

*Florida's Integrated Water Resource
Monitoring Strategy for
Fiscal Years 2025 - 2029*

Florida Department of Environmental Protection



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List of Acronyms and Abbreviations

AGP	Algal Growth Potential
ARPs	Alternative Restoration Plans
BioRecon	BioReconnaissance
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
CWA	Clean Water Act
DEAR	Division of Environmental Assessment and Restoration
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
EPA	United States Environmental Protection Agency
F.A.C.	Florida Administrative Code
FCO	Fixed Capital Outlay
FTE	Full-Time Equivalent
FDOH	Florida Department of Health
F.S.	Florida Statutes
FYI	Fifth-Year Inspection
FY	Fiscal Year
HA	Habitat Assessment
HUC	Hydrologic Unit Code
IWR	Identification of Impaired Surface Waters Rule
IWRMN	Integrated Water Resource Monitoring Network
LIMS	Laboratory Information Management System
LVI	Lake Vegetation Index
LVS	Linear Vegetation Survey
MFL	Minimum Flow and Level
NELAP	National Environmental Laboratory Accreditation Program
NPDES	National Pollutant Discharge Elimination System
OFW	Outstanding Florida Water
OPS	Other Personnel Services
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RPS	Rapid Periphyton Survey
RQ	Request Identification (Number)
SAS	Surficial Aquifer System
SBIO	Statewide Biological Database

SCI	Stream Condition Index
SFWMD	South Florida Water Management District
SMP	Strategic Monitoring Program
SOP	Standard Operating Procedure
SSAC	Site-Specific Alternative Criteria
STORET	STorage and RETrieval
TMDL	Total Maximum Daily Load
U.S.C.	United States Code
USGS	United States Geological Survey
WAS	Watershed Assessment Section
WBID	Waterbody Identification (Number)
WIN	Watershed Information Network
WMD	Water Management District
WQX	EPA's Water Quality Exchange

Executive Summary

The Florida Department of Environmental Protection (DEP) is committed to protecting and restoring Florida's waters and to providing sound, scientific water quality monitoring information. Water resources cannot be managed without comprehensive water quality monitoring and assessment. **The purpose of DEP's monitoring activities** are to (1) determine the overall quality of the state's surface waters and groundwaters, (2) determine how they are changing over time, (3) identify impaired waters, and (4) determine the effectiveness of protection and restoration programs. These monitoring activities, laboratory analyses, and assessments are implemented through DEP's [Division of Environmental Assessment and Restoration](#) (DEAR), which consists of eight programs and includes staff located throughout the state that cover each of the DEP's six district offices and Tallahassee. Meeting these monitoring objectives includes coordination and collaboration with contractors and stakeholders.

This document articulates the overall goals, objectives, strategy, and design of DEP's Integrated Water Resources Monitoring Network (IWRMN) to meet federal Clean Water Act (CWA) requirements and Florida's statutory and regulatory requirements. Under the CWA, states are required to determine whether surface waters meet applicable water quality standards (*i.e.*, attain their designated uses, or applicable criteria based on the classification); identify impaired waters; identify the causes and sources of water quality impairments; support the implementation of water management programs; establish, review, and revise water quality standards; establish special monitoring for unique resources; and support the evaluation of program effectiveness. Under Florida's statutes and rules, DEP is also required to carry out various types of monitoring, including groundwater monitoring, and to coordinate monitoring activities statewide.

The IWRMN is based on three spatial 'tiers' ranging from statewide to site specific, as follows:

Tier I. Monitoring designed to address statewide and regional (within Florida) questions.

Tier II. Monitoring designed to address basin-specific and waterbody-specific questions.

Tier III. Monitoring designed for regulatory purposes to address site-specific questions.

These monitoring tiers rely on several monitoring programs. This document describes how these monitoring programs address the 10 elements listed in the United States Environmental Protection Agency (EPA) document, [Elements of a State Water Monitoring and Assessment Program](#) (EPA 2003). These elements are as follows: monitoring program strategy, objectives,

design, indicators, quality assurance, data management, data analysis and assessment, reporting, programmatic evaluation and general support and infrastructure planning.

This document has been prepared to meet requirements specified under CWA §106(e)(1).

Introduction and DEP Tiered Monitoring Approach

Both the United States Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (DEP) recognize that water resources cannot be managed without monitoring. At the federal level, Section 305(b) of the Clean Water Act (CWA) (Federal Water Pollution Control Act, 33 United States Code [U.S.C.] 1251–1375, as amended) directs each state to (1) prepare and submit a report every two years that includes a description of the water quality of all of its navigable surface waters to the EPA, and (2) protect balanced indigenous populations. Furthermore, §106(e)(1) of the CWA directs the EPA to determine whether states meet the prerequisites for monitoring their aquatic resources. Florida addresses the federal CWA responsibilities through programs implemented by DEP which are supplementarily funded by CWA §106 and §604 grants, along with some full-time positions and bioassessment monitoring funded by CWA §319 grants.

Rule 62-40.540, Florida Administrative Code (F.A.C.), Florida's Water Resource Implementation Rule, states that DEP

“. . . shall coordinate district, state agency, and local government water quality monitoring activities in order to improve data quality and reduce costs.” Some of the means DEP uses to achieve this are described in this document. Additionally, DEP has established the [Florida Water Resources Monitoring Council](#) to serve as a forum to coordinate other monitoring activities throughout the state.

Groundwater quality monitoring is also required under Florida law through a series of rules that govern DEP's activities. The Water Quality Assurance Act (Section 403.063, Florida Statutes [F.S.]) directs DEP to establish and maintain a groundwater quality monitoring network designed to detect or predict the contamination of the state's groundwater resources.

This document articulates the overall goals, objectives, strategy, and design of DEP's Integrated Water Resources Monitoring Network (IWRMN) to meet CWA and Florida's statutory and regulatory requirements. Under the CWA, states are required to determine whether waters meet applicable water quality standards (*i.e.*, attain their designated uses, or functional classifications); identify impaired waters; identify the causes and sources of water quality impairments; support the implementation of water management programs; establish, review, and revise water quality standards; establish special monitoring for unique resources; and support the evaluation of program effectiveness. Under Florida's statutes and rules, DEP is also required to carry out various types of monitoring, including groundwater monitoring, and to coordinate monitoring activities statewide.

The [IWRMN](#) was designed utilizing guidelines provided in the United States Environmental Protection Agency (EPA) document, [Elements of a State Water Monitoring and Assessment Program](#) (EPA 2003). These elements are as follows: monitoring program strategy, objectives,

design, indicators, quality assurance, data management, data analysis and assessment, reporting, programmatic evaluation, general support and infrastructure planning. This guidance is used by the EPA to determine if states are meeting the prerequisites of CWA §106(e)(1) by maintaining an adequate state monitoring and assessment program.

The IWRMN is based on three spatial 'tiers' ranging from statewide to site specific:

- **Tier I** addresses statewide and regional (within Florida) questions. It consists of a probabilistic monitoring network (the Status Network) and a fixed station network (the Trend Network), which are used to develop statistical estimates of statewide surface and groundwater quality and examine changes in water quality over time throughout the state.
- **Tier II** addresses basin-specific and waterbody-specific questions. Tier II efforts include monitoring to meet data sufficiency requirements for statewide waterbody assessments through the Strategic Monitoring Plan (SMP), and to monitor the success of restoration efforts to attain applicable water quality standards through the implementation of alternative restoration plans (ARPs), total maximum daily loads (TMDLs) and basin management action plans (BMAPs).
- **Tier III** addresses site-specific questions. It includes watershed monitoring plans for the development of TMDLs, monitoring to establish or revise water quality standards through reference site or other monitoring design, monitoring to develop site-specific alternative criteria (SSAC), and fifth-year inspections for wastewater facilities under the National Pollutant Discharge Elimination System (NPDES) Program.

This document articulates the goals, objectives, strategy, and design of DEP's water resource monitoring programs as they pertain to (1) meeting CWA requirements, (2) meeting Florida's statutory requirements, and (3) fulfilling Florida's commitment to protect and restore water resources by providing sound, scientific water quality monitoring. It is structured to describe how each of the three IWRMN monitoring Tiers address the 10 monitoring elements defined in the EPA 841-B-03-003.

Commonalities Across All Monitoring Tiers

Element 4: Core and Supplemental Water Quality Indicators

The water quality indicators collected are primarily those for which DEP has water quality standards, as listed in Chapter 62-302, F.A.C., or other narrative interpretations of impairment, as listed in Chapter 62-303, F.A.C. In some instances, supplemental indicators are used, *e.g.* when core parameters indicate water-quality impairment, but a pollutant cannot be identified, or as evidence to support the demonstration that exceedances are due to anthropogenic sources. Indicators may be physical/habitat, chemical/toxicological, and biological/ecological where appropriate and useful in assessing impairment, or may provide supporting data such as color, alkalinity, or specific conductance required for the numeric nutrient criteria (NNC) assessment type applicable for lakes. A list of core and supplemental analytes is contained in **Table 1**.

Table 1. Core and supplemental analytes that are sampled by DEAR programs.

Analyte Group	Analyte	Waterbody Type
Bacteria	<i>Escherichia coli</i>	Stream/Lake/Springs
Bacteria	Enterococci	Estuary/Coastal/Beaches
Bacteria	Fecal Coliform	Class II - Estuarine Waters Designated for Shellfish Harvesting and Propagation
Bioassessment	Stream Condition Index	Stream
Bioassessment	Rapid Periphyton Survey	Stream
Bioassessment	Linear Vegetation Survey	Stream
Bioassessment	Lake Vegetation Index	Lake
Molecular/Genetic Markers	BacR - Ruminant Specific Bacteroides	Any
Molecular/Genetic Markers	DG3 - Canine-Specific Bacteroides	Any
Molecular/Genetic Markers	HF183 - Human-Specific Bacteroides	Any
Molecular/Genetic Markers	COWM2 - Cow-Specific Bacteroides	Any
Molecular/Genetic Markers	HOF - Horse-Specific Bacteroides Bacteroides	Any
Chemical Tracers	Sucralose	Any
Chemical Tracers	Acesulfame K	Any
Chemical Tracers	Acetaminophen	Any
Chemical Tracers	Carbamazepine	Any

Analyte Group	Analyte	Waterbody Type
Chemical Tracers	Hydrocodone	Any
Chemical Tracers	Ibuprofen	Any
Chemical Tracers	Naproxen	Any
Chemical Tracers	Primidone	Any
Field Measurements	Dissolved Oxygen	Any
Field Measurements	pH	Any
Field Measurements	Specific Conductance	Any
Field Measurements	Water Temperature	Any
Metals	Antimony	Any
Metals	Arsenic	Any
Metals	Cadmium	Any
Metals	Chromium	Any
Metals	Copper	Any
Metals	Iron	Any
Metals	Lead	Any
Metals	Nickel	Any
Metals	Selenium	Any
Metals	Silver	Any
Metals	Thallium	Any
Metals	Zinc	Any
Nutrients	Chlorophyll <i>a</i>	Any
Nutrients	Nitrate-Nitrite	Any
Nutrients	Total Kjeldahl Nitrogen	Any
Nutrients	Total Nitrogen	Any
Nutrients	Total Phosphorus	Any
Nutrients	Orthophosphate	Any
Physical/Aggregate Properties	Alkalinity	Any
Physical/Aggregate Properties	Chloride	Any
Physical/Aggregate Properties	Color	Any
Physical/Aggregate Properties	Fluoride	Any
Physical/Aggregate Properties	Turbidity	Any
Pesticides/Herbicides	Beta BHC	Any
Pesticides/Herbicides	Chlorpyrifos	Any
Pesticides/Herbicides	Demeton	Any
Pesticides/Herbicides	Diazinon	Any
Pesticides/Herbicides	Lindane	Any
Pesticides/Herbicides	Malathion	Any
Pesticides/Herbicides	Methoxychlor	Any

Element 5: Quality Assurance

DEP's Quality Assurance (QA) requirements for sample collection, sample analysis, documentation and reporting are codified in the [QA Rule](#) (Chapter 62-160, F.A.C.) and in DEP's SOPs, which have been incorporated by reference into the QA Rule. DEAR field staff follow DEP SOPs for all sampling activities, including field-meter testing, sample collection, documentation, and quality control activities. All procedures and sampling forms are available on DEP's [SOP website](#) or [Bioassessment Training, Evaluation, and Quality Assurance website](#). DEAR Quality Assurance Project Plans (QAPP) are maintained by the individual monitoring programs and are available on the [DEP Quality Assurance Program Section 106 Funded-Activities Website](#) (DEP 2025a)

Field meters are verified for pH, specific conductance, and DO before each sampling trip, and calibrated if the verifications fail. Temperature verification is performed at least annually. All information regarding field collection, preservation, preservation checks, and staff performing the sampling is recorded on forms that contain required documentation items per DEP SOP FD 1000 (some example forms are available on the [DEP SOP Forms webpage](#)). All preservation, holding times, equipment, and collection materials follow the requirements in SOP FS 1000.

Sampling is scheduled in DEP's Laboratory Information Management System (LIMS). LIMS generates a unique request (RQ) number for the sampling, which is linked to each sample bottle requested for the event. LIMS generates sample submittal/chain of custody forms using the RQ information.

DEAR samplers receive sampling kits and necessary preservatives from the DEP Laboratory. Samples are returned to the DEP Laboratory for analysis, or, on occasion, sent to accredited overflow laboratories. The data are recorded and stored by unique location/date identifiers. All laboratory data are handled to ensure data integrity from field to laboratory to reporting. All samples are analyzed following [DEP Laboratory SOPs](#), which comply with all laboratory requirements of the QA Rule and The NELAC Institute (TNI) standards.

Lab Certification

The DEP Laboratory's Chemistry, Biology and Scientific Support Services Programs operate under the [DEP Laboratory's Quality Manual and Laboratory SOPs](#). Most of the DEP Laboratory's analytical capabilities and procedures are certified for TNI standards through Florida Department of Health (FDOH) Certification Number E31780. The Biology Program's laboratory capabilities not addressed by NELAP (National Environmental Laboratory Accreditation Program) are invertebrate and algal taxonomic identification, molecular fecal indicator identification, and algal growth potential.

DEAR Training

Field staff must obtain and maintain proficiency in all sampling methods used in the monitoring program. For water sampling and field testing, staff must attend a sampling training class based on the DEP SOPs and complete the DEAR Water Quality Sampling Training program. Sampling training may be either provided for a specific program (e.g., Status and Trends) or provided to cover DEP SOPs in general and taught by the Aquatic Ecology and Quality Assurance Section (AEQAS). Field staff must complete the checklists applicable to their sampling duties and pass a performance audit for each activity. Additionally, field staff must take and pass the SOP tests pertinent to their sampling, training and QA review duties, initially and once every 3 years as a refresher. For bioassessment tools developed by DEP, the Aquatic Ecology and Quality Assurance Section maintains an [Internet-based list of proficient samplers statewide](#). DEAR staff are included on the proficient samplers list if they pass the appropriate QA measures as described in SOPs associated with biological tools. **Table 2** lists the bioassessment training requirements and timelines; more detailed information and relevant SOPs are available on DEP's [Bioassessment Training, Evaluation, and Quality Assurance website](#). Safety, QA, and training require the presence of two or more sampling staff at all sampling events. Newly hired samplers are paired with proficient staff to ensure compliance with SOPs.

Table 2. Bioassessment training and proficiency requirements

Biological Measurement Tool	SOPs Containing Training and Proficiency Requirements	Testing Procedure
SCI	SCI 1200, SCI 1300	Online test of concepts and field audit every five years
Stream HA	FA 5720	Consistency demonstration of independent field assessment and online test of concepts every five years
LVI	LVI 1200	Consistency demonstration of independent field assessment every two years, online test of plant identification proficiency every two years
BioRecon	BRN 1200, BRN 1300	Online test of concepts and field audit every five years
Rapid Periphyton Survey	FA 5730	Online test of concepts every five years
Linear Vegetation Survey	FA 5740	Online test of concepts every five years

Element 6: Data Management

DEP Laboratory-generated analytical data and the associated field-measured parameters submitted on the chain of custody form are linked to the sampling event's RQ number and maintained in a Laboratory Information Management System (LIMS) database. Once all analytical results for a specific sampling event are authorized, the DEP Laboratory sends a certified analytical report to the customer. DEP Laboratory generated taxonomic data, associated field data, and calculated bioassessment metrics are maintained in the Statewide Biology Database (SBIO). DEP Laboratory staff enter taxonomic data and other DEP program staff enter the field generated data for the sampling event into SBIO. All data entry is verified for accuracy by a second staff member and then the data are authorized. General guidance for data entry into the LIMS or SBIO is provided in [Data Entry and Verification - SOP BG-01-1.25](#) (DEP 2025a).

Ambient water quality analytical results from the DEP LIMS and the associated field data are combined using a [Data Merge Tool \(DMT\) module](#) and loaded into the [Watershed Information Network \(WIN\) database](#). Specific guidance is provided in the document [Data Merge Tool Help Guide](#). Guidance for WIN uploads is provided in the [WIN User Manual](#). The WIN data loading process is ongoing throughout the year. Once data generators review and apply necessary corrections, the data are loaded annually into the EPA's [Water Quality Exchange \(WQX\)](#) database.

Element 10: General Support and Infrastructure

The success of a long-term monitoring program relies on continuous support and an established infrastructure. DEP has managed water quality monitoring networks since the 1970s and has considerable in-house expertise. DEAR has staff dedicated to data management and analysis, as well as a state-of-the-art laboratory to support the monitoring program needs. These positions, as well as the laboratory, are funded with a mix of funds from the Florida Legislature's General Appropriations Act and EPA. DEAR's organization structure is provided in **Figure 1**. DEAR currently is staffed with 241 employees: 189 full-time equivalent employees (FTEs), and 52 temporary Other Personnel Services (OPS) employees (**Fig. 2**). Thirty-two of these positions' salaries are funded through 106 grants (28 FTEs and 4 OPS).

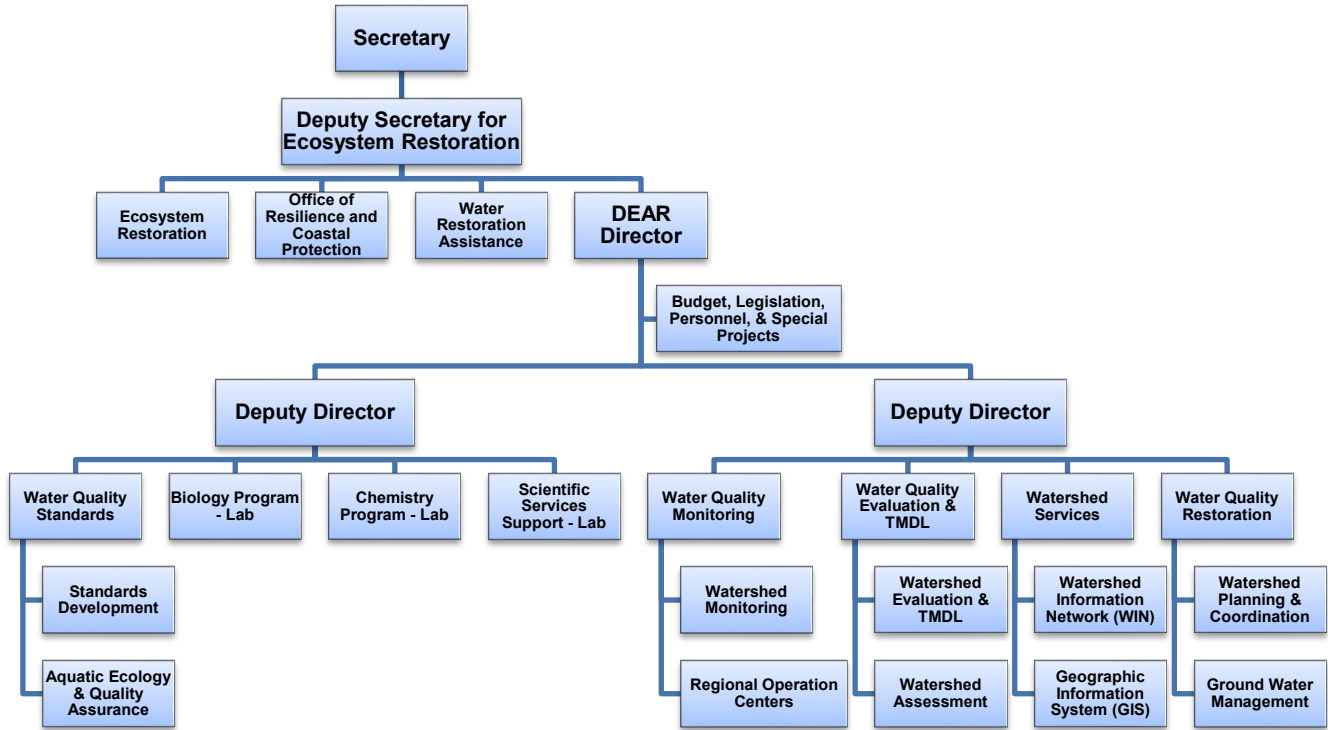


Figure 1. DEP Ecosystems Restoration Divisions and DEAR Organizational Structure

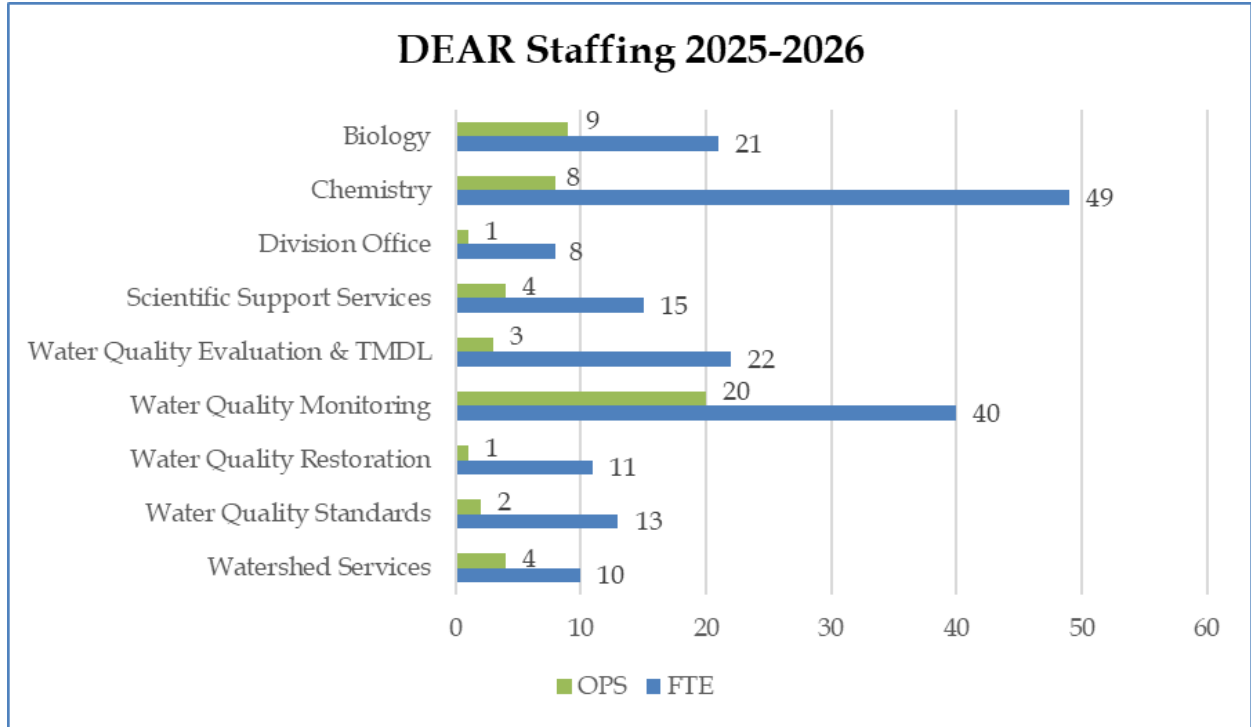


Figure 2. DEAR Staffing Distribution as of FY 25-26.

Budget Overview FY2025-2026

DEAR's operating budget varies from year to year. The operating budget for fiscal year (FY) 2025-26 (**Fig. 3**) is similar to the last fiscal year; however, there was a reduction of ten FTEs. DEAR's total budget for 2025-26 includes Fixed Capital Outlay (FCO) TMDL funding, appropriated from Water Protection and Sustainability Program Trust Fund. The division's total budget comes from Water Protection and Sustainability Program Trust Fund, Land Acquisition Trust Fund, Water Quality Assurance Trust Fund, Federal Grant Trust Fund, Solid Waste Trust fund, Internal Improvement Trust fund and Grants and Donation Trust Fund for FY 2025-26.

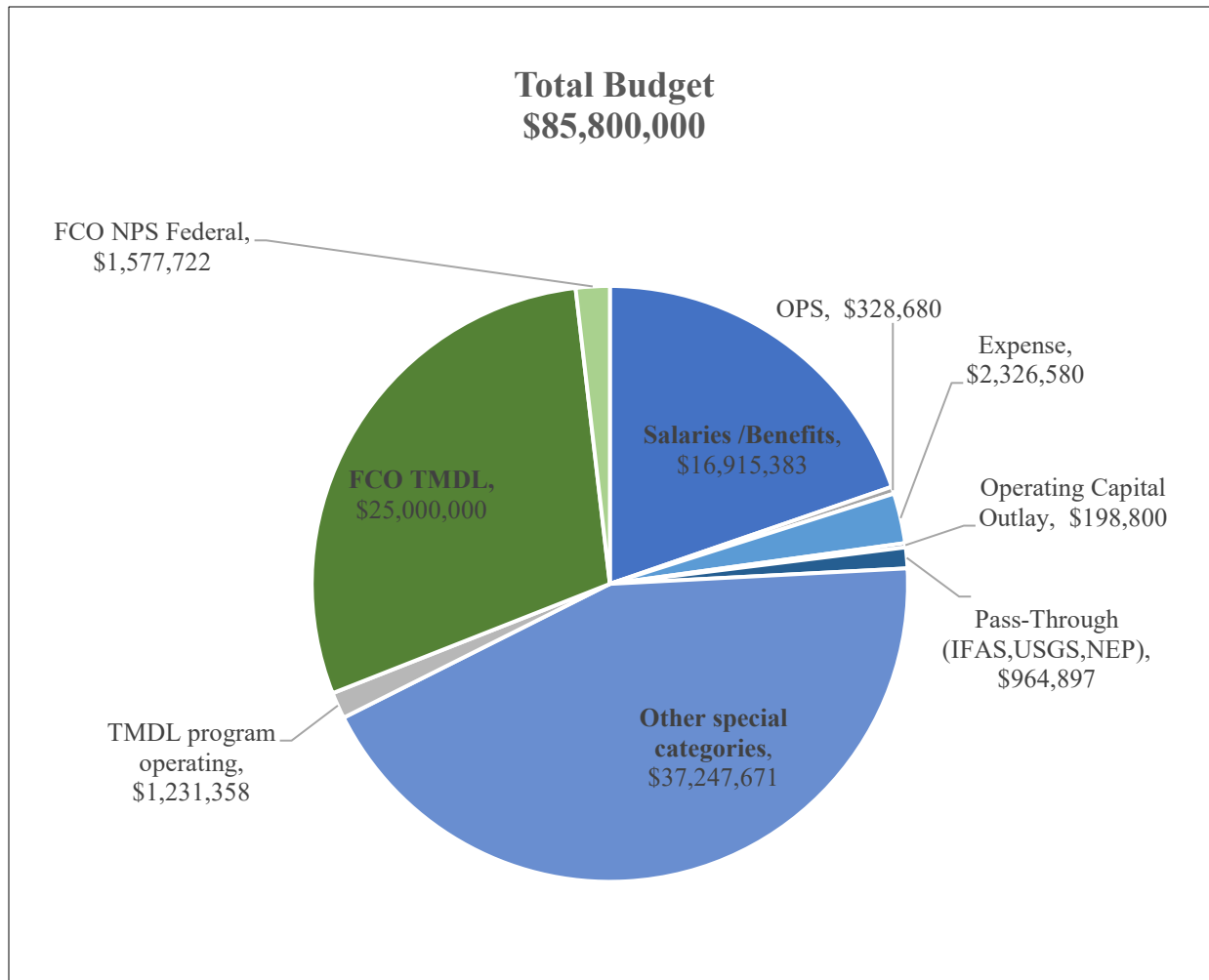


Figure 3. DEAR Budget, as of FY 2025-26.

— Salaries and benefits represent 20% of DEAR’s total budget and 29% of the operating budget.

- DEAR's operating budget includes nearly \$1 million directly transferred to other entities.
- DEAR's operating budget also includes \$37 million in special category funds. \$4 million supporting Environmental Assessment and Restoration Programs and Laboratory services for other divisions and outside entities, and \$33 million for the Florida Gulf Coast University for a water quality study.
- DEAR manages \$224 million in FCO funding to restore impaired waters by monitoring and assessing water quality, setting scientific water quality restoration goals, and guiding the implementation of the projects and actions set forth in adopted basin management action plans (BMAPs).
- The budget comprises 31% FCO and 69% operating funds.

62% of DEAR's total budget comes from Trust Funds and 38% from General Revenue.

Tier I Monitoring

DEP monitoring for the determination of statewide and regionwide water quality condition is implemented by the Water Quality Monitoring Program's Watershed Monitoring Section and is comprised of two monitoring networks, the Status and Trend Monitoring Networks. Data produced by these two monitoring networks fulfill CWA §305(b) reporting needs and complement CWA §303(d) reporting.

The Status Monitoring Network uses an EPA-designed probabilistic strategy to estimate, with known confidence, the general water quality of freshwater in Florida, including rivers, streams, canals, lakes and groundwater resources. DEP conducts annual sample surveys of each of the water resources. The results of the Status Monitoring Network are used to provide a statistically valid estimate of the overall health of Florida's waterbodies by waterbody type (*e.g.*, rivers, streams, lakes).

The Trend Monitoring Network consists of 78 flowing surface water stations (*e.g.*, rivers and streams) and 51 groundwater stations (49 wells and two springs) located throughout Florida that are sampled either monthly or quarterly. The data generated by this network are used to identify water quality changes over time (*i.e.*, trends).

Water quality and bioassessment sampling for these two monitoring networks is carried out by DEP Regional Operation Center staff and contractors. These networks were not designed to address regulatory or point source departmental monitoring needs; they are tools to help document the overall condition of state waters.

Elements of the Status and Trend Monitoring Program

The WMS maintains a design document for these monitoring networks which is updated annually. Each of the EPA 10 monitoring elements (EPA 2003) are addressed in this document.

Please refer to the [Watershed Monitoring Design Document](#) (DEP 2026a) for a complete description of the 10 monitoring elements associated with these monitoring networks.

Tier II Monitoring

Two DEP programs implement monitoring designs to address waterbody-specific and basin-specific water quality questions, the Water Quality Evaluation and TMDL Program and the Water Quality Restoration Program. These programs implement monitoring designs pursuant to Sections 403.067(2-4), F.S., which are to 1) provide sufficient data for determination of waterbody impairment, 2) supplement data necessary for the determination of TMDLs, and 3) measure success of basin-wide restoration efforts which complement CWA §305(b) reporting needs. Section 403.0675, F.S., requires DEP to annually report on the status of water quality protection and restoration actions to achieve TMDLs; BMAPs; alternative restoration plans (ARPs); minimum flows or minimum water levels (MFLs); and recovery or prevention strategies. The most recent Statewide Annual Report (STAR) is available at [Statewide Annual Report | Florida Department of Environmental Protection](#) (DEP 2025c).

Elements of the Strategic Monitoring Plan

Element 1: Monitoring Program Strategy

The WQETP's Watershed Assessment Section (WAS) annually develops and implements a Strategic Monitoring Plan (SMP) that targets monitoring activities for data and information that are used to assess the health of surface waterbodies through the implementation of the Identification of Impaired Surface Waters (IWR, Chapter 62-303, F.A.C.). The rule provides a legislatively authorized assessment methodology for DEP to assess water quality and bioassessments to determine whether individual surface waters are impaired (*i.e.*, do not attain applicable water quality standards) or not under ambient conditions. The IWR is used in conjunction with Florida's Surface Water Quality Standards (Chapter 62-302, F.A.C.) and Quality Assurance (Chapter 62-160, F.A.C.), which governs the sampling and analysis procedures. Water quality and bioassessment sampling for the annual SMP is primarily carried out by the Water Quality Monitoring Program's statewide and periodically by the Watershed Assessment Section for local waterbodies near Tallahassee.

Element 2: Monitoring Objectives

The goal of the SMP is to ensure that waterbody segments or assessment units that are identified by waterbody identification numbers (WBIDs) have sufficient data to be assessed using the IWR methodology. The primary focus of strategic monitoring is to collect sufficient data to verify whether potentially impaired waters are in fact impaired and, to the extent possible, determine the causative pollutant for waters listed as not meeting the applicable criteria for DO or

biological health. For a waterbody to be verified as impaired for the aquatic life-based water quality criteria assessment, the IWR requires a demonstration that 10% of the samples do not exceed the applicable water quality criteria in Chapter 62-302, F.A.C., using the binomial hypothesis test. Waterbodies with data that indicate a potential impairment are placed on a Planning List or Study List and targeted for future monitoring. Waters that need causative pollutant determinations may also require additional data collection and are included in the plans, as are waters with increasing nutrient trends, exceedances of nutrient thresholds that lack sufficient floral data, low DO or failed biological assessments, nutrient response variables, and decreasing DO trends.

Element 3: Monitoring Design

Florida's 52 United States Geological Survey (USGS) hydrologic unit code (HUC) basins are divided into 29 drainage basins that are distributed among the DEP's six regulatory districts. There are five basins in the Northwest, Central, Southwest, South, and Southeast Districts, and four basins in the Northeast District. In each basin, the waterbodies and waterbody segments are divided into assessment units identified as WBIDs that are unique hydrologic segments or drainage areas. WBIDs are intended to represent waterbodies or portions of waterbodies with homogenous water quality. A WBID can be a stream, estuary, spring, lake, beach, or coastal waterbody type. Representative sites within each WBID are selected and monitored following the procedures in Chapters 62-160 and 62-303, F.A.C.

Because of limited resources, monitoring is prioritized based on the EPA's Integrated Report water quality assessment categories for identifying data needs and the need for TMDL development, as follows:

- Waterbody indicates non-attainment of water quality standards, but the department does not have enough information to determine a causative pollutant; or current data show a potentially adverse trend in nutrients or nutrient response variables; or there are exceedances of stream nutrient thresholds, but the department does not have enough information to fully assess non-attainment of the stream nutrient standard. (Study List - Category 4d).
- Potentially impaired waters for which additional data are needed (Planning List - Category 3c and bacteria or nutrient Study List – Category 4d).
- Waters with insufficient data (Insufficient Data – Category 3b).
- Impaired waters that need additional information prior to TMDL development (Impaired – Category 5).
- Waters with no data (No Data – Category 3a).

Tracking for monitoring success in each individual WBID is carried out quarterly; this includes updates on monitoring success from each of the DEP sampling entities. The information is needed to refine and modify the SMP to ensure that the monitoring produces data that meet the QA objectives and are representative of ambient condition to perform reliable assessments and support TMDL development.

Element 4: Core and Supplemental Water Quality Indicators

The water quality indicators collected are consistent with this element as laid out in the **Commonalities Across All Monitoring Tiers**. In some instances, supplemental indicators are used, *e.g.* when core parameters indicate water quality impairment, but a pollutant cannot be identified. Indicators may be physical/habitat, chemical/toxicological, and biological/ecological where appropriate and useful in assessing impairment, or may provide supporting data such as color, alkalinity, or specific conductance to allow for the determination of the applicable lake assessment type (*e.g.*, low color, high-alkalinity lakes).

Element 5: Quality Assurance

In addition to the QA details laid out in the **Commonalities Across All Monitoring Tiers** and to execute the components of the DEP QA Directive, the Watershed Assessment Section has developed, and had approved, its own program-specific Quality Assurance Project Plan (QAPP). This plan and other 106 funded program's QAPPs are available on the [DEP Quality Assurance Program Section 106 Funded-Activities Website](#) (DEP 2025a).

Element 6: Data Management

The Watershed Assessment Section implements this element as laid out in the **Commonalities Across All Monitoring Tiers**. In addition, the SMP targets waterbodies for continuous monitoring for field parameters, such as dissolved oxygen which can be used in the IWR assessment. These data are loaded into AQUARIUS, a web-based data management software platform used to process, publish, and share continuous water information, by ROC staff and include a second staff member review process prior to being in an acceptance status for external use.

Element 7: Data Analysis/Assessment

Before chemical and physical data are assessed, they are first analyzed and undergo a number of quality checks. During this review process, errors are corrected, fatal data qualifiers are applied, and then all suitable data are utilized for assessment.

The Watershed Assessment Section compiles surface water data meeting QA requirements from multiple sources (WIN, US EPA Legacy Storage and Retrieval (STORET), Florida STORET, USGS National Water Data for the Nation (WDFN), SBIO, and biological data from external data providers) that are used in the implementation of the IWR. The water quality and bioassessment data used in the assessment process are processed through Statistical Analysis System (SAS) code, which then produces an output of results that are loaded into a Microsoft Access application to produce what is called the IWR Run database.

This database stores a preliminary summary of assessments and calculated results that are based on the data sufficiency. Those preliminary assessments are used to inform staff as to the attainment status and helps to identify more specific monitoring needs. The SMP is developed statewide, using the information gathered from the IWR Run database, usually in October. The SMP identifies the waterbodies and number of samples for each parameter needed to determine the attainment status using the IWR.

The process results in updates to waterbodies on previous Planning, Study, Delist, and Verified Lists, along with revisions to SMPs where indicated.

Element 8: Reporting

Assessment results in the form of a Master List (Excel worksheets) of all waterbodies and assessed parameters that are subdivided into the Planning, Study, and Verified Lists which are used for annual updates for specific basins, not only to determine which waterbodies are impaired, but also for the following:

- To assess the overall coverage of monitoring data.
- To identify data gaps for individual WBIDs.
- To track monitoring success throughout the year.
- To assess the health of surface waters.
- To track changes to the CWA §303(d) list.
- To evaluate the effectiveness and success of ARPs, TMDLs, and BMAPs over time.

Biennially the assessment results are loaded into the USEPA's Assessment and Total Maximum Daily Load Tracking and Implementation System (ATTAINS) database.

Element 9: Programmatic Evaluation

DEP provides for cross-program coordination within the agency through internal reviews of the annual SMP by its various divisions and programs. The watershed stakeholders in each basin are also an essential part of the monitoring process, and they provide critical input to refine and modify monitoring needs. This process helps support the CWA §303(d) requirements and state legislatively mandated evaluations to determine the best possible monitoring strategy for the WQETP.

Element 10: General Support and Infrastructure

The Watershed Assessment Section coordinates sampling needs between DEP headquarters and the ROCs. Staff are responsible for developing and tracking the annual SMP for the ROCs and ensuring that the data collected are loaded into WIN and / or SBIO and are assessed applying the IWR methodology. This is an ongoing, year-round process that requires constant communication between DEAR programs.

The Watershed Assessment Section current staffing resources include 12 full-time, state-funded positions: one position is Select Exempt Service, ten are Career Service and one is an OPS position.

Elements of the Basin Management Action Program Plan

Element 1: Monitoring Program Strategy

The DEP Water Quality Restoration Program (WQRP) is responsible for the development and implementation of Basin Management Action Plans (BMAPs). A BMAP is a framework for water quality restoration, containing local and state commitments to reduce pollutant loading through current and future projects and strategies. BMAPs contain a comprehensive set of solutions, such as permit limits on wastewater treatment facilities, urban and agricultural best management practices (BMPs), and conservation programs designed to implement pollutant reductions established through the implementation of a total maximum daily load (TMDL). These broad-based plans are developed with local stakeholders and rely on local input and commitment for development and successful implementation. BMAPs are adopted by DEP Secretarial Order and are legally enforceable. The Water Quality Restoration Program is responsible for water quality monitoring associated with BMAP implementation. The Water Quality Restoration Program implements monitoring to enhance the understanding of basin loads, identify areas with high nutrient concentrations, track water quality trends, and to evaluate the effectiveness of water quality restoration activities in watersheds and evaluate whether reasonable progress in pollutant load reductions is being achieved over time in BMAPs.

Element 2: Monitoring Objectives

Monitoring plans are intended to support the evaluation of water quality conditions and progress towards meeting the TMDL(s) and are included in each BMAP. The objectives of BMAP monitoring plans are to evaluate the success of each BMAP and provide information for potential future refinements.

Focused objectives are critical for a monitoring strategy to provide the information needed to evaluate implementation success. Since a BMAP is a phased process, each phase will have primary and secondary objectives. The primary objective will focus on water quality monitoring in the impaired waterbodies, achieving water quality targets, tracking trends in nutrient loads and concentrations and tracking biological responses to BMAP implementation. The secondary objective (research objectives) will focus on water quality parameters that can be used to provide additional information to support potential management strategies and future refinements of the BMAPs, and measuring the effectiveness of individual or collective projects. The monitoring strategy may be updated as necessary through revisions to BMAP documents and can be found on the [Basin Management Action Plan Documents](#) website (DEP, 2026b).

Element 3: Monitoring Design

The monitoring strategy is designed to achieve the primary objectives: to evaluate waterbody conditions in consideration of TMDLs. Representative surface water locations in watersheds, sub-watersheds and springs will be sampled for appropriate parameters at the appropriate interval to evaluate whether these waterbodies achieve the TMDL(s).

Monitoring design also considers achievement of secondary objectives. Secondary water quality parameters will be evaluated as appropriate to provide information that may be beneficial to understanding the causes or contributions of impairing pollutants. In springs areas, groundwater networks will be monitored to evaluate aquifer conditions. In the Northern Everglades and Estuaries Protection Program (NEEPP) BMAPs, a tiered system is used to provide water quality and flow data throughout the watershed, with Tier 1 as the highest priority stations representing inputs from subbasins and Tiers 2 and 3 representing upstream nutrient and flow contributions for regional planning efforts. Efforts are ongoing between Water Quality Restoration Program staff, water management districts (WMDs) and local governments to determine best available sites to monitor and available resources for monitoring.

Priority areas represent regions where pollutant inputs may have a more significant impact on water quality. In addition, the areas also often represent regions where BMAP initiatives, implemented with the purpose of reducing nutrient loading into the watershed or underlying aquifers, occur. Over time, the results of monitoring in the priority areas are expected to evaluate the success of the BMAP and provide information for potential future refinements.

The Water Quality Restoration Program works with regional and local entities to assist in monitoring efforts. Efforts include coordinating the location and frequency of sampling events. Coordination is also tied to the logistics of meeting all Quality Assurance/Quality Control (QA/QC) requirements, including the on-site preservation of samples, collection of field blanks, and adhering to chain of custody and holding time requirements.

More details about monitoring design for individual BMAPs can be found in the BMAP document for the specific waterbody of concern (DEP 2026b).

Element 4: Core and Supplemental Water Quality Indicators

The water quality indicators collected are primarily those for which DEP has water quality standards, as listed in Chapter 62-302, F.A.C., or other narrative interpretations of impairment, as listed in Chapter 62-303, F.A.C. BMAPs are implemented to restore waterbodies by reducing pollutants, thus the core and supplemental water quality indicators will vary depending on the waterbody being restored. Core and supplemental parameters are outlined within the individual BMAP documents. The core indicators are directly related to the parameters causing impairment. Supplemental indicators are monitored primarily to support the interpretation of core water quality parameters. Core parameters can include:

Springs – Total Nitrogen, Nitrate/Nitrite, Total Phosphorus

Surface Waters – Dissolved Oxygen, Chlorophyll *a*, Total Phosphorus, Total Nitrogen, Fecal Indicator Bacteria

Estuarine Waters – Dissolved Oxygen, Chlorophyll *a*, Total Phosphorus, Total Nitrogen, Fecal Indicator Bacteria, and Depth and extent of seagrass (*e.g.*, Indian River Lagoon [IRL])

Element 5: Quality Assurance

Through cooperation on TMDL-related data collection, DEP and stakeholders have consistently used similar standard operating procedures (SOPs) for field sampling and lab analyses. This consistency will continue to ensure that data can be used not only for tracking BMAP progress but also for future TMDL evaluations and other purposes. DEP's QA requirements for sample collection, sample analysis, documentation, and reporting are codified in the [QA Rule](#) (Chapter 62-160, F.A.C.) and in DEP's SOPs, which have been incorporated by reference into the QA Rule. All information regarding field collection, preservation, preservation checks, and staff performing the sampling is recorded on forms that contain required documentation items per DEP SOP FD 1000 (some example forms are available on the [DEP SOP Forms webpage](#)) . All

preservation, holding times, equipment, and collection materials follow the requirements in SOP FS 1000. All stakeholders contributing data in support of BMAPs agree to follow these SOPs.

Element 6: Data Management

Data collected as part of monitoring plans are tracked, compiled, and analyzed to be used in support of the BMAP. The Watershed Information Network (WIN) database serves as the primary resource for storing ambient water quality data and providing access for all stakeholders, in accordance with Rule 62-40.540, F.A.C. The Florida STOrage and RETrieval (STORET) Database serves as the primary repository of ambient water quality data for BMAP water quality data collected prior to the initiation of the WIN database in 2017. Currently, and since 2017, after the appropriate QA/QC checks are performed the water quality data collected to meet the BMAP's primary objectives are loaded into WIN. All applicable data collected by the entities responsible for monitoring will be uploaded to WIN regularly, but at least quarterly. Refer to commonalities section for WIN database management

WIN uploads are only appropriate for data that represent ambient conditions. Other data will be maintained by the entity that collected the samples. Stakeholders agree to provide these data to other BMAP partners upon request and when appropriate for inclusion in BMAP data analyses and adaptive management evaluations.

Element 7: Data Analysis/Assessment

Data generated as part of the monitoring plans are used to track BMAP progress toward achieving the TMDLs. Data supports essential analyses for BMAP implementation, such as the spring vent nutrient analyses to determine required reductions, Indian River Lagoon seagrass 2-step compliance analysis, and NEEPP Targeted Restoration Area (TRA) analysis. Other examples of applications to support targeted restoration activities and prioritize resources include hot spot analysis and groundwater evaluation trend.

Additionally, BMAP monitoring networks' data may be used to support the development, or refinement, of the Water Quality Restoration Program water quality models designed for the establishment of pollutant reductions, etc.

Element 8: Reporting

The Water Quality Restoration Program reports updates to the monitoring network and results in BMAP updates and the BMAP StoryMaps (DEP 2026b). Additionally, monitoring updates may be included in annual meetings or periodic reports as appropriate. For NEEPP, WQRP and the Coordinating Agencies (South Florida Water Management District [SFWMD] and Florida Department of Agriculture and Consumer Services [DACS]) include information about

monitoring and various watershed assessments through 5-Year Reviews, subbasin water quality assessments, and SFWMD's annual South Florida Environmental Report. Reporting can also be completed by Water Management Districts (WMDs) or other partner agencies, such as the reports presented at the IRL National Estuary Program quarterly meetings.

The above-mentioned reports contain evaluations of the BMAP-related monitoring activities. Corresponding data are presented in graphic or tabular form, including a display of the results of any statistical analysis applied to the datasets gathered. The reports and related data are made available for public review. Data may be excluded from analysis due to data quality qualifiers or period of record considerations.

Element 9: Programmatic Evaluation

Water Quality Restoration Program staff communicate regularly with stakeholders regarding monitoring activities and the results of monitoring. Input regarding monitoring strategies is encouraged.

One aspect of program evaluation is adaptive management. It involves setting up a mechanism for adjusting the BMAP, including its monitoring activities when circumstances change or feedback indicates the need for a more effective strategy. Key components of adaptive management to share information and expertise are tracking plan implementation, monitoring water quality and pollutant loads, and holding periodic meetings. Adaptive management measures include the following:

- Procedures to determine whether additional monitoring strategies are needed,
- Criteria/processes for determining whether and when plan components need revision due to changes in costs, environmental impacts, social effects, watershed conditions, or other factors,
- Descriptions of the stakeholders' role after BMAP completion; and
- The development of additional priority areas for BMAP implementation and the continued evaluation of existing ones.

BMAP implementation is a long-term process. Some projects will extend beyond the first five years of the BMAP. DEP and the stakeholders will track implementation efforts and monitor water quality to measure effectiveness and ensure BMAP compliance. The DEP and the stakeholders meet at least every 12 months to discuss implementation issues, consider new information, and, if the watershed is not projected to meet the TMDL(s), determine additional corrective actions. Project implementation as well as program and activity status is collected annually from the participating entities. The stakeholders will review these reports to assess progress towards meeting the BMAP's goal.

Element 10: General Support and Infrastructure

The Water Quality Restoration Program assists in coordinating sampling needs among Regional Operation Centers and stakeholders. Water Quality Restoration Program staff are responsible for developing monitoring plans, tracking restoration success of the monitoring goals and working with stakeholders to ensure their applicable data are loaded into WIN. These activities require regular communication with stakeholders, along with the Water Quality Evaluation and TMDL Program (WQETP), who are responsible for determining if TMDL goals are met, and the Water Quality Monitoring and Watershed Data Services Programs, responsible for DEP sampling and data services. Refer to commonalities section for additional general support and infrastructure information.

Tier III Monitoring

Three DEP programs implement monitoring designs to address site-specific water quality questions. They are the Water Quality Standards Program (WQSP), the Water Quality Evaluation and TMDL Program, and the Biology Program. These programs implement monitoring designs to 1) conduct watershed monitoring plans for TMDL development and implementation, 2) establish or revise water quality standards, 3) develop and evaluate site-specific alternative criteria (SSAC), and 4) perform fifth-year inspections for wastewater facilities under the National Pollutant Discharge Elimination System (NPDES) Program.

Elements of the Monitoring Plan for TMDL Development

Element 1: Monitoring Program Strategy

The Water Quality Evaluation and TMDL Program's Watershed Evaluation and TMDL Section is responsible for water quality monitoring associated with the development of TMDLs. Sediment oxygen demand (SOD), sediment nutrient flux, and occasional stormwater outfall sampling are conducted to further this goal. Waterbodies scheduled for TMDL development are also coordinated for sampling through Water Quality Monitoring Program's Regional Operation Centers to meet data sufficiency requirements beyond the minimum required to support IWR assessments.

In the context of developing TMDLs, SOD and sediment nutrient flux sampling are designed and carried out to efficiently constrain the rates of sediment oxygen demand, as well as the release or uptake of nutrients from the sediment for input into water quality models, as these data are often unavailable and not part of routine ROC sampling.

Stormwater outfall monitoring is conducted for similar reasons, that is, this type of data collection is not part of routine ROC sampling. Stormwater sampling is conducted when a waterbody has direct stormwater inflows so that Watershed Evaluation and TMDL Section staff are able to acquire the quality and quantity of the effluent which can be measured to estimate longer-term pollutant loading originating from the watershed to the receiving waterbody targeted for TMDL development.

Additional monitoring from the ROCs begins by looking at the [Verified List of Impaired Waters](#) (DEP 2025d). This list of waters is evaluated consistent with the Priority Framework Document

as described in the [TMDL Prioritization 2.0](#) process (DEP, 2025e). The approach to prioritizing development of TMDLs assigns priorities based on:

- Waterbody type (*i.e.*, spring, stream, lake, estuary)
- Targeting high priority impairments (nutrients and chlorophyll *a*, heavy metals, and/or bacteria).
- Exclusion of waters that do not meet TMDL-specific data requirements.
- Applying a rank to the severity of estuary impairments according to established procedures.

The waters that do not meet TMDL data sufficiency requirements may be added to the list of waters for Regional Operation Center sampling. The parameters sampled as part of these efforts vary depending on the parameter(s) being targeted and may utilize existing stations or require the establishment of new ones in order to characterize the system.

Overall, these TMDL-specific monitoring schemes allow DEAR to:

Communicate effectively with local governments, water management districts (WMDs), environmental interest groups, consulting companies, and other sources of information to understand the targeted impaired systems; collect data needed for TMDL development; fill data gaps; and solicit special studies on the targeted system. This will ensure that the designed watershed monitoring plans focus on the questions needed to be answered by the TMDL and that local stakeholders' concerns are addressed through the TMDL development processes.

By utilizing the existing monitoring networks, the Watershed Evaluation and TMDL Section staff supplement these monitoring networks with extra sampling sites or increased frequency to answer TMDL-specific questions.

Element 2: Monitoring Objectives

SOD and sediment nutrient flux sampling are conducted to gather data regarding the rates of oxygen consumption and nutrient release from the sediment. These rates are often only estimated or derived from literature for TMDL development and other modeling purposes; however, there is significant variation between waterbodies, throughout the year due to weather and seasonality, and even within individual water bodies. Constraining these rates allows for a more robust model, as well as a more accurate inventory of anthropogenic loading, which is essential for an informed restoration strategy. Stormwater outfall monitoring is conducted for similar reasons – the rates of input to a waterbody as well as the nutrient makeup of the effluent are typically unknown, and when combined with other factors that are often unknown, this makes it difficult

to assign residuals of a nutrient or water balance to a specific source or sink. The information gathered by conducting SOD, sediment nutrient flux, and stormwater outfall monitoring help to establish proper water quality targets and allows the creation of watershed and waterbody models to determine the maximum allowable loads of the pollutants that will restore impaired waters and protect designated uses.

Typically, a greater quantity of data is required to develop a TMDL than is needed for the IWR assessment. In some cases, once a waterbody is added to the Verified List sampling of that water is reduced in frequency or ended entirely, which leaves the Watershed Evaluation and TMDL Section staff with insufficient data or data that may not represent current conditions in the water. Additional monitoring requested by Watershed Evaluation and TMDL Section staff to the ROCs allows the section to gather additional data to calculate additional annual geometric (or arithmetic, depending on the expression of the NNC and model chosen) means.

The objectives of supplemental TMDL monitoring, SOD/sediment nutrient flux, and stormwater outfall monitoring include the following:

1. Help develop the water quality targets for TMDLs.
2. Provide needed data to support detailed statistical and/or mechanistic modeling.
3. Identify seasonal patterns of causative pollutants and responding biological factors, examine the stressor-response relationship, and characterize the critical conditions for TMDL development.
4. Test important modeling hypotheses, such as for the existence of internal pollutant loading within the impaired waters, nitrogen fixation, or significant groundwater input.
5. Obtain an understanding of the general characteristics of the impaired system, including the land use types in the watershed, receiving water morphology, hydrology, hydrodynamics, and water quality dynamics, the relationship between the impaired water and other hydrologically connected waterbodies, best management practices implemented, and other aspects of its watershed that may impact water quality.

Element 3: Monitoring Design

Water Quality Evaluation and TMDL Program staff carry out a preliminary evaluation on impaired systems to determine the approaches appropriate for TMDL development. Existing data in Florida STORET, WIN, the IWR database, and other databases readily available to DEP are

used for evaluating data sufficiency for TMDL development; identifying the diel, seasonal, and long-term temporal dynamics and spatial patterns of pollutants and responding biological factors; and generating reasonable hypotheses on possible causative pollutants and the stressor-response relationship.

Geographic information system (GIS) datasets, such as watershed land use, digital elevation model, soil types and distribution, drainage basin delineation, National Hydrography Dataset (NHD) or more recently Florida Hydrography Dataset (FHD), distributions of on-site sewage treatment systems, sewer line coverage, and point source locations, hydrology, meteorological, and water quality data networks are also analyzed to gain general understanding of the impaired systems. These preliminary analyses help Water Quality Evaluation and TMDL Program staff identify key TMDL questions to be answered and possible data gaps that need to be filled to answer these questions. Water Quality Evaluation and TMDL Program staff members may then contact resources located near the waterbody to be studied to assist in finding supplementary information that may assist in TMDL development.

SOD/sediment nutrient flux sampling plans begin by looking at the waterbody in order to determine the best location for sampling sites, considering the best way to get a representative picture of the waterbody, accessibility by boat, and amount of time needed to process the sediment cores to meet holding time requirements for samples. SOPs for these sampling events have been adapted by the Watershed Evaluation and TMDL Section's QA Officer in order to meet the needs of the section. SOD/sediment nutrient flux surveys involve the collection of sediment cores; some are reserved for SOD incubation, while others are sliced at regular intervals within a nitrogen-filled chamber to be processed for porewater analysis of nitrate-nitrite, phosphate, ammonia, chloride, and sulfate. Sliced cores are also used to determine grain size distribution in order to calculate release or uptake of nutrients from sediment.

Outfall monitoring is designed to characterize the loading to specific waters and is therefore more limited in the spatial scale required. Additionally, weather plays a role in the design of outfall monitoring plans. If there has not been any rain recently, there will not be any effluent to measure. If it has recently rained after a long dry period, it is likely that nutrient concentrations would be higher than average conditions due to a long period of buildup prior to precipitation. For this reason, outfall monitoring is typically conducted during a period where rainfall patterns have been reasonably consistent.

Supplemental sampling requested by Watershed Evaluation and TMDL Section staff to the ROCs is done for the purpose of acquiring sufficient data to develop a TMDL beyond what may be collected for assessment. These studies are designed in order to sufficiently characterize the waterbody while maintaining a reasonable workload for ROC staff, which means considering the geographic distribution of sampling stations. Large lakes, waterbodies with canals or tributaries, and streams often require multiple sampling sites to acquire sufficient spatial variability of the

waterbody or waterbody segments. In order to calculate a mean annual value of nutrients and other parameters relevant to TMDLs, 4 samples with at least one in the wet season (May – October) and one in the dry season (other months of the year) are required. For this reason, TMDL requested monitoring typically prescribes the minimum number of samples to meet data sufficiency requirements in order to maximize the number of waters that may be sampled while ensuring data sufficiency needs are met. Data gathered for these supplemental studies may include bioassessments (*i.e.*, HA, LVS, RPS, LVI, SCI), as well as some or all of the parameters from **Table 1**.

Element 4: Core and Supplemental Water Quality Indicators

The water quality indicators collected are consistent with this element as laid out in the **Commonalities Across All Monitoring Tiers**. In some instances, supplemental indicators are used, for example, when core parameters indicate water quality impairment, but a pollutant cannot be identified. Indicators may be physical/habitat, chemical/toxicological, and biological/ecological where appropriate and useful in assessing impairment, or may provide supporting data such as color, alkalinity, or specific conductance to allow for the determination of the applicable lake assessment type (*e.g.*, low color, high-alkalinity lakes).

Element 5: Quality Assurance

In addition to the QA details laid out in **Commonalities Across All Monitoring Tiers** and to execute the components of the DEP QA Directive, the Watershed Evaluation and TMDL Section has developed, and had approved, its own program-specific QAPP (DEP, 2025a).

Element 6: Data Management

The Watershed Evaluation and TMDL Section implements this element as laid out in the **Commonalities Across All Monitoring Tiers**. Section staff also use a locally accessible electronic data system for recording and storing water quality information. SOD and sediment nutrient flux data, results of stormwater outfall monitoring, and model files are not entered into WIN, but are available on request.

Element 7: Data Analysis/Assessment

Watershed Evaluation and TMDL Section staff compile summary reports of all SOD and stormwater outfall surveys, including maps, detailed site descriptions, sampling frequencies, parameter lists, lab results, and calculated rates of SOD and sediment nutrient flux. Data from the surveys are used to establish water quality targets, identify possible sources of pollutants, test hypotheses on the impact of pollutants on the impaired systems, and fill the data gaps for water quality and watershed models to develop TMDLs for individual waterbodies. The section staff

primary function within DEAR is the development of TMDLs and this is accomplished through the production of draft versions of TMDL reports, presentations, and by holding public meetings to share technical aspects of the TMDL development process and incorporation of public comments periods for public input.

These reports contain a more detailed evaluation of the watershed in which the monitoring plans was conducted. The data are presented in graphic or tabular form, including a display of the results of any parametric or nonparametric tools applied to the datasets gathered. Data collected through a survey may also be included as parameters and input data for watershed and receiving water models or fill the data needs for model calibration and validation. These data, together with the calibrated model sets, are also available for public review. If any data are rejected, they must be identified, and a rationale for the rejection of the data must be provided.

Data collected as part of routine monitoring by ROC are stored in WIN and are available in IWR Run databases.

Element 8: Reporting

While shared with other groups in DEP, the Watershed Evaluation and TMDL Section's SOD/sediment nutrient flux and stormwater outfall monitoring datasets are not directly used for CWA § 303(d) list or Verified List purposes or for 305(b) reporting requirements; however, these datasets are valuable input datasets used in model development and contribute to guiding future restoration approaches and priorities. The data gathered provide very detailed information about a limited area for a brief period (*e.g.*, one to four days). While these datasets are very useful for TMDL-specific questions, the data are generally consolidated for reporting purposes, as the quantity of data gathered in these surveys should not be overweighted in evaluating a waterbody's water quality over the long term. Upon the completion of the TMDL evaluation, a final report is prepared and submitted to the EPA for review, and all underlying data and information are made available.

Element 9: Programmatic Evaluation

DEP, in consultation with the EPA, provides a review of each aspect of its monitoring program to determine how well the program serves its water quality decision needs for state waters. The EPA and DEP's QA plans and audits are used in evaluating the monitoring program to determine how well each of the elements is addressed and how to incorporate needed changes and additions into future monitoring cycles.

Watershed Evaluation and TMDL Section staff communicate regularly with EPA Region 4 staff in Atlanta on issues relating to gathering water quality data.

At the state level, program implementation, reviewed most often at the section level, is closely orchestrated among project managers, their staff, the DEP Laboratory, data manager, and data analysts. Project managers in the section work closely with the section's QA officer, who conducts field sampling audits and responds to procedural issues. The audits are performed to ensure compliance with EPA, DEP, and internal section requirements. As the section uses different monitoring tools and techniques than other groups in DEP, it prepares its own QA manual materials, which are then reviewed by staff charged with conducting QA reviews for the DEAR.

Element 10: General Support and Infrastructure

The Watershed Evaluation and TMDL Section coordinates sampling needs between DEP headquarters and the ROCs. Staff are responsible for developing and tracking sampling results with the ROCs and ensuring that the data collected are loaded into WIN and / or SBIO and are assessed applying the IWR methodology. This is an ongoing, year-round process that requires constant communication between DEAR programs.

The Watershed Evaluation and TMDL Section current staffing resources include two full-time federally funded positions, seven full-time, state-funded positions: one position is Select Exempt Service, seven are Career Service and one is an OPS position.

Elements of the Water Quality Standards Program

Element 1: Monitoring Program Strategy

The Water Quality Standards Program is responsible for the development and maintenance of surface water quality standards (Chapters 62-302, 62-303, and Rules 62-4.242, 62-4.243, 62-4.244, and 62-4.246, F.A.C.), maintenance and implementation of DEP's QA Program and QA Rule (Chapter 62-160, F.A.C.), and implementation of DEP's biological assessment (bioassessment) programs. It provides a wide variety of technical support by conducting environmental studies and analyses, data interpretation and usability analyses, training, and audits of internal and external staff. Additional information about the program's roles is available on the [Water Quality Standards webpage](#), [Bioassessment Program webpage](#) and the [Quality Assurance webpage](#). Approximately every three years, the Water Quality Standards Program conducts a review of the state's water quality standards. Depending on the standards issues needing attention, a comprehensive monitoring strategy may be developed to address applicable state waters, which could include streams, rivers, lakes, reservoirs, springs, estuaries, coastal areas, and wetlands. The state may also receive petitions for site specific alternative criteria

(SSAC), designated use reclassifications, or Outstanding Florida Water (OFW) designations. In these cases, site-specific monitoring is conducted by the petitioner, in conjunction with the Water Quality Standards Program, to generate the required physical, chemical, biological, and habitat data, as applicable. The program routinely conducts water quality and bioassessment sampling at reference lakes and streams as part of DEP's efforts to understand the condition of minimally disturbed waters in Florida.

Element 2: Monitoring Objectives

Consistent with Section 303(c) of the CWA, Water Quality Standards Program monitoring objectives involve establishing, reviewing, and revising water quality standards relevant to all types of waters, including streams, rivers, lakes, reservoirs, springs, estuaries, coastal areas, and wetlands. These objectives answer the following questions:

What level of protection is needed to maintain waterbody designated uses? The Water Quality Standards Program establishes the level of protection that other DEP programs monitor for when determining the achievement of designated uses. It uses data from internal and external monitoring programs to conduct Triennial Reviews of state water quality standards, conduct reclassification reviews and use attainability analyses, develop and adopt revised designated uses and water quality criteria, and process petitions for Outstanding Florida Waters (OFWs). Additionally, the Water Quality Standards Program develops bioassessment tools to quantitatively establish the level of protection required to maintain healthy, well-balanced aquatic communities.

What areas need additional protection? The Water Quality Standards Program has established bioassessment tools used to identify waters of exceptional quality so that these waters are targeted for additional protection. Additionally, the W Water Quality Standards Program evaluates petitions for OFW designations, which provide additional protection through the permitting program.

What are the causes of impairment? The Water Quality Standards Program collects physical, chemical, and biological data that help identify the causes and sources of impairment, including for stream or lake stressor identification.

Element 3: Monitoring Program Design

As discussed above, studies are designed to answer a wide variety of environmental questions, and therefore each study contains specific elements or objectives best suited for answering the question at hand. Studies could involve judgment sampling (sampling sites across a human disturbance gradient or sampling for a before-after-control-impact design), probabilistic

sampling (selecting sites randomly along a stratified-random gradient), or targeted site-specific sampling to answer specific environmental questions.

The Water Quality Standards Program collects its own data, if needed, and uses data collected by other groups. The program's data collection efforts are driven by project needs, including water quality standards development, bioassessment method development, and responses to questions and issues that arise throughout DEP. Section 6 of the [Water Quality Standards Program Quality Plan](#) (DEP 2025f) describes typical study designs that are used to answer various questions. The most typical sampling conducted by the Water Quality Standards Program consists of surface water, stream and river habitat, SCI, LVI, and other biological measurements described in [SOPs FS 7000, BRN 1000, SCI 1000, and LVI 1000](#) (DEP 2023a). Studies conducted for alternative criteria development may have specific requirements. Type III SSAC development must follow the study design concepts in the document [Development of Type III Site Specific Alternative Criteria \(SSAC\) for Nutrients](#) (DEP 2011a).

Element 4: Core and Supplemental Water Quality Indicators

The core and supplemental water quality indicators are chosen according to their relevance in informing the decision at hand and range from collection of routine measurements of metered parameters, collection of samples for nutrients, chlorophyll, biological health, turbidity, color, ions, and bacteria, to the collection of metals, tracers (*e.g.*, sucralose), and priority pollutants. The most commonly sampled water quality indicators are found in **Table 1**.

Element 5: Quality Assurance

DEP's QA requirements for analytical laboratories and field activities are codified in the [QA Rule](#) (Chapter 62-160, F.A.C.) and in DEP's SOPs, which have been incorporated by reference into the QA Rule.

Data Review, Validation, and Verification

The Water Quality Standards Program reviews data to determine its usability for water quality standards development and for determination of compliance with permits or rules. The data review procedures are based on the established Data Quality Objectives and Data Quality Indicators discussed in Section 8 of the [Water Quality Standards Program Quality Plan](#) (DEP 2025f), which incorporates the concepts and criteria found in the DEP document, [Process for Assessing Data Usability](#) (DEP 2008). Rule 62-160.800, F.A.C., requires that data be reported with data qualifier codes that provide information about analytical detection status and quality control issues. The program conducts these activities using a "team approach," which provides for multiple staff and management reviewers to ensure the accuracy and defensibility of any decisions associated with the data.

If data quality is in question for data generated in-house, the results and sampling circumstances are evaluated to determine the potential cause for the aberration. If an analyte is detected in both the sample and the associated field blank, equipment blank, or trip blank and the value was greater than 10% of the associated sample value, then the associated sample is given a “G” qualifier. “G” qualified data are not used if their value is less than ten times the blank detection. If a sample result was an outlier based on expectations for a given site, but no QC measure failed and no errors can be found with the lab or field crew, the data are retained in the dataset. If data quality or consistency is in question for data generated by another party, the Water Quality Standards Program requests QC records from that party or coordinates a lab or field audit or comparison study, in which replicate samples are collected and analyzed by DEP and the other party to determine the comparability of results. QA staff in the Aquatic Ecology and Quality Assurance Section conduct these investigations in conjunction with other relevant program staff.

The Water Quality Standards Program evaluates adherence to DEP’s QA Rule and SOPs before using data collected by external entities for water quality standards development. The Aquatic Ecology and Quality Assurance Section maintains the [Process for Assessing Data Usability](#) (DEP 2008) document that provides guidance for determining the usability of water quality data for DEP purposes. The principles characterized in the document draw an overall conclusion concerning the usability of the dataset with respect to the project objectives. Evaluating the Data Quality Indicators helps determine the usability of the analytical data and thus the defensibility of the data for DEP. The approach and handling of data are represented in Section 8 of the [Water Quality Standards Program Quality Plan](#) (DEP 2025f). Guidance for the usability of bioassessment data is drawn from the DEP SOPs, the [SCI Primer](#) (DEP 2011b), the [LVI Primer](#) (DEP 2011c), and the [Implementation of Florida’s Numeric Nutrient Criteria for Streams](#) (DEP 2025g).

Data Collection

The Water Quality Standards Program follows DEP SOPs for all sampling activities, including field-meter testing, sample collection, and documentation. All procedures listed below are available on DEP SOP website or [Bioassessment Training, Evaluation, and Quality Assurance website](#). Surface water sampling follows SOP FS 2100 and biological community and habitat sampling follow SOP FS 7000, SCI 1000, BRN 1000, LVI 1000, and FT 3000. The program follows SOP FD 1000 for documentation requirements for field sampling activities, and SOP FQ 1000 for QC requirements, including a required field blank frequency of at least 5%. The WQSP follows the field instrument calibration and verification procedures in FT 1000 through FT 1700. Meters are verified for pH, specific conductance, and DO before each sampling trip, and calibrated if the verifications fail. Temperature verification is performed at least annually. For bioassessment, program samplers also follow guidelines described in the [SCI Primer](#) (DEP 2011b) and [LVI Primer](#) (DEP 2011c). All field sampling forms used by the WQSP are located on the [SOP Forms website](#) (DEP 2023b).

The Water Quality Standards Program obtains sampling kits and necessary preservatives from, and sends all samples for analysis to, the DEP Laboratory. Therefore, all samples are analyzed with consistent procedures that follow Laboratory standards, which comply with all laboratory requirements of the QA Rule. All information regarding field collection, preservation, preservation checks, and staff performing the sampling is recorded on FDEP Form FD 9000-03, Physical/Chemical Characterization field Sheet (available on the SOP Forms website) to fulfill the documentation requirements of the QA Rule. All preservation, holding times, equipment, and collection materials follow the requirements in SOP FS 1000. Water Quality Standards Program staff maintain a field meter, which is sent to the manufacturer if major maintenance is needed. Calibrations, verifications, and routine maintenance are documented in a logbook, and all documentation requirements of FD 1000 are met. Water Quality Standards Program sends all samples to the DEP Laboratory for analysis.

Staff must maintain [proficiency](#) in all sampling methods used in the Water Quality Standards Program monitoring program. For water sampling and field testing, staff must attend a DEP SOP training (offered at University of Florida's Center for Training, Research and Education for Environmental Occupations [TREEO] or internal course offering for DEP staff) and complete the DEAR Water Quality Sampling Training. For bioassessment sampling, staff must complete [bioassessment training](#) and proficiency demonstrations as described in **Table 2**.

The Water Quality Standards Program QA Officer ensures that corrective actions are implemented for data nonconformance incidents, as determined by evaluation of the data against the program's DQOs. The Corrective Action Procedures include determining the root cause of the issue and ensuring that additional training or testing is implemented if needed.

QA Assessment and Oversight

The Water Quality Standards Program houses the QA group for DEP (for all DEP programs except air), and it performs audits at various levels ranging from internal section audits and audits of other DEP entities to audits of external entities. Program audits and performance audits are carried out on an as-needed basis. The [Water Quality Standards Program Quality Plan](#) (DEP 2025f) describes various audits conducted by program staff. Those include internal section sampling performance audits, field audits to demonstrate proficiency in statewide bioassessment methods, and program or project audits for internal and external entities on a project-specific basis. The program maintains and uses audit checklists available on its [Data Review and Audits webpage](#) (DEP 2024). The program then compiles the audit reports, which can be accessed on the Audit Search webpage.

The Water Quality Standards Program prepares an annual QA Report to the DEP Secretary, the first of which was submitted in February 2012, and posts the report on its main [QA webpage](#). This annual report is a compilation of the types and outcomes of QA activities conducted throughout the year in all DEP programs except the Division of Air Resource Management.

Section 12 of the [WOSP Quality Plan](#) (DEP 2025f) describes the contents and purpose of this report.

The Aquatic Ecology Quality Assurance Section provides coordination and oversight as well as training and audits to other DEP programs to ensure that data are defensible. It provides training biannually for water sample collection and bioassessment methods using the DEP SOPs. Trainees include DEP employees, consulting firms, and other government agencies, as well as the public. The section also houses a Training webpage with links to various training presentations. Training resources include short SOP instruction videos, recorded webinars of sampling and data review topics, and presentations about staff QA responsibilities, the DEP QA Policy and QA Rule, approved analytical methods, and QA considerations for contracts. Assistance is also given to other DEP programs for the development of training materials.

The Aquatic Ecology Quality Assurance Section also provides technical assistance for a broad range of QA topics via the following: correspondence; attendance at meetings and teleconferences; presentations to internal staff and the public; review of QA planning documents for contracts and projects; review of purchase orders for sampling and analysis; review of procedures and technical criteria; data assessment and usability reviews; interpretation of rules and program requirements; and finally, coordination with DEP district QA Officers about various QA issues and tasks.

The QA requirements incorporated into the contracts, grants, and purchase orders issued by DEP are available on the [Resources for QA Officers webpage](#).

Element 6: Data Management

When a water quality standards sampling event is planned, it is scheduled in DEP's Laboratory Information Management System (LIMS). LIMS generates a Request Identification (RQ ID) number for the sampling, which is linked to each sample bottle requested for the event. LIMS generates sample submittal forms using this information. Field and laboratory data stored in LIMS are linked to that sampling event's RQ ID number. The data are recorded and stored by unique location/date identifiers. Sample collection information is provided to the laboratory by WQSP samplers via the laboratory's Chain of Custody form per documentation requirements in FD 1000.

Logbooks used by the DEP Laboratory are maintained using a formal Document Control System, which is used to control what logbooks are used when and to keep up with document version numbers, revision dates, etc. Reports produced by the laboratory are submitted to the person requesting the report. Text reports are posted or linked on DEP's website. Draft reports are reviewed by a laboratory supervisor before they are finalized. Reports produced by DEP are public records unless the data are restricted as part of a criminal investigation.

Chemistry and Biology Program data reduction, validation, and reporting policies and procedures are described in the [Laboratory Quality Manual](#) (DEP 2026c) under FDOH Certification Number E31780. All program data are handled to ensure data integrity from field to laboratory to reporting. All data generated by the DEP Laboratory are verified before being entered into LIMS. The data must be checked by designated staff before being considered “complete.”

Each sample collected and/or analyzed has a unique identifier on the sample container. This identifier includes a label on the sample container with the site and/or project name, sample collection date, collector's initials or name, and test type. The label may also include the RQ ID number for the event, a bar code for electronically uploading sample information, the sample collection time for certain tests, and/or replicate number. This information is linked to each unique sample analysis result for each event-location-date-test-replicate combination in LIMS and/or SBIO.

Data collected by the Water Quality Standards Program and analyzed in the DEP lab are processed as described in the "Commonalities" section of this document. Detailed data review and upload procedures are documented in section 6.3 of the [Water Quality Standards Program Quality Plan](#) (DEP 2025f).

Element 7: Data Analysis/Assessment

Data analysis and assessment are based on the needs of each criterion. Depending on the complexity of the criterion, the analysis and assessment may be equally complex. For an example of data analyses, see the [Technical Support Document for Development of Numeric Nutrient Criteria for Lakes, Spring Vents, and Streams](#) (DEP 2012).

Element 8: Reporting

The development of a criterion must follow the procedures established by the EPA, including documenting each component, and the criteria are not considered final until approved by the EPA.

Results from a sampling event or group of events may be summarized in an EcoSummary, or other report, that is provided to any interested parties. EcoSummaries are posted on DEP's [Biological and Audit Report Search Page](#) Website. Reference stream and lake results are periodically presented to DEP staff during annual ROC meetings.

Element 9: Programmatic Evaluation

As required by the Federal Water Pollution Control Act, at least every three years each state must hold public hearings to review applicable water quality standards. This process is commonly referred to as the Triennial Review. In addition, the EPA and DEP conduct an annual evaluation of the Water Quality Standards Program's progress in implementing 106 work plan commitments related to water quality standards. The evaluation includes status reports on each task under the work plan and includes a summary of surface water quality standards activities conducted during the year.

Element 10: General Support and Infrastructure

The Water Quality Standards Program current staffing resources include 15 full-time, state-funded positions: 13 Career Service and two OPS positions.

Elements of the Fifth-Year Inspection Program

Element 1: Monitoring Program Strategy

The Fifth Year Inspection (FYI) is a comprehensive compliance strategy to help achieve and maintain compliance through sound environmental monitoring and permitting practices. The Division of Water Resource Management's Water Compliance Assurance Program and DEAR's Water Quality Monitoring Program and Biology Program coordinate to implement FYIs for wastewater facilities under the National Pollutant Discharge Elimination System (NPDES) Program. This program utilizes a compliance inspection and various sampling techniques to determine a facility's chemical and biological impacts on receiving waters at the time of permit renewal. A report of sampling results is drafted and sent to the DEP district's permitting and compliance staff for consideration. DEP district staff determine if adjustments are needed in the permit to correct any deficiencies or impacts identified in the report.

Element 2: Monitoring Objectives

The objective of the FYI strategy is to collect comprehensive data to assist critical permitting decisions that may result in permit modifications or facility changes to improve effluent and receiving water quality. Ultimately, the results of these surveys are integrated into the state's water quality management objectives.

Element 3: Monitoring Design

Facilities with a NPDES permit are required to renew their permit every five years. As part of the renewal process, DEP performs a FYI to determine compliance with permit limits and the appropriate water quality standards for the waterbody. A standard suite of water samples is collected from the facility effluent for chemical and toxicological analysis. In addition to analyzing for the pollutants specified in the permit, the program uses either an upstream/downstream comparison or gradient approach, to assess the impacts of point source discharges on the receiving waters compared with background conditions for the receiving waterbody. Water and biological samples are collected from the receiving waterbody above and below the point of discharge. The results from these analyses are compared to facility permit limits and water quality criteria (Chapter 62-302, F.A.C.). DEP then attempts to determine if the facility's effluent is exceeding permit limits, water quality criteria or impairing biological communities in the receiving water.

Element 4: Core and Supplemental Water Quality Indicators

In addition to below, see Section **Commonalities Across All Monitoring Tiers: Element 4.**

Analyses are performed depending on permitting requirements or issues of concern not addressed in the standard protocol. A FYI includes:

- Permit effluent requirements: nutrients, chlorophyll, turbidity, alkalinity, color, ions, metals, pesticides, organic constituents (base, neutral, and acid extractables), polycyclic aromatic hydrocarbons (PAH), toxicity, algal growth potential (AGP), fecal indicator bacteria, and biochemical oxygen demand (BOD).
- Physical/chemical parameters: pH, conductivity, salinity, temperature, DO, and total residual chlorine.
- Supplemental water quality indicators: for example, dioxane, sucralose, acetaminophen and carbamazepine.
- Habitat assessment and biological indicators: aquatic macroinvertebrates, aquatic vegetation, and periphyton.

Detailed descriptions of water quality and biological indicators are located in Appendix A of each FYI report. FYI reports are available online using the [DEP Biological and Audit Report Search](#) on the [DEP Laboratory](#) website or through the [DEP Document Management System, OCULUS](#).

Element 5: Quality Assurance

See Section **Commonalities Across All Monitoring Tiers: Element 5.**

Element 6: Data Management

See Section **Commonalities Across All Monitoring Tiers: Element 6.**

Element 7: Data Analysis/Assessment

Chemical and biological data are retrieved from LIMS and SBIO and compared with applicable permit limits and surface water quality criteria to evaluate the discharge's effect on the receiving waterbody and the condition of the biological community. Exceedances are highlighted in data tables and noted in the report text. Detection of other analytes of concern are noted. To evaluate the potential for nutrient enrichment of the waterbody, freshwater AGP values are compared with predicted values based on the nutrient results of companion samples, and freshwater and/or marine AGP values are examined for nutrient limitation based on inorganic and total nitrogen to phosphorus ratios. Macroinvertebrate and algal taxonomic data, community composition metrics, SCI scores, and/or Shannon-Weaver diversity scores are compared between collection sites. Field information is compiled.

Element 8: Reporting

A FYI report is drafted for the event and reviewed by a committee that includes the data collectors and the DEP Laboratory Biology Program, Water Compliance Assurance Program, and district office. The report is edited based on the committee's recommendations and is reviewed a final time by the Biology Program Administrator before being approved for publication. FYI reports are available online using the [DEP Biological and Audit Report Search](#) on the [DEP Laboratory](#) website or through the [DEP Document Management System, OCULUS](#).

Element 9: Programmatic Evaluation

The Water Compliance Assurance Program and district biologists routinely work with Tallahassee's DEAR staff to ensure that all aspects of the FYI program's monitoring design and compliance strategies are being met, and that the reports generated from the FYI events meet the needs of the district offices. Training is also provided periodically to keep district biologists up to date on specific sampling methodologies, so that consistency can be maintained throughout the state and the program's goals and objectives can be met.

Element 10: General Support and Infrastructure

In addition to below, see Section **Commonalities Across All Monitoring Tiers: Element 10.**

The Water Compliance Assurance Program evaluates its current and future resource needs annually in order to continue to implement the FYI strategy. There are no external funding sources specifically for the FYI program (*i.e.*, legislative, EPA Section 106, or others).

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