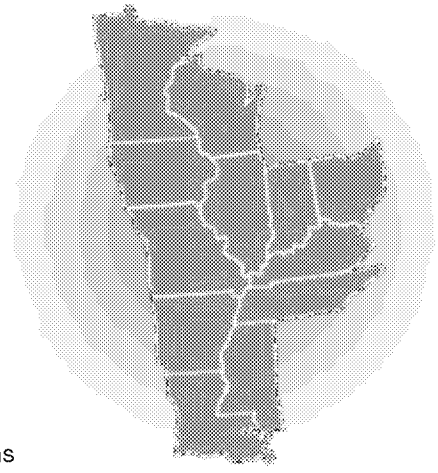
Progress Report on Coordination for Non-Point Source Measures in Hypoxia Task Force States

February 2018

TABLE OF CONTENTS

PROGRESS REPORT SUMMARY



History and Mission of the Nonpoint Source Workgroup

- The Nonpoint Source Workgroup, founded in 2014, coordinates the Hypoxia Task Force (HTF) effort to account specifically for nonpoint source (NPS) changes, primarily agricultural, that influence nutrient loading from a variety of methods. This effort provides additional critical metrics for tracking and informing progress towards reducing nutrients to the gulf that complements other historical aspects of tracking nutrient loading. Though the focus of this effort relates to gulf hypoxia, HTF members are utilizing their state's efforts to reduce nutrients and track progress for reducing nutrients and improving local water quality in their respective states for other purposes (recreation, drinking water, etc.).
- The Workgroup established two guiding principles for establishing a common measure: 1.) must be reasonably reportable for all member states and 2.) was impactful towards reducing nutrient loads to the Gulf of Mexico.

Practice Summary: A Common Nonpoint Source Measure

- The group identified a host of potential measures, and determined that a practice summary is the most fitting common "measure" amongst the states to account for and track N and P reduction progress over time and the collective effort of practice implementation through state, federal and local partners.
- The Workgroup decided to employ a broad interpretation of practice implementation. This means tracking an all-encompassing look at practices, including land use, at various points along the landscape and within parts of the basin that can be expected to influence nutrient loading. The Workgroup recognizes the opportunity for developing new technologies in addressing nutrient loss, and the need to accept and incorporate these innovations as they are developed. As these innovations are developed, this framework must have the ability to accept and incorporate these changes.
- Accounting for the collective effort of implementation of nutrient reducing practices from a variety of sources with the intention of estimating load reductions will be challenging. While loading reduction estimates are important, the Workgroup is focusing on gathering the practice implementation data at a repeatable interval (to be determined as available data is assessed) in a manner that will facilitate calculating load reductions from a variety of validated models. The data will be important to address gaps and overcome some of the challenges that might impede progress.

The HTF Nonpoint Source Measurement Framework

- The HTF, through member federal agencies, states and SERA-46 researchers secured funding to help advance and bring capacity to the NPS measures effort. Thanks to the support of the Walton Family Foundation, this project will advance through the leadership of SERA-46 researchers and states/federal agencies in the MARB to build a quantitative assessment of practice implementation from state and federal sources.
- The goal of this NPS measurement framework is to support each state as they implement nutrient strategies and as conservation practices are reported to the HTF, partners and the public. Centralizing and making data more accessible is key for states and stakeholder participants to assess progress. Accessible data means states and stakeholder participants will more likely integrate data into planning and implementing priority watershed projects and share results. Currently:
    - Many federal and state agencies collect, store, and report on progress and activities.
    - There is no consistent framework for all twelve HTF states to report NPS metrics.
    - Rather, states have a variety of methods of reporting and storing conservation practice implementation data that are not consistent across the MARB.
    - This NPS measurement framework will fill gaps in our ability to track and evaluate the effectiveness of programs and management efforts and their interactions in reducing the hypoxic zones.

INTRODUCTION

Hypoxia Task Force (HTF) Background:

Every summer, a large hypoxic zone forms in the Gulf of Mexico. This zone, where the amount of dissolved oxygen is too low for many aquatic species to survive, is fueled primarily by excess nutrients (nitrogen and phosphorus) from the Mississippi/Atchafalaya River Basin (MARB) and is also affected by temperature and salinity stratification (layering) of waters in the Gulf that prevents mixing. Fresh water from the MARB is warmer and less dense than the ocean water and contributes to the formation of an upper, less saline surface layer. This stratification of the water column restricts the mixing of oxygen-rich surface water with oxygen-poor deep water. Furthermore, the excessive nutrient loads trigger an overgrowth of algae that rapidly consumes oxygen as it decomposes. This decomposition in bottom waters, coupled with water column stratification, results in hypoxia. The nitrogen and phosphorus loads come mainly from sources upstream of the Gulf. Sources of nitrogen include agriculture (both row crop agriculture and animal feeding operations), atmospheric deposition, urban runoff, and point sources such as wastewater treatment plants. Sources of phosphorus include agriculture, urban runoff, wastewater treatment plants, stream channel erosion, and natural soil deposits.

In addition to the processes listed above that are the leading causes of increased amounts of nutrients delivered to the Gulf, other factors contribute to excess nutrients reaching Gulf waters including (1) historical landscape changes in the drainage basin, including conversion of perennial systems to annual cropping systems; (2) channelization and impoundment of the Mississippi River and its tributaries throughout the basin and the Mississippi Delta, and the loss of coastal wetlands; and (3) changes in the hydrologic regime of the Mississippi and Atchafalaya Rivers and the timing of fresh water inputs that are critical to stratification, and which can cause hypoxia under certain conditions (e.g., excess nutrients). The diversion of a large amount of fresh water from the Mississippi River through the Atchafalaya River has profoundly modified the spatial distribution of freshwater inputs, nutrient loadings, and stratification on the Louisiana-Texas continental shelf (Mississippi River/Gulf of Mexico Watershed Nutrient Task Force 2008).

For more information about the Hypoxia Task Force, see the following web link:

- www.epa.gov/ms-htf
- www.epa.gov/ms-htf/hypoxia-task-force-reports-congress

HTF Measures Progress Report Overview:

While the variety of sources and contributing factors are well known, this report focuses on the Hypoxia Task Force (HTF) coordinated effort to account specifically for nonpoint source (NPS) changes, primarily agricultural, that influence nutrient loading from a variety of methods. This effort provides additional critical metrics for tracking and informing progress towards reducing nutrients to the gulf that complements other historical aspects of tracking nutrient loading, including Mississippi River and tributary water quality monitoring and tracking point source metrics. Though the focus of this effort relates to gulf hypoxia, HTF members are utilizing their state's efforts to reduce nutrients and track progress for reducing nutrients and improving local water quality in their respective states for other purposes (recreation, drinking water, etc.).

Hypoxia Task Force Measures Overview:

In recent years, the HTF has worked to develop metrics for improved tracking to measure progress toward reduction goals. This work is key to understanding in the next few years whether the conservation actions that states and others are taking will move towards reaching our HTF goal, which is to reduce the areal extent of the gulf hypoxic zone to less than 5,000 km^2 by the year 2035, with an interim target of a 20% reduction in N and P delivered to the Gulf by 2025.

No single tool is perfect for measuring nutrient reduction because of the wide variety of factors that influence loading. Thus the HTF and partners are working to measure basin wide nutrient reductions at multiple scales and timeframes through multiple tools, including:

- a decadal look at conservation through the USDA-supported CEAP and USGS-supported SPARROW efforts;
- state, regional and basin-scale loading models, including CEAP and SPARROW, that examine nutrients in the basin through source analyses;
- statistical and other trend analyses of nutrient concentrations in the MARB across multiple time-frames using data collected by states, USGS National Water Quality Assessment (NAWQA), EPA National Aquatic Resource Surveys (NARS), watershed groups, researchers, and those who use the Water Quality Portal for Nutrient Water Quality data (WQX) to house nutrient water quality data;
- biennial reports on point and nonpoint source trend information; and
- the annual NOAA hypoxia zone monitoring cruise.

Diagram 1.

A subcommittee for Point Source Measures is working on a similar effort and their first biennial progress report from 2016 can be found here: https://www.epa.gov/sites/production/files/2016-03/documents/htf_pointsource_progressreport_02-25-16_508.pdf

Background on NPS Measures Workgroup:

Hypoxia Task Force Members	
Iowa	Illinois
Mississippi	Wisconsin
Minnesota	Kentucky
Louisiana	Tennessee
Missouri	Arkansas
Indiana	Ohio

Since 2014, the HTF has convened a Nonpoint Source (NPS) Measures Workgroup. The group is led by representatives from all member states and SERA-46[1], with support from federal agencies: United States Department of Agriculture – Natural Resources Conservation Service and the U.S. Environmental Protection Agency. This progress report is intended to serve as an update on the process, knowledge gained, and future direction of the workgroup.

NPS Measures Workgroup Guidance:

The Workgroup established two guiding principles for establishing a common measure: 1.) must be reasonably reportable for all member states and 2.) was impactful towards reducing nutrient loads to the Gulf of Mexico.

> *Measuring Progress on Reducing Nutrient Loads*
> The group has identified practice summary as the common "measure" amongst the states and to account for collective effort of practice implementation through state, federal and local partners.

While practice summary may be defined a variety of ways, the Workgroup decided a broad interpretation of practice implementation will be employed to account for a wide variety of factors that influence nutrient loading and progress towards achieving the goals of the HTF. This means tracking an all-encompassing look at practices, including land use, at various points along the landscape and within parts of the basin that can be expected to influence nutrient loading. The Workgroup recognizes the opportunity for developing new technologies in addressing nutrient loss. As these innovations are developed, this framework must have the ability to accept and incorporate these changes.

With this foundation in mind, the group identified a host of potential measures, but determined that a practice summary was the most fitting measure to account for and track progress on over time. To achieve this, there are multiple challenges and considerations taken into account when collecting this information.

Practice summary was selected because it satisfied the considerations set forth by the HTF, but also because the group felt that practice summary will be the most common and effective measure to inform progress on nutrient reductions at this time. Accounting for the collective effort of implementation of nutrient reducing practices from a variety of sources with the intention of estimating load reductions will be challenging. While loading reduction estimates are important, the Workgroup is focusing on gathering the practice implementation data at a repeatable interval (to be determined as available data is assessed) in a manner that will facilitate calculating load reductions from a variety of validated models.

This measure will also provide the most complete and valuable information for states to assess and inform N and P reduction progress. The data will be important to address gaps and overcome some of the challenges that might impede progress.

This is not the only measure for NPS, nor does this metric supersede any of the other metrics illustrated in Diagram 1. This measure will complement existing and future efforts by the HTF and others to measure progress towards the nutrient reduction goal of the HTF.

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[1] SERA-46 is Southern Extension and Research Activities committee number 46. It is one of a group of formal USDA National Institute of Food and Agriculture (NIFA) and land-grant university funded committees designed to promote multistate, research and extension activities. SERA-46 was created to operationalize a Non-funded Cooperative Agreement between the Mississippi River Gulf of Mexico Watershed Nutrient Task Force (Hypoxia Task Force) and land-grant university Extension and Experiment Stations in the North Central and Southern Regions of the United States (http://www.nccea.org/, http://asred.msstate.edu/, http://ncra.info/, http://saaesd.ncsu.edu/). SERA-46 brings together researchers and extension specialists sharing a common interest an expertise related to the environmental, social, and economic factors that contribute to nutrient loss from agricultural lands, state-level nutrient impairments, and hypoxia in the Gulf of Mexico. All extension and research activity committees are approved by Experiment Station and Extension Directors and NIFA and report to them annually.

NPS Measures Workgroup Considerations for Data Interpretation:

The NPS Measures Workgroup explored three overarching considerations which are important to keep in mind when assessing practice summary data. These considerations are important for critical assessment of this metric to inform progress.

1.) Regional and Landscape Scale Differences:

Understand the landscape and eco-region across the MARB will often dictate not only cropping systems and nutrient loss but also practices installed/applicable, which then in turn affects load reduction estimates. Data must be interpreted carefully to understand the nuance between states but also within a state or watershed based on the unique landscapes. Practices may not be applicable nor will they have the same benefit between all states nor are all practices necessarily applicable/as beneficial within a state across eco regions and land uses.

However, it's important to know the difference between a practice not being applicable vs. other barriers or gaps needed to overcome to drive implementation of certain practices where they are applicable. The information collected may be useful for states to identify their own key priority practices and develop ways to advance implementation either through new or existing programs.

2.) Understand Complexity and State Resource Limitations:

This progress report serves as an update on the process, knowledge gained, and plans for the future of the workgroup. This is a complex process that will be accomplished over time. Many of the identified data sources were set up for a specific purpose or only collect limited data. In recent years, these sources have increasingly been looked toward to track progress and account for environmental metrics. Using information collected for one purpose and translating it for another has challenges. The practice summary will be a more comprehensive look at practices installed in the Mississippi/Atchafalaya River Basin to inform and track progress specifically for nutrients. States may or may not have the resources to improve data and tracking methods, but by identifying current state of practices the challenges can be more clearly identified and prioritized to meet the needs of the HTF.

3.) Resource concerns addressed and understanding of specific or mulitple benefit(s):

Initial discussions focused on widespread data gathering from programs regardless of the program design/resources being addressed and the corresponding effects on nutrients. Therefore a more comprehensive picture of practices and efforts will be collected regardless of the resource concern(s) addressed by the practice. It is the Workgroup's preference that a broad assessment will be valuable as our understanding of these practices advances. The data would be gathered and would be better positioned to do the leg work now vs. trying to collect the information from previous year at some point in the future.

NPS Measures Categories of Data Sources of Practice Summary:

Three unique categories of practice measurement need to be to be addressed:

- Federal – programs and/or rules determined by the federal government (USDA, EPA, FWS, etc)
  - These programs may be run by state agencies, NGOs, etc. or a combination; the data is typically held in a federal database
- State-Local Governmental – programs and/or rules administered by individual states/local units of government. Can be cooperative efforts with private, federal agencies, and/or other states.
- Private/NGO – Programs administered by non-governmental agencies or practices implemented by private landowners or other individuals

Member states implement a variety of programs to address resource concerns, nutrient reduction, and water quality (voluntary, regulatory, incentive-based, low-interest financing, etc). The sum of these efforts typically has a greater effect on nutrient reduction than their individual parts. Differences between programs, practices and variability between and within states under different weather patterns add to complexity of interpreting data for progress. Practice summaries will likely show these differences, but it's important to understand that the reasons these programs were started and the resource concerns they were designed to address may not include nutrients. The data must be reviewed comprehensively, but avoid being overly critical on the effect of practices on nutrients and pit programs or practices vs. each other when there are many other important reasons programs and/or practices are implemented on the landscape.

In the spring of 2016, the workgroup developed a preliminary survey to assess the status and methods individual HTF states are using to address or plan to use in measuring NPS progress (Appendix A). The survey provides a good starting point for measure-related discussions. As expected, there was a lot of variability amongst states and their approaches for measuring progress related to practice implementation across the three categories. General consensus was that federal reporting is most consistent and private reporting provides the biggest challenge, the most variability in methods for data collection, and the least resolution. While federal reporting was indicated as most consistent, states did identify the challenge in obtaining this data. In response, the Workgroup worked with USDA-NRCS and USEPA to obtain federal data by state. This information was instrumental in advancing the discussion further by providing an example of what data is available and in what form. From here, the Workgroup was able to identify additional data parameters and worked with federal agencies on additional data and format with the intention to match state level data to help with aggregation and collectively report across sectors.

Key Base Parameters of Practice Data as Determined by NPS Measures Workgroup

State	Applied Amount	Practice Category
County	Practice Units	Land Use
HUC_8 Watershed	Applied Date	Tillage
HUC_12 Watershed	Cost Share Funding	Area Treated
Practice Name	Sunset Date	Ancillary Benefits
Practice Code	Total Project Costs	Phosphorus Reduction
Funding Source (State, Fed, Local, etc.)	Water Quality Benefits	Nitrogen Reduction
	Program	

Data Source and Methodology

Unfortunately, there isn't one data source for all of the above information. The Workgroup has worked primarily on identifying the various sources within the categories (state-local, federal, and private/NGO). The following is a summary of the sources by category gathered to date. The Workgroup was able to look at a more direct comparison of federal funding, particularly Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) programs due to the relatively comparable delivery mechanism across states. State programs are more variable because individual HTF member state representatives may not have agency or may not require formal agreements to share information. A further complication is that 7 of the 12 HTF states are not entirely in the MARB (Minnesota, Ohio, Indiana, Illinois, Louisiana, Mississippi, Wisconsin), which would require more spatial information on specific practices than may be readily available reporting on the HUC8 level would alleviate some issues.

Federal

Focus to date has been on a variety of USDA programs and initiatives through the FSA and NRCS, as these programs make up the bulk of public sector programs (in terms of dollars) impacting the HTF state implementation of nutrient reduction practices. Other important programs include the EPA Section 319 National Nonpoint Source Program and the Clean Water State Revolving Fund (SRF) for NPS practices. An important distinction with 319 and SRF programs compared to USDA programs is that these are delivered by state agencies via federal grants or loans.

While most of this report focuses on incentive based programs, the broad interpretation of practices is utilized when searching for data. This means tracking changes in cropping systems, land use, etc. as these can and often do influence nutrient loading, which is an important aspect of data collection beyond what some may think of as a conservation practice. While the decisions and driver for these practices would be considered private, the data could be derived from federal or state derived databases. For example, pasture or hayland would likely have a different nutrient loading potential than an annual crop like corn, soybeans, wheat, etc. This data could be collected from FSA farm program data annually to show changes over time.

It's important to note that while these programs have an effect on nutrient loading, they may have other objectives and reasons they were implemented. Conversely, some practices may be implemented for nutrient reduction purposes, but also provide ancillary benefits. While this effort is being conducted to account for loading reductions from practices as reported, a practice that may receive public support should not be scrutinized based solely on the ability to reduce nutrient loads. It is likely the practice is providing benefits in other areas of concern to the local community (air quality, soil conservation, wildlife habitat, etc.), which also drives public investment in practices. Also, through collaboration, multiple states and agencies can work together on approaches to address gaps in implementation of identified key practices to address nutrient loading long-term.

State & Local Government

State & local government programs/policies include those that result in practice implementation through investments from individual state appropriations. States have other programs/policy in place to address nutrients and water quality that run complementary to and/or independent of federal/private programs. CREP and 319 are examples of formal state-federal partnerships that result in practice implementation, but must be tracked correctly to avoid double-counting.

Private

This category provides perhaps the most variability and variety in available possibilities to collect amongst the states. It was also identified as the most difficult to obtain and likely will not be near the level of detail nor accuracy as the state and federal program information. Much of this is due to privacy concerns, but also no single method is available with the ability to collect at the resolution of public sector programs. There are several new and emerging areas that may provide opportunities, but are in preliminary stages today.

A few examples of emerging efforts include remote sensing, surveys, private sector tools, etc.

BMP mapping LiDAR/GIS – advancements in GIS analyses provides an opportunity to track, detect, and measure changes on the land. These tools provide opportunity to address certain category of practices, and are an emerging area of interest and will be worth exploring and learning from states utilizing this method.

Aerial imagery – cover crops/tillage – similar to structural mapping, this approach utilizes aerial photography to analyze ground cover to measure practice coverage. This works in landscapes with certain cropping systems that facilitate the detection of these changes with minimal ground truthing. Both GIS-based assessments would have to be repeated at a certain interval to show progress. Both would also need to consider overlap with other data sources.

Surveys – National Agricultural Statistics Service, Census of Agriculture, state led surveys, universities – these surveys are designed to obtain data and analyze trends in practice adoption, overall attitudes, and other objectives. Typically this information is gathered for a certain purpose and may not be applicable in all situations. Also, this data is typically a broad summary and not as precise as other data sources. Early efforts have been most useful to capture in-field nutrient management practice trends/tillage.

Private Sector – Consumer facing companies are increasingly looking for ways to provide sustainable sourcing for their products, especially food and fiber products from agriculture. In much the same way, agriculture businesses are looking for ways to address improved nutrient management services to stay on cutting edge of primarily nutrient management related services. Broad coalitions have been established to address these, including robust data gathering. This effort provides an opportunity to coordinate efforts and measure progress over time. The HTF has begun conversations with a few of these groups to understand how this information can be shared and what methods to use to prevent overlap/duplication.

Workgroup Recent Developments:

The Workgroup has received a couple of data summaries from NRCS's Environmental Quality Incentives Program (EQIP) funding. This information was valuable to the HTF and individual states and was instrumental in advancing the conversation on what data is important, what is available and how it can be received.

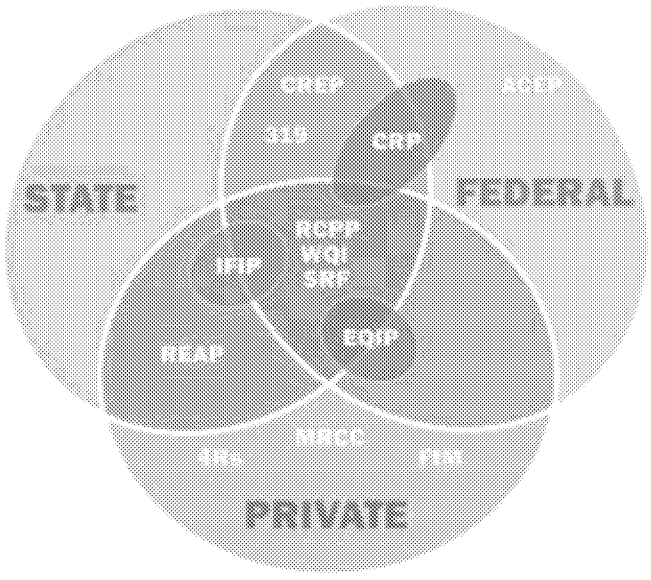
In coordination with NRCS, a formal request was made to update EQIP data in a form meeting the needs identified by the Workgroup. The request also sought additional information, if readily available. Below is a summary of all categories sought and where our current understanding is on how they are collected/accounted for. Note that all information listed is not readily available at this time. The workgroup is exploring alternatives to account for these additional parameters.

Key Base Parameters of Practice Data as Determined by NPS Measures Workgroup

LIKELY AVAILABLE	LIKELY AVAILABLE DEPENDING ON SOURCE	LIKELY ABLE TO ASSUME VALUE BASED ON COLLECTED INFORMATION	NOT LIKELY AVAILABLE WITHOUT BROADER ASSUMPTIONS
State	HUC_12 watershed	Sunset Date	Pre-Implementation Tillage
County	Practice Code	Total Project Costs	
HUC_8 Watershed		Water Quality Benefits	
Practice Name		Practice Category	
Funding Source (State, Fed, Local, etc.)		Pre-Implementation Land Use	
Program		Area Treated (ac)	
Applied Amount		Ancillary Benefits	
Practice Units		Phosphorus Reduction (fraction)	
Applied Date		Nitrogen Reduction (fraction)	
Cost Share Funding Expended			

Challenges/Barriers:

Diagram 2. Potential for duplication and over reporting (without certain information)



Acronym key

319	EPA Section 319 Program
4Rs	Four Rs for Nutrient Management (Right Source, Right Rate, Right Time, Right Place)
ACEP	Agricultural Conservation Easement Program
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
EQIP	Environmental Quality Incentives Program
FtM	Field to Market
IFIP	Iowa Financial Incentives Program
MRCC	Midwest Row Crop Collaborative
RCPP	Regional Conservation Partnership Program
REAP	Resource Enhancement and Protection
SRF	Iowa State Revolving Load Fund
WQI	Water Quality Initiative

Ex. Combined state/fed sources for 1 practice (CREP), practices established on non-cropland etc.

Federal programs, by law, can't be duplicated, but state programs can often pair with federal programs for practice implementation. A prime example is the Conservation Reserve Enhancement Program (CREP). States reporting CREP acres and dollars spent that are also reported by FSA would be counting the same acres.

Consistent reporting of practices (similar units)

Some practices can be reported in multiple forms, which provides a challenge in aggregating and accounting for practices. For example, a grassed waterway may be reported in acres, feet, or number. All of these figures can be valuable, but have different implications when analyzing the data and may require reliance on several assumptions to determine effects on nutrient loss.

Acres treated

Important metric, but not well understood or consistently reported. Some practices are measured in acres of footprint as acres treated, some measure the watershed protected and some aren't able to capture this information in databases even though it would be considered as part of the technical assistance to design the practice. There can be conservative assumptions based on standard designs, known acres treated by the same practices from other sources, etc.

Example: Database provides number of acres in buffers along streams. This information can be tracked over time to determine if buffers are increasing or decreasing. If acres go down, are less miles of streams being protected or are the buffers just getting narrower or vice versa. If only the acres are tracked, there is missing information critical to assessing impacts of the buffer. These could include contributing watershed area, width of buffer, etc.

Account for longevity of practice(s)

Practices are reported as applied and the year applied. However, this reporting happens once for all practices. This works fine for acres on an annual contract. Reported acres would look at "net" acres and not be additive

year after year. Other practices are infrastructure based and have a practice lifetime or agreement with them. There is obvious benefit to practices that accrue reductions year after year, but this creates challenges in adding the practices over time. How does the database account for practices reported in one year, but that keep nutrients out of water year after year as long as the practice is in place? How does one account for practices that are effective beyond or shorter than the designated timeframe?

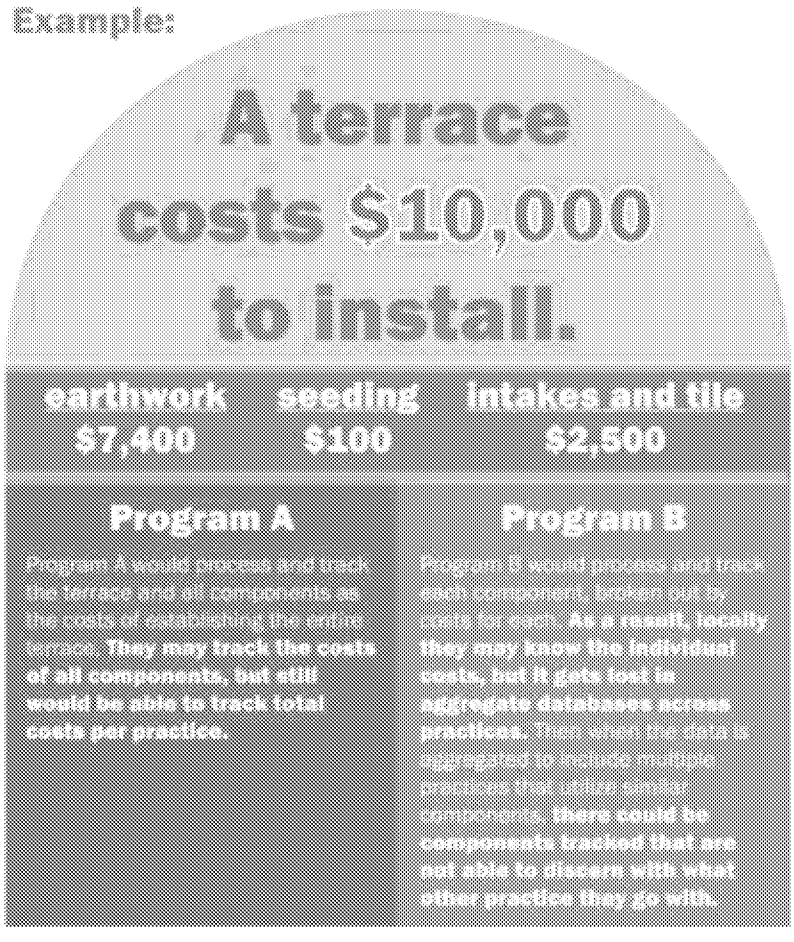
Variability amongst practices and reported information

Broad categories of practices, such as nutrient management, are difficult to quantify. Programs may offer a suite of nutrient management components for applicants, but the overall practice is reported and not the specific components. This can be a challenge because a component like application timing or rates might have a larger effect than type of product used or another nutrient management practice components.

Component practices

Many practices are made up of a collection of components necessary to ensure adequate function and usage. These components are often variable depending on site specific criteria. Some programs implement practices that are made up of several components that are reported separately, while others report the whole practice and components included. This provides a challenge in attributing load reductions, the true costs of a certain practice, and the corresponding cost per load reduction.

An example practice would be a terrace. Some programs account for all the costs associated in establishing the terrace and these data sources would reflect those costs. Others programs would break out the individual components and have separate accounting/tracking for each component.



An example subset of data to explain this is below:

Example subset of data

620	Underground Outlet	EQIP	250	ft	$310.00
600	Terrace	EQIP	2250	ft	$8,212.50
600	Terrace	EQIP	2300	ft	$4,098.60
600	Terrace	EQIP	2775	ft	$4,162.50
600	Terrace	EQIP	5050	ft	$7,575.00
606	Subsurface Drain	EQIP	2635	ft	$2,134.35
606	Subsurface Drain	EQIP	2660	ft	$2,154.60
638	Water & Sediment Control Basin	EQIP	1	no	$5,544.00
600	Terrace	EQIP	1200	ft	$1,860.00
600	Terrace	EQIP	1775	ft	$2,587.50
600	Terrace	EQIP	2300	ft	$3,915.00
600	Terrace	EQIP	2	ft	$450.00
600	Terrace	EQIP	1500	ft	$840.00
620	Underground Outlet	EQIP	1010	ft	$1,040.30
620	Underground Outlet	EQIP	272	ft	$272.00

Prior conditions/practices in series

Ideally, programs that provide more permanent land use protections, such as easements for wetlands or perennial cover, should also include information on whether the protections are for converted land, preserved land, or a combination of the two. This is critical because nutrient reductions from natural wetlands or perennial cover is typically different from nutrient reductions from converted development and/or cropland.

Multiple practices in series will have a different effect on nutrient loading in comparison to the same number of practices distributed among a wider area. Many of these considerations are factored into conservation planning and practice design, but it is not always clear how practices are tied to other practices as part of the conservation practice system.

Sources

As discussed previously, private implementation is especially difficult to track at the level of resolution that state/federal programs can report. The Workgroup is actively exploring opportunities to track this important metric by looking primarily at examples from other states and/or emerging private sector tool possibilities.

Seven of 12 states have at least a portion of their area that drains outside of the MARB. This adds a layer of complexity to data interpretation especially when data sources only report statewide or even county-wide since watershed boundaries don't typically follow political or legal boundaries.

Practice Location

A common theme of conservation practices, especially in working lands, is the "systems approach" to protecting the environment. While a proven concept, in reality practices are not accomplished all at the same time as part of the systems approach for a variety of reasons. More often, these practices are not all completed by the same program or for the same reason. This adds to the complexity of tracking adoption and accounting for estimates for the impact on the land. Also, there can be other waterbodies/natural resource areas that are being protected by practices, which already serve a nutrient reduction purpose. This is common in states that have worked for years to protect and improve state priority surface waters, typically lakes and other recreational waterbodies.

Lakes, reservoirs, wetlands, and other systems have tremendous nutrient processing potential to trap sediment, remove nitrogen and sequester phosphorus from reaching further downstream and to the Gulf. Many lakes are subject to restoration and protection efforts as well. It's important to recognize that financial resources should address local waters in addition to the Gulf, but understand that when resources are utilized in this manner, the effect on loading to the Gulf may be minimized as these waterbodies are already having an effect on reducing nutrient losses downstream. The position of the practice on the landscape and what is downstream is an important consideration for tracking. The Workgroup has positioned itself to track all practices and revisit this aspect once better documentation and understanding of the impact can be provided.

Variability within states/ecoregions.

Variability within states related to soils, climate, topography, etc. all influence nutrient loading and practice implementation. While it is important to understand these differences for prioritizing improvement efforts, they also affect the resulting practice implementation and other conservation efforts collected.

Historic data

Early discussions have looked for consensus on how far back this data is available. Although reports vary by state, survey data suggests 2012 appears to be most common historical date data is available. This will vary

by state and by program. The intention is to capture and document practice data as far back as is appropriate, but to understand this will be a work in progress and program variability will be a factor. Federal EQIP data has been received from as far back as 2008. While historic data is currently limited, there could be lessons learned, assumptions made or alternative methods developed to improve implementation efforts closer to the 1980 to 1996 baseline of the HTF.

Funding levels/practice costs/program changes

Public sector programs are primarily driven by funding and corresponding practice costs/structure. Beyond variation in funding levels, even long-term, traditional programs continue to evolve over time as priorities shift based on new research, resource concerns, changes in administrative priorities, etc. Even in the last few years there have been multiple state and national priority efforts started to address water quality, soil conservation, soil health, endangered species, pollinator habitat, transition to organic, wildlife habitat, etc. These focused efforts need to be understood when tracking practices to better comprehend progress. Some of these priorities, however, have resulted in shifting current funding levels away from other priorities.

Depending on the practice, it may take several years to provide outreach, develop practice designs, etc. before the practice is installed. Practice costs can also vary due to many considerations that impact funding levels and amount installed, as well (land, construction, or design costs, staffing levels, etc.). Ideally, mechanisms to identify and track these should be included.

Accounting for and tracking landowner or other investments

When tracking implementation, especially public sector programs, it's easy to ignore the other investments made by landowners to install/implement practices. The majority of programs operate on a cost-share or incentive-based basis, which means they will track the program's costs of the practice, but often not the landowner or farmer's share. This means that landowner typically is responsible for half or more of the costs of establishing a practice. Many state and federal programs operate on a cost-share basis with private landowners. Determining the landowner's share is important to track the total costs of practice implementation.

Landowners may be more inclined to invest in public programs that benefit society if it's beneficial to them. However, it's important to note that not all practices provide a benefit to the landowner/farmer. These benefits may accrue disproportionately to society, creating a potential disincentive to implement if landowners don't have the resources, or there is no benefit to their investment in a particular practice. This is an important consideration in the development of programs to deliver certain practices.

An example would be the Conservation Reserve Program (CRP), where the program pays the current market rate for land costs on a 10-15 year basis in exchange for idling farmland and foregoing production on those fields for habitat, soil conservation and water quality benefits. While it is common that landowners give up some income potential by entering into CRP contracts, the program was designed to compensate landowners for the lost opportunity costs of that property. If the program were to pay only half of what a landowner could gain by either farming or renting the property, there would not likely be near the acres of enrollment and the program would not have had nearly the participation levels, and impact, it has to date.

Other financing mechanisms are utilized for conservation programs besides traditionally cost-share or grant-based programs, such as low interest loan programs for landowners and farmers. The nature of a financing program typically requires an economic or other reason for the landowner to take on that investment. This sometimes makes sense for some practices more than others. In the context of this report, it may be important to avoid categorizing loan based programs as entirely public.

Conclusion:

As discussed previously in this report, there are two main objectives of the NPS Common Measure:

1. Collect as complete of a picture as possible of the level of various practice information installed annually to reduce nutrients to surface waters.
2. Use this information to inform progress towards the goals of the HTF.

Developing a multi-source dataset will allow HTF member states and stakeholders to work to collectively review programs/practices for differences or similarities to inform, refine and improve upon the progress that is being made towards meeting the goals of the HTF. Additional partnerships will be strengthened and created between states, agencies, and stakeholders to work through gaps, challenges and opportunities to address implementation of the Nutrient Reduction Strategies. This presents additional opportunity to collaborate with various stakeholders to identify, prioritize, and address practice implementation, policies, and programs on a much larger scale than previously available.

Next Steps:

Walton Family Foundation Grant

The HTF, through member federal agencies, states and SERA-46 researchers secured funding to help advance and bring capacity to the NPS measures effort. Thanks to the support of the Walton Family Foundation, this project will advance through the leadership of SERA-46 researchers and states/federal agencies in the MARB to build a quantitative assessment of practice implementation from state and federal sources.

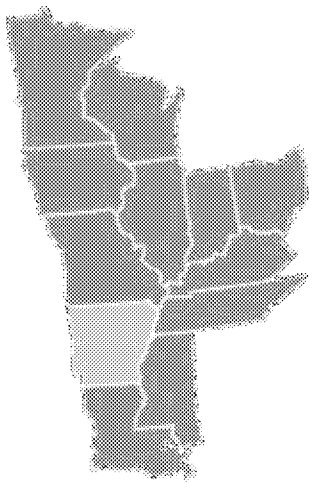
The goal of this NPS measurement framework is to support each state as they implement nutrient strategies and as conservation practices are reported to the HTF, partners and the public. Centralizing and making data more accessible is key for states and stakeholder participants to assess progress. Accessible data means states and stakeholder participants will more likely integrate data into planning and implementing priority watershed projects and share results. Currently:

- Many federal and state agencies collect, store, and report on progress and activities.
- There is no consistent framework for all twelve HTF states to report NPS metrics.
- Rather, states have a variety of methods of reporting and storing conservation practice implementation data that are not consistent across the MARB.
- This NPS measurement framework will fill gaps in our ability to track and evaluate the effectiveness of programs and management efforts and their interactions in reducing the hypoxic zones.

Additional next steps:

- Translating the collected practice data into corresponding loading reductions
- Provide recommendations to HTF on key practices/methods that could improve NRS progress
- Advancing other measures identified by the HTF
- Identifying other critical, common measures (social, etc.)
- Advancing the science around performance of practices, new practices, and in other states
- Link practice data with available water quality monitoring data.
- Providing follow-up reports

Appendix A: Individual State Supplement Reports:



Arkansas

Arkansas' nonpoint source pollution management and reduction efforts through the Arkansas Natural Resources Commission (ANRC) Section 319 Program are prioritized to: 1) increase collaborative and innovative conservation partnerships, 2) enhance cooperation among government agencies and non-governmental groups, and 3) demonstrate effective nutrient management and reduction practices that best contribute to water quality improvement. The Nonpoint Source (NPS) Pollution Management Plan, collaboratively developed and updated by state-wide nonpoint source pollution stakeholders, provides a broad framework which ranks priority watersheds through risk matrix assessment and contains adaptive strategies for allocating limited resources toward nonpoint and nutrient reduction.

Annual nutrient reduction, conservation program, and project implementation data for Arkansas is available through individual governmental agencies. Program data and routine reporting from federal agencies on common USDA programs listed below is fairly consistent in most states and therefore is not exclusive to Arkansas:

- *Environmental Quality Incentives Program (EQIP),*
- *Agricultural Conservation Easement Program (ACEP)*
- *Conservation Stewardship Program (CSP)*
- *Regional Conservation Partnership Program (RCPP)*
- *Mississippi River Basin Healthy Watersheds Initiative (MRBI)*
- *National Water Quality Initiative (NWQI)*
- *Conservation Stewardship Program (CSP).*

Other nutrient reduction related data and information is made available on a voluntary basis by non-governmental entities involved in research, demonstration projects, or technology advancement. Nonpoint source pollution and nutrient reduction efforts in Arkansas include collaborative partnerships with the Natural Resources Conservation Service (NRCS), Arkansas Department of Environmental Quality (ADEQ), University of Arkansas Cooperative Extension Service (CES), the Nature Conservancy (TNC), Arkansas Economic Development Commission (AEDC), Illinois River Watershed Partnership (IWRP), Beaver Watershed Alliance (BWA), Discovery Farms, Arkansas Association of Conservation Districts (AACD), and many other entities (too numerous to list) involved in individual nonpoint source projects and stakeholder issues. These partnerships are longstanding and vital to sustaining successful nonpoint-nutrient reduction and water quality improvement.

Arkansas' NPS Annual Report contains annual load reduction information and descriptions of NPS program milestones, project implementation, outreach efforts and activities, existing issues, and snapshot reporting from many partners. To meet nonpoint source program milestones and reduction goals will require:

- *State and federal agency technical and financial support,*
- *Stakeholder "buy in" and project "involvement",*
- *Demonstration of Low Impact Development (LID) and Green Infrastructure (GI) techniques,*
- *Development and use of effective educational materials statewide,*
- *Watershed stakeholders organize and identify common water quality goals,*
- *Development and implementation of watershed plans, conservation plans, and comprehensive nutrient plans,*
- *Continued water quality monitoring in priority watersheds to track improvement.*

An example of load reduction reporting from the Arkansas' 2017 NPS Annual Report is shown in the table below.

FY 2017 (NPS) ACTIVE PROJECT LOAD REDUCTIONS

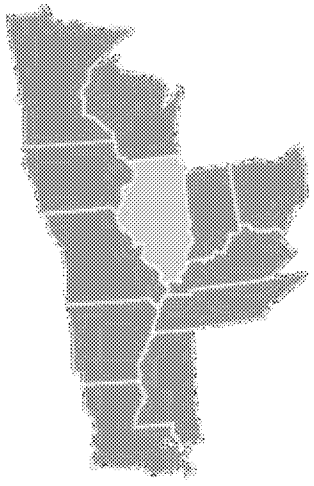
	Nitrogen Reduced (lbs./year)		Phosphorus Reduced (lbs./year)		Sediment Reduced (tons/year)	
Project #	FY 17	Project Life	FY 17	Project Life	FY 17	Project Life
14-500	2,456	11,915	1,228	5,956	996	4,770
15-500	1.9	1.9	1	1	95-267	95-267
15-600	1,551	1,807	775	902	641	815
15-700	1,793	1,793	896	896	720	720
15-1100	13,311	13,911	6,651	6,950	5,375	5,705
16-200	19,225	19,225	9,609	9,609	7,440	7,440
16-300	18,149	18,149	9,068	9,068	7,284	7,284
16-400	573	573	286	286	237	237
16-900	6,688	6,688	3,342	3,342	2,635	2,635
Totals	**63,748**	**74,063**	**31,856**	**37,010**	**25,423 – 25,595**	**29,701 – 29,873**

All water quality data for nonpoint program supported projects and partnership efforts are compiled and provided to the ADEQ for use in the development of 305(b) reporting and 303(d) listing. More information about nonpoint source pollution and nutrient reduction in Arkansas can be found on the following links:

http://anrc.ark.org/divisions/water-resources-management/nonpoint-pollution/

http://www.arkansaswater.org/

Illinois



The Agriculture Water Quality Partnership Forum Technical Subcommittee consists primarily of State and Federal Agencies tasked with tracking and reporting data for Best Management Practices (BMPs) identified in the Illinois Nutrient Loss Reduction Strategy. For the first Illinois Nutrient Loss Reduction Strategy Biennial Report, data from the year 2011 was used as a baseline and compared to data from 2015 to determine changes in implementation. For some programs, data was aggregated at the state level, while others also provided data on the HUC 8 scale.

Federal data sources include cost-share programs from Farm Service Agency (FSA), Natural Resource Conservation Service (NRCS) and Illinois Environmental Protection Agency (Illinois EPA). FSA provided information from Conservation Reserve Program enrollments for the selected BMPs. Farmer-reported data for cover crops was also included. NRCS provided statewide enrollment acres for the Conservation Stewardship Program. Statewide acres enrolled in the Wetland Reserve Easement program was also reported. For the Environmental Quality Incentives Program (EQIP), the NRCS State Office provided the spreadsheet from NRCS Headquarters that was requested by the Hypoxia Task Force. This spreadsheet was queried and filtered to obtain data for implementation of select BMPs implemented in priority watersheds and statewide.

Through the Section 319(h) Nonpoint Source Grant Program, Illinois EPA tracks site-specific implementation of all BMPs cost-shared through this program. Besides just reporting on the amount of implementation of select practices for the Biennial Report, the 319 Program also estimates nutrient and sediment load reductions for each BMP. This load reduction information is included in the Biennial Report.

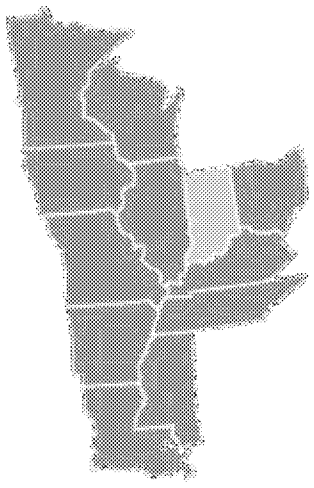
State data sources include the Conservation Reserve Enhancement Program (CREP) administered by the Illinois Department of Natural Resources, and programs administered by the Illinois Department of Agriculture, such as the Partners for Conservation Program and the Streambank Stabilization and Restoration Program.

Implementation information and data conducted by industry and non-governmental organizations is also tracked and reported on a voluntary basis. Several organizations reported on the activities implemented through the Regional Conservation Partnership Program (RCPP) they are associated with. Other data included farm organization grants and activities related to education and outreach. A National Agriculture Statistic Service (NASS) survey was developed and mailed to a subset of farmers to gage knowledge of the NLRS and recommended practices in order to track implementation of BMPs outside of cost-share programs.

Additional information on the Illinois Nutrient Loss Reduction Strategy can be found at:

http://www.epa.illinois.gov/topics/water-quality/watershed-management/excess-nutrients/nutrient-loss-reduction-strategy/index

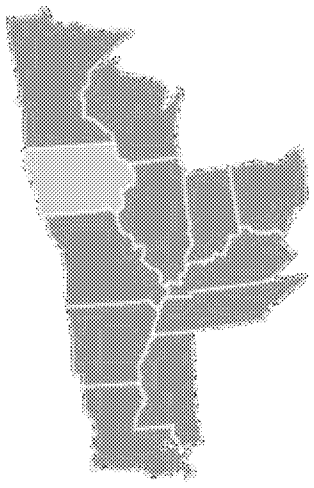
Indiana



Indiana collects data from all conservation practices that are implemented with assistance from Indiana Conservation Partnership (ICP) staff for all federal, state, and local programs. The data collected from conservation practices implemented under federal programs through NRCS and FSA, such as EQIP, RCPP, MRBI and CRP, is possible through a USDA Section 1619 Compliance Agreement (Indiana State Department of Agriculture (ISDA) and USDA). Conservation practice data from state programs is collected using a SharePoint tracking system, via MOUs (ISDA and State Agency). All practice data is collected annually statewide with each practice that can be modeled analyzed using the EPA Region 5 Nutrient Load Reduction Model. Reports are produced each March highlighting the previous calendar year. The method and process is explained further in this Methodology report. Annual Accomplishments Reports can be found here http://www.in.gov/isda/2991.htm.

To make this information more user friendly, the ISDA has developed ten GIS Story Map applications for each of the major river and lake basins in Indiana, which are then broken down by HUC 8 watersheds. These Basin Story Maps showcase efforts to enhance water quality, track progress, educate rural and urban landowners about local, state and federal cost-share programs, technical assistance, educational opportunities, and conservation practices. The story maps feature mobile friendly maps which allow users to click on watersheds, on water monitoring locations along with links to water quality data, and educational sites to view pop-ups which provide detailed information about each basin. Each basin story map includes sections on water quality and soil health that encompass everything from total acres of cover crops planted to sediments and nutrients prevented from entering Indiana's waterways. The Story Maps also contain information about local watershed groups and organizations, the number of conservation practices in specific watersheds, nutrient load reductions from BMPs, and links to active grants. Tillage and Cover Crop Transect data for each watershed is highlighted as well. The development and purpose of these story maps ensures Indiana's nutrient reduction strategy remains interactive and tracks progress. To access the conservation story maps, visit http://www.in.gov/isda/2991.htm.

Iowa



The Iowa NRS Progress Report, revised and published each year, provides updates on point source and nonpoint source efforts related to specific action items listed in the elements of the NRS. The Annual Progress Report also provides updates on statewide efforts and activities that aim to achieve reductions in nitrogen and phosphorus loads. The NRS documents, including the most recent Annual Progress Report, can be accessed at www.nutrientstrategy.iastate.edu/documents

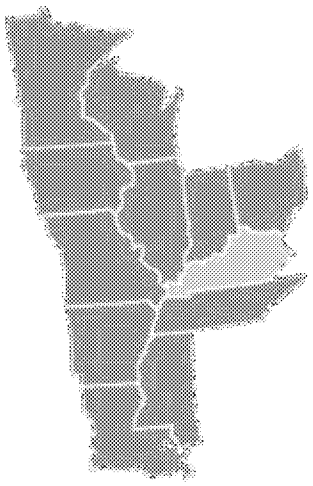
Iowa currently assesses data from conservation practices that are implemented with public sector programs for federal, state, and local programs led by NRCS, FSA, DNR and IDALS. The data is collected through an MOA with NRCS for EQIP, RCPP, CSP, ALE, etc. annually. FSA-CRP and crop reporting data is collected annually from publicly available records, though efforts are underway to explore the ability to track this data similar to the other state and federal programs. State program data is collected annually primarily through an IDALS financial and records tracking system. All practice data collected is assessed using the Iowa NRS nutrient load reduction estimates. Reports are produced each summer highlighting the previous calendar year.

Private:

In an effort to help support progress measurement and accountability efforts of the NRS, a collaborative project between Iowa State University (ISU), Iowa DNR, the Iowa Nutrient Research and Education Council (INREC), and IDALS aims to identify and enumerate the aggregate amount of certain conservation practices, independent of government programs, outlined in the NRS Science Assessment. Practices include terraces, water & sediment control basins, grassed waterways, pond dams, contour buffer strips, and contour strip cropping. These practices are identifiable by use of LiDAR elevation data and aerial photos, thereby enabling an accurate accounting of the practices present on the Iowa landscape. https://www.gis.iastate.edu/gisf/projects/conservation-practices

An ongoing, five-year (2015-2019) longitudinal survey, by HUC6 watershed, conducted by ISU aims to increase the understanding of Iowa farmers' awareness of, and attitudes toward, the NRS, and their conservation behavior related to nutrient loss. The survey will focus on three factors: 1) farmer knowledge, attitudes, and behavior regarding nutrient loss into waterways; 2) barriers to and facilitators of behavior change that reduces nutrient loss; and 3) change in these factors over time. Updated reports on the survey may be found here: http://www.nutrientstrategy.iastate.edu/documents

Kentucky

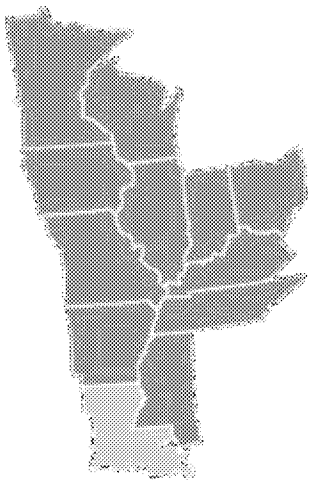


Kentucky's Nonpoint Source (NPS) Pollution Control Program works to coordinate efforts to minimize nutrient loss at a statewide level through multiple partnerships with federal, state, and local organizations. As part of a close, long-term collaboration between the Division of Water (Division) and the state NRCS office, Kentucky designated a new pilot watershed for the National Water Quality Initiative, Gunpowder Creek. A watershed plan currently being implemented in Gunpowder Creek was recently approved by EPA as a TMDL Alternative. All watershed planning projects, as well as any associated State Soil and Water Cost Share projects, generate estimated load reductions for nutrients on an annual basis. The NPS Annual Report, which discusses implementation of the Kentucky NPS Management Plan, can be found at http://water.ky.gov/nsp/Pages/PollutionControl.aspx

The Division has developed a (water quality) Success Program, working with partners to track and monitor projects and BMPs where nutrient reductions are anticipated. The state NRCS office regularly provides the Division with reports on EQIP practices implemented at the HUC 12 scale, which are critical to identifying locations where tracking and monitoring may show water quality improvements. Through the state Agriculture Water Quality Authority, Kentucky has made recent updates and refinements to BMPs in the State Water Quality Plan and continues to post stories from producers highlighting local implementation activities (https://www.uky.edu/bae/awqp). Identified water quality issues are addressed through local Conservation Districts for technical and financial assistance.

The Kentucky Wastewater Advisory Council meets quarterly to discuss regulatory issues with the wastewater community. This serves as a forum to discuss current issues, nutrient criteria, and permit requirements and limits. The Kentucky Stormwater Association meets regularly, and provides a regular forum for discussion with and among this regulated community about current issues, permit requirements, and MS4 program needs. The USGS facilitates the KY Agriculture Science and Monitoring Committee to communicate with and discuss complex scientific information with the agricultural community. This group helps to facilitate understanding about monitoring and water quality among agricultural producers across the state. Recent legislation created the Kentucky Water Resources Board with a mandate to address agricultural and rural water quantity issues. This group is working to develop programs and funding mechanisms that can be institutionalized in the state, as well as providing recommendations on issues of concern to the Kentucky Energy and Environment Cabinet. Members of this Board are currently working with the Governors Office of Agricultural Policy to develop an On-Farm Water Resiliency Program.

Louisiana



The Louisiana Nonpoint Source (NPS) program is administered by the Louisiana Department of Environmental Quality (LDEQ) in coordination with many other agencies and organizations including the Louisiana Department of Agriculture and Forestry (LDAF) and the United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) to implement the statewide program intended to improve water quality. Activities of these partnerships include prioritization of watershed planning and implementation activities, evaluating progress, and reporting program activities.

Louisiana USDA-NRCS provides annual conservation practice implementation data at the HUC12 level for the entire state to LDEQ. Sharing implementation data at the HUC12 scale does not require Louisiana USDA-NRCS to have a data sharing agreement with LDEQ or LDAF. Data may be shared by program, conservation practice and/or by year.

Quarterly interagency committee meetings with LDEQ, LDAF, USDA-NRCS, the Louisiana Department of Natural Resources (LDNR), and the Louisiana Department of Health (LDH) have begun in order to keep partners abreast of activities occurring in priority watersheds as well as future plans in new or existing watersheds. This interagency coordination is the strength of Louisiana's NPS Program, resulting in water quality restoration and improvement as well as success stories for the state.

Louisiana NPS Program Highlights for FFY 2017 included:

- LDEQ participated in 25 outreach and educational events;
- LDEQ published success stories for Bayou Queue de Tortue, Natalbany River, and Selsers Creek which were approved by the United States Environmental Protection Agency (USEPA) as qualifying for three (3) WQ-10 measures;
- LDEQ and LDAF managed approximately $4.2 million of Section 319 grant funds in FFY 2017 in order to implement projects to reduce NPS pollution and improve water quality;
- LDEQ continued watershed planning and implementation activities with two watershed coordinators (WSCs) and two watershed groups that are located in various parts of the state;
- LDEQ revised and drafted 6 watershed implementation plans (WIPs) within 2 Basins;
- LDEQ submitted Bayou Mallet watershed plan to USEPA and it has been accepted as meeting the nine key elements of a watershed based plan;
- LDEQ's NPS and Assessment staff worked together on the New Vision Initiative;
- LDEQ Water Surveys (WS) staff provided water quality sampling for the NPS program in 10 watersheds;
- Louisiana continues to focus on watershed planning, assessment, monitoring and implementation in 29 watersheds;
- In partnership with LDNR, LDEQ responded to comments from USEPA and National Oceanographic and Atmospheric Administration (NOAA) on Louisiana's Coastal Nonpoint Pollution Control Program (CNPCP); specifically the OSDS measure which was updated;
- LDEQ's Drinking Water Protection (DWP) program implemented activities in Rapides, Sabine, Vernon, Winn and Union parishes;
- LDEQ published monitoring data in EQUIS and USEPA's Storage and Retrieval (STORET) Data Warehouse for active watersheds;
- LDEQ developed maps using the Watershed Delineator from the ArcGIS Soil and Water Assessment Tool (ArcSWAT) for active watersheds to assist in watershed planning, implementation, and monitoring; and
- LDEQ, LDAF and USDA-NRCS continue partnering in watersheds prioritized through National Water Quality Initiative (NWQI) and Mississippi River Basin Initiative (MRBI).

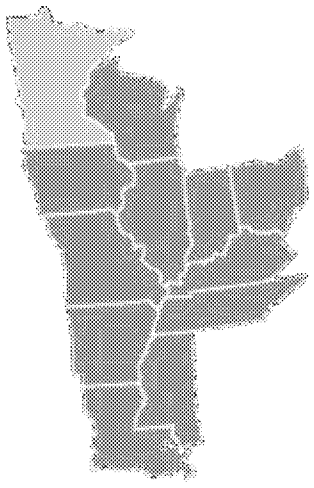
Mississippi River Basin Initiative (MRBI)

Watershed Name	Parish	HUC 12
Alligator Bayou	West Carroll Parish	80500020503
Cane Bayou-Little Creek	Richland Parish	80500011010
Lake St. Joseph-Clark Bayou	Tensas Parish	80500030406
Little Creek	Richland and West Carroll Parish	80500011001
Lake Providence-Tensas Bayou	East Carroll Parish	80500030101
Van Buren Bayou - Lake Bruin	Tensas Parish	80500030503 and 80500030501
Little Tensas Bayou-Bull Bayou	Madison Parish	80500030105
Upper Deer Creek	Franklin Parish	80500011601

National Water Quality Initiatives (NWQI)

Watershed Name	Parish	HUC 12
Bayou Grand Marais	Vermilion Parish	80802020103
Lake Louis	Catahoula Parish	80402070303
Bayou Du Portage	Iberia and St. Martin Parish	8081020801
Bayou Folse (Pilot)	Lafourche Parish	80903020502 and 080903010203

Minnesota



Federal:

- The Minnesota NRCS office is providing a list of BMPs adopted in various watersheds, as requested. The BMP adoption information is provided at the HUC12 watershed scale.

State/Local:

1. All NPS measures funded with state monies are recorded into a data base (eLINK), along with estimates of nutrient and sediment reduction achieved by these BMPs (estimates are made by local staff using simple spreadsheet calculator tools). http://www.bwsr.state.mn.us/outreach/eLINK/index.html
2. Every other year, Minnesota provides an accountability report to its legislature of progress made in adopting the BMPs outlined in HUC8 Watershed Strategies. This is primarily developed from State and Federal records of projects with cost share. https://www.pca.state.mn.us/water/clean-water-fund
3. Minnesota's feedlot program conducts regular inspections of regulated feedlot facilities, and tracks certain findings. https://www.pca.state.mn.us/sites/default/files/lrwq-f-1sy16.pdf
4. Nitrogen fertilizer use farmer surveys are conducted across the state, with findings summarized in reports by the Minnesota Department of Agriculture. http://www.mda.state.mn.us/protecting/cleanwaterfund/gwdwprotection/nutrientmgmtsurvey.aspx
5. The State of Minnesota is partnering with the University of Minnesota to quantify spring crop residue levels, fall cover crop adoption, and annual soil loss. This project is currently underway and the initial results are under review.

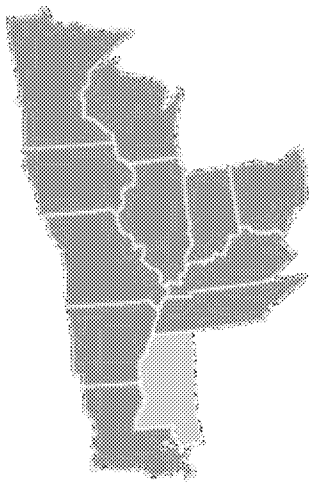
Private:

Items 4 and 5 above reflect a mix of non-public and public sector practices.

Additional Links:

https://www.pca.state.mn.us/sites/default/files/lrp-f-3sy16.pdf Pages 21-22 of this Clean Water Fund Performance Report pertain to nonpoint actions.

Mississippi



Mississippi developed a statewide strategy and regionally specific strategies to address nutrient concerns on state lands and in state waters. These strategies focus on land use practices and characteristics that are unique to each region of the state: the MS Delta (alluvial plain), upland areas, and coastal areas of the state. As individual watershed projects are developed, the nutrient reduction strategies are used to guide the development and implementation of watershed restoration and protection plans to ensure all plans include activities necessary to mitigate nutrient contributions to state waters and the Gulf of Mexico.

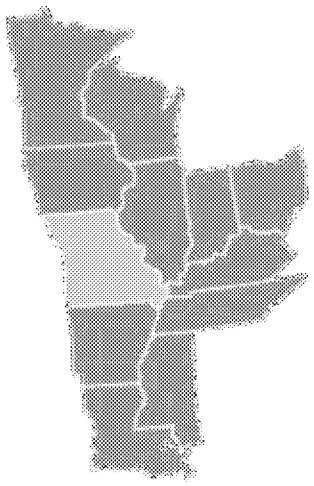
MDEQ, working with resource partners, have implemented at least one nutrient reduction pilot project in each of the regions defined in the nutrient reduction strategies. As part of the process, a project specific monitoring plan was developed for each pilot project area. Working with the USGS and others, MDEQ has been collecting physical, chemical, biological, and meteorological data in the project areas. Also, the monitoring design included sampling to represent both storm and routine stream flows. To ensure consistency, the monitoring strategy outlined in the nutrient reduction strategies was used to guide the process.

The focus of MS's nutrient reduction strategies, developed in conjunction with stakeholder input and recommendations, is to work toward answering the following questions:

- *What levels of nutrient reduction are achievable?*
- *What will they cost?*
- *What is the value to each stakeholder from these nutrient reductions?*
- *What levels of nutrient reduction will protect state waterbodies and benefit the Gulf of Mexico?*

Working with partners, producers, and researchers, MDEQ is making progress toward answering the questions in the strategies. Taking a data driven approach, the agency and partners have been collecting water quality data in watersheds where nutrient reduction practices have been implemented following the monitoring approaches outlined in the strategies. These data, collected pre and post implementation and representing varying flow regimes, will be used to determine the nutrient load reductions achieved by the practices. Once load reductions are calculated, progress can be made to determine the costs and values associated with nutrient reduction practices.

Missouri



Federal

Missouri Natural Resources Conservation Service (NRCS) offers financial and technical assistance to help landowners implement voluntary conservation through various programs, including Environmental Quality Incentives Program (EQIP), Regional Conservation Partnership Program (RCPP), Conservation Stewardship Program (CSP) and Agricultural Conservation Easement Program (ACEP). From October 1, 2016 – September 30, 2017 NRCS investments made to combat nonpoint source issues in Missouri through working lands programs invested over $48 million dollars treating over 1.8 million acres of land. (Source: ProTracts, USDA)
https://www.nrcs.usda.gov/wps/portal/nrcs/site/mo/home/

The Department collaborates with the US Geological Service (USGS) to support the state's ambient water quality monitoring network. The network allows for collection of high quality assured data over a long period of time, providing an important basis for water quality decisions in the state. The Department funds discrete water-quality monitoring at 71 USGS long-term monitoring stations, one streamflow monitor and two continuous water-quality monitors on the Missouri River at Herman and St. Joseph, Missouri. Much of this data is available on the Internet at: http://mo.water.usgs.gov/.

Missouri EPA 319 Program

Through the Section 319(h) Nonpoint Source Grant Program, EPA tracks site-specific implementation of all BMPs cost-shared through this program. Besides just reporting on the amount of implementation of select practices for the Biennial Report, the 319 Program also estimates nutrient and sediment load reductions. State cost-share through the Soil and Water Conservation Program (SWCP) supports water quality activities throughout the state.
https://dnr.mo.gov/env/swcp/nps/index.html

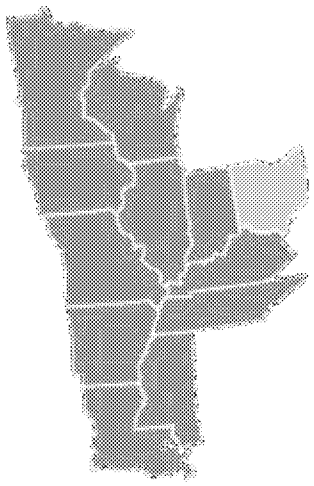
The Department's 319 program is partnering with the Missouri Corn Merchandising Council (MCMC) and Missouri Soybean Merchandising Council to form a collaborative monitoring partnership to provide information about the amount of runoff, soil, and nutrients moving off a given field into an adjacent waterway as well as how rainfall patterns can impact these processes. Edge of Field analyses will identify the extent to which BMPs could function in gaged locations. Data analyses from this monitoring program will also be done to inform numerical simulation(s), such as the APEX model, to support BMP recommendations as well as to document expected reduction/water quality improvement of existing BMPs.

State

Soil and Water Conservation Cost-Share Program - The Missouri Soil and Water Conservation Cost-Share Program assists farmers and landowners with soil and water conservation by providing partial reimbursement up to 75% of the estimated cost for conservation practices. The Missouri Soil and Water Information Management System tracks all acres treated, tons of soil saved and dollars spent and can be sorted by watershed or by county. Efforts from edge of field studies and other monitoring programs will help determine benefits over the 30 years the Soil and Water Program has been implemented. https://dnr.mo.gov/env/swcp/index.html#costshare

Missouri Nutrient Loss Reduction Strategy – The Missouri Nutrient Loss Reduction Strategy was developed over a three-year period from 2011 through 2014. A committee composed of representatives from state agricultural, environmental, and natural resource organizations was formed to develop recommendations for reducing nutrient loads to surface water and groundwater in Missouri through an open, consensus-building process. (https://dnr.mo.gov/env/wpp/mnrsc/docs/nlrs-strategy-2014.pdf)

Ohio



Ohio's landscape is approximately 52% agricultural, 27% forested, and 14% urban and suburban. Much of Ohio's agricultural lands are engineered to be drained using subsurface tile systems and nearly all of Ohio's developed areas have sanitary sewers and/or well developed but typically antiquated stormwater management systems. Historic impacts to the agricultural lands headwater streams include channelization, removal of woody riparian vegetation, and routine maintenance or ditching. Many headwater streams in developed areas have been buried in culverts or contained in concrete channels. These modifications result in rapid runoff and delivery of nutrients and a decrease in assimilative capacity.

The major programs operating in Ohio with regulatory or non-regulatory responsibilities aimed at curbing the delivery of high nutrient-laden flows include the following:

State Agencies:

Ohio EPA

- 319 NPS Program (watershed and stream restoration programs)
- Urban area stormwater and combined sewer overflow abatement efforts
- Surface water improvement fund Grants
- TMDL program and NPDES permitting
- Concentrated Animal Feeding Operation NPDES Permits

Ohio Department of Agriculture

- Fertilizer storage and applicator licensing and regulation
- Livestock environmental permitting
- Watershed Coordinator grant program
- Collaboration between Division of Soil and Water and local Soil and Water districts on nutrient reduction and conservation efforts

Federal Agencies, Universities, and Non-Governmental Organizations

- USDA Natural Resources Conservation Service
- Ohio Department of Higher Education
- Voluntary Certification Program for nutrient management

NPS measures:

The following statewide water quality improvement activities pertinent to the Ohio River Basin are underway:

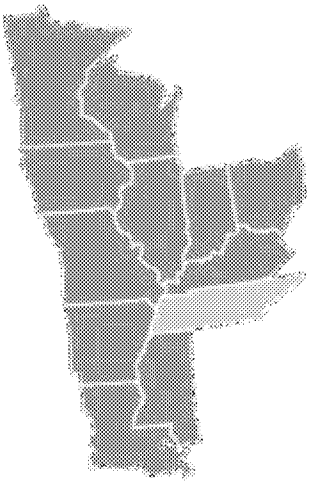
- **Nonpoint source program:** Ohio's program is implemented through the NPS management plan (a requirement of Section 319 of the Clean Water Act) and Ohio's nutrient reduction strategy. The NPS plan was updated in 2014 and approved by US EPA in 2015. The Nutrient Reduction Strategy, a collaborative of Ohio's environmental, agricultural, and natural resource agencies, was originally published 2014, updated 2015, and is currently in the process of revision. Provisions of these updated plans effectively guide Ohio's implementation of state and local nonpoint source management measures and activities through 2019. Ohio EPA's Division of Surface Water provides primary coordination and implementation with assistance from other federal, state, and local partners. Fifty percent of funds are awarded as subgrants to provide critical funding for local NPS implementation, including nine-element plans, green infrastructure improvements, urban stormwater abatement measures, and stream channel and riparian habitat improvements.
  NPS Plan: http://www.epa.ohio.gov/Portals/35/nps/NPS_Mgmt_Plan.pdf
  Nutrient Reduction Strategy: http://www.epa.ohio.gov/dsw/wqs/NutrientReduction.aspx

- **Water Quality Bill**: SB 1, effective July 2015, requires major POTWs to conduct feasibility studies to achieve 1.0 mg/L total phosphorus and establishes regulations for fertilizer or manure applications

- **Agriculture Water Quality Bill:** SB 150, effective August 2014, requires that beginning September 31, 2017, fertilizer applicators must be certified and educated on the handling and application of fertilizer and authorizes development of a voluntary nutrient management plan.

- **Nutrient Mass Balance:** HB 64, effective June 2015, required the development of a biennial report on mass loading of nutrients delivered to Lake Erie and the Ohio River from Ohio's point and nonpoint sources. The nutrient mass balance study for Ohio's major rivers was released in 2016. The 2018 update will evaluate trends to determine effectiveness of the NPS management practices. http://epa.ohio.gov/Portals/35/documents/Final%20Nutrient%20Mass%20Balance%20Report_12_30_16pdf.pdf.

Tennessee

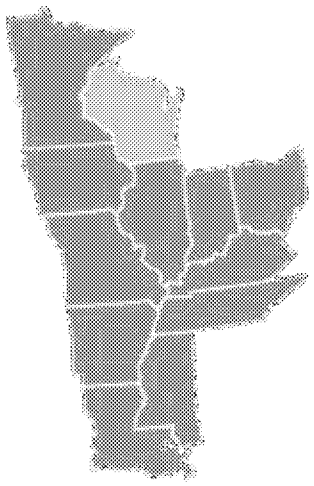


Tennessee has local and state programs that provide staff and cost-share grants to incentivize the installation of conservation practices that affect nutrient impacts. These programs, along with partnerships with federal agencies, have resulted in documented success stories of water quality improvement, which can be found here: https://www.epa.gov/nps/nonpoint-source-success-stories.

Tennessee has a distinct focus on soil health through the initiatives of the USDA Natural Resources Conservation Service and the Tennessee Department of Agriculture (TDA). Tennessee is a leader in the nation in the number of acres of cover crops being planted. In 2015 alone, NRCS programs provided cost share assistance for cover crops on over 99,000 acres. Since 2013, TDA programs have provided cost share assistance for producers to plant cover crops on over 55,000 acres. Cover crops lessen the risk of nutrient flux, and may dramatically improve the water infiltration capacity of the soils. Many informative video interviews with Tennessee producers regarding soil health and other beneficial conservation practices have been made, and can be accessed here: http://www.nrcs.usda.gov/wps/portal/nrcs/main/tn/soils/health/.

Another informative link to more "Soil Health Heroes" can be found here: http://www.tnacd.org/index.php/soil-health/soil-health-heros.

Wisconsin



Wisconsin's Nonpoint Source (NPS) Program is implemented through a comprehensive network of federal, state, and local agencies, working in partnership with other organizations and the citizens of Wisconsin to address the significant nonpoint sources in the state. (http://dnr.wi.gov/topic/nonpoint/) The core activities of these programs – research, monitoring, data assessment and management, regulation and enforcement, financial and technical assistance, education and outreach, and public involvement – work to address current and prevent future water quality impairments and threats caused by NPS pollution. Wisconsin's success in addressing NPS issues is aided by the partnerships that have been developed and the use of both voluntary and regulatory approaches coupled with financial and technical assistance.

The current regulatory approach to NPS pollution reduction, in place since 2002, centers on statewide enforceable agricultural and non-agricultural performance standards and manure management prohibitions, required by Chapter NR 151, Wisconsin Administrative Code (http://docs.legis.wisconsin.gov/code/admin_code/nr/100/151.pdf). Performance standards are minimum expectations that apply to phosphorus delivery, cropland erosion, livestock and manure storage management, nutrient management, livestock process wastewater, construction erosion, post-construction storm water management, developed urban areas and transportation facilities.

Under state law, the Wisconsin Department of Natural Resources (WDNR) coordinates NPS program implementation with the Wisconsin Department of Agriculture, Trade, and Consumer Protection (WDATCP). Through Chapter ATCP 50, Wis. Adm. Code (http://docs.legis.wisconsin.gov/code/admin_code/atcp/020/50.pdf), WDATCP establishes technical standards and other elements related to program implementation. In addition to other watershed plans, County Land and Water Resources Management Plans define a locally appropriate mix of approaches (e.g. regulatory, nonregulatory, financial and technical assistance) for implementing state performance standards. The steps involved in developing these plans mirror the 9-key element process that EPA's NPS Program (Section 319) requires for watershed-based plans.

A critical factor in turning watershed plans into action is the ability to fund implementation. For the last forty years, the WDNR and WDATCP have made a significant commitment of *state* funds for implementation. In calendar year 2017, the two agencies awarded over $21 million in state and federal funds (State General Purpose Revenue, Segregated Funds, and Bond Revenue and Federal Section 319 Funds) for local assistance, planning, and BMP construction cost-sharing grants to local units of government from multiple WDNR/WDATCP grant programs. However, no one agency or program can adequately fund all of the nonpoint source control needs across the state. Stakeholders are encouraged to leverage funds from existing programs to efficiently target and meet the needs of a particular area. Funding can be accessed from numerous sources at the federal, state, and local level.

The WDNR and the WDATCP are required under state statute to submit a report to the Wisconsin Land & Water Conservation Board summarizing and evaluating progress made throughout Wisconsin to implement the land and water conservation programs funded or administered by the agencies. To develop this annual report, the agencies use the information provided to them in an annual report from counties to determine, among other things, progress in implementation of the performance standards. Information from the WDNR and WDATCP grant program databases, annual county work plans and the county annual report is incorporated into the WDATCP-WDNR annual report to the Wisconsin Land and Water Conservation Board. The latest report (2016) is available at: https://datcp.wi.gov/Documents/LandWaterAnnualReport2016.pdf.

Federal-Partners

EPA

CWA Section 319 Nonpoint Source Program - EPA provides grants to states to implement nonpoint source management programs and reduce nutrient pollution from nonpoint sources under section 319 of the CWA. Recently, almost all HTF states updated their nonpoint source management programs. Section 319 grant monies support a wide variety of activities, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. The program relies on watershed plans as a primary tool to ensure grant monies are used as effectively as possible to achieve water quality goals. Nonpoint source success stories in HTF states are highlighted in the Hypoxia Task Force 2017 Report to Congress and on the Hypoxia Task Force website Success Stories page. From 2009 to 2016, EPA provided $255 million in section 319 grant funding to HTF states to support their efforts to reduce water pollution, including nutrients. Data on the 319 program is reported into EPA's Grants Reporting and Tracking System. Project sponsors often leverage multiple sources of funding from landowners and local, state, and federal partners, including section 319 funds, to cover the costs of installing best management practices. More information about the section 319 grant program nationwide is available on EPA's Nonpoint Source Pollution website.

While the HTF states should continue to supply information through the Nonpoint Source Measures Workgroup for the purpose of tracking nonpoint source progress, EPA stands ready to assist with providing, consolidating, and analyzing data on the work that states accomplish through section 319 grant funding when needed.

NRCS

USDA's Natural Resources Conservation Service (NRCS) offers financial and technical assistance to help landowners implement voluntary conservation through various programs, including Environmental Quality Incentives Program (EQIP), Regional Conservation Partnership Program (RCPP), Conservation Stewardship Program (CSP) and Agricultural Conservation Easement Program (ACEP). USDA's Farm Service Agency (FSA) administers the Conservation Reserve Program (CRP), which is a voluntary program where participating landowners convert highly erodible and environmentally sensitive cropland into conservation covers. From FY 2009 to FY 2015, NRCS invested $6.7 billion in voluntary conservation programs in HTF states.

Beginning in the 2008 Farm Bill, NRCS developed several landscape conservation initiatives that target voluntary conservation program funding to areas with critical natural resource concerns (http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/initiatives/). The initiatives, which include three water quality-related initiatives that intersect with the MARB, cross geopolitical boundaries, take a science-based approach to addressing resource concerns on a landscape scale, and rely on strong partnerships to enhance and accelerate conservation system implementation. Current projects for the Mississippi River Basin Healthy Watersheds Initiative were developed to be aligned with and to support the states' nutrient reduction strategies.

USDA quantifies the effectiveness of conservation practices implemented through NRCS programs and uses models to predict impacts of those practices through the Conservation Effects Assessment Program (CEAP - https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/ceap/). The first national survey of farmers through CEAP was completed in 2006, and a second national survey will be completed in 2017. These two surveys will provide USDA with a method to track progress in conservation adoption and highlight areas in which additional conservation will make the largest impact on delivery of sediment and nutrients to the Gulf.

Privacy laws and policy prevent NRCS from disclosure of information provided by agricultural producers, including information about their operations, practices implemented or land attributes. NRCS at the state level can enter into data sharing agreements with conservation partners to share practice data when partners provide technical assistance for practice implementation. Sharing of data with partners for purposes other than on-the-ground technical assistance

must be reviewed and approved through the NRCS National Office. Requests for aggregated data or data that does not include non-public information can be sent to the USDA-NRCS Resource Economics and Analysis Division (REAPDataTeam@wdc.usda.gov).

Appendix B: HTF Common Measures Subgroup Survey Response Summary

3/15/16

<<<<State-level data (state programs only)>>>>

Question

2 - What, if any, formal agreements to States have in place to collect State (inter-agency) practice data?

Explanation: Some states have programs that promote and provide financial assistance to install conservation practices. These programs may be administered by various state agencies and may require formal agreements for HTF state reps to access this information.

Responses: 6 Formal Agreements in place to access this data

6 N/A - Formal agreements aren't needed or no state programs exist

3 - Is the collective effort of state-funded practices currently reported in aggregate?

Explanation: Is all state program data currently reported? If so, these reports could be compiled and submitted to HTF.

Responses: 8 Yes's, program dependent

4 follow-up

4 - Level or scale state-level practice data is reported.

Explanation: What is the current scale these practices are reported? Looking for a common scale by state for reporting.

Responses: All report on a statewide basis (SW reporting may not work for states with land out of Mississippi Basin. 7 states indicated HUC12 scale)

5 - If your state has the ability to collect state-level data. To what extent of practices are report-able?

Explanation: Practice data collected can be reported at various scales. What scale do states have for the available data?

Responses: variable answers, likely inconsistent interpretation of question

6 - Has your state developed a set of "core" practices for N&P reductions?

Explanation: Some practices have a larger impact on nutrients than others. Have states designated "core" practices to focus on vs. a subset or the collective suite of practices?

Responses: 6 - Yes

6 - No

Mixed response, some indicate no specific list of core practices, but states are targeting efforts into more effective practices.

7 - Please, check the box next to the list of "core" practices that have been developed for the corresponding nutrient.

Responses: All indicated both N & P practices are priorities

8 - Does your state report on progress of your state's Nutrient Reduction Strategy?

Explanation: State NRS report status. Could be used to collect practice data on a state level, which in-turn could be scaled up to basinwide.

Responses: 10 - Yes's

1- No, still under development (KY)

1- Program Specific (MN)

9 - Reporting timeframe

Explanation: General reporting timeframe. Did not ask for time of the year or reporting period

Responses: 10 - Annual

1 - Biennial (OH)

1- Biannual (IL)

10 - Do states have programs in place to deliver these core practices?

Explanation: some practices have larger impact than others, but do states have ways to deliver them?

Responses: 10- Yes

1 - skipped (TN)

1 - No (KY)

11 - Does your state have the ability to collect data on state-funded implementation from past years?

Explanation: Collecting past data could help more readily show progress or influence from NRS development.

Responses: yes, but program specific as to how far back

12 - How far back can state-level data be reported?

Responses: 2012 seems to be the common year among states (range 1990s-2012, dependent on specific program)

13 - What additional needs or comments do states need regarding state-level practice implementation data? (summary of responses)

Responses: need to be able to aggregate and synthesize USDA program data related to location and contract periods

Additonal funding to fully implment program

gap analysis of the data to inform methods for improving data collection to ensure consistent and appropriate data is collected to facilitiate aggregate reporting

Good tracking system in place for state funded activities

consolidated practice reporting method and consistent load reduction calc method for state and regional level

desire ability to combine all efforts within the state and document the effectiveness of work being done

modernize the OH DNR SWIMs database. If funded, could be improved to better track funding and core practice implementation

funding support to develop a sw, web-based tracking system to capture all NPS related practice and imp activities beyond state funding.

<<<<Federal Reporting Questions>>>>

14 - Level or scale federal-level practice data desired by states for NRS reporting:

Explanation: scale practice data from USDA is desired by state.

Responses: General Consensus HUC12 (IN/IA HUC8)

15 - What method or agreements are in place to collect this data? Options include: MOA/MOU, FOIA, Public Database, N/A, None, Other (please specify)

Explanation: List of formal agreements between states and federal agencies for sharing data.

Responses: 319 - 7 yes, 5 no answer

USDA - 3 yes, 9 no

USDA-FSA should have access to county level data through public database (basin split?) – my answer

16 - What level or scale is this data reportable? Options include: Statewide, County, Regional, HUC8, HUC12, Field level, Other (please specify)

Explanation: Data may be available or collected at smaller scales, but what scale is it able to be reported?

Responses: Highest is statewide - lowest is field level (most common is County)

17 If your state has the ability to collect federal-level data. To what extent of practices are report-able?

Explanation: What level of practice data if available to states from fed agencies.

Responses: 7 collective suite of practices

2 subset of practices

1 priority practices

1 none

1 depends on FOIA

18 - Does your state have the ability to collect data on federally-funded implementation from past years?

Explanation: Similar to state question. Past data can help provide additional information and context related to fed program data.

Responses: no consesus

Range from no - to TBD

19 - What model or method does your state use for generating load reductions for 319 funded practices?

Explanation: Various models in use by states for reporting load reductions. Individual state responses on model they use currently.

Responses: 4 Region 5

4 STEPL

3 Other

1 skipped

20 - Are funding levels available with federal reported data? Options include: Yes, No, Under development, N/A

Explanation: Funding levels to augment practice data.

Responses: 7 yes USDA

11 yes, 319 1 skipped

21 - What additional needs or comments do states need regarding federally-funded practice implementation data?

Responses: Need access to USDA-NRCS data

state 319 programs need more flexibility in imp. Timeframes

institutionalize NRCS reporting

States with sunshine laws need to provide legal assurance to fed agencies that individual information can be protected

states need field level bmp data for better planning and implementation programming

<<<<Private Implementation>>>>

22 - What method(s) or agreement(s) are in place to collect this data? Options include: Yes, No, Under development, N/A

Explanation: Different process in collecting this information. What methods are states using to collect portions of privately implemented practices.

Responses: 4 none/skipped

5 public database

4 surveys

6 Public-Private parnterships/remote sensing under development

23 - Does your state have the ability to collect data on private practice implementation from past years?

Explanation: Can historical data be retrieved?

9 - no

3 - yes- dependent on method

Examples: Historical NASS, CTIC, University, etc surveys

24 - Will these methods account for financial commitments for privately implemented practices?

Explanation: Quantifify value of private investments to augment State/Fed. investment data.

8 - nos

4 skips or N/As

25 - What additional needs or comments do states need regarding privately implemented practice data?

Responses: Generally agreed that this area is one of the most difficult to obtain, but also a very important area.

<<<<Summary Questions>>>>

26 - Are these practice measures (among others) available, in aggregate, by state? (State, Federal, Private sources)

Explanation: Do states account, analyze, compile, etc. information from all of these sources?

Responses: 5 - yes

General consensus this is still a work in progress

27 - Is your state utilizing/building methods to measure social indicators as a way to measure progress?

Explanation: Additional question to look at behavior or social aspects that influence practice adoption.

Responses: 4 - No

8 - Yes (at least under development)

28 - Are states able to calculate loading reductions with the information collected?

Responses: 10 - Yes

2 - No

Varies by program, variable answers

Currently done by 319 and other state programs related practice data

Will use Nutrient Tracking Tool

Not available from all sources