2022 Annual Report

Louisiana Nutrient Reduction and Management Strategy Implementation

Baton Rouge, Louisiana

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Louisiana Department of Natural Resources (LDNR)
Louisiana State University Agricultural Center (LSU AgCenter)

With collaboration:

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS)
U.S. Environmental Protection Agency (USEPA)

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THE HYPOXIA TASK FORCE

2022 Nutrient Reduction and Management Strategy Annual Report

The Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (Hypoxia Task Force, HTF) was established in 1997 to address eutrophication and hypoxia in the Gulf of Mexico.

The first Action Item of the 2008 Action Plan called for the development and implementation of state nutrient reduction strategies for each of the 12 member states. Louisiana fulfilled that directive in 2014. Annual Reports and 5-year updates have been ongoing since development.

Currently, The Louisiana Governor's Office of Coastal Activities is the Louisiana state member of the HTF. The HTF reports to Congress biennially as part of the Harmful Algal Blooms and Hypoxia Research and Control Amendments Act of 2014 (as amended).

Louisiana continues to support the HTF and its goals. Collective efforts in the Mississippi River Basin will ultimately be responsible for achieving the 5,000 square kilometers hypoxia zone target by 2035, and the 25% nutrient reduction targets by 2025, as studies show the majority of nutrient inputs occur upstream.

The HTF and member states meet bimonthly to discuss progress and opportunities. In 2022, significant funding was made available to Louisiana through the Bipartisan Infrastructure Law Gulf Hypoxia Program.

Strategy Purpose:

This Strategy presents a framework of **TEN Strategic Components** underlying actions that guide implementation of nutrient reduction and 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.

2022 HIGHLIGHTS

USEPA awards Bipartisan Infrastructure Law, Gulf Hypoxia Program funds to the 12 HTF States to support nutrient reduction strategies

Louisiana to receive $4.1 million in GHP funds from FY22-26 to implement state nutrient reduction and management strategy

The Final Environmental Impact Statement for the Mid-Barataria Sediment Diversion project was released

2022 Integrated Report available with interactive viewing

LDEQ Environmental Leadership Program welcomed 6 new members and presented 9 awards

369 Certified Louisiana Master Farmers in the state

LDAF and LDEQ efforts in 2022 decreased N, P and Sediment loads by ~8,869, 1,874, and 376,100 pounds, respectively, according to models

EPA released the 2022 Vision for the 303(d) Program to encourage flexible and innovate approaches in the next decade

LDEQ NPS Program's 5-year Management Plan approved by EPA through 2027

Stormwater declared a utility by the State with the passage of HB 713 (Act 228)

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ABBREVIATIONS

ACEP	Agricultural Conservation Easement Program
ACWA	Association of Clean Water Administrators
AWQMN	Ambient Water Quality Monitoring Network
BMP	Best Management Practice
CDBG	Community Development Block Grants
CELCP	Coastal and Estuarine Land Conservation Program
CIG	Conservation Innovation Grant
CP	Conservation Practice
CPRA	Coastal Protection and Restoration Authority of Louisiana
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund Program
DWPP	Drinking Water Protection Program
EDMS	Electronic Document Management System
ELP	Environmental Leadership Program
EQIP	Environmental Quality Incentives Program
GIS	Geographic Information System
GOCA	Governor's Office of Coastal Activities
GOMA	Gulf of Mexico Alliance
HTF	Mississippi River/Gulf of Mexico Watershed Nutrient Task Force (Hypoxia Task Force)
HUC	Hydrologic Unit Code
ICIS	Integrated Compliance Information System
LDAF	Louisiana Department of Agriculture and Forestry
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LGU	Land Grant Universities
LMFP	Louisiana Master Farmer Program
LPDES	Louisiana Pollutant Discharge Elimination System
LSU AgCenter	Louisiana State University Agricultural Research Center
MARB	Mississippi/Atchafalaya River Basin
MRB	Mississippi River Basin
MGD	Million Gallons per Day
MRBI	Mississippi River Basin Healthy Watersheds Initiative
N	Nitrogen
NGO	Non-governmental Organizations
NOAA	National Oceanographic Atmospheric Administration
NOx	Nitrate + Nitrite Nitrogen
NPS	Nonpoint Source
NTT	Nutrient Tracking Tool
NWQI	National Water Quality Initiative

OSDS	Onsite Sewage Disposal System
OSWC	Office of Soil and Water Conservation
P	Phosphorus
PDARP	Programmatic Damage Assessment and Restoration Plan
POTW	Publicly Owned Treatment Works
SB/CAP	Small Business/Community Assistance Program
SERA-46	Southern Extension and Research Activities Committee Number 46
SPARROW	SPAtially Referenced Regressions On Watershed attributes
STEPL	Spreadsheet Tool for Estimating Pollutant Loads
STORET	Storage and Retrieval Database
SWAMP	System-wide Assessment and Monitoring Program
SWCD	Soil & Water Conservation District
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Loads
TN	Total Nitrogen
TNC	The Nature Conservancy
TP	Total Phosphorus
TSS	Total Suspended Solids
USDA NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
USHUD	U.S. Housing and Urban Development
WIP	Watershed Implementation Plan
WQT	Water Quality Trading

STRATEGIC ACTIONS

The Louisiana Nutrient Management Strategy was released in May 2014 (Louisiana Nutrient Management Strategy Interagency Team 2014), and underwent the scheduled 5-year update in 2019 (Louisiana Nutrient Reduction and Management Strategy Interagency Team; 'Strategy'). The 2019 Strategy may be found, along with this document, on the Nutrient Reduction and Management Strategy (NRMS) website: https://www.deq.louisiana.gov/page/nutrient-management-strategy. The Strategic Actions Schedule is found in Appendix A.

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. Engaging stakeholders and educating the public concerning nutrient matters remains high priority for the Strategy team and partners.

1.a. Identification and Engagement of Stakeholders

Stakeholder identification was initiated early during the initial stage of Strategy development (2013-2014), and has ongoing since inception. This action continues to focus on identifying and engaging stakeholders with interest in nutrient reduction and management in Louisiana. Stakeholders include groups such as local state and federal agencies, agricultural producers, academic institutions, nonprofit organizations, non-governmental organizations (NGOs), private industry, private landowners, parishes, municipalities, and Soil & Water Conservation Districts. There are currently over 200 identified stakeholders.

Ongoing stakeholder activities of note include:

- The Governor's Office of Coastal Activities (GOCA). The Deputy Director at GOCA serves as the Louisiana member of the USEPA Mississippi River/Gulf of Mexico Hypoxia Task Force (HTF). To supplement the scientific and technical work of the Team, GOCA provides a multi-agency and multi-stakeholder perspective on statewide, Gulf Coast, Task Force, and national concerns relevant to policy, legislative, and community impacts. Routine interaction with the Interagency Strategy Team ensured GOCA's continued coordination with and expansion of the NRMS scope in its approach to these impacts.

- The HTF currently has nine workgroups to address priority needs that state members have identified to support implementation of state nutrient reduction strategies (HTF 2023a). These workgroups are:

Nine HTF Work Groups address priority needs to support implementation of state nutrient strategies

- **Adoption of Innovative BMPs:** Explore opportunities for states to use federal funds to implement innovative BMPs.
- **Communications:** Explore opportunities to enhance public awareness of HTF accomplishments and promote and support actions that reduce nutrient inputs and improve water quality.
- **Ecosystem and Social Metrics:** Identify potential metrics that will help illuminate ecosystem changes/success due to implementation of nutrient reduction strategies in the MARB.
- **Funding:** Explore available programs and synergy with federal funding sources (Farm Bill, CWA, FEMA, WRDA, etc.) with a focus on near-term increases in nutrient reduction practice adoption versus large program or policy changes, and identify potential long-term actions.
- **Nonpoint Source Metrics:** Focus on strategies, challenges and opportunities for documenting and analyzing data related to nonpoint source nutrient reductions; produce periodic progress reports.
- **Point Source Metrics:** Focus on tracking progress in reducing nutrient loads from point sources in the Mississippi River Basin; produce periodic progress reports.
- **Research Needs:** Identify key research needs that effectively support state implementation of nutrient reduction strategies.
- **Water Quality Monitoring:** Evaluate funding needs to support existing and potential new monitoring in the MARB, particularly to track loads and trends in large rivers to help states evaluate progress toward meeting nutrient reduction goals and to support adaptive management of nutrient reduction strategies.
- **Water Quality Trends:** Evaluate new metrics to complement current metrics for evaluating water quality trends in the basin. The workgroup is partnering with the National Great Rivers Research and Education Center (NGRREC) in these efforts.

❖ LDEQ TMDL New Vision activities are currently at different stages in the following watersheds: Tunica Bayou, Bayou Sara, Yellow Water River, Natalbany River, New River and Blind River. Local parish government stakeholders were identified in each watershed. Local citizen advisors/stakeholders have been identified in the Natalbany River, Yellow Water River, New River, and Blind River.

❖ LDEQ NPS Section continues to coordinate with the Capital Resource Conservation & Development Council (RC&D), Louisiana Rural Water Association (LRWA), Bayou Vermilion District (BVD) and Barataria-Terrebonne National Estuary Program (BTNEP) to inspect and

educate homeowners concerning bacteria as well as nutrient issues related to sewage systems. These activities are also coordinated with LDEQ's TMDL program.

1.b. 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 2022, the Strategy Interagency Team participated in many events related to nutrient reduction and management in Louisiana as well as other areas of the Mississippi/Atchafalaya River Basin (MARB).

Strategy Team participated in ~ 600 nutrient related activities

Strategy Interagency Team members continued to communicate with stakeholders concerning nutrient reduction and management activities within their respective areas; approximately 600 outreach activities were performed across various sectors such as media, school visits/education events, and meetings (Table 1). Louisiana agency participation in USEPA and associated environmental programs/groups are also included in the tally and CPRA meetings include outreach to advisory committees, regional working groups, and the public. Details on the events, including additional metrics not included in table, may be found in Appendix B.

TABLE 1. OUTREACH ACTIVITIES PERFORMED BY STRATEGY TEAM AND SELECT PARTNERS IN 2022.

Organization	Meeting	Presentation	Public Event	Workshop / Training	School	Tour	Inspections	Press	Field Day	Total
CPRA	**48**					**30**				**78**
LSU AgCenter	**8**	**12**	**8**	**8**					**15**	**51**
LDEQ TMDL	**9**			**2**	**120**					**131**
LDEQ NPS/DWPP*			**10**							**10**
BTNEP**	**5**	**8**	**3**		**2**		**253**	**4**	**30**	**305**

*LDEQ NPS staff participated in 5 outreach and educational events across the state this fiscal year. In FFY 2022, LDEQ reached over 6,600 adults and students through NPS related educational outreach events. Additional outreach by LDEQ Drinking Water Protection Program (DWPP) staff included giving presentations or working booths at the 5 events, and DWPP staff reached more than 1,600 people during this reporting period.

**LDEQ NPS contracted activity included Barataria-Terrebonne National Estuary Program (BTNEP) participating in 50 educational events, and public education through home sewage system inspection and outreach, that included field demonstrations, event tabling, virtual presentations, and meetings, among others.

Online resources continue to provide educational and outreach opportunities to the public. For instance, the New Vision and Onsite Sewage videos may also be found on the TMDL webpage: https://deq.louisiana.gov/page/newvisionprogram. The Louisiana Watershed Initiative hosted several training webinars on 'Working with Nature' to promote nature-based solutions for flood control, which is linked to improved water quality. The Current Webinar Series sponsored by the North Central Region Water Network and Extension Directors from all 12 North Central states continues to provide engagement opportunities in water-related extension, research, and conservation activities (NCRWN 2023).

USDA NRCS outreach includes:

- Webinars continued in 2022 on how to apply for an Agriculture Innovation Center Grant. Monthly ongoing webinar series on Conservation Outcomes every fourth Thursday at 2:00 central time via Adobe Connect at: https://nrcs.adobeconnect.com/ceap2/
- YouTube video entitled Introduction Wetland Reserve Easement (WRE) Management Video Series was still active in 2022 and gaining views
- Conservation at Work video series on YouTube and featured on farmers.gov highlighted dozens of conservation practices
- GovDelivery provides emails and text messages to producers, owners and others interested in NRCS program information while on the go

The HTF held a public meeting in December 2022 to discuss ongoing activities with member states, federal partners, and the public concerning nutrient reduction activities. In addition, HTF Quarterly Newsletters and HTF Nutrient Success Stories are ongoing outreach components. The HTF webpage continues to offer reports and other published documents as well (HTF 2023). More information on HTF related activities are found throughout this document.

1.c. 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. Government agency agreements and partnerships with other agencies and outside programs, including non-profits, often leverage various aspects of programs (e.g., funds, personnel, equipment, data collection and reporting) and offer incentives to improve performance. Partnerships and leveraging among agencies like LDAF, LDEQ NPS Program, and USDA NRCS are routine and continued through 2021, with dollars provided through 319 funding and/or Farm Bill provisions. These programs are often coordinated and leveraged through USEPA Region 6 Nonpoint Source Group and LSU AgCenter. Further, partnership with GOCA encouraged a broader basin-wide Task Force focus on strategy implementation and nutrient abatement.

Collaboration and leveraging opportunities in 2022 included:

- Louisiana agencies completed projects funded through the 2019 USEPA Hypoxia Task Force Grant to states in support of nutrient reduction efforts outlined in state strategies (USEPA 2019, 2020). The two projects in Louisiana were:
  - *Pilot Expansion of Water Quality Monitoring from Inshore to Offshore*-this project continues to monitor a historic coastal transect to collect data to inform restoration models
    - Partnerships included LDEQ, CPRA and USEPA/HTF to support the continuation of a study initially performed with funds provided by the Gulf of Mexico Alliance Water Resource Team (Gulf Star initial award in 2018)
  - *Nutrient Reduction Strategies Supporting Section 319 Clean Water Act (CWA) Louisiana Nonpoint Source (NPS) Water Quality Analysis*-this project collects nutrient data to provide support for implementation activities in four Basins: Mermentau, Vermilion Teche, Ouachita River, and Terrebonne. The priority waters within each basin are still undergoing monitoring include Bayous Maringouin (120111), Du Portage (060703), Grosse Tete (120104) and the Vermilion River (060801).
    - Collaboration with LDEQ Water Planning and Assessment Division (WPAD), LDEQ NPS, and LDEQ's Water Surveys (WS)
- The Louisiana Watershed Initiative (LWI), in partnership with the USGS and LDEQ, has 117 gauge stations active in the state (LWI 2023).
- Louisiana Climate Initiatives Task Force
  - The Louisiana Climate Action Plan was approved in January 2022.
  - Recommendations for the reduction of greenhouse gas emissions originating in Louisiana will improve coastal resilience, and Agriculture and Land Use components will have water quality connections.
- LDEQ NPS collaborated with partners by:
  - Working with SWCDs, LDAF, and USDA in NPS priority watersheds
  - Participating on the BTNEP Management Conference and the BTNEP Water Quality Action Team
  - Serving on the Louisiana Outdoors Forever Technical Advisory Board
  - Working with Keep America Beautiful and Governor's Task Force on Statewide Litter Abatement and Beautification
  - Membership on Lake Providence Watershed Council
  - Collaborating with Bayou Vermilion District, Louisiana Master Farmer Program, Louisiana Rural Water Association, Capital RC&D, and BTNEP in watershed planning, education and outreach, and BMP implementation.
- Lower Mississippi River Nutrient Comparison

- USGS has worked with CPRA to develop a work plan to determine the scope of a comparison of various water quality parameters at multiples sites in the lower Mississippi River to understand factors and influences on nutrient transport.

- The Nature Conservancy is looking to develop a water monitoring collaborative for the Atchafalaya River Basin to supply data to multiple partners within the state.
- A Memorandum of Understanding (MOA) between Minnesota and the Barataria-Terrebonne National Estuary Program (BTNEP) has continued through 2022. Under the National Estuary Program, Comprehensive Coastal Management Plans (CCMPs) are put into place to direct research and restoration activities for each NEP (BTNEP 2019). The MOA allows implementation of pollution prevention and restoration best management practices listed in the BTNEP CCMP within parts of Minnesota inside of the Mississippi River watershed, which is the watershed of BTNEP.
- The Patrick K. Taylor foundation awarded an additional $1.7 million in support of model farms for sugarcane, grain, and now rice in Louisiana.

2. Decision Support Tools

Decision support tools are essential to evaluating and assessing various aspects of nutrient reduction and 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, evaluate, and document selected tools

During early Strategy development, the Strategy Interagency Team conducted a broad review of available decision support tools. In all, greater than 250 tools have been identified and evaluated since Strategy development. The most applicable tools include best management practices, data access portals, mapping applications, modeling tools, and reports.

Nine new tools, totaling 170 currently active, are available for public viewing on the Strategy Website

A list of the identified tools may be found on the Strategy webpage: https://www.deq.louisiana.gov/page/nutrient-management-decision-support-tools.

Updated or expanded tools identified 2022 include:

- USDA Loan Assistance Tool for farmers was launched in October 2022 by the USDA Farm Service Agency
- The 2022 Census of Agriculture was released in Nov 2022 (occurs every 5 years)
  - The National Agricultural Statistics Service (NASS) has released Quick Stats Tools for accessing agricultural data collected by NASS

- The Council on Environmental Quality released the Climate and Economic Justice Screening Tool in support of President Biden's policy goals
- USGS released the Groundwater Conditions Animated Data Visualization Tool to depict groundwater levels at 2,281 well sites across the U.S. At each site, groundwater levels are shown relative to the historic record (using percentiles)
- USGS Next Generation WaterAlert, a notification service, was updated to provide notification to user's email or phone for changes in water conditions based on user-defined thresholds
- USDA Agriculture Innovation Strategy Dashboard for solutions and barriers to agriculture innovation--new additions are ongoing to the tool
- USDA NRCS Conservation Assessment and Planning Tools have be consolidated under the Conservation Effects Assessment Project (CEAP) page
- LDEQ 2022 Integrated Report Interactive Assessment Map
- The Environmental Defense Fund and Quantified Ventures released the report *Generating revenue to finance natural infrastructure projects in the Mississippi River Basin* to assist with funding to improve water quality and protect communities.

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. Propose new regulations, policies and programs

Regulations, programs, and policies were identified early in Strategy development, and documentation and distribution continues. Numerous efforts are underway within the state of Louisiana as well as nationally that address a multitude of nutrient reduction and management activities such as those aimed toward outreach, monitoring, or agricultural incentives.

Ongoing regulations, policies, and programs of note in 2022 include:

- The Gulf Hypoxia Program was established by the US EPA in 2022 to distribute funding established via the Bipartisan Infrastructure Law for strategies to improve water quality in the Mississippi River/Atchafalaya River Basin and the Gulf of Mexico and reduce the hypoxia zone in the northern Gulf.
  - Louisiana Strategy Team partners submitted 2 projects that were awarded in September 2022 through 2025:

The Gulf Hypoxia Program was established in 2022 to guide Infrastructure Law Projects

        - The first project focus is on implementation agriculture practices in and around the Lake St. Joseph watershed in the northeastern part of the state
        - The second project was developed to continue efforts to close a critical data gap in nutrient monitoring through data collection of an established monitoring transect extending from Barataria Pass, Louisiana, to the inner Gulf of Mexico shelf
    - Eligible Tribes ($2 million), Sub-Basin Committees ($400 k), and Land Grand University Consortiums ($200 k) will also be receiving funds per year for FY23-FY25
- Freshwater numeric criteria for ammonia (which is treated as a toxin)
    - Promulgated in the state surface water quality standards (LAC 33:IX.1113) through WQ097 rulemaking in November 2020 and approved by USEPA in January 2021.
    - Criteria were then rescinded on June 2022 with the intention of readopting criteria after reconsideration of the costs to directly affected persons and simultaneously adopting a process for developing water permit effluent limitations and schedules of compliance. LDEQ Permits has established an interim permitting procedure, approved by USEPA Region 6, until criteria are readopted, implementation procedures are developed, and both are approved by USEPA.
    - LDEQ is actively drafting a rule to readopt ammonia criteria and develop corresponding implementation procedures, to be included in Volume 3 of the WQMP, *Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards*.
- Volume 3 of the WQMP, *Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards* has been revised, effective July 5, 2022, to include 1) updated stream flow calculation methodology; 2) guidance for permitting discharges into impaired waters or waters subject to a TMDL; and 3) revisions to the wetland assimilation permitting requirements which will help ensure the longevity and appropriate management of the wetland assimilation systems.
- LDEQ published notice of intent for Triennial Review in January 2023 in Louisiana Register (LDEQ 2023p).
- The Louisiana Watershed Initiative (LWI) was established by Governor Edwards in 2016 to address statewide flood risk reduction through an innovative watershed-based floodplain management approach.
    - In addition to the collaboration among interagency activities and regional entities, the LWI is continuing to develop its statewide watershed modeling program, intended to develop scientific models of major watersheds throughout the state. These models will support greater regional collaboration around shared water management challenges and build an objective, science-based understanding of how projects, policies, and other measures will reduce flood risk. Additionally, the

LWI, in partnership with LDEQ and USGS, signed a $15 million cooperative endeavor agreement to install and operate up to 100 new river and rain gauges throughout the state alongside an addition of 15 water quality monitors (LWI 2022, 2022a). To date, 117 gauges are operational in this cooperative effort.

- The initiative has developed a series of 9 training models in the 'Working with Nature Training Series' that are free and open to public viewing.

❖ The Louisiana Master Farmer Program helps agricultural producers voluntarily address the environmental concerns related to production agriculture, as well as to enhance their production and resource management skills that will be critical for the continued viability of Louisiana agriculture. The LMFP involves producers becoming more knowledgeable about environmental stewardship, resource-based production and resource management through a voluntary producer certification process.

- The Master Farmer Program began in 2001 as a way for farmers to learn up-to-date, research-based conservation practices in a comprehensive manner. It is a partnership of five agricultural entities – NRCS, LSU AgCenter, Louisiana Farm Bureau, Louisiana Cattlemen's Association, LA Dept. Agriculture and Forestry, which approves the Master Farmer certifications and recertification. To be certified as a LA Master Farmer, producers must
  - Attend at least 6 hours of classroom instruction on conservation needs, concerns and initiatives
    - Four in-person trainings were held in 2022
    - 20 producers completed new online trainings to receive Phase 1 credit
  - Take part in an instructional tour of a working conservation farm or demonstration site
    - Fifteen field days were offered in 2022
      - 15 producers completed virtual, recorded field days for Phase 2 credit on Master Farmer website
  - Develop and implement a total Resource Management System (RMS)-level conservation plan for each farm
    - Three new and two recertified Master Farmer certifications were awarded for 2022
    - 38 certified Master Farmers completed Continuing Education Credits online on Master Farmer website

❖ USDA Partnerships for Climate-Smart Commodities and Rural Projects Investments released the first pool of funding in September 2022 to create market opportunities for American commodities produced using climate-smart production practices for a total of $1 billion dollars in allocated funding in support of President Biden's climate policies.

- USDA Organic and Transitional Education Certification Program (OTECP) and Organic Certification Cost Share Program (OCCSP) was released in May 2022 to help producers and handlers cover the cost of organic certification along with other related expenses.
- The U.S. Department of Agriculture (USDA) is investing up to $20 million in fiscal 2023 to help conservation partners nationwide protect and restore critical wetlands through the Wetland Reserve Enhancement Partnership (WREP).
- USDA Expands and Renews Conservation Reserve Program in efforts to boost enrollment and address climate change: USDA's goal is to enroll up to 4 million new acres in CRP by raising rental payment rates and expanding the number of incentivized environmental practices allowed under the program in 2021-2023.
    - In 2022 in Louisiana, a total of 252,029 acres were enrolled in the Conservation Reserve Program (CRP) of USDA FPAC NRCS.
- USDA announced that $80 million in funding will go to the USA Rice Ducks Unlimited Rice Stewardship Partnership (RSP) along with project partner the National Black Growers Council through the Partnerships for Climate-Smart Commodities
- Release of the USDA Information Technology Strategic Plan (FY 2022-2026) and FY 2022-2026 Departmental Strategic Plan occurred in 2022 with goals to improve life and livelihoods across America while utilizing modern technology and digital tools.
- USDA NRCS projects include:
    - NB 300-19-34 LTP – Mississippi River Basin Healthy Watersheds Initiative ended in 2021, final reports and new plans can be found on the MRBI webpage.
        - Three new MRBI implementation watersheds have been identified for FY 2023
    - HUC 12 Names of the FY 2020 Implementation Watersheds are Bayou Blanc, Bayou Plaquemine Brule and Bayou Plaquemine Brule-Estherwood—these watersheds remain active through 2022

LDEQ NPS Program updated the 5-year Management plan through 2027

- LDEQ NPS Program updated its 5-year Management Plan for 2023-2027. This plan was accepted by USEPA. It describes the goals and strategies of 319 operations in the state, including priority watersheds and statewide programs.
- Louisiana's Coastal Nonpoint Source Pollution Control Program was approved for full compliance in 2022 (Louisiana Coastal NPS 2022). The program establishes a set of management measures for states to use in controlling runoff from five main sources: agriculture, forestry, urban areas, marinas, and hydromodification (shoreline and stream channel modification). The program also includes management measures for wetlands, riparian and vegetated treatment systems.

- Louisiana Outdoors Forever Program was established with the passage of House Bill 762 during the 2022 Legislative Session to provide funding for outdoor conservation projects in the State of Louisiana (LOF 2023). Types of projects eligible for funding under this bill that may impact nutrients include: (1) Land conservation of important natural areas, including fish and wildlife habitat. (2) Water quality projects related to land conservation or land management, including those lands that protect drinking water supplies. (3) Working land, farms, and forested land.
- In 2022 Louisiana became the 42nd state to declare stormwater to be a utility with the passage of HB 713 (Act 228). This "local option" bill provides a viable way to permanently fund a stormwater management program to address water quality and water quantity issues…" https://www.louisianastormwater.com/".
- The US Senate Passed the Inflation Reduction Act in August 2022 investing $369 billion in climate and clean energy (among others). Key provisions include:
    - $8.45 billion for the Environmental Quality Incentives Program (EQIP), which provides financial support to implement conservation practices on working lands.
    - $6.75 billion for the Regional Conservation Partnership Program (RCPP), which provides grants for conservation projects at the state, multistate, or watershed-scale level.
    - $3.25 billion for the Conservation Stewardship Program (CSP), which provides financial assistance to producers to maintain and improve existing conservation systems and to adopt additional conservation activities.
    - $1.4 billion for the Agricultural Conservation Easement Program (ACEP), which provides financial support for Agricultural Land Easements and Wetland Reserve Easements.

4. Management Practices & Restoration Activities

Management practices and restoration activities in Louisiana encompass activities focused on 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 reduction and 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 reduction and management is ongoing. Within Louisiana, current practices include implementation of the LDEQ NPS Program in collaboration with LDAF, USDA NRCS, and LDNR (LDEQ 2023q); LDEQ implementation of the Louisiana Pollutant Discharge Elimination System (LPDES) Permit Program (LDEQ 2023b); and CPRA implementation of the Comprehensive Master Plan for a Sustainable Coast (Coastal Master Plan, CPRA 2023).

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, these priority watersheds are identified in Strategic Action 6.e. 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 (USDA NRCS 2023).

An annual survey was designed and released in 2020 by the USDA to measure areas for improvement across agricultural activities (USDA 2023a). The survey of farmers, ranchers and private forestland owners will help USDA understand what it is doing well and where improvements are needed, specifically at the Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS) and Risk Management Agency (RMA). The survey was closed on 03/31/2023, and includes 2022 data.

The LSU AgCenter develops Best Management Practice (BMP) Manuals for agronomic crops, aquaculture, beef, dairy, poultry, rice, sugarcane, sweet potatoes, and swine. Forestry BMP resources are available at LDAF. Additionally, LDWF Scenic Rivers Program develops BMPS to minimize impact from development activities.

4.c. Identify case studies and 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 ongoing identification of case studies/model watersheds in Louisiana will aid in demonstrating and promoting effective and successful nutrient reduction and management in the state.

In 2019, Dr. Ronnie Levy, Dr. Lisa Fultz, Allen Hogan, James Hendrix, Donna Morgan, Randall Mallette, Dr. Naveen Adusumilli, and Dr. Brenda Tubaña were awarded a Conservation Innovation Grant (CIG) for Education and Outreach to improve knowledge of soil health and implementation of agronomic BMPs, including cover crops (USDA NRCS 2023b). As part of this effort, participants learned about the adoption of soil health management systems and management strategies relative to the regional resource concerns pertinent to two areas of the state. Participants also learned about the impact of cover crops and the influence of grazing and other cultural practices on soil health parameters and soil microbial properties, and received copies of Conservation Practice or Best Management Practice literature pertinent to the management of agricultural products. To conclude the grant, approximately 130 participants attended three soil health meetings and events in 2021 in Newellton, New Roads, and Napoleonville, LA. Field events that highlighted on-farm cover crop plantings and/or agricultural

equipment associated with soil health management systems also took place on Patrick F. Taylor model farms (Dugas and Hardwick Planting Company); these model farms are currently under study and will result in publication. A Sugarcane Model Farm Field day occurred in September. Field activities are recorded and videoed at regular intervals and updated on the Facebook page and on the LSU AgCenter website. The Patrick F. Taylor Foundation Model Farm grant was renewed for $1.7 million and will add two rice farms to the "model farm" list where rice Best Management Practices will be monitored and will include field days and other outreach events over the next three years.

Fifteen million dollars was released by the USDA NRCS for the Conservation Innovation Grants (CIG) program in 2022 (USDA NRCS 2023b). This funding is in addition to the $25 million in funding that was previously announced for on-farm trials (a CIG sub-program established under the 2018 Farm Bill), and is not part of the Bipartisan Infrastructure Law. Winners will be announced in 2023.

4.d. Integrate science-based nutrient reduction and management approaches

The integration of science-based nutrient management approaches is ongoing. The CPRA is conducting research on modeling for river diversions that includes a new nutrient component to evaluate nutrient dynamics in response to a river diversion (see Strategic Action 5.f.). For NPS management, the LSU AgCenter is forefront in researching and applying science-based approaches for nutrient reduction and management in Louisiana and research is ongoing within the state, for example the Patrick F. Taylor model farm projects. As new scientific information becomes available, integration will allow for improved nutrient management activities to be implemented in Louisiana.

LDEQ NPS uses data-driven nutrient reduction targets in its watershed planning, incorporating a year of baseline monitoring data throughout a watershed with targets established using TMDLs and water quality criteria, and modeling BMP-related reductions needed to meet those targets. This approach is incorporated into NPS watershed implementation plans, approved by USEPA, and provides LDAF with implementation targeting and guidance.

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

Through the state's NPS Program, LDEQ, LDAF, USEPA Nonpoint Source, and other partners collaborate on setting priority watersheds for implementation of BMP and CPs. The state NPS Program prioritized watersheds for implementation activities through 2027 (LDEQ 2023). In FY22, baseline monitoring for nutrients occurred in 10 priority watersheds at 126 sites. BMP implementation expected to impact nutrients occurred in 12 watersheds. BMP outreach, site planning, and implementation occurred via LDAF, SWCDs, NRCS, and other partners.

Additionally, through the Ducks Unlimited Rice Stewardship Initiative, Chevron awarded the program $500,000 to support projects along the Gulf Coast of Louisiana. These funds will help manage 1,200 acres of wetlands in Cameron Parish through the Cameron Prairie National Wildlife Refuge Moist Soil Enhancement Project, while the Port Fourchon Terracing and Living Shoreline Project will restore and protect 650 acres in Lafourche Parish. In addition, USDA awarded the Initiative with $80 million, with partner National Black Growers Council, to support the Partnerships for Climate-Smart Commodities program.

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 conducted 51 events in 2022 that included four Phase I environmental/soil health trainings, 15 Phase II research station field days, and three cover crop/soil health/BMP field tours to increase voluntary participation in the program (Gentry, 2023). Recorded virtual field days are available on the LA Master Farmer Program website for those who could not participate in person.

5. Status & Trends

The Strategy aims to document the current status and determine trends over time for nutrient reduction and 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.

Three reports have been released from HTF working groups to inform nutrient partners on the status of point and nonpoint sources within the 12 member states.

- *Report on Point Source Progress in Hypoxia Task Force States* (2016)
- *Second Report on Point Source Progress in Hypoxia Task Force States* (2019)
- *Progress Report on coordination for Nonpoint Source Measures in Hypoxia Task Force States* (2018).

These documents represent steps necessary to improve tracking and progress in nutrient reduction and management within the MARB, and may be found on the Hypoxia Task Force webpage (HTF 2023).

The HTF Water Quality Monitoring Workgroup evaluated funding needs to support existing and potential new monitoring in the MARB, particularly to track loads and trends in large rivers to help states evaluate progress toward meeting nutrient reduction goals and to support adaptive management of nutrient reduction strategies. The monitoring workgroup consists of

representatives with relevant expertise from HTF member states, the U.S. Environmental Protection Agency, the U.S. Geological Survey, and the U.S. Department of Agriculture. The workgroup evaluated funding needed to support a baseline nutrient monitoring network to quantify loads and trends from large rivers in HTF states. This evaluation was submitted to the full HTF for consideration of potential next steps.

The Illinois Drainage Research and Outreach Program (I-DROP) website provides information on Conservation Practice Tracking from HTF states as supplied by the USDA NRCS. Data were extended through a grant by the Walton Family Foundation to include information suggested by the HTF Nonpoint Measures Workgroup in their May 2018 report (Christianson, 2019).

5.a. Model nutrient loading estimated within Louisiana watersheds

Modeling of nutrient loading within Louisiana watersheds is ongoing. The USGS SPAtially Referenced Regressions On Watershed attributes (SPARROW) surface-water quality models for nitrogen and phosphorus are available for the MARB for 2002 and 2012 data (USGS 2020). The updated website and mappers have been released and are fully functional with new mappers and reports available.

Additionally, as part of the watershed planning process, LDEQ NPS calculates nutrient loading within watersheds using flow measurements and nutrient concentrations at the ambient monitoring location. Relative load contributions of smaller drainage areas within the watershed are estimated using monitored concentrations.

5.b. Document/trends for in-stream nutrient water quality

Through the LDEQ AWQMN, the agency monitors in-stream water quality in water bodies across the state. In the 2021/2022 water sampling year (October 2021 through September 2022), the LDEQ monitored 130 sites in 128 subsegments for in-stream concentrations of nitrogen (nitrate-nitrite and TKN) and phosphorus (TP). Results of the LDEQ ambient water quality monitoring are available through LDEQ's *Ambient Water Quality Monitoring Network* on the LEAU Web Portal (LDEQ 2023e, 2023h). Information on nutrient impairments for the 2022 Integrated Report cycle can be found on Louisiana's Water Quality Integrated Report website (LDEQ 2023n).

In 2022, LDEQ NPS sampled for nutrients at 126 sites in 10 priority watersheds. TKN, nitrate-nitrite, and total phosphorous are monitored at these sites bimonthly during the baseline sampling period, and monthly post-baseline through one year after implementation. This data is shared through USEPA's Water Quality Exchange (WQX) and made publicly available through USEPA's Water Quality Portal: https://www.epa.gov/waterdata/water-quality-data-download.

LDEQ updated the *Nitrogen and Phosphorus Trends of Long-Term Ambient Water Quality Monitoring Sites in Louisiana* document, initially released in 2015 (LDEQ 2021a). In 2021, analyses were performed on long-term and seasonal trends and land-use correlations for

concentrations of total Kjeldahl nitrogen (TKN), nitrate-nitrite nitrogen (NOx), and total phosphorous (TP) from Louisiana's 21 long-term Ambient Water Quality Monitoring sites from October 1, 1978 through September 30, 2020. The results found TKN was decreasing significantly overall at 95% of sites; NOx was decreasing overall at 48% of sites and increasing at 5%; and TP was decreasing overall at 52% of sites and increasing at 10%; all other long-term trends were not significant. Land-use correlation analyses found higher TKN and TP concentrations were significantly correlated with increases in agricultural land use, while higher forest cover was significantly correlated with lower TKN and TP values, all other correlations were not significant.

LDAF assists LDEQ with surface water monitoring in critical project watersheds as part of the USEPA/Agricultural Nonpoint Source Abatement Program (LDAF 2023). This program is implemented by LDEQ. Also, the ground water monitoring network, Louisiana's Aquifer Sampling and Assessment Program, or the ASSET Program, is an activity that was developed to determine the quality of naturally occurring ground water in the major drinking water aquifers in the state. The program also monitors and examines regional changes in ground water quality on a statewide basis. This program can provide an early warning to NPS contamination of ground water in the state. The ASSET Program monitors approximately 180 water wells in 14 major aquifers every three years. Over 150 targeted analytes and field parameters are analyzed/measured for each well. Analyte categories include conventional water quality and nutrient parameters, inorganics, volatile and semi-volatile organic compounds, pesticides, and PCBs.

5.c. Document/trends for Social Indicators of nutrient reduction and management behavior

The charge of the HTF Ecosystem and Social Metrics Workgroup is to identify potential metrics that will help illuminate ecosystem changes/success due to implementation of nutrient reduction strategies in the Mississippi River Basin (MRB). The workgroup recommended that a social indicator variable be incorporated into federal and state conservation program reporting so that a basin-wide metric can be developed in the future. The USEPA provided a grant to the University of Wisconsin to support the HTF in gaining insight into collective social indicator action through 2023.

The workgroup also conducted an assessment of conservation tracking tools in the MRB, which was published: Compendium of Tools to Track Conservation. The workgroup narrowed in on OpTIS, Tillage and Erosion Survey Program, COMET-Farm and COMET-Planner, with the intention of determining the tools that the workgroup will recommend the HTF use to provide a value for ecosystem services of practices that also have a nutrient reduction benefit. A literature review was undertaken by CPRA to further assess the tools by identifying studies that used conservation tracking tools to characterize the impact of agricultural conservation practices on nitrogen and phosphorous reductions, and carbon sequestration. The OpTIS tool has the potential to be highly

effective in addressing basin-scale questions given its large spatial scale and focus on carbon, nitrogen, and phosphorus.

5.d. Document/trends 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. Conservation Plans include various practices like nutrient management, cover crops, irrigation water management, crop residue management, conservation tillage, grade stabilization and irrigation land leveling among others.

USDA Conservation Practices were active in 2022, with the Conservation Stewardship Program receiving the most acreage in 2022 as reported by USDA NRCS (Appendix E). EQUP and RCRPP were the next popular conservation program during this fiscal year.

> Over 316,000 land-unit acres were a part of the USDA NRCS Conservation Stewardship Program in 2022

In FY 22, USDA-NRCS obligated $501,890 for implementing conservation practices on agricultural land through the MRBI and NWQI programs. These funds were obligated for practices on 2,260 acres in Louisiana watersheds with LDAF.

Nearly 8,869.27 pounds of nitrogen, 1,874.11 pounds of phosphorus, and 188.05 tons of sediment were prevented from entering Louisiana waterways (as estimated by STEP-L) at the watershed scale level due to LDAF and LDEQ collaborative efforts in 2022 (Table 2). LDAF provided technical assistance and BMP implementation on 17,621.58 acres in 7 priority watersheds within the Ouachita River, Mermentau River, and Vermilion-Teche River Basins (Table 3).

TABLE 2. LDEQ NPS TOTAL REDUCTIONS BY PARAMETER AND WATERSHED BASED ON STEP-L ESTIMATION (2022).

SUBSEGMENT	TOTAL STEPL ANNUAL REDUCTIONS		
	Nitrogen (lb/yr)	Phosphorus (lb/yr)	Sediment (t/y)
Big Creek North	4.09	0.42	0.09
Upper Bayou Lafourche	2,913.43	634.63	15.21
Bayou Chene	138.70	43.49	8.54
Bayou des Cannes	4,009.54	831.01	130.49
Bayou Mallet	138.2	44.04	10.99

SUBSEGMENT	TOTAL STEPL ANNUAL REDUCTIONS		
Bayou du Portage	939.651	161.76	22.82
Bayou Queue de Tortue	729.76	159.17	24.81
TOTAL	**8,869.27**	**1,874.11**	**188.05**

TABLE 3. LDAF TECHNICAL ASSISTANCE AND BMP IMPLEMENTATION AREAS FOR 2022.

Watershed	Acres Implemented	Basin
Bayou Queue De Tortue	1,470.5	Mermentau River
Bayou Des Cannes	2,175.5	Mermentau River
Bayou Mallet	5,767.8	Mermentau River
Bayou Chene	121.5	Mermentau River Basin
Big Creek (North)	3,482	Ouachita River
Bayou Du Portage	1,375.16	Vermilion Teche
Bayou Lafourche	3,299.62	Ouachita River
TOTAL	17,692.08	

5.e. Document/trends 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 2023c). At the end of Federal FY22 (from October 2021 to September 2022), there were 14,841 permitted dischargers in the LPDES Permit Program. Of these 14,841 permitted dischargers in FY22, 11,139 were general permit authorizations (non-stormwater), 2,090 were stormwater general permit authorizations, 1,208 were individual permits, and 4 were individual storm water (MS4) permits. The LPDES permits issued in 2022 can be found on the LDEQ Permit Program website (LDEQ 2023b).

5.f. Document/trends for riverine diversion efforts

Louisiana's Coastal Master Plan is revised and updated on a 6-year cycle to incorporate new information and lessons learned. In developing the 2023 Coastal Master Plan, projects are being

reevaluated, including the river diversion projects which were included in the 2017 version of the plan. All of the proposed sediment diversion projects are intended to divert freshwater and sediment from the Mississippi or Atchafalaya rivers 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 (CPRA 2017). A key component of the implementation process 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 conducted planning-level landscape modeling, basin-level modeling, and project-specific modeling to help define project location, size, operations, and other key project attributes.

The River Reintroduction into Maurepas Swamp project, which is projected to benefit approximately 45,000 acres of wetlands by reconnecting one of the largest forested wetland complexes in the nation to the Mississippi River, is projected to receive $130 million in funding from BP oil spill fines, through a grant to CPRA from the Gulf Coast Ecosystem Restoration Council. In January 2023, the River Reintroduction into Maurepas Swamps was selected by the U.S. Army Corps of Engineers as a mitigation feature for the West Shore Lake Pontchartrain Project, marking a first of its kind partnership. The project goal is to introduce river water into the swamp, designed to ensure water retention long enough to benefit woody vegetation from fresh flowing water, nutrients, and fine sediments. During early project design, hydrodynamic modeling was used to ensure that these objectives can be met. It is estimated that the project will be ready for construction in approximately three years.

Mid-Barataria Sediment Diversion Final Environmental Impact Statement published in 2022

The Mid-Barataria Sediment Diversion and Mid-Breton Sediment Diversion planning processes are being further developed and refined. The Mid-Barataria and Mid-Breton Sediment Diversions are designed to reconnect the Mississippi River to wetlands and open water bodies by mimicking natural land building processes using an “engineering with nature” approach. The Delft3D water quality model, D-WAQ, is being used to simulate dissolved nutrient dynamics in the Barataria and Breton receiving basins. CPRA has conducted feasibility and engineering and design analyses that projected the Mid-Barataria Sediment Diversion would create and sustain 28 square miles of land. The Final Environmental Impact Statement (FEIS) was officially published by the U.S. Army Corps of Engineers on September 23, 2022, representing a major milestone in the project’s permitting process. The document, which was preceded by a Draft EIS, details the benefits and impacts of the project and includes the Louisiana Coastal Protection and Restoration Authority’s updated mitigation plan with significant increased funding for these measures. The Mid-Barataria Sediment Diversion is a first-of-its kind project and represents one of the largest and most innovative coastal restoration efforts ever

undertaken not just in Louisiana, but nationally and globally. The project is designed to mimic the natural land building processes of the Mississippi River to sustainably restore and nourish thousands of acres of marsh in the Barataria Basin. Louisiana's coastal wetlands have the value-added benefit of assimilating and removing nutrients from the Mississippi River. More information on the project can be found here: https://midbasin.coastal.la.gov/.

5.g. Document coastal protection and restoration activities

The CPRA develops an annual plan that is submitted to the Louisiana Legislature during the spring session each year. This annual plan documents activities from the previous fiscal year, and project activities and budgets for the upcoming fiscal year. The FY 2023 Annual Plan is available and the draft FY 2024 Annual Plan is currently in development. Once finalized, Annual Plans are posted on the CPRA website. In addition, quarterly progress reports with information about construction status on individual projects are also posted on the CPRA website.

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 reduction and management activities.

6.a. Maintain watersheds and water body characterization

LDEQ maintains the Water Quality Management Plan (WQMP) "Volume 4 Basins and Subsegment Boundaries" (LDEQ 2021). This document describes the watershed basins and water quality assessment units, referred to as subsegments, which are part of the LDEQ water programs. Appendix A of Volume 4 lists the subsegment codes and descriptions by basin.

LDEQ identifies several features pertinent to watersheds, such as boundary delineations, land use, and elevations, through GIS-based products (e.g., the USGS National Hydrography and Watershed Datasets, the National Land Cover Database, statewide LiDAR, Cropland Data Layer land use/land cover information, and NAIP imagery). Updates and new GIS technologies are implemented as they become available. As part of these efforts, LDEQ continues to utilize GIS to improve the accuracy of the subsegment delineations and contribute to the state's National Hydrography Dataset (NHD). Although subsegments comprise the geographic regulatory boundaries for LDEQ Clean Water Act programs, the NHD also provides representative geometry for the subsegment's assessed rivers, lakes, wetlands, or estuaries, and LDEQ staff utilizes GIS to extract the appropriate features. LDEQ's subsegments undergo periodic revisions utilizing available GIS layers, such as the latest topography, imagery, hydrography (i.e., NHD), and elevation (i.e., LiDAR) data.

LDEQ modified the WQMP Volume 4 in 2021 to include 142 subsegment updates proposed in the water quality Triennial Revision 2019 rule. This triennial review for the Surface Water Quality Standards of Louisiana began on January 20, 2016 and the results of these triennial review efforts were developed into a rule (WQ097) which updated portions of the water quality standards found in LAC 33:IX.Chapter 11. The final rule for WQ097 was published in the November 2020 edition of the Louisiana Register and approved by USEPA on January 28, 2021 (LDEQ 2023p). Updates included those to standardize language of descriptions and typographical corrections, as well as adjustments to subsegment boundaries to align with natural features and NHD flowlines, among others. These updates are documented in Appendix A of the WQMP Volume 4 and the LDEQ Subsegment GIS layer (LDEQ 2021). The current triennial review cycle was initiated on March 20, 2021 with a public hearing on April 28, 2021. LDEQ prepared the Report of Findings in 2022 to identify priorities for water quality standards revision efforts. A notice of intent for the Triennial Review proposed rule (WQ111) was published January 20, 2023 in the Louisiana Register (LDEQ 2023p).

LDEQ's Nonpoint Source Pollution Program characterizes watersheds before implementing activity in priority areas. Watershed characterization occurs during a pre-monitoring reconnaissance phase, where NPS and Water Surveys staff visit the watershed and examine auxiliary data sources, identify potential representative sampling sites, and visually identify potential sources of NPS runoff. It also occurs during watershed implementation planning, when analysis of baseline monitoring data, including flow measurements, GIS data layers, and modeling inform load estimation for constituents that include nutrients, and identification of areas contributing high pollutant loading.

The NHD provides a national framework of flowlines that can be used for assigning stream reach addresses to water quality related entities, such as dischargers, drinking water supplies, streams affected by fish consumption advisories, wild and scenic rivers, Clean Water Act Section 305(b) and 303(d) water bodies, designated uses, etc. LDEQ integrated updates to NHD flowlines, water body areas and features, and feature attributes within the area southwest of the Louisiana Intracoastal Waterway into the NHD Model in 2022. Currently, 92% of the LDEQ subsegments utilize at least one of the NHD feature classes to estimate the assessed water body size. The NHD also provides representative geometry for the subsegment's assessed rivers, lakes, wetlands, or estuaries, and LDEQ staff utilizes GIS to extract the appropriate features. USGS NHD Editing and Markup requests and processes, including Technical Exchange meetings and training courses, are paused as of December 2022. It is anticipated that by September 2023, the most current version of the NHD will be saved and stored as a static product. The pause in editing is due to USGS developing a new 3DHP product. The 3DHP product aims to update the current NHD model by providing better linkage to other water datasets, improved spatial accuracy, better alignment to

elevation data, and have more frequent updates. The 3DHP development process may take approximately five or more years for USGS to complete.

LDEQ shares web-based mapping tools with the public.

ArcGIS Online has been an essential mapping tool to display water quality data for the public. LDEQ developed two online web maps that also have corresponding phone applications. The Fishing Consumption and Swimming Advisories map was released in 2018 and has received advisory updates through 2022. The fish advisory map displays the areas of the state affected by fish consumption or swimming advisories due to mercury or organic chemical contamination and provides the corresponding health recommendations for the water body (LDEQ 2023o). The newest online web map is the 2022 Louisiana Water Quality Inventory: Integrated Report (Appendix A-Assessments; LDEQ 2022a), which displays the water quality assessment information for three designated uses (i.e., swimming, boating, and fishing). LDEQ developed this StoryMap to display the water quality data for the state's surface water in an interactive and more user-friendly format which also displays features in the pop-up, such as a link to a subsegment's site data page.

6.b. Identify potential pollution sources through Desktop Analysis/Windshield Survey

The identification of potential pollution sources can be accomplished through various means. By performing desktop analyses and windshield surveys, potential pollution sources can be evaluated in the initial stages of project planning, which will help to best utilize resources for actual water quality monitoring and target implementation of best management and conservation practices. In this manner, LDEQ continued efforts to investigate and track sources in the Yellow Water River and Natalbany River. Further, outreach and education are a critical part of the effort in these two New Vision watersheds. GIS capabilities described above assist in this effort.

In regard to the New Vision of the §303d Program, LDEQ identified priority watersheds for restoration and protection in Louisiana (below and Appendix C). In these New Vision priority waters, alternatives to TMDL plans are being developed in collaboration with stakeholders with a vested interest in the watershed restoration. Of the total 7 watersheds, implementation efforts have occurred or been initiated in 100%.

- The watersheds include:
  - Bayou Sara- draft report is under development
  - Tunica Bayou- final report was accepted by USEPA on October 5, 2020.
  - Yellow Water River- draft report under development and citizen outreach is ongoing
  - Natalbany River- ongoing monitoring and citizen outreach
  - New River- monitoring initiated in July 2021 and citizen outreach is ongoing

- Blind River- monitoring initiated in February 2022 and citizen outreach is ongoing

Additionally, work has begun to prioritize watersheds for the 2022 Vision period beginning in 2023.

LDEQ Sourcewater also monitors wells and surface supplies of drinking water and identifies potential sources of contamination. In order to determine the susceptibility of public water supplies to contamination, LDEQ identified nearby types, quantity, and locations of potential sources of contamination and hydrogeologic sensitivity factors. This assessment phase was completed in 2003.

Beginning in 2021, the Source Water Protection Program (SWPP) transitioned from the parish-based approach to a watershed basin approach, focusing on one or more watersheds to initiate protection activities (LDEQ 2023q). Key elements of the watershed SWPP include the following strategies:

1. Updating and maintaining source water assessment data, which includes information on sources of drinking water (wells or intakes) and a list of potential sources of contamination located near those drinking water sources;
2. Development of contingency plans for all water systems in each targeted community in the event of an emergency or the loss of the water supply;
3. Implementation of public education/awareness campaigns to make the public aware of their drinking water sources and how to protect them;
4. Development and dissemination of educational/outreach material and BMPs for protection of drinking water;
5. Addressing the most threatening potential sources of contamination identified in the source water assessment data;
6. Addressing specific issues affecting water sources identified by local stakeholders;
7. Addressing specific NPS contamination identified as affecting water supplies; and
8. Introduce the drinking water protection model ordinance for adoption by local governments. The model ordinance may be modified by the local governing body to address specific issues and concerns.

6.c. Identify unpermitted point sources

The LDEQ Compliance Monitoring Strategy (LDEQ 2023d) outlines approaches for monitoring permit compliance to aid in addressing potential point source issues. The LDEQ Surveillance Division performs 'Watershed Sweeps' under the Compliance Monitoring Strategy to identify nonpoint sources and unpermitted point source dischargers within targeted subsegments. In the 2022 calendar year, the LDEQ Surveillance Division conducted 48 Watersheds Sweeps in two subsegments (Table 3).

Table 3. Louisiana Department of Environmental Quality (LDEQ) Surveillance Division Watershed Sweeps in 2022.

Subsegment No.	Water Body Segment Description	Inventory/ Inspections	Notice of Deficiency (NOD)
LA080802	Cheniere Brake Lake	36	31
LA040809	Black River	12	5

6.d. 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, and several USDA NRCS initiatives employed restoration activities associated with CPs. These USDA NRCS initiatives include the Mississippi River Basin Healthy Watersheds Initiative (MRBI) and National Water Quality Initiative (NWQI), which target watersheds across the state to address suspected nonpoint sources through the implementation of CPs. Previously reported MRBI projects were completed in 2021, and a summary is found here. Sediment, phosphorus, and nitrogen loss was reduced by 379 tons, 1.4 million pounds, and 4.2 million pounds, respectively, during FY 2020-2021. Upcoming projects, for both MRBI and NWQI have been identified as follows:

New MRBI projects are being proposed and public comment initiated for program

In FY2023, USDA MRBI implementation will occur in four watersheds in Louisiana (USDA MRBI 2023c):

1. Tiger Bayou 080402070301
2. Bieler Bayou-Tensas River 080500030407
3. Wildhorse Bayou-Tensas River 080500030402
4. Baxter Bayou 080500020501

In FY2023, USDA NWQI implementation will occur in two watersheds in Louisiana (USDA 2023d):

1. Town of Estherwood-Bayou Plaquemine Brule 080802010208
2. Bayou Blanc-Bayou Plaquemine Brule 080802010206

Further, in FY2023 USDA NWQI is planning in four watersheds in Louisiana (USDA 2023d):

1. Lower Overflow Creek 080402050805
2. Outlet Chemin-a-Haut Creek 080402050905
3. Walkers Slough-Bayou Bartholomew 080402050802
4. White Oak Creek 080402050903

USDA expenditures for 2022 projects are found in Table 4, and eligible watersheds are found in Table 5.

TABLE 4. USDA NRCS PROJECT EXPENDITURES

Watershed Name	$FY20	$FY21	$FY22	Total
MRBI				
Bayou Baxter included with Hill Bayou-Bayou Macon	110,000	0	118,000	$118,000
Tiger Bayou	119,858	157798	205000	$372,259
Wildhorse Bayou-Tensas River (Included with Bieler Bayou-Tensas River)	124,849	774378	158000	$934,351
Hill Bayou-Bayou Macon (Included with Baxter Bayou	166,086	46000	0	$212,086
Bieler Bayou-Tensas River (Included with Wildhorse Bayou-Tensas River)	29,061	0	0	$29,061
NWQI				
Bayou Blanc-Bayou Plaquemine Brule, Bayou Plaquemine Brule-Estherwood	134,102	726,087	60,009	$920,198
Bieler Bayou-Tensas River	24,096			$24,096
Fool River-Tensas River	34,943			$34,943
Hill Bayou-Bayou Macon	6,887			$6,887
Long Lake Bayou-Bayou Macon	12,358			$12,358

TABLE 5. USDA NRCS PROGRAM ELIGIBLE/APPROVED PROJECT AREA WATERSHEDS AND FUND CODES:

Watershed Name	Parish	HUC12
FY21 MRBI Eligible Area / Approved Project Area Watersheds		
Bieler Bayou-Tensas River	Tensas	80500030407
Wildhorse Bayou-Tensas River	Tensas	80500030402
Baxter Bayou	East Carroll	80500020501
Hill Bayou-Bayou Macon	West Carroll	80500020403
Tiger Bayou	Catahoula	80402070301
FY22 MRBI Eligible Area / Approved Project Area Watersheds		
Bieler Bayou-Tensas River	Tensas	80500030407
Wildhorse Bayou-Tensas River	Tensas	80500030402
Baxter Bayou	East Carroll	80500020501

Watershed Name	Parish	HUC12
Hill Bayou-Bayou Macon	West Carroll-East Carroll	80500020403
Tiger Bayou	Catahoula	80402070301
FY21 NWQI Eligible Area		
Bayou Blanc-Bayou Plaquemine	Acadia	80802010206
Town of Estherwood-Bayou Plaquemine Brule	Acadia	8080201020
FY22 NWQI Subaccounts / Fund Codes: Subaccount Watershed (12 Digit HUC) Parish		
Bayou Blanc-Bayou Plaquemine Brule	Acadia	80802010206
Bayou Plaquemine Brule-Estherwood	Acadia	8080201208

To provide technical assistance and best management practices (BMPs) through cost-share and incentive payments LDAF expended approximately $909,714.98 on watershed implementation within multiple watersheds around the state. Implementation, Planning and/or Technical Assistance was conducted on approximately 18,334.89 acres of private farmland in an effort to restore or partially restore surface water quality in eight priority watersheds within the Ouachita River, Mermentau River, and Vermilion-Teche Basins. Table 6 illustrates LDAF Section 319 USEPA grant expenditures. Funds from 2015-2016 are due to end in 2023, at which time the funding source will rotate to later years.

TABLE 6. LOUISIANA EXPENDITURES ON BMPS THROUGH INCENTIVES FOR 2022 BY GRANT YEAR.

Grant Year	LDAF (USEPA)
2015	$ 8,868.80
2016	$ 578,386.37
2017	$ 12,892.51
2018	$ 215,242.78
2019	$ 94,323.52
2020-2022	Upcoming
TOTAL	**$ 909,714.98**

In FY2022, Louisiana's NPS Program identified its priority watersheds for Section 319 implementation activities for 2023-2027, (LDEQ 2023q). Prioritization was based on impairment status due to suspected nonpoint sources, water quality criteria, partnerships such as USDA and

LDAF, statewide programs such as the Coastal Nonpoint Source Pollution Plan and the individual home sewerage system statewide program.

These BMPs were carried out through the traditional conservation partnership cooperation between the USDA-NRCS, the LDAF and participating Soil and Water Conservation Districts (SWCDs). These local SWCDs included Acadia, Vermilion, Jefferson Davis, Morehouse, St. Landry,

LaSalle, Evangeline, and Bouef River. Signed contracts establish the participant's BMP payment schedules and implementation requirements, defining the relationship between themselves and the Federal-State-Local conservation delivery team. To attain Section 319 water quality crop rotation objectives, an array of proven conservation practices such as grade stabilization, conservation, prescribed grazing, heavy use area protection, critical area planting, irrigation land leveling, tillage and residue management and others were cost-shared through this program. Participants are required to implement a total Resource Management System plan through which additional BMPs are prescribed. These additional BMPs further ensure reduction of water quality impairments and exceed the participants required matching funds. To ensure effective delivery of these necessary BMPs, LDEQ provides water quality data, watershed modeling, targeted sampling, mapping and other critical logistical assistance to ensure maximum effectiveness for our collective efforts in restoring water quality in agricultural settings.

Under the "Long-Term Vision for Assessment, Restoration, and Protection" under the Clean Water Act Section 303(d) Program, Louisiana plans to implement nutrient reduction and management strategies in 4 of 6 priority New Vision watersheds (those that have had suspected nutrient impairments). LDEQ is in the reporting stage for two of these watersheds, and in the planning and/or monitoring phase of the additional two. Investigation of sources continues. Outreach and education activities are ongoing. Detailed information can be found in Section 6e below.

The Wetlands Reserve Enhancement Partnership (WREP) between NRCS and the Mississippi River Trust focuses on the "batture" land floodplains to provide flood protection, reduce soil erosion, and improve water quality for local areas and neighboring communities, as well as restore migration and winter habitat for neotropical songbirds, shorebirds, and waterfowl species (USDA NRCS 2022). The Batture Lands-MRBI-WREP Project will work in 9 parishes. Maps can be seen in Figure 1 (page 29). For 2022, the Lower Mississippi Batture Reforestation Project, led by the Mississippi River Trust, continued to enroll acreages focusing on restoring bottomland hardwood forests (USDA NRCS 2023e).

FY 2022 Status **for WREP Expenditures** (Landreneau, 5/09/23):

Agriculture Conservation Easement Program (ACEP)-WREP Financial Assistance Allocation

- ❖ WRE General

- $25,774,754
  - $22,496,028 – New Enrollments
  - $3,278,726 – Stewardship
- WREP – Tri-State WREP
  - $1,666,000
- WREP – Batture WREP
  - $5,438,968
- $32,879,722 Total WRE Allocation

6.e. Determining Priority Watershed & Subwatershed Basins

This Strategic Action focuses on selecting priority watershed basins and subwatersheds for nutrient reduction and management in Louisiana. Through the collection of information during the Strategy development phase it became apparent that combined with the Ouachita River Basin's location in northeast Louisiana within the larger MARB, and the ongoing water quality and nutrient reduction and management efforts, that this basin should undergo development and implementation of on-the-ground nutrient management activities. Water quality improvements and participation by partners to support further improvement progress in nutrient reduction and management in the Ouachita River Basin has been successful. The USDA NRCS and LDAF/LDEQ NPS Program are active in the Ouachita River Basin in Louisiana.

Factors in selection of the priority waters for nutrient reduction and management in the state include consideration of the current water quality, implementation activities, and participation of local, state, and federal programs within the basin to manage nutrients.

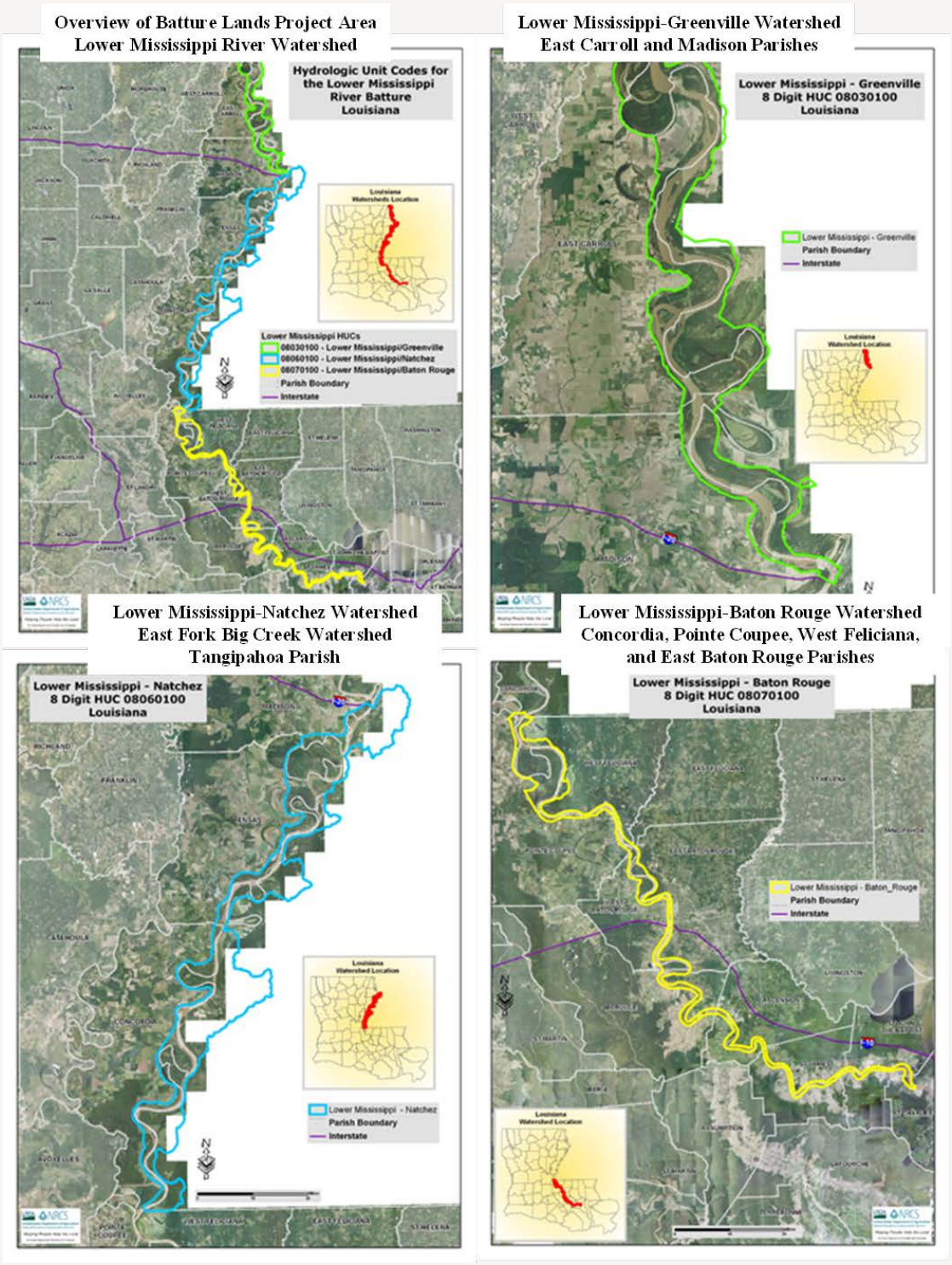

FIGURE 1. USDA MISSISSIPPI RIVER BASIN INITIATIVE-WETLANDS RESERVE ENHANCEMENT PROGRAM PROJECT PROJECTS

6.f. Develop/leverage watershed nutrient reduction and 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 reduction and management activities. Such programs where projects to address nutrient reduction and management can be leveraged include the LDEQ Nonpoint Source Program, the New Vision of §303d Program, and the BP *Deepwater Horizon* restoration.

The Louisiana NPS Program is currently working in 10 watersheds to implement CPs that may impact nutrient loading, some of which overlap with those watersheds in the USDA initiatives. An additional 2 are in the baseline monitoring phase. Priority watersheds for these leveraging programs are provided in Appendix C.

In 2017, the BP Deepwater Horizon Oil Spill Trustees in Louisiana released a Notice of Solicitation (NOS) in July 2017 to request ideas from the public to address lost recreational opportunities and nutrient reduction (nonpoint source). All funds and projects are administered through the U.S. Department of the Interior's (DOI) Natural Resource Damage Assessment and Restoration Program (NRDA Restoration Program), as the mission of NRDA is to restore natural resources injured as a result of oil spills or hazardous releases into the environment. Development of a draft restoration plan and environmental assessment for nutrient reduction and recreational use activities was initiated by the LA Trustee Implementation Group (TIG) in fall 2017. The TIG released the draft plan of *LA TIG Restoration Plan #4: Provide and Enhance Recreational Opportunities and Nutrient Reduction* for public review in April 2018. Following consideration of public comments received on the draft, the final restoration plan and environmental assessment was released in July 2018, with project completion in 2019 (LA TIG 2019). The Deepwater Horizon Oil Spill Final Programmatic Damage Assessment and Restoration Plan (PDARP) includes restoration goals and restoration types, including restoring water quality. The Louisiana Trustee Implementation Group (LA-TIG) undertook a process to clarify decision making processes to guide future spending of Management and Adaptive Management (MAM) funds, outlined in the LA-TIG Monitoring and Adaptive Management Strategy. Fundamental and SMART (specific, measurable, achievable, relevant, time-bound) objectives were developed to assess progress toward PDARP restoration goals, and the LA-TIG process for screening and approval of LA-TIG MAM activities is summarized. Priorities in the strategy for nutrient reduction focused on agriculture-related conservation measures. Furthermore, three other LA TIG projects concerning nutrient reduction are in progress: (1) Nutrient Reduction on Cropland and Grazing Land in Bayou Folse; (2) Nutrient Reduction on Dairy Farms in St. Helena and Tangipahoa Parishes; and (3) Nutrient Reduction on Dairy Farms in Washington Parish. Information on all projects concerning restoration activities after the BP oil spill may be found on the Gulf Spill Restoration website.

The LDEQ, in coordination with LSU AgCenter, was tasked to develop producer-specific master programs and nutrient management plans to be utilized by beef cattle, dairy, and poultry producers for the purpose of reducing pollution, such as excess nutrients, into the environment through improved farm practices specific to producer needs and funded by an LDEQ Beneficial Environmental Project (BEP). An interagency contract entered by LDEQ and LSU AgCenter on July 10, 2019 and was identified as *Educational Programs to Improve Nutrient Management and Water Quality Protection Practices Implementation in Animal Operations across Louisiana*. The proposed project will address soil health and water quality resource concerns within Louisiana watersheds. Education and outreach efforts are expected to improve conservation implementation, consequently providing economic benefit to the farmers. The core strategy will be to promote the implementation of an enhanced and comprehensive conservation system that integrates recommended EQIP conservation practices and technical support. Assistance with conservation plan development will be accomplished by an interdisciplinary team that will work to integrate soil health management practices, water-quality improvement practices that emphasize nutrients among others, and wildlife enhancement practices. An economic evaluation of conservation practices promoted will be conducted to provide a cost-benefit analysis to address profitability concerns. The total project cost was not to exceed $249,606.00 and was completed June 30, 2022.

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 reduction and management strategies to improve participation with Strategy implementation. Advantageous leveraging opportunities among programs and incentives provisions for nutrient reduction and management 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, science-based conservation practices offered through targeted initiatives or a suite of programs utilizing financial incentives or cost-share opportunities to encourage participation by stakeholders in nutrient reduction and 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 Environmental Quality Incentives Program, Conservation Stewardship Program and the CWA Section 319 Program, each creating enhanced opportunities for many participants including those of the Louisiana Master Farmer Program, the Advanced Master

Gardener Program, and the Environmental Leadership Program to complete program certification requirements (LSU AgCenter 2023; LDEQ 2023f).

To reduce the amount of nutrients entering rivers and reaching the Gulf of Mexico, the Patrick F. Taylor Foundation has awarded the LSU AgCenter $1.7 million to continue funding a four-year project to study the issue (Patrick Taylor Foundation 2020). Another $1.7 million was awarded again in 2022. The goal is to provide a reduction of nutrients into the Gulf of Mexico to reduce impacts on the dead zone. All of other agricultural states along the Mississippi River (and other rivers) could benefit from this study and model farms.

The Louisiana Master Farmer Program (LMFP) is an environmental stewardship educational program aimed at agricultural producers in the state. Since the end of 2021, participation in the Master Farmer program increased to 4,250. Three producers received certification, with two receiving re-certification. There are currently 369 certified and re-certified Master Farmers in Louisiana representing 51 of the 64 parishes (79.7% of the parishes in the state; Gentry 2023).

In 2014, the LSU AgCenter announced an Advanced Master Gardener Program (LSU AgCenter 2021). 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. More details on this program including a 2020/2021 course schedule can be found on the Advanced Master Gardener Program webpage (LSU AgCenter 2021).

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 2023f). In 2022, six new members were added and nine awards were given (LDEQ 2023r).

7.b. Identify and communicate new funding initiatives/projects

This Strategic Action is to identify and communicate available funding support related to nutrient reduction and management activities. Many funding programs provide continued opportunities for participation.

In 2022, the Bipartisan Infrastructure Law (BIL) provided funds to each of the 12 Hypoxia Task Force states through the Gulf Hypoxia Program (GHP). For Louisiana, funding is expected to be $4.1 million from FY22 to FY26. Louisiana's GHP workplan is focused on Louisiana Nutrient Reduction & Management Strategy Implementation. The workplan will target implementation of agricultural best management practices within prioritized tracts in northeast Louisiana, and will conduct transect monitoring in coastal Louisiana. Best management practices will be targeted within the Lake St. Joseph and Cypress Bayou watersheds to reduce agriculture-induced nutrient loading and provide other water quality improvements. Coastal monitoring will occur along a transect extending from Barataria Pass, Louisiana to the inner shelf of the Gulf of Mexico to inform the interactive effects of multiple ecosystem change drivers (restoration, riverine nutrient loading, hypoxia, climate change) on living resources in the Gulf of Mexico (LDEQ 2023).

Programs previously identified in the Strategy remain relevant as available support, and include:

- Agricultural Economic Development Assistance, LDAF
- Clean Water Act §319, LDAF & LDEQ
- Coastal and Estuarine Land Conservation Program (CELCP), LDNR
    - In 2022, NOAA solicited proposals for this land conservation effort with funding from the Infrastructure Investment and Jobs Act
- Community Development Block Grants (CDBG)
- U.S. Housing and Urban Development (USHUD) CDBG
- CDBG Disaster Recovery Assistance
- Clean Water State Revolving Fund Program (CWSRF)
- Conservation Innovation Grant (CIG) Program, USDA NRCS (2023a)
- Regional Conservation Partnership Program, USDA NRCS (2021b)
- Coastal Vegetative Planting Program, LDAF, CPRA
- Agricultural Solid Waste Management Program, LDAF. LDEQ
- Urban Waters, USEPA–New Report in Jan 2021 (2021)
- Gulf Coast Ecosystem Restoration Council (RESTORE Council)
- LWI River and Rain Gauge Network
- Patrick F. Taylor Foundation (2020; McClure 2019)
- USEPA Water Infrastructure and Resiliency Finance Center (USEPA 2023a)
- USEPA grant to support HTF member state's nutrient reduction efforts (USEPA 2019, 2020)
- USDA NRCS CIG grant: *A comprehensive demonstration of using agricultural tailwater irrigation for southern crop production* was awarded to LSU AgCenter

NRCS Conservation Innovation Grants (CIG) that support partners working to reduce nutrient excess in the environment include:

- Campti Field of D was awarded a CIG grant for a three-year grant program that began on March 1, 2022. It will support 21 historically underserved producers as they implement No-Till Organic Market Garden (No-Till OMG) production to restore soil health and help re-build local food systems.
- Improving crop yield and soil carbon accumulation in Louisiana soybean and corn production with sugarcane bagasse biochar. LSU AgCenter. 2021-2024.
- Sugarcane on-harvest residue management. LSU AgCenter. 2022-2025.

Additional funding sources that may support nutrient-related activities:

- USEPA/CWA:
  - CWA Section 106 Supplemental Monitoring
  - CWA Section 104(b)(3) Water Pollution Control Program Grant
  - Gulf of Mexico Division grants
  - EPA Multipurpose Grants
- Gulf of Mexico Alliance (GOMA)
- USDA Farm Bill Programs:
  - EQIP – Environmental Quality Incentives Program
  - CSP – Conservation Stewardship Program
  - WRE – Wetland Reserve Easements Program
  - CRP – Conservation Reserve Program
  - CREP – Conservation Reserve Enhancement Program EQIP (NRCS)
  - NWQI – National Water Quality Initiative
  - MRBI – Mississippi River Basin Healthy Watersheds Initiative
  - WRP – Wetland Reserve Program
- Louisiana Outdoors Forever

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 RMS-level conservation plan on their entire farming operation with USDA NRCS.

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. 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 over 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.

Under the state's Nonpoint Program, BMP implementation in priority watersheds is incentivized and participation is encouraged through LDAF and NRCS, SWCDs, sign-ups, meetings, and other outreach activities. LDEQ NPS staff provide public education during events throughout the state to students and adults on sources of runoff, prevention strategies, and types of BMPs in urban and rural settings.

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

LDEQ provides technical assistance for point sources. The LDEQ conducts technical trainings and information sharing sessions for point sources. LDEQ Stormwater Pollution Prevention Plans (SWP3) guidance and documents are available on LDEQ's Storm Water Permit Resources website (LDEQ 2023j).

In 2021, LDEQ performed outreach to communities, businesses, and other organizations through online EnviroSchool training sessions, focusing on nonpoint source pollution, onsite sewage systems, and New Vision activities (See Section 1b). These videos are posed on LDEQ's YouTube Channel. Information on NetDMRs (Discharge Monitoring Reports) may be found on LDEQs CDX/NetDMR Training website (LDEQ 2023k).

7.e. Document economic impacts from available sources

The documentation of economic impacts of nutrient reduction and management is ongoing. This documentation of economic impacts is essential to implementation of cost-effective nutrient management practices in Louisiana.

Louisiana State University researchers investigated the economic feasibility of variable cover crop strategies and multiple seeding rates within a soybean production system in Louisiana (Wang, et al. 2020). Conservations motives differ, and are based on individual risk behavior. The study found that as the risk-bearing capacity of a landowner increases, the current level of voluntary incentive programs does not motivate the landowner to implement conservation. The economic and risk assessment framework developed improves understanding of the temporal dynamics of different practices, and can inform policy that promotes agricultural systems that are economically, environmentally, and socially sustainable.

7.f. Develop and implement a water quality credit trading program

Louisiana developed a Water Quality Trading Program in 2019 (LDEQ 2023g). Implementation of this activity is ongoing. 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 traditional regulatory approaches. In addition, WQT is a cost-effective approach for reducing nutrients and improving water quality that 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 2021, the program was amended to allow projects with public conservation funds eligibility to participate unless otherwise prohibited by the terms and conditions of the public conservation funded project.

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 2019 to 2023.

9. Monitoring

Monitoring related to nutrient reduction and 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 reduction and 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 water column nutrient water quality in the state's water bodies through the LDEQ Ambient Water Quality Monitoring Network (LDEQ 2023e). During the

2021 to 2022 water sampling year (October 2021 through September 2022), LDEQ monitored 130 sites in 128 subsegments for in-stream water column concentrations of nitrogen (nitrate-nitrite and TKN) and phosphorus (TP). Beginning in November 2022 LDEQ changed its monitoring year from October through September to November through October. This was done to obtain more accurate statistical assessments of enterococci data for Water Quality Integrated Report purposes. During the transition both the 2021/2022 and the 2022/2023 monitoring cycles continued to obtain 12 months of data. Results of the LDEQ ambient water quality monitoring are available through the LEAU Web Portal (LDEQ 2023h).

Under the New Vision approach for the TMDL program, TMDL alternative plans have been completed- or are planned for- Tunica Bayou (070505), Bayou Sara (070501), Yellow Water River (040504), Natalbany River (040503, 040507), New River (040404) and Blind River (040401, 040403). The plans for Tunica Bayou and Bayou Sara address fecal coliform. The plans for Yellow Water River, Natalbany River, New River and Blind River will address nutrients in addition to fecal coliform and dissolved oxygen. The final report for Tunica Bayou was accepted by USEPA on October 5, 2020. Monitoring has been completed for Yellow Water River and Natalbany River. Monitoring for New River began in July 2021, and monitoring for Blind River began in February 2022.

Under the state's NPS Program, intensive water quality monitoring occurs typically bimonthly at multiple sites in priority watersheds as part of baseline monitoring, to inform BMP targeting. Frequency is typically reduced to monthly, and potentially at fewer sites after implementation begins, and continues through one year following the conclusion of CP implementation. This monitoring supports LDAF and NRCS efforts in those watersheds.

9.b. Monitor relative to BMP/CP implementation

In 2022, LDEQ NPS sampled for nutrients at 126 sites in 10 priority watersheds. TKN, nitrate-nitrite, and total phosphorus are monitored at these sites bimonthly during the baseline sampling period to help target BMP implementation, and monthly post-baseline through one year after implementation to track BMP-related water quality changes. This data is shared through USEPA's Water Quality Exchange (WQX) and made publicly available through USEPA's Water Quality Portal: https://www.epa.gov/waterdata/water-quality-data-download.

The Patrick F. Taylor Foundation Grant project has developed model farms on commercial agricultural operations to demonstrate science-backed best management practices as components of overall conservation programs for grain crops and sugarcane. In 2022, the LSU AgCenter was awarded $1.7 million to continue the project, with the addition of rice farming operations in two additional locations in Louisiana. The overall goals of the demonstrated BMPs are to be economically and environmentally efficient. The best management practices are occurring at Sugarcane Model Farm in Napoleonville and Cotton & Grain Crops Model Farm in

Somerset. A production field under producer's standard practices (Producer Farm) has been established adjacent to each of these model farms. Both the Model and Producer Farms at each location have installed with flume and automated water sampler for water quality monitoring and total nutrient load estimation. Plant data including main crop yield and cover crops biomass will be collected. Full analysis of elemental composition of these collected plant parts will be performed to estimate nutrient (i.e., nutrient and phosphorus) use efficiency and nutrients recovered from the soil. Soil samples will be collected at critical growth stages during the growth of main crop and cover crops to monitor nutrient cycling, biological activity, soil physical properties, and organic matter accumulation. The same data will be collected on the additional model farms over the next three years. These metrics will be used to evaluate the performance of the proposed Model Farm and Producer Farm in terms on agronomic, economic, and environmental sustainability.

A portfolio of practices that are economically profitable and environmentally sustainable will be identified. The marginal impact of any conservation practice is an important component of conservation benefits measurement. Focusing solely on a system of practices deters some from adopting the whole suite of conservation methods due to challenges from an implementation standpoint and a financial standpoint. Identifying practices that maximize nutrient loss reduction benefits, either through one practice and/or combining with one or more practice is an unmet need of the farmer in Louisiana. Through the Model Farms project, researchers will be able to identify the value of conservation practices individually and in combination with other conservation practices. Relying on the results generated through the project and the literature, we will be able to value the ecosystem services that are generated, consequently mitigation of the Hypoxia Zone in the Gulf. A conservation practices budget will be generated that will include the practice, its marginal impact on nutrient reduction and/or nutrient losses to bodies of water, and overall profitability. Outreach activities included a Soil Health/Cover Crop Field day and a Best Management Practices in Sugarcane Production Field Day in June and September, 2022, respectively. Approximately 100 producers, university faculty, and state and federal agency personnel attended the events. The field days highlighted water and soil health monitoring projects, as well as cover crops and conservation practices.

The HTF Nonpoint Source Metrics Workgroup continues to track progress in nonpoint source reductions in the 12 HTF states in the MARB (HTF 2018).

9.c. Monitor nutrients associated with riverine diversions

The CPRA has developed a System Wide Assessment and Monitoring Program (SWAMP) to monitor and assess both natural and human systems in coastal Louisiana. In light of its growing restoration and protection programs, CPRA has worked 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

(Hemmerling, et al., 2019). 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.

SWAMP water quality monitoring and nutrient sampling has been implemented coast-wide. The SWAMP water quality network leverages existing long-term water quality programs (LDEQ, LDWF, and USGS), combined with the implementation of new water quality stations for a total of 120 water quality stations. Water quality parameters measured include nitrogen [(total Kjeldahl nitrogen (TKN), nitrate+nitrite nitrogen (NO3NO2), and ammonia (NH3)], phosphorus [(total phosphorus (TP), orthophosphate (PO4)], silica (SiO2), chlorophyll a, total suspended solids (TSS), turbidity, dissolved oxygen (DO), dissolved oxygen percent saturation, temperature, salinity, and pH. The monitoring data collection was implemented in Barataria starting in 2015 and in the basin east of the Mississippi River starting in 2017, based on recommendations in Hijuelos and Hemmerling (2016). Implementation in the western basins started in 2020, and was based on recommendations in The Water Institute of the Gulf (Hemmerling, et al. 2019). Water quality data are collected to understand system conditions and dynamics at the basin scale, and the water quality data can be accessed at https://cims.coastal.la.gov/monitoring-data/.

9.d. Monitor nutrients in point sources

Monitoring for nutrients in point sources is documented through the LPDES Permit Program and also by the USEPA HTF. LDEQ is responsible for the LPDES Permit Program whereby dischargers to waters of the state are permitted for such water discharge activity. Through the LPDES Permit Program, LDEQ is able to locate and track the number of permitted dischargers to water bodies in Louisiana. LDEQ continues to implement the Point Source Implementation Strategy for Nutrients in the LPDES Program by including TN and TP report requirements in permits, as appropriate. The LPDES Program also implements TMDLs with TN and TP waste load allocations. Nutrient monitoring of permitted dischargers aids in gathering necessary data on nutrient discharges in Louisiana. Nutrient monitoring information from the LPDES Permit Program is available through the LDEQ EDMS system (LDEQ 2023m) and is now available through the USEPA Integrated Compliance Information System (ICIS) (USEPA 2023b). In addition, permitted wetland assimilation sites are evaluated annually by LDEQ to determine if the permitted nutrient loading rates are appropriate. These evaluations are available for review in EDMS under the assigned AI number for each permitted facility.

The LDEQ Point Source Implementation Strategy for Nutrients in Louisiana began implementation in May 2016. In this point source strategy, major and minor sanitary permitted dischargers began reporting TN and TP on a quarterly basis, and the reporting requirement is now added to new and renewal permits. Other types of dischargers may undergo a nutrient review to determine if reporting requirements will be included in their new or renewal permit

(LDEQ 2017). As of January 2023, nutrient monitoring requirements have been established in approximately 92% of all individual sanitary treatment plant LPDES permits. It is projected nutrient monitoring requirements will be established in all individual sanitary treatment plant permits by the end of 2023. In addition, the following facilities are required to monitor for nutrients, based on TMDL requirements or reasonable potential to discharge TN and/or TP: 1,060 facilities covered under general sanitary permits, and 610 individual sanitary, MS4 and industrial permits. Reported numbers may be affected by new and terminated permits in the program. Industrial permits with TN/TP monitoring or limits are most often based on Effluent Limit Guidelines promulgated by USEPA.

The HTF Point Source Metrics Workgroup documents the efforts of the 12 HTF states to reduce point source nutrient loads to the MARB (HTF 2023b). The HTF Point Source Metrics Workgroup tracks two measures for point sources: 1) the number of major Publicly Owned Treatment Works (POTW) permits with monitoring requirements for N and P; and 2) the number of major POTW permits with total N and P limits, as first reported in the 2016 Report on Point Source Progress in HTF States (HTF 2016). The Second Report in 2019 demonstrates the increases in both monitoring requirements and discharge limits in permits for nutrients since the 2016 report (HTF 2019). The Second Report in 2019 also includes an analysis that summarizes N and P loads from all major sewage treatment plants in the 12 HTF states discharging to the MARB. LDEQ is involved in reviewing and verifying data for permitted dischargers in the state that is part of these measures. The Third Report is in development and anticipated in 2023.

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 LDEQ webpages (LDEQ 2023i).

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 for parameters for TN (STORET code 00600) and TP (STORET code 00665). In a review of 107,423 data records for TN or TP in DMRs available through ICIS from January 1, 2000 to December 31, 2022, compliance with point source permits in regard to completion of DMRs for TN or TP was about 92.4% whereas about 7.6% of DMR submissions resulted in data violations that may have been related to overdue reporting or non-receipt. Of the 5,718 records for TN or TP with limits, less than 0.7% of the DMR submissions were effluent violations.

9.f. Identify and communicate new monitoring projects/initiative

Monitoring programs within Louisiana continue to improve. Monitoring programs improvements include increased number of permitted dischargers monitoring for nutrients through the LDPES

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.

Tulane is to develop new experimental stations from support provided by an endowment provided by Charlotte Beyer Hubble (Tulane News 2020). Part of the established Excellence Fund will be used to expand and support the development of a network of Lower Mississippi River Experimental Stations. In addition, Tulane is hosting Lower Mississippi River Science Symposiums (inaugural in 2021 to occur biennially) to establish a recurring forum to connect academic, government and NGO scientists and managers in the region to share their research, ideas, and needs with a goal of building synergy.

The Louisiana Watershed Initiative (LWI), with LDEQ, USGS, and the Louisiana Office of Community Development (OCD), have collaborated to install, operate and maintain 100 new river and rain gauges throughout the state. Up to 15 of the gauges may include equipment to monitor selected water quality parameters. To date, 117 gauges are operational through this effort.

CPRA's System-Wide Assessment and Monitoring Program (SWAMP) extended in-state monitoring (including nutrients) to include stations across the LA coast beginning in 2020; monitoring throughout the coast is ongoing (Hijuelos and Hemmerling, 2016; Hemmerling, et al. 2019). In addition, LDEQ and CPRA collaborated with funding from the USEPA HTF on a study designed to expand sampling from inshore to offshore Louisiana waters. The *Pilot Expansion of Water Quality Monitoring from Inshore to Offshore Project* continued in 2022. This study was extended in 2022 via funds from the Bipartisan Infrastructure Law through 2025 and projects can be accessed on the Strategy's website.

USEPA HTF funds also supported monitoring for the NPS Program. The *Nutrient Reduction Strategies Supporting Section 319 Clean Water Act (CWA) Louisiana Nonpoint Source (NPS) Water Quality Analysis Project* collects nutrient data to provide support for implementation activities in four Basins: Mermentau, Vermillion Teche, and Ouachita River and Terrebonne. The priority waters within each basin where monitoring occurred included Bayous Maringouin (120111), Du Portage (060703), Grosse Tete (120104) and the Vermilion River (060801).

The Patrick F. Taylor Foundation Grant project will develop model farms on commercial agricultural operations with demonstrations of science-backed best management practices as components of overall conservation programs for grain crops and sugarcane. Relying on the results generated through the project and the literature, researchers will be able to value the ecosystem services that are generated, consequently mitigation of the Hypoxia Zone in the Gulf. A conservation practices budget will be generated that will include the practice, its marginal

impact on nutrient reduction and/or nutrient losses to bodies of water, and overall profitability. This project extends through 2022, with additional funds awarded in 2022 to continue project for 4 more years.

LDNR has no new funding initiatives and projects planned, however, the Office of Coastal Management continues to be committed to reducing and minimizing adverse impacts on water quality, and supports state and local partnerships in improving monitoring projects.

10. Reporting

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

10.a. Conduct 5-year strategy review

The Strategy team reviewed and updated the Strategy in 2018 as part of the Strategy timeline. 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 2018 to 2022 (LDEQ 2018) and the CPRA 2023 Draft Coastal Master Plan (CPRA 2023) from 2017 to 2023. Both programs utilize a five or six-year timeline for program evaluation that incorporates adaptive management. The next 5-year review is expected to take place in 2023/2024.

10.b. Report annually on strategy activities

This present document represents the 2022 Annual Report on Louisiana Nutrient Reduction and Management Strategy activities.

10.c. Disseminate information through strategy website

The updated Strategy was released in December 2019 (Louisiana Nutrient Reduction and Management Strategy Interagency Team 2019) and is available on the Strategy website (Figure 2). The Strategy website contains information related to nutrient reduction and management activities in Louisiana. Content includes information on nutrient reduction and management, resources, reports, decision support tools, programs, and frequently asked questions. As new and updated information are made available, it will be accessible to the public through the website.

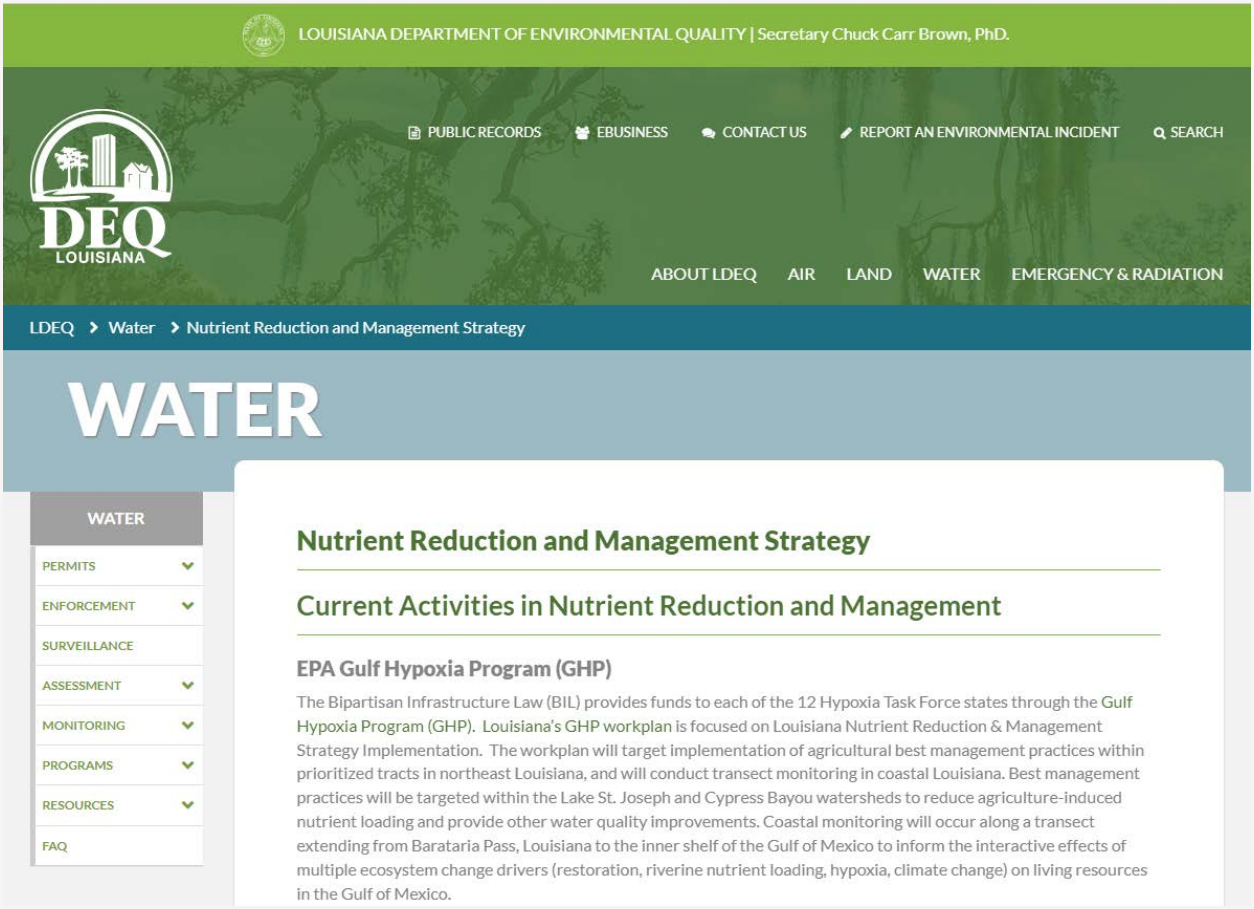

FIGURE 2. LOUISIANA NUTRIENT REDUCTION AND MANAGEMENT STRATEGY WEBSITE LOCATED AT HTTPS://WWW.DEQ.LOUISIANA.GOV/PAGE/NUTRIENT-MANAGEMENT-STRATEGY.

10.d. Document spotlight(s) of nutrient reduction and management successes

The LDEQ NPS Program aims to partially or fully restore impaired water bodies in Louisiana. According to the NPS Management Plan (LDEQ 2023q), the LDEQ will average two success stories every other year in conjunction with the Integrated Report to document use support restoration. The LDEQ NPS Program prepares and reports success stories as publication occurs.

Under the New Vision approach to the TMDL program, LDEQ is conducting activities that are expected to restore each of the priority waterbodies. Based on current assessments, the primary contact recreation designated use for Bayou Sara has been restored.

The USDA NRCS has adopted a new reporting system called Conservation Desktop that promises to quantify the levels of soil and nutrient loss prevented by the over 50,000 acres of nutrient

management practices implemented in Louisiana for 2019 (USDA NRCS 2019; USDA NRCS Louisiana Office personal communication).

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APPENDIX A: STRATEGIC ACTIONS SCHEDULE 2019 to 2023

Strategic actions targets and goals (Component 8) from 2019 through 2023 for the Louisiana Nutrient Reduction and Management Strategy ("Strategy"). *Activities may be dependent on resource availability.*

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
1. Stakeholder Engagement		
1.a. Identification and engagement of stakeholders	Strategy Interagency Team	Ongoing
1.b. Perform outreach/education on Strategy	Strategy Interagency Team	Ongoing
1.c. Identify and promote partnerships/leveraging opportunities	Strategy Interagency Team	Ongoing
	Stakeholders	As needed, notify Strategy Interagency Team of opportunities (contact (nutrient.management@la.gov)
2. Decision Support Tools		
2.a. Identify, evaluate, and document selected tools	Strategy Interagency Team	Ongoing
	Stakeholders	Ongoing, notify Strategy Interagency Team of potential tools (contact nutrient.management@la.gov)
3. Regulations, Programs, & Policies		
3.a. Propose new regulations, policies and programs	Strategy Interagency Team	As needed
	Stakeholders	As needed, notify Strategy Interagency Team of new items (contact (nutrient.management@la.gov)

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
4. Management Practices & Restoration Activities		
4.a. Document current practices related to nutrient reduction and management	LDEQ, LDAF, USDA NRCS and LDNR for NPS Program	Annual
	LDEQ LPDES Program	Annual
	CPRA	See Coastal Master Plan
4.b. Identify areas where practices being implemented	LDEQ, LDAF, USDA NRCS and LDNR for NPS Program	Annual, see NPS Program
	LDEQ LPDES Program	Quarterly, see LPDES Program
	CPRA	Annual, see Coastal Master Plan
4.c. Identify case studies and model watersheds	LDEQ, LDAF, USDA NRCS and LDNR for NPS Program	Annual
	LSU AgCenter	Annual
	CPRA	Annual
4.d. Integrate science-based nutrient reduction and management approaches	CPRA	Ongoing, see Coastal Master Plan
	LSU AgCenter	Ongoing
	LDEQ and LDAF NPS	Ongoing
	LDEQ LPDES	Ongoing
4.e. Promote BMP/CP implementation by farm in priority watersheds	USDA NRCS	Ongoing, see Farm Bill Programs
	LDAF OSWC	Ongoing

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
	LSU AgCenter	Ongoing
5. Status & Trends		
5.a. Model nutrient loading estimated within Louisiana watersheds	USGS, LDEQ, CPRA	SPARROW modeling availability anticipated provided in 2021
	LDEQ NPS	STEP-L model to estimate nutrient loading and reductions
	CPRA	Ongoing, see Coastal Master Plan
5.b. Document/trends for in-stream nutrient water quality	LDEQ	Annual documentation, Long-term ambient stations trends update completed in 2021
5.c. Document/trends for Social Indicators of nutrient reduction and management behavior	SERA-46 and Land Grant Universities (LGU)	See SERA-46 and LGU
5.d. Document/trends for BMP/CP implementation in watersheds	USDA NRCS, LDAF OSWC, LSU AgCenter, LDEQ	Annual documentation
5.e. Document/trends for permitted discharger inventories	LDEQ LPDES Program	Annual documentation
5.f. Document/trends for river diversion efforts	CPRA	See Coastal Master Plan
5.g. Document coastal protection and restoration activities	CPRA	See Coastal Master Plan
6. Watershed Characterization, Source Identification, & Prioritization		

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
6.a. Maintain watersheds and water body characterization	LDEQ	Ongoing, National Hydrography Dataset (NHD) & Watershed Boundary Dataset (WBD); Water Quality Management Plan (WQMP) Volume 4 Basins & Subsegments
	LDNR, CPRA	As needed, coastal zone boundary
	USGS, USDA	Ongoing, national datasets
6.b. Identify potential pollution sources through Desktop Analysis/Windshield Survey/Stakeholder input	LDEQ New Vision LDEQ Surveillance LDEQ NPS	Ongoing, project specific
6.c. Identify unpermitted point sources	LDEQ Surveillance	Ongoing
6.d. Identify priority watersheds from leveraging programs	USDA GOMI	Project funded through 2019
	USDA MRBI	Extended through 2023
	USDA NWQI	Extended through 2023
	LDEQ/LDAF/LDNR NPS	See NPS Program
	LDEQ New Vision	See New Vision Program
	Stakeholders	Ongoing, notify Strategy Interagency Team of priority watersheds (contact nutrient.management@la.gov)
	Strategy Interagency Team	Ongoing

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
6.e. Determine priority watershed & subwatershed basins	LDEQ WPAD	Evaluate nutrient translators
	LDEQ NPS	Ongoing
6.f. Develop/leverage watershed nutrient reduction and management projects for priorities	Strategy Interagency Team	Ongoing
	LDEQ NPS	Ongoing
	LSU AgCenter	2019 through 2022, focus on educational programs and plans for animal operations
	NRDA Louisiana TIG	See BP Deepwater Horizon Restoration
	Stakeholders	Ongoing, notify Strategy Interagency Team of projects (contact nutrient.management@la.gov)
7. Incentives, Funding, & Economic Impact Analysis		
7.a. Promote voluntary participation in incentive-based programs	Louisiana Master Farmer	Ongoing, see LSU AgCenter
	Louisiana Master Poultry Producer	
	Louisiana (Kellogg) Master Rice Grower	
	Louisiana Master Cattlemen	
	Louisiana Master Gardener	
	Louisiana Master Naturalist	

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
	Louisiana Environmental Leadership Program (ELP)	Ongoing, see ELP Program
	LDEQ NPS	Ongoing
7.b. Identify and communicate new funding initiatives/projects	Strategy Interagency Team	Ongoing
	Stakeholders	Ongoing, notify Strategy Interagency Team of projects (contact nutrient.management@la.gov)
7.c. Promote assistance (financial or technical) for BMP/CP implementation	USDA NRCS	Ongoing
	LDAF OSWC	
7.d. Promote assistance (financial or technical) for point sources	LDEQ SB/SCAP	Ongoing
	LDEQ Enforcement	Ongoing
7.e. Document economic impacts from available sources	Strategy Interagency Team	As available
	LSU AgCenter	Monthly, Commodities and Conservation
	Stakeholders	As available, notify Strategy Interagency Team of sources (contact nutrient.management@la.gov)
7.f. Develop and implement a water quality credit trading program	LDEQ	Ongoing implementation
	Stakeholders	Ongoing, notify LDEQ of interest in participating in water quality trading (contact wq.trading@la.gov)

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
9. Monitoring		
9.a. Monitor in-stream nutrient water quality	LDEQ Surveillance	Ambient stations monthly for a year, every 4 years; Long-term ambient stations monthly each year
	LDEQ WPAD	Inland lakes monitoring completed in 2022
9.b. Monitor water quality relative to BMP/CP implementation	LDEQ NPS Program	Project specific, bi-monthly or monthly
9.c. Monitor nutrients associated with riverine diversions	CPRA	Project specific, see Coastal Master Plan
9.d. Monitor nutrients in point sources	LDEQ LPDES Permitted Dischargers	Performed by permittees quarterly or other frequency as specified in permit
9.e. Evaluate compliance with point source permits	LDEQ	Annual
9.f. Identify and communicate new monitoring projects/initiatives	Strategy Interagency Team	Ongoing
	Stakeholders	As needed, notify Strategy Interagency Team of new monitoring projects and initiatives (contact nutrient.management@la.gov)
10. Reporting		

Strategic Action	Agency Commitment(s)	Schedule 2019 to 2023
10.a. Conduct 5-year Strategy review	Strategy Interagency Team	Initiate in 2023, Complete in 2023-2024
10.b. Report annually on Strategy activities	Strategy Interagency Team	Annual
10.c. Disseminate information through Strategy website	LDEQ	Ongoing
10.d. Document spotlight(s) of nutrient reduction and management successes	Strategy Interagency Team	Ongoing
	Stakeholders	Ongoing, notify Strategy Interagency Team of spotlights (contact nutrient.management@la.gov)

Abbreviations: *BMP*: Best Management Practice; *CP*: Conservation Practice; *CPRA*: Coastal Protection and Restoration Authority; *LDAF OSWC*: Louisiana Department of Agriculture and Forestry, Office of Soil and Water Conservation; *LDEQ*: Louisiana Department of Environmental Quality; *LDNR*: Louisiana Department of Natural Resources; *LPDES*: Louisiana Pollutant Discharge Elimination System Permit Program; *LSU AgCenter*: Louisiana State University Agricultural Center; *NRDA*: Natural Resource Damage Assessment; *NPS*: Nonpoint Source Program; *SB/SCAP*: Louisiana Small Business/Small Community Assistance Program; *TIG*: Trustee Implementation Group; *WPAD*: Water Planning and Assessment Division; *USDA GoMI*: U.S. Department of Agriculture (USDA), Gulf of Mexico Initiative; *USDA MRBI*: USDA, Mississippi River Basin Initiative; *USDA NRCS*: USDA, Natural Resources Conservation Service; *USDA NWQI*: USDA, National Water Quality Initiative; *USGS*: U.S. Geological Survey.

APPENDIX B: DETAILED OUTREACH ACTIVITIES BY STRATEGY TEAM

Multi-Program Outreach and Education:

Hypoxia Task Force Activities-

- CPRA, GOCA, and LDEQ participation in the Hypoxia Task Force (HTF) Public Meeting December 14, 2022
- CPRA and LDEQ participation on HTF Coordinating Committee Bimonthly meetings
- CPRA, LDAF, LDEQ, LDNR, GOCA coordination on NRMS activities
- LDEQ, CPRA, and LDAF Coordination on Gulf Hypoxia Program (GHP) Grant
- LDEQ participation in Illinois Nutrient Loss Reduction Strategy Report Workshop February 10, 2022
- CPRA and LDEQ project on SPARROW Modeling
- LDEQ/USGS Nutrient Discussion March 3, 2022
- LDEQ participation in Improving Flexibility of the Iowa Nutrient Reduction Strategy N-Load Model: Use at the Watershed Scale July 27, 2022
- LDEQ participation in EPA HERO Database Training August 23, 2022
- Coordination with Lower Mississippi River Basin states

Gulf of Mexico Alliance (GOMA) Activities-

- CPRA and LDEQ participation on Gulf of Mexico Alliance (GOMA) Priority Issues Teams for Water Resources and Data & Monitoring Steering Committee meetings
- LDEQ participation in Alliance Coordination Team (ACT) meetings
- CPRA and LDEQ participation in GOMA GOMCON April 26, 2022
- LDEQ participation in Marine Debris Project meetings
- LDEQ participation in State of GOMA and Wednesday Webinars on special topics

LDEQ Water Planning and Assessment:

Association of Clean Water Administrators (ACWA) Activities-

- ACWA Executive Committee
- ACWA Board of Directors
- ACWA Mid-Year Meeting, March 16-17, 2022
- ACWA Annual Meeting August 3-5, 2022

- ACWA Monitoring, Standards, and Assessment Committee; Nutrients Policy Committee; Watersheds Committee; Clean Water Act 50th Anniversary Committee; and Environmental Justice Committee meetings
- ACWA Innovative Nutrient Removal Technologies Webinar September 14, 2021
- ACWA Water Quality Modeling Workshop September 19-21, 2022
- ACWA Nutrient Permitting Workshop April 12-14, 2022

Harmful Algal Bloom Activities-

- Virtual Harmful Algal Bloom Research Symposium January 6-7, 2022
- GeoCollaborate: Putting HAB Data to Work - A Hindcast of the 2016 IRL HAB January 10, 2022
- Changing How We See Algal Blooms January 12, 2022
- Removing Algal Toxins from Drinking Water with Activated Carbon January 26, 2022
- Ancient Algal Blooms: Comparing historic and modern cyanobacteria and cyanotoxin dynamics in the tropics and subtropics over the last 5000 years March 29, 2022
- Health Impacts of Algal Toxins in the Context of Chronic Illnesses March 31, 2022
- HABs Webinar Series - Complexities in Predicting HABs April 6, 2022
- Illinois 2022 Harmful Cyanobacteria Workshop April 13, 2022
- Strategies for Preventing and Managing Harmful Cyanobacteria Blooms-Part 2 April 28, 2022
- Harmful Algal Blooms Call with LSU Sea Grant May 9, 2022
- North Central Regional Water Network Webinar Series: Harmful Algal Blooms June 1, 2022
- NHABON Webinar #4: Monitoring HABs for Aquaculture June 22, 2022
- Long Term Lake Okeechobee Harmful Algal Bloom and Water Quality Monitoring with the Nav2 Sail and Solar AUV June 28, 2022
- Southeast Climate Monthly Webinar and Harmful Algae Blooms in the Southeast July 26, 2022
- Using Bacteria to Remove Microcystin from Drinking Water July 28, 2022
- Removal of HABs Using Cyanophages August 3, 2022
- Algae in the Depth of Winter August 30, 2022
- Eget Liber, Inc. HAB Mitigation Device Discussions August 2022
- Ohio State University PHAB Conference: Understanding Algal Blooms, State of the Science September 7, 2022
- NHABON Webinar #5: Remote Sensing, Observing and Forecast Using Drones, Hyperspectral Sensors and Satellites September 21, 2022

- Freshwater Science: A Toxin Forecast for Lake Erie's Harmful Algal Blooms September 29, 2022
- Harmful Algal Blooms Webinar Series – Remote Sensing and Strategic Management of CyanoHABs Across the Nation October 5, 2022
- HABs NOAA RESTORE discussion October 10, 2022
- HABs: On the national stage and in Louisiana-Part II November 3, 2022
- HABs Monitoring session November 16, 2022
- Extending VIIRS Ocean Color Neural Network retrievals to High Chlorophyll-a Algal Bloom Conditions November 16, 2022
- Nutrient Loads and Macroalgae Blooms in Shallow Estuarine Embayments December 1, 2022
- Monitoring and Forecasting Cyanobacterial Blooms December 7, 2022

Agriculture Stakeholder Related-

- Louisiana Master Farmer Partners Group Meetings January 13, March 29, July 19, and November 1, 2022
- Nutrient Management Training January 4, 2022
- Better Utilizing the Field Edge with Saturated Buffers and Bioreactors January 12, 2022
- Best Management Practice Deep Dive: Conservation Drainage February 2, 2022
- Manure management: New Approaches February 3, 2022
- Redefining the Field Edge to Improve Profitability, Wildlife Habitat and Water Quality February 3 & 16, 2022
- Winter Manure Application and Water Quality February 9, 2022
- Hedging Your Biochar Bet: Pairing Biochar Properties with Soil Deficiencies to Improve Agronomic Outcomes February 10, 2022
- Establishing and Managing Prairie Strips February 12, 2022
- Guidelines for the Application of Compost to Agricultural Lands March 3, 2022
- FIELD NITROGEN & GHG: Understanding and Reducing Greenhouse Gas (GHG) Emissions in Agriculture & Forestry March 8, 2022
- Communicating Conservation to Landowners March 9, 2022
- Incorporating Conservation Planning in Farmland Leasing March 9, 2022
- Water Quality Benefits of Two-Stage Ditch Construction March 23, 2022
- Nutrient Monitoring in NPS Projects April 4, 2022
- How to Review a Nutrient Management Plan and 590 Checklist April 6, 2022
- COMET tools for modeling the GHG benefits for Agroforestry practices April 7, 2022
- No-Till "Regenerative" Agriculture April 20, 2022

- Conservation Practices on Cultivated Cropland: A Comparison of CEAP I and CEAP II Survey Data and Modeling April 28, 2022
- Nutrient Management Farmer Education Curriculum Guidance May 5, 2022
- Understanding Adoption of Agricultural Conservation Practices May 18, 2022
- Using Biochar and Zeolite to Recycle Phosphorus and Nitrogen from Swine Manure: An Integrative Approach May 25, 2022
- AI and Open Data Practices in Chemical Hazard Assessment May 25, 2022
- Transforming Drainage: Working Together to Increase Resiliency of Drained Agricultural Land July 6, 2022
- Innovative Practices Lunch and Learn July 8, 2022
- Enhancing Sustainability through On-farm Research and Metrics July 26, 2022
- Impact of Cover Crops on Nitrogen and Phosphorus Dynamics August 25, 2022
- Influence of Fertilizer Timing on Nitrate Loss September 7, 2022
- Improving Manure Management to Maximize Agronomic and Environmental Outcomes September 14, 2022
- Agriculture inventory planning and implementation efforts to reduce nutrient loading October 5, 2022
- LSU AgCenter Career Day November 3, 2022
- Precision Conservation: Tools for Improving Agricultural Conservation Decision-Making November 9, 2022
- Remote Sensing Technology for Conservation December 20, 2022

Carbon and Trading Related-

- Nutrient Tracking Tool (NTT) meeting January 11, 2022
- Carbon Farming Connection January 13, 2022
- Valuing Manure as a Seller or a Buyer January 13, 2022
- How to Ensure High Integrity When Purchasing Carbon Credits January 27, 2022
- Carbon Farm Planning February 1, 2022
- Opportunities on the Horizon, Carbon Markets February 3, 2022
- American Biocarbon Biochar Meeting February 22, 2022
- Making Sense of Carbon Markets February 25, 2022
- Nutrient Tracking Tool Workshop March 21, 2022
- Decarbonizing the U.S. Health Sector March 29, 2022
- Grower Perspectives on Carbon Market Opportunities and Unknowns April 6, 2022
- USDA Climate Smart Grant Proposal April 6 & 14, 2022
- Solving the Barriers to Agricultural Carbon Markets April 12, 2022

- Driving Impact with Forest Carbon Markets April 21, 2022
- Carbon Collaborative/Nature Based Solutions Working Group Meetings May 19 and August 18, 2022
- Water Quality Trading - Delta Land Services June 1, 2022 and June 20, 2022
- Carbon Markets July 14, 2022
- Planning Makes Perfect - First Wetland Mitigation Bank in New York City Serves the Critical Needs of a Growing City July 27, 2022
- An Overview of Carbon Sequestration in Ecosystems August 3, 2022
- Exploring the Present and Future of Carbon and Ecosystem Services Markets August 9, 2022
- Carbon Farming and Markets: Misconceptions, Falsehoods, and Outright Errors August 10, 2022
- Enabling Forest Carbon Accounting at Scale with Basemap August 31, 2022
- Water Quality Trading Discussion with Regrow Ag September 2, 2022
- Adding Value by Stacking Benefits: What are Composite Credits? September 14, 2022
- Introduction to US Carbon Markets September 15, 2022
- State of the Debate: Critiques of Forest Carbon Credits September 22, 2022
- Registry Protocol Development September 29, 2022
- Carbon Farming on Dairies October 10, 2022
- Carbon Offsets at COP: A poison pill for the planet, farmers, and communities October 27, 2022
- Buying Carbon Credits November 3, 2022
- Credits Verification: Building Credibility for the Path Forward November 16, 2022
- Forest Carbon Markets in Ohio: What Landowners Need to Know November 18, 2022

Miscellaneous-

- Discussions with Lillianah Technologies
- Lower Mississippi River Conservation Committee (LMRCC)
- Council on Watershed Management
- Envirothon
- Coordination of LDEQ Water Programs Monthly
- Coordination with LDEQ/ LDH
- Coordination on National Hydrography Dataset (NHD)
- Coordination on ammonia
- R Discussion Meetings
- NOAA RESTORE discussions

- Green Stormwater Infrastructure January 6, 2022
- USGS NHD Technical Exchange Meetings January 15, June 1, August 3, September 7 and November 2, 2022
- After the spill: Findings from a decade of GoMRI science January 13, 2022
- Sustainable Investing: Decarbonizing portfolios and financing green development January 18, 2022
- Permeable Pavement January 18, 2022
- Adaptations to sea level rise: Dutch experiences January 21, 2022
- Role of Cation Exchange in Nutrient Management January 25, 2022
- Public Hearing for Fiscal Year 2023 Draft Atchafalaya Basin Program Annual Plan January 25, 2022
- Evaluating Air Quality Resource Concerns January 25, 2022
- Advancing Inland Lake Stewardship through Shoreline Best Management Practices January 25, 2022
- Site Redevelopment? There's an App for That - Superfund Redevelopment Mapper Training January 26, 2022
- Sustainable Shorelines: New Tools for Engaging Communities and Resource Managers January 27, 2022
- Evaluating Aquatic Habitat Restoration January 27, 2022
- National Levee Safety Program Stakeholder Engagement February 1, 2022
- Louisiana National Estuarine Research Reserve (LaNERR) Town Hall Meeting Atchafalaya Basin February 2, 2022
- Prairie Strips to Improve Water Quality February 8, 2022
- 14th Annual Nutrient Management Conference February 8, 2022
- Biochar for Stormwater Management February 9, 2022
- A Brief History of O2 in the Sea Webinar February 10, 2022
- Louisiana Watershed Initiative Working with Nature Training Series Module 4 February 12, 2022
- Targeted Runoff Management (TRM) Grant Program February 15, 2022
- Electrical Hydrogeology: See the Groundwater Flow February 23, 2022
- Diversifying Landscape February 24, 2022
- SAS Studio Flows and Steps February 24, 2022
- National Academies of Sciences, Engineering, and Climate Conversations February 24, 2022
- IOCM Seminar Series: ICESat-2 Inland Water Product: A Pathfinder for Operational Satellite Hydrology February 24, 2022

- Partnerships for Climate-Smart Commodities: Second Funding Pool Outreach March 3, 2022
- Leveraging Scientific Uncertainty for Estimating Among Assessment Variation in Overfishing Limits March 3, 2022
- SAS: When Do I Use SG Procedures vs. Graph Template Language March 3, 2022
- Flood Resilience and Adaptation Planning in the U.S.: Challenges and Opportunities March 8, 2022
- Mississippi River Cities and Towns Initiative (MRCTI) 10th Capitol Meeting March 8, 2022
- Fisheries, Protected Species, and Ecosystem Science in a New Era of Offshore Wind Energy Development in the U.S. March 9, 2022
- Louisiana Climate Initiatives Task Force March Meeting March 9, 2022
- 2nd Annual Lower Mississippi River Science Symposium March 10, 2022
- 2022 Michigan Great Lakes Conference: Connecting Science and Management March 8, 2022
- Working Group on Research for Farming of Seaweed And Seagrass March 8, 2022
- Reducing Societal Impacts from Hazardous Weather and Other Environmental Phenomena March 9, 2022
- SAS: How Do I Use Command-Line Interface in SAS Viya March 10, 2022
- LAURISA Lunch and Learn: Utilizing High-Precision UAS for Large-Scale Topographic Mapping March 23, 2022
- What determines how well an estuary neutralizes acids? A case study of alkalinity in the Chesapeake Bay's tidal tributaries March 24, 2022
- DataCamp: 8 Rules for Better Data Storytelling March 24, 2022
- Federal State Toxicology and Risk Analysis Committee (FSTRAC) March 24, 2022
- Great Lakes Sediment & Nutrient Reduction Program March 24, 2022
- Floundering Around - Evaluating a Declining Species in the SE United States-Webinar March 29, 2022
- Coastal Restoration Project Overview, Delivery, and Implementation March 29, 2022
- Increasing river alkalinity slows ocean acidification in the northern Gulf of Mexico March 30, 2022
- Tips and Tricks for Working with Dates and Times in SAS April 5, 2022
- Multi-Sensor Nearshore Bathymetric Mapping April 5, 2022
- Techniques for Reviewing Modeling Studies April 6, 2022
- How to Organize Review of MNA and MNA Case Study April 7, 2022
- An Approach for Assessing U.S. Gulf Coast Ecosystem Restoration April 7, 2022
- National Sea Grant Strategic Plan Listening Session April 13, 2022

- From the Lab to the Field - How Treatability Testing Supports Field Outcomes April 14, 2022
- Development of a Great Lakes Groundwater and Surface Water Conceptual Framework April 14, 2022
- Earth Day 2022: Water on the Rise April 21, 022
- Valuing nature-based solutions: The benefit-cost analysis April 21, 2022
- Using the UN Biodiversity Lab to Monitor the Pulse of the Planet April 21, 2022
- Using Geospatial Indicators of Watershed Condition to Support Freshwater Conservation Actions April 21, 2022
- Co-Design Sustainable, Resilient, and Just Nature-based Stormwater Solutions with Communities April 21, 2022
- Presentations at Scotlandville Magnet High School April 22, 2022
- Louisiana's Groundwater Management Challenges/Status and Long-Term Strategic Plans April 26, 2022
- Fish Programs – Health Approaches with Tribes and Indigenous Peoples April 27, 2022
- Taking ecosystem restoration assessment to the next level: introducing a new Restoration Project Information Sharing Framework April 28, 2022
- NOAA: Using the UN Biodiversity Lab to Monitor the Pulse of the Planet April 28, 2022
- Partnerships to Manage the Red Lake Nation's and Minnesota's Largest Lakes May 2, 2022
- 2022 Environmental Finance Center (EFC) Grant Program May 3, 2022
- The National Wetlands Inventory: Driving Conservation Through Mapping May 5, 2022
- Tracking Hurricane Ida through NOAA's Office of Response and Restoration: Preparedness, Response, and Recovery May 10, 2022
- Future of Managed Aquifer Recharge in the U.S. May 10, 2022
- Red River Compact Mtg with DOTD May 10, 2022
- Pollution Prevention Finance Forum - Workshop 2 May 10, 2022
- NMFS R UG: Creating reproducible and robust fisheries science workflows using R and GitHub May 10, 2022
- Environmental Impacts of Improved Drainage and Targeted Wetland Restoration May 11, 2022
- Solutions for the Geospatial “Data Tsunami” May 18, 2022
- NNCR Basics May 19, 2022
- Conservation Buffers: Sink or Source Habitats for Fish-Wildlife May 23, 2022
- GIS Modernization Workgroup May 24, 2022
- Restoration Success: Linking Social and Ecological Metrics May 25, 2022

- Louisiana Chapter of the American Fisheries Society Annual Meeting May 26-27, 2022
- National Clean Water Act (CWA) 303(d) and Data Management Training Workshop May 31-June 2, 2022
- Government Accountability Office (GAO) and LDEQ Meeting-Restoring Pontchartrain Basin June 3 & 6, 2022
- EnBiorganic Introduction June 7, 2022
- Soil Health's Link to Water Quality June 8, 2022
- Biological Responses to Stream Nutrients: A Synthesis of Science from Experimental Forests and Ranges June 9, 2022
- NEPA, ESA, and Fundamentals of Environmental Law June 9, 2022
- Watershed-Wide Infiltration and Flood Benefits from the Fields June 14, 2022
- ECHO - Behind the Scenes June 14, 2022
- Louisiana Watershed Initiative Working with Nature Training Series Module 8 June 15, 2022
- 3DHP Interest Group Meeting June 15, 2022
- Processing Water Quality Portal data in R June 21, 2022
- Getting to Know SAS Viya June 28, 2022
- 2022 Virtual Clean Fuels Summit June 28-29, 2022
- USGS Data Reference Lists User Input Interview and Discussion June 29, 2022
- Meeting with Vermilion-Teche Fresh Water District and Lafayette Consolidated Govt. June 29, 2022
- Drone the System Wide Monitoring Program (SWMP): Assessing the Utility of Drones for Monitoring Coastal Wetlands June 29, 2022
- Getting the Most from Visual eLearning: How to Create Compelling Presentations for Virtual Training June 30, 2022
- Hurricane Data Mining July 12 ,2022
- Processing USGS Streamflow Data in R July 19, 2022
- 3D Hydrology Project (3DHP): MI Coordination, Data, and Conundrums July 20, 2022
- Hazard Mitigation and the CWA 303(d) Program: Opportunities for Integration-Day 1 July 20-21, 2022
- The Economics of Nonpoint Source Pollution and Implications for the Texas Coast July 21, 2022
- Louisiana Watershed Initiative Working with Nature Training Series Module 9 July 27, 2022
- Deep Water Horizon Project Tracker July 27, 2022
- RStudio Virtual Conference 2022 July 28, 2022

- Unlock the Power of GeoCollaborate Advancing Situational Awareness and Decision-Making July 28, 2022
- 2022 Gulf of Mexico Hypoxia Size Press Webinar August 3, 2022
- USACE APT Tool Demo August 10, 2022
- The Gulf Blue Navigator: Regional Innovation for the New Blue Economy August 11, 2022
- Processing NOAA Weather data in R August 16, 2022
- R Studio and SAS Viya Overview August 17, 2022
- 3DHP Forum: Transition from NHD to 3DHP - Current Status and Timelines August 17, 2022
- Preparing for changing flood risks August 18, 2022
- Natural Resource Damage Assessment (NRDA) 101 August 18, 2022
- NADA cencorreg discussion August 18, 2022
- USGS Hydrography Community Call August 23, 2022
- Managing nutrients and water in a changing climate August 29, 2022
- SAS Data Cleaning Tips and Tricks August 30, 2022
- 19th Annual EPA Drinking Water Workshop August 30-31, 2022
- Scaling Up Forest Restoration in a Parcelized Landscape: A Case Study in Working With Neighbors September 7, 2022
- Risk Management Program Proposed Rule Briefing for State and Local Officials September 7, 2022
- Stream desktop planning 580/582 September 8, 2022
- How Do I Get My Data Into and Out of SAS? September 8, 2022
- Be Data Literate: The Data Literacy Skills Everyone Needs to Succeed September 8, 2022
- LSU Fisheries Candidate Seminar September 8, 2022
- Nonpoint Source Watershed Implementation Funding September 13, 2022
- Student Career Fair at Lamar Dixon September 13, 2022
- Helping Communities Prepare for Extreme Weather September 14, 2022
- Oil Spill Fate and Transport Modeling for Emergency Response September 15, 2022
- Protecting “Pristine” Places from Pollution: Applying New Water Quality Assessment Techniques September 15, 2022
- Opportunity Zones and Pollution Prevention Workgroup September 20, 2022
- What Can We Learn From a Consistent 18-Year Dataset? September 20, 2022
- Linking Urban and Rural Communities Through Watershed Management September 21, 2022
- Presentation at State of the River-Vermilionville September 22, 2022
- Stream Site Assessment September 23, 2022

- SE Climate Monthly Update + Modernizing WQ Data Webinar Series September 27, 2022
- SAS Explore Conference September 27-29, 2022
- Iberville Parish Swamp Life Expo October 1, 2022
- SAS Webinar Ask the Expert: How do I perform Simple Linear Regression? October 4, 2022
- 50 years of the Clean Water Action Webinar Series - Overview, History, and Significance October 4 & 11, 2022
- SAS® Viya Visual Analytics Basics October 11-14, 2022
- Processing gridded weather data in ArcGIS and Python October 18, 2022
- Surveillance Training at Jimmie Davis State Park October 19, 2022
- Southeast Climate Monthly Webinar Series October 25, 2022
- USGS Hydrography Community Call October 25, 2022
- Effectiveness of Off-site Compliance Monitoring November 1, 2022
- Coastal Landscapes in Transition: Impacts of Sea Level Rise on Blue Carbon Ecosystems November 9, 2022
- Evaluating the efficacy of five chlorophyll algorithms in the Chesapeake Bay for operational monitoring and assessment November 10, 2022
- Advancing Watershed Protection Through Land Conservation November 10, 2022
- SETAC November 14-17, 2022
- Monitoring New Contaminants in Public Drinking Water Sources November 15, 2022
- SAS Training-Modifying SAS 9 Programs November 17, 2022
- Lower Mississippi River Basin Special Drought Webinar November 18, 2022
- Upcoming Justice, Equity, Diversity and Inclusion Webinar on Cultural and Traditional Water Uses Webinar November 21, 2022
- Taxonomy of needle-shaped Fragilaria to support a long-term monitoring program November 22, 2022
- Authorizing Point and Non-Point source Discharges to Ground in BC November 23, 2022
- Water Quality Trends on the Upper Mississippi River November 30, 2022
- Automation...the "Easier Button" to Parcel Data Governance November 30, 2022
- Gulf of Mexico Open Data Platform Update November 30, 2022
- Measuring What Matters: Towards a More Comprehensive and Equitable Evaluation of Benefits November 30, 2022
- LaUrisa New Web Map Viewer Webinar December 5, 2022
- Keep Louisiana Beautiful Community Grants December 5, 2022
- Programming for SAS® Viya December 7-8, 2022

- Drinking Water Sampling Procedures & Sampling Plans: Getting it Correct the First Time! December 12, 2022
- Louisiana Environmental Leadership Program (ELP) & Award Winner Highlights December 13, 2022
- Green Stormwater Infrastructure for Urban Flood Resilience: An Example From Dallas, Texas December 15, 2022
- Evaluating Plant Uptake Pathways of Chemical Contaminants in State Models for Risk Assessments of Contaminated Urban Gardening Sites December 19, 2022

LDEQ Nonpoint Source Pollution Program:

Educational Events Nonpoint Staff-

In FFY 2022, LDEQ reached over 6,600 adults and students through the following events:

- Saints and Pelicans STEM Fair, sponsored by Chevron - DEQ Outreach and Small Business Assistance Staff and NPS staff participated in this STEM fair. Approximately 2,500 students from the Greater New Orleans area attended as support organizations shared their time and expertise with the community. LDEQ NPS staff demonstrated runoff processes using the Enviroscape Model. April 1, 2022
- First Baptist School, Lafayette - LDEQ NPS staff visited First Baptist Christian School in Lafayette to talk about nonpoint source pollution. Using the Enviroscape model, the second graders learned about the impact that nonpoint source pollution can have on the environment. April 7, 2022
- LACD Meeting- Project WET Certification, presented Enviroscape. LDEQ NPS staff participated in the Project WET certification workshop at the Louisiana Association of Conservation Districts' annual meeting. The workshop was designed to certify participants to hold workshops where they can teach environmental activities to other environmental educators. April 21, 2022
- STEM Fest SELU - Nearly 2,000 students and adults, along with almost 50 organizations participated in the 4th annual STEM Fest at Southeastern Louisiana State University in Hammond. LDEQ NPS staff used the Enviroscape model to demonstrate how NPS enters the environment, subsequently traveling in other areas that can ultimately harm ecosystems and communities. August 26, 2022
- National Hunting and Fishing Day - LDEQ NPS staff participated in the 2022 Louisiana National Hunting and Fishing Day at Waddill Wildlife Refuge in Baton Rouge. The event is an annual forum for participating organizations to provide outdoor recreation-related educational activities and exhibits. LDEQ staff used the opportunity to educate local children on methods to reduce NPS pollution. Staff provided promotional items as

incentives for learning the methods, which included picking up pet waste, reducing the use of fertilizers and pesticides, washing cars on grass instead of concrete and bagging grass clippings as opposed to blowing them into storm drains. September 24, 2022

DWPP Outreach-

- DWPP staff gave presentations or worked booths at the following locations/events; LRWA Management Conference, LRWA Annual Conference, Oil City – Caddo Lake Area Community Meeting, Bains Elementary and the LSU Ag Center in Farmerville. DWPP staff reached more than 1,600 people during this reporting period.

BTNEP Contracted Education-

- Contracted activity included BTNEP participating in 50 educational events, and public education through home sewage system inspection and outreach, that included field demonstrations, event tabling, virtual presentations, and meetings, among others.

NPS Miscellaneous-

- Communicating Conservation to Landowners: Part of the North Central Region Water Network's "The Current Webinar Series", this webinar covers lessons on communication with producers and non-operating landowners.
- Participating on the BTNEP Management Conference and the BTNEP Water Quality Action Team
- Serving on the Louisiana Outdoors Forever Technical Advisory Board
- Working with Lake Providence Watershed Council
- Working with SWCDs/LDAF and USDA in NPS priority watersheds
- Partnering with Capital RC&D, Bayou Vermilion District, LRWA, and BTNEP on water quality restoration
- Working with Keep America Beautiful and Governor's Task Force on Statewide Litter Abatement and Beautification
- Review updates to La Forestry BMP Manual February 18 2022
- Communicating Conservation to Landowners webinar March 9, 2022
- Lower Mississippi Science Symposium March 10-11, 2022
- Nutrient Tracking Tool Workshop March 21, 2022
- Economics of Regenerative Soil Health Systems for Cotton webinar March 31, 2022
- Using Geospatial Indicators of Watershed Condition to Support Freshwater Conservation webinar April 21, 2022
- Source Water Protection and Harmful Algal Blooms webinar April 26, 2022
- Piloting 3D Hydrography: USGS Objectives and Activities webinar May 18, 2022

- Conservation Buffers: Sink or Source Habitats for Fish-Wildlife webinar May 23, 2022
- Hazard Mitigation and the CWA 303(d) Program webinar July 20-21, 2022
- Lake Providence Watershed Council meeting August 17, 2022
- Integrated Approaches in Community Nonpoint Source Nutrient Management webinar August 24, 2022
- Managing Nutrients and Water in a Changing Climate webinar August 29, 2022
- BTNEP BIL Funding Discussion September 1, 2022
- USGS NHD meeting September 30, 2022
- NSGIC 3DHP and 3DEP updates meeting October 19, 2022
- Advancing Watershed Protection Through Land Conservation webinar November 11, 2022
- Coastal NPS Working Group meeting November 11, 2022
- 3DHP Info Forum November 16, 2022

LDEQ TMDL Program:

- TMDL partners provided education at 12 schools during 10 different events
- 10 different public meetings or presentations occurred with TMDL staff
- Two workshops we attended by TMDL staff

EPA Activities

- Coordination with EPA Region 6 on water program
- Coordination with EPA on nutrient translators
- Coordination with EPA on dissolved oxygen
- EPA Regions 6 & 8 Aquatic Life Criteria for Toxics Outreach Workshop, January 18-20, 2022
- How's My Waterway January 20, 2022
- Proposed Revised Definition of “Waters of the United States” – State and Local Roundtable January 24, 2022
- US EPA's Quality Program Virtual Meeting 2022 February 8-10, 2022
- EPA Tools & Resources Training Webinar: Final Ecosystem Goods and Services Scoping Tool February 10, 2022
- Intro to ECHO Webinar: EJSCREEN February 15, 2022
- Optimizing Nutrient Removal in Sequencing Batch Reactors February 17, 2022
- EPA Science Advisory Board Public Meeting on Cumulative Impact Assessment March 2, 2022
- Technical Session on EPA’s Ambient Water Quality Criteria to Address Nutrient Pollution in Lakes and Reservoirs March 29, 2022

- Clean Watersheds Needs Survey & EJ March 31, 2022
- Advanced ECHO Webinar: Reports April 12, 2022
- Wastewater Lagoons and Onsite Septic Systems May 4, 2022
- Developing a Budget May 5, 2022
- Biologically Based Tools to Examine Nutrient Effects in Alabama Streams – Alabama's N-STEPS Project and Beyond May 12, 2022
- Reproducible Workflows: Moving from Spreadsheets to Coding, May 24, 2022
- ATTAINS 101 May 25, 2022
- EPA Tools & Resources Webinar: Visualizing Ecosystem Land Management Assets (VELMA) June 2, 2022
- Understanding Environmental Justice through two EPA tools - EJSCREEN and EnviroAtlas June 15, 2022
- Processing Water Quality Portal data in R, June 21, 2022
- Draft FY23-24 National Water Program Guidance Discussion June 29, 2022
- EPA Meets the World: A Research Webinar July 2, 2022
- Processing USGS Streamflow data in R, July 19, 2022
- EPA State-Scale Results in ATTAINS Discussion July 22, 2022
- Processing NOAA Weather data in R, August 16, 2022
- Integrated Approaches in Community Nonpoint Source Nutrient Management August 24, 2022
- Turning Water Data into Public Information September 6, 2022
- EPA Grants Series – Competition Process September 13, 2022
- EPA ORD Emergency Response Webinar: Facilitating Coordinated Response from Field to Lab: ESAM Program September 14, 2022
- EPA Grants Series – Development a Budget September 20, 2022
- EPA Webinar for Update of Online Models that Support the Recommended Ambient Water Quality Criteria to Address Nutrient Pollution in Lakes and Reservoirs September 20, 2022
- EPA NPS Technical Exchange Webcast – Water Quality Data Enhancements and Visualization September 27, 2022
- EPA Symposium on Improving Compliance at Small Municipal WWTPs: Regulatory Support Tools for Achieving Water Quality Standards/Goals October 27, 2022
- TADA Working Group November 8, 2022
- EJScreen 2.1 Training November 16, 2022
- Implementation Document, National 304(a) Nutrient Criteria for Lakes November 29, 2022

- Using the Recovery Potential Screening Tool for Watershed Prioritization November 30, 2022
- Longstanding 304(a) Criteria and Implementation: Process Improvements and Multi-Agency Coordination November 30, 2022
- EPA Virtual Water Quality Standards Academy December 2022
- Water Announcement on WOTUS December 29, 2022

LSU AgCenter:

- Phase I crop/soil health trainings
- Field days/tours
- Phase II research station field days

APPENDIX C: PRIORITY WATERSHEDS-LEVERAGING PROGRAMS IDENTIFIED

Priority watersheds in Louisiana through USDA initiatives including Mississippi River Basin Initiative (MRBI) and the National Water Quality Initiative (NWQI), and through the LDEQ Nonpoint Source (NPS) Program and the New Vision §303(d) Program (through Federal Fiscal Year). * indicates priority water body in more than one program.

Program	Watershed Name	Watershed Level	Watershed Code
Lake Pontchartrain Basin (04)			
LDEQ NPS	Comite River[4]	Subsegment	40101
LDEQ NPS	Middle Amite River[4,6]	Subsegment	40302
LDEQ NPS	Natalbany River[1,5,6]	Subsegment	40503
LDEQ NPS	Yellow Water River[1, 4,6]	Subsegment	40504
Mermentau River Basin (05)			
LDAF, Evangeline SWCD, LDEQ NPS	Bayou Des Cannes	Subsegment	50101
LDAF, St. Landry SWCD, LDEQ NPS	Bayou Mallet	Subsegment	50103
LDAF, Acadia SWCD, LDEQ NPS, USDA NRCS	Bayou Queue de Tortue[3]	Subsegment	50501
LDAF, Jefferson Davis SWCD, LDEQ NPS	Bayou Chene	Subsegment	50603
Vermilion-Teche River Basin (06)			
LDAF, St. Martin SWCD, LDEQ NPS, USDA NRCS	Bayou Du Portage[3]	Subsegment	60703
LDAF, Lafayette SWCD, LDEQ NPS	Vermilion River[4]	Subsegment	060801/060802
Mississippi River Basin (07)			
LDEQ NPS	Thompson Creek[4]	Subsegment	70502
Ouachita River Basin (08)			
LDAF, LDEQ NPS, NRCS	Big Creek (North) [8]	Subsegment	80903

LDAF, Morehouse SWCD, LDEQ NPS	Bayou Lafourche	Subsegment	80904
LDEQ NPS, USDA NRCS-concluded 2021	Lake Providence[2]	Subsegment	81101
LDAF, LaSalle SWCD, LDEQ NPS	Hemphill Creek	Subsegment	81609
Terrebonne Basin (12)			
LDAF, Upper Delta SWCD, LDEQ NPS	Bayou Grosse Tete	Subsegment	**120104**
LDAF, Upper Delta SWCD LDEQ NPS	Bayou Maringouin	Subsegment	**120111**
DU, Lafourche-Terrebonne SWCD, LDEQ NPS	Bayou Folse[6,7]	Subsegment	**120302**

[1]New Vision

[2]Mississippi River Basin Initiative (MRBI)

[3]National Water Quality Initiative (NWQI)

[4]Monitoring Supporting Education & Outreach (OSDS Inspections)

[5]On-Site Disposal System Inspections (OSDS) only

[6]Coastal Zone Act Reauthorization Amendments (CZARA)

[7]Natural Resource Damage Assessment (NRDA)

[8]United States Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS)

APPENDIX D: 2022 LDEQ AND LDAF NONPOINT SOURCE CURRENT/PLANNED IMPLEMENTATION

Water Body Name	Number of Stations Monitored	Impairment Causes to be Addressed	Parameters sampled
Bayou des Cannes[2] (050101)	6	Dissolved oxygen, nitrate-nitrite, total phosphorus, turbidity, fipronil, carbofuran, TDS	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, turbidity, and *in-situ*
Bayou Mallet[2] (050103)	8	Dissolved oxygen, total dissolved solids, fecal coliform bacteria	Turbidity, total dissolved solids, and *in-situ*
Bayou Queue de Tortue[2] (050501)	13	Dissolved oxygen, fipronil, nitrate-nitrite, total phosphorus, turbidity, total dissolved solids	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, turbidity, and in-situ
Bayou Chene[2] (050603)	9	Dissolved oxygen, fipronil, fecal coliform bacteria	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, turbidity, fecal coliform bacteria, and *in-situ*
Bayou Courtableau[1] (060204)	21	Turbidity, fecal coliform bacteria	Turbidity, fecal coliform bacteria

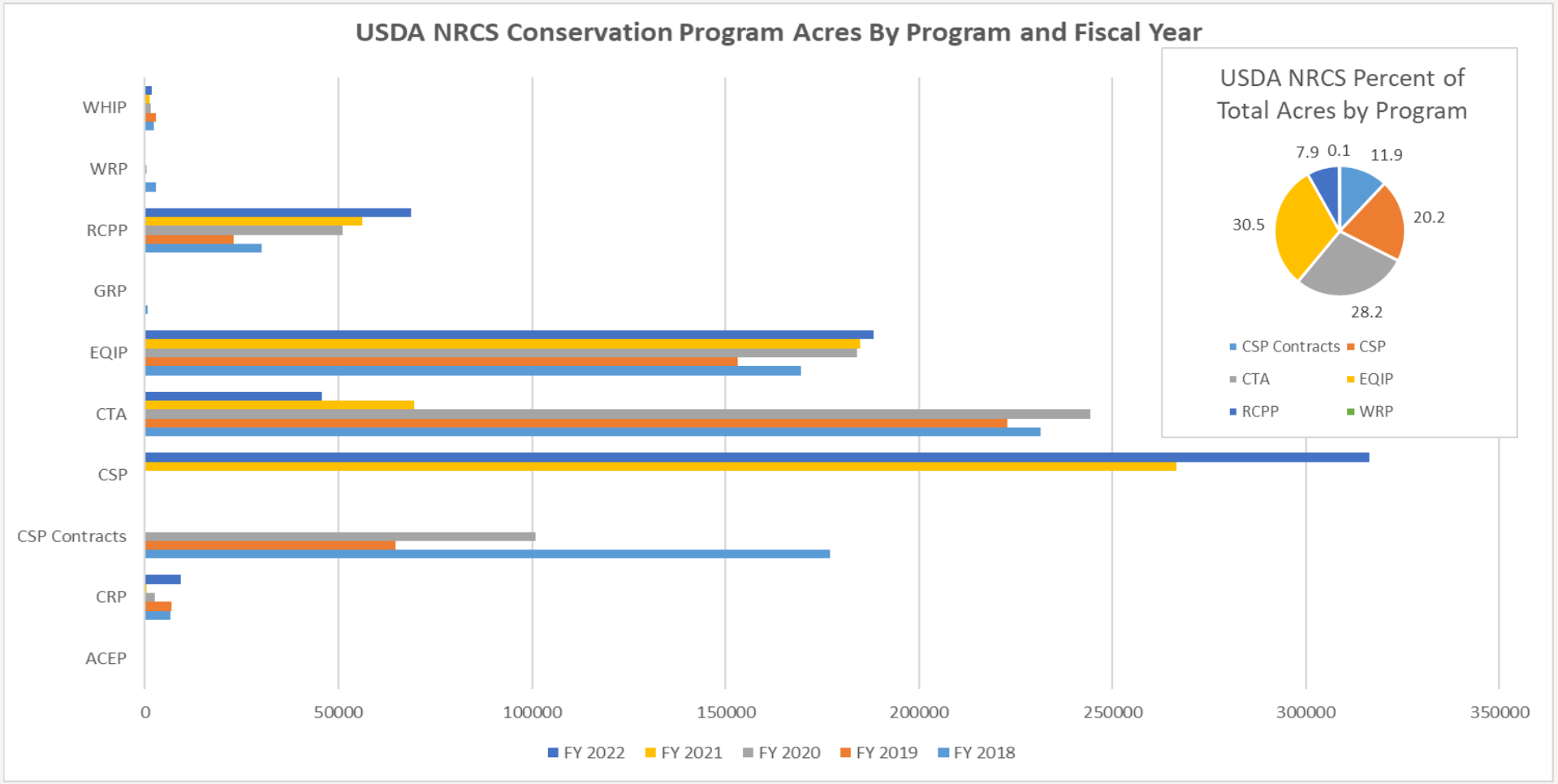
Water Body Name	Number of Stations Monitored	Impairment Causes to be Addressed	Parameters sampled
Bayou du Portage[2] (060703)	14	Dissolved oxygen, turbidity, total dissolved solids, fecal coliform bacteria	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, total dissolved solids, turbidity, fecal coliform bacteria, and *in-situ*
Vermilion River[2] (060801)	26	Dissolved oxygen, nitrate-nitrite, fecal coliform bacteria, carbofuran	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, fecal coliform bacteria, and *in-situ*
Bayou Bartholomew[1] (080401)	18	Turbidity	Turbidity and *in-situ*
Big Creek[2] (080903)	14	Dissolved oxygen, 4,4'-DDT, atrazine, methyl parathion, carbofuran, turbidity	Turbidity, and *in-situ*
Bayou Lafourche[2] (080904)	12	Dissolved oxygen, turbidity, fecal coliform bacteria	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, total dissolved solids, turbidity, and *in-situ*
Lake St. Joseph[2] (081202)	12	Dissolved oxygen, nitrate-nitrite, total phosphorous, turbidity	Nitrate/nitrite nitrogen, ammonia, total Kjeldahl nitrogen, total phosphorus, total orthophosphate, turbidity, and *in-situ*

Water Body Name	Number of Stations Monitored	Impairment Causes to be Addressed	Parameters sampled
Hemphill Creek[1] (081609)	9	Fecal coliform bacteria	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, fecal coliform bacteria, and *in-situ*
Bayou Grosse Tete[2] (120104)	18	Dissolved oxygen, nitrate-nitrite, total phosphorous	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, fecal coliform bacteria, and *in-situ*
Bayou Maringouin[2] (120111)	9	Dissolved oxygen, total dissolved solids, fecal coliform bacteria	Nitrate/nitrite nitrogen, total Kjeldahl nitrogen, total phosphorus, total dissolved solids, turbidity, fecal coliform bacteria, and *in-situ*

[1]LDAF implementation TBD pending watershed implementation plan (WIP) acceptance by USEPA

[2]LDAF implementation underway or in planning; WIP accepted by USEPA or not required

APPENDIX E: USDA NRCS LAND UNIT ACRES RECEIVING CONSERVATION FOR PRACTICES RELATED TO WATER QUALITY IN LOUISIANA



Data Sources: FY2010-FY2020 CSP Program-USDA-NRCS, ProTracts Program Contracts System, October 2020 (excludes renewal contracts); FY 2021-FY 2022 and all other programs-USDA-NRCS, National Planning and Agreements Database NPAD, October 2022.

https://publicdashboards.dl.usda.gov/t/FPAC_PUB/views/RCAAcresRecievingConservationbyProgramandFY/AcresReceivingConservationbyProgramandFiscalYear?%3Aembed=y&%3AisGuestRedirectFromVizportal=y

Acres are “land Unit acres” and represent land where practices related to a program have been applied during a fiscal year. Here land unit acres are counted the first time a practice is applied on that land unit for a program in the fiscal year. Therefore land unit acres may be counted multiple times across programs and fiscal years, but are only counted once per program per fiscal year.

Abbreviations:
Agricultural Conservation Easement Program (ACEP)
Conservation Reserve Program (CRP)
Conservation Stewardship Program (CSP Contracts)
Conservation Stewardship Program (CSP)
Conservation Technical Assistance (CTA)
Environmental Quality Incentives Program (EQIP)
Grassland Reserve Program (GRP)
Regional Conservation Partnership Program (RCPP)
Wetlands Reserve Program (WRP)
Wildlife Habitat Incentive Program (WHIP)