

Watershed Monitoring Data Management Protocols, version 7

**Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection**

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2600 Blair Stone Road, MS 3560
Tallahassee, Florida 32399-2400
www.dep.state.fl.us



Table of Contents

Introduction.....	3
Project Preparation	4
Definition of Project	4
Current Agency Codes	5
Current Project Types	6
Historic Project Types	6
LIMS Scheduling.....	6
List of Stations.....	6
Project Paperwork	7
Site Reconnaissance and Stations Maintenance.....	7
Site Reconnaissance	7
Site/Station Data Maintenance	7
Status Network Stations	7
Trend Network Stations	9
Minimum Data Requirements for Stations.....	9
Updating Existing Station Data	10
Batch Station Updates to Existing Data	10
Data Transfer	10
Status Network Field Data Transfer	10
Trend Field Data Transfer	11
Acceptable Transfer Formats for Trend Field Data	16
Field Data Submittal Deadlines.....	17
Field Data Paperwork (Status and Trend)	17
Lab Data Submittal	18
Bioassessment Data	18
Project Processing.....	19
Provisional Data Review	19
Data Correction.....	20
Project Data Release.....	21
Certification of Data for Release.....	21
General Release Databases	22
Deletion of Data from Release Database	22
Other Data.....	22
Data Preparation for Data Analysis.....	23
Data Notifications.....	24
Data Security	24
Oracle Database	24
Data Management Deadlines	25
Data Availability	25

Introduction

The Watershed Monitoring Section (WMS) of the Florida Department of Environmental Protection (DEP) oversees data flow using several platforms, including an Oracle® database, internet applications, Microsoft® (MS) Access applications, and standard data transfer formats in dBASE and MS Excel. Collectively, these platforms are referred to as the Oracle Generalized Water Information System (OGWIS).

This document outlines the normal data management protocols to be used for any project scheduled by the WMS. The protocols follow the progress of the project to its conclusion, marked by the final release of data to the general public and upload to the Watershed Information Network (WIN). These protocols are, for the most part, managed by two Internet applications 1) Automated Data Management, which has two interfaces known as ADM (an Oracle Forms application) and AutoDM (a web-based PHP interface), and 2) GWIS Database Utilities. These applications allow contractors/staff to edit, update, and export data generated by the WMS.

ADM, developed by WMS staff, is an Oracle forms application used to update data within the WMS' Oracle database. ADM may be used to track the progress of individual projects (from preparation through release of the data), to prepare labels for sampling and to generate reports to communicate results to property owners or contacts. Data retrievals and reports are generated via a PHP platform known as AutoDM which was developed by the Office of Technology and Information Services (OTIS). OTIS is responsible for the maintenance of ADM and AutoDM. A Users' Manual for ADM and AutoDM is found at

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

GWIS Database Utilities is an online Active Server Page (ASP) application, which interacts with the WMS' Oracle database, used to enter site reconnaissance (recon) information and update station information. A Users' Manual for the Database Utilities is found at

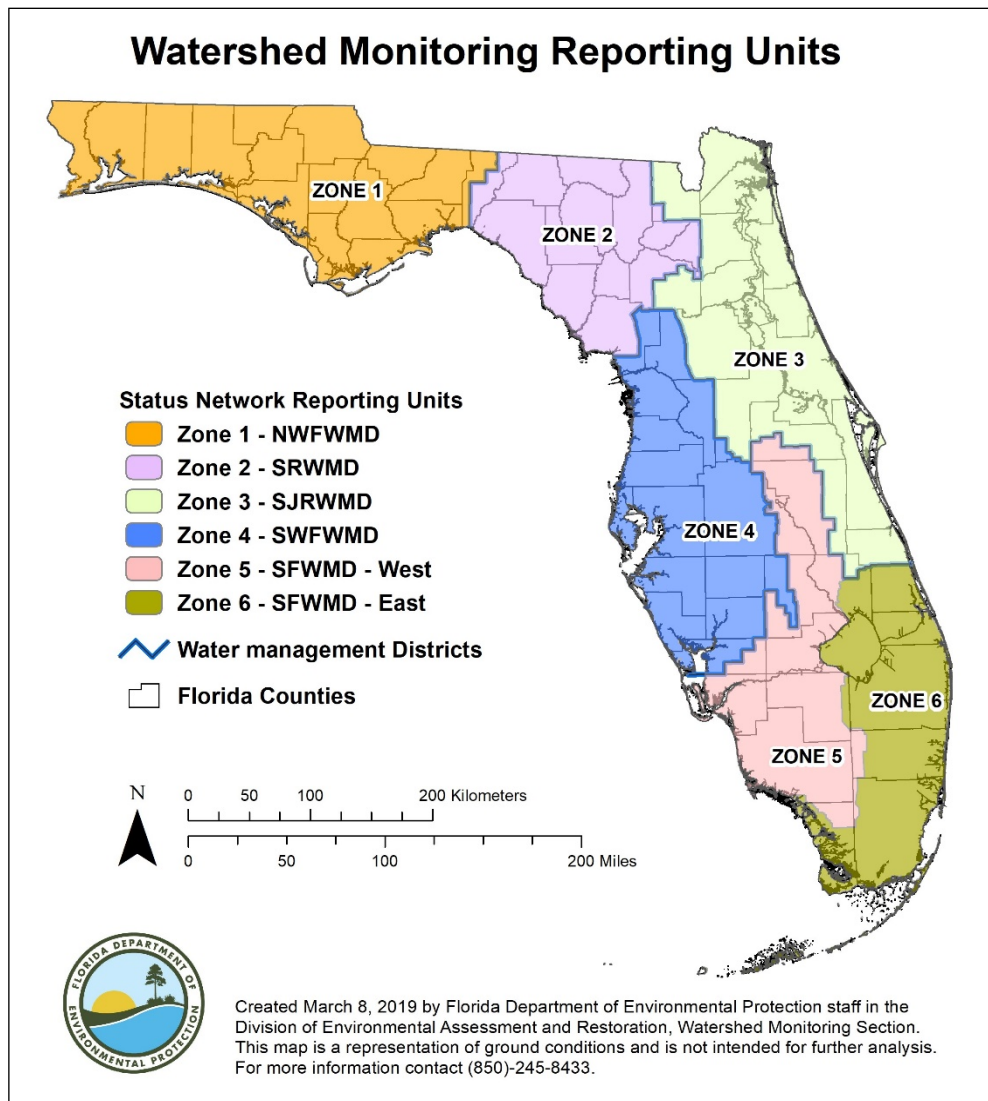
http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operating%20Procedures/GWIS%20Manual/WMS-GWISManual.pdf.

Project Preparation

Definition of Project

Projects are the basic unit of WMS sampling. Prior to April, 2019 all project names consisted of three acronyms: Region/Zone (see Figure 1), project type (see *Current Project Types* below), and date in YYMM format (e.g., Z2GT1901 is Zone 2 Ground Water Trend sampling conducted in January 2019; Z2CA1902 is Zone 2 Confined Aquifer Status sampling conducted in February 2019). Status projects will continue to use this naming structure. Beginning April 2019, project names for Trend sampling changed to reflect the agency performing the sampling. They will consist of three acronyms: Agency (see *Current Agency Codes* below) project type (see *Current Project Types* below), and date in YYMM format (e.g. TRST1904 is Tallahassee Regional Operations Center Surface Water Trend sampling conducted in April 2019).

Figure 1. WMS zones (reporting units). The zones are equivalent to the state's five Water Management Districts (WMDs), with South Florida WMD divided into eastern and western zones. NWF = Northwest Florida; SR = Suwannee River; SJR = St. Johns River; SWF = Southwest Florida; SF = South Florida.



Current Agency Codes

- AC - Alachua County
- CR - Central Regional Operations Center
- NW - Northwest Florida Water Management District
- NR - Northwest Regional Operations Center
- SO - South Regional Operations Center
- SE - Southeast Regional Operations Center
- SW - Southwest Regional Operations Center
- SF - South Florida Water Management District
- SJ - St. Johns Water Management District
- TR - Tallahassee Regional Operations Center

Current Project Types

GT	- Ground Water Trend
ST	- Surface Water Trend
UA	- Status Unconfined Aquifer
CA	- Status Confined Aquifer
CN	- Status Canals
SS	- Status Streams
LR	- Status Rivers
SL	- Status Small Lakes
LL	- Status Large Lakes
SP	- Special Projects

Historic Project Types

B	- Background
M	- Ground Water Temporal Variability, Monthly/Quarterly
T	- Surface Water Temporal Variability, Monthly
V	- VISA (Very Intense Study Areas for ground water protection)
LS	- Status Low Order Stream
HS	- Status High Order Stream

LIMS Scheduling

For each project, samplers estimate the number of samples to be collected during each week of the sampling period. This information is given to the Quality Assurance Officer (QAO). The QAO schedules the sampling on the DEP Laboratory Information Management System (LIMS).

Instructions for using the LIMS Scheduler can be found in the Laboratory's [SOP LB-018](#). The WMS Data and Analysis Coordinator (DC) then enters the Lab Requisition (RQ) numbers and ancillary data into the table T_RQ_LIST in the Oracle database. This information is used to create RQ labels for the custody sheets. The process for loading RQ's to T_RQ_LIST is described in \\fldep1\DEAR\WQAP\SOL_Z\ProcessFlow\Documents related to Process Flow\03.2\03.2.01-PROJECT CREATION RQ AND SITE QUARTERLY LOAD INSTRUCTIONS.

List of Stations

Periodically, the stations and blanks to be sampled per project are loaded into the table T_PENDING in the Oracle Database. The process for loading stations and blanks to T_PENDING is described in \\fldep1\DEAR\WQAP\SOL_Z\ProcessFlow\Documents related to Process Flow\03.2-Loading RQs\03.2.01-PROJECT CREATION RQ AND SITE QUARTERLY LOAD

INSTRUCTIONS.docx\\ This information is used to create bar code labels for the sample containers and custody sheets.

Project Paperwork

Two weeks prior to a project begin date, either the QAO will ensure that sample labels and custody sheets are generated and distributed to samplers. Please refer to the [WMS Sampling Manual](#) for further details on project paperwork.

Site Reconnaissance and Stations Maintenance

The random site selection (T_RANDOM_SAMPLE_LOCATION or T_WELL_LISTFRAME) and station (T_STATION) tables reside on the department's Oracle server as part of the section's Oracle database. The URL for the GWIS Database Utilities Internet application is

<https://fldep.dep.state.fl.us/gwis>, and this application can be accessed via Chrome or Firefox.

Please refer to the User's Manual ([GWIS Database Utilities User's Manual](#)) for site reconnaissance and station maintenance instructions.

Site Reconnaissance

The sampling agency, PMs, and/or other DEP staff perform all site reconnaissance activities (see [WMS Recon Manual](#) for details). After field/office reconnaissance has been performed, reconnaissance information is stored in Oracle, using the Recon Tracking Utility in GWIS Database Utilities.

Site/Station Data Maintenance

Responsibility for site/station data maintenance, such as updates to owner information, is addressed by the appropriate PM. Typically, individual updates and additions are done by the PM via GWIS Database Utilities. Updates to locational information (i.e. latitude and longitude) must be made by the Data Manager (DM). The DM also initiates batch additions and updates at the request of the PM. The DM or PMs add all new stations to the database.

Status Network Stations

1. The WMS Data Analyst (DA) works with the US Environmental Protection Agency (EPA) to generate all new Status Network random site selections for surface water (SW) and

ground water (GW) resources (for further details, see the [WMS Monitoring Design Document](#)).

2. The site locations are assigned site identifiers by the DA. The DM adds project-specific data elements.
3. The SW site data then are loaded into the table T_RANDOM_SAMPLE_LOCATION, and the GW site data are loaded into the table T_WELL_LISTFRAME in the GWIS schema of the Production Oracle database. The process by which these site selections are loaded is described in \\fldep1\DEAR\WQAP\SOL_Z\ProcessFlow\Documents related to Process Flow\02.19-Load Site Selections\02.19.01-Instructions for Loading Stations Selections. The sql scripts used to perform this task are in \\fldep1\DEAR\WQAP\SOL_Z\sql (T_RANDOM_TEMP_INSERT.sql, T_RANDOM_TEMP_UPDATE_YYYY.sql (where YYYY is the current year), and T_RANDOM_SAMPLE_INSERT.sql).
4. All Status Network SW sites are considered potential new stations. These sites are used to create new stations in the T_STATION table if they are sampled and locational data received. Each site in T_RANDOM_SAMPLE_LOCATION that is sampled is updated with the primary identifier found in T_STATION for the station which relates to the site.
5. Occasionally, a site must be resampled due to issues with the samples not being received in a timely manner in the laboratory or issues with the laboratory analyses after the samples are received. In these cases, the data will be stored as different samples.
 - a. If the original site and resample site have a different latitude and longitude, two different stations with unique PK_STATION numbers will be created and associated with the two sets of data. The original site's STATION_NAME and FK_RANDOM_SAMPLE_LOCATION (if applicable) will be appended with the letter 'B'. The resample site will have the same STATION_NAME and FK_RANDOM_SAMPLE_LOCATION (if applicable) as the original site but without the appended letter 'B'.
 - b. If the original site and resample site have the same latitude and longitude, only one station will be created for the two sets of data.
6. Once GW wells are sampled for a project, their site and physical well information is used to either 1) update an existing well in T_STATION, if the well/station is currently in T_STATION, or 2) create a new well/station record if the well/station does not exist in

T_STATION. A package on the database, GWIS_ADMIN.pkg_process_status_station, is run to accomplish this. This procedure also updates the Fk_Random_Sample_Location identifier in T_STATION, and the station's primary identifier (PK_RANDOM_SAMPLE_LOCATION) in T_WELL_LISTFRAME.

7. Note: the PM or sampling staff must check/enter the minimum data required whenever a new station is added to the Station table.

Trend Network Stations

Trend Network Stations rarely change locations. Due to the nature of the data analysis (i.e., looking for trends), it is desirable to keep the station location the same. However, certain conditions make it necessary to move the sampling location such as hydrologic alterations, construction activities, etc. that make sampling at the current location impractical or unsafe. If the Trend station must be moved, it can be moved within a 200 meter stretch in either direction without creating a new station record in T_STATION if the criteria in Florida Administrative Code 62-303.320(4)(b) can be met. Chapter 62-303.320(4)(b), F.A.C. states that 'Samples collected within 200 meters of each other will be considered the same station or location, unless there is a tributary, an outfall, or a significant change in the hydrography of the water.' The locational and descriptive information for the record should be updated to reflect the new location, and the station comments should clearly describe the old station information and how it changed. If the new location is > 200 meters from the original location or the criteria Chapter 62-303.320(4)(b) cannot be met, then a new station with a new PK_STATION is created.

Minimum Data Requirements for Stations

- **For a GW well** to be included into the database the following information is required, as defined in the current GWIS Database Data Dictionary (found at http://publicfiles.dep.state.fl.us/dear/watershed%20monitoring/info_center_appdata/Procedures/GWIS%20DATABASE%20DATA%20DICTIONARY%201.6%20-%20June%202018.pdf): STATION NAME, WATERBODY NAME, WATER RESOURCE, LATITUDE, LONGITUDE, LOCATION METHOD, LOCATIONAL DATUM, CASING DIAMETER, CASING MATERIAL, CASING DEPTH, TOTAL DEPTH, CONTACT INFORMATION, and DATA SOURCE. A statement describing why the well was selected for inclusion should be supplied with the electronic data in the comment column for the well(s).

- **For a SW station** to be included into the database the following information is required, as defined in the current GWIS Database Data Dictionary (found at http://publicfiles.dep.state.fl.us/dear/watershed%20monitoring/info_center_appdata/Procedures/GWIS%20DATABASE%20DATA%20DICTIONARY%201.6%20-%20June%202018.pdf): STATION NAME, WATERBODY TYPE, WATERBODY NAME, WATER RESOURCE, LATITUDE, LONGITUDE, LOCATION METHOD, LOCATIONAL DATUM, CONTACT INFORMATION, and DATA SOURCE. A statement describing why a station was selected for inclusion should be supplied with the electronic data in the comment column for the station.
- **In addition** to the above-mentioned data elements, the samplers and/or PMs should make every effort to fill in as much information for the station as appropriate and possible via GWIS Database Utilities (see below for station updates).

Updating Existing Station Data

Periodically, some of the data for a station (either GW or SW site) may change (e.g., ownership of a well may change). Updates to reflect these changes should be made in a timely manner by either the WMS PM or the contracted sampling staff. Existing station data can be updated following the instructions in [GWIS Database Utilities User's Manual](#) (Updating Existing Station Information). If changes are needed to the locational information (i.e. latitude and longitude), the DM must make these updates.

Batch Station Updates to Existing Data

Requests for large-scale updates to T_STATION should be made to the DC or DM.

Data Transfer

Status Network Field Data Transfer

Status Network field data transfer is made via a field data entry program installed on the samplers' Trimble® Global Positioning System (GPS) data loggers. The resultant files then are forwarded to the WMS PM via Internet, diskette, or other mutually acceptable electronic media. Details of the management of these data are found in the 'Status Monitoring Network GPS Data Management Procedures' appendix in the [Design Document](#). The process by which the Status field data are loaded to OGWIS using the Trimble files is described in \\fldep1\DEAR\WQAP

\\SOL_Z\\ProcessFlow\\Documents related to ProcessFlow\\03.24-Status Field Data Load\\03.24.01-SSF_LOAD. For Status field data from the St. Johns River Water Management District (SJRWMD), there are additional instructions in \\fldep1\\DEAR\\WQAP

\\SOL_Z\\ProcessFlow\\Documents related to ProcessFlow\\03.11-Standard Format Field Data Load\\03.11.01-STD_FORMAT_FIELD_LOADS.

Because there are several review steps for the SSF files, progress is tracked in an Excel spreadsheet for each year located in the applicable year's folder in \\fldep1\\DEAR\\WQAP \\SOL_Z\\STATUSFD. The original and formatted SSF files also are stored in this folder.

Trend Field Data Transfer

Trend Network field data transfer is made via an online data entry page, or in a standardized format that has been approved by the DM. Instructions for loading the data from the SJRWMD in a standardized file format are described in \\fldep1\\DEAR\\WQAP

\\SOL_Z\\ProcessFlow\\Documents related to ProcessFlow\\03.11-Standard Format Field Data Load\\03.11.01-STD_FORMAT_FIELD_LOADS. To use the online application:

1. Open Internet Explorer 6.0 or higher (do not use Google Chrome), and go to <https://fldeploc.dep.state.fl.us/ambient/field>.
2. Click **Surface Water**, **Springs**, or **Ground Water**, depending on the type of data to be entered.
3. Then, click on the link for the **agency** that collected the data to be entered. This will take you to the actual field data entry form.
4. Select a Trend station or blank from the **Station** dropdown list.
5. Select the month and year of the sampling project from the **Trend Project** dropdown lists.
6. Enter the date on which samples were taken using the **Sample Date** dropdown lists.
7. Select the **Sample Time** in the boxes provided (note that Primary and Bottom samples coming from the same station must have different sample times, and that the time is in 24-hour format). All times should be converted to Eastern Time.
8. Select a **Sample Type** (Primary (Surface), Bottom, Field Blank, Equipment Blank) from the dropdown list.
9. Choose the **Equipment Type** used to collect the sample or blank. For surface water, bottom samples should have equipment type 'N/A Bottom Sample' which will be translated to 'Field testing meter' in the database. For ground water, non-quarterly field

measurements should have equipment type 'N/A Field Measurements Only' which will be translated to 'Field testing meter' in the database.

10. Choose the **Equipment Name/Number** for the equipment used. Bottom Sample, Field Measurement Only, Sample Bottle and In-Place Plumbing should have equipment name/number 'N/A'. If a new piece of equipment is obtained, contact the DM to have that name/number added to the pick list.
11. Enter the name of the person(s) collecting samples in the **Sampler's Name(s)** box. Spell out sampler names, using delimiters (, /) between each name. Do not use initials. There is a 50-character limit.
12. **Enter Your Name** into the box provided. This is the name of the person entering the data. A name must be entered, or else submission of the form will be rejected. Do not use initials. Spell out the name.
13. Enter the field data in the appropriate fields of the form:
 - a. Starting at the top of the **Parameter** list, type in the **Value** measured in the field. If no measurement was made, leave the Value null, add an 'O' in the **Value Qualifier** field and make the appropriate **Comments**.
 - b. Select any pertinent **Value Qualifiers** associated with each measurement. A list of acceptable value qualifiers is available by clicking on the provided link. Any qualified value requires a comment.
 - c. Type in any comments pertaining to that particular measurement (i.e., result level comments) into the **Comment** box. There is an 80-character limit.
 - d. Special instructions apply to blanks. For surface water field or equipment blanks, enter a value of zero for Sample Depth (meters). For ground water field or equipment blanks enter a value of zero for Depth to Water from Measuring Point (feet). Leave all other values empty. These zero values are place holders so that samples will be created for the blanks in the database. These zero values will be deleted after the data are processed.
 - e. Follow this procedure until all field measurements are entered.
14. Any comment pertinent to the sample as a whole is entered into the **Comments** field at the bottom of the form. Again, there is an 80-character limit.
15. If data entry is complete, review the entries on the screen for accuracy, and click **Submit**. Once submitted, the data cannot be viewed in the application.

16. To clear the form and start over, click **Reset**.
17. After clicking on **Submit**, a confirmation screen appears. To enter data for another station or sample, type click the 'Return to Form' link and follow the preceding steps for the next station.
18. After entering all the data, be sure to e-mail a notification back to DEP WMS stating the data are waiting. Include any corrections needed to the data. An e-mail link, which is already addressed, is provided via the application.
19. Once data for all stations have been entered, an output of all data entry should be requested from the DM so that data entry verification can be performed. Data entry verification should be performed following the steps outlined in the DEP Laboratory SOP [BG-01](#).

Within 30 days of receipt, DEP will download the submitted data from the web server. These data are then loaded into the table T_FIELD_DATA in OGWIS, and the column DATE_FIELD_DATA in T_PROJECT is updated.

For sampling staff who are unable to use the online data entry application, Trend Network field data transfer shall be via one of the two standard file formats described on pages 16 and 17 in the section, *Acceptable Transfer Formats for Trend Field Data* or the PM can enter the data into the online data entry application. The formatted file or field sheets containing the field data will be forwarded to the WMS PM via Internet, diskette, or other mutually acceptable electronic media.

Required Field Measurements - Ground Water

This is a three-column table. Column 1 lists the measurement, column 2 lists the unit, and column 3 lists the parameter code.

Note: °C = degrees Celsius; umhos/cm = micromhos per centimeter; mg/L = milligrams per liter; NTU = Nephelometric Turbidity Unit; NGVD = National Geodetic Vertical Datum; N/A = not applicable

MEASUREMENT ¹	UNITS	PARAMETER CODE
Water Temperature, field	°C	00010
Specific Conductance at 25° C, field	umho/cm at 25°C	00094
Dissolved Oxygen, field	mg/L	00299
Dissolved Oxygen Percent Saturation, field	Percent	00301
pH, field	standard units	00406
Depth to Water from Measuring Point	feet	72109
Turbidity, field ²	NTU	82078
Elevation of Measuring Pt., above or below NGVD	feet	82514
Micro Land Use ³	N/A	84147

¹ = Measurements that were required, but were not taken, should be listed as null (empty) values along with an 'O' value qualifier and a comment indicating why the measurement was not performed.

² = Required by DEP SOP FS 2200as of 8/06/2002, however this is subject to change.

³ = Required at each Status Site.

Required Field Measurements – Surface Water

This is a three-column table. Column 1 lists the measurement, column 2 lists the unit, and column 3 lists the parameter code.

Note: °C = degrees Celsius; umhos/cm = micromhos per centimeter; mg/L = milligrams per liter

MEASUREMENT ¹	UNITS	PARAMETER CODE
Water Temperature, field	°C	00010
Specific Conductance at 25° C, field	umhos/cm at 25°C	00094
Dissolved Oxygen, field	mg/L	00299
Dissolved Oxygen Percent Saturation, field	Percent	00301
pH, field	standard units	00406
Secchi Depth (transparency) ²	meters	00078
Total Depth at Sampling Site ³	meters	82903
Sample Depth	meters	90068

¹ = Measurements that were required, but were not taken, should be listed as null (empty) values along with an 'O' value qualifier and a comment indicating why the measurement was not performed.

² = If disc is visible on bottom of water body, the 'S' value qualifier must be used with the result comment 'Secchi visible on bottom'.

³ = If sampling is conducted from a fixed point.

Acceptable Transfer Formats for Trend Field Data

Delimited Text Format:

This is a four-column table. Column 1 lists the parameter name, column 2 lists the parameter type, column 3 lists the total number of characters or digits, and column 4 lists the number of decimal digits.

N/A = not applicable

NAME	TYPE	TOTAL CHARACTERS OR DIGITS	DECIMAL DIGITS
STATION	CHARACTER	25	N/A
PARAM_CODE	NUMERIC	5	0
PARAM_NAME	CHARACTER	40	N/A
TEXT_VALUE	CHARACTER	11	N/A
VAL_QUAL	CHARACTER	5	N/A
SAMP_DATE	CHARACTER	8	N/A
SAMP_TIME	CHARACTER	4	N/A
SAMP_SEQ	CHARACTER	2	N/A
SAMP_TYPE	CHARACTER	1	N/A
PROJECT	CHARACTER	30	N/A
COMMENT	CHARACTER	80	N/A
SAMPLER	CHARACTER	50	N/A

File may be tab or pipe-delimited.

Microsoft® Excel Format:

This is a four-column table. Column 1 lists the parameter name, column 2 lists the parameter type, column 3 lists the total number of characters or digits, and column 4 lists the number of decimal digits.

N/A = not applicable

NAME	TYPE	TOTAL CHARACTERS OR DIGITS	DECIMAL DIGITS
STATION	TEXT*	25	N/A
PARAM_CODE	NUMERIC	5	0
PARAM_NAME	TEXT	40	N/A
TEXT_VALUE	TEXT	11	N/A
VAL_QUAL	TEXT	5	N/A
SAMP_DATE	TEXT	8	N/A
SAMP_TIME	TEXT	4	N/A
SAMP_SEQ	TEXT	2	N/A
PROJECT	TEXT	30	N/A
COMMENT	TEXT	80	N/A
SAMPLER	TEXT	50	N/A

* = All text columns to be left justified

Please refer to the [GWIS Database Data Dictionary](#) for data element definitions.

Field Data Submittal Deadlines

Deadline for Trend and Status field data submittal is 30 days from project end date (the day that the last sample was collected for the project).

Field Data Paperwork (Status and Trend)

For DEP sampling teams, copies of all relevant paperwork for the project, including sample custody records and the list of stations actually sampled, should be delivered to the WMS PM within 30 days from the project end date. The timeline for contractors to submit project paperwork is within 30 days from the end of each quarter.

Lab Data Submittal

Once all analyses for a project are completed, the DEP lab transfers the receipt, result, and QA/QC records to AMBIENT holding tables on its Oracle database in the schema VGSM. Then these data are transferred directly to the WMS Oracle database via PL/SQL procedures in a package named PKG_PROCESS_DATA that is scheduled to run every Monday night at 7pm. Once all lab data have been transferred, the procedure PROCESS_RECEIPTS updates

T_PROJECT.DATE_DEP_DATA. On occasion, this date does not get updated due to samples being cancelled in LIMS after the log in information has been transferred to T_RECEIPT, or if samples are re-reported by the lab. In these instances, the DC or DM must search LIMS using the LIMS Browser to find cancelled samples or missing results and manually update the appropriate tables in GWIS. Instructions for using the LIMS Browser can be found in the Laboratory's SOP [LB-005](#).

Bioassessment Data

Habitat Assessment (HA), Rapid Periphyton Survey (RPS), Linear Vegetation Survey (LVS), and Lake Vegetation Index (LVI) data collected at Status Network or Trend Network stations should be entered into the Statewide Biological Database (SBIO) by the samplers. For contracted sampling teams who do not have access to SBIO, the bioassessment data should be entered by the PM. PMs will check to make sure the data have been entered when project data is under review.

On occasion, PMs may also enter bioassessment data collected by DEP teams. This is accomplished by selecting the appropriate bioassessment parameter from the Field Activities menu in SBIO. When the data entry screen appears, click on the 'User Guide' button for instructions for entering data. Data entry should be verified following the instructions in the Laboratory's SOP

[BG-01](#).

Periodically, HA data are retrieved from SBIO using the public connection to the Oracle database (username – SBIO_QUERY, password – SBIO, database – DOPPLER). SQL scripts for retrieving HA data are \\fldep1\DEAR\WQAP\SOL_Z\sql\HABITAT_CREATE.sql for STATUS and HABITAT_CREATE_TREND.sql for TREND. These scripts retrieve the primary, secondary and total HA scores from SBIO and store them in holding tables in the GWIS_ADMIN schema. Then, scripts are used to match the HA scores with existing SCI samples in Status and Trend projects. If SCI samples exist, the HA scores are added to those existing samples as additional parameters. If

no matching SCI sample exists, a new sample is created within the matching project to store the HA parameters.

To retrieve other bioassessment data from SBIO (i.e. RPS, LVS, or LVI), log in to SBIO and choose menu item **Reports\Retrieve Data**. Click on the 'View User Guide' button in the SBIO Reports – Retrieve Data form for instructions on retrieving data. For large data retrievals, users can also request a data retrieval via DEP's Labs Scientific Support Services Program.

Project Processing

1. Once all lab and field data for a project are loaded into the WMS Oracle database, the DM runs a series of PL/SQL procedures to normalize the data. During this process, each sample is spot checked for missing analytes. Furthermore, the DM checks for missing stations. The resultant data are held in temporary tables in the WMS Oracle database (T_PROVIS_SAMPLE and T_PROVIS_RESULT).
2. Once all of the data have been accounted for and any necessary edits made, they are transferred to the tables T_SAMPLE and T_RESULT, and the column DATE_PROVISIONAL in T_PROJECT is updated.
3. Projects are tracked by the DM in a spreadsheet located in Z:\datamgmt\Project_Tracking to make sure data are merged, reviewed and released in a timely manner. Occasionally, T_PROJECT.DATE_FIELD_DATA does not get updated for Status projects because that update is done manually. Occasionally, T_PROJECT.DATE_DEP_DATA does not get updated because samples were cancelled or re-reported. In rare instances, LIMS data may not be transferred properly to AMBIENT_DATA. The scripts found in \\fldep1\DEAR\WQAP\SOL_Z\sql\ProjectTrack.sql are used to track projects and find missing data.

Provisional Data Review

After the DM has normalized the files, the appropriate staff are notified that the data are ready for review using ADM/AutoDM. Detailed instructions for locating and validating project data are outlined in the WMS Automated Data Management Application User's Manual

(http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operati

[ng%20Procedures/ADM%20Manual/](#)) in sections *SEARCHING FOR PROJECT INFORMATION*, *SAVING & PRINTING REPORTS*, *THE REVIEW TAB*, and *THE REPORTS TAB*.

Data files are created via AutoDM and reviewed by the WMS PM, or they may be forwarded to the sampling contractor and/or sampler for review. MS Excel or text exports of the project data and the project's blank data should be submitted for review at the same time following the instructions in the [WMS ADM Manual](#). Data exports from ADM and AutoDM do not include all data associated with the project from T_SAMPLE and T_STATION. Data review should be performed following the guidelines in the [WMS Regional Project Manager Manual](#), section *Reviewing and Managing Data*. Comments documenting any changes made to the data, or referring to unusual results, should be entered in the project comments section in ADM.

The data exports from AutoDM mentioned above are not for permanent storage and they should not be re-used to fill data requests. If a data request is made, the PM should generate a new spreadsheet to send at that time. The procedure for regenerating spreadsheets does not vary from the initial creation procedure. In addition, corrections by PMs or samplers should not be made to these spreadsheets, as they do not update the database (see *Data Correction* below).

Data Correction

Updates and additions to the Stations table are made through the GWIS Database Utilities application as described in the *Site/Station Data Maintenance* section above. PMs are granted access, and changes/additions are made at their discretion. Any updates that cannot be made through GWIS Database Utilities, such as corrections to latitude or longitude, should be forwarded to the DM.

Sample data corrections are made through a form review process. PMs send requests for sample data correction to the WMS DM for review and update of the appropriate Oracle tables. Data reviewers at contracted sampling agencies can also submit requests for data correction through their PM.

Requested data corrections are submitted on a copy of the Sample Data Correction Request Form at \\fldep1\DEAR\WQAP\SOL_Z\datamgmt\DATA_Corrections_Tracking\GWIS Sample Data Corrections. More extensive, systematic changes can be requested by e-mail, as long as all pertinent data are included. Correction requests are dated upon receipt, annotated with action taken and date action taken, copied, and the original correction form is returned to the PM.

Any editing changes made to a database are documented in the project's documentation file (maintained by the PM) and the associated Sample Data Correction Request Forms. Furthermore, the DM updates the comment columns of the sample and/or results table to reflect any editing changes made to either of these two tables.

Project Data Release

Certification of Data for Release

1. Certification for public release can come only after the review of the project data and the metadata (see *Reviewing and Managing Data* in the [WMS Regional Project Manager Manual](#)), and after any needed editing has been completed and reviewed.
2. The WMS Project Manager and, if applicable, the contracted sampling agency's data reviewer must approve the data before it is certified for release. The only exception occurs if the data review time period (see *Data Management Deadlines* below) has expired, and DEP deems it necessary to release the data so that data analysis may proceed.
3. Project status is upgraded to Release in ADM, via the **Review** tab's **Release** button. This button also updates T_PROJECT with the RELEASE_DATE.
4. In rare instances released data may be 'quarantined' via the **Review** tab's **Revert Release** button. This should only occur when egregious errors are noted in released data. If data are quarantined any noted errors causing this action must be corrected and the data must be reviewed again before they are released. The PM should obtain approval from the DM and, if applicable, the contracted sampling agency's Project Manager before quarantining any data.

A report can be generated that contains target dates for each project and if they have been met by using the **Project Status** option in the list of reports on the left-hand side of the screen in the AutoDM interface. The list of reports that is generated can be filtered using any of the options in

bold at the bottom of the list, and this can be saved as a .csv file or copied to the clipboard and pasted into Excel.

General Release Databases

1. Once provisional data have been reviewed, edited, and certified for general release, exports of the data can be distributed for general use. It is important to use AutoDM to create a current export of the data directly from the Oracle Database for each request, because any changes made to the data will be reflected in the current export. There is no guarantee that prior exports will be up to date with edits/changes that may have been made to the database.
2. Newly released data also will be loaded to the Watershed Information Network (WIN) database on a monthly basis. Instructions for preparing files for WIN data upload are described in \\fldep1\DEAR\WQAP \ProcessFlow\Documents related to Process Flow\03.25-WIN_STORET Load\03.25.01_PREPARING DATA FILES FOR WATERSHED INFORMATION NETWORK.

Deletion of Data from Release Database

To be physically deleted from the database, data must meet at least one of the following criteria: data were collected in obvious violation of sampling agreement with station owner, or data were not collected for a WMS Monitoring Network.

Other Data

Periodically, stream flow data from Trend stations with USGS flow gauges is retrieved and loaded to OGWIS following the instructions in \\fldep1\DEAR\WQAP \SOL_Z\datamgmt\Manuals_Instructions>Loading_data>Loading USGS Flow Data to GWIS.docx and instructions in the sql script \\fldep1\DEAR\WQAP \SOL_Z\sql\USGS_FLOW_LOAD.sql.

Ground Water Trend stations have been created in the National Ground Water Monitoring Network (NGWMN) Well Registry. To add stations to the registry, a username and password must be requested from USGS. If new stations are added to the registry, follow the instructions in the 'Well Registry Guidance Document' available within the registry. After stations have been added,

retrieve the information and have a second person verify that what was entered matches the information in GWIS and WIN.

Data Preparation for Data Analysis

Once all data have been released for a Status resource (e.g. Small Lakes, Unconfined Aquifers), the DC retrieves the data for transfer to the DA. Information on which stations were sampled or excluded and the type of exclusions is retrieved using sql script \\fldep1\DEAR\WQAP\SOL_Z\sql\TONYS_EXCLUSION_SCRIPT for surface water resources and TONYSEXCLUSION_SCRIPT_WELL for ground water resources. These scripts create tables in the GWIS_ADMIN schema named using the convention XX_EXCLUSIONS_YYYY where XX is the two-letter code for the resource and YYYY is the year. The DC visually reviews the sites sampled to ensure that a sampled date was entered and reviews the excluded sites to ensure that they were marked as 'unsamplable' and exclusion categories and criteria were entered. Any sites that were reconned (either sampleable or unsamplable) after the last sampled site are removed from the table since they were not sampled.

Data are retrieved using a package in the GWIS_ADMIN schema named PKG_RESULT_PIVOT. This package retrieves all data for a resource in a matrix format with samples as rows and results as columns. When executing the package, first execute procedure CREATE_RESULT_TABLE. The parameter to enter as Input is p_resource in the format of Z%XXYYMM%, where XX is the two-letter code for the resource, YY is the two-digit year and MM is the two-digit month for the project. Second, execute procedure INSERT_RESULTS_INTO_TEMP. Enter Input parameter p_resource in the format of Z%XXYYMM%, where XX is the two-letter code for the resource, YY is the two-digit year and MM is the two-digit month for the project. Enter Input parameter p_flg as 'V' to retrieve T_RESULT_VALUE. After executing both procedures, the data are stored in a holding table in the GWIS_ADMIN schema called TEMP_RESULT_PIVOT. The table header created by this package uses the pk_param_code from T_PARAMETER. The DA needs the parameter name, and that information is created by the package as a row in the table. The DC views the data and sorts it by the first column, FK_RESULT, to ensure that the header row is created in the format used by the DA. The DC then creates a new table using the naming convention XX_RESULTS_YYYY, where XX is the two-letter code for the resource and YYYY

is the year. The DC reviews the results for any records with FK_RANDOM_SAMPLE_LOCATION appended with a 'B' (samples that were not collected in the correct location or samples that required resampling due to improper preservation or loss during transport) and removes them. The DC then notifies the DA that the exclusion and result information is available. The DA uses an R software script to pull the data directly from the oracle tables into R for analysis. These pivoted exclusion and result data tables are stored in GWIS_ADMIN until all data analysis and reporting are complete, after which the tables are deleted.

Data Notifications

Letters, data reports, and notifications for exceedances of water quality thresholds will be created and forwarded to other programs within DEP, the Florida Department of Health, and property owners, as referenced in the WMS Project Manager Manual (http://publicfiles.dep.state.fl.us/dear/DEARweb/WMS/Reports_Docs_SOPs/Standard%20Operating%20Procedures/QA%20Manuals/WMS-ProjectManagerManual.pdf). ADM uses the information in T_STATION.NOTIFICATION_LETTER and T_STATION.PROPERTY_OWNER or T_STATION.CONTACT_AGENCY to determine if a letter has been requested. If NOTIFICATION_LETTER = 'C', a letter is sent to the contact agency. If NOTIFICATION_LETTER = 'O', a letter is sent to the property owner. When all required letters for each project have been sent, Project Managers use the **Record Date** button in the ADM **Reports** tab to document that notifications are complete. Enter the date that the last letter was sent.

The list of reports in AutoDM also contains information about each project's notification status (**Notification Status** option). This report generates a list of projects that includes the station name, owner or contact name, notification recipient (Owner or Contact) and the date the letter was sent. This report can be filtered using any of the information displayed.

Data Security

Oracle Database

The database is located on the department's depdbprod.dep.state.fl.us server.

Once loaded to the WMS Oracle Database, each sample data record is locked and changes are solely permitted by the WMS DM. However, updates to the Comment column of the Project Table will be made available to the PMs and contractors via the ADM Application. Updates to the STATIONS tables will be allowed via GWIS Database Utilities, <https://fldep.dep.state.fl.us/gwis>, as indicated in the [GWIS Database Utilities User's Manual](#).

The Agency for State Technology (AST) is responsible for data backups. Full Recovery Manager (RMAN) is used to perform backups of the production database, along with transaction logs, every Monday through Saturday night. Prior to each nightly backup, the previous night's backup is copied to a disk storage device for six weeks, where it can easily be retrieved by OTIS. The previous night's backup is then deleted from the RMAN server and the new backup is generated. After six weeks, the backup stored on disk is copied to tape on the AST server, where it is stored for eighteen months. This allows for point in time recovery of the database from the AST server upon request.

DEP Database Administrators (DBAs) are responsible for performing Oracle schema exports. These exports are available only for short term retention.

Data Management Deadlines

Note: due dates are from project end date, the day on which the final sample for the project was taken.

<u>Item</u>	<u>Due Date</u>
Field Data Receipt	30 days
Lab Data Receipt	90 days
Provisional DBF Creation	120 days
Project Review/Data Release	240 days
Letter to Owner/contact Person	360 days
Dept. of Health Notification	360 days

Data Availability

Watershed Monitoring surface water data collected prior to July 2017 are stored in [Florida STORET](#) for public access. Surface water data collected from July 2017 to present are stored in the Florida Department of Environmental Protection's [Watershed Information Center](#) (WIN). EPA's STORET Legacy Data Center houses historic ground water data (from before the year 2000). Ground water Trend data from 2014 to present are also stored in WIN. Ground water data

from 2000 to 2014 are available from DEP upon request. For ground water data not available in WIN or for special data requests please contact either James.Silvanima@floridadep.gov or Elizabeth.Miller@floridadep.gov.

In addition, all data stored in WIN is annually ported to the EPA Water Quality Exchange (WQX) database. Ground Water Trend data are retrieved from WQX nightly by the National Ground Water Monitoring Network Data Portal using the stations created in the Well Registry. A web service is currently under development by OTIS that will allow well construction and water level (depth to water from land surface elevation) to be retrieved from WIN and ported to the NGWMN Data Portal. Lithological information needs associated with each of these stations will be identified over the next year and also will be available through this web service. Details on storage for the lithological data has yet to be determined.