Quality Plan for the Water Quality Standards Program Florida Department of Environmental Protection

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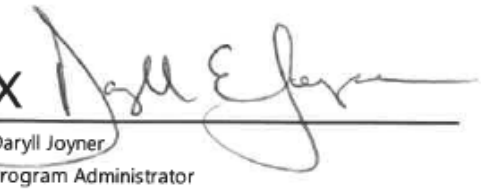
Signature Page

The undersigned have read and understood this Quality Plan, are charged with managing and improving the quality system, and are responsible for ensuring that all staff properly execute the procedures discussed in the plan.

X 

Daryll Joyner
Program Administrator

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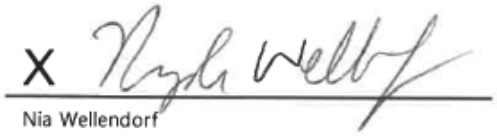
Ken Weaver
Environmental Administrator

X 

Nia Wellendorf
Environmental Administrator

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Jennifer Claypool
Quality Assurance Officer

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Michael Blizzard
Program Manager

1. Introduction

To execute the components of the Florida Department of Environmental Protection's (department) QA Directive, the Water Quality Standards Program (WQSP) has developed a quality plan to ensure the implementation of a quality system when conducting WQSP activities. The WQSP includes the Aquatic Ecology and Quality Assurance Section (AEQAS) and the Standards Development Section (SDS), and this document pertains to both sections. This document describes the steps WQSP staff take to ensure the scientific and legal defensibility of environmental data generated or used by the Program. It details the processes that Program staff use to ensure that environmental data meet established quality criteria.

The AEQAS is responsible for coordinating the Quality Assurance (QA) program for the Regulatory, Ecosystem Restoration, and Land and Recreation programs. The QA program oversees the implementation of a management system (planning, review, training, and assessment) to ensure that data collection, generation, interpretation, reporting, evaluation and management are of sufficient quality to support department decisions. The effectiveness of the department's QA program is dependent upon the actions of all department staff, from "front line" employees to management, meaning QA is a function distributed throughout our organization. The QA Program ensures that department QA activities are carried out according to commitments made to the Environmental Protection Agency as described in the department's Quality Management Plan (QMP), Revision 7 (2/10/14). AEQAS is also responsible for the bioassessment functions of the Division. The section maintains the bioassessment SOPs, coordinates training for DEP staff and outside agencies, and conducts studies to improve the bioassessment tools.

The SDS is responsible for reviewing, establishing, and revising state water quality standards, as established in Chapters 62-302 (Surface Water Quality Standards), 62-4 (antidegradation policy in Rule 62-4.242), and 62-303 (Impaired Waters Rule), Florida Administrative Code (F.A.C.). The components of Florida's water quality standards include: classifications and uses, criteria, the antidegradation policy, moderating provisions, and special protection of certain waters (Outstanding Florida Waters). The section also reviews petitions for waterbody use classification changes via Use Attainability Analyses (UAA) and for Site Specific Alternative Criteria (SSAC). The section provides guidance on the implementation of antidegradation policies in Rule 62-4.242, F.A.C.

The department Secretary is committed to implementation of the QA requirements in the QMP and as authorized at Section 403.0623, F.S., and Chapter 62-160, F.A.C. (QA Rule for Regulatory, Ecosystem Restoration, and Land and Recreation programs). It is the Secretary's intent to carry out these obligations and requirements as described in the department's QA Directive (Directive 972, November 2016).

All WQSP staff are expected to read, understand and follow the procedures and criteria as described in this plan, and to carry out their assigned responsibilities for effective utilization of our quality system.

2. Basic Elements of the WQSP Quality Plan

This Quality Plan explains both the process and criteria by which WQSP's quality system is managed, and identifies current staff and their QA responsibilities. The plan is used to inform our staff of current and future QA activities and discusses how specific QA duties are assigned. The Quality Plan is also used as a training document for new staff and as a reference for experienced personnel. WQSP Staff will

revise our Quality Plan as needed, and will ensure the consistent application of procedures and criteria for the generation or use of our environmental data. The Quality Plan addresses all WQSP activities associated with environmental sampling, field testing, and data review, including those activities associated with database construction and management, as well as those responsibilities assigned to the program via the DEP QA Directive for implementation of the Department's quality system. The WQSP plan also addresses how decisions about data use are made based on data quality assessments. The plan and its revisions also serve as an archival record of our formal quality system.

The elements of our plan are consistent with the department's QMP, Quality Assurance Directive, and QA Rule (Chapter 62-160, F.A.C.). In addition, we affirm that our quality system for all sampling activities, including field-meter testing, is consistent with DEP SOP FA 3300 (which discusses required topics for quality manuals for field organizations).

2.1 Policy Statement

It is the Water Quality Standards Program's policy to:

2.1.1 Use scientifically valid and legally defensible data for our decisions affecting protection of the environment, especially relating to water quality criteria development and assessing Florida's water resources;

2.1.2 Develop and implement the Quality System described in this document;

2.1.3 Adaptively manage our Quality System to be consistent with provisions of the department Quality Management Plan and QA Directive;

2.1.4 Ensure that all Program staff are properly trained to execute their assigned functions;

2.1.5 Implement procedures to evaluate the quality of the data we use and to implement corrective actions when data do not meet our Data Quality Objectives (DQO);

2.1.6 Periodically audit the performance and record-keeping practices of data generators that provide data to the department;

2.1.7 Make sound data use recommendations based on the DQOs of a department program and the results of a data audit or inquiry;

2.1.8 Implement QA procedures for the management of our data repositories; and

2.1.9 Carry out assigned duties for the implementation and active oversight of the Department's quality system per the QA Directive.

2.1.10 Perform a yearly systematic assessment of our QA activities, including any needed corrective actions, with the findings submitted to our Quality Assurance Officer and reviewed by our Program Administrator, who is responsible for ensuring that corrective action policies and procedures are implemented when data do not meet our program DQOs.

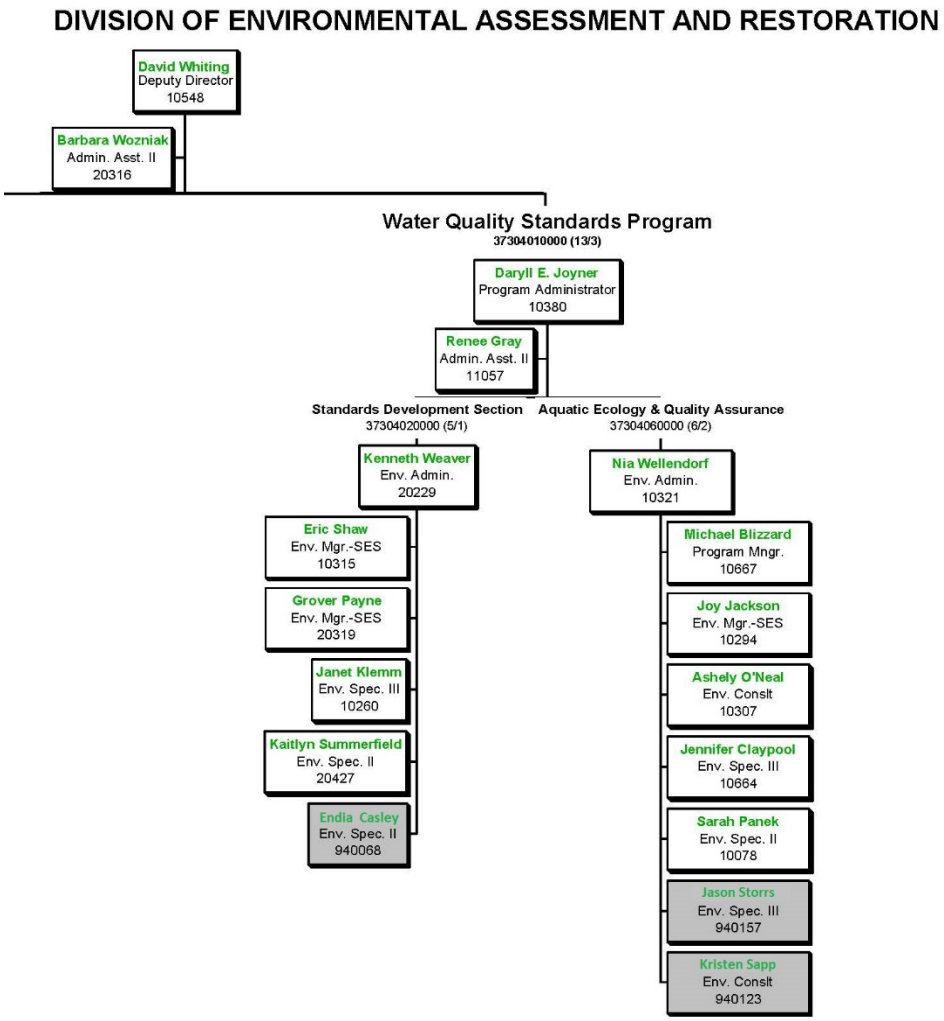
3. Ethics

All employees of the WQSP are held to high professional ethical standards in the performance of their duties. Employees are bound by state law to observe, in their official acts, the highest standards of ethics consistent with the State Code of Ethics for Public Officers and Employees. In addition, all employees are required to take an annual ethics training class. Improper, unethical or illegal actions will be dealt with per the published department Administrative Directives.

4. Organization and Responsibilities

The WQSP resides within the Division of Environmental Assessment and Restoration (DEAR). Daryll Joyner is the Program Administrator of the WQSP, and Renee Gray is the Administrative Assistant. Daryll oversees both the AEQAS and the SDS. Nia Wellendorf is the Environmental Administrator for the AEQAS, and Ken Weaver is the Environmental Administrator for the SDS. Individual staff are shown in the organization chart (figure 1), and their responsibilities are listed below in sections 4.1.2 and 4.1.3.

Figure 1: Organizational Chart



4.1 Staff Responsibilities

The WQSP functions in several capacities to assist with department priorities, including the development and maintenance of surface water quality standards (Chapters 62-302, 62-303, and 62-4, F.A.C.), overseeing the department's QA Program (including maintenance of Chapter 62-160, F.A.C., (Quality Assurance Rules), directing the department's biological assessment program, and providing a wide variety of technical support such as conducting focused environmental studies, auditing field and laboratory records, and training and auditing department and external staff for performance of field activities. Responsibilities for existing staff are as follows.

4.1.1 Standards Development Section Activities

Ken Weaver, Eric Shaw, Grover Payne, Janet Klemm, Endia Casley, and Kaitlyn Summerfield perform the following duties:

- Develop, coordinate, maintain, and revise Florida's surface water quality standards. Standards include Designated Uses and surface water classifications, numeric and narrative criteria for protection of aquatic life, recreation, and human health, the antidegradation policy, and certain moderating provisions such as variances and site specific alternative criteria;
- Conduct the Triennial Review of water quality standards;
- Provide technical assistance regarding surface water quality standards, uses, criteria, antidegradation, Outstanding Florida Waters, water quality standards implementation, site specific alternative criteria to department programs, other Federal, state, and local agencies, and to the public;
- Coordinate the review and approval or disapproval of study plans in support of reclassifications, site specific alternative criteria, and Level II Water Quality Based Effluent Limitations (WQBEL);
- Respond to petitions received for changes to any aspect of Florida's surface water quality standards. Response includes coordination and communication with departmental staff, other agencies, and the public; gathering appropriate data and documentation; development of special studies if further data are needed; analysis and evaluation of the proposal; development of a departmental recommendation and alternatives; compiling reports of the proposal and activities; conducting public workshops; following appropriate rulemaking procedures; submission to the Environmental Regulation Commission (ERC) or Secretary as appropriate; and, submission of final rule package to the United States Environmental Protection Agency (EPA);
- Analyze environmental data for development of statewide or site-specific criteria;
- Review documents for errors and completeness;
- Develop, maintain, and revise the GIS data layers for surface water classifications, Outstanding Florida Waters, numeric nutrient criteria, and Site Specific Alternative Criteria.
- Provide technical assistance on water quality standards-related questions to the public, Department staff, and other agencies;
- Design, manage, coordinate, and implement environmental studies for the development of water quality criteria and assessment of surface water uses and classifications. Management of studies includes the organization of data in relevant databases, including STORET or WIN, and statistical analysis, interpretation, recommendation formulation, and report preparation;
- Coordinate with other department staff and programs on TMDLs, site specific interpretations of the narrative nutrient criterion, listing decisions, and permitting;
- Coordinate with U.S. EPA, U.S. Fish and Wildlife Service, and NOAA National Marine Fisheries Service on potential endangered species issues related to water quality standards changes;
- Provide leadership and manage sampling and analysis contracts for the south Florida Canals Aquatic Life Study; and

- Provide technical support on Everglades issues, when requested.

4.2 Quality Assurance Program Activities

4.2.1 Aquatic Ecology and Quality Assurance Activities

4.2.1.1 Duties of the department QA Coordinator

Michael Blizzard is the designated Quality Assurance Coordinator for the Water, Waste, and Land and Recreation programs, as described in the department's QMP, and is the QA liaison for all associated organizational units therein. The QA Coordinator responsibilities include:

- Preparing and distributing the QMP. Ensuring that the department quality systems documented in the QMP meet all relevant requirements prescribed in Florida statutes, department contracts and grants, and all delegation and performance partnership agreements for work funded and mandated by EPA;
- Updating the QA rule and incorporated documents and SOPs as needed;
- Developing, implementing and overseeing the continued execution of the department's QA policies;
- Providing leadership for all data quality issues;
- Ensuring that each agency program has a program-specific quality plan;
- Coordinating the efforts of all program Quality Assurance Officers (QAOs) by holding regularly scheduled meetings, and providing specific guidance and training to the program QAOs;
- Independently evaluating the effectiveness of the department's Quality System and initiating corrective actions where warranted;
- Coordinating the preparation of an annual QA report on all QA activities to the DEP Secretary, including recommendations for improving the department's Quality System;
- Interacting with data generators and providers, data consumers and external organizations concerning department QA matters, including providing training and technical assistance; and,
- Publishing the Quality of Science e-Newsletter as needed to disseminate important updates to the general scientific community regarding the QA rules and other QA matters.

4.2.1.2 Duties of the Water Quality Standards Program Quality Assurance Officer

Responsibilities of our section Quality Assurance Officer (QAO), Jennifer Claypool, include:

- Conducting and/or coordinating evaluation of the quality of data used by the section;
- Overseeing staff performance of assigned QA functions;
- Conducting and/or coordinating systems audits of internal and external data generators (lab and field) and sampling performance audits;
- Ensuring that corrective actions are implemented for data non-conformance incidents as

determined by evaluation of the data used by the program against established DQOs;

- Assisting program managers in the development of program-specific Quality Systems and the logistical aspects of implementation, such as coordinating associated training needs;
- Coordinating data reviews and the documentation of all program QA activities, including training, audits and corrective actions; and
- Updating the Quality Plan as needed.

4.2.1.3 Other Quality Assurance Duties

Responsible staff:
Michael Blizzard, Nia Wellendorf, Ashley O'Neal, Jennifer Claypool, Joy Jackson, Kristen Sapp, Sarah Panek, and Jason Storrs (all AEQAS staff) perform the following duties:

- Maintain and update as needed the QA Rules (Chapter 62-160, F.A.C.) and the collections of department Standard Operating Procedures (DEP-SOP-001/01, DEP-SOP-002/01, and DEP-SOP-003/11);
- Evaluate new technologies and methodologies proposed for incorporation into department rules and procedures;
- Coordinate, evaluate, and report on bioassessment QA activities;
- Develop data quality planning and assessment criteria, Data Quality Objectives (DQOs), and Data Quality Indicators (DQIs) for regulatory and contractual data use;
- Conduct and assist other department staff with reviews of QA documents for contracts and grants;
- Maintain templates for grant and contract QA attachments and provide QA training to grant and contract staff;
- Conduct field and laboratory audits;
- Coordinate implementation of the QA Directive through QA training and development of information materials;
- Coordinate with and assist department QA Officers in the development of quality systems for department programs and organizational work units;
- Provide technical training on a variety of issues, such as ecological study design, sampling SOPs, and water quality standards;
- Assist with special studies, WQSP contract management, and water quality standards development through support of QA components;
- Administer the department-wide QA program for the water, waste, and land & recreation programs (see duties of the department Quality Assurance Coordinator); and,
- Provide technical assistance to department Programs concerning miscellaneous topics, when requested.

4.2.1.4 Aquatic Ecology Activities

All AEQAS staff perform the following duties:

- Implement the department's bioassessment program;
- Coordinate and assist in the development and review of biological assessment methods and SOPs (e.g., Stream Condition Index (SCI), Lake Vegetation Index (LVI), algal assessment methods such as the Rapid Periphyton Survey);
- Train and audit department and external staff, focusing on biological assessment SOPs and issues;
- Establish habitat benchmark sites for QA purposes;
- Coordinate LVI Proficiency Testing;
- Conduct lab records audits of macroinvertebrate taxonomy data produced by the DEP and external labs that are used by the department;
- Assist in the development and review of water quality standards, which includes criteria, designated uses (surface water classifications), antidegradation policies, and certain moderating provisions;
- Coordinate, perform sampling, and produce reports for directed studies (e.g., Site Specific Alternative Criteria studies, stressor identification studies, and bioassessment development studies);
- Conduct scientific reviews for department programs (e.g., Minimum Flows and Levels program, Resource Conservation and Recovery Act program, Total Maximum Daily Load program); and
- Assist with Data Interpretation and Usability analyses for department programs and external programs and projects.

4.2.2 Support Activities for Sampling (both sections of WQSP)

WQSP staff perform many activities in support of sampling efforts for department projects and programs (staff responsibilities are as indicated):

- Design sampling plans to meet project- and program-specific needs (Ken Weaver, Michael Blizzard, Joy Jackson, Eric Shaw, Grover Payne, Nia Wellendorf, and Ashley O'Neal);
- Prepare QA plans and SOPs (Michael Blizzard, Nia Wellendorf, Ashley O'Neal, Joy Jackson, Kristen Sapp, and Jennifer Claypool);
- Review procedures and methods for compliance with QA plans and requirements (Michael Blizzard, Nia Wellendorf, Joy Jackson, Ashley O'Neal, Kristen Sapp, and Jennifer Claypool);
- Provide guidance for and process requests for use of alternative or modified sampling procedures according to requirements in Chapter 62-160.220, F.A.C. (Michael Blizzard, Nia Wellendorf, Ashley O'Neal, Kristen Sapp, and Jennifer Claypool);

- Answer public or external technical inquiries about data interpretation, approved procedures, suspected QA problems, site-specific issues, etc. (Michael Blizzard, Nia Wellendorf, Ashley O'Neal, Jennifer Claypool)
- Manage WQSP field sampling, field-testing and associated support operations (Joy Jackson, Nia Wellendorf, Jason Storrs, and Sarah Panek);
- Conduct field sampling, field-testing and associated support operations (Michael Blizzard, Nia Wellendorf, Joy Jackson, Ken Weaver, Ashley O'Neal, Eric Shaw, Grover Payne, Jennifer Claypool, Kaitlyn Summerfield, Kristen Sapp, Jason Storrs, and Sarah Panek);
- Review Ecosummary reports written by department Regional Operations Centers (ROC) samplers (Joy Jackson, Nia Wellendorf, and Ashley O'Neal);
- Conduct aquatic and wetland plant identifications and verifications for other DEAR staff (Ashley O'Neal and Nia Wellendorf).

4.2.3 Support Activities for Laboratory Analysis

4.2.3.1 WQSP staff provide guidance for and process requests for use of alternative or modified lab methods according to requirements in Rule 62-160.330, F.A.C. (Michael Blizzard, Nia Wellendorf, Jennifer Claypool, and Kristen Sapp).

4.2.3.2 WQSP staff routinely review laboratory data at the request of other departments and outside agencies. Data are reviewed for adherence to the provisions of the QA rule and the Data Usability document, DEP-EA 001/07, to determine the usability for specific purposes, or to give an overview of the quality and defensibility of the data.

4.2.3.3 Additionally, Michael Blizzard, Nia Wellendorf, Ashley O'Neal, Joy Jackson, Jennifer Claypool, Sarah Panek, Ken Weaver, and Grover Payne answer public or external technical inquiries about data interpretation, approved procedures, suspected QA problems, site-specific issues, etc.

4.2.3.4 Our unit's management, Daryll Joyner, Nia Wellendorf, Ken Weaver, and Michael Blizzard, ensure that the WQSP quality system is fully operational for all activities within our program. Jennifer Claypool has been designated as our Quality Assurance Officer. These individuals also evaluate the Data Quality Objectives and Data Quality Indicators found in Table 1 to ensure they meet our program's needs, and periodically evaluate the effectiveness of staff's data quality assurance activities, including reviewing internal audit results. They evaluate corrective action policies and procedures to be implemented when data do not meet our established program DQOs. Our managers discuss audit results with the QAO, and review the annual QA Report to the Secretary.

5. Training

WQSP personnel shall be properly trained to perform their duties. Supervisors periodically assess whether our staff performance conforms with the policies and procedures of our work unit.

5.1 Internal Training Procedures

Ensuring all new WQSP field staff are familiar with the QA Rule requirements and the details involved with department SOPs includes the following tasks:

5.1.1 Staff must complete the appropriate environmental sampling training program for the job duties assigned.

5.1.1.1 For general and water sampling, this is the DEAR Water Quality Sampling Training. The link to this training program is internal and not available to the public.

5.1.1.2 For bioassessments, requirements consist of hands-on training at Bear Creek in SCI, LVS, and RPS, and completion of the Stream Condition Index and Habitat Assessment (SCI/HA) apprenticeship program, as detailed in DEP SOPs BRN 1000, SCI 1000 and FA 1000 (Part FA 5720, HA training).

5.1.1.3 For the Lake Vegetation Index, training includes attending plant identification workshops, participating in field training and team proficiency testing, and passing the on-line plant test (for applicable staff) as detailed in LVI 1000.

5.1.2 Staff will be trained for specific QA functions, including performing audits, and data verification and validation projects. This is done for appropriate staff via meetings and hands-on training.

5.1.2.1 Staff responsible for supporting the program's QA functions must read materials posted on the QAO Resources page on the QA website and become familiar with those topics applicable to their assigned duties.

5.1.3 All WQSP staff must complete the annual DEP "combo refresher" training, which includes ethics training.

5.2 Proficiency Evaluation

5.2.1 Sampling staff are evaluated by reviewing their performance to determine effectiveness of training. For example, field staff must be trained in biological assessment and habitat assessment procedures, and pass audits for those assessment procedures prior to collection of samples or field data (see section 5.1). Similarly, as part of the DEAR training program, new staff are audited by experienced staff during collection of water chemistry samples, field measurements, and use of other SOPs prior to collecting samples and performing field tests as lead samplers. Senior staff review raw field data sheets to determine that all staff are consistently conducting the sampling and documenting information as required by the DEP SOPs.

5.2.2 Staff training metrics are included in the WQSP reporting templates submitted for the annual QA report to the Secretary. Individual staff must maintain training logs for water sampling, SCI, and HA training, found on the bioassessment training website.

5.2.3 For selected department biological assessment tools, staff must maintain proficiency to conduct the sampling (see section 5.1). The AEQAS maintains an internet-based list of proficient samplers statewide, and WQSP staff are included on that list if they pass the appropriate QA measures as described in SOPs associated with the biological tools, as follows:

Biological Measurement Tool	*SOPs containing Training & Proficiency Requirements*	*Testing Procedure*
Stream Condition Index (SCI)	SCI 1200, SCI 1300	Online test of concepts and field demonstration (benchmark site SCI score within acceptance criteria) every 5 years
Stream Habitat Assessment (HA)	FA 5720	Consistency demonstration of independent field assessment of benchmark sites (initially and every 2 years)
Lake Vegetation Index (LVI)	LVI 1200	Online taxonomic test (for applicable LVI team members) and LVI team consistency demonstration of independent field assessment of benchmark sites (initially and every 2 years)
Biological Reconnaissance (BioRecon)	BRN 1200, BRN 1300	Online test of SCI concepts and field audit every 5 years

5.2.4 Staff who conduct audits, perform data evaluations, or generate reports are periodically evaluated by senior staff. This evaluation is informal and usually in the form of editing or review of work products such as audit reports, data summaries, or project reports.

5.3 External Training

5.3.1 AEQAS staff hold semi-annual training sessions for DEP stream bioassessment SOPs (SCI, habitat assessment, RPS, and LVS) at locations throughout the state (e.g., Bear Creek Environmental Center, Starkey Wilderness Preserve).

5.3.2 AEQAS staff hold semi-annual training sessions in DEP SOPs at the University of Florida's Center for Training, Research and Education for Environmental Occupations (TREEO). The training sessions are held jointly with the Site Investigations Section and cover the SOPs necessary for surface water, ground water, drinking water, and wastewater sampling.

5.3.3 AEQAS staff participate in the DEAR training and apprenticeship program. AEQAS staff write and maintain training checklists and coordinate with other programs within DEAR to determine training needs and ensure consistency.

5.3.4 AEQAS staff train other DEP staff and outside agencies upon request in the use of DEP SOPs, Quality Assurance practices, and auditing procedures.

5.3.5 SDS staff offer training as needed for Numeric Nutrient Criteria and other standards implementation.

6. Sampling Design and Procedures

Successful implementation of the WQSP relies on having valid data, which begins with proper study design and sampling. Studies are designed to answer a wide variety of environmental questions, and therefore, each study should contain specific elements or objectives best suited for answering the question at hand. Studies could involve judgment sampling (sampling sites upstream and downstream of a suspected pollutant source or a Before-After-Control-Impact design), probabilistic sampling (selecting sites randomly along a stratified-random gradient), or other methods. Extensive discussion of various study objectives/study design are found in the following documents produced by the WQSP:

- Sampling and Use of the Stream Condition Index for Assessing Flowing Waters: A Primer;
- "Sampling and Use of the Lake Vegetation Index (LVI) for Assessing Lake Plant Communities in Florida: A Primer";
- "Development of Type III Site Specific Alternative Criteria for Nutrients";
- "Process for Reclassifying the Designated Uses of Florida Surface Waters ";
- Implementation of Florida's Numeric Nutrient Standards; and
- Everglades "Data Quality Screening Protocol"

The following are water quality parameters commonly collected by the WQSP, depending upon the needs of the study.

- Preserved Nutrients (TKN, TP, NOx, NH3)
- Filtered Nutrients (Orthophosphate)
- Unpreserved Nutrients (NO2, NO3,
- Total Organic Carbon
- Sulfate (SO4)
- Physical/Aggregate Properties (TDS, TSS, TS, Turbidity, Alkalinity, Color)
- Chlorophyll
- BOD
- Microbiology (e. coli, fecal coliform, enterococci)
- Macroinvertebrates
- Phytoplankton (algal blooms or research)
- Periphyton
- AGP
- Metals
- Filtered Metals
- Base Neutral/Acid Extractable organics
- Pesticides
- Volatile Organics
- Bioassays

Most often, a direct grab with the sample container is performed; however, pole samples, dippers, peristaltic pumps, and Alpha bottles may also be used as needed. Yellow Springs Instruments (YSI) Multi-probed units are most often used to collect field measurements of dissolved oxygen (DO), pH, specific conductance, and temperature. The instruments are verified and calibrated per DEP SOPs FT 1000, FT 1100, FT 1200, FT 1300, FT 1400, and FT 1500. AEQAS maintains a YSI unit for WQSP

use. Additional YSI units are maintained by the Biology Program in the DEP Laboratories. Calibration and verification records are kept with each unit and maintained within the Laboratories document control system.

Field documentation and quality control for field sampling activities follow DEP SOP FD 1000 and DEP SOP FQ 1000. The DEP lab maintains SOPs for sample handing, log in and custody, lab procedures, data entry, analytical methods and quality control.

6.1 Sample Scheduling and Trip Planning

The Laboratory Information Management System (LIMS) is a tool used for scheduling sampling events, entering, searching and viewing data. LIMS also can be used to create electronic or hard copy reports. WQSP staff use LIMS to schedule samples with the DEP labs, print field sheets, and retrieve data. For WQSP sampling, the customer in LIMS is "BSSP," which includes the following projects:

ALG-GR-STY: Algal Gradient Study
DESIG_USES: Evaluation of Designated Uses
DIS_OXYGEN: Dissolved oxygen project
EPA-NWCA: EPA National Wetland Conditions Assessment
LANDG-GOMA: Gulf of Mexico Mercury and Nutrient sampling
LKWTCH-DEP: Comparability Study
LOWWATER: Effect of drought and low water on SCI
MCKAY-BAY: McKay Bay Contaminants Project - Multi Agency project
MST-SAMPLG: Microbial Source Tracking Sampling - Color and Turbidity
NNC-STUDY: Coastal numeric nutrient criteria (NNC) project with NOAA
NT-ESTUARY: Estuary Nutrient Criteria Development Project
NT-LON-STY: Nutrient Longitudinal Study
NT-LVI-STY: Nutrients and LVIs in Lakes
NT-REF-SIT: Nutrient Criteria Reference Sites
QA-INVSGTN: Quality Assurance Investigations
RECLASS: Assess potential revisions to the surface water classifications
RND-ROBIN: Project for Round Robin Samples
SCI-BNCHMK: Benchmark SCI Sites for Re-auditing Purposes
SCI-DUPS: Evaluation of variability for SCI_2007
SCIREF: SCI Stream Reference Site - Not to be used for TMDL projects
SSAC-PETTN: Site Specific Alternative Criteria Petition
STRESSORID: Stressor ID Project
WETLAND-DO: DO monitoring in wetlands
WW-NUT-EFF: WWTP Effects Study
CLAMBAYOU
EST_NT_CRKS
PEACE_BSN_STY

WQSP staff take the following steps to schedule and prepare for sampling trips:

6.1.1 After scheduling a sampling trip in LIMS, labels for the sample bottles are printed using the program, DYMO Label version 8. Staff select the appropriate size of the labels loaded in the

DYMO printer and ensure the labels are waterproof. Labels should include the site name and the latitude and longitude of the site. Two barcodes should be included: one generated for the field ID and a second for the WIN ID. Remember to create designated space for the date, time, and initials of the sampler. Select the number of labels desired and print.

6.1.2 Once the sampling kit has been received from the lab, attach the labels to the sample bottles and use a checklist to collect all the equipment you will need for sampling. Check the weather and recent water level readings to determine if it is an appropriate and safe time to sample.

6.2 Sampling Procedures

6.2.1 When you reach the sampling site, verify that conditions are appropriate for sampling and the site is representative.

6.2.2 Follow the procedures in the DEP SOPs for the applicable type of sampling. Use the appropriate equipment for the sampling conditions. Collect your samples and preserve according to the codes on the bottles. Preserve and filter (as needed) within 15 minutes of collection.

6.2.3 Collect any field meter readings or physical measurements required by the sampling plan.

6.2.4 Before leaving the site, check to be sure that all the needed procedures were completed and no equipment or trash was left behind.

6.2.5 Bring any samples that need analysis back to lab and follow procedures for transferring custody.

6.3 Data Review and Upload to WIN

6.3.1 Field data sheets are generated in hard copy formats in the field for all water quality samples and biological monitoring activities. After returning from the field, samplers must review documentation from the field trip and ensure that records are complete and accurate. All records are retained in accordance with the department's Records Retention Schedule. Hard copy files are stored in project folders in Room 238A. Scanned copies of all additional field records are stored in the WQSP common electronic folder. Laboratory reports are received in an electronic format from the Central Laboratory. These records are stored electronically in the WQSP common network drive folder. Erasing or obliteration of 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 are required to be legible. Unless otherwise specified by statutes or directives, all hard copies of records shall be retained for a minimum of five years after the date of generation or completion of the project unless otherwise specified in a Department contract, order, permit or Title 62 rules, in accordance with Rules 62-160.240, 62-160.340, and DEP SOP FD 1000. After five years, hard copies of records shall be maintained per the official DEP records retention schedule. Electronic copies of records will be stored indefinitely.

6.3.2 Previously, data collected by WQSP staff were uploaded semi-annually or as needed to the Florida data Storage and Retrieval System (STORET) under the organization (Org) code "21FLWQSP." If a sampling station had not yet been established in STORET, the station was named using the following convention: [first three letters of county name][last two digits of year

of project initiation][first three letters of waterbody name][ordinal indicating which site for that waterbody]. For example, if two sites on Beaver Creek in Leon County were sampled for a project starting in 2013, the STORET site names would be LEO13BEA1 and LEO13BEA2. STORET will no longer be used for data upload as of July 2017, but the data already in the database will be stored indefinitely and can be retrieved any time.

6.3.3 A new data repository was brought online in July 2017. The Watershed Information Network (WIN) includes many Quality Assurance checks that are not available in STORET. New data will generally be entered in WIN as it is received by the department, or within 6 months. The data currently in STORET will not be migrated to WIN, so both data repositories will remain in use. Once entered, data must be checked for Quality Control. See section 8, Data Quality Review for procedures.

6.4 Long-Term Sampling Projects

WQSP staff perform field sampling at a network of stream and lake reference sites, which are used to establish natural background conditions. Stream reference sites currently sampled include 21 sites from the following counties: Bay, Calhoun, Liberty, Gadsden, Leon, Wakulla, Jefferson, Taylor, Madison and Lafayette. The current list of analytes for reference streams is listed in this document, for lakes it is listed here. At reference sites that are currently listed as impaired for fecal coliforms per Chapter 62-303, F.A.C., WQSP staff also collect samples for analysis of E. coli, fecal coliforms and microbial source tracking. WQSP also samples approximately five reference lakes. Descriptions of these projects are in the common sampling folder.

Occasionally, data are needed to support applications for Site Specific Alternative Criteria (SSAC) or Water Quality Based Effluent Limitations (WQBEL). When additional data are needed and the department is responsible for data collection, WQSP staff will either collect the required data, or arrange for another department program to collect it.

7. Quality Assurance Program Procedures

7.1 Development of the QA Rules and the department Standard Operating Procedures

AEQAS staff periodically update the QA Rules, Chapter 62-160, F.A.C., and DEP SOPs (DEP-SOP-001/01, DEP-SOP-002/01 and DEP-SOP-003/11) to ensure that they accurately reflect ongoing technical and scientific advancements and are practical and suitable for carrying out the department's mission. WQSP staff routinely accept technical input on QA Rule and DEP SOPs and periodically hold public workshops at the time of rule development to solicit public comment on any proposed revisions. Revised versions of the documents are posted on the WSQP website and finalized when the rulemaking process is complete.

7.2 Evaluation and Approval of Alternative or Modified Methods

(This section is pending approval of the 2016/2017 updates to the QA rule and DEP-QA-001/01) AEQAS staff review and either deny or approve applications from external parties for alternative or modified field or laboratory procedures, per Rules 62-160.220 and 62-160.330, F.A.C. Staff review requests to check that applicants have provided the information required in the QA Rule and, for

laboratory methods, the document "Alternative and Modified Analytical Laboratory Methods (DEP-QA-001/01)." Checklists have been created to ensure that the review of each request is consistent. General checklists are found in this folder. FLPRO has a unique set of checklists that were specifically written to perform a detailed comparison of the approved DEP FLPRO method and the alternative or modified method submitted.

To determine equivalence for a proposed alternative or modified field or lab procedure, staff may conduct and/or require from the requester specific statistical tests to evaluate whether a dataset of sample results using the requested method is statistically significantly similar to a dataset of results using the DEP-approved standard or reference method. Per recommendations in Niu et al. (2014), the following statistical tests are used: Student t-test, Wilcoxon signed rank test or Fisher Sign test, and Bland and Altman's limits of agreement. When evaluating statistical differences, staff consider whether those differences are relevant to the scale for the proposed application of the method. For example, if the difference between two types of meters is statistically significant, but that difference is less than the allowed margin of error for that test, the alternative meter could be approved.

If a proposed alternative or modified method is approved, that approval is communicated in a letter to the applicant. The letter must be signed by the Deputy Division Director or the Division Director, and then certified by a department Clerk. The letter shall have an Office of the General Counsel (OGC) tracking number for official agency action. The letter may be transmitted via e-mail. All approvals or disapprovals of new methods are announced in the Quality of Science Newsletter, and approvals for statewide use (as defined in the relevant rules of Chapter 62-160) are also published in the Florida Administrative Register (FAR). Both alternative and modified method approvals are posted on the department website for approvals of alternative and modified methods.

7.2.1 General Procedure for Review of Alternative and Modified Method Requests

7.2.1.1 The AEQAS staff member receiving the request or approval inquiry will first determine whether any submitted information is complete. This may require consultation with the requestor prior to the submission of any information or validation data. The reviewer must clearly determine the scope of the requested approval and whether Department approval is required according to 62-160.220, F.A.C., (field) or 62-160.330, F.A.C. (lab), as some method modifications are preapproved, and are described in these two rule sections. The requester will be apprised of submission requirements by the AEQAS member, according to the appropriate rule section and AEQAS checklists. The relevant checklists may be provided to the requester to facilitate this process. During the consultation process, AEQAS staff will inform the AEQAS section administrator and QA program manager about the scope of approval requested. The section administrator will assign the review to a designated staff member.

7.2.1.2 Once the data and supporting information for the request are received at AEQAS, the reviewer will examine all information for conformance with the submission package requirements listed in 7.2.1.1 above. As necessary, the reviewer will enlist the expertise of other section members or expert staff from other programs, usually the DEP Chemistry and Biology lab programs, to assist with problems and questions concerning the submission. If it is likely that DEP regulatory program staff should be apprised of the approval request, the appropriate program(s) should be contacted early in the review

process to ensure that data quality objectives for regulatory data use will be met. The full description of the proposed method steps and the validation of submitted data must be verified by the reviewer before proceeding with any approval (or disapproval).

During this process, it is often necessary to solicit additional clarification and documentation from the requester to verify all information submitted. This may be accomplished with phone calls and emails, including emailed support documents and document revisions submitted by the requester to provide the additional information. In some cases, a resubmission of validation data from a new study may be required. Staff should request such resubmissions informally, rather than incur the delay of a formal disapproval letter. Requesters are often amenable to performing new validation studies to help expedite timely approval. However, the reviewer will in all cases ensure that any approval is based on the written documentation, not verbal communications.

7.2.1.3 Once the review of the submitted information is completed, the AEQAS reviewer will determine whether the alternative or modified method has been validated for the scope of approval requested, including, when required, whether equivalency with the DEP-approved, standard or reference method has been demonstrated, according to the requirements outlined in 7.2.1.1 above. The reviewer will then route the review package to the AEQAS section administrator and QA program manager for final review, who will authorize the completed review and request approval of the package from the WQSP Program Administrator and the DEAR Deputy Division Director.

The reviewer will prepare an approval letter on DEP stationery, and request the OGC file number from the WQSP program attorney (see 7.2 above). The approval letter will provide a detailed list of the significant method modifications, or a complete description of the alternative method that is approved. In all cases, the scope of approval will be limited to that requested by the submitter and validated by the reviewed data. In no instance will an approval be granted without the Department's receipt of a complete SOP or published method that includes the step-wise details of the method and/or method modifications. Current templates for approval letters consist of previous approval letters retained in the AEQAS subfolder. The reviewer will use a recent approval letter as the example to edit for the current approval request. In the rare situation where a request is formally disapproved, the approval letter will be modified to indicate the technical reason(s) for denying an approval.

7.2.1.4 Once the official approval has been signed by the Deputy Director and Clerk, the reviewer may transmit the approval letter to the requester by email. The reviewer will inform the requester that the approved SOP or method will be posted on the Department website along with the letter (unless SOP or method confidentiality or copyright is claimed, which must be indicated with the original submittal of the SOP or method to DEP). If statewide-use approval is given to a request, the reviewer will work with WQSP staff to publish the approval in the FAR. Field procedures approved for statewide use are incorporated into the collection of DEP SOPs. The reviewer will list

the statewide-use method in the current DEP SOP revision tracker maintained by the section.

8. Data Review Procedures

WQSP staff understand the need to evaluate the quality and usefulness of environmental data prior to making decisions. Data used by WQSP is reviewed by staff to determine its usability for determination of compliance with permits or rules and as input for water quality standards development. Upon request, WQSP may review data for other programs and agencies. These procedures are based on established DQOs and DQIs, and incorporate the concepts and criteria found in the department's "Process for Assessing Data Usability", DEP-EA-001/07." See Table 1 for a list of routine DQOs and DQIs that are reviewed via the procedures in DEP-EA-001/07. Staff evaluate data using the WQSP DQOs and DQIs and implement corrective actions as directed by the QAO.

8.1 Biological Data Quality Review

Determining if biological data are usable by the Department for a certain purpose is a complex process requiring an objective evaluation of many factors. There are factors specific to each type of biological assessment tool, and specific data usability considerations are included in the SCI Primer and LVI Primer documents. AEQAS staff use data review checklists for specific tools (LVI, LVS, RPS, SCI, Hester-Dendys, and macroinvertebrate dredge sampling) to assess data usability for specific purposes (e.g., Impaired Waters listing per Chapter 62-303, F.A.C., wastewater permit compliance).

In general, the following are considered when making decisions about using biological data:

- The user must understand the purpose for the sampling, and extent to which the biological data meet the objectives of the program data use.
- The user must determine if the samplers were proficient in the bioassessment method. Bioassessment proficiency information is maintained on the department's website (see section 5.2).
- The user must evaluate field and lab quality control measures and supporting data (water quality data, other biological tools, companion tools [HA], other entities' [FDEP, WMDs, local governments] data for the same waterbody) to determine if appropriate SOPs were followed and if results were within expected levels.
- The user must determine the pattern, frequency, and magnitude of any QC issues associated with results.
- The user must determine the relationship between the bioassessment result (SCI, LVI, LVS, RPS score), the associated action level (listing decision, etc.), and the MDD (minimum detectable difference—a measure of uncertainty) associated with the method.
- The user must determine, to the extent possible, a reasonable cause for a failing or anomalous bioassessment score.

8.2 Data Quality Review for Water Quality Criteria Development

Water quality criteria are the ultimate threshold against which monitoring data will be assessed for Clean Water Act purposes. Therefore, water quality standards and criteria derivation require

particularly stringent quality assurance. Data used to develop water quality criteria for the protection of aquatic life from acute or chronic toxicity endpoints are reviewed based on the requirements and procedures in Stephan et al., 1985, or other scientifically defensible methods applicable to the criteria under development. Water quality data used to assess or derive numeric criteria for other parameters are reviewed to ensure the data used accurately represent ambient conditions following the procedures in DEP-EA-001/07. Additionally, data and associated qualifiers are reviewed and data are handled as follows:

- On a case by case basis, reject results with 'Fatal' Qualifier codes (J, K, N, O, Q, V {except as noted below}, Y, or ?), as defined in Table 1 of Rule 62-160.700, F.A.C., or per equivalent laboratory comments.
- Results reported as below the detection limit and flagged for blank contamination (e.g., V qualifier code) will not be rejected.
- Results reported as less than the method detection limit (e.g., U qualifier code) are replaced with either half of the reported detection limit or half the criterion, whichever is lower. Zeros are not used to represent values below the MDL.
- Qualifiers are reviewed to ensure appropriate use (e.g., T was used when U was more appropriate).

8.3 Audits

Pursuant to the QA Rule, Chapter 62-160, F.A.C., the department has the authority to conduct audits in support of program-specific use of data (see Rule 62-160.650, F.A.C., Field and Laboratory Audits). Department staff may audit sampler performance at the time of sample collection and visit laboratories to assess analytical operations. For both on-site audits and off-site records audits, documentation is inspected for conformance with requirements found in the QA Rule, the DEP SOPs, and the NELAC/TNI standards. Regulated parties and contractors, as well as consultants, local governments and department work units, are all subject to audits, and must provide all information necessary to reconstruct sampling events and laboratory analyses. The department may require corrective action responses for specific findings reported as the result of audits. The general procedures for conducting audits are described in section 9 of this document.

8.4 Data Validation

The rule authorizing the department to verify and validate data used by its programs for specific usability assessments is Rule 62-160.670, F.A.C. (Data Validation by the Department). This assessment includes evaluation of sample collection, preservation and handling; laboratory certification, analysis methodology, analytical sensitivity, instrument calibration and quality control; and attainment of any specific data quality objectives identified for the project or program, and may include the additional activities listed in this section. Data records are evaluated for completeness and internal linkage by tracking specific samples through the process from sample collection to data use, to reconstruct the sampling and/or analytical process that produced the sample results. Further detail about the usability assessment process is provided in the document, "Process for Assessing Data Usability", DEP-EA-001/07, which is incorporated into the QA Rule. The validation process is similar to that used for records audits and includes many of the same verification and validation criteria, and may also include criteria more specific to the project or program data use. Often, DEP program staff in DEAR or the

regulatory divisions' request that AQEAS perform abbreviated QA reviews of project or sampling event data packages and make recommendations about specific usability questions. The general process for conducting data validations and data verifications of all types includes:

8.4.1 The AEQAS staff member receiving the data review or validation request will coordinate with the program requesting the review to gather the relevant facts of data use and QA/QC questions pertaining to the review, and, with the concurrence of the section administrator regarding any review assignments, engage the help of subject matter experts within AEQAS and other programs (often the DEP Laboratory programs) to assist with the review or answer specific validation questions. The AEQAS reviewer will attempt to reach a consensus evaluation of the data with the experts.

8.4.2 Once completed, the evaluation of the data is shared with the requesting program staff, and AEQAS makes a recommendation for data usability, based on the specific data use indicated. Communications with requesting program staff are often informal, and are facilitated with emails, phone calls and meetings. AEQAS staff will retain all correspondence and documentation concerning the review and usability recommendation. Emails and records of meetings and phone calls are kept for the project file by the reviewer. Documentation submitted for review is also retained by the AEQAS reviewer, and a copy of the documentation may be placed in the AEQAS common subfolder for data reviews. The requesting program staff are responsible for initiating any department action regarding the use of the data.

8.4.3 If a formal record of data validation is necessary, AEQAS will prepare a department memo that summarizes the categorical review items that were validated according to rule 62-160.670, F.A.C., in addition to the additional criteria specific to the project. The summary will contain sufficient technical details for defensibility of the AEQAS data usability recommendation and department action taken.

8.5 GIS Layer Updates and Maintenance

8.5.1 Geographic Information Systems (GIS) use geospatial data files and internet-based mapping to allow the display and analysis of a wide array of environmental data. Department staff and the public can view spatial information relevant to department programs. This information can be used to help make environmental decisions, such as selecting sites for water quality or biological sampling or monitoring, permit and compliance considerations, or 303(d) assessments. GIS is an important tool for staff and helps WQSP staff work more efficiently and accurately, resulting in better decisions and responses.

8.5.2 Surface water quality standards are fundamental to many department programs and decisions. In addition to the maintenance and revision of these water quality standards rules, SDS is responsible for the development, maintenance and revision of four attendant GIS data layer categories. These data layers are fundamental to several department programs, including permitting, assessment, and monitoring, because the layers provide information on the applicable standards for waterbodies throughout the state. The water quality standards data layers include the Surface Water Classifications, Outstanding Florida Waters (OFW), Numeric Nutrient Criteria (NNC), and Site-Specific Criteria (SSC).

8.5.3 The bases for these data layers are generally the geographic descriptions and/or maps adopted by reference in the standards rule (Chapter 62-302, F.A.C.) or Final Orders. Regardless of the adoption procedure (rule or final order), the description in the documentation that was approved by the department and EPA is used to update the GIS layer with new data or to create new data layers as the need arises.

8.5.4 Though each data layer has its own unique requirements, the general revision or addition to the data layer is as follows:

- Compare the adopted rule language and spatial descriptions to the supporting documentation and to features on land (e.g., cities, roads, waterbodies, latitude and longitude);
- Resolve any questions;
- Create a shapefile of the change;
- Create a static (e.g., .pdf, .jpeg) image of the shapefile showing the change in relation to features that would aid viewers in locating the area;
- Create attribute table entries and any necessary revisions to the layer metadata;
- Distribute the static image, attribute table, and metadata drafts to staff knowledgeable about the change for consistency and accuracy review;
- Once the changes are verified and approved as accurate, include a final static image in the file for the WQS change as additional documentation; and,
- Submit the shapefile and updated attributes to staff in the GIS section for modification of the appropriate data layer. Only a limited number of individuals (currently one) are approved to make changes or additions to the water quality standards data layers. WQSP staff are notified when the data layer has been updated and is available for use.

8.5.5 The overall GIS layer revision process is similar for all water quality standards layers, but can involve additional program areas depending on the specific need and data layer. Questions regarding OFWs can involve additional research into the history and ownership of an area prior to validating the extent or responding to the question. Since similar questions are often received by different program areas, a specialized team was developed to address questions and to maintain communication and consistency of departmental response. The team is comprised of members from the SDS, GIS Section, Division of State Lands, and OGC. The coordination process within this team is as follows:

- The question is forwarded to SDS staff if received by GIS or Division of State Lands
- SDS staff research the records, documentation, and history from previous investigations,
- Additionally, program staff from GIS, Division of State Lands, and/or OGC assist with the record and documentation review as needed.
- Once the response or decision is made, those involved are informed and the documentation is retained in SDS files.
- Any modifications to the data layer(s) that are necessary are made in the same manner as above.

9. Procedures for Conducting Audits and Managing Corrective Actions Resulting from Audits

Audits provide objective feedback concerning the effectiveness of a program's quality system, and may identify areas in need of improvement. The WQSP performs both internal and external audits and follow-up activities, as discussed below (also see section 8.3 above).

9.1 Internal Auditing

9.1.1 Internal audits are typically comprised of a field evaluation to determine each person's skill and knowledge of sampling and field testing techniques. These audits are conducted by QA Program staff (see Section 4.1.2) using audit checklists designed for each of the applicable DEP SOPs. The current version of these checklists is in Excel format and is stored in the program's common server directory under QA\Audits\Cklsts. Generic versions of these checklists are found in the appendix to DEP SOP FA 1000 and are also available to staff and the public via links on the QA Officer Resources webpage. Auditors complete the checklist, describe any deficiencies, and provide a preliminary audit report to audited staff and supervisors within the section. Audited staff provide responses to the audit findings and parties agree on corrective actions. Corrective actions often consist of additional training and revision of field sheets to improve documentation. Once corrective actions have been agreed upon and approved, a final report with a summary of the actions and dates of implementation is issued.

9.1.2 WQSP personnel are also audited to determine initial and continuing proficiency per timeframes outlined in DEP SOPs to be qualified to conduct sampling and field assessment activities for the SCI, BioRecon and LVI. Proficiency requirements for those methods are in SOP sections SCI 1300, BRN 1300, and LVI 1200, respectively. In addition, after receiving training per DEP SOP FA 5720, staff are required to participate in periodic peer group evaluations of their ability to perform Habitat Assessments (HA; DEP SOP FT 3000).

9.1.3 The results of audits for individuals evaluated for SCI and BioRecon sampling are scored per DEP SOPs SCI 1300 and BRN 1300 and retained in AEQAS archives. The results for sampling teams evaluated for the LVI procedures are scored per DEP SOP LVI 1200 and retained. Audits of water quality sampling and field testing are retained. Habitat Assessment (FT 3000) evaluations are periodically conducted on a peer group basis and are based upon the central tendency of the established expert group. These results are also scored and retained.

9.1.4 When deficiencies arise with respect to the SCI, LVI, HA, water quality sampling, field-meter testing, or documentation, the root cause of the issue is identified and corrective action, such as additional training or testing, is implemented.

9.2 External Audits

The WQSP conducts sampling-performance, field-testing and data records audits at the request of department programs, and provides recommendations for data use by those programs, as appropriate. When necessary, the WQSP can jointly conduct laboratory audits with the Florida Department of Health (DOH) Environmental Laboratory Certification Program (ELCP) to investigate QA issues identified with a specific laboratory. Reports containing audit findings are posted on the department's Audit

Reports Webpage. The WQSP also conducts routine audits to evaluate proficiency of individuals performing biological assessment procedures (see 9.2.4 below). The prioritization and scheduling of all audits is based on the availability of WQSP staff auditors and auditor-trainees.

9.2.1 Quality of Science Reviews

Dependent upon requests, need and utility, WQSP performs Quality of Science Reviews of department programs, per its responsibilities under the QA Directive. WQSP conducts these reviews by evaluating the effectiveness of a program's quality system, including its implementation and documentation, while providing suggestions for and assisting with improvement of the program's quality system. The following steps are followed for Quality of Science Reviews:

9.2.1.1 Identify the program, section or district to be reviewed. Key members of quality assurance within the unit are identified. This should include the Administrator and the Quality Assurance Officer. Details about the review, including interview date and time, are determined via email.

9.2.1.2 Any documents used for quality assurance purposes, including program-specific SOPs and the program's quality plan, that are not incorporated in the QA Rule are provided to WQSP staff by the audited program. During this time, AEQAS staff review the documents and develop questions regarding the quality system.

9.2.1.3 At least one meeting is scheduled with AEQAS staff and the program being reviewed to discuss any questions left unanswered by the QA documents. Procedures in use are covered through the meeting interview. If any gaps in procedures exist, AEQAS staff discuss how to best resolve them.

9.2.1.4 Findings from the quality system document review and interview meeting(s) are compiled in a draft report, which includes recommendations for quality system improvement, as well as suggested revision topics for the program's Quality Plan. A second meeting is held with AEQAS staff and appropriate program staff to review the draft report.

9.2.1.5 The report is finalized and issued. This report is transmitted via email to the staff involved in the Quality of Science Review, including the Program Administrator. This report may be distributed amongst interested staff or staff within the reviewed program.

9.2.2 Laboratory Records Audits Procedures

After an initial request and subsequent discussions, WQSP staff typically obtain pertinent information about sampling sites, sample lists, sampling dates, and the identities of the organizations involved in the audit. Michael Blizzard, as the department QA coordinator, is the lead auditor and organizes these audit preparations or delegates this task to other WQSP staff, with the concurrence of the AEQAS section administrator (and the WQSP program administrator, when appropriate), and includes the following steps:

9.2.2.1 Identify the set of records to be audited. This set is defined by the sites, sampling entity, and/or timeframe for which data are to be used by the program requesting the audit. For each analyte or test to be audited, QA Program staff (within AEQAS) select a set of sample results to audit based on the purpose of the audit and the number of results available. For example, records from a single sampling event, single laboratory, for a few analytes may be selected as the scope of the audit. Alternatively, multiple sampling events, sampling projects or laboratories with a larger number of analytes may

be represented by the scope of the requested audit, with a corresponding increase in the number of results selected.

9.2.2.2 Determine the appropriate evaluation criteria for the audit. Audit criteria are derived from the QA Rules, relevant program rules and requirements, DEP SOP requirements, NELAC requirements for lab certification, DEP data usability criteria (DEP-EA-001/07), or analytical method requirements. Checklists to be used for these audits are located on the program's common drive.

9.2.2.3 Arrange to perform the audit. The designated lead auditor will be responsible for ensuring that all preparations are completed timely before the start of the audit. Any auditor training must be completed prior to the audit, and may include a review of standard AEQAS checklists, review of example documentation, conducting a mock audit, etc. Any new checklists required for the specific audit scope will be prepared by experienced AEQAS QA staff, with the assistance of subject matter experts, as needed. When possible, audit checklists will be pre-filled with information about the selected audit samples and reported sample results, based on records submitted by the audited organization and obtained from the appropriate department data base. Develop and send the field and/or lab organization(s) a list of records that will be evaluated (representing sample result data that has been reported to DEP), indicating that all field and/or lab records related to the chosen audit samples must be provided for inspection. For audits that comprise an evaluation of both field and lab components, records must be sufficient to reconstruct how the sample was collected, received in the lab, processed and analyzed, results evaluated, and results reported. For separate field or lab audits, only the relevant records are examined. If the audit will be conducted on-site at the office or lab location for the audited organization, schedule a date and time to meet at the location, indicate the expected duration of the audit (typically, one or more business days), specify the number of auditors attending, and ensure that there is sufficient office space for audit staff to review documents. If AEQAS will conduct a desk audit, make arrangements for providing all digital documents to DEP by email or ftp download. All communications with the audited organizations should facilitate a smooth and cooperative exchange of information and documentation. AEQAS auditors will provide enough details to the organization about the audit to clearly indicate the scope of the audit and the records to be exhibited.

9.2.2.4 During the audit, review assembled records and complete the audit checklists. Obtain additional information from the audited lab if needed to resolve questions that may influence the findings. The designated lead auditor will ensure that all auditors are correctly completing checklists and interpreting information in relevant organization records. The audit team will request copies of any documentation needed to complete the audit and audit reports, both at the time of the audit onsite at the organization location, and after the audit, as needed. Often, such documentation requests are necessary to resolve details of specific audit findings.

9.2.2.5 Compile findings and discuss them among QA staff. Write a preliminary audit report that contains a summary of the audit event, a table of deficiencies, and a timeframe within which the audited party must provide responses and proposed corrective actions

for deficiencies. For AEQAS audits, the date by which the preliminary report must be sent to the audited party is specified in Rule 62-160.650, F.A.C., but other deadlines may apply if AEQAS is assisting a regulatory program with an audit and preparing a report according to different established schedules. Some findings, especially related to data reporting, may be directed to the sampling entity rather than the lab; in this case, split the findings into two tables within the report. The preliminary report will be sent to the audited party within 90 days of the audit date. Preliminary and final audit report templates are located on the AEQAS common directory.

9.2.2.6 Per Rule 62-160.650, F.A.C., the audited party must send responses and corrective actions within 45 days from receipt of the preliminary audit report. QA staff shall determine if the responses and corrective actions adequately address the deficiencies. QA staff will amend the preliminary audit report to create the final report by adding comments of acceptance or conditional acceptance of the proposed corrective action within the table, and include a data usability recommendation for the Program that requested the audit, when requested by the program. The data usability recommendation and any associated cautionary statements will be determined based on the severity and frequency of the noted deficiencies. If QA staff recommend that some or all data generated by the audited party should not be used, this recommendation should also contain a date range for usability, or some other appropriate constraint.

9.2.2.7 Issue the final audit report. The final report may be transmitted with a cover letter to external organizations or as a memo to an internal DEP program, may be directed at the audited lab, sampling entity, the program requesting the audit, or some combination thereof, and it may be transmitted via email, which is the typical method of routing. The final audit report will have an Office of the General Counsel (OGC) tracking number for official agency action, be signed by the Division Director or Deputy Directory, and be certified by a department Clerk. Post the final audit report on the department Audit Reports Webpage. The lead auditor will ensure that each step of the final report processing is completed timely and accurately.

9.2.3 Sampling Performance and Field-Testing Audits Conducted by WQSP

The WQSP conducts field performance and field-testing audits upon the request of department programs. Sampling teams to be audited are identified through contacts with the team leader or other managers. The following steps are followed for field performance audits, and it will be the responsibility of the designated lead auditor to ensure that all steps are completed:

9.2.3.1 Identify the sampling team and site(s) to be audited. The team and site(s) should be representative of typical sampling operations conducted by the audited organization and specific to the project for which the audit was requested (when applicable). Details about the planned audit date, meet-up logistics and audit scope are typically arranged via email and phone calls. As with other types of audits, the lead auditor will organize strategy meetings and auditor training as necessary to prepare for audits. Since field-performance checklists have been standardized to the DEP SOPs, there is typically

little, if any, revising of audit checklists needed, but the lead auditor will oversee any revision of checklists required as part of audit preparations.

9.2.3.2 WQSP auditors will observe as much of the sampling process as possible, including pre-event field meter calibration/verification, field mobilization, sampling, sample submittal to the lab, and post-event field meter verification. Auditors will use audit checklists based on department SOPs to evaluate sampling performance (checklists are located on the program common file directory). Auditors will obtain copies of all field sampling, sample submittal, and field meter calibration/verification documentation on the audit day, if possible, or from the sampling team shortly after the audit date. The records from the will be scanned and electronically stored with the audit report.

9.2.3.3 Compile findings observed during the sampling performance audit and findings from the review of field documentation prepared with the sampling event(s) audited, and discuss them among QA staff. Write a preliminary audit report that contains a summary of the audit event, a table of deficiencies, and a timeframe within which the audited party must provide responses and proposed corrective action for deficiencies. The preliminary report should be sent to the audited party within 90 days of the audit date, if possible. For AEQAS audits, the timeline is specified in Rule 62-160.650, F.A.C., but other deadlines may apply if AEQAS is assisting a regulatory program with an audit and preparing a report according to different established schedules. Preliminary and final audit report templates for field performance audits are located on the AEQAS common directory.

9.2.3.4 Per Rule 62-160.650, F.A.C., the audited party must send responses and corrective actions within 45 days from receipt of the preliminary audit report, unless a different schedule applies, as in 9.2.3.3 above. QA staff shall determine if the responses and corrective actions adequately address the deficiencies. QA staff will amend the preliminary audit report to create the final report by adding comments of acceptance or conditional acceptance of the proposed corrective action within the table, and including a data usability recommendation for the Program that requested the audit. The data usability recommendation and any associated cautionary statements will be determined based on the severity and frequency of the noted deficiencies. If QA staff recommend that some or all data generated by the audited party should not be used, this recommendation should also contain a date range for usability, or some other appropriate constraint.

9.2.3.5 Issue the final audit report. The final report may be transmitted with a cover letter to external organizations or as a memo to an internal DEP program, may be directed at the audited lab, sampling entity, the program requesting the audit, or some combination thereof, and it may be transmitted via email, which is the typical method of routing. The final audit report will have an OGC tracking number for official agency action, and be certified by a department Clerk. Post the final audit report on the department Audit

Reports Webpage. The lead auditor will ensure that each step of the final report processing is completed timely and accurately.

9.2.4 Bioassessment Audits Conducted by WQSP for External Parties

The AEQAS schedules field audits with individuals wishing to become proficient in performing the SCI and BioRecon, coordinates comparability testing for the LVI and stream HA, and provides web links to allow people to take the SCI concept test and LVI plant test. Results of these QA evaluations are maintained by Ashley O'Neal and Joy Jackson in an online registry.

AEQAS staff conduct the SCI and BioRecon audits, and evaluate results from the LVI and HA comparability testing. SCI and BioRecon audits are conducted and evaluated per SOPs SCI 1300 and BRN 1300, respectively. LVI and HA testing results are evaluated per SOPs LVI 1200 and FA 5720. For biennial LVI testing, the AEQAS issues a report of the results, including discussion of differences among teams and indication of which teams were within the acceptable range of scores. This Quality Plan section outlines additional details of LVI and HA test result evaluations. Ashley O'Neal is responsible for the LVI proficiency testing and evaluation, and Joy Jackson is responsible for the HA evaluations.

9.2.4.1 Lake Vegetation Index Proficiency test evaluation

Testing:

- Establish 3 lakes, with at least 1 lake in the north region and one in the south (SOP currently says 1 in Panhandle, 1 in N Peninsula, and 1 in S Peninsula). Each lake should have good public access, good boat ramps, and accommodate moderately sized boats.
- Announce the test and test window on the website and Quality of Science newsletter at least 15 days prior to test window. The test window should be 30 days in length. Give teams 2 weeks after testing window to send results to the AEQAS.
- Provide a map of the lake, with sections numbered and labeled with lat/longs.
- If a team misses the testing window but wants to test, allow them to do so but do not include their score in the expert median, even if they passed last year.

9.2.4.2 Summarizing and Reporting:

- Calculate the median score from the teams that passed the exercise last year.
- Notify participants of pass or fail status as soon as all scores are in.
- Create plots and tables of LVI scores, metric scores, dominant taxa chosen, and participating teams (see previous years' reports for formats).
- Summarize results into a report, including tips for plant identification for any taxa that were commonly misidentified or confused.
- Post report on website and send to participants.

9.2.4.3 Habitat Assessment proficiency test evaluation

For HA testing purposes, five sites are typically established in three regions across the state, but

circumstances allowed for only four sites being available in each region during the 2014-2015 assessment period. In addition, there were some components that were inherently more subjective than usual, which resulted in greater variability in scores. These factors combined meant that there was a greater likelihood that individuals would not pass the required number of sites due to factors unrelated to their ability to perform the HA protocols. To make the process as fair and reasonable as possible, the scores were analyzed in two ways. The first was the way it has typically been done, comparing the total score to the "consensus score" of experts, and the second was to evaluate the individual components of the score. More details are provided below.

A "consensus score" was established by a minimum of seven "expert" HA analysts at the same site on the same day. Testers must achieve a score that is within 10 points of the established consensus score at a minimum of three out of five sites every other year to be in "Pass" status.

To evaluate the individual components of the score, the variability associated with the median score for each component for a group of "expert" testers was analyzed by calculating the +/- 1 F-psuedosigma around the median. The median was used because outliers tend to have less influence on the median than on the mean. Applying this method, if the value of 1 F-psuedosigma in a component was < 2 points, then a +/- 2 point range was the assumed default to account for a small amount of variation (often a single water velocity is taken during the testing process resulting in no variability for that parameter).

Summary of Combined Steps:

- Calculate tester's total score.
- Compare tester's total score to the consensus score for that site.
- If total score is +/- 10 points of the consensus score, the tester is considered in "Pass" status.
- If, however, the total score is greater than or less than 10 points from the consensus score, the tester's individual component scores are compared to the acceptable range for each component (based on the variation in the expert scores as described above). If they are within the acceptable range for five out of the eight components, they are considered in "Pass" status.
- If they are outside the acceptable range for more than three components, they are required to do some additional training with someone in "Pass" status and re-test at other sites, starting the process over again.

10. Contract Management

10.1 Contracts Managed by the Water Quality Standards Program

The WQSP ensures that the contracts managed by program staff are properly developed and managed to assure appropriate data quality. Contract managers assure that the work is properly planned and executed, relevant to department environmental decisions, and consistent with the department QA Rule and department SOPs. Joy Jackson, Grover Payne, Ashley O'Neal, Nia Wellendorf, and Kaitlyn Summerfield are trained department contract managers. WQSP staff ensure that contract development and review includes the provisions of the QA rule and the instruction document, Quality Assurance Process for Procurement of Sampling and Analytical Services. Standard templates are maintained by AEQAS and provided to contract managers as attachments to the above document. These templates may be edited to customize requirements to the scope of contract work.

10.2 Support Activities for Contracts Managed by Other Department Programs

The WQSP provides education and "stock" QA language to contract managers from other department programs to assist them with data quality issues for all contracts and grants that include field or laboratory analytical work. However, all department contract managers bear the obligation of assuring that the work is properly planned and executed, relevant to department environmental decisions, and consistent with the department QA Rule and department SOPs.

AEQAS staff prepared the document, Quality Assurance Process for Procurement of Sampling and Analytical Services, which provides guidance for contract/grant managers about whether to attach a Standard or Research QA Attachment to their agreements. The document includes those QA Attachments as embedded documents, and Quality Assurance Project Plan (QAPP) templates to be used for research projects contracted by the department and for Nonpoint Source Best Management Practices (BMP) projects funded by EPA via 319h grants and managed by the department.

10.2.1 Contract/grant managers are trained by AEQAS staff on an as needed basis. The training consists of Quality Assurance concepts, the use of the templates for contracts and grants, and how to review a QAPP. AEQAS will also provide training upon request from contract managers and department procurement staff.

10.2.2 When a contract/grant or Purchase Order (PO) is initiated (i.e., a department contract "agreement"), the contract managers edit and attach the appropriate template to the contract or PO. If a QA Plan is required as part of the agreement, a template for the QA Plan is provided to the contractor or grantee for NPS BMP and research projects. Other projects requiring a QA Plan will be evaluated by AEQAS contract QA staff, who will provide the department agreement manager with appropriate guidance information contained in EPA-QA/R-5 or DEP-QA-002/02, and may also provide the manager with a copy of the Excel worksheet used by AEQAS QA plan reviewers. This worksheet outlines the review topics against which the QA plan contents are evaluated, and incorporates the criteria contained in the EPA and DEP documents cited above.

10.2.3 Once the contractor or grantee has submitted a QA Plan, the contract/grant manager will review and approve or request further edits, as appropriate. If the project is non-standard, such as a research QA Plan, or the contract/grant manager has questions, AEQAS staff are available to help with review.

10.2.4 It is up to the contract/grant manager to ensure that the contractor or grantee has an approved QA Plan in place prior to any work being done.

10.2.5 Quality Assurance Review for My Florida Marketplace (MFMP) Purchase Orders:

Staff within the AEQAS (Michael Blizzard, Jennifer Claypool, Kristen Sapp and Nia Wellendorf) are responsible for reviewing and approving any purchase order (PO) that includes field or laboratory analytical work, using the MFMP online review and approval procedures. For AEQAS staff to evaluate the PO, it must include the lab conducting the analysis and the analytes to be tested, with proof of

Department of Health (DOH) National Environmental Lab Accreditation Certification (NELAC), if applicable. Staff follow the following steps in reviewing and approving or denying the POs:

10.2.5.1 Typical POs: A common type of PO is for surface water and/or drinking water testing at State Parks for one or more of the following: fecal coliforms, total coliforms, nitrate/nitrite, and lead. AEQAS staff must ensure that the purchased sampling and analysis complies with the QA Rule. AEQAS staff checks the DOH lab certification page to verify that the lab is certified in the appropriate matrix (drinking water if from drinking water source, or non-potable water if from swimming area) for the analytes to be tested. If the lab is certified for the analyte and appropriate matrix, then staff approve the PO by attaching the document "Purchase Order QA Standard," clicking "Approve," and adding the following comment, "Approved per requirements in Purchase Order QA Standard (attached)." If the PO information does not clearly indicate which lab will conduct the analyses, or the lab is not listed on the DOH website as certified for the analyte(s), staff should deny the request and, in the comment box, request that the vendor specify which certified lab will conduct the work. Once the lab information is received via a resubmitted requisition, the AEQAS MFMP QA Approver will then verify the certification status of the laboratory and approve the item.

10.2.5.2 Non-standard research or monitoring POs: If department programs are contracting with samplers or labs to conduct monitoring or analyses for non-standard procedures or methods not explicitly covered by the DEP SOPs or the lab DOH certification program, AEQAS staff must verify that there are published methods and procedures that will be followed to conduct the work within the PO. The contracted entity should provide a project plan, SOPs, or other documentation describing the QC, calibration and data evaluation elements of the sampling and analysis or other experimental procedures, as required in the Purchase Order Research QA template. If sufficient documentation is not provided, the MFMP QA Approver will ask the requestor to provide the missing information, and the requestor will attach that information to the PO request. AEQAS staff should review the plan or SOP to ensure that expected QC measures will be taken.

When reviewing the research documentation, the AEQAS QA Approver must rely on the presumed expertise of the researcher to describe appropriate experimental procedures and quality control measures, but should ensure that these types of activities (and measurement acceptance criteria) are adequately discussed or summarized in the documentation. These reviews are often discussed among AEQAS staff to ensure that the work being purchased will be of sufficient quality for the intended use. If necessary, the AEQAS Approver will consult with other DEP subject matter experts for assistance with the review. After the review for sufficiency is complete and satisfactory, AEQAS MFMP staff will attach the Purchase Order Research QA template, approve the PO requisition, and record a comment that approval is per adherence to the attached project plan or SOPs and the QA requirements template.

10.2.5.3 No field or lab work: Sometimes POs are routed through for QA approval because of a commodity code used in MFMP, but there is not actually any sampling or lab work

involved. In these cases, AEQAS staff approve the PO and comment that QA approval was not needed.

10.2.5.4 Second round approval: Occasionally minor administrative changes in a PO can cause a PO to be routed back through all approvers, including the QA approval. If the PO has already been approved by AEQAS staff, the PO can be approved again without further review after verification of the initial QA approval.

11. Compilation of the Annual Quality Assurance Report to the Secretary

To provide the Secretary with information regarding the department's ongoing QA efforts, the WQSP prepares a WQSP-specific QA report that is compiled with the department-wide annual QA report. Both the WQSP and department-wide QA reports describe the types and outcomes of QA activities conducted each year. The AEQAS solicits annual QA reports from all department programs (except Air) during January-March, and summarizes those reports into a single annual QA report, which is delivered to the Secretary by July of each year.

12. References

Department Standard Operating Procedures for Field Activities (DEP-SOP-001/01), Laboratory Activities (DEP-SOP-002/01), and Bioassessment Methods (DEP-SOP-003/11)

Niu, X., S. Zhang, and N. Wellendorf. 2014. Statistical Comparison of Two Paired Samples. Technical report submitted to the Florida Department of Environmental Protection under Contract No. LAB043. May 2014.

Stephan, C.E., D.I. Mount, D.J. Hansen, J.H. Gentile, G.A. Chapman, and W.A. Brungs, 1985, Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, U.S. Environmental Protection Agency, Office of Research and Development, Environmental Research Laboratories, Duluth MN, Narragansett R.I., and Corvallis, OR.

Table 1. Default Data Quality Objectives and Data Quality Indicators for the Water Quality Standards Program. DQOs and DQIs are adjusted as necessary to meet the requirements and objectives of the department Projects and Programs we are assisting.

Data Quality Indicator	Analyte, Parameter or Assessment Test	Data Quality Objective
Laboratory Control Spike (LCS) or Laboratory Fortified Blank (LFB) Concentration	Ammonium	≤ 160 µg/L
LCS or LFB	Calcium (Ca)	≤ 0.4 mg/L
LCS or LFB	Hardness (Ca + Mg calculation method)	Note 8
LCS or LFB	Hardness (titration method)	≤ 50 mg/L
LCS or LFB	Magnesium (Mg)	≤ 0.16 mg/L
LCS or LFB	Metals	See Note 2
LCS or LFB	Other Nutrients, including Nitrate, Nitrite, Nitrate + Nitrite, Orthophosphate, Total Phosphorus (TP)	≤ 80 µg/L
LCS or LFB Percent Recovery (%R)	Hardness (Ca + Mg calculation method)	See Note 8
LCS or LFB Percent Recovery (%R)	Hardness (titration method)	See Note 1
LCS or LFB Percent Recovery (%R)	Metals, including Ca, Mg	85% -115%
LCS or LFB Percent Recovery (%R)	Nutrients, including Ammonium, Nitrate, Nitrite, Nitrate+Nitrite, Orthophosphate, TKN, TP; and TOC	80% - 120%
LCS or LFB Percent Recovery (%R)	Semi-volatile (Extractable) Organic Compounds, including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, Polycyclic Aromatic Hydrocarbons (PAHs), Phthalate Esters, Polychlorinated Biphenyls (PCBs), Oils & Greases	See Note 4
Matrix Spike (MS) %R	Hardness (Ca + Mg calculation method)	See Note 8
Matrix Spike (MS) %R	Hardness (titration method)	See Note 1

Data Quality Indicator	Analyte, Parameter or Assessment Test	Data Quality Objective
Precision (Relative Percent Difference, Percent Relative Standard Deviation or Other) for Duplicate or Replicate (LCS, LFB, MS, Quality Control Check Sample or Sample Analyses)	Ammonium, BOD (Biochemical Oxygen Demand), Chlorophyll, Color, Hardness (titration method), Metals (including Ca, Mg), Nitrate, Nitrite, Nitrate+Nitrite, Orthophosphate, TDS (Total Dissolved Solids), TKN, TP, TSS (Total Suspended Solids), TOC, Turbidity	≤ 20%
Precision for Duplicate or Replicate	Bacteriological Quality (Fecal Coliform Bacteria)	See Note 5
Precision for Duplicate or Replicate	Hardness (Ca + Mg calculation method)	See Note 8
Precision for Duplicate or Replicate	Semi-volatile (Extractable) Organic Compounds, including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, PAHs, Phthalate Esters, PCBs, Oils & Greases	See Note 4
Surrogate Spike Percent Recovery	Semi-volatile (Extractable) Organic Compounds, including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, PAHs, Phthalate Esters, PCBs, Oils & Greases	See Note 4
Calibration Curve Linearity Evaluation	Ammonium, Metals (including Ca, Mg), Nitrate, Nitrite, Nitrate+Nitrite, Orthophosphate, TKN, TP, TOC	See Note 6
Calibration Curve Linearity Evaluation	Hardness (Ca + Mg calculation method)	Note 8
Calibration Curve Linearity Evaluation	Semi-volatile (Extractable) Organic Compounds, including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, PAHs, Phthalate Esters, PCBs, Oils &	Note 14

Data Quality Indicator	Analyte, Parameter or Assessment Test	Data Quality Objective
	Greases	
Minimum Number of Calibration Standards for Calibration Curve or Calibration Verification	Ammonium, Nitrate, Nitrite, Nitrate+Nitrite, Orthophosphate, TKN, TP, TOC	≥ 3
Minimum Number of Calibration Standards for Calibration Curve or Calibration Verification	Metals (including Ca, Mg)	Note 13
Minimum Number of Calibration Standards for Calibration Curve or Calibration Verification	Color	See Note 7
Minimum Number of Calibration Standards for Calibration Curve or Calibration Verification	pH, Specific Conductance, Turbidity	See Note 15
Minimum Number of Calibration Standards for Calibration Curve or Calibration Verification	Hardness (Ca + Mg calculation method)	Note 8
Minimum Number of Calibration Standards for Calibration Curve or Calibration Verification	Semi-volatile (Extractable) Organic Compounds, including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, PAHs, Phthalate Esters, PCBs	Note 14
For the following analytes, at least one calibration verification standard is from a second source as indicated in the applicable NELAC Quality Systems standard for continuing calibration verification	Ammonium, Hardness by Ca + Mg calculation method (see Note 8), Metals (including Ca, Mg), Nitrate, Nitrite, Nitrate+Nitrite, Orthophosphate, TKN, TP, TOC, Semi-volatile or Extractable Organic Compounds (including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols,	N/A

Data Quality Indicator	Analyte, Parameter or Assessment Test	Data Quality Objective
	Chlorinated Cresols, PAHs, Phthalate Esters, PCBs)	
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	Ammonium, Nitrate, Nitrite, Nitrate+Nitrite, Oils & Greases, Orthophosphate, TKN, TP, TOC	90% - 110%
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	Metals (including Ca, Mg)	Note 10
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	Conductance, Specific	95% - 105%
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	Dissolved Oxygen	See Note 9
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	Hardness (Ca + Mg calculation method)	See Note 8
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	pH	See Note 11
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	Turbidity	See Note 12
Calibration Verification Standard Recovery or Other Verification Acceptance Criteria	Semi-volatile (Extractable) Organic Compounds, including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, PAHs,	See Note 14

Data Quality Indicator	Analyte, Parameter or Assessment Test	Data Quality Objective
	Phthalate Esters, PCBs	
Laboratory Method Blank or Other Analytical Blank Results shall be < 10% of the associated sample results in the preparation batch or analytical sequence	Ammonium, Chlorophyll, Color, Hardness by Ca + Mg calculation method (see Note 8), Hardness (titration method), Metals (including Ca, Mg), Nitrate, Nitrite, Nitrate+Nitrite, Orthophosphate, TDS (Total Dissolved Solids), TKN, TP, TOC, Semi-volatile or Extractable Organic Compounds (including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, PAHs, Phthalate Esters, PCBs), Oils & Greases, TSS (Total Suspended Solids)	N/A
Field Quality Control Blank (Field Blank, Equipment Blank or Trip Blank) Results shall be < 10% of the associated sample results associated with the sample set or sampling event	Ammonium, Chlorophyll, Hardness by Ca + Mg calculation method (see Note 8), Metals (including Ca, Mg), Nitrate, Nitrite, Nitrate+Nitrite, Orthophosphate, TKN, TP, TOC, Semi-volatile or Extractable Organic Compounds (including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, PAHs, Phthalate Esters, PCBs), Oils & Greases	N/A
Target for Maximum Reported PQL	Ammonium	≤ 80 µg/L
Target for Maximum Reported PQL	Bacteriological Quality (Fecal Coliform Bacteria)	≤ 2 CFU/100 mL
Target for Maximum Reported PQL	BOD (Biochemical Oxygen Demand)	≤ 2 mg/L

Data Quality Indicator	Analyte, Parameter or Assessment Test	Data Quality Objective
Target for Maximum Reported PQL	Calcium	≤ 0.2 mg/L
Target for Maximum Reported PQL	Chlorophyll	≤ 3 µg/L
Target for Maximum Reported PQL	Conductance, Specific	1 µS/cm
Target for Maximum Reported PQL	Dissolved Oxygen	0.1 mg/L
Target for Maximum Reported PQL	Hardness (titration method)	≤ 50 mg/L
Target for Maximum Reported PQL	Hardness (Ca + Mg calculation method)	≤ 50 mg/L
Target for Maximum Reported PQL	Magnesium	≤ 0.08 mg/L
Target for Maximum Reported PQL	Metals	Note 16
Target for Maximum Reported PQL	Other Nutrients, including Nitrate, Nitrite, Nitrate + Nitrite, Orthophosphate, Total Phosphorus (TP)	≤40 µg/L
Target for Maximum Reported PQL	pH	0.1 Std pH Unit
Target for Maximum Reported PQL	TKN (Total Kjeldahl Nitrogen)	≤ 400 µg/L
Target for Maximum Reported PQL	Turbidity	1 NTU
Target for Maximum Reported PQL	Semi-volatile (Extractable) Organic Compounds, including Pesticides, Herbicides, Phenolic Compounds, Chlorinated Phenols, Chlorinated Cresols, Polycyclic Aromatic Hydrocarbons (PAHs), Phthalate Esters, Polychlorinated Biphenyls (PCBs), Oils & Greases, Color, Total Organic Carbon (TOC), TSS (Total Suspended Solids), TDS (Total Dissolved Solids)	See Note 17

Data Quality Indicator	Analyte, Parameter or Assessment Test	Data Quality Objective
Biological Analyses	Stream Condition Index, Lake Vegetation Index, Stream Periphyton sampling, Habitat Assessment, Biological Integrity Assessment, Lake Condition Index, Rapid Periphyton Survey and all other biologically related assessments.	See Note 18

Notes for Table 1.

Note 1 – Laboratory-generated control limits apply.

Note 2 - The usability of the LCS or LFB concentration for fresh water metals shall be evaluated based on the relevant hardness value and applicable water quality standard in 62-302.530, or for marine waters, the LCS or LFB concentration shall be evaluated based on the applicable water quality standard in 62-302.530, except that the provisions for an alternative PQL per 62-4.246(4) shall be used as the basis of evaluation in considering the lowest achievable concentration factor for the LCS or LFB, if necessary because of analytical technology limitations, or where a numerical water quality standard does not apply. In any case, the LCS or LFB target concentration shall be ≤ 2X the relevant concentration derived from the above criteria.

Note 3 - The usability of the LCS or LFB concentration for this analyte shall be evaluated based on the applicable water quality standard in 62-302.530, except that the provisions for an alternative PQL per 62-4.246(4) shall be used as the basis of evaluation in considering the lowest achievable concentration factor for the LCS or LFB, if necessary because of analytical technology limitations, or where a numerical water quality standard does not apply. In any case, the LCS or LFB target concentration shall be ≤ 2X the relevant concentration derived from the above criteria.

Note 4 - Laboratory-generated or method-specified control limits shall be used to evaluate the Data Quality Indicator, as applicable per any method instructions.

Note 5 – The control limits generated by the laboratory using the procedure in Standard Methods, Method 9020B, shall be used to evaluate method precision.

Note 6 - The correlation coefficient for the linear regression of the calibration curve data must be ≥ 0.995. Non-linear regressions must have a coefficient of determination of ≥ 0.99, using the appropriate number of standards for the curve.

Note 7 - The approved method requires a series of 12 standards. Fewer standards may be acceptable if the sample results fall within the PCU range of the standards used for the visual comparison analysis.

Note 8 - The DQIs and DQOs for the individual measurements of Ca and Mg apply.

Note 9 - Calibration verifications for dissolved oxygen must be within ± 0.3 mg/L of the standard saturation value for the measured temperature, as prescribed in DEP SOP FT 1500.

Note 10 - Calibration verifications for ICP analyses must be with 95% - 105%. Analyses by other techniques must be within 90% - 110%.

Note11 – Calibration verifications for pH must be within ± 0.2 standard pH units of the measured buffer value.

Note 12 - Calibration verifications for turbidity must be within the limits for the applicable NTU ranges as prescribed in DEP SOP FT 1600.

Note 13 - Flame or furnace: 4 standards; ICP-ES or ICP-MS: calibration blank and high standard; Cold vapor AA or Fluorescence (Hg): 5 standards and blank.

Note 14 - Method requirements and options for evaluation of the calibration curve shall apply. The number of standards used for the curve shall be as specified in the approved method. If the method does not specify the number of standards to use to construct the calibration curve, a minimum of 2 calibration standards and a calibration blank shall be used. The method requirements and options shall be used for all calibration verifications.

Note 15 - A minimum of 2 calibration standards shall be used to calibrate or verify the instrument per the applicable DEP SOP for the test, such that the associated sample results are quantitatively bracketed by the concentrations of the calibration standards.

Note 16 - The usability of the reported PQL concentration for fresh water metals shall be evaluated based on the relevant hardness value and applicable water quality standard in 62-302.530, or for marine waters, the reported PQL concentration shall be evaluated based on the applicable water quality standard in 62-302.530, except that the provisions for an alternative PQL per 62-4.246(4) shall be used as the basis of evaluation in considering the lowest achievable PQL, if necessary because of analytical technology limitations, or where a numerical water quality standard does not apply.

Note 17 - The usability of the reported PQL concentration shall be evaluated based on the applicable water quality standard in 62-302.530, except that the provisions for an alternative PQL per 62-4.246(4) shall be used as the basis of evaluation in considering the lowest achievable PQL, if necessary because of analytical technology limitations, or where a numerical water quality standard does not apply.

Note 18 - All biology lab and field procedures, including quality assurance requirements, are found in DEP SOPs FA 1000, FS 7000, FT 3000, LQ 1000, and LT 7000, BRN 1000, SCI 1000, and LVI 1000. http://dep.state.fl.us/water/sas/sop/sops.htm