

QA Project Plan (QAPP) Watershed Assessment Section 2015

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 [Quality Plan](#) for WAS 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 Department, 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 USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains a specific element devoted to assuring training is provided and documented under Section A8 "Special Training Requirements/Certified Listed". This element is explained in more detail in Sections 5.3 *Employee Training*, 7.6.4 *Biological Impairment*, and 2.0 *Basic Elements of the WAS Quality Plan*, but in general are accomplished through the objectives carried out by each member of the WAS. The Environmental Administrator for the WAS is responsible for maintaining training records on each employee; however, each employee also maintains their own records. They should also remain proficient with their own skills commensurate with their responsibilities.

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). 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 portions of the document named *Training Manual for ROCs-04-02-2015* pertaining to Strategic Monitoring, maintained by the Water Quality Assessment Program (WQAP).
- To participate in sample collection, attend at least one surface water sampling training workshop/event every two years (or as needed, before then). These workshops are typically conducted at least once a year, and training is based on specific FDEP Standard Operating Procedures (SOP).
- To conduct or participate in field surveys, individuals must train with qualified FDEP 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.

- 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.

The WAS is committed to following good quality assurance (QA) and quality control (QC) management practices to produce all data. In Section 3 of the [Quality Plan](#), the *Statement of Policy* provides a general overview of the data quality objectives, training priorities, evaluation procedures, and corrective actions followed by the WAS staff. In Section 6.0, *Documentation* highlights that the sample documentation is a critical data quality objective of the WAS intensive field surveys. Data gathered on these projects is entered into Florida STORET and must be properly linked to historical data, i.e. updates shall be made to existing STORET ID for a station. 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 FDEP WAS documentation requirements are based on the FDEP SOPs cited in the QA Rule Chapter 62-160, available at: <http://www.dep.state.fl.us/legal/Rules/general/62-160/62-160.pdf>.

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 of the assessment for a particular Group-Basin and includes public comments received from stakeholders and the responses from WAS staff.

Project/Task Organization

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains a specific element devoted to the identification of key project personnel with their roles and responsibilities well defined under Section A4 "Project/Task Organization" and Section A7 "Objectives and Criteria for Measurement Data". These elements are explained in more detail in Sections 5.0 *Organization and Responsibility* and 5.1 *Responsibilities of Key Personnel*, but in general are accomplished by WAS beginning with the delegation of duties and responsibilities by one Environmental Administrator, who evaluates work priorities, assigns projects to appropriate staff (two Environmental Managers, five Environmental Consultants, or six Environmental Specialists), reviews all section work products, and ensures that projects are completed on schedule.

Generally, the section's workload is divided among three geographic sectors (the North Sector, the Southwest/Central Sector, and the South/Southeast Sector) and a Technical Support Sector. The primary responsibilities of the North, the Southwest/Central, and the South/Southeast Sectors involve conducting and/or reviewing IWR related impairment assessments, including assessing 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 Technical Support Sector is responsible for special projects, researching and developing new database tools, solving problems associated with existing tools, development and maintenance of the impaired waters database, and development of the statewide monitoring plans and sections of the 305(b) report.

Documentation and Records

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains a specific element devoted to information to be included in reports and retention time and specific locations for records under Section A9 “Documentation and Records”. These elements are explained in more detail in Sections 7.5 *Sampling Handling* and 6.3 *Types of Documentation/Reports Generated/Record of Storage*, and 7.5.2 *Chain of Custody*, but in general are accomplished by WAS through sample labeling and forms that are consistent with FD 9000 of the FDEP 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. All containers will be labeled using an indelible ink pen or by attaching an identification tag.

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 an electronic format compatible with SIM for uploading to STORET. 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 project manager at the end of each sampling day.

Sample custody is consistent with and follows FD 5000 and FD 7000 of the FDEP SOPs. Sample bottles will be received by the project manager/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 project manager/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. Custody begins when the sample bottles are received from the FDEP Central Laboratory by WAS personnel. Central Laboratory personnel will provide a signed copy of the FDEP 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.

Project/ Task Description

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains specific elements devoted to a summary of required projects and QA records/reports under Section A6 “Project/ Task Description”. These elements are explained in more detail in Sections 6.0 *Documentation*, but in general are accomplished on multiple tiers by WAS for field sampling and reports that are produced by the section. All documentation generated by the WAS is controlled and maintained in essentially two manners. 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. Furthermore,

all documentation contains documentation control blocks such as page numbers and section headings used to identify completeness. Current documents such as standard operating procedures shall be followed. Ensuring the use of current procedures is consistent with FA 1000, FC 1000 and FD 1000 of the FDEP SOPs and Rule 62-160.210 F.A.C.

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 FDEP SOPs.

Documentation related to Intensive 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

- Quality Assurance Reports (Retained by QA Officer or EA)
 - Provides Update on Audits, Training, Key Personnel Roles, Program Overview
- 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 WAS 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 (see Section 9.5 for details) (Network Folders, 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

Storage and Archiving

All records shall be retained for at least 5 years after the completion of the project. All data will be maintained in hard copy form (both in the original raw format and in the Intensive Survey Document) 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). Backup copies will be made of all electronic data files (backup disks).

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains a specific element devoted to stating project objectives quantitatively and qualitatively under Section A7 “Objectives and Criteria for Measurement Data”. These elements explained in more detail in Sections 7.6 *General Strategic Monitoring Strategy* and 9.2.4 *Data Use for Impaired Waters Assessment*, but in general are accomplished by WAS through Strategic Monitoring Plans, and through the evaluation of data for usability in the Impaired Waters Assessment.

Strategic Monitoring Plans

The primary focus of strategic monitoring is to have WAS and other DEAR sections coordinate with the appropriate DEP Regional 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 or bioassessment failures. 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 FDEP 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 Alan Punshon 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 District and Watershed Assessment Section personnel to determine the best sampling locations. Photos of the sites are part of the reconnaissance, and these photos, along with any additional information about the sites, must be sent to Alan Punshon prior to sampling. The use of existing stations is generally preferable to creating new ones, but new stations may be needed to ensure that sampling is representative of water body conditions.

Evaluation of Data for Use in the Impaired Waters Assessment

One of the primary functions of WAS involves conducting and/or reviewing IWR assessments as part of the state’s waterbody restoration program for impaired waters. For a detailed description of how water quality data collected for the identification of impaired surface waters of the state is used in the impaired waters assessment, please see the biennial Integrated Water Quality Assessment for Florida: 305(b) Report and 303(d) List Update available on the section’s webpage at:

<http://www.dep.state.fl.us/water/watersheds/assessment/index.htm>

Additional information on the use of water quality data in the impaired waters assessment is described in the 2014 EPA Decision Document Section 303(d) List Amendments for Basin Group 5, available at the EPA's webpage: <http://www.epa.gov/region4/water/tmdl/florida/index.html>.

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, SBIO, and USGS. The data used to support the Impaired Waters assessments must comply with the Departments QA Rule 62-160, F.A.C., as well as all DEP SOPs.

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains a specific element devoted to types of data from non-measurement sources, description of limitations when data cannot be used, and documentation of the rationale for original collection of data and its relevance to the project under Section B9 "Data Acquisition Requirements for Non-Direct Measurements". These elements explained in more detail in Section 9.1 *Quality Control Measures*, but in general are accomplished by WAS through a detailed data review and verification process and quality control measures.

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.

In cases where metered parameters were taken over the station depth, data may be depth averaged (simple arithmetic average) for data presentation (downstream or temporal plots). All plots or tables presenting depth averaged data will indicate that the data has been averaged over the depth. DO data taken using YSI Multi-probe models 6920 (or 6900 Series), 6600, or 600 XLM will be corrected for the measured salinity and temperature. The saturation DO and percent DO saturation may be calculated using measured salinities and temperatures. Salinity values may also be calculated from measured conductivities and temperatures. Flows will be calculated using point velocities measured in-stream using a cross-section method. A variety of spreadsheets and basic computer programs are used to perform the necessary calculations.

Data entered on field sheets are written into the Chain of Custody submittal forms and entered into LIMS by the Central Lab. These field parameters are then associated with lab results when the data are uploaded into STORET by a Project Manager. Raw field data are reviewed by the lead sampler and the project manager. Field logs and previously collected field data are reviewed for obvious problems or errors. Each lead sampler and the project manager 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 project manager are responsible for checking calculations, completing sample preparation, calibration, analysis and instrument logs, and completing all internal custody documentation. Each sector supervisor is responsible for reviewing this work for completion and correctness prior to authorizing the individual results for release.

The data verification procedures consist of all the QC validations and calculations checks discussed in the FDEP Bureau of Labs 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 database.

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 Florida STORET. Specific data correction requests are submitted to the STORET Manager or appropriate 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 FDEP SOPs. Additionally, the quality control procedures are consistent with FQ 1000 (blanks, duplicates and other QC samples) and FT 1000 (calibration requirements and acceptance) of the FDEP SOPs. 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 FDEP 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 FDEP Central 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 FDEP Bureau of Labs Quality Manual available at:
http://publicfiles.dep.state.fl.us/dear/labs/lab_qualitymanual_15.pdf.

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains specific elements devoted to a description of records/reports, storage and retrieval policies, data handling and equipment used to process, compile, and analyze data under Section B10 "Data Management". These elements are explained in more detail in Sections 6.0 *Documentation* and 1.0 *Introduction* of the WAS Quality Plan, but in general are accomplished on multiple tiers by WAS for field sampling and report that are produced by the section. All documentation generated by the WAS is controlled and maintained in essentially two manners. 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. Furthermore, all documentation contains documentation control blocks such as page numbers and section headings used to identify completeness. Current documents such as standard operating procedures shall be followed. Ensuring the use of current procedures is consistent with FA 1000, FC 1000 and FD 1000 of the FDEP SOPs and Rule 62-160.210 F.A.C.

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 FDEP SOPs.

Documentation related to Intensive Surveys includes:

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

Reports

- Quality Assurance Reports
- 303(d) Assessment Lists
- 305(b) Integrated Reports
- TMDL Not Needed (for example, 4c Natural Condition Documentation)
- Annual QA Report (see Section 9.5 for details)
- Reasonable Assurance Plans (RAP)

Storage and Archiving:

All records shall be retained for at least 5 years after the completion of the project. All data will be maintained in hard copy form (both in the original raw format and in the Intensive Survey Document) 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). Backup copies will be made of all electronic data files (backup disks).

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 and available online at:
<http://www.dep.state.fl.us/water/sas/qa/docs/DEP-Directive-972.pdf>.

As noted in the WAS Quality Plan, Section 8.0 *Equipment and Instruments*, all equipment (and associated standards/buffers) must follow data calibration procedures outlined in the FDEP SOPs (FDEP-SOP-001/01 FT 1000, FT 1100, FT 1200, FT 1300, FT 1400, FT 1500, and FT 1600) and meet all FDEP 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 FDEP SOPs. Preventive and corrective maintenance follow FS 1007, FT 1000, and the FT Series of the FDEP SOPs.

Section 7.6 *General Strategic Monitoring Strategy* of the WAS Quality Plan outlines the specific sampling procedures and methods used by DEP District staff and are explained in detail. The primary focus of strategic monitoring is 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 or bioassessment failures. Strategic monitoring plans for most parameters are designed to ensure that the minimum data requirements are met when combined with all readily available data in the IWR database.

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains a specific element devoted to sample collection procedures, equipment needs, preparation and decontamination of sampling equipment under Section B2 "Sampling Methods Requirements". These elements are explained in more detail in Sections 7.5 *Sampling Handling*, 6.3 *Types of Documentation/Reports Generated/Record of Storage*, 7.5.2 *Chain of Custody*, and 8.0 *Equipment and Instruments*, but in general are accomplished by WAS through sample labeling and forms that are consistent with FD 9000 of the FDEP SOPs. Additionally, the process of planning a sampling event, collecting field data and submitting samples to the Central lab have been previously addressed in the Documentation and Records section of this document.

Sampling equipment preparation and decontamination is handled by ROC staff or by the DEP Central 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 FDEP Field SOPs. Sample containers will be prepared and decontaminated by the Central Laboratory in Tallahassee 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 FDEP Central 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 FDEP Bureau of Labs Quality Manual available at: http://publicfiles.dep.state.fl.us/dear/labs/lab_qualitymanual_15.pdf. 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 project manager and central 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 checklist available at: <http://www.dep.state.fl.us/water/sas/qa/dr-audits.htm>. 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 FDEP personnel, depending on its nature and may be implemented immediately or require subsequent training.

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 Quality Assurance Officer 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. In particular, under Section 9.2.4 *Data Use for Impaired Waters Assessment* of the Quality Plan, a reference to key documents that explains how decisions for data usability are made based on data quality assessments.

Section 9.5 *Audits and Annual Report to Management* highlights the Annual QA Report that is prepared by the WAS's Quality Assurance Officer and submitted to the section Environmental Administrator. Reports to management are consistent with the procedures outlined in FA 3250 of the FDEP Field SOPs. This includes a yearly systematic assessment of the quality assurance activities, including any corrective actions, which is then submitted to the Standards and Assessment Section and subsequently included in the Annual QA Report to the DEP Secretary.

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains specific elements devoted to a description of types of reports and their frequency, and results of periodic data quality assessments under Section C2 "Reports to Management". These elements are explained in more detail in Sections 1.0 *Introduction* and 6.0 *Documentation* of the WAS Quality Plan, but in general are accomplished by the WAS through the generation of 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 FDEP SOPs.

Reports

- Quality Assurance Reports (Annual)
- 303(d) Assessment Lists (Annual)
- 305(b) Integrated Reports (Biennial)
- TMDL Not Needed (for example, 4c Natural Condition Documentation, As Needed Basis)
- Reasonable Assurance Plans (RAP) (Every 5 Years)

D. DATA VALIDATION AND USABILITY

One of the primary functions of WAS involves conducting and/or reviewing IWR assessments as part of the state's waterbody restoration program for impaired waters. Section 9.2.4 *Data Use for Impaired Waters Assessment* of the [WAS Quality Plan](#) provides a reference to key documents explaining how decisions for data usability are made based on data quality assessments, as well as a description of how water quality data collected for the identification of impaired surface waters of the state is used in the impaired waters assessment. One document of particular interest explaining in detail Florida's 303(d) listing process is the biennial Integrated Water Quality Assessment for Florida: *305(b) Report and 303(d) List Update* available on the section's webpage at: <http://www.dep.state.fl.us/water/watersheds/assessment/index.htm>. For additional information on the data usability of water quality data in the impaired waters assessment and the 303(d) listing process please see the *303(d) List Decision Documents* available at the EPA's webpage: <http://www.epa.gov/region4/water/tmdl/florida/index.html>.

WAS field survey data collected internally meets the Data Quality Objectives and Data Quality Indicators established in FDEP Directive 972 (QA Directive), and incorporate the concepts and criteria found in FDEP's "Process for Assessing Data Usability", FDEP-EA-001/07, available at: http://publicfiles.dep.state.fl.us/dear/labs/sas/sopdoc/2008sops/usability_doc.pdf. Within these surveys, staff is 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 FDEP Central Laboratory in Tallahassee is responsible for all lab analyses performed on the submitted samples.

Sample documentation and reporting data with the appropriate data qualifiers are critical data quality objectives of the WAS intensive field surveys. Data gathered on these projects is entered into Florida STORET and must be properly linked to historical data, i.e. updates shall be made to existing STORET ID for a station. 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 FDEP WAS documentation requirements are based on the FDEP SOPs cited in the QA Rule Chapter 62-160, available at: <http://www.dep.state.fl.us/legal/Rules/general/62-160/62-160.pdf>. For additional information on these topics, please see Sections 9.2 *Data Review* through 9.3 *Corrective Actions* in the WAS Quality Plan, which highlights these important data quality objectives.

The USEPA Region 4 Quality Assurance Section, QAPP Review Checklist contains specific elements devoted to a description of types of reports and their frequency, and results of periodic data quality assessments under Section D1 "Data Review, Validation and Verification", D2 "Validation and Verification Methods", and D3 "Reconciliation of Data to Project Objectives". These elements are explained in more detail in Sections 7.3 *Test Methods*, 9.0 *Data Review and Assessment*, 9.2 *Data Review*, and 9.2.4 *Data Use for Impaired Waters Assessment* of the WAS Quality Plan, but in general since water quality monitoring is carried out by many agencies and groups statewide, it is particularly important that FDEP evaluate the QA of the data used in 303(d) assessments.

Monitoring entities submitting data to the agency are required to follow a comprehensive set of Standard Operating Procedures (SOPs) set forth in rule Chapter 62-160, F.A.C., and specified in the FDEP 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 was adopted on July 30, 2014, requires all entities submitting data to FDEP be certified by the National Environmental Laboratory

Accreditation Conference (NELAC) through FDOH. Additionally in September 2009, FDEP 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, FDEP 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 FDEP 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 audits by the FDEP 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 included for future monitoring. Overall, the excluded data makes up a small proportion of the total. Data that were excluded from the assessments are listed below:

- All records having numeric values for results of 888, 8888, 88888, 888888, 8888888; 999, 9999, 99999, 999999, 9999999
- All records coded as belonging to the City of Lakeland (as requested by the City based on data quality issues)
- All records having no value for the sample Date
- All records having qualifier codes of F, N, O, V, or Y
- All records coded as belonging to the St Johns River Water Management District having a J-qualifier
- All records coded as belonging to the Special Projects Section having a J-qualifier
- All records from Florida STORET coded as results for blanks
- All records from Florida STORET that cannot be matched to a legacy STORET parameter code
- All chlorine result records from Florida STORET coded as belonging to the City of Jacksonville
- All metals result records prior to the year 2000 from Florida STORET coded as belonging to Orange County
- All unionized ammonia result records from Florida STORET coded as belonging to Orange County
- All records having result values reported as below detection limits from Florida STORET, when no detection limits are provided
- All records having result values reported below quantification limits from Florida STORET, when no detection limits or no quantification limits are provided
- All records having inconsistent reporting of method detection limits and quantification limits
- All unqualified fecal coliform results data having result values reported as zero
- All dissolved oxygen records from volunteer monitoring organizations known to use field kits
- All non-fecal coliform result records coded as belonging to the SEAS program
- All orthoPhosphate result records prior to 02/10/2007 processed by the Test America lab in Tampa
- All turbidity, fecal coliform, BOD, and chlorophyll-a result records prior to 06/30/2008 processed by the TestAmerica lab in Tampa

- All fecal coliform and BOD result records prior to 10/01/2007 coded as belonging to the Southwest District processed by their own lab
- All result records coded as belonging to Lee County prior to 09/15/2004 for TN, NH₄, TKN, NO₃, NO₃O₂, ORGN, TP, and COLOR
- All result records coded as belonging to the Bream Fisherman's Association prior to 11/04/2007 for TN, NH₄, BO, CU, AS, PB, ZN, PH, COND, and DO
- All result records coded as belonging to McGlynn Labs between the dates of 9/28/2000 and 10/04/2004 for species of nitrogen, species of phosphorus, chlorophyll-a, and lab turbidity
- All results records coded as belonging to McGlynn Labs prior to 10/04/2004 for fecal coliforms and BOD; ALK, TSS, COLOR, TOC, chlorides, and total coliforms
- All chlorophyll-a result records coded as belonging to the Northwest District for the year 2001; all fecal coliform result records coded as belonging to the Northwest District for the year 2005
- All chlorophyll-a result records coded as belonging to the Central District for the year 2003; all fecal coliform result records coded as belonging to the Central District for the year 2002

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).