Louisiana Surface Water Monitoring And Assessment Program

Prepared by

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Office of Environmental Assessment
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Acronyms and Abbreviations

ALC	Aquatic Life Criteria
ATTAINS	Assessment, Total Maximum Daily Load, Tracking and Implementation System
AWQMN	Ambient Water Quality Monitoring Network
CWA	Clean Water Act
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
IR	Integrated Report
LAC	Louisiana Administrative Code
LCMS	Laboratory Contract Management Services
LDAF	Louisiana Department of Agriculture and Forestry
LDEQ	Louisiana Department of Environmental Quality
LDH	Louisiana Department of Health
LEAU	Louisiana Environmental Assessment Utility
LEADMS	Louisiana Environmental Analytical Data Management System
LEQA	Louisiana Environmental Quality Act
NARS	National Aquatic Resource Surveys
NHD	National Hydrography Dataset
NPS	Nonpoint Source
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
SP	Sampling Plan
SD	Surveillance Division
TMDL	Total Maximum Daily Load
UAA	Use Attainability Analysis
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WPAD	Water Planning and Assessment Division
WPD	Water Permits Division
WSS	Water Surveys Section
WQMP	Water Quality Management Plan
WQX	Water Quality Exchange
WQP	Water Quality Portal
WQS	Water Quality Standards
WQSAS	Water Quality Standards and Assessment Section

Introduction

The goal of the nation's Clean Water Act (CWA) (CWA 1972) is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." It is the responsibility of the Louisiana Department of Environmental Quality (LDEQ) to protect the chemical, physical, biological and aesthetic integrity of the water resources and aquatic environment of Louisiana.

To address the federal and state goals and protect Louisiana waters, LDEQ has developed and implemented a statewide Water Quality Management Plan (WQMP). The WQMP is the primary document associated with water quality management, pollution control, and planning activities carried out by the state in its effort to implement the provisions of the CWA. The WQMP was developed in accordance with Sections 205(j), 208 and 303(e) of the CWA. LDEQ is authorized to develop the WQMP and carry out activities according to the Louisiana Water Quality Regulations (Louisiana Administrative Code (LAC) 33:IX), developed under the authority and mandate of the Louisiana Environmental Quality Act (Louisiana Revised Statutes 30:2001 and 30:2071) (LEQA 2018). The WQMP goal is that the waters of the state meet established water quality standards and thereby maintain all designated uses for each water body.

LDEQ has established Water Quality Standards designated uses for all state waters including primary and secondary contact recreation, drinking water, fish and wildlife propagation, oyster propagation, agriculture, outstanding natural resource waters, and limited aquatic life and wildlife. Narrative and numerical criteria for chemical, physical, and biological characteristics of the waters have been established in LAC Title 33, Part IX, Chapter 11 (LAC 33:IX. Chapter 11) to support the designated uses. This document outlines LDEQ's strategy to monitor and assess the quality of state surface waters. This document will be revised as needed.

Monitoring Strategy

Louisiana, well known for its abundance of water resources, contains over 126,000 miles of rivers and streams (i.e., perennial, intermittent, canals), 1,486,650 acres (2,323 square miles) of lakes and reservoirs, 9,849,353 acres (15,390 square miles) of woody and emergent/herbaceous wetlands, and 3,203,200 acres (5,005 square miles) of estuaries (U.S. Geological Survey (USGS) 2019a, USGS-National Geospatial Program 2019b). These figures, some of which are taken from the high resolution (1:24k) USGS National Hydrography Dataset (NHD), may be conservative estimates in comparison to the actual total area of Louisiana's rivers, lakes, wetlands, and estuaries. LDEQ conducts a variety of water monitoring activities to assess the chemical, physical and biological integrity of rivers, streams, bayous, lakes, reservoirs, wetlands, estuaries, coastal bays, and offshore waters. However, it is not feasible to monitor every water body in the state for all physical, chemical, and biological components. Therefore, the state must implement a strategy that utilizes limited resources yet addresses to the maximum extent practicable the water quality management needs of the state.

The following projects are implemented by LDEQ or provide information that is used by LDEQ to assess the chemical, physical, and biological integrity of state waters:

- Ambient Water Quality Monitoring Network (AWQMN) Program
  - Routine monitoring
  - Continuous monitoring for dissolved oxygen as needed
  - Coastal dissolved oxygen pilot project
- Mercury program
- Intensive water quality surveys
  - §303(d)/Vision program targeted water bodies
  - Nonpoint source (NPS) program targeted water bodies
- Supplemental monitoring to support water quality standards review and development
  - *Escherichia coli* and Enterococci
  - Toxins
  - Cyanobacteria Harmful Algal Bloom (CyanoHAB) Pilot Project
  - Biotic Ligand Model (BLM) methodology and Selenium freshwater Aquatic Life Criteria (ALC)
  - Pesticides
  - Trace metals monitoring using clean sampling and analysis techniques
  - Nutrient Stressor-Response Relationship Studies
- Cooperative monitoring
  - Lake St. Joseph (Subsegment 081202) Nutrient Loading Reduction
  - Pilot Transition to Autonomous Monitoring from Inshore to Offshore in Coastal Louisiana
  - Wetlands monitoring

How each project addresses the assessment of the chemical, physical, and biological integrity of Louisiana waters is described below.

Chemical Integrity

Of the three components affecting a water body's integrity addressed in the CWA (chemical, physical, and biological), water chemistry is the most straightforward monitoring process and oftentimes the most cost-efficient. Under CWA Section 304(a), the U.S. Environmental Protection Agency (USEPA) publishes water quality criteria based on sound science that consist of concentrations of specific chemicals or levels of parameters in water that protect aquatic life and human health. These can be used to establish enforceable standards in Louisiana's surface water quality regulations. Numerical criteria have been established for many chemicals and water characteristics (including some physical characteristics such as temperature) and many times it is just a matter of analyzing for these components for direct comparisons to the criteria.

Routine Monitoring

The primary monitoring program that addresses the chemical characteristics of Louisiana waters is LDEQ's routine AWQMN program (Figure 1). The state of Louisiana has monitored water quality in its surface waters through a fixed station network since 1958 (LDEQ 2022a). All water body types are addressed in this AWQMN program. A variety of characteristics are measured including field parameters such as dissolved oxygen, pH,

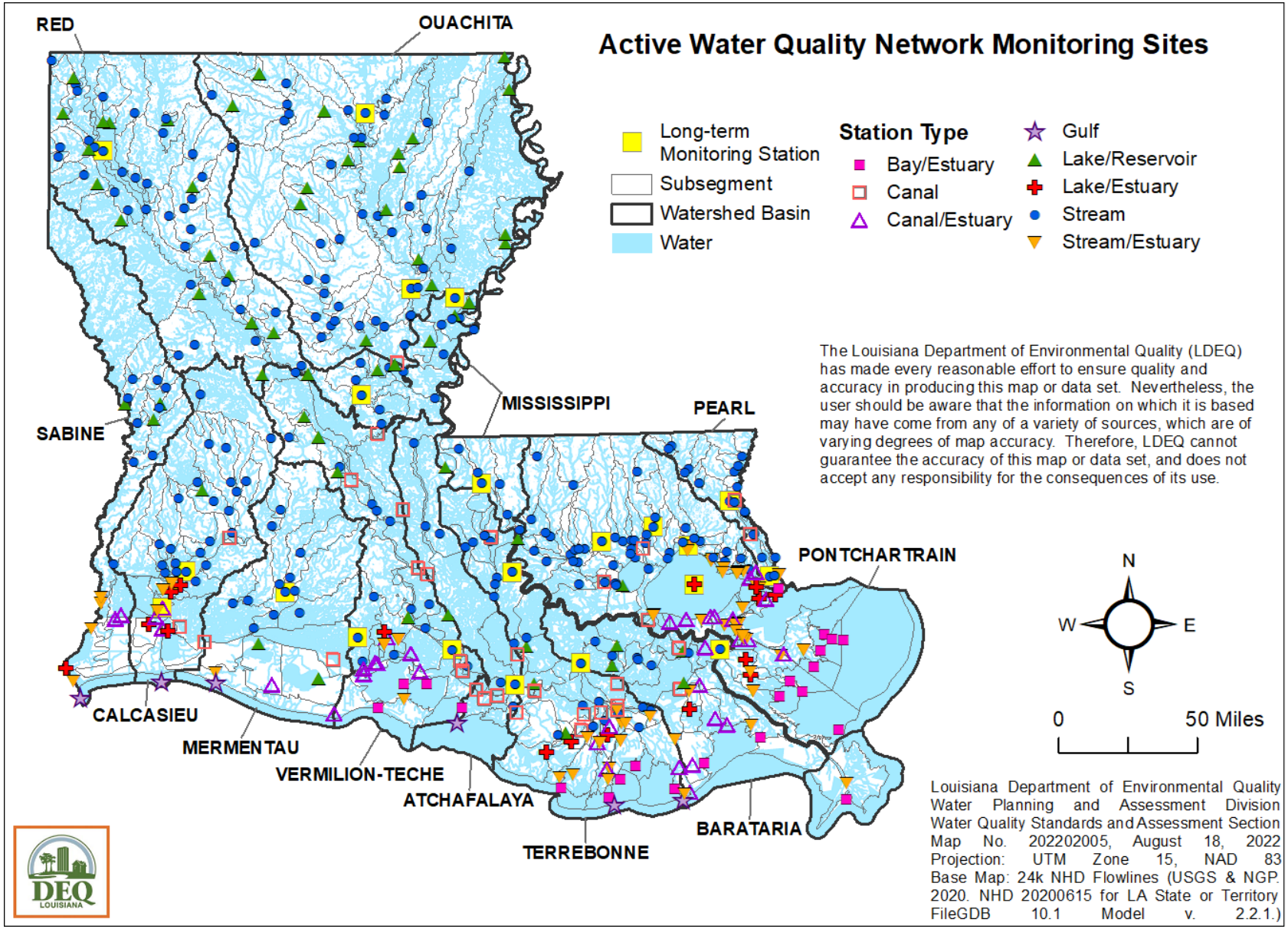

Figure 1. Ambient water quality monitoring network program sites.

and salinity; along with a host of analytical measurements including, but not limited to, nutrients, alkalinity, hardness, organic compounds, and dissolved metals. Monitoring frequencies vary by parameter category and water body type, but in general waters are monitored monthly for most parameters and quarterly for organic compounds. There are twelve major basins in Louisiana, and throughout these basins, LDEQ has currently defined 487 watershed subsegments. More information on LDEQ's AWQMN is available at: https://deq.louisiana.gov/page/ambient-water-quality-monitoring-data.

With existing resources, it is not possible to monitor all subsegments annually. LDEQ has established 21 long-term monitoring stations that are monitored every year. The remainder of the stations are monitored on a four-year cycle with approximately 123-154 sites monitored throughout the twelve basins each "water year." The LDEQ water year starts in November of each calendar year and ends in October of the next calendar year More information on LDEQ's IR is available at: https://deq.louisiana.gov/page/louisiana-water-quality-integrated-report.

Continuous Monitoring for Dissolved Oxygen

Monitoring for dissolved oxygen (DO) during the routine AWQMN program is an instantaneous measurement, often taken in early morning hours. It is well known that DO fluctuates diurnally and is typically at its lowest levels during early morning hours. LDEQ has implemented a tiered approach to monitoring DO. With this approach, routine "grab" sample monitoring for the AWQMN program is considered a screening mechanism. If data from routine monitoring indicates potential impairment, follow-up continuous monitoring of DO may be performed. LDEQ formalized procedures through the MOA with USEPA (LDEQ 2008) and developed continuous monitoring data collection and evaluation protocols (LDEQ 2023a).

Coastal Dissolved Oxygen Pilot Project

The objective of this project is to evaluate DO concentrations within three coastal Louisiana subsegments known to experience stratification of the water column and hypoxia: LA120806; LA21102; and LA070601. Data collection includes sampling along the profile of established sample sites (LDEQ 2024e).

Mercury Program

Per an MOA with the Louisiana Department of Health (LDH 2012), LDEQ's Water Surveys Section (WSS) conducts statewide fish tissue sampling of commonly consumed fish species for the determination of mercury content (LDEQ 2022d). Results are reviewed by LDH, with consultation with LDEQ and the Louisiana Department of Wildlife and Fisheries, to determine the need for updates to, and/or new, mercury fish consumption advisories. In addition to fish tissue sampling, in situ water quality meter readings are collected at all sites. Site selection is based on those water bodies currently under a mercury fish consumption advisory, and new sites are periodically added based on new information. More information on the mercury program is available at: https://deq.louisiana.gov/page/ mercury-initiative.

Intensive Water Quality Surveys

Intensive water quality surveys are conducted for Total Maximum Daily Load (TMDL) development and Nonpoint Source (NPS) projects. Data from these projects is used in IR assessments as appropriate to supplement the AWQMN program data.

303(d)/Vision Program Targeted Water Bodies

Current Federal regulations require that TMDLs be established for all waterbodies in the state according to the priority order and schedule of the state's IR 303(d) list. The TMDL establishes the allowable loadings or other quantifiable parameters for a waterbody that will achieve water quality standards for the constituent of concern, and thereby provides the basis for water quality based controls. TMDL alternative plans may also be conducted in accordance with USEPA's "Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) program." Water chemistry data are routinely collected during these surveys (LDEQ 2022a). More information on LDEQ's TMDL program is available at: https://deq.louisiana.gov/ page/tmdl.

Nonpoint Source Program Targeted Water Bodies

The LDEQ NPS Program monitors watersheds utilizing the LDEQ NPS Strategic Planning for the Watershed Restoration approach. This approach is used to identify where high concentrations of NPS pollutants (i.e., bacteria, sediment and nutrients) exist. It is also used to evaluate the effectiveness of implementing Best Management Practices (BMPs) and on-site wastewater disposal system inspections to reduce and control these pollutants. LDEQ receives CWA Section 319(h) funds to implement watershed monitoring projects. Data collection activities in the field are conducted for watershed-based plan implementation are guided by a high level generic QAPP (LDEQ 2023d) and a Sampling Plan (SP) for each individual impaired watershed identified in the LDEQ NPS Management Plan. More information on LDEQ's NPS program is available at: https://deq.louisiana.gov/page/nonpoint-source.

Supplemental Monitoring to Support Water Quality Standards Review

Supplemental monitoring is conducted to provide data for site-specific criteria and/or designated use evaluations for ecoregion-based criteria, Use Attainability Analysis (UAA) based criteria, and reference stream sites. LDEQ and USEPA have agreed upon protocols to refine ecoregion criteria on an ecoregion basis (LDEQ 2008).

Monitoring for Escherichia coli and Enterococci

In 2012, the USEPA released 304(a) recreational water quality criteria recommendations for protecting human health in all coastal and non-coastal waters designated for PCR use that included enterococci for marine and freshwater, or *Escherichia coli* (*E. coli*) for freshwater. In 2016 LDEQ adopted enterococci as the indicator for coastal marine waters, gulf waters to the state three-mile limit, coastal bays, estuarine waters, and adjacent subsegments with recreational beach waters for PCR use, but retained the use of fecal coliform as an indicator in subsegments without applicable enterococci criteria (LAC 33:IX.1113.C.5). A study (LDEQ 2023c) was initiated to collect data on *E. coli* and enterococci in Louisiana freshwaters to aid in LDEQ's review of the appropriateness of *E.*

coli and enterococci as bacterial indicators of recreational water quality. The monitoring for this study started in 2023 and is expected to occur over four sampling years.

Monitoring for Selected Toxins

During the 2021 Triennial Review, 27 parameters were documented as having insufficient or no monitoring data to support water quality standards (WQS) reviews and evaluation efforts. From these identified parameters, LDEQ reviewed the USEPA 304(a) water quality criteria recommendations for aquatic life criteria (ALC) and human health criteria, available information from water quality databases [LDEQ LEAU database and USEPA Water Quality Portal (WQP)], permitting information from the Integrated Compliance Information System, laboratory detection limits, and cost per analysis for a parameter from contract laboratories that perform sample analyses for LDEQ. Based on these factors and on the available supplemental monitoring funds, LDEQ prioritized the following six parameters to be monitored to support WQS review and evaluation efforts: Acrolein, Acrylonitrile, Bis(2-ethylhexly) phthalate, Silvex (2,4,5,-TP), Thallium, and Tributyltin. A study (LDEQ 2022f) was initiated in 2022 to collect data to aid LDEQ in determining appropriateness of water quality criteria for the six parameters. Sampling events should be completed by October 2026 and data analysis completion is expected by June 2027.

Cyanobacteria Harmful Algal Bloom (CyanoHAB) Pilot Project

Initiated in 2021, the objective of this project was to document toxin formation and cell count values during cyanobacteria blooms within Louisiana coastal waters. Monitoring was associated with algal blooms as indicated by satellite imagery (LDEQ 2022b) on a rotating basis as blooms occur. Lakes included in the study are: Pontchartrain, Maurepas, Lac des Allemands, Verret, Salvador, and Palourde. Typically, 9-10 toxin samples (cylindrospermopsin and microcystin) are collected at the surface per sampling event during bloom conditions with nutrient and profile field parameters. Sampling events were completed in August of 2023 followed by data review and evaluation. LDEQ submitted data to USEPA's Water Quality Exchange (WQX) and final project report in December 2024.

Biotic Ligand Model Study

LDEQ currently utilizes a hardness-based methodology to derive ALC for metals that is not applicable to brackish and marine waters, does not fully account for all bioavailability pathways, particularly dissolved organic carbon (DOC), and has been found to be either over or under protective to aquatic species (USEPA 2007). In 2007, USEPA published a revised methodology for calculating freshwater ALC for copper using the Biotic Ligand Model (BLM), a metal bioavailability model that uses receiving water body characteristics and monitoring data to develop site-specific water quality criteria. In 2016, USEPA released draft estuarine/marine ALC for copper (USEPA 2016a); as well as freshwater ALC for selenium, which included multiple approaches to developing criteria (USEPA 2016b). The BLM is primarily driven by DOC, along with dissolved ions, which are not routinely collected by LDEQ. Louisiana currently does not have water quality criteria for selenium.

A study was initiated in 2019 (LDEQ 2022e) to collect data for five metals (copper, lead, zinc, and aluminum, from sixty sites, and selenium from twelve sites, across a range of pH, salinity, ecoregion type (depositional, erosional, and transitional), water body types (lakes, streams and estuaries), and water body flow regimes (lentic, lotic, or tidal). Input data necessary for the BLM includes ten parameters: (1) pH; (2) alkalinity; (3) temperature; (4) chloride; (5) sulfate; (6) calcium; (7) magnesium; (8) sodium; (9) potassium; and (10) DOC. Because DOC is one of the primary drivers of the BLM, LDEQ will also collect total organic carbon (TOC) to evaluate the relationship between it and DOC. Monitoring for this project was completed in September of 2024. Data review is expected to be completed by June 2025 and will be used to evaluate the validity of the BLM in water quality criteria development for metals in Louisiana waters.

Pesticides Sampling

In March 2020, it was found that detection levels for a Nonpoint Source Program pesticides study conducted in 2014/2015 were too high to effectively assess the subsegments in question. As a result, these subsegments were once again reported as suspected causes of impairment for one or more of five pesticides (Carbofuran, DDT, Fipronil, Methoxychlor, and Toxaphene). A new study was initiated by LDEQ to reevaluate 27 subsegments with lower detection levels (LDEQ 2023e). Four sampling events were conducted quarterly in each of the subsegments. The sampling events were completed between 2022 and 2023. Data for this project is currently under review. Data evaluation will be included in the state's 2026 IR assessment process.

Trace Metals Monitoring Using Clean Techniques

Metals are ubiquitous in nature, therefore, metals data derived from traditional collection, transportation, and laboratory analytical procedures are known to inaccurately represent trace metals concentrations in water. Notably, contamination of trace metals samples may erroneously add a waterbody subsegment to the state's §303(d) list and consequently target the subsegment for expensive water pollution control activities such as TMDL development.

Ultra-clean metals sampling was discontinued in March 2015 due to lack of funding. LDEQ received supplemental funding in 2021 to conduct surface water clean metals sampling (LDEQ 2024f). Under the current project ten subsegments were sampled four times between 2023 and 2024 using methods outlined in USEPA *Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels* (Method 1669) and 1600 series analytical techniques or comparable techniques. In addition, other field parameters will be measured that include hardness and salinity used for freshwater/marine criteria calculations. Data from this project is currently under review. Data evaluation will be included in the state's 2026 IR assessment process.

Nutrient Stressor-Response Relationship Studies

LDEQ's efforts to establish translators of the narrative nutrient criteria began with a stressor-response study conducted from 2011 to 2013 (LDEQ 2012). This study, focusing on inland rivers and streams, aimed to understand how Total Nitrogen and Total Phosphorus impact water quality and biological indicators such as fish,

macroinvertebrates, algae, and diatoms. The research covered 60 sites across five inland ecoregions, representing a range of nutrient conditions. Two studies to monitor and collect additional data needed to support the evaluation of nutrient stressor-response relationships in select Louisiana water bodies are in progress. These studies will aid in addressing the prevention of degradation in the state's inland water bodies through development of nutrient levels that are protective of designated uses, in particular aquatic life protection. Water habitat assessments, water chemistry monitoring, and biological monitoring was conducted for selected rivers and streams as well as inland lakes.

Data collection for inland rivers and streams was completed in September of 2021 after three years of sampling in the months of May through October (LDEQ 2022c). To identify potential screening values for nutrient impacts, the study combined three elements: stressor response thresholds, summary statistics, and significant relationships between Total Nitrogen, Total Phosphorus, and water quality parameters like DO, pH, temperature, and turbidity. LDEQ is developing an assessment protocol based on these findings.

In addition, from 2019 to 2021, LDEQ extended research to inland lakes and reservoirs across four inland ecoregions in Louisiana (LDEQ 2018). Sampling involved 48 lakes, chosen for their representativeness, nutrient impact gradient, depth, and area. Data is currently being analyzed for this project, alongside historical data from USEPA's National Lakes Assessment.

Cooperative Monitoring Activities

Cooperative monitoring activities occur when two or more entities have common needs for information on a water body, watershed, or a specific water quality parameter, or a combination of any of these. These activities can either be short-term or long-term monitoring projects. Development and implementation can occur with academia, federal or other state partners, surrounding states, watershed committees, or numerous other organizations. LDEQ is currently involved in the following cooperative endeavor agreements:

Lake St. Joseph (Subsegment 081202) Nutrient Loading Reduction

The objective of this LDEQ Cooperative Endeavor Agreement with the Louisiana Department of Agriculture and Forestry (LDAF) is to conduct targeted agricultural BMP implementation on prioritized tracts within the Lake St. Joseph and Cypress Bayou watersheds according to the U.S. Department of Agriculture - Natural Resources Conservation Service practice standards to reduce agriculture-induced nutrient loading. The project began in May of 2023 and water quality monitoring will continue through September of 2025 (LDEQ 2023b). Data is currently being reviewed for this project.

Pilot Transition to Autonomous Monitoring from Inshore to Offshore in Coastal Louisiana

The objective of this LDEQ Cooperative Endeavor Agreement with the Coastal Protection and Restoration Authority (CPRA) is to conduct coastal monitoring 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. Phase One,

the "Boat-based Survey" was completed in 2023. CPRA was unable to initiate Phase Two, "Autonomous Monitoring" (LDEQ 2023f). Data is currently being reviewed for this project.

Wetlands Monitoring

LDEQ's Water Permits Division (WPD) has established wetland monitoring in coordination with permitted facilities. There are 16 wetland assimilation areas in Louisiana that receive secondarily treated effluent. LDEQ has established monitoring requirements in the permits for these facilities which provide information on the quality of the receiving wetlands. Chemical integrity is measured by monitoring field parameters, nutrients, metals, solids, and oxygen demand in the surface water, along with metals and nutrients in plant tissues and sediments. Additionally, monitoring of treated wastewater prior to discharge into wetlands is required. The typical parameters are shown in Table 1.

Table 1. Wetland assimilation areas annual monitoring parameters (LDEQ 2024c).

Monitoring Requirement
Floral Species Diversity
Percent Whole Cover
Above-Ground Vegetative Productivity
Water Level Measurements
Metals Analysis: Hg, Pb, Cd, Cr, Cu, Zn, As, Ni, Ag, Se
Nutrient Analysis I: TKN, TP
Nutrient Analysis II: NH_3N, NO_3-NO_2-N, PO_4-P
Others: BOD_5, TSS, pH, Dissolved Oxygen, Salinity, Temperature
Accretion Rate
Nutrient Loading Rates
Adaptive Management Practices

Interstate Waters Monitoring

LDEQ is not currently engaged in any type of interstate water monitoring. LDEQ is kept apprised of water flow for selected streams entering Louisiana from Arkansas through the Red River Compact[1]. However, it does not require Arkansas to guarantee a minimum flow from the four streams shared exclusively by Arkansas and Louisiana.

Probabilistic Monitoring

The USEPA conducts National Aquatic Resource Surveys (NARS) to assess the status of and changes in quality of the nation's coastal waters, lakes and reservoirs, rivers and streams, and wetlands. Using random sample site selection, these surveys provide a snapshot of the overall condition of the nation's water. In April 2023, USEPA published the final report for the 2016 National Wetland Condition Assessment. Sites were tested for impacts to vegetation, soils, hydrology, algae, water chemistry, and potential wetland stressors. To characterize wetland conditions, USEPA interpreted the data using applicable and available benchmarks for each ecological indicator to calculate an index score to rate a site good, fair or poor. Louisiana specific site data was aggregated for

[1] Red River Compact Commission. https://www.tceq.texas.gov/permitting/compacts/redriver.html

LDEQ by USEPA Region 6 personnel using the NARS Population Estimate Calculation Tool (v. 2.0). LDEQ included state-specific results in the 2024 IR. However, due to the limited nature of the existing probabilistic data sets (one-time sampling event) water body specific assessments will not be made using the temporally-limited data sets for IR assessment decision purposes. NARS benchmark results will continue to be considered for inclusion in subsequent IRs following release of reports by USEPA. LDEQ will also continue to evaluate use of data from national level probabilistic monitoring to complement other water quality monitoring programs such as standards and TMDL development.

Physical Integrity

Measuring the physical integrity of a water body involves a variety of processes, from measurements as simple as water temperature to monitoring complex characteristics such as stream flow, discharge, sinuosity, and habitat integrity. Louisiana's WQS have general and specific requirements regarding the physical integrity of Louisiana's waters including narrative criteria for aesthetics, solids, turbidity, foaming or frothing materials and flow requirements. Additionally, the WQS state that criteria do not apply when flows are below critical conditions.

Routine Monitoring

Assessing physical integrity is typically complex and resource-intensive. Physical measurements that are routinely collected for LDEQ's AWQMN program include water temperature, gage-height and/or tape-down (stage) measurements, flow severity rating, and anecdotal information recorded on field sheets. Additionally, as part of an interagency agreement, LDEQ obtains stage and flow data from the USGS stations in the fixed station network. The usefulness of the gage-height and tape-down measurements is limited without stream ratings. As a surrogate, a less-resource-intensive collection of qualitative flow severity observations are made in the AWQMN program using a flow severity scale (Table 2) during field sampling and included with LDEQ's routine AWQMN data submittal to USEPA's WQX.

Table 2. Flow severity ratings for suitable streams in the AWQMN Program.

LDEQ Flow Code	LDEQ Flow Description
0 = Not applicable	Lake, bay or estuary where single directional flow is not present
1 = Dry	Streambed is completely dry with no visible pools
2 = Intermittent	Streambed has water visible in naturally occurring isolated pools
3 = No Flow	Streambed has water from bank to bank but flow is not detectable
4 = Low Flow	Flows are detectable
5 = Normal Flow	Flows greater than low flow but stay within the stream channel
6 = High Flow	Flows that leave the normal stream channel but stay within the stream banks
7 = Flood	Flows that leave the normal confines of the stream channel and move out on to the flood plain over the stream bank (either side of the stream)

Mercury Program

Physical measurements collected for the Mercury Program are limited to in-situ water quality meter readings and anecdotal information included on field forms.

Intensive Water Quality Surveys

Habitat assessments are used to make determinations about the potential to sustain the fish and wildlife propagation use. To date, habitat assessments have been used strictly for UAA's and WQS projects.

TMDL Program Monitoring

Surveys conducted for TMDL development typically do not include comprehensive habitat assessments, but do include numerous hydrologic and hydraulic measurements. Hydrologic and hydraulic measurements are primarily used in the development of TMDLs and wasteload allocations for permits.

Nonpoint Source Watershed Monitoring

NPS monitoring sites are chosen based on visual assessments, accessibility, proximity to the ambient station, and drainage of potential sources of cropland runoff and areas draining pasture land and unsewered communities. Major tributaries, land use, elevation data, infrastructure, and accessibility are mapped and evaluated to identify potential sites. The LDEQ NPS Program's sampling design collects chemical and physical data using USEPA approved methods to characterize water quality conditions at the monitoring sites in the watershed. The in-situ parameters measured are pH, temperature, DO, DO percent saturation, specific conductance, and salinity. In situ parameters aid in watershed characterization and provide an indication of the water quality at the time the sample is collected. In situ data also provides an economical source of reference data for other possible anomalies occurring in the watershed. A tapedown measurement and Secchi disk depth measurement is made at each sampling event. LDEQ's NPS Program may also reference local parish project flow calculations and stream geometry measurements in where stream hydromodification activities are a component of the watershed protection/restoration project.

Supplemental Monitoring to Support Water Quality Standards Review

Supplemental monitoring conducted for criteria refinement/development may involve habitat assessments, as well as hydrologic and hydraulic measurements. LDEQ may evaluate the use of habitat assessments and other physical measurements in routine water quality assessment processes. Physical measurements typically collected during a habitat assessment include: watershed features to determine predominate land use, erosion, and pollution sources; waterbody characteristics (presence of flow, flow direction, wind influence, tidal influence, presence of algae, sedimentation and/or turbidity, percent surface coverage of aquatic vegetation, and canopy cover); instream features to determine stream characteristics (width, riffle depth, run depth, pool depth, high water mark, and any man-made structure or channelization); sediment/substrate features; and water quality features in additional to routine physical measurements (water temperature, pH, specific conductivity, dissolved oxygen, dissolved oxygen percent saturation, and

salinity) such as odors, oils, water clarity water color. Other information noted includes weather conditions (cloud cover, temperature, wind speed and direction).

Wetlands Monitoring

Physical integrity in wetlands receiving secondarily treated effluent is measured by monitoring water stage to assist in determining stress in wetlands from hydrologic loadings. Additionally, to address the rate of subsidence in these wetlands, accretion measurements are made that will assist in determining if a wetland is gaining in elevation (Table 1).

Biological Integrity

Of the three CWA components affecting the integrity of water bodies, biological integrity is likely the most complex and resource-intensive to monitor. Narrative criteria have been established in Louisiana's WQS for biological and aquatic community integrity, criteria for microbial levels are established (bacteria criteria), and site-specific numerical biological criteria based primarily on vegetative productivity have been developed for wetland assimilation areas.

Routine Monitoring

Biological monitoring conducted under the AWQMN program consists of bacteriological monitoring for fecal coliforms and, under certain conditions, enterococci. Resulting data are compared directly to numerical water quality criteria for water quality assessments. The restrictions on holding times for many bacteriological parameters prohibit incorporation of biological community assessments into AWQMN routine sampling.

Mercury Program

Biological monitoring is conducted for the Mercury Program in the form of fish collection efforts. However, the Mercury Program focuses on commonly consumed fish species and, therefore, does not provide a complete assessment of biological community.

Intensive Water Quality Surveys

LDEQ's NPS Program collects biological data (i.e., fecal coliform bacteria) in selected watershed monitoring projects where fecal coliform bacteria are identified as a cause of water quality impairment from pasturelands, urban storm water runoff, dairies and/or individual on-site sewage systems. LDEQ's NPS Program may collect additional biological data (i.e., macroinvertebrates and fish) in selected watersheds where nutrients and dissolved oxygen were identified as a cause of water quality impairment from agriculture, urban storm water runoff, forestry activities or individual on-site sewage systems.

Supplemental Monitoring to Support Water Quality Standards Review

Supplemental monitoring conducted for water quality standards evaluation and development may involve biological monitoring. Biological data (i.e., macroinvertebrates and fish) have been collected on a number of reference sites throughout the state.

Cyanobacteria Harmful Algal Bloom (CyanoHAB) Pilot Project
Algal pigment parameters and phycology were collected at each sampling event during bloom conditions for this project.

Nutrient Stressor-Response Relationship Studies
Fish and macroinvertebrate community as well as algal productivity data (sestonic and periphyton chlorophyll-a) data were collected for these studies.

Wetland Monitoring
Biological integrity in wetlands receiving secondarily treated effluent is measured by monitoring floral species diversity, percent whole cover, and above-ground vegetative productivity. Plant tissue metals and nutrient data are used to gauge excesses or deficiencies that may be a problem (Table 1).

Monitoring Objectives

Collectively, monitoring projects allow LDEQ to address CWA goals and objectives. Objectives associated with monitoring programs include the following:

- Determine water quality standards attainment
  The primary objective of LDEQ's AWQMN program is to monitor water quality conditions. LDEQ's IR water quality assessment process evaluates AWQMN data along with state water quality numeric criteria to determine attainment of water quality standards for designated uses. LDEQ also evaluates chemical specific data from other projects as well as third party data sources to determine if data is appropriate for assessment purposes.
- Identify impaired waters
  LDEQ's IR process identifies impaired waters biennially. All assessment decisions are listed in the §305(b) list. If a TMDL has not been completed for an identified impairment the subsegment is included on the state's §303(d) list.
- Identify suspected causes and sources of water quality impairments
  Suspected causes for water body impairment are determined through the evaluation process for water quality standards attainment. The suspected source(s) of each impairment is determined by regional staff. In some cases, the specific source for the impairment may be complex and not immediately apparent. In instances where a cause of impairment or source for the cause is not readily apparent, the subsegment may be targeted for intensive water quality surveys. This is done to determine the causes and sources of nonsupport of designated uses or whether the uses and criteria are appropriate.
- Establish, review and revise water quality standards
  Data collected by the monitoring activities are used in determining or validating designated uses and supporting criteria. Typically, data from intensive water quality surveys provide the bulk of the data and information. Data from the AWQMN program and other projects may also be used to refine water quality criteria.
- Support the implementation of water management programs
  LDEQ recognizes the relationship of water quality to activities that occur in the watershed, including point source discharges, nonpoint source contributions, and land

use characteristics. LDEQ's water quality program is dependent upon water quality data as the foundation for development of TMDLs and the resulting permits and watershed implementation plans. The monitoring strategies also provide information allowing for more efficient management of limited resources that support permitting, surveillance, and enforcement activities.

- Support the evaluation of program effectiveness
  By integrating all of the monitoring activities, it is possible to identify the sources of pollution and the reasons for impairment, address specific issues, determine the efficiency of pollution control programs, and allow administrative overview of program effectiveness.
- Estimate the costs of implementing the CWA
  Finance tracking for the monitoring projects is achieved through coding all monitoring activities to specific accounts. Many monitoring activities are cost-coded to the accounts dedicated to CWA surface water quality management activities, including §106 base and supplemental funds and §319 funds. If CWA funds are not used to support the monitoring activities, state financing codes are used for finance tracking purposes.
- Estimate the extent of nonpoint source pollution
  The intensive water quality surveys conducted for TMDL development provide the data necessary to estimate the contribution of nonpoint source pollution to the watershed. Nonpoint source watershed monitoring projects further allow estimation of NPS contributions.
- Evaluate general condition of state waters
  EPA, states, and tribes are conducting a series of national aquatic resource surveys (probability-based surveys). The national studies report on core indicators of water condition that use standardized field and lab methods. The surveys include a national quality assurance program and are designed to yield unbiased, statistically-representative estimates of the condition of the whole water resource (such as rivers and streams, lakes, ponds, and reservoirs, wetlands, etc.). LDEQ participated in the 2017 National Lakes Assessment sampling effort. For the 2024 IR, LDEQ reported on results of the 2016 NWCA as it pertained to Louisiana (LDEQ 2024b).

Monitoring Designs

Targeted (authoritative) designs are used for all current LDEQ monitoring projects. Targeted designs are appropriate for objectives 1-8 above, allow the state to monitor and assess nearly all water management subsegments in the state, and permit efficient use of limited resources.

Randomized designs are used in the national aquatic resource surveys (Objective 9 above). LDEQ returns a portion of its §106 Supplemental Monitoring Initiative funds (see funding section below) to USEPA Region 6 for implementation of the national surveys projects. LDEQ has provided assistance to USEPA during implementation of their randomized monitoring design projects throughout the state in the past. Due to the limited nature of the data (one-time sampling event) no water body specific assessments will be made for IR purposes based only on current probabilistic data sets.

Core and Supplemental Water Quality Indicators

Core water quality indicators used in routine water quality assessments are outlined in Table 3, along with supplemental indicators that are or may be used to assess water quality.

Table 3. Core and supplemental water quality indicators for assessing designated use attainment.

WATER QUALITY INDICATORS	Designated Uses[1]					
	FWP	**REC**	**DWS**	**OYS**	**ONRW**	**AGR**
CORE INDICATORS						
Chemical						
Dissolved Oxygen	X					
pH	X					
Chlorides	X					
Sulfates	X					
Color			X			
Toxic Substances	X		X			
Wetlands Water Chemistry[2]	X					
Fish Tissue Contamination (as needed and available)	X	X				
Physical						
Temperature	X	X				
Total Dissolved Solids	X					
Turbidity	X				X	
Wetlands Hydro-geography[2]	X					
Biological						
Fecal Coliforms		X	X	X		
Enterococci Bacteria[3]		X				
Wetlands Productivity	X					
Wetlands Plant Diversity	X					
SUPPLEMENTAL INDICATORS						
Chemical						
Total Phosphorus[4]	X					
Nitrate/Nitrite Nitrogen[4]	X					
Ammonia[3]	X					

WATER QUALITY INDICATORS	Designated Uses[1]					
	FWP	REC	DWS	OYS	ONRW	AGR
Total Kjeldahl Nitrogen[4]	X					
Sediment Contamination[4]	X	X				
Total Inorganic Nitrogen[4,5]	X	X				
Total Organic Nitrogen[4,5]	X	X				
Total Organic Phosphorus[4,5]	X	X				
Total Organic Carbon[6]	X					
Dissolved Organic Carbon[6]	X					
Dissolved Calcium[6]	X					
Dissolved Magnesium[6]	X					
Dissolved Sodium[6]	X					
Dissolved Potassium[6]	X					
Dissolved Copper[6,7]	X					
Dissolved Aluminum[6]	X					
Dissolved Zinc[6]	X					
Dissolved Lead[6,7]	X					
Dissolved Selenium[8]	X					
4,4-DDT[9]	X					
Atrazine[9]	X					
Carbofuran[9]	X					
Methoxychlor[9]	X					
Methyl Parathion[9]	X					
Physical						
Habitat Assessments[4]	X				X	
Qualitative Flow	X					
Biological						
Fish Communities[4]	X				X	
Macroinvertebrates[4]	X				X	
Bioassays[4]	X				X	
Chlorophyll-A[4,5]	X	X				
Chlorophyll-B[4,5]	X	X				
Chlorophyll-C[4,5]	X	X				
Phycocyanin[4,5]	X	X				
Phycoerythrin[4,5]	X	X				

WATER QUALITY INDICATORS	Designated Uses[1]					
	FWP	REC	DWS	OYS	ONRW	AGR
Cylindrospermopsin[4,5]	X	X				
Saxitoxin Dihydrochloride[4,5]	X	X				
Anatoxin[4,5]	X	X				
Algal Biomass[4,5]	X	X				
Total Microcystins[4,5]	X	X				

[1] FWP = Fish and Wildlife Propagation; REC = Primary and Secondary Contact Recreation; DWS = Drinking Water Supply; OYS = Oyster Propagation; ONRW = Outstanding Natural Resource Waters; AGR = Agriculture
[2] Sampled as part of wetland assimilation area monitoring for water permitting.
[3] Designated coastal recreational waters only.
[4] Not currently used to assess designated use attainment.
[5] Parameters are part of the CyanoHAB Pilot Project.
[6] Parameters are part of the Biotic Ligand Model Project.
[7] Parameters are part of Clean Metals Project.
[8] Parameter to evaluate development of selenium freshwater ALC.
[9] Parameters are part of Pesticides Project.

Quality Assurance

It is LDEQ's policy that data of the appropriate type and quality be used by the department in all of its environmental programs and decision-making processes. Each environmental data collection project conducted by/for LDEQ will be planned using a systematic planning process outlined in the agency's Quality Management Plan[2] (QMP); the results of the project planning process will be documented in a QAPP. Currently, QAPPs are developed for all monitoring projects involving the use of federal funds. QAPPs have been developed for most state-funded projects.

Project specific SPs may also be developed for monitoring projects, but are not required if all details required to implement the project are included in the QAPP. The AWQMN program does not develop SPs for all monitoring events; all necessary details are included in the most recent versions of the QAPP for the AWQMN (LDEQ 2022a) or the SOP for water quality sampling (LDEQ 2024d). Intensive water quality surveys conducted for NPS projects and TMDL development are guided by a high-level umbrella QAPP (LDEQ 2024a) and SPs for each individual TMDL survey. Planning documents for WQS review studies are project-specific.

LDEQ has written SOPs for most processes used during implementation of environmental monitoring projects. Collection and analysis of samples are currently covered by SOPs. Data entry, management and evaluation processes are covered in QAPPs and SOPs.

[2] LDEQ FY25 Quality Management Plan. Available upon request.

Data Management

Database
Data for most monitoring projects are stored in the Louisiana Environmental Assessment Utility (LEAU) database. This includes data for the AWQMN program, mercury program, intensive survey projects, supplemental projects, and other projects/purposes.

Geographic Information System Data
Site information is stored in LEAU with location data, such as coordinates (i.e., UTMs in NAD83 Zone 15 and decimal degrees in WGS84), water body name, nearby cities and road crossings, LDEQ region, and parish. LDEQ has Federal Geographic Data Committee-compliant metadata for spatial data sets (e.g., sites, subsegments, watershed basins) that can be accessed through the LDEQ Interactive Mapping Application (https://www.deq.louisiana.gov/resources/category/make-a-map). The USGS NHD (i.e., Flowline, Area, and Waterbody feature classes) is also used to maintain geographic location data for state waters, including delineating the assessed stream and lake/reservoir boundaries.

In Situ Grab Sample Data Processing
LDEQ's Surveillance Division (SD) and Water Planning and Assessment Division (WPAD) WSS staff enter grab sample field data (data collected using in situ instruments) into an uploader application from the field data forms (sent to the Electronic Data Management System upon completion). Data is reviewed by SD/WSS staff before upload to the Louisiana Environmental Analytical Data Management System (LEADMS). Data is then forwarded to the WPAD Water Quality Standards and Assessment Section (WQSAS) for review and upload into LEAU.

Continuous Monitoring Data Processing
Field data for DO continuous monitoring is electronically reviewed by LDEQ SD staff before upload to LEAU with intranet uploader application. Field data forms are sent to the Electronic Data Management System. WPAD WQSAS staff review the data for completeness, accuracy, and appropriateness.

Data Handling and Review
Contract laboratories are required to provide analytical data to LDEQ Laboratory Contract Management Services (LCMS) in the form of narrative Portable Document Format (PDF) reports and Electronic Data Deliverables. LCMS reviews the data, uploads it into LEADMS, and forwards the data packages to the WQSAS for entry into LEAU. WQSAS staff review the data packages for additional QA/QC requirements based on their SOPs. All data are checked and verified by LCMS and the WQSAS during entry to ensure accuracy.

Data from LEAU are submitted by WPAD staff to USEPA's WQP through the WQX. LEAU data are extracted into a staging area where it is formatted into an .XML formatted file to be transferred through the WQX node. Data are submitted to WQX in a yearly batch. All

data are available to interested parties and can be obtained by following Public Records Request procedures as stated in LDEQ Policy 0005-90.

Data Retrieval
WPAD/WQSAS staff review/retrieve LEAU data using the LEAU Data Management intranet application or TOAD software. Programs such as SAS, R, Excel, and Microsoft Access are used for data analysis and performing water quality assessments. Other statistical packages are used as needed. Results of water quality assessments for IR purposes are entered into USEPA's ATTAINS (Assessment and Total Maximum Daily Load Tracking and Implementation System). This process is described in more detail in the Reporting section.

All data are available to interested parties and can be obtained directly through the LDEQ website at: https://waterdata.deq.louisiana.gov/. Data can also be obtained by following Public Records Request procedures as stated in LDEQ Policy 0005-90.

Data Analysis

Louisiana WQS define eight designated uses for surface waters: primary contact recreation, secondary contact recreation, fish and wildlife propagation, drinking water supply, oyster propagation, agriculture, outstanding natural resource, and limited aquatic life and wildlife use. Designated uses and criteria for each water body subsegment are identified in LAC 33:IX. Chapter 11. Each water body is assessed as fully supporting or not supporting its designated use(s). In instances of more than one parameter and criteria defining a designated use, support for each designated use is determined using the worst-case scenario.

The assessment procedures used by LDEQ follow USEPA guidance documents where applicable for §305(b) and §303(d) assessments, as well as Louisiana's surface water quality standards (LAC 33:IX.1101-1123). By following a four-year monitoring schedule, Louisiana is able to address the historical problem of not possessing sufficient amounts of information on many of the state's water bodies and the resulting data gaps. Every four years, detailed water quality information will be available on nearly every water body subsegment within each of the twelve state basins.

Intensive water quality surveys are conducted to provide physical and chemical data used to construct models for development of TMDLs. These models are used to determine acceptable pollutant loads for impaired water bodies, that is, to calculate waste load allocations and load allocations. The models also project reductions in pollutant loads needed to meet WQS in those water bodies. The models form the basis for decisions regarding both point source and nonpoint source pollution controls.

Supplemental monitoring projects provide data to evaluate appropriateness of water quality criteria and designated uses. For the ecoregion efforts, physical data and other non-monitoring data (e.g., discharger inventories, land use data) provide the basis for determining if project sites represent least-impacted conditions and/or conditions that

support designated uses. Biological data (e.g., fish community) from least-impacted conditions provide the basis for evaluating the attainable fish and wildlife propagation use. Chemical data (primarily) are used to set appropriate water quality criteria.

Monitoring data for facilities discharging to wetland assimilation areas are evaluated by the permitted facility prior to submittal to LDEQ's WPD. Data are evaluated by the WPD to determine compliance with permitted conditions.

Reporting

It is the responsibility of LDEQ to protect the chemical, physical, biological, and aesthetic integrity of the water resources and aquatic environment in the state of Louisiana. The data obtained through the AWQMN program is used to develop the state's biennial §305(b) report (*Water Quality Inventory*) and the §303(d) List (*Impaired Water Bodies requiring a TMDL*). These are combined into one document known as the *Louisiana Water Quality Inventory: Integrated Report* and update LDEQ's WQMP (Volume 5). The IR documents LDEQ's progress toward meeting this CWA requirements of §303(d) and §305(b). As part of the assessment reporting process, LDEQ enters all assessment information into the USEPA ATTAINS database. Information submitted to ATTAINS includes water body name, size, type, designated uses, use support, suspected causes and suspected sources of impairment, TMDL documentation, and other related types of water body information. More information on the IR can be found at: https://www.deq.louisiana.gov/page/louisiana-water-quality-integrated-report.

Survey reports are produced for intensive water quality surveys. Depending on the project, the reports may include: land use(s) observed, locations of sampling sites, number of sampling sites, types of data acquired, problems getting the data, and any other relevant information regarding the survey details. TMDL and NPS project reports are written largely based on data and results from the intensive surveys. TMDL project reports and NPS Annual Reports are included as updates to LDEQ's WQMP (Volume 8 and 6, respectively).

WQS reports or studies (typically UAAs) are drafted and sent to USEPA for review and approval. Once approved by USEPA, any WQS updates outlined in the report are drafted and promulgated into the state regulations in accordance with the state's Administrative Procedures Act. They are included in LDEQ's updates to the WQMP (Volumes 2 and/or 4)

Program Evaluation

In accordance with LDEQ's QMP, monitoring program activities are evaluated through technical assessments and audits based on QAPPs, SPs, and SOPs. The frequencies of technical assessments are project-specific and defined in the individual plans and SOPs.

LDEQ reviews its QAPPs (QAPPs) annually, unless otherwise directed by USEPA for projects using federal funds. Planning sessions are held to discuss existing programs and processes and potential modifications. Monitoring program modifications may be required

for a number of different reasons, including updates to water quality standards, impaired water body listings, or resource allocation issues.

In addition to the LDEQ internal assessments, USEPA-sponsored programs are subject to review at any time. Formal assessment of performance under USEPA assistance agreements occurs as part of a comprehensive review and evaluation of LDEQ programs. USEPA program reviews are conducted at least annually, often semi-annually in coordination with the Performance Partnership Grant reporting reviews.

General Support and Infrastructure Planning

Staff Training

In accordance with LDEQ's QMP, personnel performing work in monitoring and laboratory programs shall be qualified and competent to perform assigned work. Initial and ongoing personnel qualifications shall be determined, training needs shall be identified, access to appropriate training opportunities shall be provided, and the acquisition of needed knowledge and skills shall be verified. Competency is verified with the following processes:

- Civil Service personnel qualifications specify minimum education and experience for each job category (e.g., Environmental Scientist);
- LDEQ position descriptions specify minimum education and experience for a specific job;
- Mentors are used to train employees assigned new functions or jobs and verify their competency to perform the required quality related tasks without additional mentoring;
- Annual staff performance evaluations are used to identify training needs.

Training needs are determined annually on an individual basis by supervisors in consultation with employees through annual staff performance evaluations. Supervisors outline training requirements for each employee. The accomplished training is used in the annual review process (Continuous Performance Management (CPM)) to assess training status. Training determinations are based on performance in meeting statutory requirements, management directives, SOPs, and QAPPs, as outlined in the employee's annual planning document. CPMs may address remedial training needed to correct deficiencies in performance, educational preparation, or professional experience and to address prerequisites for advancement and new or unique job requirements. Training topics may include technical, quality assurance, operational, non-technical, and managerial topics. Additional training needs may be specified in QAPPs or SOPs.

Laboratory Resources

The laboratory analyses of samples collected through the State's surface water quality monitoring program are performed by contract laboratories. Current contract labs are outlined in Table 5.

Table 5. Contractual resources for the surface water monitoring and assessment programs.

Contractor	Services	Status
PACE Analytical Services	Chemical Analysis of Water and Sediment	Ongoing
Eurofins TestAmerica	Chemical Analysis of Water and Sediment	Used in 23/24, but expired. No current existing contract.
Cenla Environmental Services	Fecal Coliform	Ongoing
Pace Analytical Gulf Coast – Baton Rouge	Fecal Coliform	Ongoing
Gulf States Environmental Laboratory	Fecal Coliform	Ongoing
Petroleum Laboratories – Houma	Fecal Coliform/Enterococci	Ongoing
University of Louisiana at Monroe	Fecal Coliform; Mercury in Fish Tissue	Ongoing
Eurofins TestAmerica (As needed for special projects.)	Clean Metals	Used in 23/24, but expired. No current existing contract.
Element Materials Technology, Inc.	Chemical Analysis of Water and Sediment	Ongoing
ALS Global – Kelso, Washington	Pesticides	Used in 23/24, but expired. No current existing contract.
Louisiana State University, Ag Chemistry Laboratory	Pesticides	Used in 23/24, but expired. No current existing contract.

Funding Resources

The water quality monitoring and assessment program is supported by both state and federal funding. Federal grants with applicable match requirements are awarded under the CWA, as described below, support the State's water quality monitoring and assessment program.

Clean Water Act (CWA) §104(b)(3) (USEPA): Noncompetitive assistance agreement with Hypoxia Task Force states under CWA §104(b)(3). It provides for nutrient reduction strategies supporting §319 CWA through Louisiana NPS water quality analysis and pilot expansion of water quality monitoring from inshore to offshore.

CWA §106 Supplemental Monitoring (USEPA): Used to establish and implement ongoing water pollution control programs ensuring the health of the nation's water bodies. Activities include monitoring and assessing water quality; developing WQS; identifying

impaired waters and TMDLs; managing national pollutant discharge elimination system permits; ensuring compliance; implementing enforcement actions; protecting source water; and managing outreach and education programs.

CWA §319 NPS (USEPA): Used to assist in implementing the state's NPS Management Plan to control NPS pollution thus ensuring continued compliance with the §319 CWA and assisting in meeting national water quality goals in the Strategic Plan. Funding is split 50/50 with LDAF the lead partner for project implementation and with LDEQ acting as lead agency. The LDAF, Office of Soil and Water Conservation provide administration and coordination in the planning and implementation of BMP projects to improve water quality in stream segments impacted by runoff from agriculture and forestry lands in these priority watersheds. A 40% match is required with this program.

In addition, with the §319(h) work plan, Congress mandated each state to implement a Wellhead Protection Program that protects public water wells and a Source Water Assessment Program to assess potential susceptibility to contamination of all water sources utilized for drinking water supplies. LDEQ's Source Water Protection Program combines the efforts of both to prioritize protection activities. Also, the Aquifer Sampling and Assessment Program is an monitoring program established to determine and monitor the quality of groundwater in Louisiana's major freshwater aquifers.

CWA §604(b) (USEPA): Used to support the LDEQ's performance of water quality management for restoration and protection activities, including modeling and data analysis to support Louisiana's Water Permits Program; Nutrient Management Strategy; TMDL revisions; and other TMDL alternative approaches. The states must pass-through 40% of these funds to regional planning agencies unless the Governor, in consultation with affected parties, determines that regional planning agency participation will not significantly assist the State in its water quality management planning efforts. With Regional Planning Commissions approvals, the Governor submits letter to USEPA's Regional Administrator with approval to proceed with LDEQ funding.

Performance Partnership Grant (PPG): Used to collect data on the quality of state waters; develop tools and procedures, to process incoming water quality permit applications such as Louisiana Pollution Elimination System; for water quality certification, pretreatment program audits and biomonitoring programs; and for waste permits. Encourage green infrastructure practices to minimize and prevent the release of pollutants to waters of the state. Also used to conduct water quality standards, assessment activities and modeling functions, and to support TMDL activity.

Capitalization Grants for Clean Water State Revolving Funds (CWSRF) § 205(m) Title VI of the CWA of 1987 Intended Use Plan (USEPA): Grants to states to capitalize the CWSRF Loan Program to provide other assistance specified in Title VI to communities

for the purpose of addressing wastewater treatment, NPS control, and estuary protection needs. A 20% match is required with this program.

Exchange Network Grant (USEPA): This is a competitive grant used by LDEQ for water quality assessment process improvement as part of the Assessment TMDL Tracking and Implementation System (ATTAINS) database. It is used to advance LDEQ's ability to provide quality, efficient, and timely submittals of water quality information. This is done by improving the process of LDEQ data validation and determination of technical acceptability prior to data use by the agency for assessments through development of a more automated and efficient validation process. It also enables more efficient submittal of information to satisfy CWA Integrated Reporting §305(b)/§303(d) reporting and TMDL/Alternatives to USEPA through the new priority ATTAINS process.

Mercury in Fish Tissue: Continued operation of the mercury program for FY 24/25 was provided by State general funds in the amount of $529,624.

Possible Future Initiatives

The following list of water quality initiatives contains possible studies that may be implemented in the future should additional money and personnel become available. It is intended only as a non-binding set of potential activities and does not reflect current, funded, or planned projects by the LDEQ. The list is in no particular order as to importance.

1. Establish least-impacted reference sites in coastal water bodies on an ecoregion basis and collect water quality (field and laboratory), habitat, and biological data to inform water quality management decisions.
2. Investigate the possibility of adding instantaneous flow rate sampling to the sample collection protocol at the 21 long-term ambient water quality monitoring sites to assist in investigating the relation of flow to chemical concentration trends.
3. Develop eDNA baseline study to detect presence/absence of organisms down to the species level. Significant technical and financial hurdles must be overcome to obtain this.
4. Investigate possibility of funding sampling of fish or sediment to remove legacy advisories. There would be significant financial and personnel requirements to accomplish these.
5. Consider initiating a study to measure free CO_2 and humic acid for subsegments impaired for low pH in order to compare with the free CO_2 values or proxies obtained using carbon species calculator (based on carbonate and bicarbonate values). Comparison could be used to determine the role of natural sources causing pH impairment and possible need for criteria revision.

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