Watershed Monitoring
Data Management Protocol, version 10

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

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Introduction

The Watershed Monitoring Section (WMS) of the Florida Department of Environmental Protection (DEP) oversees Status and Trend Monitoring data flow using several platforms, including an Oracle® database, internet applications, ArcGIS Survey123, and standard data transfer formats in delimited text 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 Hypertext Preprocessor or PHP interface), and 2) GWIS Database Utilities (an online transaction processing PHP application). These applications allow contractors/staff to edit, update, and export data generated by the WMS.

ADM, developed by WMS staff, is 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 https://floridadep.gov/dear/watershed-monitoring-section/documents/wms-automated-data-management-adm-autodm-application.
GWIS Database Utilities is an online PHP 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 https://floridadep.gov/dear/watershed-monitoring-section/documents/gwis-database-utilities-manual.

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 Groundwater 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).

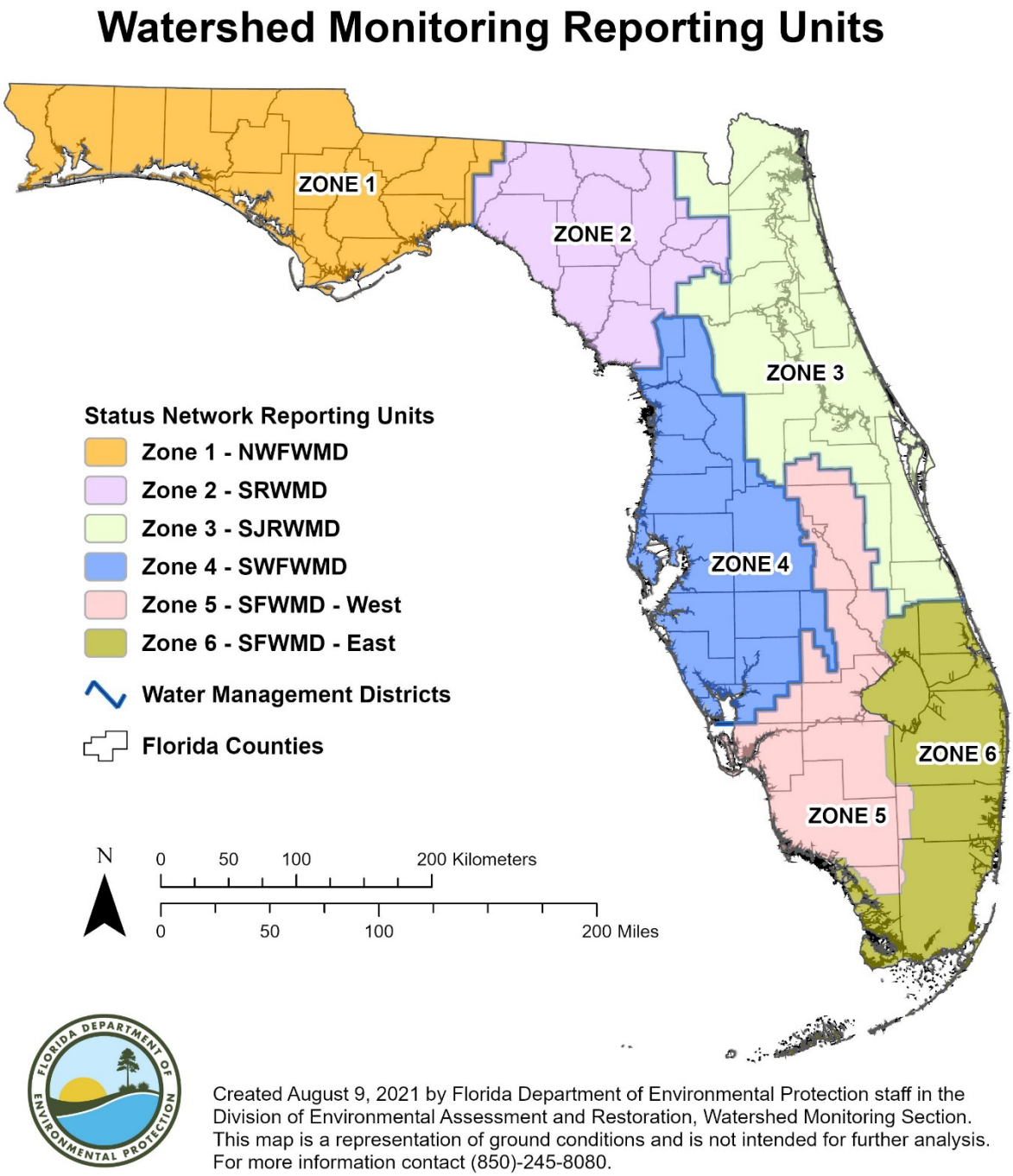

Figure 1. WMS zones (reporting units). The zones are equivalent to the state's five Water Management Districts (WMDs), with South Florida WMD divided into eastern and western zones. NWF = Northwest Florida; SR = Suwannee River; SJR = St. Johns River; SWF = Southwest Florida; SF = South Florida.

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 - Groundwater 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 - Groundwater Temporal Variability, Monthly/Quarterly
Q - Groundwater Temporal Variability, Quarterly
T - Surface Water Temporal Variability, Monthly
V - VISA (Very Intense Study Areas for groundwater 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 in 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 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 documentation generated by field staff. The process for loading RQ's to T_RQ_LIST is described

in \\floridadep\data\DEAR\WQAP\Sol_Z\ProcessFlow\Documents related to Process Flow\03.2-Loading RQs_Projects_Sites_for_Labels\03.2.01-PROJECT CREATION RQ AND SITE QUARTERLY LOAD INSTRUCTIONS_2020.docx.

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 \\floridadep\data\DEAR\WQAP\Sol_Z\ProcessFlow\Documents related to Process Flow\03.2-Loading RQs_Projects_Sites_for_Labels\03.2.01-PROJECT CREATION RQ AND SITE QUARTERLY LOAD INSTRUCTIONS_2020.docx.This information is used to create bar code labels for the sample containers and documentation generated by field staff.

Project Documentation

Two weeks prior to a project begin date, the QAO and Project Managers (PMs) will ensure that sample labels 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 and 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://prodapps.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 Status Network 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. Updates to locational information (i.e. latitude and longitude) must be made by the DC or the Data Manager (DM). The DC or DM also initiate batch additions and updates at the request of the PM. The DC, DM or PMs add all new stations to the database.

Status Network Stations

1. The WMS Data Analyst (DA) uses US Environmental Protection Agency (EPA) developed procedures to generate all new Status Network random site selections for surface water (SW) and groundwater (GW) resources (for further details, see the WMS Monitoring Design Document).
2. The site locations are assigned site identifiers by the DA. The DC adds project-specific data elements and stores the surface water selections in Oracle tables named RESOURCE_SELECTIONS, where RESOURCE is the two-letter code for the surface water resource (CN, LL, LR, SS, SL). Well selections are stored in a table named WELL_SELECTIONS_YYYY where YYYY is the year the selections will be sampled.
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 \\floridadep\data\DEAR\WQAP\Sol_Z\ProcessFlow\Documents related to Process Flow\02.19-Load Site Selections\02.19.01-Instructions for Loading Station Selections_2022.docx. The sql scripts used to perform this task are in \\floridadep\data\DEAR\WQAP\Sol_Z\sql\T_RANDOM_TEMP_INSERT.sql, T_RANDOM_TEMP_UPDATE_2021.sql, 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 are received. Each site in T_RANDOM_SAMPLE_LOCATION that is sampled is updated with the primary identifier (PK_STATION) found in T_STATION for the station which relates to the site.
5. Occasionally, a site must be resampled due to issues during the original sampling or during laboratory analysis. 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 (most commonly applies to Status surface water stations), 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 (if it is the random sample location) and FK_RANDOM_SAMPLE_LOCATION (if applicable) will be appended with the letter 'B'. The resample site may have the same STATION_NAME and FK_RANDOM_SAMPLE_LOCATION (if applicable) as the original site but without the appended letter 'B'. If the station names are not the random sample location designation, the station names can be descriptive of the site sampled and the original station name does not have to be appended with the '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 (most commonly applies to Trend sites and Status groundwater stations) If the site is a Status station, the FK_RANDOM_SAMPLE_LOCATION (if applicable) of the original sample should still be appended with the letter 'B'. For both Status stations and Trend stations, a sample comment should be added to indicate that data should not be used for analysis, if applicable.

6. Once GW wells are sampled for a project, their site and physical well information are 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_LISTRAME.
   Note: the PM and/or data management staff must ensure that all required data fields are populated 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 https://floridadep.gov/dear/watershed-monitoring-section/documents/gwis-database-data-dictionary: STATION NAME, WATERBODY NAME, WATER RESOURCE, LATITUDE, LONGITUDE, LOCATION METHOD, LOCATIONAL DATUM, CASING DIAMETER, CASING MATERIAL, CASING DEPTH, TOTAL DEPTH, CONFINEMENT STATUS, 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). UNKNOWN AQUIFER is only acceptable as a waterbody name if the confinement status of the well is known (i.e. Confined or Unconfined).
- **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 https://floridadep.gov/dear/watershed-monitoring-section/documents/gwis-database-data-dictionary: 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. UNKNOWN or UNNAMED are acceptable for WATERBODY NAME.

- **In addition** to the above-mentioned data elements, the PMs should make every effort to fill in as much information for the station as appropriate and possible. If a well is selected for sampling, LAND_SURFACE_ELEVATION (LSE) is required for the station to be added to WIN. If LSE is unknown by field staff, the PM or DC should seek assistance from a Geographic Information System (GIS) Analyst to obtain an elevation value from a Digital Elevation Model. If depth to water is measured for the well, WELL_MEASURING_PT_ELEVATION (MPE) is required.

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). New information should be communicated by sampling or contracted staff to PM's and/or data management staff (DC or DM) in a timely manner, and updates to reflect these changes should be made by the data management 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 DC or DM must make these updates. Any changes to GW sites should be communicated to the DC or DM so that all instances of that well (T_STATION, T_WELL_LISTFRAME and WELL_LISTFRAME) can be updated.

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 and location data are captured using the ArcGIS Survey123 Field Application installed on the samplers' field tablets and/or computers. Data entered using Survey123 are stored in ArcGIS Online hosted feature layers. The DC and DM retrieve data from ArcGIS Online using the Survey123 web application. The process by which the Status station information is loaded to OGWIS using the Survey123 is described in \\floridadep\data\DEAR\WQAP\SOL_Z\ProcessFlow\Documents related to Process Flow\03.24-Status Field Data Load\Survey123 Status Station Import Process.docx . Status field data are loaded to OGWIS as described in

\\floridadep\data\DEAR\WQAP\SOL_Z\datamgmt\Manuals_Instructions\Loading_data\Import FieldSurvey123 Data into GWIS.docx.

Trend Field Data Transfer

Trend Network field data transfer is made from ArcGIS Online (via the Survey123 web application) into OGWIS as described in \\floridadep\data\DEAR\WQAP\SOL_Z\datamgmt\Manuals_Instructions\Loading_data\Import FieldSurvey123 Data into GWIS.docx.

Within 30 days of receipt, DEP will download the submitted data from ArcGIS Online via the Survey123 web application. These data are then loaded into the table T_FIELD_DATA in OGWIS, and the column DATE_FIELD_DATA in T_PROJECT is updated.

Required Field Measurements

Table 1 and Table 2 list the required field measurements for all samples collected for Status Network and Trend Network projects. If any of these required measurements were not taken for an individual sample, they should be documented with null (empty) values along with an 'O' value qualifier and a comment indicating why the measurement was not performed. Please refer to the GWIS Database Data Dictionary for data element definitions.

Table 1. Required Field Measurements - Groundwater

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; N/A = not applicable

MEASUREMENT	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
Depth to Water from Measuring Point	feet	72109
Turbidity, field	NTU	82078
Micro Land Use[1]	N/A	84147

[1] = Required for samples collected as all Status Network stations. Required annually for samples collected at Trend Network stations.

Table 2. 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	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)[1]	meters	00078
Total Depth at Sampling Site	meters	82903
Sample Depth	meters	90068

[1] = If disc is visible on bottom of water body, the ‘S’ value qualifier must be used with the result comment ‘Secchi visible on bottom’.

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 sampled, should be delivered to the WMS PM within 30 days from the project end date (the day that the last sample was collected for the project). 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. Data entry 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.

To retrieve bioassessment data from SBIO (i.e. HA, 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 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 DC in a spreadsheet located in \\floridadep\data\DEAR\WQAP\Sol_Z\datamgmt\Project_Tracking to make sure data are merged, reviewed and released in a timely manner. 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 \\floridadep\data\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 (https://floridadep.gov/dear/watershed-monitoring-section/documents/wms-automated-data-

management-adm-autodm-application) 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 data export to send at that time. The procedure for regenerating data exports does not vary from the initial creation procedure. In addition, corrections by PMs or samplers should not be made to these exported files, as they do not update the database (see *Data Correction* below).

Data Correction

PMs are granted access to update data in T_STATION using GWIS Database Utilities, 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 DC or 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 \\floridadep\data\DEAR\WQAP\SOL_Z\datamgmt\DATA_Corrections_Tracking\GWIS

Sample Data Corrections. More extensive, systematic changes can be requested by e-mail, if 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.

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 Released 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 DC 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 \\floridadep\data\DEAR\WQAP\SOL_Z\ProcessFlow\Documents related to Process Flow\03.25-WIN_STORET Load\03.25.01_PREPARING DATA FILES FOR WATERSHED INFORMATION NETWORK_2021.docx.

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

Groundwater 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

The Analysis and Reporting Coordinator (ARC) notifies the DC when all site reconnaissance information has been reviewed for a Status resource (e.g. cycle 17 Small Lakes, cycle 17 Unconfined Aquifers). Information on which stations were sampled or excluded and the type of exclusions is retrieved by the DC using sql script \\floridadep\data\DEAR\WQAP\SOL_Z\sql\SW_EXCLUSIONS_RETRIEVAL_TOMMY.sql for

surface water resources and GW_EXCLUSIONS_RETRIEVAL_NEW_DEC2023.sql for groundwater resources. These scripts load the exclusion information to a table in the GWIS_ADMIN schema named SITE_EVALUATIONS. The DC visually reviews sampled sites to ensure that a sampled date was entered and reviews the excluded sites to ensure that they were marked as 'unsampleable' and exclusion categories and criteria were entered. Any sites that were reconned (either sampleable or unsampleable) after the last sampled site are removed from the table since they were not sampled.

Once all data have been released for a Status resource (e.g. Small Lakes, Unconfined Aquifers), the ARC notifies the DA that the data are ready for analysis The DA uses an R software script to pull the data directly from the oracle tables into R for analysis.

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 (https://floridadep.gov/dear/watershed-monitoring-section/documents/wms-project-manager-manual). ADM uses the information in T_STATION.NOTIFICATION_LETTER and T_STATION.PROPERTY_OWNER, T_STATION.OWNER, T_STATION.CONTACT_NAME 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/person. If NOTIFICATION_LETTER = 'O', a letter is sent to the property owner/well 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. The date entered reflects when 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 dbprod.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 DC or DM. However, updates to the Comment column of the Project Table are made available to the PMs and contractors via the ADM Application. Updates to the STATIONS tables are made via GWIS Database Utilities, https://prodapps.dep.state.fl.us/gwis/, as indicated in the GWIS Database Utilities User's Manual.

Full Recovery Manager (RMAN) is used to perform backups of the production database, along with transaction logs, every Monday through Saturday night. The responsibility for performing the RMAN database backups resides with the Northwest Regional Datacenter (NWRC). NWRC is responsible for ensuring RMAN database backups are performed nightly, which includes the archive logs. Nightly backups are held on active disk for six weeks whereupon they are then moved to cloud storage and retained for two years.

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

Data Management Deadlines

Table 3 lists the due dates for key steps in the data management process.

Table 3. Data Management Deadlines

This is a two-column table. Column 1 lists the data management task (item), column 2 lists the due date.

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

ITEM	DUE DATE
Field Data Receipt	30 days
Lab Data Receipt	90 days
Provisional File 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 and groundwater data collected from July 2017 to present are stored in the Florida Department of Environmental Protection's Watershed Information Network (WIN). EPA's STORET Legacy Data Center houses historic groundwater data (from before the year 2000). Groundwater data from 2000 to 2017 are available from DEP upon request. For groundwater data not available in WIN or for special data requests please contact either James.Silvanima@floridadep.gov or Thomas.L.Adams@floridadep.gov.

In addition, all data stored in WIN is annually ported to the EPA Water Quality Exchange (WQX) database. Groundwater Trend data are retrieved from WQX nightly by the National Ground-Water Monitoring Network (NGWMN) Data Portal using the stations created in the Well Registry. Two web services maintained by OTIS allow well construction and water level (depth to water from land surface elevation) data to be retrieved from WIN and ported to the NGWMN Data Portal. A third web service, also developed by OTIS, allows lithology data to be retrieved from the Florida Geological Survey (FGS) GEOlogic Data Enterprise Systems database (GEODES) and ported to the NGWMN Data Portal.