

Quality Manual

for

State of Florida
Department of Environmental Protection
Watershed Monitoring Section

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3.0 Statement of Policy

This Quality Manual for the Florida Department of Environmental Protection's (DEP) Watershed Monitoring Section (WMS) in Tallahassee, Florida, states the procedures that will be used to ensure that data generated by WMS is of verifiable quality and meets the scientific objectives of the DEP required by federal and state law, including: sections 104, 106, 305(b), 303(d), 314 and 604 of the Clean Water Act, as amended; 40 CFR Part 31,35, and 131 (EPA); Florida Statute Chapter 403 Environmental Control; Florida Administrative Code Rules 62-160, 62-302, 62-520, and 62-522. The WMS is committed to following good quality assurance (QA) and quality control (QC) management practices to produce all data.

4.0 Ethics Statement

All employees of the DEP WMS are held to high professional ethical standards in the performance of their duties. All employees are required to read and understand an 'Ethics Statement' attesting to their commitment to honesty and integrity in performance of their duties. Improper, unethical or illegal actions will be dealt with according to the published Administrative Directives of the DEP.

5.0 Organization and Responsibilities

The WMS is responsible for implementing two water quality monitoring networks. The Status Monitoring Network (Status Network) is a probabilistic network designed to randomly sample and characterize Florida's fresh water resources and to estimate by statistical inference the proportion of waters meeting water quality standards. The Trend Monitoring Network (Trend Network, previously called the Temporal Variability Network) is a fixed-station-monitoring network designed to detect both short-term variability and long-term trends in targeted waters. Section 1 (pages 7-10) of the [Status and Trend Monitoring Networks Sampling Manual](#) (WMS Sampling Manual) provides further details regarding the structure and intent of both networks.

Personnel from DEP Regional Operations Centers (ROCs) (Northwest, Tallahassee, Southwest, South, Central, and Southeast), three Water Management Districts (Northwest Florida Water Management District, St. John's River Water Management District, and South Florida Water Management District) and one local government agency (Alachua County Environmental Protection Department) are responsible for WMS field reconnaissance and sample collection. Each entity participates in sampling for one or both WMS networks. Each external agency is held responsible for producing and managing individual Quality Manuals which address all internal QA/QC activities not bound to them by their contracts or collaborative agreements with WMS. DEP ROCs are also responsible for producing and managing a Quality Manual which address all internal QA/QC activities associated with projects that produce data not managed by WMS. Furthermore, all sections of this Quality Manual will apply directly to DEP WMS personnel and will not include non-DEP WMS personnel. The WMS is part of the Division of Environmental Assessment and Restoration.

The WMS is headed by the Environmental Administrator, who is responsible for both the technical and administrative direction of the Section and is committed to the QA program described in this plan.

The Quality Assurance Officer is responsible for the production and timely revision of the Quality Manual and Section Sampling Manual, scheduling all analyses, and for ensuring that regular audits are conducted to demonstrate that the objectives of the Quality Manual and Sampling Manual are being met.

Each sampling entity (DEP personnel and external agency personnel) is assigned a DEP WMS Project Manager, who manages required contracts (as applicable), handles numerous data review issues, and assists the QA Officer with training and audits. Refer to the [Project Manager Manual](#) for full project manager duties.

Data management and review is conducted by the Data Coordinator and staff who are responsible for processing fresh water quality monitoring data for both the Status and Trend Networks. They also assist the Data Coordinator with data management for other special projects. Refer to the [Data Management Standard Operating Procedures](#), the [Generalized Water Information System \(GWIS\) Database Utilities User's Manual](#), and the [Automated Data Management \(ADM\) Application User's Manual](#), for full data management duties.

The data analysis staff compile the sampling results for federal and state reporting requirements and public distribution. The Analysis and Reporting Coordinator oversees their work, by providing guidance on analysis and reporting through data analysis reviews and the development of new analysis and reporting methods.

An organizational chart describing the relationships of all DEP WMS staff is provided in Section 11.6.

The DEP Laboratory (Chemistry and Biology Sections) have been selected to perform all analyses for both the Status and Trend Networks until further notice. Refer to the Quality Manuals submitted by these sections for details on QA/QC, organization and responsibilities that are internal to the Laboratory.

5.1 Responsibilities of Key Personnel

DEP WMS firmly believes that all personnel within the Section are vital to the overall quality of data being produced. Therefore, all DEP WMS employees listed below are “Key Personnel” with a brief description of respective responsibilities. Roles and responsibilities of all personnel are consistent with FA 3200 and 3300 of the DEP SOPs.

a. Jay Silvanima, Environmental Administrator

Supervises the ongoing development and implementation of the statewide Status and Trend monitoring networks. Responsible for developing and directing surface water and groundwater monitoring programs, providing technical assistance to other monitoring programs in the division, and providing assistance with the development of water quality standards. Oversight of staff to implement and maintain network operations and the Florida Water Resources Monitoring Council. Reviews and approves section Quality Manual annually. Oversees the establishment of specific tasks to analyze data, determine long-term water quality trends and ensure data are made available to federal, state and public agencies. Ensures network data are reported to meet federal Clean Water Act and state of Florida requirements. Assists with technical issues pertaining to the networks. Acts as the division's grants coordinator for EPA 106 supplemental funds. Develops grant applications to secure funding for, manages, and closes out EPA supplemental 106 grants. Serves as the section's financial administrator, utilizing federal grant (EPA 604, EPA 106 and USGS Cooperative) and state trust fund monies (Water Quality Assurance Trust Fund for Ambient Monitoring). Works with division budget personnel to track section budget throughout the fiscal year, authorizes all section expenditures, ensures that funds are spent appropriately and plans future budget needs and activities in a timely manner. Acts as the principle representative for agency participation in the Florida Water Resources Monitoring Council (FWRMC).

b. Vacant, Environmental Specialist III (QA Officer)

Provides quality assurance for state-wide surface and groundwater Status and Trend monitoring networks. Coordinates sampler training workshop and revises program sampling manual. Maintains section Quality Manual and revises Quality Manual annually. Conducts on-site audits of sampling agencies and field samplers. Schedules laboratory analysis of samples. Reviews results of quality assurance procedures (quarterly reports, equipment blanks, and field blanks). Provides QA oversight for special projects, as needed.

c. Carolyn Voyles, Environmental Specialist III

Coordinates select aspects of Status and Trend network sampling operations within peninsular Florida (DEP Southwest ROC, DEP South ROC, DEP Central ROC, DEP Southeast ROC, and SFWMD), including data review, sample results notification to landowners and other designated data users, and other related duties as required. Edits data generated by the Monitoring Section, and assists in updating the section's databases. Incumbent will participate in Watershed Monitoring Section activities, including assistance with preparation of reports required for section/program and division initiatives, and to meet federal requirements. Incumbent also functions as the contract manager for facilitation of the FWRMC.

d. Thomas Seal, Environmental Specialist III

Coordinates all aspects of network sampling operations within the northwest and northeast regions of Florida with six government agencies: DEP Northwest ROC, DEP Tallahassee ROC, Northwest Florida Water Management District, St. Johns River Water Management District, Alachua County Environmental Protection Department. Liaison with Florida Fish and Wildlife and the University of Florida for environmental sampling conducted for EPA's National Aquatic Surveys and with the United States Geological Survey for installation and maintenance of continuous monitoring stations in north and central Florida. Tasks include contract management, financial management of invoices, data analysis and review, sample results notification to landowners, and other related duties. Additional tasks include interpreting sediment data produced by the Status Network sampling teams; and managing contracts with the USGS to gauge river discharge at 26 sites in north Florida, to record turbidity measurements at two sites on the Choctawhatchee River, and to measure nutrients and discharge at 9 springs. Tom is a section liaison for emerging contaminants.

e. Liz Miller, Environmental Consultant

Development of the WMS data management plan including water quality, biological, chemical, sediment and physical data from the Status and Trend Monitoring Networks. Ensures the maintenance of an Oracle database and interactive applications which incorporate field generated data and allow the review and distribution of field and analytical data. Ensures all data collected by the WMS are loaded into the database. Ensures the smooth and timely flow of data from WMS field sampling and laboratory sources to the Florida STORET database and, as of July 1, 2017, the Division's Watershed Information Network (WIN) database. Ensures that sites collected for WMS monitoring networks are geo-referenced in accordance with the department's and division's Locational Data Standards.

f. Indira Pindi, OPS Environmental Consultant

This position is responsible for managing an Oracle Database (GWIS) and associated applications used to store, reconnaissance, review, and report Status, Trend, and Springs data. The database houses more than 3 million water quality results collected from more than 16140 stations. This includes 1.34 million results coming from 5865 wells. All data are uploaded monthly to the DEP [Watershed Information Network \(WIN\)](#) Oracle Database where it can be retrieved by the public. Annually all surface water and groundwater data are exported from WIN to the [EPA Water Quality Exchange \(WQX\)](#). Historic groundwater data (collected prior to 2017 for Status and prior to 2013 for Trend) are stored in GWIS because those data were not accommodated by Florida STORET. Trend groundwater data collected from 2013-present has been loaded to WIN, and efforts will be made to load more historic data as

time permits. Historic data that has not been loaded to Florida STORET or WIN can be requested from WMS. Responsibilities include 1) loading approximately 900 new stations and 78,000 results annually for the Watershed Monitoring Section, 2) loading approximately 6,250 candidate selections for the Status Monitoring Network, 3) managing the existing Oracle database and associated applications for the division's changing needs.

g. Stephanie Sunderman-Barnes, Environmental Consultant

Serves as interim QA Officer. This position is responsible for coordination of the Watershed Monitoring Section's data analysis and reporting responsibilities. Provides technical assistance through 1) the review of the division's current environmental data analysis methods, 2) maintenance of the section's data analysis protocols, 3) oversight of section's data analysts and Geographic Information Systems (GIS) analyst for section's required data analyses as defined in the DEAR business plan. This work includes quality assurance of the section's data analyses, including version control of analysis scripts, and the review of annual probabilistic survey analyses and of the triennial trend analyses. This positions also supports division environmental data analyses and reporting needs. Coordinates the data analysis and reporting of WMS data for the annual statewide Status report, the biennial US EPA 305(b) Report, the triennial Status zone reports, and other periodic reports as necessary.

h. Andy Woeber, OPS Environmental Consultant

This position is responsible for GIS data analysis, and reporting, including the preparation of each of the Status Monitoring Network's water resource coverages for random site selection. Responsibilities include 1) preparation and maintenance of a geo-database containing the seven water resource coverages (canals, streams, rivers, small lakes, large lakes, unconfined aquifers, confined aquifers) utilized by the Status Monitoring Network, 2) geo-spatial analysis of status data for annual reporting, 3) creation of map products which are used to report status, trend, springs, and FWRMC data.

i. Rick Copeland, OPS Environmental Consultant

The position is responsible for the statistical evaluation and visual display of groundwater and springs data for the Status & Trend Networks including but not limited to monitoring network design, statistical analysis development, and the analysis and reporting of the data. Responsibilities include 1) annual analysis and reporting of status and trend groundwater and spring monitoring data, 2) groundwater and spring trend analysis report writing, 3) monitoring network design and modification to meet division priorities including but not limited to status and trend monitoring and the determination of contaminants of concern prevalence, 4) determination of state-wide groundwater resource issues and supplying recommendations to address them.

j. Chris Sedlacek, OPS Environmental Consultant

This position is responsible for the statistical evaluation and visual display of surface water data for the Status Network, Trend Network, and springs, including but not limited to monitoring network design, statistical analysis development, and the analysis and reporting of the data. The position is responsible for probabilistic site selection for the Status Monitoring Network. Responsibilities include 1) annual analysis and reporting of status and trend surface water monitoring data including flow adjusted trend analysis, 2) surface water trend analysis report writing, 3) monitoring network design and modification to meet division priorities including but not limited to status and trend monitoring and the determination of contaminants of concern prevalence, 4) biennial assessment of Status and Trend Network data for ATTAINS submittal to USEPA.

k. Debra Harrington, Environmental Consultant

This position is responsible for quality assurance evaluation, data retrieval, and other data management tasks associated with WMS springs and groundwater monitoring. Assists WMS staff with loading and maintaining WMS groundwater and springs data in WIN. Reviews and provides updates and additions to the department's statewide springs GIS Spatial Database Engine layer. Assists with work for federal grants including the USGS groundwater data portal grant. Assists with the FWRMC Salinity Monitoring Workgroup.

5.2 Job Descriptions

The WMS consists of several employees (all who are listed above in Section 5.1); please refer to this list in Section 5.1 above for each job description.

5.3 Approved Signatories

Approved signatories within the DEP WMS are stated as:

Stephanie Sunderman-Barnes, QA Officer
Jay Silvanima, Environmental Administrator
Nia Wellendorf, Program Administrator
Greg DeAngelo, Deputy Division Director
Julie Espy, Division Director

5.4 Employee Training

All WMS employees are required to review the Sampling Manual (and/or provide technical assistance in editing and updating the Sampling Manual) on an approximate annual basis. All staff (DEP ROC staff and contracted staff) who are responsible for sample collection are required to attend at least one Status and Trend Networks Sampling Training Workshop every five years (or as needed, before then). These workshops are

conducted at least once a year, and training is based on specific DEP Standard Operating Procedures (SOP) as applied to the Status and Trend Networks sampling programs.

Field samplers performing Habitat Assessments (HA) and Stream Condition Index (SCI) sampling are required to have specific training and demonstrate competency due to the expert judgment exercised during field sampling. Individuals conducting a HA must train with qualified DEP staff (via workshops and participating in field sampling) and remain in “pass” status for field performance tests. Training is conducted using the Habitat Assessment Training Checklist (FD 9000-34). Habitat Assessment testing is conducted at select streams/rivers located throughout the state, and sites change every two years or as needed. All field samplers are required to participate in at least one testing event every two years. At all times, a minimum of one sampler from each sampling team must be in pass status in order to perform a Habitat Assessment.

Field samplers conducting SCI sampling must train with qualified DEP staff (via workshops and participating in field sampling) and pass an online SCI knowledge test and field performance audit to demonstrate competence. After passing the initial performance audit, samplers must pass a refresher audit every 5 years to remain in pass status. Training is conducted using the SCI Training Checklist (FD 9000-35). SCI audits are administered by the Water Quality Standards Program. At all times, a minimum of one sampler from each sampling team must be in pass status in order to collect an SCI sample.

Field samplers are also required to obtain training on use of handheld Global Navigation Satellite System (GNSS) / Global Positioning System (GPS) devices, Class I Watercraft and Trailering Operation, and safety.

A list of all sampling personnel and their respective water quality sampling training is maintained internally within the Section, and their training is consistent with FA 3100. Furthermore, training records are maintained on each WMS employee who is trained in skills that are commensurate with their responsibilities.

6.0 Documentation

Sample documentation is of critical importance to the objectives of the Status and Trend Monitoring Networks. Data gathered on these projects are entered into an existing statewide water quality database, and must be properly linked to historical data. The database is also a source of public information and is used for a variety of purposes. The data must be accurate to avoid incorrect evaluations and decisions on the State’s water resources. All DEP WMS documentation requirements are based on the DEP SOPs.

6.1 Generation, Retainment and Storage of Records

Record keeping practices are consistent with 62-160.240(1) and 62-160.340(1), F.A.C. and FD 1000 of the DEP SOPs. All records shall be retained for at least 5 years after the completion of the project.

Sample documentation begins in the DEP laboratory. A label is placed on each container with the request (RQ) number, the major analyte group and the preservation method. See the [WMS Sampling Manual](#), Figure 30 (page 154).

DEP WMS provides the sampling agencies with station identification labels (see the [WMS Sampling Manual](#), Figure 6, page 128) that are bar coded to uniquely identify a sample station. The field samplers place these labels on the sample containers and on the custody sheet. This links the station to both the containers and the custody sheet.

All field documentation is recorded on appropriate field sheets. Samplers enter field collected data into ArcGIS Survey123 electronic forms using tablet or laptop computers. Upon data submittal, data are automatically transferred to digital field sheets. Paper versions of the field sheet forms are also supplied by DEP WMS, as a backup documentation method for use when electronic forms are unavailable. Samplers are required to ensure that the most current versions are used by downloading all published updates to Survey123 electronic forms and observing the date printed on the field sheet forms.

All paper documentation records must be recorded in waterproof ink (except the Habitat Assessment sketch map, which may be drawn in pencil). 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.

All documentation requirements regarding initial activities performed by the Laboratory (container preparation, supplying sampling kits, RQ information, etc.) are generated, retained and stored internally by appropriate lab personnel.

All documentation regarding sampling procedures (Sampling Manual) are generated, retained and stored electronically by the DEP WMS QA Officer.

All documentation from data collection events, produced by field sampling personnel, is retained and stored by the respective Project Manager.

All documentation regarding data management and review is generated, retained and stored by the Data Manager and through the Project Manager's interactions with the appropriate database software programs (see [Data Management Standard Operating Procedures](#) and [GWIS Database Utilities User's Manual](#)).

6.2 Documentation Control and Maintenance

Revision dates or version numbers are used to indicate date(s) of use and to ensure the most current version of the documentation form is being used. Furthermore, all documentation contains control blocks such as page numbers and section headings used to identify completeness. Electronic documents posted for internal or public viewing, maintained by the DEP WMS QA Officer, are lock-protected to prevent editing by anyone other than the QA Officer.

6.3 Types of Documentation/Reports Generated

WMS generates several types of documentation and reports that are listed below.

Documentation:

- Sampling Manual, including paperwork as described below:
 - field sheets (groundwater, surface water, biology)
 - custody sheets
 - labels
 - micro land use forms
 - permission forms
 - log book forms (calibration, standards and buffers, equipment maintenance, and equipment cleaning)
 - inventory sheets
 - field audit forms
- Quality Manual
- Monitoring Design Document
- Data Management and Analysis SOPs
- Project Manager Procedures Manual
- Status Network Reconnaissance Manual
- Generalized Water Information System (GWIS) Database Utilities User's Manual
- Automated Data Management (ADM) Application User's Manual
- GNSS / GPS Basics Manual
- Data dictionaries for field data and locational data collection based on programmatic standards

Reports:

- Quality assurance reports
- Data analysis summary reports from annual surface water and groundwater monitoring
- Integrated report to EPA for satisfaction of Section 305(b) Clean Water Act requirements
- Report on the Integrated Florida Monitoring Strategy to satisfy section 106 reporting requirements to EPA

- Quality Assurance Project Plan in support of Florida Department of Environmental Protection monitoring activities conducted under sections 104(b)(3), 303(d), 305(b), and 604 of the Clean Water Act as amended

6.4 Sample Identification and Data Integrity

Procedures involving accurate sample identification begin with proper sample nomenclature. Refer to [Data Management Standard Operating Procedures](#), page 4-6 for details on how samples are named (based on sampling agency, project codes and collection timeframe).

Once samples are properly named, accurate sample identification continues with the scheduling of samples in the Laboratory Information Management System (LIMS). Refer to the [WMS Sampling Manual](#), page 11 and the DEP Laboratory Quality Manual for specific details regarding scheduling.

The sample identification process continues with additional documentation procedures involving the field sheets and custody sheets by including station identification barcodes on each form. See the [WMS Sampling Manual](#), Figure 6 (page 128) for an example of the station identification barcode labels. Sample custody is consistent with and follows FD 5000 of the DEP SOPs.

Furthermore, accurate sample identification and data integrity remains intact throughout the data review and data analysis process. Refer to the [Data Management Standard Operating Procedures](#) and [GWIS Database Utilities User's Manual](#) for details.

6.5 Confidentiality

All records and documents generated by DEP WMS are public records and may be subject to disclosure according to the guidelines and exceptions published in Chapter 119 of Florida Statutes. The procedures used for release of all data/documentation are detailed in the [Data Management Standard Operating Procedures](#) page 13-16.

7.0 Capabilities

The WMS has proven it is capable of staffing and administration of two statistically sound monitoring networks (Status and Trend). Within these networks, staff are capable of planning, scheduling and collecting high-quality samples for Florida's water resources, and managing all aspects of the associated data review and reporting. The DEP Laboratory in Tallahassee is responsible for all lab analyses performed on the submitted samples.

7.1 Sampling Capabilities

The WMS collects all samples based on procedures outlined in the DEP SOPs applicable to groundwater (DEP-SOP-001/01 FS 1000, FS 2000, and FS 2200), surface water (DEP-SOP-001/01 FS 1000, FS 2000, and FS 2100), sediment (DEP-SOP-001/01 FS 1000 and FS 4000), and biological communities (DEP-SOP-001/01 FS 7230, FS 7320, and FT 3000; DEP-SOP-003/11 SCI 1000 and LVI 1000). Sampling for these matrixes includes all applicable DEP SOP field testing procedures (DEP-SOP-001/01 FT 1000, FT 1100, FT 1200, FT 1400, FT 1500, FT 1600, and FT 1700). Furthermore, all containers, preservation, holding times and preservation procedures are consistent with FS 2000, FS 1006, Table FS 1000-2 and Tables FS 1000-4 through FS 1000-8 of the DEP Field SOPs.

7.2 Sampling Procedures

Specific sampling procedures employed by WMS for groundwater are detailed in the [WMS Sampling Manual](#), Section 4 (pages 25-39 and A-2 - A-4).

Specific sampling procedures employed by WMS for surface water are detailed in the [WMS Sampling Manual](#), Section 5 (pages 41-50 and A-4).

Specific sampling procedures employed by WMS for sediment collection are detailed in the [WMS Sampling Manual](#), Section 6 (pages 51-55 and A-4).

Specific sampling procedures employed by WMS for biological communities are detailed in the [WMS Sampling Manual](#), Sections 7-10 (pages 57-82 and A-4 - A-5).

7.3 Test Methods

List of analytical test methods used for field data and laboratory analyses can be found in the following documents:

- [Status Network Indicator List](#)
- [Trend Network Indicator List](#)

7.4 Equipment

All WMS sampling equipment is consistent with FS 1001 and Tables FS 1000-1 through FS 1000-3 of the DEP Field SOPs.

For groundwater sample collection, any combination (or all) of the equipment/instruments listed below may be used:

- pumps (peristaltic or submersible; centrifugal used for well purging only)
- power converters
- gas or electric generators
- tubing
- water level tape / potentiometer (or steel tape and chalk)

- pressure gauge
- YSI multiprobe (or similar) and all associated standards and buffers
- portable turbidimeter
- GNSS / GPS equipment (Trimble GeoXT, Geoexplorer 6000 Series, or Geo 7X)
- measuring tape
- additional non-equipment supplies (sampling pole, cleaning materials, buckets, gloves, filters, preservatives, brushes, camera, etc.)

For surface water sample collection, any combination (or all) of the equipment listed below may be used:

- Van Dorn sampler / Beta bottle (or similar)
- secchi disk
- measuring tape
- YSI multiprobe (or similar) and all associated standards and buffers
- GNSS / GPS equipment (Trimble GeoXT, Geoexplorer 6000 Series, or Geo 7X)
- additional non-equipment supplies (cleaning materials, buckets, gloves, filters, preservatives, brushes, camera, etc.)

For sediment sample collection, any combination (or all) of the equipment listed below may be used:

- stainless steel corer and extruder
- stainless steel petite ponar
- stainless steel Ekman dredge
- scoops or spoons
- secchi disk
- measuring tape
- YSI multiprobe (or similar) and all associated standards and buffers
- GNSS / GPS equipment (Trimble GeoXT, Geoexplorer 6000 Series, or Geo 7X)
- additional non-equipment supplies (cleaning materials, buckets, gloves, syringes, preservatives, brushes, camera, etc.)

For SCI sample collection and performance of the HA, rapid periphyton survey (RPS), or linear vegetation survey (LVS), any combination (or all) of the equipment listed below may be used:

- D-frame dipnet with No. 30 mesh
- collection brush
- 100 meter measuring tape
- flagging tape (or similar)
- YSI multiprobe (or similar) and all associated standards and buffers
- secchi disk
- ruler
- concave or convex spherical densiometer
- hand lens

- frotus
- aquatic and wetland plant identification manuals
- GNSS / GPS equipment (Trimble GeoXT, Geoexplorer 6000 Series, or Geo 7X)
- additional non-equipment supplies (cleaning materials, buckets, gloves, camera, etc.)

For additional details regarding supplies used for sample collection for the above mentioned matrixes, see the [WMS Sampling Manual](#), Section 4 (pages 25-39) and Figure 18 (page 139), for groundwater; see the [WMS Sampling Manual](#), Section 5 (pages 41-50) and Figure 19 (page 140), for surface water; see the [WMS Sampling Manual](#), Section 6 (pages 51-55) for sediments; and see the [WMS Sampling Manual](#), Sections 7-10 (pages 57-82) for SCI, HA, RPS, and LVS.

7.5 Sample Handling

All activities regarding WMS sample custody, shipment and submittal to the DEP Laboratory are detailed in the [WMS Sampling Manual](#), Section 13 (pages 91-96). Sample handling is consistent with and follows FD 5000 of the DEP SOPs.

8.0 Equipment and Instruments

All equipment (and associated standards/buffers) used by WMS for calibration procedures are based on procedures outlined in the DEP SOPs (DEP-SOP-001/01 FT 1000, FT 1100, FT 1200, FT 1400, FT 1500, FT 1600, and FT 1720) and meet all DEP SOP specifications for accuracy, reproducibility and design.

8.1 Calibration and Standards

Specific calibration procedures used by WMS for pH, specific conductance, dissolved oxygen, temperature, and turbidity are detailed in the [WMS Sampling Manual](#), Section 3 (pages 15-23 and A-1 - A-2).

All standards and buffers used in calibration procedures are documented in a log book. An example of a page from the log book is included in the [WMS Sampling Manual](#), Figure 26 (page 150).

All calibration procedures are documented as described in the [WMS Sampling Manual](#), Figures 22-25 (pages A-25 - A-28). Furthermore, all records are maintained per FT 1000, the FT Series and FD 1000 of the DEP SOPs. Per FT 1000 and FD 1000, calibration standards and the calibration procedure are traceable to each instrument.

8.2 Equipment Maintenance and Documentation

All instruments and equipment used for sample collection and calibration procedures are maintained and cleaned on an as-needed basis, and all associated documentation regarding maintenance and cleaning is recorded in log books. Furthermore, all decontamination/cleaning and preservation derived wastes are disposed of in accordance with FS 1011 of the DEP SOPs.

All equipment cleaning is based on DEP SOPs (DEP-SOP-001/01 FC 1000). Specific procedures are detailed in the [WMS Sampling Manual](#), Section 16 (pages 103-108) and Table 10 (page 122). An example of a page from the cleaning log book is included in the [WMS Sampling Manual](#) Figure 39 (page 161).

All instrument and equipment maintenance is based on recommendations made in FS 1007, Table FS 1000-12, and the individual FT series of the DEP SOPs, and manufacturer recommendations. An example of a page from the equipment maintenance log book is included in the [WMS Sampling Manual](#), Figure 27 (page 151).

9.0 Review and Assessment

WMS reviews and assesses the quality of the data being generated by employing quality control measures for both field and laboratory parameters.

9.1 Quality Control Measures

WMS uses several quality control measures to ensure high-quality data is being collected and analyzed for. Quality control samples assess the accuracy and precision of sampling and analytical techniques. The quality control procedures are consistent with FQ 1000 (blanks and other QC samples) and FT 1000 (calibration requirements and acceptance) of the DEP SOPs.

9.1.1 Field Quality Control

Sampling personnel collect and submit three types of blanks to the DEP Laboratory based on the type of equipment used to collect the actual water chemistry samples. All blanks are collected at a minimum of 10% frequency based on the number of samples collected each project. All blanks are collected using analyte-free (de-ionized) water and are collected in the same manner as actual samples.

Pre-cleaned equipment blanks, field-cleaned equipment blanks, and field blanks are collected and submitted as discussed in the [WMS Sampling Manual](#), Section 14 (pages 97-99).

9.1.2 Laboratory Quality Control

The DEP Laboratory uses multiple internal quality control measures for evaluating the quality of the data being generated. These are outlined in detail in the DEP Laboratory Quality Manual.

9.1.3 Quality Control Criteria

The results for each quality control measure are assessed using specific acceptance criteria.

For all blank samples submitted to the lab, results must meet the following specifications. The WMS qualifies data which are detected at values less than 10 times the concentration found in the associated blanks. During the data loading process, an Oracle procedure determines if there are any blank detections for the project. If there are blank detections, the highest detected value per analyte is stored. These stored values are then compared with each individual sample value for the analyte. Sample values detected at less than 10 times the value stored for the blank detection are qualified with a 'G' and a comment is inserted for the result stating 'ANALYTE DETECTED IN FIELD GENERATED BLANK'. Staff conducting data review check that "G" qualifiers have been properly applied, considering additional factors such as sample collection agency and sample collection equipment. In 62-160 F.A.C, the "G" data qualifier is defined as follows: *"A "G" – qualified sample value indicates that the analyte was detected at or above the method detection limit in both the sample and the associated field blank, equipment blank, or trip blank, and the blank value was greater than 10% of the associated sample value. The value in the blank shall not be subtracted from associated samples."*

The WMS QA officer reviews the blank results to determine if significant or reoccurring detections are taking place. The WMS QA officer and Project Managers track blank detections and related actions, such as qualifying associated sample data, in a blank detection tracking spreadsheet. This spreadsheet lists all field collected blanks and any detection greater than the MDL (method detection limit). Every three months, these blank detection tracking spreadsheets are also sent to all staff at each sampling entity who participate in Status and Trend Network projects. Any significant or reoccurring detection requires the sampling personnel to investigate possible contamination sources and initiate corrective actions accordingly.

All calibration and calibration verification results must meet the acceptance criteria stated in the [WMS Sampling Manual](#), Section 3 (page 15) and Table 6 (page A-14). The accuracy of field test measurements is reflected in the acceptance criteria for continuing calibrations as specified in the FT series of the

DEP SOPs. If data are collected using a field meter that fails to meet calibration verification acceptance criteria, the WMS assigns a “J” qualifier to those data, and adds a comment describing which calibration verifications failed to meet the acceptance criteria.

Additionally, the lab may assign a “J” data qualifier to data which are found to be associated with analytical laboratory blank detections other than the method blank or quality control failures. In 62.160 F.A.C, the “J” data qualifier is defined as follows:

“Estimated value. A “J” – qualified sample value shall be accompanied by a detailed explanation to justify the reason(s) for designating the value as estimated. Where possible, the organization shall report whether the actual sample value is estimated to be less than or greater than the reported value, to assist data users in any evaluation of the usability of the sample value. A “J” data qualifier code shall not be used as a substitute for G, K, L, M, S, T, V, or Y, however, if additional reasons exist for identifying the value as an estimate (e.g., laboratory control spike or matrix spiked failed to meet acceptance criteria), the “J” code may be added to a G, K, L, M, T, U, V, or Y qualifier.

Examples of situations in which a “J” code must be reported include: instances where a quality control item associated with the reported value failed to meet the established quality control criteria (the specific failure must be identified); instances when the sample matrix interfered with the ability to make any accurate determination; instances when data are questionable because of improper laboratory or field protocols (e.g., composite sample was collected instead of a grab sample); instances when the analyte was detected at or above the method detection limit in an analytical laboratory blank other than the method blank (such as a calibration blank) and, the blank value is greater than 10% of the associated sample value; or, instances when the field or laboratory calibrations or calibration verifications did not meet calibration acceptance criteria, including quantitative or chronological bracketing requirements for field testing data.”

The lab may assign a ‘V’ data qualifier to data which are found to be associated with method blank detections. In 62-160 F.A.C, the ‘V’ data qualifier is defined as follows: *“A “V” – qualified sample value indicates that the analyte was detected at or above the method detection limit in both the sample and the associated method blank and the blank value was greater than 10% of the associated sample value. The 10% criterion shall not apply to blank results for biochemical oxygen demand (BOD) or microbiological tests. For BOD tests, the “V” code shall be used for all sample results where the associated method blank result exceeds the maximum blank DO depletion specified in the analytical method. For microbiological tests, the “V” code shall be used for all samples where the associated method blank indicates growth of the target organism. Note:*

unless specified by the method, the value in the blank shall not be subtracted from associated samples.”

9.2 Raw Data

These policies and procedures are used to review and assess raw data, laboratory data and project data. All data management is consistent with FD 1200 of the DEP SOPs.

9.2.1 Data Reduction

Values for conductivity, dissolved oxygen, pH, temperature, secchi depth, depth to water, and sample depth are transferred directly from the sampling instrument to the ArcGIS Survey123 electronic data entry form or to a paper field sheet. All values recorded on paper field sheets must also be entered into the ArcGIS Survey123 electronic data entry form. This raw data is reviewed by the samplers or lead sampler. Data collected by contracted sampling agencies are also reviewed by the sampling agency's data manager. For calibration criteria and information, see the [WMS Sampling Manual](#), Section 3 (pages 15-23 and A-1 - A-2), and Table 6 (page A-14). Refer to the DEP Laboratory Quality Manual for specific details regarding formulas for calculating final sample results.

9.2.2 Data Verification

Raw field data are reviewed by the samplers and / or lead sampler and the DEP Project Manager. Field data collected by contracted agencies are also reviewed by the sampling agency data manager. Field logs and previously collected field data are reviewed for problems or errors.

Each sampling agency's lead sampler and each contracted sampling agency's data manager are responsible for determining that the results of each analytical determination have all associated QC measurements and that the acceptance criteria are met and documented according to protocol. These individuals are responsible for checking calculations, completing sample preparation, calibration, analysis and instrument logs, and completing all internal custody documentation. Each DEP Project Manager is responsible for reviewing this work for completion and correctness prior to authorizing the individual results for release.

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

9.2.3 Data Validation

Once the reconnaissance, field, and lab data are received by WMS, the data are loaded into the WMS Oracle database (GWIS). The data are then considered provisional and must be reviewed by the DEP Project Manager prior to release to the general public. Two applications which interact with the GWIS database are used to review these data: Automated Data Management (ADM), and Generalized Water Information System (GWIS) Database Utilities. ADM is used to export provisional data out of the Oracle database and to create documentation to enable efficient data review. These files are reviewed by the DEP Project Manager and returned to the data generators for their review if required by contract. The files include the metadata file and various exports of the results. GWIS Database Utilities is used by DEP Project Managers to review the accuracy of station data for all projects in the provisional status.

The metadata file contains information on the completeness or lack thereof of the project data, and on the quality of these data. Problems with the project data may be listed in the comments section of the metadata file. All of the sample and blank data are exported to review the data for accuracy.

Specific data correction requests are submitted to the DEP Project Manager on the Sample Data Correction Request Form, as described in the [Data Management Standard Operating Procedures](#), pages 20-21. Once the requested corrections are made by DEP staff, the correction requestor is notified and asked to look over the corrections one final time. Additionally, any problems identified with the data are documented in the project comments dialog box by the DEP Project Manager at this time. If no errors are found the data are 'released'.

9.3 Corrective Actions

Network personnel responsible for assessing each quality control measure and initiating corrective action if needed are the designated quality assurance officers for the WMS, the DEP laboratory, and the sampling agency. Specific QC measures that initiate corrective action and the types of action that will be taken are listed in Table A., below. Corrective action procedures are consistent with FA 3000 of the DEP SOPs.

Notifying network personnel of problems and corrective actions can occur on several levels. Generally, oral communication from the QA officer initiates corrective action. In the event a problem fails to be remedied, written communication from the QA officer will serve as official notice of the need for corrective action. Official memoranda between Project Managers, contract managers, or managers of the sampling staff may occur in the event that corrective action is not being implemented.

Reviews and audits of sampling operations by DEP personnel are welcomed. Corrective action recommended by DEP personnel, depending on its nature, may be implemented immediately or at the beginning of a new contract year.

Please refer to the DEP laboratory Quality Manual for laboratory guidelines concerning corrective action.

Table A. – Corrective Actions.

QA/QC MEASURE	CRITERIA FOR CONCERN	CORRECTIVE ACTION
Field Blank	Any value > Method Detection Limit	Evaluate: Analyte-free water source and storage, Sample collection and preservation technique, Sample custody
Equipment Blank	Any value > Method Detection Limit	Implement: additional cleaning procedure Evaluate: Analyte-free water source and storage, Equipment storage, Equipment construction, Sample collection and preservation technique, Sample custody
Field Audit	Deviations from WMS Quality Manual	See section 9.5, below
Performance (laboratory)	Results exceed targets for accuracy in Lab Quality Manual	Lab notification

9.4 Deviations

Significant deviations from standard policies or practices of the WMS are reported to the Project Managers, data generators, and data managers and documented in the data's comments or in the metadata file for the affected project(s). Any samples that are prepared or analyzed beyond accepted holding times have a comment and a lab-assigned "Q" qualifier associated with that sample. Similarly, data associated with the failures of any quality control checks or deviations from standard field or laboratory procedures are qualified as needed and supporting information is documented in the data's comments. All other significant observations that do not conform to accepted practices or policies are documented and reported along with analytical results. The documentation may be letters, interoffice memorandum, appendices to reports or comments in the WMS database.

9.5 Audits

The WMS conducts both internal and external audits that have been designed to evaluate field sampling protocols, laboratory data quality and all associated documentation.

External audits are performed by the WMS QA Officer for each sampling entity, including DEP ROC staff, contracted agencies (NFWMD, SJRWMD and Alachua County), and agencies that collect data as part of collaborative agreements (SFWMMD).

External audits will be scheduled for each sampling entity every 9 -18 months. During this time period, at least one audit for the Status and/or Trend groundwater networks and at least one audit for the Status and/or Trend surface water networks will be conducted with each entity. Project Managers and/or the WMS QA Officer may choose to perform additional audits at their own discretion each year, which will also be considered external audits.

Internal audits are performed by internal staff for each respective sampling entity. Those agencies under contract with WMS are entitled to create individual internal audit schedules and may perform them at their own desired frequencies. Internal audits are not required for DEP ROC staff, but teams may elect to perform internal audits as needed.

All audits (internal and external) are concluded with an audit report that summarizes the overall performance. Deficiencies are noted, and corrective actions are established for each deficiency. In response, sampling personnel are required to submit a plan of corrective action report addressing each deficiency and how they intend to prevent future occurrences. All audit reports are distributed as stated: the original is given to the supervisor of the sampling personnel; copies are provided to each sampling personnel, DEP Project Manager, and the WMS QA Officer. Additional copies are provided as requested by interested parties (internal QA Officers, team leaders, etc.).

Refer to the [WMS Sampling Manual](#), Figure 40 (pages A-30 – A-36) for the WMS Audit Form that is used for both internal and external audits. All audits are conducted according to the requirements of FA 4200 of the DEP SOPs.

10.0 Consumer Relations

10.1 Review of Proposed Work

Review of work products includes internal agency review for reports written to satisfy requirements not limited to but including Sections 305(b), 106, and section 604 of the Clean Water Act. Further review of reports is provided by regional program administrators at EPA region 4 in Atlanta, Georgia.

Other reports, posters and presentations generated for public distribution are reviewed by immediate supervisors, internal program staff, and Administrators with responsibility for section and division programs as specified in section 5.3.

10.2 Complaints

The WMS is committed to resolving complaints and implementing suggestions for improvement. All informal complaints, suggestions or requests for information are directed to the appropriate supervisor for resolution. If immediate resolution cannot be attained, the matter is passed to the section administrator who may investigate and direct the resolution. Formal written complaints are logged with the section and, after the investigation and resolution, are responded to in writing. Copies of responses are kept for reference.

11.0 Appendix

Items listed in this appendix are available for reference, as specified below.

11.1 Status and Trend Monitoring Networks Sampling Manual (WMS Sampling Manual)

The WMS Sampling Manual including Addenda is available online at:

http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operating%20Procedures/Sampling%20Manuals/WMS-SamplingManual.pdf.

11.2 Project Manager Manual

The WMS Project Manager Manual is available online at:

http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operating%20Procedures/QA%20Manuals/WMS-ProjectManagerManual.pdf.

11.3 Data Management Standard Operating Procedures

The WMS Data Management Standard Operating Procedures document is available online at:

http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operating%20Procedures/Data%20Management%20Protocols/WMS-DataManagementSOP.pdf.

11.4 Generalized Water Information System (GWIS) Database Utilities Application User's Manual

The GWIS Database Utilities User's Manual is available online at:

http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operating%20Procedures/GWIS%20Manual/WMS-GWISManual.pdf.

11.5 Automated Data Management (ADM) Application User's Manual

The ADM User's Manual is available online at:

http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operating%20Procedures/ADM%20Manual/WMS-ADMManual.pdf.

11.6 Organization Chart

Figure 1 illustrates the WMS organization chart.

Figure 1. WMS organization chart.

