

2014 Annual Report

Louisiana Nutrient Management Strategy Implementation

FINAL

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Baton Rouge, Louisiana

**Prepared by the
Louisiana Nutrient Management Strategy Interagency Team**

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Louisiana Department of Agriculture and Forestry (LDAF)
Louisiana Department of Environmental Quality (LDEQ)
Louisiana Department of Natural Resources (LDNR)

With collaboration of the

Louisiana State University Agricultural Center (LSU AgCenter)
US Business Council for Sustainable Development (US BCSD), Louisiana Water Synergy Project
US Department of Agriculture, Natural Resources Conservation Service (USDA NRCS)
US Environmental Protection Agency (USEPA)

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STRATEGIC ACTIONS

The Louisiana Nutrient Management Strategy ('Strategy') was released May 2014. The Strategy presents a framework of ten strategic components with underlying actions that guide implementation of nutrient management activities across the state. Completing these strategic actions, in addition to adapting, modifying, and/or identifying additional actions is part of the Strategy implementation process.

The Strategy Interagency Team is comprised of representatives from the Louisiana state agencies of the Coastal Protection and Restoration Authority of Louisiana (CPRA), the Louisiana Department of Agriculture and Forestry (LDAF), the Louisiana Department of Environmental Quality (LDEQ), and the Louisiana Department of Natural Resources (LDNR). Partnerships with other agencies and groups including the Louisiana State University Agricultural Center (LSU AgCenter); the US Business Council for Sustainable Development (US BCSD), Louisiana Water Synergy Project; the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS); and the US Environmental Protection Agency (USEPA) Region 6 form a well-rounded team to achieve these nutrient management efforts outlined in the Strategy for Louisiana.

This Annual Report describes the accomplishments in development and implementation of the Strategy during 2014. Completed and ongoing strategic actions are identified and results and progress made during 2014 are discussed.

1. STAKEHOLDER ENGAGEMENT

Stakeholder participation is essential to accomplishing the vision of the Strategy. Stakeholders are the stewards of their local landscapes and have a vested interest in the protection, improvement, and restoration of water quality within their watershed community. Engaging and communicating with stakeholders is crucial to the success of the Strategy.

One of the many benefits of a robust stakeholder engagement process is increased awareness and participation from all sectors within a watershed in activities that are more nutrient-responsible. Future stakeholder engagement efforts will focus on performing ongoing and additional outreach and education, and identifying and promoting partnerships and leveraging opportunities. Leveraging existing programs is critical to further engage stakeholder communities as the Strategy is further implemented.

1.a. Identify stakeholders with interest in the strategy

Stakeholder identification was initiated and completed in 2012 during the initial stage of Strategy development. This action focused on identifying stakeholders with interest in nutrient management in Louisiana. Over 200 stakeholder groups in Louisiana were identified, and stakeholder groups included state and federal agencies, agricultural producers, academic institutions, nonprofit organizations, non-governmental organizations (NGOs), private industry, private landowners, parishes, and municipalities.

1.b. Engage stakeholders in strategy development

Stakeholder engagement was initiated in 2012 and completed in 2013. This action focused on outreach regarding the development of the Strategy. The Strategy Interagency Team engaged

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representatives from over 130 stakeholder affiliations through presentations delivered at local and regional level meetings. From November 2012 through June 2013, Strategy Interagency Team members targeted more than 30 events to interact with stakeholders.

1.c. Perform outreach/education on strategy activities

Outreach/education on strategy activities is ongoing. This action is focused on outreach to stakeholders to inform, promote participation, and report results on Strategy activities.

In 2014, the Strategy Interagency Team participated in several events related to nutrient management in Louisiana as well as other areas of the Mississippi/Atchafalaya River Basin (MARB). At these events, Strategy Interagency Team members communicate with stakeholders on Strategy activities specific to Louisiana and learn from other states and partners on the nutrient management activities occurring within their other areas.

Outreach events performed by Strategy Interagency Team members included the following:

- LDAF and LDEQ participation at the Association of Clean Water Administrators (ACWA) Mid-Year Meeting, March 10-11, 2014 in Washington, D.C.
- LDEQ participation at Americas Watershed Initiative Workshop on Development of a Lower Mississippi River Report Card, March 24-26, 2014 in Germantown, Tennessee
- LDEQ participation at USEPA R6 Regional Technical Advisory Group (RTAG) Meeting, April 29-May 1, 2014 in Dallas, Texas
- CPRA, LDAF, and LDEQ participation at the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (Hypoxia Task Force) Spring Meeting in Little Rock, Arkansas, May 19-22, 2014
- CPRA, LDAF, LDEQ, USDA NRCS, USEPA Region 6, and LSU AgCenter participation in Louisiana Nutrient Management Strategy Implementation Meeting in Baton Rouge, Louisiana, August 5, 2014
- CPRA and LDEQ participation in the Hypoxia Task Force Fall Meeting in Alton, Illinois, October 20-21, 2014
- LDAF and LDEQ participation in Louisiana Water Synergy Project Quarterly Meetings, Feb 24, 2014; May 29, 2014; August 21, 2014; and November 13, 2014
- CPRA and LDEQ participation on Hypoxia Task Force Coordinating Committee Monthly Conference Calls in 2014
- LDEQ participation on recurring ACWA conference calls in 2014

In addition to participation at events with stakeholders, additional levels of outreach are being planned. The Louisiana Water Synergy Project is spearheading development of an outreach tool called the Louisiana Watershed Simulation Game. The Louisiana Water Synergy Project, managed by the US Business Council for Sustainable Development (US BCSD), provides a forum for business leaders with infrastructure investments in southern Louisiana, state and local leaders, academic institutions, and non-governmental organizations (NGOs) to take collective actions to help protect wetlands and improve water quality in the region. The project has been underway since May 2012. The 21 companies participating represent a wide range of industrial sectors, including oil and gas, utilities, chemicals, manufacturing, beverages, and services. Participants also include representatives from the Lake Pontchartrain Basin Foundation, The Nature Conservancy, LDEQ,

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and LDAF. Working Groups are in place to address: Nutrients Management, Wetlands Restoration and Protection, Sustainable Water Supplies, and Alternative Levee Construction Materials.

The Project team is working with the University of Virginia (UVa), local academic institutions, and NGOs to develop a computer-based, multi-player participatory simulation game for the region to help build awareness, education, and collaboration around actions and policies to restore and protect wetlands and improve water quality in southern Louisiana. Modeled after UVa's successful Chesapeake Bay Game, the Louisiana Watershed Simulation Game will allow players to take roles, e.g., farmer, developer, fisherman, regulator, to experience how their business decisions over time can interact with natural processes to impact water quality, wetland loss, wetlands restoration and protection. Human players introduce realism into system behavior by bringing their individual knowledge, experience and values to the simulation model, something impossible to do with equations. Each gameplay results in unique outcomes and reveals new insights. The dialog and discussion that occurs as players in different roles discuss their thoughts, perspectives, and outcome perceptions is more important than absolute outcomes and metrics.

The Louisiana Water Synergy Project has completed a blueprint for the development of the game. The next steps are to develop the underlying predictive model and the simulation game specifics, including time period to be covered in game play; game metrics, e.g., wetlands lost/restored, nutrient loadings; and player types, their decisions, and the impact of those decisions on game metrics.

1.d. Identify and promote partnerships/leveraging opportunities

The ongoing identification and promotion of partnerships and leveraging opportunities is vital to the success of the Strategy. Participation of and collaboration with all stakeholder groups in a watershed is not only key to the implementation of the Strategy, but is also fundamental to the success of water quality protection and restoration activities as a whole.

In 2014, Land Grant Universities (LGU) which includes the LSU AgCenter became a partner with the Hypoxia Task Force to aid in improving water quality in the MARB (USEPA 2014a; McClure 2014d). The LGU will be able to promote effective implementation of science-based approaches to nutrient management and conservation to reduce nutrient losses to the environment. The LGU will aid in establishing and strengthening relationships for addressing nutrients and environmental quality; expanding knowledge base through the discovery of new tools and practices as well as the continual validation of recommended practices; and in improving the coordination and delivering of educational programming and increasing the implementation effectiveness of nutrient management strategies for both agricultural and non-agricultural audiences. Nutrient use efficiency, social and economic impacts, and monitoring are some of the research areas where LGU may be to put science into practice to aid in improving water quality.

A new and innovative online platform may provide the mechanism for identifying and promoting such partnerships and leveraging opportunities. The Water Action Hub (the Hub) is an innovative online platform designed to promote water-related collaboration among key stakeholders, including the business community, in particular regions (The CEO Water Mandate 2015). The Hub enables organizations to quickly identify potential partners and engage in collective actions to address shared water challenges in basins of mutual strategic interest. The Hub was presented to the

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Hypoxia Task Force at the Fall Meeting in 2014 and on a monthly Hypoxia Task Force Coordinating Committee conference call in early 2015. The Hub was presented as a way to help address hypoxia in the Mississippi River Basin and Gulf of Mexico as a “rallying vehicle” and entry point for engaging the business community; linkages with state and federal initiative, a catalyst for local efforts underway with potential to codify and upscale, and an “action-focused” dimension, bringing interested parties together to identify possible areas for short and long-term coordination and action (The CEO Water Mandate 2015).

The Hub users register and complete an organizational profile that communicates the user organization’s priorities, strategies, and interests in collective action on water. This profile allows potential collaborators to better understand other Hub organizations’ areas of interest in order to determine with whom they may engage. The Louisiana Water Synergy Project is registered in the Hub, and the Strategy Interagency Team encourages other stakeholder groups to register to promote and share their activities as well as engage other potential collaborators on watershed projects and activities.

2. DECISION SUPPORT TOOLS

Decision support tools are essential to evaluating and assessing various aspects of nutrient management activities. Numerous tools exist that may be utilized for this purpose. Available tools include water quality data, water quality models, and management actions and assessments.

2.a. Identify available tools

During 2012 and 2013, the Strategy Interagency Team conducted a broad review of available decision support tools in support of the Strategy and identified and evaluated over 200 tools. Most applicable tools included best management practices, data access portals, mapping applications, modeling tools, and reports.

Many of the tools identified in the Strategy development phase in 2012 and 2013 are still applicable. These previously identified tools include the web-based data access including LDEQ Louisiana Environmental Data Access Center (LDEQ 2013a), the USEPA Nitrogen and Phosphorus Data Access Tool (NPDAT) (USEPA 2015a), and the Water Quality Portal (USGS et al. 2013), modeling tools including the USGS SPAtially Referenced Regressions On Watershed attributes (SPARROW) surface-water quality models (USGS 2013a), and Geographic Information Systems (GIS)-based tools.

In 2014, the LDEQ collaborated with the USEPA on the development of a tool specific to Louisiana nutrient management efforts. The USEPA Recovery Potential Screening Tool (RPST) provides a systematic approach for comparing waters or watersheds and identifying differences in how a watershed may respond to restoration efforts (USEPA 2014). The USEPA in collaboration with LDEQ developed Louisiana specific inputs for a RPST for Louisiana watersheds.

This Microsoft Excel based spreadsheet RPST is customized to the water bodies and characteristics for Louisiana and provides a technical method for comparing the relative restorability of large numbers of water bodies. The RPST includes several ecological, stressor, and social context indicators that are associated with the likelihood that a restoration effort may succeed. The user

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selects the indicators based on what is most appropriate to the waters being assessed and their surrounding communities, the availability of quality data, and the goals of the restoration effort. Measuring the same indicators on all waters allows for a systematic, even-handed and information-based comparison. Outputs based on scenario criteria selected by the user include ranked watersheds and a statewide map to visualize recovery potential for watersheds in the state.

2.b. Evaluate available tools

In addition to the decision support tool evaluations that were conducted prior to 2014, the LDEQ has evaluated the USEPA RPST for use in Louisiana watersheds. LDEQ determined the use of the RPST would be appropriate for nutrient management efforts, and would provide useful information to be weighted in prioritizing watersheds in Louisiana for nutrient management efforts under the Strategy.

2.c. Select available tools

In addition to the decision support tools that were selected prior to 2014, the LDEQ selects the USEPA RPST as a useful tool for nutrient management efforts in Louisiana.

2.d. Document selected tools

New features are available in some of the previously identified decision support tools. In the USEPA NPDAT web tool, newly updated information includes National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operations (CAFO) summary, waters listed for Nitrogen/Phosphorus (N/P) Impairments, and waters with N/P Total Maximum Daily Loads (TMDLs) (USEPA 2015a).

The USEPA RPST development team will provide documentation to LDEQ on the development and use of the RPST specific to Louisiana ecological, stressor, and social indicators. This documentation will aid LDEQ in generating scenarios for nutrient management efforts to assist in prioritization efforts under the Strategy.

3. REGULATIONS, PROGRAMS, & POLICIES

This component of the Strategy recognizes that regulations, programs and policies will assist with nutrient management activities within the state of Louisiana as well as benefit activities within the larger MARB watershed.

3.a. Identify current

Current regulations, programs, and policies were identified during the Strategy development phase in 2012 and 2013. Ongoing efforts of the Louisiana Agricultural Nutrient Task Force, the LSU AgCenter task force on fertilizer effectiveness, the Louisiana Water Synergy Project, and the USDA-USEPA expanded partnership continue to aid in leading the way to improvement in nutrient management in Louisiana.

Created by the Louisiana Commissioner of Agriculture and Forestry, the Louisiana Agricultural Nutrient Task Force will study topics related to agricultural nutrient issues. The Task Force is then charged with reviewing and making recommendations on at least the following topics and practices:

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- To address the need for research, education and training in the selection and application of agricultural fertilizer and soil nutrients in the state;
- To identify practices that apply to the selection, purchase, storage, and application of agricultural fertilizer and soil nutrients, including the reasonableness of rules for their on-farm storage;
- To identify state level agricultural certainty certification programs that encourages the implementation of best management practices in the generation, handling or land application of nutrients in Louisiana;
- To establish a nutrient management planning program;
- To formulate a systematic and economically viable nutrient management program that will both maintain agricultural profitability and improve water quality in Louisiana.

Another agricultural leader in nutrient management is the LSU AgCenter. The LSU AgCenter created a Task Force to study the effectiveness of fertilizers on major row crops and forages grown in Louisiana (McClure 2014c). The Task Force is made up of ten members, including LSU AgCenter agronomists and specialists for different crops. The Task Force will work to ensure the recommended fertilizer application rates are up to date based on current research. The rate recommendations should strive to minimize such problems in water quality where overabundance of nutrients. The LSU AgCenter Task Force hopes to produce a booklet listing nutrient deficiencies in various crops along with appropriate fertilizer rates.

The US BCSD, Louisiana Water Synergy Project has been underway since May 2012. The 21 companies participating represent a wide range of industrial sectors, including oil and gas, utilities, chemicals, manufacturing, beverages, and services as well as representatives from the Lake Pontchartrain Basin Foundation, The Nature Conservancy, LDEQ, and LDAF. The Project Team works on collective actions to improve water quality in the region. Long-term project initiatives include development of a Water Quality Trading Program and wetlands restoration and protection.

In late 2013, the USDA and the USEPA announced an expanded partnership to support water quality trading and other market-based approaches (USDA and USEPA 2013). The purpose of this USDA and USEPA policy is to support states, interstate agencies and tribes as they develop and implement water quality trading programs for nutrients, sediments and other pollutants where opportunities exist to achieve water quality improvements at reduced costs. Through expanded partnership the USDA and the USEPA will coordinate and enhance communications and outreach to states, agricultural producers, regulated sources, and interested third parties on water quality trading; engage expertise across agencies in the review of grants, loans or technical assistance programs focused on water quality trading; share information on the development of rules and guidance that have the potential to affect water quality trading; collaborate on developing tools and information resources for states and credit generators to guide decision making, reduce costs in program design and implementation, improve environmental performance, and foster consistency and integrity across regional initiatives; and co-host a workshop by 2015 to share tools and resources available to assist in stakeholder decision making and opportunities. The Strategy Interagency Team has expressed interest to both the USDA and USEPA regarding the development of a water quality trading program for Louisiana.

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3.b. Identify gaps

The identification of gaps in current regulations, programs, and policies is ongoing. Currently there is not an implemented program for water quality credit trading in Louisiana. Thus, expanded regulations, programs, or policies related to water quality credit trading may be warranted for stakeholders in Louisiana to advance trading as a cost-effective means for nutrient management and general water quality protection and restoration in the state.

Nutrient management activities under the Strategy are being performed within current programs. Yet, dedicated funding may be necessary to realize improvements in nutrient management in Louisiana, as well as in other parts of the MARB.

3.c. Proposed or establish new

Proposing or establishing new regulations, policies, or programs is an ongoing action of the Strategy. One such new regulatory effort is the Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program (USEPA 2013). The LDEQ is part of this national collaborative effort by states and the USEPA to promote alternative measures to water body protection and restoration. This national effort, called the New Vision of the Clean Water Act (CWA) 303(d) Program, refers to the CWA Section 303(d) Program where states identify impaired water bodies.

The New Vision of the CWA 303d Program will allow states to not only prioritize water bodies for protection and restoration based on factors considered important to each state, but will allow each state to identify and implement alternative measures for protection and restoration prior to a TMDL. The choice among alternative measures or a TMDL will aid states in implementing the most appropriate solution to addressing a water body impairment. States are expected to prioritize water bodies under the New Vision of the CWA 303(d) Program for the 2016 Integrated Reporting cycle. The LDEQ in collaboration with USEPA Region 6 developed a draft Prioritization Framework in late 2014. The LDEQ will engage stakeholders in 2015 on the Prioritization Framework under the New Vision of the CWA 303d Program effort (LDEQ 2015g).

4. MANAGEMENT PRACTICES & RESTORATION ACTIVITIES

Management practices and restoration activities in Louisiana encompass activities focused on nonpoint source (NPS) management, point source management, and coastal restoration and protection efforts. This multi-prong approach to the management of nutrients in Louisiana allows for a more holistic approach to nutrient management where true nutrient sources can be identified and appropriate solutions tailored to addressing the source.

4.a. Document current practices related to nutrient management

The documentation of current practices related to nutrient management is ongoing. Within Louisiana, current practices include implementation of the LDEQ NPS Program in collaboration with LDAF, USDA NRCS, and LDNR (LDEQ 2011); LDEQ implementation of the Louisiana Pollutant Discharge Elimination System (LPDES) Permit Program (LDEQ 2015h); and CPRA implementation of the Comprehensive Master Plan for a Sustainable Coast (Coastal Master Plan, CPRA 2012).

4.b. Identify areas where practices are being implemented

The LDEQ NPS Program and the LPDES Permit Program are implemented statewide. The LDEQ NPS Program selected priority watersheds targeted for implementation activities through 2016; these priority watersheds are identified in Strategic Action 6.g. The LPDES Permit Program is implemented in facilities throughout the state within all water bodies. The CPRA Coastal Master Plan is focused within coastal areas of the state. The USDA NRCS conservation practices (CPs) are implemented statewide based on appropriate practices with consideration of watershed characteristics and land uses.

4.c. Model nutrient removal estimated through riverine diversions

In 2014, CPRA contracted with The Water Institute of the Gulf (Water Institute) to develop a model describing the effects of proposed diversions from the Mississippi River into coastal receiving basins on the west and east sides of the Mississippi River. This model includes modifying existing Delft3D modeling tools developed by Deltares (The Netherlands) and also developing new tools to integrate new capacity into the model. This model includes four main components (hydrodynamics, nutrient dynamics, morphodynamics, and vegetation) which will describe the performance of the proposed sediment diversions in coastal Louisiana under various operational strategies.

The nutrient component of this model contains new code that had not previously been developed. Along with the new code development, the Water Institute has been collecting field data in both receiving basins (west and east sides of the Mississippi River) for the purposes of calibrating and validating the nutrient dynamics and morphodynamics model components. This work began in 2014 and will continue through the summer of 2015.

4.d. Identify case studies/model watersheds

The identification of case studies/model watersheds in Louisiana is an ongoing Strategic Action. Efforts that successfully combine restoration and protection activities with stakeholder participation and leadership may champion other groups doing the same. The Strategy (2014) highlighted a floodplain reconnection effort by The Nature Conservancy at the Mollicy Farms in northeastern Louisiana (The Nature Conservancy 2012, 2013; The Conservation Fund 2013). Mollicy Farms, which covers a 17,000-acre tract, is a floodplain reconnection project located in the Upper Ouachita National Wildlife Refuge in the Ouachita River Basin of Louisiana and is the largest floodplain restoration effort in the Lower Mississippi Alluvial Valley. The ongoing identification of case study/model watersheds in Louisiana will aid in demonstrating and promoting effective and successful nutrient management in the state.

4.e. Integrate science-based nutrient management approaches

The integration of science-based nutrient management approaches is ongoing. The CPRA is conducting research on modeling for river diversions that will allow for the addition of a new nutrient component to the model to evaluate nutrient dynamics in response to a river diversion (see strategic action 4.c.). For NPS management, the LSU AgCenter is forefront in researching and applying science-based approaches for nutrient management in Louisiana. At the LSU AgCenter Red River Research Station, researchers are conducting studies on runoff reduction and nutrient and irrigation management strategies (McClure 2014a, 2014b). The LSU AgCenter released in 2014 a Best Management Practice (BMP) manual for poultry litter and soil testing which are foundational for a sound nutrient-management program and essential components of a comprehensive nutrient-

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management plan (CNMP) (Lavergne et al. 2014). For point source management, the LDEQ is funding a project to analyze the long-term productivity and nutrient removal of several wetland assimilation projects permitted under the LPDES Permit Program; this analysis will aid in documenting and understanding the long-term nutrient removal observed in these wetland assimilation areas. As new scientific information becomes available, integration will allow for improved nutrient management activities to be implemented in Louisiana.

4.f. Promote BMP/CP implementation by farm in priority watersheds

Through the NPS Program, LDEQ and LDAF collaborate on setting priority watersheds for implementation of BMP and CPs. Further, the LSU AgCenter is instrumental in working with producers to implement appropriate BMPs/CPs. The LSU AgCenter conducts field days throughout the state to perform outreach and promote BMPs/CPs that are most appropriate for the various commodity groups within Louisiana. The LSU AgCenter scheduled 14 field days in 2014 that focused on topics including beef cattle, rice, sugarcane, sweet potato, and pest and crop production (Benedict 2014).

5. STATUS & TRENDS

The Strategy aims to document the current status and determine trends over time for nutrient management efforts in Louisiana's water bodies. The status and trends will be documented for water quality monitoring efforts of the LDEQ Ambient Water Quality Monitoring Network (AWQMN); implementation of LDEQ NPS Program projects by LDEQ, LDAF, and USDA NRCS; implementation of LPDES Permit Program; modeling efforts of the CPRA, LDEQ, and USGS; implementation of coastal protection and restoration projects by CPRA; and LSU AgCenter developed social indicators of public behavior regarding nutrient management in Louisiana.

5.a. Model nutrient loading estimated within Louisiana watersheds

Modeling of nutrient loading within Louisiana watersheds is ongoing. Regarding the USGS SPARROW Decision Support System (DSS), LDEQ contacted USGS in March 2014 to discuss using SPARROW for modeling efforts in Louisiana watersheds. The USGS conducted a webinar for LDEQ staff to present an overview of the SPARROW model and present options for utilizing the SPARROW model for Louisiana watersheds. At that time the USGS indicated a model update was in progress.

In October 2014, the USGS conducted an on-site training seminar for LDEQ staff where the USGS discussed the SPARROW model in detail and trained LDEQ staff on use of the online DSS. Recently, the USGS informed LDEQ that a model update was in progress and that newer tools were available in SPARROW that might better assist with modeling nutrient loading in Louisiana watersheds using the SPARROW DSS.

5.b. Document in-stream nutrient water quality

Through the LDEQ AWQMN, the agency monitors in-stream water quality in water bodies across the state. In the 2014 water sampling year (October 2013 through September 2014), the LDEQ monitored 131 sites in 127 water bodies for in-stream concentrations of nitrogen (nitrate-nitrite and total Kjeldahl nitrogen) and phosphorus (total phosphorus). Results of the LDEQ ambient water

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quality monitoring are available through the Louisiana Environment Data Access Center (LDEQ 2015i).

5.c. Document Social Indicators of nutrient management behavior

During the Strategy development phase in 2013, the LSU AgCenter conducted surveys with producers to document current behavior on nutrient management in Louisiana. This survey of nutrient management behavior can provide a social indicator associated with implementation of CPs and attitude on water quality for specific agricultural interest groups within the state (LSU AgCenter 2013a).

5.d. Document BMP/CP implementation in watersheds

The LDAF Office of Soil and Water Conservation (OSWC), in collaboration with the LDEQ NPS Program, implemented CPs that aid in improving water quality in watersheds across the state. In the Federal Fiscal Year 2014 (October 2013 through September 2014), the LDAF OSWC implemented CPs in seven LDEQ subsegment watersheds (LDEQ 2014c). These watersheds included Bayou Queue de Tortue, Boston Canal, Bayou Plaquemine Brule, Lake St. Joseph, Lake Louis, Big Creek, and Bayou LaFourche. Conservation Practices included nutrient management, conservation cover crop, irrigation water management, and irrigation land leveling among others (see LDEQ 2014c for details on specific CPs implemented by watershed).

The USDA NRCS also implemented CPs in watersheds across the state of Louisiana. In Federal Fiscal Year for 2013 (October 2013 through September 2014), CPs were certified or planned for 464 USGS HUC12-level watersheds in Louisiana (USDA NRCS 2014). The CPs included nutrient management, irrigation land leveling, conservation crop rotation, and cover crop among others.

5.e. Document permitted discharger inventories

Point source discharges into Louisiana waters are managed through the LPDES Permit Program by the LDEQ under Louisiana's Water Quality Regulations (LAC 33:Chapter IX) (LDEQ 2013b). At the end of Federal FY14 (ending September 2014), there were 13,570 permitted dischargers in the LPDES Permit Program. Of these 13,570 permitted dischargers in FFY14, 10,417 were general or individual permits (non-stormwater) and 3,153 were stormwater permits. The LPDES permits issued in 2014 can be found on the LDEQ website (LDEQ 2015a).

5.f. Document riverine diversions

Louisiana's 2012 Coastal Master Plan identifies a number of diversion projects designed to divert freshwater and sediment from the Mississippi River into adjacent coastal wetlands in an effort to restore land-building processes that were interrupted by the construction of levees on the river and to reverse the trend of land loss that has plagued coastal Louisiana since at least the 1930s. A key component of the implementation process of the 2012 Coastal Master Plan is to more fully investigate technical uncertainties to maximize the benefits of these projects while minimizing trade-offs and unintended consequences. To this end, CPRA is conducting planning-level landscape models, basin-level models, and project-specific models to help define project location, size, operations, and other key project attributes.

Because diversions are an essential restoration tool in coastal Louisiana, CPRA has worked with the Water Institute to establish and convene an independent Diversion Advisory Panel to provide expert

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advice and guidance on key issues that pertain to river diversions. The 12 panel members have backgrounds in a broad range of physical and biological sciences, social science, and engineering and convened three meetings in 2014.

CPRA's diversion development process is on track to make key decisions in 2015 regarding which of the proposed diversions from the 2012 Coastal Master Plan will move forward to engineering and design, including recommendations on specific locations and size.

5.g. Document coastal protection and restoration activities

The CPRA of Louisiana develops an annual plan that is submitted to the Louisiana Legislature in March of each year. This annual plan documents activities from the previous fiscal year, and project activities and budgets for the upcoming fiscal year. The FY2016 Annual Plan is currently in development. Once finalized, Annual Plans are posted on the CPRA website (CPRA 2015a). In addition, quarterly progress reports with information about construction status on individual projects are also posted on the CPRA website (CPRA 2015b).

5.h. Determine trends in nutrient water quality at long-term monitoring stations

The LDEQ is determining trends in nutrient water quality concentrations observed at 21 active long-term monitoring stations located in the LDEQ AWQMN throughout the state. Nutrient trends for nitrogen and phosphorus concentrations observed at AWQMN long-term stations are expected to be available in 2015. Initial indications are that increasing trends in nitrogen and phosphorus are not being observed in major Louisiana water bodies, and in fact nutrient concentrations are either on the decline or stable over the past 30 years.

5.i. Determine trends in Social Indicators

This strategic action for determining trends in Social Indicators will build upon those results obtained in 2013 under action 5.c, with a target completion by 2018. No activities occurred under this action in 2014 and the target completion milestone is set for 2018.

5.j. Determine trends in BMP/CP implementation

This Strategic Action is focused on determining trends in BMP/CP implementation. The USDA NRCS Conservation Program reports on water quality (USDA NRCS et al. 2013; Appendix C) indicate that the land unit acres receiving conservation related to water quality for the practice of nutrient management generally increased from 50,746 acres in 2005 to 69,365 acres 2013 in Louisiana. Further for land unit acres treated by at least one conservation practice related to water quality, a general increase was also observed from 179,375 acres in 2005 to 382,745 acres in 2013.

5.k. Determine trends in permitted discharger inventories

In the LPDES Permit Program, there were 8,736 permitted point-source dischargers at the end of FY09 (ending September 2009) and 10,443 permitted point-source dischargers at the end of FY14 (ending September 2014). This represents an increase of 1,707 permitted, point-source dischargers, or a 19.5% increase, from FY09 to FY14.

5.l. Determine trends in nutrients related to riverine diversions

As a part of the model development described under Strategic Action 4.c., CPRA and the Water Institute have recently collected nutrient-related data in the Barataria (west) and Breton Sound (east)

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basins which will serve as baseline for new diversion projects, as well as providing data for the calibration and validation of the models. Work will continue in future years to investigate and evaluate trends in nutrients as diversion projects move through engineering and design to construction, and finally to operation.

5.m. Determine trends in coastal protection and restoration activities

Activities under this Strategic Action are ongoing. After Hurricanes Katrina and Rita in 2005, the Louisiana Legislature directed the state to respond to the land loss crisis in a new way. Act 8 of the First Extraordinary Session of 2005 created the CPRA of Louisiana and required CPRA to develop a plan for a safe and sustainable coast. The Louisiana Legislature required that this plan be updated every five years to ensure that the state was building on success and taking maximum advantage of new science and innovation. The Louisiana Legislature further directed that the plan include large scale projects and take the needs of the entire coast into account. Most importantly, the plan had to prepare the way for action. The 2007 Coastal Master Plan was the first such plan, and it helped support the many protection and restoration projects that have since been implemented.

In the five years between the 2007 Coastal Master Plan and the 2012 update to the Coastal Master Plan, the state has exponentially increased its financial commitment to the coast. Some of these dollars provided the state's match for repairs and revisions to the Greater New Orleans area levees, allowing the state to leverage over \$14 billion in federal dollars for this vital hurricane protection system. In addition, the federal Coastal Impact Assistance Program (CIAP) is providing approximately \$496 million to Louisiana to mitigate impacts from Outer Continental Shelf oil and gas production. Many of the CIAP projects address coastal restoration needs through shoreline protection, marsh creation, and other strategies. Approximately 90% of the CIAP program's projects are underway or complete.

The 2017 Coastal Master Plan will build on the past and establish a clear vision for the future. It carries the 2007 and 2012 plans forward by improving our methods to ensure projects are completed as efficiently and effectively as possible.

CPRA is actively working on the 2017 Coastal Master Plan and making several key advancements:

- *Improving the science.* The 2012 plan was founded on state of the art science and analysis, and the 2017 effort builds further upon this basis. The modeling process provides a holistic understanding of our coastal environment today and the changes we can expect over the next 50 years. Recent advancements include incorporating a larger geographic area and increasing spatial details of land loss and flood risk.
- *Expanding collaboration and partnerships.* A successful plan is built on local knowledge, input from a diverse range of coastal stakeholders, and extensive dialogue with the public. The 2017 plan is continuing the many partnerships we developed for the 2012 plan and adding additional representation for landowners and community advocates. We continue to reach out to the public in new ways to better share information on increasing flood risk.
- *Focus on flood risk reduction & resilience.* We need to use all of the tools available to reduce communities' flood risk. We are exploring multiple types of nonstructural options and refining policies to help communities become more resilient. In addition, we are also creating new interactive tools to help citizens understand their flood risk now and in the future.

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As a part of the development of the System-Wide Assessment and Monitoring Program (SWAMP) discussed under Strategic Action 9.c., CPRA is planning to utilize these data to evaluate the extent to which the Coastal Master Plan is reaching its overall objectives. This will include the assessment of changes in the priority performance measures, which are linked to overall program performance. Specific to diversion projects, this will include changes in water quality parameters as a result of the introduction of nutrients from the Mississippi River to the coastal wetland receiving basins.

6. WATERSHED CHARACTERIZATION, SOURCE IDENTIFICATION, & PRIORITIZATION

Watershed characterization, source identification, and prioritization involve identifying the natural characteristics of land and water bodies found within watersheds, and identifying the possible suspected sources of nutrients to a given water body. This information on watershed characteristics and suspected sources will allow for prioritization of water bodies for nutrient management activities.

6.a. Characterize watersheds by land use/cover and geographic features

This action was completed in 2013. Main features such as watershed delineations by LDEQ and USGS, National Land Cover Data on land cover/land use, and elevations have been identified through GIS-based products.

6.b. Characterize water bodies by type such as streams, bayous, rivers and lakes

This action was completed in 2012. LDEQ maintains the Water Quality Management Plan, Volume 4 Basins and Subsegments (LDEQ 2008) which describes the watershed basins and subsegments that are part of the LDEQ water programs.

6.c. Characterize watersheds within the coastal zone

This action was completed in 2013. Coastal watersheds in Louisiana can be described as areas where water is generally distributed broadly from streams rather than as in upland watersheds where water is shed from headlands to one outlet. The main stem water body can be higher than the surrounding areas, and that in flood stage, water leaves the main channel, over the banks and down the natural levees to the back swamps; thus, water is shed to the land rather than from it. Flow in these coastal areas may also be bidirectional within the channel due to tides and winds dependent on prevailing conditions including slope.

LDEQ maintains the Water Quality Management Plan, Volume 4 Basins and Subsegments (LDEQ 2008) which describes the watershed basins and subsegments that are part of the LDEQ water programs. Additionally under the CPRA Coastal Master Plan 2012, the CPRA jurisdictional boundary is described in the Louisiana Revised Statutes 49:214.2 as "Coastal area" means the Louisiana Coastal Zone and contiguous areas subject to storm or tidal surge and the area comprising the Louisiana Coastal Ecosystem as defined in Section 7001 of P.L. 110-114' of the Water Resources Development Act.

6.d. Characterize watersheds within existing or planned riverine diversions

As discussed under Strategic Action 5.f., a critical component of the development and implementation of river diversions in Louisiana will be the development of decision support tools to

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estimate the most appropriate location, size, and operational strategy for a given river diversion project. An additional critical piece will be the necessary environmental compliance (National Environmental Policy Act, NEPA) documentation, which provides a characterization of the existing conditions of the receiving basins, along with the anticipated changes as a result of a river diversion project. As the selected projects move towards implementation in the next five years, the environmental documents will be developed.

In addition, the receiving basins are being characterized as a part of the development of predictive models discussed under Strategic Action 4.c. by the collection of empirical data for the purpose of model calibration and validation. Long-term nutrient constituent monitoring, which will allow for the evaluation of trends in nutrients within the receiving basins, will be conducted as a part of System-Wide Assessment and Monitoring Program (SWAMP) discussed in Strategic Action 9.c.

6.e. Identify potential sources through Desktop Analysis/Windshield Survey

This Strategic Action will aid in documenting sources in watersheds. Potential sources can be identified through desktop analyses such as GIS-based tools including Google Earth or maps, and through on-the-ground reconnaissance. Once priority watersheds are identified under the Strategy, this action will be performed to aid in identifying sources which will help to select the appropriate measure to be implemented to address the source. No activities under this action have been conducted at this time.

6.f. Identify unpermitted point sources

The LDEQ Compliance Monitoring Strategy (LDEQ 2013e) outlines approaches for monitoring permit compliance to aid in addressing potential point source issues. In 2014, the LDEQ Inspections Division conducted 977 water inspections within 229 subsegments in Louisiana.

Additionally, LDEQ performs Watershed Sweeps under the Compliance Monitoring Strategy to identify nonpoint sources and unpermitted point source dischargers within targeted subsegments. In 2014, the LDEQ Inspections Division initiated Watershed Sweeps of three subsegments: Bayou Carron (subsegment number LA060210) in the Vermilion-Teche River Basin, Bayou Folse (Subsegment number LA120302) and Bayou Choctaw (subsegment number LA120103) in the Terrebonne Basin. The Watershed Sweep for Bayou Carron resulted in 30 inspections and 13 notices of deficiency (NOD) being issued for point source dischargers. The Watershed Sweep for Bayou Folse resulted in 34 inspections and 11 NODs being issued for point source dischargers. The Watershed Sweep for Bayou Choctaw is still ongoing.

6.g. Identify priority watersheds from leveraging programs

There are several state and federal programs focused on watershed restoration and protection in Louisiana. These programs prioritized watersheds in Louisiana to target for restoration and protection activities. Several USDA NRCS initiatives within Louisiana prioritized watersheds within the state for restoration activities associated with CPs. These USDA NRCS initiatives that include the Gulf of Mexico Initiative (GoMI), Mississippi River Basin Initiative (MRBI), and National Water Quality Initiative (NWQI) target watersheds across the state to address suspected nonpoint sources through the implementation of CPs. Additionally, the LDEQ NPS Program prioritized watershed for implementation activities through 2016 (LDEQ 2011).

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In Louisiana, the USDA NRCS prioritized three HUC 12 watersheds in GoMI, six HUC 8 watersheds in MRBI, and four HUC 12 watersheds in NWQI. The LDEQ NPS Program prioritized 31 watersheds in Louisiana for implementation of CPs, some of which overlap with those watersheds in the USDA initiatives. Priority watersheds for these leveraging programs are provided in Appendix B.

In 2014, a new initiative the Regional Conservation Partnership Program (RCPP) was launched under the USDA NRCS (USDA NRCS 2015a). The RCPP promotes coordination between USDA NRCS and its partners to deliver conservation assistance to producers and landowners. USDA NRCS provides assistance to producers through partnership agreements and program contracts or easement agreements. In Louisiana, two projects were selected as part of this national program. The Rice Stewardship Program in southwest Louisiana led by Ducks Unlimited, which will work with rice producers to improve and sustain their operations through the conservation of natural resources. The CPs will address the primary resource concerns of southwest Louisiana by improving water quality, as well as improving wetland habitat for wintering waterfowl and other wildlife species.

The other project of the RCPP in Louisiana is led by the LDAF Office of Soil and Water Conservation to target conservation delivery to improve soil health, water quantity and quality. LDAF along with partners will conduct site specific assessments within five targeted watersheds across Louisiana. This detailed assessment will identify soil and water management concerns that have a significant potential to contribute to the degradation of soil health and water quality and quantity within the watershed. The primary focus will be to identify, inform and develop resource management plans for landowners and managers to conserve and sustain soil health, water quality and water quantity on working lands. Selection of specific watersheds for the RCPP in Louisiana is ongoing.

6.h. Determine priority watershed basins

This Strategic Action focuses on selecting priority watershed basins for nutrient management in Louisiana. Through the collection of information during the Strategy development phase, it became apparent that combined with this basins location within the larger MARB and ongoing water quality and nutrient management efforts, the Ouachita River Basin in northeast Louisiana served as a model for development and implementation of on-the-ground nutrient management activities. Water quality improvements and participation by partners to support further improvement progress in nutrient management in the Ouachita River Basin make it an ideal model basin.

The LDEQ ambient water quality monitoring data analyzed in 15 subsegments in the Ouachita River Basin; where the LDEQ NPS, LDAF, and USDA NRCS have partnered, developed, and implemented Watershed Implementation Plans (WIPs); illustrates that partnerships can lead to improved water quality. This is demonstrated in the basin as decreasing nitrate-nitrite nitrogen trends were observed in 11 subsegments; decreasing total Kjeldahl nitrogen trends observed in 13; and decreasing total phosphorus trends observed in 12 of the 15 watersheds where WIPs were developed and implemented. Further preliminary water quality trend analysis (see Strategic Action 5.h.) indicates that trends in nutrient concentrations in the Ouachita River Basin are not increasing and in some cases are decreasing.

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The LDEQ, LDAF, and USDA NRCS are actively working together in the Ouachita River Basin in Louisiana to continue to make progress in improving water quality. Of the LDEQ NPS priority watersheds, 12 are within the Ouachita River Basin (see Appendix B). Additionally, both the USDA NRCS MRBI and NWQI programs contain priority watersheds within the Ouachita River Basin. Continuing water quality improvements and nutrient management efforts in the Ouachita River Basin is a priority for Louisiana. The Ouachita River Basin is identified as a priority basin for nutrient management efforts in Louisiana.

6.i. Develop priority watershed scheme for basin subwatersheds

This strategic action develops a priority watershed scheme for basin subwatersheds in Louisiana, allowing for further prioritization within the selected priority watershed basin in Louisiana. Factors in selection of the priority watershed basins for nutrient management include consideration of the current water quality, implementation activities, and participation of local, state, and federal programs within the basin to manage nutrients. In 2014, the Strategy Interagency Team developed a priority watershed scheme that includes the following considerations for selecting priority subwatersheds:

- Current water quality;
- Water quality trends;
- Degree of impairment;
- Degree of success;
- Overlap with monitoring activities (such as the LDEQ Ambient Water Quality Monitoring Network sampling schedule);
- Participation of current or planned local, state, and federal programs within a subwatershed; and
- Data gaps, information gaps, and areas in need of additional improvements within the subwatershed.

6.j. Determine priority subwatersheds

Priority subwatersheds under the Strategy will be selected in 2015.

6.k. Develop/leverage Watershed Nutrient Management Projects for priorities

Following the selection of priority subwatersheds under the Strategy, Watershed Nutrient Management Projects or other implementation mechanisms can be leveraged or developed for nutrient management activities within the priority subwatersheds. This Strategic Action is scheduled to occur within the 2015 to 2018 timeframe.

7. INCENTIVES, FUNDING & ECONOMIC IMPACT ANALYSIS

The Strategy aims to ensure that adequate technical and financial assistance are available for the implementation of voluntary nutrient management strategies to improve participation with Strategy implementation. Advantageous leveraging opportunities among programs and incentives provisions for nutrient management strategy implementation will encourage voluntary participation. Leveraging from LDEQ, LDAF, USDA NRCS, USEPA, and local parish government, among many others, has resulted in economic incentives, technical support, and funding for implementation of CPs in priority watersheds.

7.a. Promote voluntary participation in incentive-based programs

Voluntary participation by stakeholders in nutrient management activities is key to the Strategy. Current incentive-based programs in Louisiana provide a means for voluntary participation that will aid in improving water quality in the state. Voluntary incentive-based programs highlighted in the Strategy include the Louisiana Master Farmer Program, the Advanced Master Gardener Program, and the Environmental Leadership Program.

The Louisiana Master Farmer Program (LMFP) is an environmental stewardship educational program aimed at agricultural producers in the state. Louisiana Master Farmer participation increased from 2,550 participants in 2012 to 2,718 in 2014, an increase in 168 participants over that time. The LMFP added 29 certified Master Farmers in 2013 and six certified Master Farmers in 2014 (LSU AgCenter 2014a, Schulz 2015). As of 2014, there are 206 certified Master Farmers in Louisiana representing 49 of the 64 parishes (77%). In 2014, Master Farmer University sessions aided to maximize a farmer's time and effort spent in the training program by offering Phase 1 and Phase 2 training in a back-to-back format.

In 2014, the LSU AgCenter announced an Advanced Master Gardener Program (LSU AgCenter 2014). The purpose of this program is for Certified Advanced Louisiana Master Gardener volunteers to extend the educational outreach capacity of the Louisiana Cooperative Extension Service in areas such as home, school and community gardens, emphasizing environmental sustainability and nutrient management. The Advanced Louisiana Master Gardener Program is open to current Louisiana Master Gardeners in good standing who have completed at least a year of volunteer service and all initial coursework. As with other Master Programs offered by the LSU AgCenter, the Advanced Master Gardener Program is in three phases and certification comes through the completion of all three program phases, demonstrating mastery of concepts by passing exams with a score of 70% or higher, presenting information to public (master gardener groups, civic organizations, etc.), and maintaining required volunteer and continuing education hours.

The LDEQ Environmental Leadership Program (ELP) aims to promote a cleaner and better environment for Louisiana through voluntary pollution prevention, waste reduction and/or other environmental stewardship efforts (LDEQ 2015f). ELP membership includes large, medium and small businesses, municipalities, non-governmental organizations and schools/universities.

In 2014, the LDEQ presented 14 awards and recognized a total of 17 new members that joined in 2013 to 2014 in recognition of the following (Kelly 2015; LDEQ 2014b):

- Pollution Prevention – 299,783,059 pounds (lbs) of pollutants were removed including: criteria pollutants, toxic air pollutants, biosolids, greenhouse gas emissions.
- Reduction in Water Usage – 4,080,000 gallons (gals) of water per day
- Recycling of Materials – 78,000 pounds per yr of Metals, and 1,995,757 gals per yr of hydrocarbon contaminated water, soapy water, and used oil.

Two special recognition ELP Awards were also presented, including one special in pollution prevention involving nutrient management. The City of West Monroe was awarded the ELP *Special Recognition Award in Pollution Prevention* for the Sparta Re-Use Facility. This project was designed to reduce the draw on the strained Sparta Aquifer while reducing the flow and

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nutrient/pollutant loading to the Ouachita River in an effort to preserve the aquifer. The project consists of two-50-acre ponds where raw influent sewer is reliant on a completely biological process and a 30-day detention time. Treated, cleaner water is discharged to the Ouachita River via a permitted outfall and treated wastewater is managed for use as process water by the local paper mill in the making of food contact paper. Pumping treated wastewater to the paper mill, rather than the river, reduces the nutrient daily loading and provides a source of process water for the mill, rather than drawing water from the Sparta Aquifer. Recycling all sludge produced in the plant eliminates the need to have that sludge dried and landfilled. This unique first of a kind facility has been showcased for other wastewater reuse projects to EPA drinking water standards for the region, the country and for Third World applications. Industrial firms are reviewing the recycle facilities for other industrial applications (LDEQ 2014b).

7.b. Identify and communicate available funding support

This Strategic Action is to identify and communicate available funding support related to nutrient management activities. Many funding programs provide continued opportunities for participation. Programs previously identified in the Strategy remain relevant as available support, and include:

- Agricultural Economic Development Assistance, LDAF
- Clean Water Act Section 319, LDEQ
- Coastal and Estuarine Land Conservation Program (CELCP), LDNR
- Coastal Forest Conservation Initiative (CFCI), CPRA
- Community Development Block Grants (CDBG)
- US Housing and Urban Development (USHUD) CDBG
- CDBG Disaster Recovery Assistance
- Clean Water State Revolving Fund Program (CWSRF)

Newly identified funding support includes:

- Conservation Innovation Grant (CIG) Program, USDA NRCS (2015b)
- Regional Conservation Partnership Program (RCPP), USDA NRCS (2015a)
- Urban Waters, USEPA (2015c)

7.c. Promote assistance (financial or technical) for BMP/CP Implementation

The USDA NRCS, LDAF, and LSU AgCenter promote voluntary participation in financial and technical assistance programs for BMP and CP implementation. The LMFP has increased participation each year with more producers in all three Phases of the program. The Phase 1 environmental education provides an awareness of state and federal regulations, water and soil conservation issues, point and nonpoint source pollution, coastal zone issues and conservation planning to document stewardship of the on-farm natural resources. Phase 2 requires a producer to attend a conservation-based field day or workshop where specific best management practices (BMPs) are demonstrated and discussed. In Phase 3 the producer must request a farm-specific Resource Management System (RMS) level conservation plan on their entire farming operation with USDA NRCS.

In 2014 over 450 new participants attended Phase 1 and 2 resulting in a total of 2,496 farmers completing Phase 1 and 2,239 completing Phase 2 of the LMFP for the duration of the LMFP. Participants in the LMFP have over 1.7 million acres that currently have implemented selected

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BMPs and are participating in current Farm Bill conservation programs. Currently, there are 206 Certified LMFs that have completed all program requirements and are "presumed" to be in compliance with Louisiana's soil and water conservation requirements.

The LSU AgCenter recognizes that in order for educational efforts to be successful in mitigating water quality impairments in State water bodies, we must address the sources of these pollutants regardless of their geographical location. The Louisiana Watershed Simulation Game, under development by the Water Synergy Project, will offer another tool to support awareness, education, and collaboration around actions to improve water quality. Therefore, educational programs have been directed towards non-traditional audiences such as youth, homeowners, and other land owners. To improve citizen awareness about these important dynamics, the AgCenter developed several programs to educate and encourage land-owners about the impacts of runoff from various sources. Sources include marina activities, urban/suburban lawn care, individualized sewage treatment, management of aquaculture ponds, and diminishing healthy ecosystems. Youth in various communities are often engaged as a part of these various outreach strategies. General water quality programs educated students, teachers, and volunteers. Teacher workshops and field trips have provided classroom teachers with knowledge and techniques to significantly enhance education on Louisiana ecosystem topics. Trained teachers have reached about 20,000 students in the classroom. Educational efforts for local parish governments have promoted recommendations based on on-site research to improve hydrology and recreational opportunities.

7.d. Promote assistance (technical) for point sources

LDEQ provides technical assistance for point sources. The LDEQ conducts technical trainings and information sharing sessions for point sources that include EnviroSchool, Sanitary Wastewater Compliance Assistance Training (SWAT), and NetDMR training throughout the year. In 2014, LDEQ held EnviroSchool sessions on an update on Municipal Separate Storm Sewer Systems (MS4) throughout the state, two NetDMR trainings in Baton Rouge, and five sessions for SWAT training in Crowley, Mandeville, Lockport, Ruston, and Baton Rouge, Louisiana (LDEQ 2015b, 2015c, 2015d).

Additionally, the LDEQ Small Business/Community Assistance Program (SB/CAP) provides free technical assistance to small businesses in understanding and complying with wastewater permits and environmental regulations (LDEQ 2015j). In 2014, the LDEQ SB/CAP provided 1,980 water assists which included 807 compliance consultations, 373 newly permitted assistance, 536 permit applications, 5 pollution prevention audits, 259 referrals from internal LDEQ enforcement, permitting or surveillance.

7.e. Document economic impacts from available sources

The documentation of economic impacts of nutrient management is ongoing and essential to implementation of cost-effective nutrient management practices in Louisiana. In 2014, the LDEQ and LSU AgCenter began working to evaluate the costs and benefits of nutrient management to both point and nonpoint sources in Louisiana. Specifically for Louisiana, nutrient management activities are implemented by both point and nonpoint source stakeholders through technology or CPs. Economic impact analyses are necessary in order to determine the relative costs associated with improving water quality through nutrient management. The LDEQ and LSU AgCenter

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anticipate results from this economic cost and benefit study for nutrient management to be available in 2016.

7.f. Explore feasibility for credit trading

The exploration of the feasibility of credit trading is ongoing. Previous work described in the Strategy highlighted two areas of research into water quality credit trading for Louisiana. In the first area of research, CPRA conducted preliminary evaluation of water quality credit trading as an innovative means for nutrient management associated with coastal restoration activities. Through that effort it was determined that expansion of trading between point and nonpoint source stakeholders is possible (CH2M Hill 2011). In the second, the World Resources Institute (2013) reported that nutrient trading in the MARB is an economically feasible approach to reduce the costs of meeting water quality goals in the Gulf of Mexico.

Water quality credit trading remains an area of great interest for not only nutrient management but for management of other water pollutants. The Strategy Team, in coordination with the Louisiana Water Synergy Project members, is looking to further the efforts of exploring the feasibility of trading in Louisiana. The Louisiana Water Synergy Project members are evaluating design options for a Water Quality Trading Program (WQT) as a market-based, voluntary approach for improving water quality in Louisiana. An effective WQT program could lead to greater nutrient reductions in the lower Mississippi River Basin and the Gulf of Mexico more quickly and at a lower overall cost than a traditional regulatory approach. In addition, water quality trading could provide some point sources and agriculture businesses the opportunity to generate revenues, and offer local regulators more policy options for improving water quality.

In 2015 Louisiana Water Synergy Project participants are identifying funding sources and plan to contract a WQT scoping study to evaluate and select program design options, implementation strategies, and Key Performance Indicators (KPIs). The scoping study will review pros and cons of trading program design options, including lessons learned in other US trading programs and input from project participants, regulators, and key stakeholder groups, e.g., agricultural producers, cities, parishes, and municipal point sources.

7.g. Identify gaps

Identifying gaps in incentives, funding, and economic impact analyses may aid in future Strategy efforts. A current gap in economic impact is in understanding the costs and benefits, of nutrient management in Louisiana. This gap is being addressed through a collaborative effort with the LDEQ and the LSU Ag Center where the costs and benefits of nutrient management in Louisiana, including those practices and technologies employed by both nonpoint and point sources will be described; results are anticipated to be available in 2016. Additionally, activities through the Louisiana Water Synergy Project may help to address the gap in market based approaches to connect both nonpoint and point sources through continuing to explore a trading program in Louisiana.

8. TARGETS AND GOALS

Targets and goals under the Strategy will focus on the Strategic Actions outlined in the other nine strategic components and the agency commitments, timelines, and milestones to accomplishing these strategic actions. The targets and goals schedule for all strategic components and actions of the Strategy is presented in Appendix A, and includes agency commitments, timelines, and milestones from 2012 to 2018.

9. MONITORING

Monitoring related to nutrient management in Louisiana allows for the documentation of nutrient levels observed and in documenting other relevant information regarding planning and implementation of nutrient management activities. Monitoring will facilitate the demonstration and verification that nutrient management measures are having the desired impact on water quality. In the event that water quality has not improved, monitoring data guide improvements in the application of more robust and effective nutrient management actions.

9.a. Monitor in-stream nutrient water quality

The LDEQ routinely monitors in-stream nutrient water quality in the states' water bodies through the LDEQ Ambient Water Quality Monitoring Network (AWQMN) (LDEQ 2014a). For the 2014 Water Sampling Year (from October 2013 through September 2014), 131 stations were monitored monthly for nutrients that included nitrogen (as nitrate-nitrite and total Kjeldahl nitrogen) and phosphorus (as total phosphorus).

9.b. Monitor relative to BMP/CP implementation

In 2014, LDEQ and LDAF in conjunction with USDA NRCS conducted water quality monitoring for nutrients and other parameters in 14 watersheds where BMPs were implemented (Appendix D). Of these 14 watersheds, nutrient monitoring was conducted in 10.

9.c. Monitor nutrients associated with riverine diversions

Though CPRA currently does not monitor for nutrients, CPRA conducts monitoring within the coastal zone of Louisiana through its Coastwide Reference Monitoring System (CRMS)-*Wetlands* (CPRA 2015c) with future planned monitoring to be expanded to include more robust water variables. CPRA is currently working with the Water Institute of the Gulf to design a System-Wide Assessment and Monitoring Program (SWAMP) to build on its historic monitoring program, and in light of its growing restoration and protection program, to ensure that a comprehensive network of coastal data collection activities is in place to support the development, implementation, and adaptive management of the coastal protection and restoration program within coastal Louisiana (The Water Institute of the Gulf 2013). The focus of this new monitoring program is to obtain repeated long-term (e.g., years to decades) measurements that can be analyzed to detect changes that may result from a variety of sources, including large-scale restoration and protection projects, environmental disturbances, and other major drivers that impact the system.

Initial steps in developing the SWAMP program included the development of a framework to identify drivers of change, create an inventory of existing and ongoing data collection efforts which could offer leveraging opportunities, and develop priority performance metrics/variables to focus limited resources on the most important and relevant data needs. Nutrient constituents (primarily

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nitrogen, phosphorus, and silica) were identified as one of the priority water quality variables of the SWAMP program.

CPRA anticipates that a Barataria Basin (west side of the river) pilot monitoring plan will be finalized in 2015 and will begin implementation before the end of the calendar year. Other hydrologic basins will follow, with the next priority moving to the Breton Sound Basin (east side of the river).

9.d. Monitor nutrients in point sources

Monitoring for nutrients does occur through the LPDES Permit Program. Nutrient monitoring may be included in LPDES permits to address specific facility types. Nutrient monitoring for TN and TP is being implemented through dissolved oxygen TMDL recommendations in several subsegments in the Lake Pontchartrain Basin. Additionally, LDEQ permits wetland assimilation projects and nutrient monitoring occurs quarterly within the wetland assimilation area. Nutrient monitoring information from the LPDES Permit Program is available through the LDEQ EDMS system (LDEQ 2015e) and may also be available for specific facility types through the USEPA Integrated Compliance Information System (ICIS) (USEPA 2015b).

In 2014, the Water Synergy Project funded an inventory of nutrient releases to the Mississippi River by point sources within the Louisiana Mississippi River Industrial Corridor (MRIC) (Providence Engineering 2014), which was an update to the previously available inventory by Knecht 2000. The inventory was compiled using publicly available information sources and covered the period of 1999 to 2013. Information sources included: USEPA Toxic Release Inventory (TRI) and ICIS databases, self-reported Discharge Monitoring Report (DMR) data, and permit information from LDEQ's Tools for Environmental Management and Protection Organizations (TEMPO) database.

The MRIC encompasses point source discharges that enter the Mississippi River in Louisiana from the West Feliciana Parish-Wilkinson County Line at Louisiana and Mississippi state line, south to the mouth of the river near Head of Pass. According to LDEQ records there are nearly 400 permitted point sources discharging into this stretch of the river. Of these facilities, 125 facilities have been considered to contribute a quantifiable nutrient load to the Mississippi River. This includes 50 chemical plants, 10 refineries, 40 sanitary wastewater treatment plants, 5 fertilizer manufacturing facilities, 4 sugar mills, 4 seafood processors, 3 centralized waste processors, 2 pulp and paper mills, and a landfill. The remaining discharges either do not contribute a nutrient load in their discharge, or the contribution is considered to be insignificant.

The 2014 inventory findings include the following:

- Nutrient releases from industrial and municipal point sources to the MRIC continue to have minimal or essentially no impact on nutrient levels in the river as indicated by ambient water quality data collected by LDEQ. Nutrient levels entering the MRIC at St. Francisville, the northern border of the MRIC, are essentially the same as the levels at Belle Chasse.
- As substantiated by the data and information compiled and evaluated for this inventory, dischargers in the Louisiana MRIC continue to contribute a negligible percentage of the overall nutrient load to the Mississippi River. The combined 2013 industrial point source load and estimated sanitary wastewater load of total nitrogen is approximately 19,543,321

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pounds per year (or 53,543 pounds per day) which represents approximately 6.3 percent of the estimated total nitrogen discharged annually to the Gulf of Mexico from point sources in the entire Mississippi River, and 0.56 percent of the estimated total nitrogen load to the Gulf of Mexico from all sources in the Mississippi River Basin.

- Industrial point sources in the MRIC contribute an estimated 1.5 percent of the total nitrogen from point sources dischargers.
- Sanitary wastewater treatment facilities contribute approximately 3.3 times the total nitrogen load discharged by industrial facilities, at an estimated 4.8 percent.
- During the period 2008 to 2013 there was considerable industrial expansion in Louisiana based on capital expenditure data from the manufacturing sector. Inventory data shows that industry has continued to control nitrogen releases to the river during this period.

9.e. Evaluate compliance with point source permits

The evaluation of compliance with point source permits is ongoing. The LDEQ Enforcement Division leads the effort on compliance with point source permits through the LPDES Permit Program. Enforcement actions issued by LDEQ for any permitted activity, including point source water permits, are available for viewing on the DEQ webpages (LDEQ 2015k).

In regard to nutrients, a review of Discharge Monitoring Reports (DMRs) that are submitted to LDEQ online through the netDMR system to ICIS was conducted. In a review of the DMRs available through ICIS from 2000 to 2014, compliance with point source permits in regard to completion of DMRs for TN or TP was 95%, where only 5% of DMR submissions resulted in data violations that may have been related to overdue reporting or non-receipt, or effluent violations (less than 0.1% of the DMR submissions were effluent violations).

9.f. Identify gaps

Monitoring programs within Louisiana continue to improve. Monitoring program improvements include increased number of permitted dischargers monitoring for nutrients through LPDES Permit Program, increasing the water quality variables including nutrients monitored relative to implementation of coastal restoration and protection projects by CPRA, and monitoring for nutrient water quality in NPS watershed CP implementation projects by the LDEQ, LDAF, and USDA NRCS.

An area identified as a potential gap in monitoring of stream flow measurements in the receiving water body. Quantitative measurements for flow that are correlated with nutrient monitoring is lacking; thus, a potential exists to collect quantitative flow data. Correlated nutrient monitoring and quantitative flow measurements allow for loading determinations, which will aid in improving our understanding of nutrient loadings from various sources in Louisiana water bodies.

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10. REPORTING

Reporting is a critical component of Louisiana's Nutrient Management Strategy. Reporting actions include public outreach, dissemination of strategy documents and resources through the Strategy website, and availability of geospatial information.

10.a. Review of draft strategy December 2013

The review draft of the Strategy was made available to the public December 23, 2013.

10.b. Public comment period

A public comment period occurred from December 23, 2013 through January 31, 2014, following the release of the review draft of the Strategy. Comments on the review draft of the Strategy were received from the public. A Response to Public Comments on Review Draft was prepared and included as Appendix F in the Nutrient Strategy document (Louisiana Nutrient Management Strategy Interagency Team 2014).

10.c. Final strategy

The final Strategy was released in May 2014 (Louisiana Nutrient Management Strategy Interagency Team 2014) and is available for viewing on the Strategy website.

10.d. Strategy review

The Strategy team will review the Strategy in 2018. This five year timeframe from 2013 to 2018 for strategy review is similar to that of other Louisiana programs such as the LDEQ NPS Management Plan from 2011 to 2016 (LDEQ 2011) and the CPRA 2012 Coastal Master Plan (CPRA 2012) from 2012 to 2017 which utilize a five year timeline for program evaluation that incorporates adaptive management.

10.e. Report annually on strategy activities

This present document represents the 2014 Annual Report on Louisiana Nutrient Management Strategy activities.

10.f. Present information through strategy website

The Louisiana Nutrient Management Strategy website from January 2012 through November 2014 was located at <http://lanutrientmanagement.org>; however that website is no longer active. In November 2014, the Strategy website was migrated to the LDEQ webpage and is now located at <http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssessment/NutrientManagementStrategy.aspx>. The previous webpage at <http://lanutrientmanagement.org> will no longer be active as of December 2014.

The Strategy website contains information related to nutrient management activities in Louisiana. Content includes information on nutrient management, resources, decision support tools, programs, frequently asked questions, and provides a link to the Louisiana Nutrient Management Strategy document. As new information is made available it will be accessible to the public through the website.

Figure 1. Louisiana Nutrient Management Strategy website located at <http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssesment/NutrientManagementStrategy.aspx>.



10.g. Present information geospatially through web-based viewer.

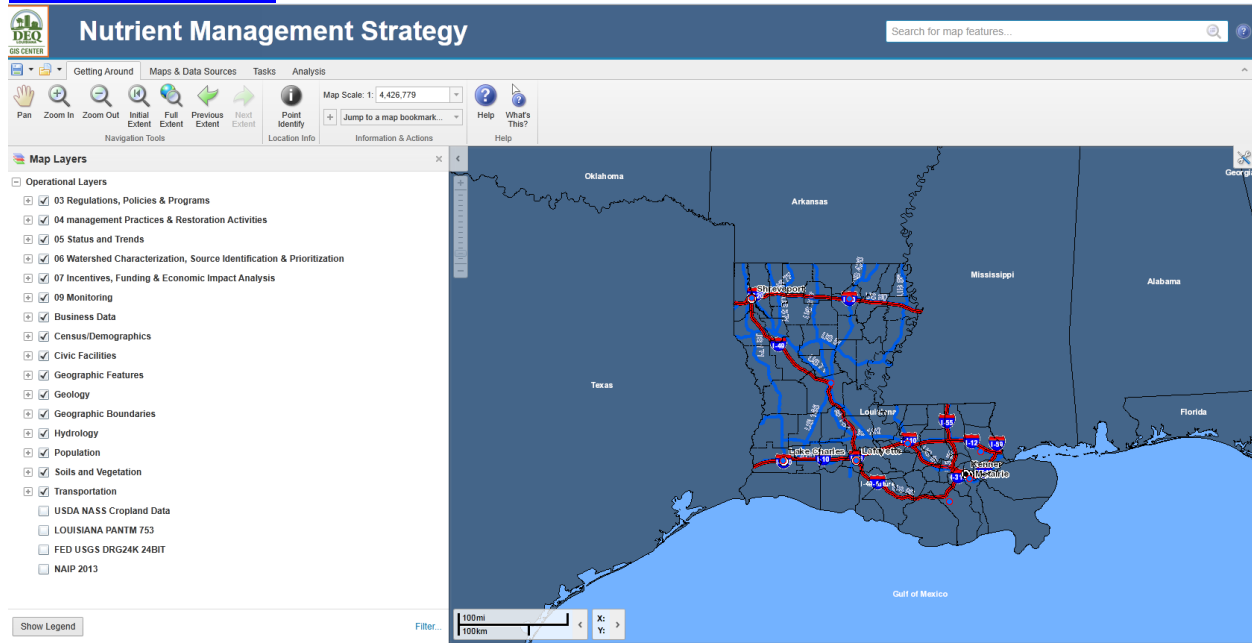
The LDEQ GIS Center provides public access to a web-based geospatial mapping application called the LDEQ Interactive Mapping Application (LIMA). A GIS Project was designed for the Strategy which is available through the LDEQ LIMA site. To access the Strategy geospatial information visit <http://map.ldeq.org/>, go to 'GIS Projects' on left hand menu, and navigate to the 'Nutrient Management Strategy' link, then navigate to the thumbnail for the 'Public Nutrient Management LIMA map'.

The LIMA application contains basic geospatial layers related to business data, census/demographics, civic facilities, geographic features, geology, geographic boundaries, hydrology, population, soils and vegetation, and transportation. Background layers are available for crop data and satellite imagery. Specific content for the Strategy is subgrouped by Strategy Component and currently includes content for Component 3 Regulations, Policies, and Programs; and Component 4 Management Practices & Restoration Alternatives; Component 5 Status and

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Trends; Component 6 Watershed Characterization, Source Identification & Prioritization; Component 7 Incentives, Funding & Economic Impact Analysis; and Component 9 Monitoring. Additional geospatial content will be added as new information becomes available.

Figure 2. Geospatial viewer for Louisiana Nutrient Management Strategy located at <http://map.ldeq.org>.



10.h. Document spotlight(s) of nutrient management

Many projects and programs have been highlights during 2014. The LDEQ NPS Program (or 319 Program) in coordination with LDAF and USDA NRCS published three success stories in 2014 for Bayou Nezpique in southwestern Louisiana, Lake Arthur and the Lower Mermentau River in southwestern Louisiana, and Little Silver Creek in eastern Louisiana. These 319 Program success stories focused on water quality improvements in previously impaired watersheds in Louisiana, where agency collaboration on planning and development and implementation of BMPs resulted in the watersheds being removed from the 303(d) list of impaired waters.

In Bayou Nezpique located in the Mermentau River Basin in southwestern Louisiana, sediment and nutrient runoff from agricultural fields degraded water quality; as a result total dissolved solids (TDS) was listed as a cause of impairment for Bayou Nezpique on the 2008 CWA section 303(d) list of impaired waters (USEPA 2014b). Beginning in 2009, agricultural BMPs were installed in the Bayou Nezpique subsegment resulting in decreased the sediment and nutrient loads entering the bayou, leading to the delisting of TDS as a cause of impairment in the Bayou Nezpique subsegment in 2010.

Another 319 Program success story occurred in Lake Arthur and the Lower Mermentau River in southwestern Louisiana (USEPA 2014c). In 1999, the Louisiana Department of Environmental Quality (LDEQ) added the Lake Arthur and Lower Mermentau River to the CWA section 303(d) list of impaired waters for not meeting the fish and wildlife propagation (FWP) designated use.

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Suspected causes of impairment included low dissolved oxygen (DO) and high levels of total suspended solids (TSS), nutrients, turbidity, oil and grease, and ammonia from point and nonpoint sources of pollution. Landowners implemented agricultural BMPs to reduce pollutant loading within the watershed. Water quality improved and LDEQ removed the Lower Mermentau River and Lake Arthur from the state's list of impaired waters in 2010 for sediment/siltation, TSS, turbidity, and ammonia, and in 2012 for DO, nitrate/nitrite, and total phosphorus (TP).

Little Silver Creek in eastern Louisiana is a 319 Program success story in 2014 (USEPA 2014d). Bacterial loadings from pasture and livestock led to high bacteria counts and resulted in the LDEQ adding Little Silver Creek to the 2008 CWA section 303(d) list of impaired waters. Agricultural producers used pasture renovators, AerWays and grain drills to increase water infiltration, which decreased bacterial loading to the creek. The reduction of bacterial loading resulted in the removal of Little Silver Creek from the 303(d) list of impaired waters in 2014.

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REFERENCES

- Benedict, L.F. 2014. *AgCenter announces 14 field days for 2014*.
http://www.lsuagcenter.com/news_archive/2014/february/headline_news/AgCenter-announces-14-field-days-for-2014.htm. Accessed February 3, 2015.
- Coastal Protection and Restoration Authority (CPRA). 2012. *Louisiana's Comprehensive Master Plan for a Sustainable Coast (Final): 2012 Coastal Master Plan*.
<http://www.coastalmasterplan.louisiana.gov/>.
- Coastal Protection and Restoration Authority (CPRA). 2015a. *Annual Plans*.
<http://coastal.la.gov/a-common-vision/annualplan/>. Accessed May 1, 2015.
- Coastal Protection and Restoration Authority (CPRA). 2015b. *Whats New*.
<http://coastal.la.gov/newscategory/whats-new/>. Accessed May 1, 2015.
- Coastal Protection and Restoration Authority (CPRA). 2015c. *Coastwide Reference Monitoring System (CRMS)*. <http://www.lacoast.gov/crms2/Home.aspx>. Accessed February 3, 2015.
- Kelly, J. 2014. *DEQ 2014 Environmental Leadership Awards presented*. LDEQ Press Release, Baton Rouge, Louisiana. February 26, 2014.
<http://www.deq.louisiana.gov/portal/portals/0/news/pdf/ELP2014pr.pdf>.
- Knecht, A.T. 2000. *Nutrient releases to the Mississippi River in the Louisiana Industrial Corridor: Voluntary Reductions in Nitrogenous and Phosphatic Compounds*. The Louisiana Environmental Leadership Pollution Prevention Program and Louisiana Department of Environmental Quality. Interagency Agreement No. 541321.
- Lavergne, T., M. Stephens and J. Stevens. 2014. *Sampling: Poultry Litter and Soil for Nutrient Analysis*. Pub. 2890.
http://www.lsuagcenter.com/en/crops_livestock/livestock/poultry/environmental+concerns/sampling+poultry+litter+and+soil+for+nutrient+analysis.htm.
- Louisiana Department of Environmental Quality (LDEQ). 2011. *Louisiana's Nonpoint Source Management Plan 2011-2016*. Baton Rouge, LA.
- Louisiana Department of Environmental Quality (LDEQ). 2014a. *Quality Assurance Project Plan (QAPP) for Ambient Water Quality Monitoring Network*. Office of Environmental Services, Water Permits Division. Baton Rouge, Louisiana. QAPP_1004_R08.
<http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssessment.aspx>.
- Louisiana Department of Environmental Quality (LDEQ). 2014b. *2014 ELP Award Descriptions*. Baton Rouge, Louisiana. February 26, 2014.
<http://www.deq.louisiana.gov/portal/portals/0/news/pdf/ELPAwardDescriptions2014.pdf>.

2014 Annual Report
Louisiana Nutrient Management Strategy Implementation

Louisiana Department of Environmental Quality (LDEQ). 2014c. *Louisiana Nonpoint Source Annual Report Federal Fiscal Year (FFY) 2014*.

Louisiana Department of Environmental Quality (LDEQ). 2015a. *Quarterly Water and Biosolids Permits Issued*.

<http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WPDActivities.aspx>.

Accessed February 3, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015b. *NetDMR: Electronic Discharge Monitoring Reports*. <http://www.deq.louisiana.gov/portal/tabid/2951/Default.aspx>.

Accessed February 3, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015c. *Sanitary Wastewater Compliance Assistance Training (SWAT)*.

<http://www.deq.louisiana.gov/portal/DIVISIONS/Enforcement/ComplianceTraining.aspx>

Accessed February 3, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015d. *Enviroschool*.

<http://www.deq.louisiana.gov/portal/PROGRAMS/CommunityIndustryRelations.aspx>.

Accessed February 3, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015e. *Electronic Document Management System (EDMS)*. <http://edms.deq.louisiana.gov/app/doc/querydef.aspx>.

Accessed February 3, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015f. *Louisiana Environmental Leadership Program*.

<http://www.deq.louisiana.gov/portal/PROGRAMS/EnvironmentalLeadershipProgramELP.aspx>.

Accessed March 10, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015g. *A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program*.

<http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/CWA303dVisionProgram.aspx>.

Accessed March 16, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015h. *Louisiana Pollutant Discharge Elimination System: LPDES Permits*.

<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=243>. Accessed March 16, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015i. *Louisiana Environment Data Access Center*. <http://www.deq.louisiana.gov/portal/tabid/2739/Default.aspx>. Accessed March 16, 2015.

2014 Annual Report
Louisiana Nutrient Management Strategy Implementation

Louisiana Department of Environmental Quality (LDEQ). 2015j. *Small Business/Community Assistance Program (SB/CAP)*.

<http://www.deq.louisiana.gov/portal/PROGRAMS/SmallBusinessSmallCommunityAssistanceSBSCAP.aspx>. Accessed March 18, 2015.

Louisiana Department of Environmental Quality (LDEQ). 2015k. *Enforcement Actions*.

<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=225>. Accessed March 24, 2015.

Louisiana Nutrient Management Strategy Interagency Team. 2014. *Louisiana Nutrient Management Strategy: Protection, Improvement, and Restoration of Water Quality in Louisiana's Water Bodies*. Coastal Protection and Restoration Authority of Louisiana, Louisiana Department of Agriculture and Forestry, Louisiana Department of Environmental Quality, and Louisiana Department of Natural Resources. May 2014. Baton Rouge, LA.
<http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssessment/NutrientManagementStrategy.aspx>.

LSU AgCenter. 2013a. *Survey of Agricultural Participation and Attitudes on Conservation and Water Quality*. Unpublished.

LSU AgCenter. 2014a. *Louisiana 'Master Farmers' Lead the Nation*.

http://www.lsuagcenter.com/en/communications/leads/Environment_Natural_Resources/Louisiana+Master+Farmers+Lead+the+Nation.htm. Accessed January 26, 2015.

LSU AgCenter. 2014b. *Louisiana Advanced Master Gardener Program*.

http://www.lsuagcenter.com/en/lawn_garden/master_gardener/advanced-master-gardener/. Accessed January 26, 2015.

McClure, O. 2014a. *AgCenter scientist studies ways to help farmers reduce runoff*. LSU AgCenter Headline News, Bossier City, Louisiana. June 12, 2014.

http://www.lsuagcenter.com/news_archive/2014/june/headline_news/agcenter-scientist-studies-ways-to-help-farmers-reduce-runoff.htm.

McClure, O. 2014b. *Agronomist studies effects of nutrient, irrigation management strategies*. LSU AgCenter Headline News, Bossier City, Louisiana. June 23, 2014.

http://www.lsuagcenter.com/news_archive/2014/june/headline_news/agronomist-studies-effects-of-nutrient-irrigation-management-strategies.htm.

McClure, O. 2014c. *AgCenter forms nutrient task force*. LSU AgCenter Headline News, Winnsboro, Louisiana. June 30, 2014.

http://www.lsuagcenter.com/news_archive/2014/June/headline_news/AgCenter-forms-nutrient-task-force.htm. Accessed March 6, 2015.

McClure, O. 2014d. *AgCenter joins EPA watershed task force*. LSU AgCenter Headline News, Baton Rouge, Louisiana. June 5, 2014.

http://www.lsuagcenter.com/news_archive/2014/June/headline_news/AgCenter-joins-EPA-watershed-task-force.htm. Accessed March 6, 2015.

2014 Annual Report
Louisiana Nutrient Management Strategy Implementation

Providence Engineering. 2014. *Nutrient Releases to the Mississippi River in the Louisiana Industrial Corridor*. Prepared for the Louisiana Water Synergy Project. Pre-release copy.

Schultz, B. 2015. *9 named Louisiana Master Farmers*. LSU AgCenter Headline News, January 14, 2015. http://www.lsuagcenter.com/news_archive/2015/january/headline_news/9-named-louisiana-master-farmers-.htm.

The Water Institute of the Gulf. 2013. *System-Wide Assessment and Monitoring Program (SWAMP) Framework*. http://thewaterinstitute.cdn.z-comm.com/files/pdfs/SWAMP_Framework_11.5.13.pdf.

The CEO Water Mandate. 2015. *The Water Action Hub*. <https://wateractionhub.org/>. Accessed January 21, 2015.

The Conservation Fund. 2013. *Upper Ouachita National Wildlife Refuge - Mollicy Farms*. <http://www.conservationfund.org/projects/upper-ouachita-national-wildlife-refuge/>. Accessed October 9, 2013.

The Nature Conservancy (TNC). 2012. *Annual Report 2012: Hydrologic and Water Quality Response to River Reintroduction in Restored Bottomland Hardwood Forests of the Upper Ouachita River Watershed*. Baton Rouge, Louisiana. CFMS Cooperative Agreement No. 6. 46 p.

The Nature Conservancy (TNC). 2013. *Mollicy Farms: Reconnecting Rivers and Floodplains*. Baton Rouge, Louisiana. <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/louisiana/explore/mollicy-farms.pdf>.

US Department of Agriculture Natural Resources Conservation Service (USDA NRCS), Financial Management Modernization Initiative (FMMI) November 2014, Foundation Financial Information System (FFIS) December 2011, National Conservation Planning Database November 2013 and ProTracts Program Contracts System October 2013. 2013. *NRCS Conservation Programs: Louisiana 2005-2013*. http://www.nrcs.usda.gov/Internet/NRCS_RCA/reports/cp_la.html#wq. Accessed May 1, 2015.

US Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2014. *Conservation Practices, ProTracts*. October 25, 2013.

US Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2015a. *Regional Conservation Partnership Program (RCPP)*. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farbill/rcpp/>. Accessed February 3, 2015.

2014 Annual Report
Louisiana Nutrient Management Strategy Implementation

- US Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2015b. *Conservation Innovation Grants*.
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig/#>. Accessed March 24, 2015.
- US Environmental Protection Agency (USEPA). 2013. *New Vision for the CWA 303(d) Program – An Updated Framework for Implementing the CWA 303(d) Program Responsibilities*.
<http://water.epa.gov/lawsregs/lawguidance/cwa/tmdl/programvision.cfm>. Accessed January 26, 2015.
- US Environmental Protection Agency (USEPA). 2014a. *Mississippi River/Gulf of Mexico Watershed Task Force Announces Agreement with 12 Universities to Further Water Pollution Reduction Programs and Goals* USEPA News Release, May 21, 2014.
<http://yosemite.epa.gov/opa/admpress.nsf/0/645836A375ABEE1385257CDF004D41E1>.
- US Environmental Protection Agency (USEPA). 2014b. *Louisiana: Bayou Nezpique - Federal and State Agencies Rally Together to Reduce Total Dissolved Solids Concentrations in Bayou*
http://water.epa.gov/polwaste/nps/success319/la_bayou.cfm. Accessed January 23, 2015.
- US Environmental Protection Agency (USEPA). 2014c. *Louisiana: Lake Arthur & Lower Mermentau River - Partners Cooperate to Improve Water Quality*.
http://water.epa.gov/polwaste/nps/success319/la_arthur.cfm. Accessed January 23, 2015.
- US Environmental Protection Agency (USEPA). 2014d. *Louisiana: Little Silver Creek - Implementing Best Management Practices on Pasture Reduced Bacteria Levels in Creek*.
http://water.epa.gov/polwaste/nps/success319/la_silver.cfm. Accessed January 23, 2015.
- US Environmental Protection Agency (USEPA). 2014e. *Recovery Potential Screening: Tools for Comparing Impaired Waters Restorability*.
<http://water.epa.gov/lawsregs/lawguidance/cwa/tmdl/recovery/>.
- US Environmental Protection Agency (USEPA). 2015a. *Nitrogen and Phosphorus Pollution Data Access Tool (NPDAT)*. <http://www2.epa.gov/nutrient-policy-data/nitrogen-and-phosphorus-pollution-data-access-tool>. Accessed January 21, 2015.
- US Environmental Protection Agency (USEPA). 2015b. *Permit Compliance System (PCS) and Integrated Compliance Information System (ICIS) databases*.
<http://www.epa.gov/enviro/facts/pcs-icis/search.html>. Accessed February 3, 2015.
- US Environmental Protection Agency (USEPA). 2015c. *Urban Waters*.
<http://www2.epa.gov/urbanwaters>. Accessed March 24, 2015.

APPENDIX A: STRATEGIC ACTIONS SCHEDULE

8. Targets and goals for strategic actions from 2012 through 2018 for the Louisiana Nutrient Management Strategy (“strategy”).

X = Completed activity; O = Ongoing activity; T = Target date for completion of activity; -- = Activity not initiated during that period.

Activities may be dependent on resource availability.

Strategic Action	Agency Commitment(s)	2012	2013	2014	2015	2016	2017	2018
1. Stakeholder Engagement								
1.a. Identify stakeholders with interest in the strategy	Interagency Team	X	--	--	--	--	--	--
1.b. Engage stakeholders in strategy development	Interagency Team	X	X	--	--	--	--	--
1.c. Perform outreach/education on strategy activities	Interagency Team	--	--	O	O	O	O	O
1.d. Identify and promote partnerships/leveraging opportunities	Interagency Team Stakeholders	--	--	O	O	O	O	O
2. Decision Support Tools								
2.a. Identify available tools	Interagency Team	X	X	O	O	O	O	O
2.b. Evaluate available tools	Interagency Team	X	X	O	O	O	O	O
2.c. Select available tools	Interagency Team	X	X	O	O	O	O	O
2.d. Document selected tools	Interagency Team	--	X	O	O	O	O	O
3. Regulations, Programs, & Policies								
3.a. Identify current	Interagency Team	X	X	O	O	O	O	O
3.b. Identify gaps	Interagency Team	X	X	O	O	O	O	O
3.c. Propose or establish new	Interagency Team	--	X	O	O	O	O	O
4. Management Practices & Restoration Activities								
4.a. Document current practices related to nutrient management	Interagency Team	X	X	O	O	O	O	O
4.b. Identify areas where practices are being implemented	Interagency Team	X	X	O	O	O	O	O
4.c. Model nutrient removal estimated through	CPRA	O	O	O	T	--	--	--

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Strategic Action	Agency Commitment(s)	2012	2013	2014	2015	2016	2017	2018
riverine diversions								
4.d. Identify case studies/model watersheds	Interagency Team	X	X	O	O	O	O	O
4.e. Integrate science-based nutrient management approaches	Interagency Team	--	--	O	O	O	O	O
4.f. Promote BMP/CP implementation by farm in priority watersheds	USDA NRCS LDAF OSWC LSU AgCenter	--	--	O	O	O	O	O
5. Status & Trends								
5.a. Model nutrient loading estimated within Louisiana watersheds	USGS Interagency Team	X	--	O	O	O	O	T
5.b. Document in-stream nutrient water quality	LDEQ	X	X	O	O	O	O	O
5.c. Document Social Indicators of nutrient management behavior	LSU AgCenter	--	X	--	--	--	--	--
5.d. Document BMP/CP implementation in watersheds	USDA NRCS LDAF OSWC LSU AgCenter LDEQ	X	O	O	O	O	O	O
5.e. Document permitted discharger inventories	LDEQ	--	--	O	O	O	O	O
5.f. Document riverine diversions	CPRA	--	--	O	O	O	O	T
5.g. Document coastal protection and restoration activities	CPRA	--	--	O	O	O	O	T
5.h. Determine trends in nutrient water quality at long-term monitoring stations	LDEQ	--	O	O	T	--	--	--
5.i. Determine trends in Social Indicators	LSU AgCenter	--	--	O	O	O	O	T

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Strategic Action	Agency Commitment(s)	2012	2013	2014	2015	2016	2017	2018
5.j. Determine trends in BMP/CP implementation	USDA NRCS LDAF OSWC LSU AgCenter LDEQ	--	--	O	O	O	O	T
5.k. Determine trends in permitted discharger inventories	LDEQ	--	--	O	O	O	O	O
5.l. Determine trends in nutrients related to riverine diversions	CPRA	--	--	O	O	O	O	T
5.m. Determine trends in coastal protection and restoration activities	CPRA	--	--	O	O	O	O	T
6. Watershed Characterization, Source Identification, & Prioritization								
6.a. Characterize watersheds by land use/cover and geographic features	LDEQ USDA	X	X	--	--	--	--	--
6.b. Characterize water bodies by type such as streams, bayous, rivers, and lakes	LDEQ	X	--	--	--	--	--	--
6.c. Characterize watersheds within the coastal zone	LDNR	X	O	O	O	O	O	O
6.d. Characterize watersheds with existing or planned riverine diversions	CPRA	--	X	O	O	O	O	O
6.e. Identify potential sources through Desktop Analysis/Windshield Survey	Interagency Team	--	--	O	O	O	O	O
6.f. Identify unpermitted point sources	LDEQ	X	X	O	O	O	O	O
6.g. Identify priority watersheds from leveraging programs	USDA GoMI USDA MRBI USDA NWQI LDAF/LDEQ/LDNR NPS	X	X	O	O	O	O	O
6.h. Determine priority watershed basins	Interagency Team	--	X	T	--	--	--	--
6.i. Develop priority watershed scheme for	Interagency Team	--	--	T	--	--	--	--

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Strategic Action	Agency Commitment(s)	2012	2013	2014	2015	2016	2017	2018
basin subwatersheds								
6.j. Determine priority subwatersheds	Interagency Team	--	--	O	T	--	--	--
6.k. Develop/leverage Watershed Nutrient Management Projects for priorities	Interagency Team Stakeholders	--	--	--	O	O	O	O
7. Incentives, Funding, & Economic Impact Analysis								
7.a. Promote voluntary participation in incentive-based programs	Louisiana Master Farmer Louisiana Master Poultry Producer Louisiana (Kellogg) Master Rice Grower Louisiana Master Cattlemen Louisiana Master Gardener Louisiana Master Naturalist Louisiana Environmental Leadership	--	X	O	O	O	O	O
7.b. Identify and communicate available funding support	Interagency Team Stakeholders	--	--	O	O	O	O	O
7.c. Promote assistance (financial or technical) for BMP/CP implementation	LDAF/LDEQ/LDNR NPS USDA NRCS LDAF OSWC	X	X	O	O	O	O	O
7.d. Promote assistance (technical) for point sources	SB/SCAP	X	X	O	O	O	O	O
7.e. Document economic impacts from available sources	Interagency Team LSU AgCenter Stakeholders	--	X	O	O	O	O	O
7.f. Explore feasibility for credit trading	Interagency Team Stakeholders Louisiana Water Synergy Project	--	--	O	O	O	O	T
7.g. Identify gaps	Interagency Team Stakeholders	--	--	O	O	O	O	O

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Strategic Action	Agency Commitment(s)	2012	2013	2014	2015	2016	2017	2018
9. Monitoring								
9.a. Monitor in-stream nutrient water quality	LDEQ	X	X	O	O	O	O	O
9.b. Monitor relative to BMP/CP implementation	USDA GoMI USDA MRBI USDA NWQI LDAF/LDEQ/LDNR NPS	--	--	O	O	O	O	O
9.c. Monitor nutrients associated with riverine diversions	CPRA	--	--	--	O	O	O	O
9.d. Monitor nutrients in point sources	LDEQ LPDES Permitted Dischargers	X	X	O	O	O	O	O
9.e. Evaluate compliance with point source permits	LDEQ	X	X	O	O	O	O	O
9.f. Identify gaps	Interagency Team Stakeholders	--	--	O	O	T	--	--
10. Reporting								
10.a. Review draft strategy December 2013	Interagency Team	--	X	--	--	--	--	--
10.b. Public comment period	Interagency Team	--	--	X	--	--	--	--
10.c. Final strategy	Interagency Team	--	--	X	--	--	--	--
10.d. Strategy review	Interagency Team	--	--	--	--	--	--	T
10.e. Report annually on strategy activities	Interagency Team	--	--	O	O	O	O	O
10.f. Present information through strategy website	Interagency Team	--	X	O	O	O	O	O
10.g. Present information geospatially through web-based viewer	Interagency Team	--	X	O	O	O	O	O
10.h. Document spotlight(s) of nutrient management	Interagency Team Stakeholders	--	--	O	O	O	O	O

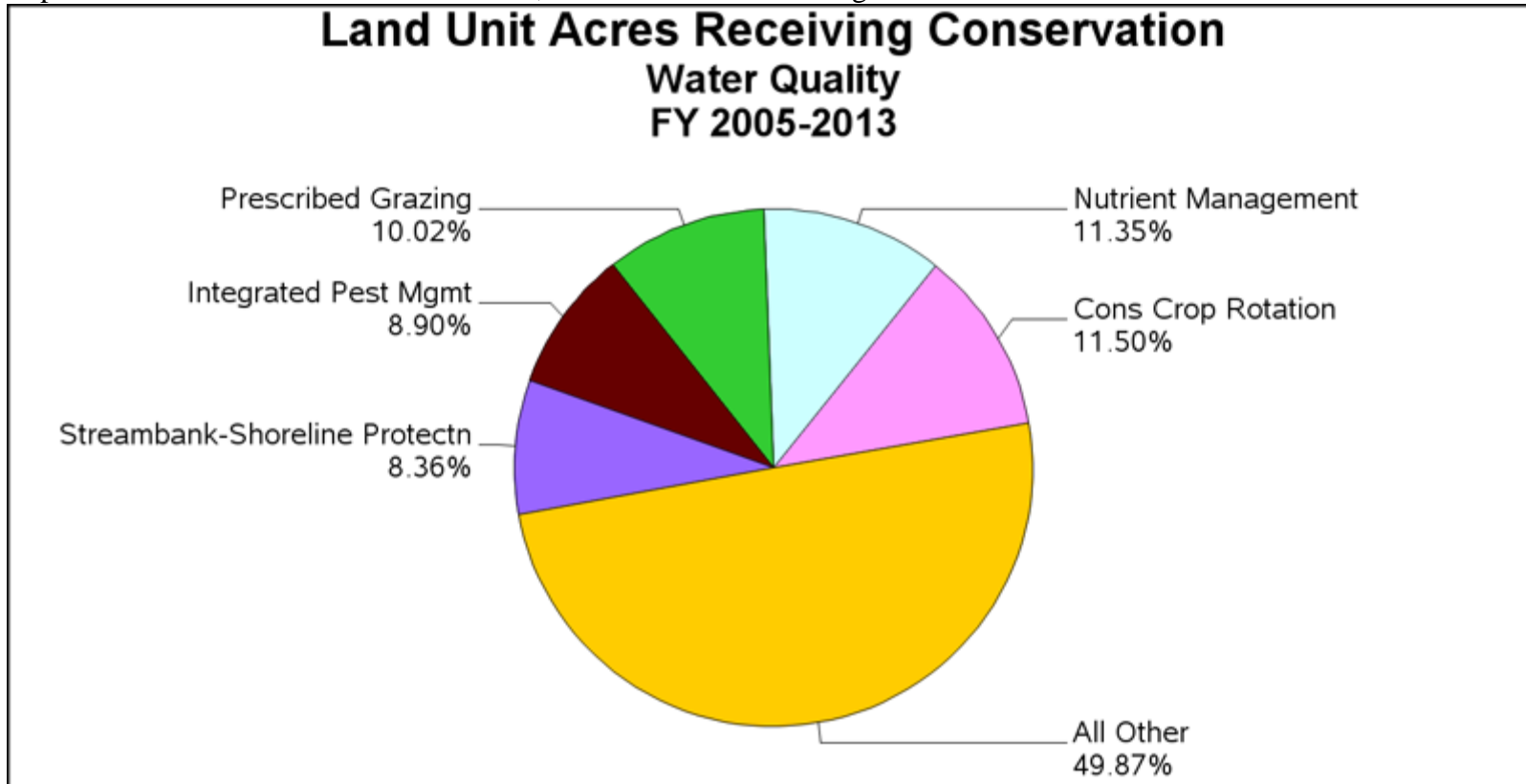
APPENDIX B: PRIORITY WATERSHEDS OF LEVERAGING PROGRAMS

Priority watersheds in Louisiana through USDA initiatives including Gulf of Mexico Initiative (GoMI), Mississippi River Basin Initiative (MRBI), and the National Water Quality Initiative (NWQI), and through the LDEQ NPS Program.

Program	Watershed Name	Watershed Level	Watershed Code
USDA-GoMI	Bayou Corne-Grand Bayou	HUC 12	080903020302
USDA-GoMI	Bayou Grand Marais	HUC 12	080802020103
USDA-GoMI	Bayou St. Vincent-Little Grand Bayou	HUC 12	080903020304
USDA-MRBI	Bayou Macon	HUC 8	08050002
USDA-MRBI	Boeuf River	HUC 8	08050002
USDA-MRBI	Lower Mississippi-Baton Rouge	HUC 8	08070100
USDA-MRBI	Lower Mississippi-Greenville	HUC 8	08030100
USDA-MRBI	Lower Mississippi-Natchez	HUC 8	08060100
USDA-MRBI	Mermentau	HUC 8	08080202
USDA-NWQI	Big Creek	HUC 12	080702050203
USDA-NWQI	East Fork Big Creek	HUC 12	080702050202
USDA-NWQI	Indian Bayou-Bayou Queue De Tortue	HUC 12	080802020101
USDA-NWQI	Lake Louis-Bayou Louis	HUC 12	080402070303
LDEQ NPS	Bayou Lafourche	Subsegment	020401
LDEQ NPS	Six Mile Creek	Subsegment	030503/030504
LDEQ NPS	Natalbany River	Subsegment	040503
LDEQ NPS	Yellow Water River	Subsegment	040504
LDEQ NPS	Ponchatoula Creek/Ponchatoula River	Subsegment	040505
LDEQ NPS	Selsers Creek	Subsegment	040603
LDEQ NPS	Big Creek (NWQI)	Subsegment	040703
LDEQ NPS	Lower Tchefonctre River	Subsegment	040801
LDEQ NPS	Bogue Falaya River	Subsegment	040804
LDEQ NPS	Bayou Plaquemine Brule	Subsegment	050201
LDEQ NPS	Bayou Queue de Tortue (GoMI)	Subsegment	050501
LDEQ NPS	Bayou Lacassine (MRBI)	Subsegment	050601
LDEQ NPS	Bayou Chene (MRBI)	Subsegment	050603
LDEQ NPS	Bayou Teche	Subsegment	060301/060401
LDEQ NPS	Boston Canal	Subsegment	060910
LDEQ NPS	Bayou Louis/Lake Louis	Subsegment	080202/080203
LDEQ NPS	Bayou Desiard	Subsegment	080701
LDEQ NPS	Upper Ouachita River (Mollicy Farms)	Subsegment	080101
LDEQ NPS	Cheniere Creek	Subsegment	080801
LDEQ NPS	Bayou Lafourche (MRBI)	Subsegment	080904
LDEQ NPS	Turkey Creek (MRBI)	Subsegment	080905/080906
LDEQ NPS	Joe's Bayou	Subsegment	081002
LDEQ NPS	Tensas River	Subsegment	081201
LDEQ NPS	Lake St. Joseph	Subsegment	081202
LDEQ NPS	Dugdemona River	Subsegment	081401
LDEQ NPS	Caney Lake	Subsegment	081505
LDEQ NPS	Little River	Subsegment	081601/081602
LDEQ NPS	Grand/Little Grand Bayou	Subsegment	120206
LDEQ NPS	Upper Bayou Terrebonne	Subsegment	120301
LDEQ NPS	Middle Bayou Terrebonne	Subsegment	120601
LDEQ NPS	Bayou Folse	Subsegment	120305

APPENDIX C: USDA NRCS LAND UNIT ACRES RECEIVING CONSERVATION FOR PRACTICES RELATED TO WATER QUALITY IN LOUISIANA, 2005-2013

Reproduced from USDA NRCS et al. 2013, NRCS Conservation Programs: Louisiana 2005-2013.



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The following chart and table includes practices that are related to Water Quality. Water quality is an indicator of the health of our environment and reflects what occurs on the land. The primary water quality issues from agriculture are sediment, nutrients, pesticides, pathogens, and in some parts of the country, salinity. Using conservation practices to improve land in an environmentally sound manner will result in better water quality for drinking, recreation, wildlife, fisheries and industry. Only practices representing a significant portion of the total for the period are included. Practices not included are summed into the All Other category.

USDA NRCS Land Unit Acres Receiving Conservation (including practice count) by Fiscal Year, Water Quality Practices in Louisiana (USDA NRCS et al. 2013).

Practice Name	Practice Code	2005 Acres	2005 Count	2006 Acres	2006 Count	2007 Acres	2007 Count	2008 Acres	2008 Count	2009 Acres	2009 Count	2010 Acres	2010 Count	2011 Acres	2011 Count	2012 Acres	2012 Count	2013 Acres	2013 Count
Access Control	472	16,351	652	33,422	1,528	17,781	850	38,733	1,546	8,872	381	14,025	672	24,110	911	31,031	726	31,003	947
Access Road	560	1,761	20	2,360	60	324	9	190	4	1,099	14	405	11	173	3	3,505	22	1,492	21
Animal Mortality Facility	316											36	1			13	1	7	1
Composting Facility	317	102	40	247	30	225	31	202	11	44	4	60	4	44	4	60	4	53	6
Conservation Cover	327	7,832	378	38,007	1,775	21,508	1,183	18,790	928	12,497	567	13,065	557	23,685	1,186	19,678	893	12,318	568
Conservation Crop Rotation	328	32,421	756	29,450	772	47,127	1,149	45,063	1,769	64,401	3,797	65,983	3,542	92,471	2,826	76,123	2,316	113,194	2,950
Contour Farming	330					71	2					239	11					126	10
Cover Crop	340	3,341	85	2,358	44	6,718	145	5,814	169	2,357	42	1,119	12	3,796	62	1,750	44	4,952	77
Critical Area Planting	342	4,185	171	9,628	397	9,794	227	9,589	180	12,712	190	9,055	221	5,914	168	5,787	134	8,104	173
Diversion	362			31	1			200	5	103	3	49	1			78	2	44	2
Filter Strip	393	261	7	1,411	29	603	18	192	5	519	11	181	8	201	2			421	12
Grade Stabilization Structure	410	18,778	409	26,322	497	34,703	681	44,783	728	43,265	838	24,536	588	35,702	633	31,743	599	27,281	733

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Practice Name	Practice Code	2005 Acres	2005 Count	2006 Acres	2006 Count	2007 Acres	2007 Count	2008 Acres	2008 Count	2009 Acres	2009 Count	2010 Acres	2010 Count	2011 Acres	2011 Count	2012 Acres	2012 Count	2013 Acres	2013 Count
Grassed Waterway	412	420	11	966	46	1,603	19	1,698	34	1,413	18	283	6	34	1	96	2	140	3
Heavy Use Area Protection	561	3,676	151	4,721	254	6,788	322	12,251	465	11,506	418	16,854	646	17,952	684	14,129	675	12,939	496
Integrated Pest Management (IPM)	595	45,439	1,265	40,065	1,454	44,792	1,224	38,174	1,310	30,896	886	40,029	1,361	39,836	794	67,783	2,399	90,826	5,299
Irrigation System, Microirrigation	441					436	9			94	1	21	2	13	3	3,523	7	18	7
Irrigation System, Tailwater Recovery	447			206	3			562	1	243	2							74	1
Irrigation Water Management	449	17,118	507	18,906	490	24,774	622	30,224	721	32,892	724	35,200	730	23,818	337	96,280	1,528	75,582	1,528
Mulching	484	1,540	81	5,325	292	2,977	101	2,690	40	2,375	53	2,020	53	2,329	49	3,202	70	2,871	65
Nutrient Management	590	50,746	1,668	47,536	1,891	42,651	1,660	62,272	1,936	76,000	1,943	63,764	2,076	59,130	1,449	87,433	2,107	69,365	1,704
Prescribed Grazing	528	30,650	1,093	72,626	2,809	56,313	2,374	58,218	1,994	46,226	2,016	55,635	2,212	58,715	2,117	51,793	2,052	62,807	2,265
Residue Management, No-Till/Strip Till	329	3,879	84	11,233	189	8,400	178	6,018	137	4,808	85	3,222	123	4,602	69	1,456	34	3,519	78
Residue and Tillage Management, Mulch Till	345	550	9	2,588	38	624	10	1,475	42	3,908	85	394	17	886	23	4,013	97	1,897	53

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Practice Name	Practice Code	2005 Acres	2005 Count	2006 Acres	2006 Count	2007 Acres	2007 Count	2008 Acres	2008 Count	2009 Acres	2009 Count	2010 Acres	2010 Count	2011 Acres	2011 Count	2012 Acres	2012 Count	2013 Acres	2013 Count
Residue and Tillage Management, Ridge Till	346	4,742	154	4,759	148	7,871	190	5,918	132	6,365	209	3,830	72	11,125	248	3,951	144	5,482	182
Riparian Forest Buffer	391	4,313	236	2,104	128	2,440	115	2,094	59	812	21	1,159	62	3,301	60	2,340	48	1,480	66
Riparian Herbaceous Cover	390													6	1			118	3
Roof Runoff Structure	558													88	1				
Stream Crossing	578			370	2	37	3	183	1	20	2	18	1	56	2	10	1	83	5
Streambank and Shoreline Protection	580	29,573	13	307,249	8	3,490	10	3,729	5	8,357	7	8,345	1	41,247	7	9,434	9	214	1
Structure for Water Control	587	26,155	61	5,138	147	4,088	79	1,327	43	2,613	50	9,708	37	2,455	63	1,453	40	1,649	43
Tree/Shrub Establishment	612	30,862	799	136,170	1,630	39,523	1,190	13,199	454	10,422	298	17,128	638	16,467	522	13,106	410	16,227	680
Waste Facility Closure	360			14	1	42	3			2	1	66	8					29	2
Waste Recycling	633	2,413	142	6,997	387	4,919	235	4,818	222	3,903	181	5,719	248	5,537	228	6,033	196	7,002	291
Waste Storage Facility	313	125	54	244	38	237	27	191	13	110	7	23	2	212	5	18	2	104	10
Waste Transfer	634					55	3	39	6	25	2	0	1	160	9	19	1	59	5

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Practice Name	Practice Code	2005 Acres	2005 Count	2006 Acres	2006 Count	2007 Acres	2007 Count	2008 Acres	2008 Count	2009 Acres	2009 Count	2010 Acres	2010 Count	2011 Acres	2011 Count	2012 Acres	2012 Count	2013 Acres	2013 Count
Waste Treatment Lagoon	359					4	1	2	1	3	1	44	5	17	2	13	2	112	7
Water Well Decommissioning	351	456	7	380	17	55	13	1,480	36	3,788	73	2,965	57	1,863	33	1,291	30	563	15
Wetland Creation	658	6	1	781	40	2,019	17	2,166	16	148	3	1,955	10	362	10	1	1	28	1
Wetland Enhancement	659	36,369	23	12,545	32	21,390	10	23,848	3	28,113	22	28,288	6	112,505	38	30,826	375	11,939	61
Wetland Restoration	657	28,863	582	24,374	662	25,657	445	14,796	348	56,866	160	45,508	403	53,793	422	37,910	301	18,484	257

Notes: Data Source: USDA-NRCS, National Conservation Planning Database, November 2013. Land unit acres may be counted multiple times across practices and fiscal years.

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The following table includes program information under which the above practices related to Water Quality were applied. These data reflect the geographic extent of land treated with water quality practices by each conservation program during a fiscal year. Land unit acres may be counted multiple times across programs and fiscal years, but are only counted once per program per fiscal year.

Land Unit Acres Receiving Conservation (including practice count) by Program and Fiscal Year																		
Water Quality Practices																		
Program	2005		2006		2007		2008		2009		2010		2011		2012		2013	
	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count
Conservation Reserve Program (CRP)	11,460	1,396	37,548	4,583	27,900	2,977	31,580	2,715	11,587	927	15,345	1,432	22,022	2,001	11,921	1,130	6,548	902
Conservation Technical Assistance (CTA)	65,565	1,337	138,812	5,048	116,738	4,180	151,977	5,997	202,074	7,135	202,467	8,280	292,345	6,546	266,398	9,515	284,590	13,541
Environmental Quality Incentives Program (EQIP)	86,504	4,959	94,702	4,666	123,543	5,079	109,020	4,251	135,724	4,703	108,536	4,241	103,113	3,945	92,768	3,488	98,226	3,431
Grassland Reserve Program (GRP)	4,550	174	1,267	79	459	74					1,129	135	580	44			573	24
Watershed Protection and Flood Prevention Program (WFPO)	622	52	251	9	179	6	479	16	533	16	440	13	956	35				
Wetlands Reserve Program (WRP)	19,540	1,380	16,541	1,344	18,947	689	10,415	277	7,593	156	4,257	172	7,670	264	29,926	924	13,177	644
Wildlife Habitat Incentive Program (WHIP)	1,165	148	1,536	110	3,092	130	3,837	104	3,293	178	3,370	129	3,346	131	7,078	215	3,441	86
Other	461	13			6	20	185	4			91	3	56	6				

Notes: Data Source: USDA-NRCS, National Conservation Planning Database, November 2013. Land unit acres may be counted multiple times across programs and fiscal years, but are only counted once per program per fiscal year.

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The following table includes unique land unit acres for practices related to Water Quality. Land unit acres may be counted multiple times across fiscal years, but are only counted once per fiscal year.

Land Unit Acres Receiving Conservation (including practice count) by Fiscal Year																	
Water Quality Practices - Land Unit Acres treated by at least one practice																	
2005		2006		2007		2008		2009		2010		2011		2012		2013	
Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count	Acres	Count
179,375	9,459	279,429	15,839	272,093	13,155	293,345	13,364	346,422	13,115	316,828	14,405	414,898	12,972	393,049	15,272	382,745	18,628

Notes: Data Source: USDA-NRCS, National Conservation Planning Database, November 2013. Land unit acres may be counted multiple times across fiscal years.

APPENDIX D: MONITORING BY LDEQ AND LDAF NONPOINT SOURCE IMPLEMENTATION IN 2014

Waterbody Name	Number of Stations Monitored	Number of BMPs Implementing	Impairment	Parameters sampled
Bayou Lafourche	12 ¹	62	DO, TSS, Turbidity, and Fecal Coliform	pH, DO, conductivity, temperature, turbidity, BOD, nitrite-nitrogen, nitrate-nitrogen, total phosphates, TSS, total solids, TDS, fecal coliform, DO saturation, salinity, oil and grease, TKN
Turkey Creek	11 ³	20	DO	pH, DO, conductivity, temperature, BOD, nitrite-nitrogen, nitrate-nitrogen, total phosphates, TSS, total solids, TDS, chlorophyll a, ammonia
Lake St. Joseph	7 ²	37	nitrate/nitrite, DO, total phosphorus, TSS, and turbidity	pH, DO, conductivity, temperature, anions, TDS, TSS, total solids, turbidity, total phosphorus, total Kjeldahl nitrogen, BOD, and total organic carbon
Boston Canal	14 ¹	1	Carbofuran and fecal coliform	fecal coliform, turbidity, ammonia - nitrogen, nitrate nitrogen, phosphate, pH, temperature, water clarity, DO, DO saturation, conductivity, salinity, and oil and grease
Comite River	17 ¹	2	fecal coliform	fecal coliform, pH, temperature, water clarity, DO, DO saturation, conductivity, salinity, and oil and grease
Upper Bayou Terrebonne	18 ¹	3	fecal coliform and non native aquatic plants	pH, temperature, DO, DO percent saturation, secchi, and conductivity/salinity, fecal coliform, TP, and Nitrate/Nitrite.
Bayou Folsé	12 ¹	5	Nitrate/Nitrite (Nitrite + Nitrate as N), DO, Total Phosphorus, Fecal Coliform	pH, temperature, DO, DO percent saturation, secchi, and conductivity/salinity, Fecal Coliform, TP, and Nitrate/Nitrite

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Waterbody Name	Number of Stations Monitored	Number of BMPs Implementing	Impairment	Parameters sampled
Bayou Chene	10 ³	8	Fipronil, mercury in fish tissue, DO, sulfates, fecal coliform	DO, conductivity, pH, turbidity, temperature, BOD5, Nitrate/Nitrite, TKN, TP, SRP, TSS, TS, TDS, Cl, SO4, FL
Bayou Lacassine	5 ³	8	Chlorides, Mercury in Fish Tissue, DO, Sulfates, TDS	DO, conductivity, pH, turbidity, temperature, BOD5, Nitrate/Nitrite, TKN, TP, SRP, TSS, TS, TDS, Cl, SO4, FL
Bayou Queue de Tortue	22 ¹	29	Nutrients, DO and Turbidity	pH, temperature, secchi, specific conductivity/salinity, DO, and DO percent saturation, turbidity, TKN, NO2/NO3 and TP
Bayou Plaquemine Brule	4 ²	6	Nutrients, Turbidity and DO	DO, TSS, Turbidity, Nutrients, pH, Temperature, Conductivity, Hardness, %DO, Salinity, TDS
Six Mile Creek	7 ¹	3	Low pH and Fecal Coliform	pH, temperature, secchi, specific conductivity/salinity, DO, and DO percent saturation, fecal coliform
Little River	4 ¹	0	Fecal Coliform	pH, temperature, secchi, specific conductivity/salinity, DO, and DO percent saturation, fecal coliform
Big Creek	16 ²	3	Fecal Coliform	pH, water temperature, water clarity, DO/percent saturation, and conductivity/salinity, fecal coliform

¹Monitored twice per month

²Monitored once per month

³Monitored weekly