

Quality Assurance Project Plan

Watershed Assessment Section

2019

A. PROJECT MANAGEMENT

The Department's Watershed Assessment Section (WAS), which is in the Division of Environmental Assessment and Restoration (DEAR), is responsible for assessing the state's surface waters pursuant to the Identification of Impaired Surface Waters Rule (IWR, Chapter 62-303, Florida Administrative Code, F.A.C.), as part of the state's watershed management program. The assessments are conducted on an annual basis using a basin rotation approach such that one-fifth of the state is assessed each year. In addition to processing millions of data results, this work includes holding public meetings and responding to comments to confirm that accurate assessments of Florida's waterbodies are produced. This information is then submitted to EPA in support of section 303(d) of the Clean Water Act.

The WAS Quality Assurance (QA) Plan, or [Quality Plan](#), provides specific information on project objectives, training and procedures that will be used to ensure that data generated by the WAS is of verifiable quality and meets the scientific objectives of the Florida Department of Environmental Protection (DEP), as required by the Federal Clean Water Act, Chapter 403 of Florida Statutes, Chapters 62-160, 62-302, 62-303, 62-650, and 62-4, F.A.C.

The WAS firmly believes that all personnel within the Section are vital to the overall quality of data being produced. Please see the *Organization and Responsibilities* and *Appendix (Figure 1)* sections of the WAS Quality Plan for a brief description of staff responsibilities and an organizational chart.

The WAS workload is divided among three geographic sectors (the North Sector, the Southwest/Central Sector, and the South/Southeast Sector) and a Data Management Sector. The primary responsibilities of the North, the Southwest/Central, and the South/Southeast Sectors involve reviewing and/or conducting IWR related impairment assessments and the development of the statewide monitoring plans. The assessments utilize ambient surface water quality data, biological data, and other information (i.e. fish advisory, beach advisory, shellfish harvesting evaluations, etc.) available to evaluate the attainment of designated uses for Florida surface waters as indicated by assessment of applicable water quality standards (Chapters 62-302, 62-303, and 62-4, F.A.C.). The Data Management Sector is responsible for special projects, researching and developing new database tools, solving problems associated with existing tools, and sections of the 305(b) report.

To achieve the data sufficiency requirements necessary for basin assessments, the WAS develops Strategic Monitoring Plans (SMP) each fall prior to the year of sampling. The primary focus of strategic monitoring is to have WAS and other DEAR sections coordinate with the appropriate

DEP Region Operation Centers (ROC) to collect sufficient data to verify whether waters on the planning list are in fact impaired, and to the extent possible, determine the causative pollutant for waters listed for dissolved oxygen, bioassessment failures. Additionally, the SMP targets potential impairment areas for chemical tracers and genetic markers to determine if bacteria impairments are due to anthropogenic sources. Strategic monitoring plans for most parameters are designed to ensure that, once combined with available recent data, there are at least twenty samples (collected at least four days apart when collected at the same sampling station), with a minimum of five independent sampling events, as required by the IWR. While this section focuses on the Department's sampling strategy, staff should investigate what other QA approved agencies might also be sampling in their respective ROC, such that the number of samples DEP has to collect is potentially reduced, or at least coordinated in such a way as to optimize the sampling times and stations in a way to avoid unintended redundancy. Monitoring plans for nutrients are designed to collect at least five samples over the course of the year, with at least one set of samples taken between May 1st – September 30th and at least one another time of the year. For WBIDs listed for multiple parameters, the sampling strategy is determined by the parameter(s) requiring the greatest number of samples needed for assessment.

The study design includes the scheduling of additional samples so there are sufficient samples for assessment in the event that samples are “lost” due to non-collection (due to poor weather or other factors), or other events (e.g., sample QA deficiencies, qualifier coded data, etc.). If any samples exceed holding times or are deemed unacceptable, sampling staff should re-schedule the samples and contact the SMP coordinator to determine if additional data are needed to alleviate deficits. In some cases, sampling will be conducted for de-listing purposes, which requires a larger sample size.

Proper sampling station reconnaissance is vital to the overall sampling process. After conducting a reconnaissance survey of the site, sampling staff should discuss with supervisory staff at the ROC and WAS personnel to determine the most appropriate sampling locations. Photos of the site visits are part of the reconnaissance, and these photos, along with any additional information about the sites, must be sent to the SMP coordinator and WAS sector staff prior to sampling. The use of existing station locations is generally preferable to creating new ones, but new stations may be needed to ensure that sampling is representative of water body conditions.

The WAS Quality Assurance Officer (QAO) is responsible for summarizing all training events attended by staff each year and is documented in the Quality Assurance Annual Report (MS Excel format). Additionally, a list of all sampling personnel and their respective trainings are maintained internally within the Section. Training opportunities can vary each year, depending on the type of project or needs of the section at the time, and are provided through several different ways (e.g. classroom setting, in the field, or web-based).

A list of training objectives expected by all WAS employees are below:

- Review the WAS Quality Plan and the Strategic Monitoring Program [Sampling Guidance](#) maintained by the SMP coordinator.

- To participate in sample collection, attend at least one surface water sampling event every two years (or as needed, before then).
- To conduct or participate in field surveys, individuals must train with qualified DEP staff (via workshops and/or in field sampling events). Field survey training events for water quality and biological monitoring are scheduled throughout the year by the Aquatic Ecology and Quality Assurance Section (AEQAS) and/or other sections in the Division.
- All samplers performing Habitat Assessments (HA) and Stream Condition Index (SCI) sampling are required to have specific training and remain in “pass” status for field performance tests. Field samplers conducting SCI sampling remain in “pass” status by passing an online knowledge test and field performance tests (audits) to demonstrate competence. At all times, a minimum of one sampler from each sampling team must be in pass status in order to perform an HA or SCI.
- Although not required, WAS sampling personnel are encouraged to obtain training on Global Positioning System (GPS), Class I Watercraft and Trailer Operation (only necessary to act as a boat operator or drive a vehicle towing a boat), and safety training.

All sampling equipment is consistent with DEP Standard Operating Procedures (SOPs); DEP-SOP-001/01: FT 1000, FT 1100, FT 1200, FT 1300, FT 1400, FT 1500, and FT 1600. The *Equipment and Instruments* section of the WAS Quality Plan list specific pieces of equipment used for sample collection and field testing.

Sample documentation is a critical data quality objective of the WAS intensive field surveys. Data gathered on these projects are entered into the Watershed Information Network (WIN) and must be properly linked to historical data. The database is also a source of public information and is used for a variety of purposes. The data must be accurate to avoid incorrect evaluations and decisions on the State’s water resources. All WAS documentation requirements are based on the DEP SOPs cited in the Quality Assurance Rule Chapter [62-160](#), F.A.C.

The *Documentation and Records* section of the WAS Quality Plan provides details on information to be included in reports along with retention time and specific location of records, but in general are accomplished by WAS through sample labeling and forms that are consistent with FD 1000 of the DEP SOPs.

When a sampling event is planned, the event is scheduled in the Laboratory Information Management System (LIMS) scheduler. LIMS generates an “RQ” number (Request ID) for the sampling event, which is linked to each sample bottle requested for the event. Sample submittal forms are generated by LIMS using this information. Field and laboratory data that are stored in LIMS are linked to that sampling event’s RQ number. Data are recorded and stored by unique location/date identifiers. Prior to sample collection, sample bottles will be properly identified with information pertaining to the location, date, time, name of samplers, type of sample (duplicate, field blank, equipment blank, effluent sample), station and replicate number (when applicable) and recorded on the appropriate form. The WAS uses waterproof labels to ensure the label will not disintegrate or detach from the sample container when wet.

Field data and observations for a sampling trip are recorded on one or more field sheets. Water quality meter data, location information, sample type and preservation are recorded on the sample submittal form. This information is entered into the Data Merge Tool in LIMS for uploading to WIN. Once in the field, the samplers will fill in the sample time immediately before taking and filling the sample bottle. Two separate forms will be filled out in addition to the label information, field sheets and chain of custody sheets. The following information will be recorded on a field data sheet: date, time, location, station number, station description, samplers, weather, sample depth, and any field measurements (dissolved oxygen mg/L and percent saturation (DO), specific conductance, temperature, salinity, and pH). The data sheet will also indicate the type of bottle samples collected (sample, blank, or duplicate), note any field decontamination performed, and the sampling sequence. Any errors in the field record sheets will be deleted with a single line through the incorrect entry and initialed. Field sheets will be transferred to the QAO at the end of each sampling event.

Sample custody is consistent with and follows FD 5000 and FD 7000 of the DEP SOPs. Custody begins when the sample bottles are received from the DEP Laboratory by WAS personnel. Laboratory personnel will provide a signed copy of the DEP Chain of Custody form with the samples. This form will be used to document all subsequent custody transfers and will be kept with the project file. Sample bottles are retrieved by the sampling team leader who will verify that the sample bottles are clean and pre-labeled (with blank labels) and verify that sufficient bottles have been provided. The sampling team leader will then supervise the field teams as they organize and subdivide the bottles to ensure that each field team has the correct bottles. Bottle labels will include a unique sample identification number.

The WAS generates several types of documentation and reports that are listed below. Record keeping practices are consistent with Rules 62-160.240(1) and 62-160.340(1), F.A.C., and FD 1000 of the DEP SOPs. All documentation includes a revision date or version number to indicate date(s) of use and to ensure the most current version of the documentation form is being used or referenced.

Documentation related to Field Surveys includes:

- field sheets (surface water)
- custody sheets
- labels
- digital photos
- permission forms
- log books (calibration, standards and buffers, equipment maintenance and equipment cleaning)
- inventory sheets
- field audit forms
- float plan

Reports:

- 303(d) Assessment Lists (Retained on [WAS webpage](#), network folders, submitted to EPA)
 - Identifies waterbodies not meeting water quality standards.
- 303(d)/305(b) Integrated Reports (Retained on [Water Quality Assessment Program webpage](#))
 - Provides overview of the quality of surface and groundwater resources in Florida
- TMDL Not Needed (Retained on network folders, submitted to EPA)
 - Provides documentation on impaired waterbodies not due to a pollutant.
- Annual QA Report (WAS QA Report is retained on network folders while the DEAR QA Report is retained on the [Quality Assurance Resources](#) webpage and submitted to EPA)
 - Provides a condensed update on QA activities, training, and audits.
- Reasonable Assurance Plans (RAP) (Retained on [WAS webpage](#), network folders, and submitted to EPA)
 - Provides restoration goals, funding sources, and specific targets to assure attainment of water quality standards for impaired waterbodies.
- Alternative Restoration Plans, also known as 4e Plans are retained on network folders and submitted to EPA)
 - Provides restoration goals, funding sources, and watershed management actions that will be or are being implemented for impaired waterbodies, so that attain water quality standards in the future.

As part of a submittal package sent to EPA with updates on the 303(d) list, the WAS sends all relevant documentation needed to support the current assessment decisions. This is typically sent each year following the completion by Secretarial adoption of the assessment for a particular Group-Basin and includes public comments received from stakeholders and the responses from WAS staff.

All sampling records shall be retained for at least 5 years after the completion of the project. All data will be maintained in hard copy form and on computer files. Hard copies are typically kept in the WAS project files (office storage). Data from very large projects will be kept in the project files for at least three years and then archived in the Department's archive file system (warehouse). Back up copies will be made of all electronic data files (backup disks).

B. DATA GENERATION AND ACQUISITION

The WAS generates a small percentage of water quality or biological data for strategic monitoring purposes but acquires a significant amount of data from external data providers using Florida STORET, Legacy STORET, WIN, SBIO, and USGS. The data used to support the Impaired Waters assessments must comply with the Department's QA Rule 62-160, F.A.C., as well as all DEP SOPs.

There is relatively little data reduction required for the metered parameters measured by the WAS. Most parameters (dissolved oxygen, temperature, conductivity, pH, fluorescence, salinity, incident light, and water level) are read directly from the instrument and entered onto the field data sheet. Each field sheet includes the name of the sampler and the data recorder if different.

Stream flow point velocities will also typically be read directly from the flow meter. The IWR Access Database and/or Excel spreadsheets are used to perform any possible calculations; such as averaging dissolved oxygen (DO) data over multiple depths or calculating the percent DO saturation from DO and measured salinities and temperatures.

Data entered on field sheets are written into the Chain of Custody submittal forms and entered into LIMS by the DEP Lab. These field parameters are then associated with lab results when the data are uploaded into WIN. Raw field data are reviewed by one of the field samplers and the QAO. Field logs and previously collected field data are reviewed for obvious problems or errors. Each lead sampler and the QAO are responsible for determining that the results of each analytical determination have all associated QC measurements and that the acceptance criteria are met and documented according to protocol. The lead sampler and the QAO are responsible for completing sample preparation, calibration, analysis and instrument logs, and completing all internal custody documentation.

The data verification procedures consist of all the QC validations and calculations checks discussed in the [DEP Laboratory Quality Manual](#). In addition, soundness of all data is evaluated by the representativeness of the sample, the inter-relationship among the parameters and the historical values, etc. Any discrepancy or inconsistency will initiate a recheck of data or reanalysis of the sample(s). If no reason can be found to invalidate these data, they will be entered into the appropriate databases.

Once the reconnaissance, field and lab data are received by the WAS, the field and lab data are loaded into the LIMS. The data are then considered provisional and must be reviewed by the data generators and then are uploaded to WIN. Specific data correction requests are submitted to the appropriate WIN Coordinator. Any additional problems identified with the data should be documented in the project comments.

For quality control measures, WAS ensures high-quality data are collected and analyzed within the section. Quality control samples assess the accuracy and precision of sampling and analytical techniques. The accuracy of field test measurements is reflected in the acceptance criteria for continuing calibrations as specified in the FT series of the DEP SOPs. The quality control procedures are consistent with FQ 1000 (blanks, duplicates and other QC samples) and FT 1000 (calibration requirements and acceptance). These quality control measures apply to data collected by WAS staff, but cannot be validated for all water quality data collected by other sampling entities that may potentially be used in the Impaired Waters assessment. Each of these entities is responsible for adhering to the DEP QA Rule and SOPs as data providers to the agency.

Sampling personnel collect and submit three types of blanks (equipment, field and trip blank) to the DEP Laboratory based on the type of equipment used to collect the actual water chemistry samples. All blanks are collected based on the number of samples collected for a specific project over a specific period of time (typically 5%). All blanks are collected using analyte-free (de-ionized) water and are collected in the same manner as actual samples. The WAS also collects

field duplicates to ensure precision in the data sets. The results for each quality control measure are assessed using specific acceptance criteria. For all blank samples submitted to the lab, results must meet specifications detailed in the DEP Laboratory Quality Manual.

Data handling hardware are acquired, maintained, and stored on personnel computers by WAS staff. Typical programs that are used to evaluate and analyze data results are Microsoft Access, Excel, and Word. These programs are used on a routine basis to run regressions on data, compute basic statistics, and as a tool to communicate complex environmental data to the public, including stakeholders that may comment on draft and final versions of the 303(d) lists. All documents and spreadsheets must comply with the requirements set forth by the Office of Technology and Information Services (OTIS), described in [DEP Directive 370](#).

As noted in the *Equipment and Instruments* section of the WAS Quality Plan, all equipment (and associated standards/buffers) must follow data calibration procedures outlined in the DEP SOPs (DEP-SOP-001/01: FT 1000, FT 1100, FT 1200, FT 1300, FT 1400, FT 1500, and FT 1600) and meet all DEP SOP specifications for accuracy, reproducibility and design. Field instrument calibration follows the requirements for frequency and acceptance criteria as outlined in FT 1000, and the FT Series of the DEP SOPs. Preventive and corrective maintenance follow FS 1007, FT 1000, and the FT Series of the DEP SOPs.

Sampling equipment preparation and decontamination is handled by WAS staff or by the DEP Laboratory. Sampling is limited to in-situ metered parameter measurements and collection of bottle samples from surface waters for independent laboratory analyses. All containers, volumes, holding times and preservation procedures are consistent with FS 2000, of the DEP Field SOPs. Sample containers will be prepared and decontaminated by the DEP Laboratory according to the laboratory's approved comprehensive QA plan and kept in a safe place to avoid damage. Samples will be iced as they are collected and returned to the DEP Laboratory promptly to permit analysis within the proper holding times. Bottle samples will be collected for those parameters that cannot be analyzed in-situ using field meters. The type of sample containers, sample volume, choice of preservation, and the maximum sample holding time for each parameter are described in the DEP Laboratory Quality Manual. Pre-cleaned sample bottles will be provided by the laboratory. Section personnel will be responsible for pre-labeling, rinsing, collecting, recording, handling, and returning samples for laboratory analysis in a manner that will ensure sample integrity. Pre-preserved sample bottles may be used to collect samples but is not recommended. It is at the discretion of the laboratory to use pre-preserved sample bottles.

C. ASSESSMENT AND OVERSIGHT

The WAS follows the guidance provided by the Aquatic Ecology and Quality Assurance Section (AEQS) to use the [DEP Audit Checklists](#) while performing audits. These audits are performed on a periodic or case by case basis for data providers who request field or lab audits or may contract with the Department for data collection. To ensure data usability and accuracy in the Impaired Waters assessment, all samplers whether DEP or not, must follow DEP SOPs for data collection.

Some entities may receive training from local DEP District staff, but for outside data sources training is to be performed internally. At times corrective action or improvements are recommended by DEP personnel, depending on its nature and may be implemented immediately or require subsequent training. The WAS also use an internal Checklist for Assessment Lists to ensure that Assessment Lists are completed accurately.

Corrective actions may occur through additional training or by performance audits in the field or in the laboratory. These performance audits are planned on an as needed basis by the specific entity providing data to WAS or by District QA staff. When an audit does occur, the WAS QAO will attend the audit along with local District staff. Audits are documented by providing the corrective actions and deficiencies to the AEQS and are summarized annually through the QA Annual Report. Corrective actions are implemented by the WAS or District QAO following the completion of a QA report.

For internal WAS activities, all staff are expected to read, understand, and follow the procedures and criteria as described in the section's Quality Plan, and to carry out their assigned responsibilities for effective utilization of the quality system. The WAS Quality Plan addresses all activities associated with sampling, field testing, lab analysis and data review of any type, including those activities associated with database construction, maintenance and management.

The section *Audits and Corrective Actions* of the Quality Plan, highlights the Annual QA Report that is prepared by the WAS's QAO and submitted to the section Environmental Administrator. Reports to management are consistent with the procedures outlined in FA 3250 of the DEP Field SOPs. This includes a yearly systematic assessment of the quality assurance activities, including any corrective actions, which is then submitted to the AEQS and subsequently included in the Annual QA Report to the DEP Secretary.

D. DATA VALIDATION AND USABILITY

One of the primary functions of WAS involves conducting IWR assessments as part of the state's program for identifying impaired waters. The section *Data Use for Impaired Waters Assessment* in the WAS Quality Plan, provides a reference to key documents explaining how decisions for data usability are made based on data quality assessments and a description of how water quality data collected for the identification of impaired surface waters is used in the impaired waters assessment. The biennial Integrated Water Quality Assessment for Florida, or the [305\(b\) Report](#), explains in detail Florida's 303(d) listing process. For additional information on the data usability of water quality data in the impaired waters assessment and the 303(d) listing process please see EPA's [Overview of Listing Waters under CWA Section 303\(d\)](#).

WAS field survey data collected internally meets the Data Quality Objectives and Data Quality Indicators established in [DEP Directive 972](#) (QA Directive) and incorporate the concepts and criteria found in DEP's [Process for Assessing Data Usability](#), DEP-EA-001/07. Within these surveys, staff are capable of planning, scheduling and collecting high-quality samples for

Florida's water resources, and managing all aspects of the associated data for review and reporting. The DEP Laboratory is responsible for all lab analyses performed on the submitted samples.

The *Data Review* and *Quality Control Measures* sections of the WAS Quality Plan provides detailed information on data review, validation, and verification, but in general since water quality monitoring is carried out by many agencies and groups statewide, it is particularly important that DEP evaluate the QA of the data used in the 303(d) assessments.

Monitoring entities submitting data to the agency are required to follow a comprehensive set of SOPs set forth in rule Chapter 62-160, F.A.C., and specified in the DEP document, Standard Operating Procedures for Field Activities (DEP-SOP-001/01, February 1, 2004). Labs must have SOPs for handling and analyzing samples, reporting precision, accuracy and method detection limits that apply, and reporting data. Laboratory certification must be maintained as required by Chapter 62-160.300, F.A.C. The Quality Assurance Rule (Chapter 62-160, F.A.C.), which last had revisions effective on April 16th, 2018, requires all entities submitting data to DEP be certified by the National Environmental Laboratory Accreditation Conference (NELAC) through FDOH. Furthermore, in September 2009, DEP Secretary Michael Sole approved a QA Directive (Directive 972) which directs Department programs to implement a system that will ensure that data collection, generation, interpretation, reporting, evaluation and storage be of sufficient quality to support Department decisions.

In addition to requiring that data meet QA rule requirements and be collected following adopted SOPs, DEP QA staff perform lab and field audits that monitor on-site sampling techniques, the suitability of sampling environments, and proper use of sample preservatives and sample transport and storage conditions. Some data are excluded from some assessments due to lab audit reports from DEP QA staff.

There are various reasons why data may be excluded from an assessment, but typically data are excluded because it has been found to be inaccurate or of poor quality. This is usually determined by either the data provider or through the audits by the DEP QA staff. Generally, the data are only excluded from the verified period assessment but included in the planning period assessment. If the planning period assessment indicates impairment and there is insufficient data in the verified period to assess, then the waterbody is placed on the planning list for the appropriate parameter and will be designated for future monitoring. Overall, the excluded data makes up a small proportion of the total. Details about the specific types of data that have been excluded from assessments performed under the IWR can be found in Table D6 of the [2018 Integrated Water Quality Assessment of Florida](#) report.

Typical programs that are used to evaluate and analyze data results are Microsoft Access, Excel, and Word. These programs are used on a routine basis to run regressions on data, compute basic statistics, and as a tool to communicate complex environmental data to the public, including stakeholders that may comment on draft and final versions of the 303(d) lists. For WAS projects

the typical statistics that are calculated include annual geometric mean, annual arithmetic average, median, sample count, a sample count compared to a specific criterion (or more specifically an exceedance of a criterion), the maximum, the minimum, and a count of the number of weeks there are samples within a particular assessment time period (planning or verified). ArcMap and ArcPro software are also used to evaluate water quality stations spatially, and to produce watershed assessment maps for internal and external distribution.