

A. Project Management

The goal of the Groundwater Management Section (GWMS) is to provide the Florida Department of Environmental Protection (DEP) with scientifically defensible information on the chemical, physical, and biological characteristics of Florida's aquifers, springs, and groundwater-influenced surface waters. This information provides the basis for advising the U.S. Environmental Protection Agency (EPA), relevant DEP programs, partner agencies, and the Governor and Legislature on the status of Florida's groundwater quality.

DEP's former Springs Section (now integrated into the GWMS) initiated the Springs Monitoring Network in 2002. The network consists of over 50 Floridan aquifer system karst springs, sampled quarterly to monthly by DEP and the four northern water management districts. The goal of the Springs Monitoring Network is to measure temporal changes in water quality to provide data needed for springs restoration.

Most of the field sampling projects undertaken by the GWMS are limited in scope and size and are tied to total maximum daily load (TMDL) and basin management action plan (BMAP) development in areas where groundwater is an important contributor to surface water lakes and rivers. Examples of projects recently undertaken or currently under way include the following:

- Quarterly monitoring of 17 spring vents and spring tunnel access wells located in panhandle and north central Florida;
- The monitoring of experimental septic drainfields designed to further remove nitrate from effluent before it percolates into shallow aquifers.
- Nitrogen and oxygen isotope sampling to provide nutrient source information.

Data collection is accomplished through a collaborative effort involving section staff, an in-house DEP field sampling team located in Tallahassee (Tallahassee Regional Operations Center [ROC]), four DEP ROCs (Southwest, South, Central, and Southeast), private consultants, and on occasion the five Florida water management districts (Northwest Florida, Suwannee River, St. Johns River, Southwest Florida, and South Florida). See pages 5-8 and Appendix B of the *Quality Assurance Plan for the Groundwater Management Section – August 2019*, for a brief description of staff responsibilities and an organizational chart, respectively.

All employees directly involved in sample collection are required to attend at least one Sampling Training Workshop every five years (or as needed, before then). These workshops are conducted at least once a year by the Watershed Monitoring Section (WMS), and training is based on specific DEP Standard Operating Procedures (SOPs) as applied to the Status and Trend Network sampling programs, which follow nearly identical protocols to those used by GWMS field staff.

GWMS sampling staff are also required to obtain training on Class I Watercraft and Trailing

Operation and Safety, and to be DEP-certified for snorkeling. All GWMS sampling equipment must be consistent with FS 1001 and Tables FS 1000-1 through FS 1000-3 of the DEP field SOPs.

Sample documentation is of critical importance to the objectives of GWMS field projects. Data gathered for most of these projects are entered into the Watershed Information Network, or WIN. The data must be accurate to avoid incorrect evaluations and decisions regarding the state's water resources. All GWMS documentation requirements are based on the DEP SOPs, and record-keeping practices are consistent with Subsections 62-160.240(1) and 62-160.340(1), Florida Administrative Code (F.A.C.), and FD 1000 of the DEP SOPs. All records must be retained for at least five years after the completion of the project.

Sample documentation begins in the DEP Central Chemistry and Biology Laboratories. A label is placed on each container with the request (RQ) number, the major analyte group, a notation if filtration is required, and the preservation method. For all samples, bar-coded site and RQ labels are prepared for each sample container, as well as field sheets and DEP Laboratory receiving reports. Bar codes provide an electronic link between sample containers and associated paperwork. Field sheets pre-populated with site ID's and physical well or spring information are used for every routine sampling site.

All field documentation is recorded on appropriate field sheets developed by the GWMS (see *Quality Assurance Plan for the Groundwater Management Section – August 2019*). Samplers must ensure that the most current versions are used by observing the date printed on the forms. All paper documentation records must be recorded in waterproof ink. Erasing or obliterating records is not permitted. Corrections are made by marking a single line through the error so that it is still legible, and the initials of the individual performing the correction are included. All documentation records must be legible.

All documentation requirements for initial activities performed by the Central Laboratory (container preparation, supplying sampling kits, RQ information, etc.) are generated, retained, and stored internally by appropriate lab staff and within the DEP Laboratory Information Management System (LIMS).

All documentation for sampling procedures (sampling manuals) are generated, retained, and stored electronically by the GWMS quality assurance officer (QAO). All documentation requirements produced by field sampling staff are retained and stored by the respective project manager.

The GWMS generates several types of documentation and reports, listed below. Reports to management are consistent with the procedures outlined in FA 3250 of the DEP field SOPs:

- *Quality Assurance Plan for the Groundwater Management Section – August 2019:*
 - Spring sampling inventory list.

- Spring sampling field sheets.
- Surface water sampling field sheets.
- Calibration log.
- Standards and Reagents Logbook.
- Field audit form.
- Barcoded bottle and paperwork labels.
- Equipment and maintenance log sheets.
- Data management and analysis SOPs.
- Reports:
 - QA reports.
 - Integrated report to the EPA to meet Section 305(b) Clean Water Act requirements.
 - Report on the Integrated Florida Monitoring Strategy to meet Section 106 reporting requirements to the EPA.
 - Quality Assurance Project Plan (QAPP) elements in support of DEP monitoring activities conducted under Sections 104(b)(3), 303(d), 305(b), and 604 of the Clean Water Act as amended.

The Data Quality Objectives (DQO) process is a planning tool that can save resources. DQO invests up-front time and funding in the planning stages to ensure that the final product satisfies the needs of data users. It focuses data collection activities so only the most critical questions are addressed. An overarching DQO is providing data of a known quality and confidence for use in DEP programs and to aid in the development of rules and thresholds (see Appendix A of the *Quality Assurance Plan for the Groundwater Management Section – August 2019*).

B. Data Generation and Acquisition

For the Springs Monitoring Network, GWMS and Tallahassee ROC staff collect samples from 17 first and second magnitude springs on a quarterly basis. These data are used along with quarterly to monthly samples collected from other major springs by the Northwest, Suwannee River, St. Johns and Southwest Florida Water Management Districts, totaling over 50 springs. Samples are analyzed by the DEP Laboratory and other private National Environmental Laboratory Accreditation Program (NELAP)–certified labs.

For special projects, a work plan is developed to lay out specific monitoring goals necessary to answer the question(s) under consideration. The work plan specifies sampling sites, who will be responsible for field work, analytes needed, sampling frequency, any special equipment and/or training needs, and project duration. The installation of monitoring wells, soil moisture lysimeters, and dedicated sampling tubing, and the deployment of onsite continuous monitoring equipment, are also covered.

The DEP Laboratory provides the containers used for the collection and analysis of all water quality samples (except for isotope analyses). GWMS staff collect water quality samples either directly with the sample container (referred to as a "direct grab") or by using DEP-approved sampling equipment. All equipment is selected based on the sampling resource, the analytes of interest, and the sampling procedure. Equipment materials, such as pumps, tubing, filters and sample containers that come into direct contact with actual samples, must not react with or affect the sampled analytes, to ensure data quality is not compromised.

After collection, sample containers are preserved as necessary, bagged, and submerged in wet ice in a cooler in preparation for delivery to the lab. DEP Laboratory or GWMS custody sheets must be used for all sample submittals.

GWMS uses specific instruments to collect field measurements such as pH, temperature, conductivity, dissolved oxygen (DO), and turbidity. These instruments are properly calibrated on a routine basis (daily for field multimeters) to ensure accuracy and precision. Furthermore, all instruments and equipment are maintained and repaired (including preventative maintenance) routinely.

Records of each meter calibration and calibration checks are maintained in a calibration logbook. Each calibration and verification must be directly linked to affected samples (the project name and/or applicable sample sites must be listed on the calibration record). Supplies and consumables for field testing must adhere to the requirements set forth in the FT1000 series of the DEP [SOPs for Field Activities](#). This includes following the stated expiration dates for all standards and buffers. All GWMS samplers are encouraged to use an inventory checklist for all sampling supplies and equipment needed.

The GWMS uses quality control (QC) measures to ensure that high-quality data are being collected and analyzed. The QC procedures are consistent with the DEP SOPs. Sampling staff collect and submit two types of blanks (field blanks and equipment blanks) to the DEP Central Laboratory based on the type of equipment used to collect the actual water chemistry samples. All blanks are collected at a 10 % frequency based on the number of samples collected for a specific project over a specific period. Blanks are collected using analyte-free (de-ionized) water and are collected in the same manner as actual samples. The GWMS QAO reviews the blank results. Any significant or reoccurring detection requires sampling staff to investigate possible contamination sources and initiate corrective actions accordingly.

Most samples are analyzed by the DEP Bureau of Laboratories. The DEP Laboratory

consistently scores high, compared with other environmental labs in the nation, based on performance reviews by the U.S. Geological Survey (USGS) and EPA. It is certified under NELAP by the Florida Department of Health (FDOH) for most of the analytes requested by the GWMS.

C. Assessment and Oversight

The GWMS conducts internal audits designed to evaluate field sampling protocols, laboratory data quality and all associated documentation. Internal audits are performed at least annually by the GWMS QAO for section sampling teams and staff. All audits are conducted using a GWMS standardized audit form to ensure consistency across all teams (*Quality Assurance Plan for the Groundwater Management Section – August 2019*). Audits are concluded with a report that summarizes overall performance. Deficiencies are noted, and corrective actions are established for each deficiency.

D. Data Validation and Usability

Lab data generated by the GWMS are imported into the DEP Watershed Information Network (WIN). Associated field data are manually checked against field data imported from DEP Laboratory receiving reports into WIN by the GWMS QAO.

Qualifiers are codes that flag irregular or questionable measurements. Samples may be qualified for a variety of reasons; these are described in Table 1 of [Rule 62-160, F.A.C.](#) The DEP Laboratory and the GWMS must use these codes when reporting data values that either meet the specified description outlined in the table or do not meet the QC criteria of the lab or GWMS.