Sierra Nevada Network Lake Monitoring Protocol

SOP 13. Water Quality and Streamflow Monitoring Database User's Manual

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Revision History Log

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #

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1. Introduction

The National Park Service Water Resources Division (NPS-WRD) has created an MS Access desktop database (NPStoret) suitable for collection and delivery of water quality data to a central corporate repository (the NPS' STORET Oracle database) through which it is managed and delivered to the Environmental Protection Agency's (EPA) STORET national data warehouse. The Water Resources Division requires all water quality data collected by the NPS Inventory and Monitoring Program to be delivered to their central repository.

Extensive water quality monitoring is also conducted by state agencies and other parties within California. The California State Water Quality Control Board coordinates and oversees all ambient surface water quality monitoring conducted by agencies of the state through its Surface Water Ambient Monitoring Program (SWAMP). Local and federal agencies, resource conservation districts, and non-profit organizations participate on a voluntary and welcome basis. The California Department of Water Resources (DWR) manages a corporate database and Internet data delivery system called the California Environmental Data Exchange Network (CEDEN) through which all water quality data collected through SWAMP and other monitoring programs in the state are integrated and made available to the public. The DWR has developed a desktop database application in MS Access that is used by the SWAMP program and its clients to store and deliver data to CEDEN.

The SWAMP Information Management System (SIMS), or simply the SWAMP Database, has several purposes, the most important of which is to provide a mechanism for sharing statewide water quality monitoring data among project participants. Data sharing is required for the SWAMP goal of producing an integrated hydrologic unit assessment of the State's surface waters. While this is the primary focus, the SIMS has been developed as an initial effort toward data standardization among regions, agencies and laboratories and it is the intention that protocols adopted here may be later used for other data sharing purposes. While the system was constructed primarily to serve the State of California Regional Board Staff and technical committees, it has also been designed to supply data to non-project scientists and the interested public.

The SWAMP database is organized through a relational structure. A relational structure allows data created at different times (e.g., lab data vs. field) to be entered at the time of production, minimizing the possibility of data loss. The table structure of this database was designed around a sample-driven model. The database structure was designed with surface water sampling in mind, however, it is built to capture information collected at multiple depths in the water column more commonly observed in marine and freshwater lake sampling systems.

The Sierra Nevada Network (SIEN) Water Quality and Streamflow Monitoring Database is an extension of the SWAMP database designed principally to include more extensive metadata reporting required by the NPS-WRD. Principal modifications include the addition of metadata elements to database lookup tables, and development of the forms used for entering these data. The Main Menu has been modified to include a Metadata section that groups all lookup tables used by the database. Slight modifications have also been made to the Data Entry and Edit form to customize data entry for SIEN water quality monitoring. None of these modifications affect

the structure or content of the original SWAMP database, while incorporating the additional elements required for compatibility with NPStoret.

Two conventions are followed throughout. Form objects, including textboxes and comboboxes, receiving required data elements have a yellow background. Non-required data are represented by a white background. All fields incorporated from the NPStoret database are identified with blue labels.

This User's Manual is adapted from the SWAMP Database Training Document, developed by the MPSL-MLML Database Management Team, and last updated in January 16, 2006.

2. Program Setup

The programs needed for Database data entry should be set up on the User's computer under a folder titled NPSWQDatabase. The two programs necessary to run the Database and Forms Entry Program are the database itself (NPSWQDatabase.mdb) and a file called NPSWQsys.mdw which is responsible for maintaining permissions access to the other programs.

2.1. System Requirements

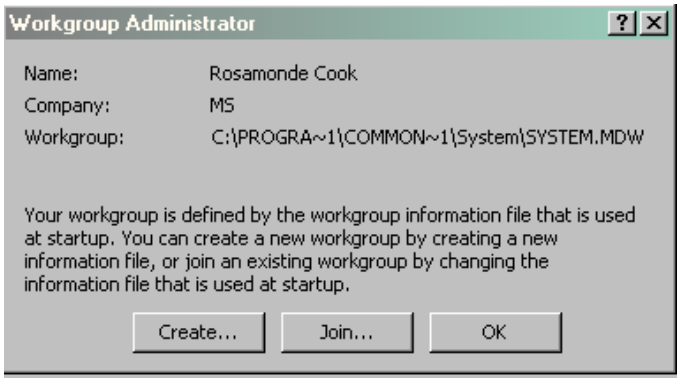
The system on which the Database Program resides must have some minimum system requirements, as follows:

- Microsoft Windows 98 or above
- current on all Windows Service Packs (see http://www.microsoft.com/windows/default.mspx)
- Microsoft Access 2000 or above, including installation of all wizards.

2.2. User Permissions

2.2.1. Connect to Permissions File for Access 2000

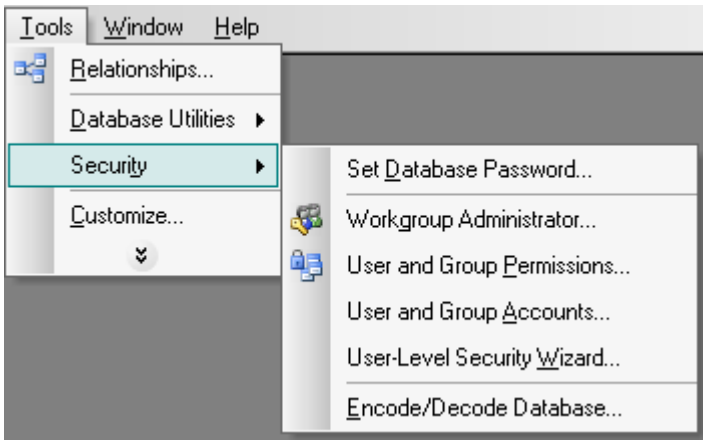
Once the Database Program has been installed, the first thing to do is to connect to the proper permissions file. Click on the file called wrkgadm.exe in your NPSWQDatabase folder. If this file does not exist in the folder, it can be found by searching in Windows Explorer.



1. When the Workgroup Administrator window appears, click on center button "Join".
2. Browse to NPSWQSys.mdw file within the NPSWQDatabase folder.
3. Click OK.
4. The message confirming a successful join should appear; click OK.
5. Click OK on the Workgroup Administrator window to close it.

2.2.2. Connect to Permissions File for Access 2002 and above.

Once the Database Program has been installed, the first thing to do is to connect to the proper permissions file. Open the database and select Tools from the File Menu, then Security and then Workgroup Administrator.



1. When the Workgroup Administrator window appears, click on center button "Join".
2. Browse to NPSWQSys.mdw file within the NPSWQDatabase folder.
3. Click OK**.**
4. The message confirming a successful join should appear; click OK.
5. Click OK on the Workgroup Administrator window to close it.

2.2.3. Reconnect to Original Permissions File

It may be necessary due to other Access use to reverse the above process when not using the NPSWQDatabase. If this is so, the following steps should be followed.

2.2.3.1. Access 2000

Click on the file called wrkgadm.exe in your NPSWQDatabase folder. If this file does not exist in the folder, it can be found by searching in Windows Explorer.

1. When the Workgroup Administrator window appears, click on center button "Join".
2. Browse to C:\Program Files\Common Files\SYSTEM
3. Highlight the System.mdw file.
4. Click OK**.**
5. The message confirming a successful join should appear; click OK.
6. "Exit" the Workgroup Administrator tab.

2.2.3.2. Access 2002

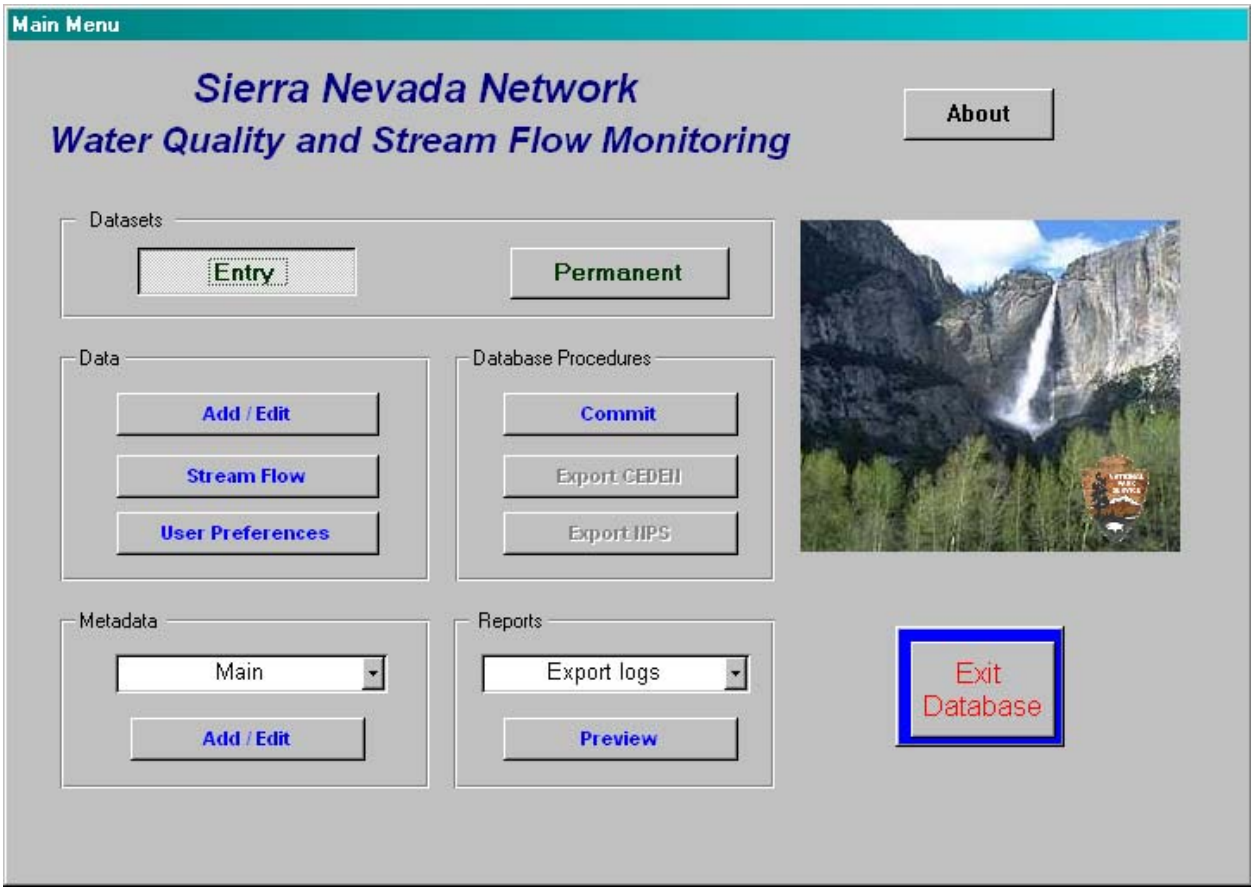
Run Access and select Tools from the File Menu, then Security and then Workgroup Administrator.

1. When the Workgroup Administrator window appears, click on center button "Join".
2. Browse to C:\Program Files\Common Files\SYSTEM
3. Highlight the System.mdw file.
4. Click OK**.**
5. The message confirming a successful join should appear; click OK.

6. Click OK on the Workgroup Administrator window to close it.

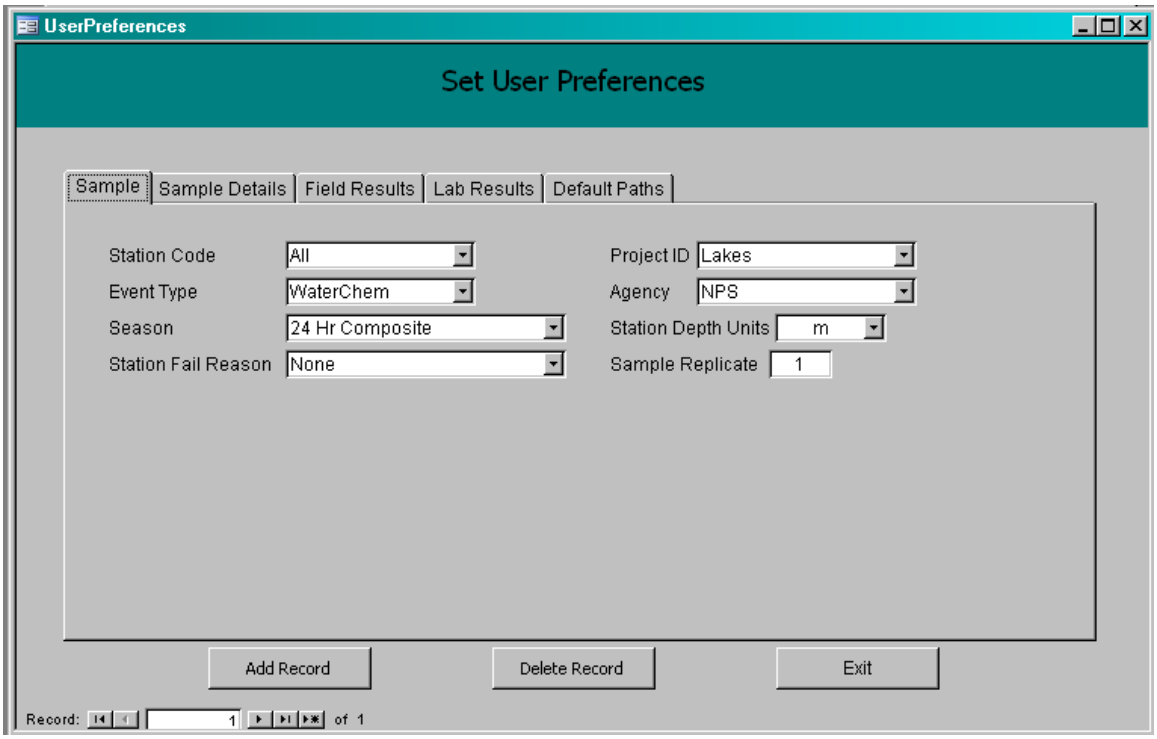
3. Water Quality Monitoring

Open the Database Program from the NPSWQDatabase folder. If it is a new version of the program, or if there is a new version of the database file, follow the steps under Section 2: Program Setup. Otherwise, the Menu screen should appear as follows:



3.1. Setting User Preferences

You can set default values for many fields on the Data Entry and Edit form. Click on the User Preferences button in the Data frame on the Main Menu. Enter values for fields indicated on the Sample Information, Sample Details, Field Results, Lab Results, and Path Defaults tabs. These values will be used automatically when completing these sections of the Data Entry and Edit form.



There are a variety of rules or options related to this functionality.

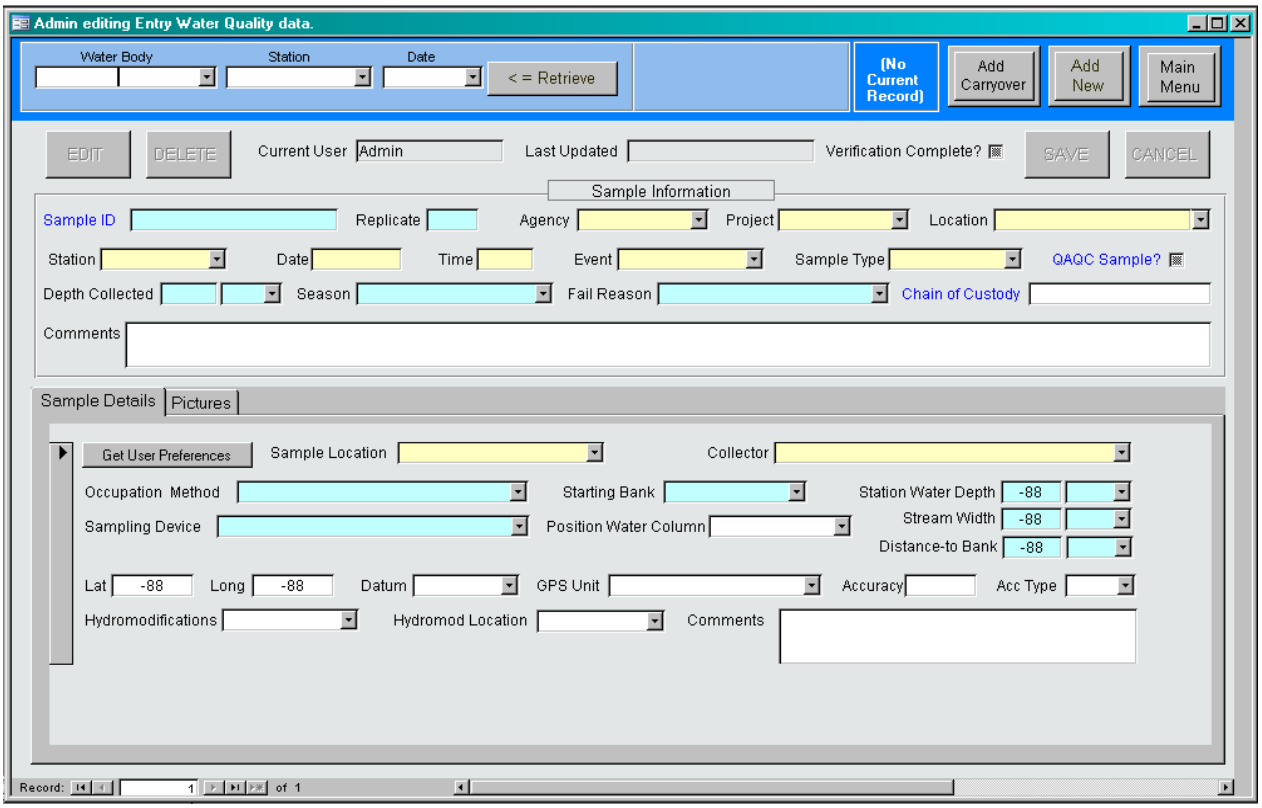
- Any value pre-populated from the User Preferences table can be changed during data entry if necessary.
- There can be a unique set of preferences for an unlimited number of Station Codes.
- If the Station Code field is left empty in a row, and a Station Code is selected in the data entry forms that does not have a value elsewhere in the User Preferences table, then the values for the fields in that row will pre-populate for data entry.
- If there is no row with an empty Station Code and a Station Code is selected during data entry that does not appear in the User Preferences table, then no default values will appear in the forms.

3.2. Entering New Data

To begin entering field data into the database, it is best to have completed Field Data Sheets which contain the data to be entered.

To open the Forms Entry Program, select the Entry option from the Datasets frame at the top of the Main Menu. Click the Add/Edit button in the middle of the Main Menu window. The program will then begin an internal initiation process and open the form. This process may take up to a minute depending on the speed of the computer being used.

The Data Entry portion of the program will appear as the following:



There are three options at this point. A user may retrieve an existing record, add a new record, or revert back to the Main Menu or previous screen.

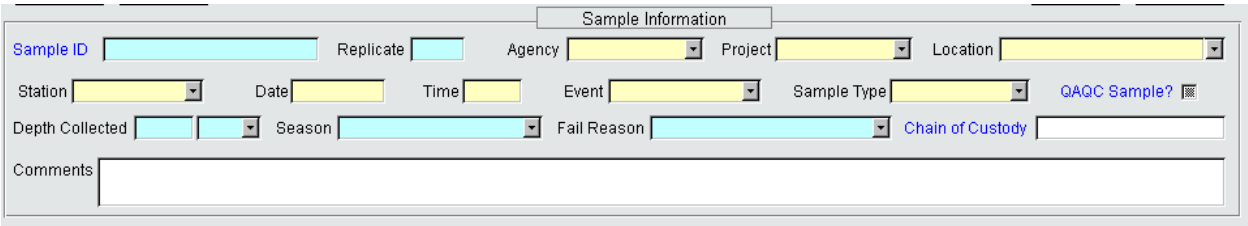
Before entering a new record, you might wish to verify that the record has not already been entered into the database. To do this, go to the top panel of the form do the following:

1. Select from the Waterbody dropdown, the name of the waterbody where the sample was collected.
2. Select the Station where the sample was collected from the Station dropdown list.
3. View the dates in the Date dropdown list and check to see if the one for which the new sample record was taken appears. If it does not, then no records for the selected station and date exist in the database yet. If the date in question does appear, click Retrieve and review the records retrieved.

There are two buttons that will initialize the form for entering new records, Add New and Add Carryover. Add New creates a completely blank record. Add Carryover creates a new record with values for the fields Agency, Project, Location, Station, Date, Event, and Season populated by the current record. If no record is currently displayed, then a message box will appear with the message “There is no information to carry over”. Add Carryover is convenient when entering a block of records collected from the same station on the same date. Use the value ‘-88’ when data are not available to enter into a required field.

3.2.1. Sample Information

Complete Sample Information by entering data into each of the fields as follows. Note that default values entered through the User Preferences form will be populated automatically. Also note that the choices available on dropdown lists are maintained in a separate part of the database and are accessible through the main form within the Metadata frame. See the Metadata section below.



SampleID: An identification created by the organization directing the sampling and is used to track the sample throughout the sampling and analysis processes.

Replicate: Identifies the record as an "original" sample or one of any number of duplicates of that sample for QA purposes. The default is '1' for the original sample and increases by one for each successive replicate. The value should always be 1 for Field Observation samples.

Sample Type: Select the appropriate sample type. Principal Sample Types for a WaterChem or SedChem sampling event are Grab and Integrated. Grab are individual samples collected from a single location. Integrated samples are composed of water or sediment combined from multiple collection points and may include multiple depths. Other options include types of samples taken for QA/QC purposes. Sample Type should always be FieldObs for FieldDescription sampling events.

QA/QC Sample: Indicate whether the sample is taken for QA/QC purposes.

Agency: Select the appropriate Agency Code from the dropdown list.

Project: Select the appropriate Project Code from the dropdown list.

Location: Select the appropriate Location Code from the dropdown list.

Station: Select the appropriate Station Code from the dropdown list.

Date: Enter the Sample Date, expressed as mm/dd/yy.

Time: Enter the Sample Time, expressed as xx:xx.

Event: Sampling Event, used to describe the nature of the sample taken in the field and/or analyzed in a laboratory. It refers to the combination of the matrix and type of analysis

performed on the sample. Event types relevant to SIEN water quality monitoring include the following.

1. FieldDescription, which is used for Field Observation data, describes qualitative or categorical observations made by sampling crews at the station at the time of sampling.
2. WaterChem indicates that water was collected for the purpose of quantitative analysis in the field or in a laboratory.
3. SedChem indicates that sediment was collected for the purpose of quantitative analysis in the field or in a laboratory.

Depth Collected: Enter the depth at which the sample was collected, where depth is measured from the surface of the water or sediment layer. As depths for Grab samples are generally "subsurface", defaults have been established to indicate this. For water samples, the default value is 0.1 m and for sediment samples, the default value is 2 cm. When a water sample is composed of water from multiple depths and therefore has the Sample Type of Integrated, the value should be -88 (for Not Recorded). The same should be true where a single sample is taken while equipment is being pulled through multiple depths. Depth should always be entered as -88 for FieldDescription sampling events.

Units: Units for Depth Collected, expressed in *m* (meters) for water samples or *cm* (centimeters) for sediment samples.

Season: Differentiates between actual seasons (such as Winter, Spring, Summer or Fall) or other discrete periods of time or weather conditions, such as Wet and Dry. These descriptions are usually defined for individual projects and are used to group sample results for analysis.

Fail Reason: should be None if a sample was collected successfully. If it was not, select the appropriate reason from the dropdown list. If the options listed do not accurately describe the reason for failure, select Other and type the actual reason in the Comments box below.

Comments: The Comments box in this section should be used for any notes or comments specifically related to the sample collection and the fields described in this section.

3.2.1.1. Special Circumstance Samples: Pore water analysis

Certain sampling events create a special set of rules that apply to a subset of the fields above. One such event is the collection of sediment from which pore water is extracted and then analyzed. Below are the fields that differentiate from the above set of rules and how they should be completed.

Event: Sediment (Sed_Chem)
Sample Type: Integrated

Note: The matrix for these samples should be Interstitialwater.

3.2.1.2. Special Circumstance Samples: Travel Blank

For those types of analyses that require a Travel Blank to accompany a sampling event, the data is entered with the same set of business rules as the regular samples in the same group, with the following exceptions.

Agency: Agency that created the Travel Blank
Date: should be entered as the date the Travel Blank becomes part of the sample group (i.e., leaves the lab for the sampling event). The date the sample returns to the lab should be noted in the Comments box.
Depth Collected: -88
Units: m

3.2.1.3. Laboratory-generated (QA) Samples

There are two types of samples discussed in this section that are generated or modified within the laboratory. The first is a Matrix Spike (MS), which is a modified field sample. For these samples, all fields describing the sample (i.e. Station, Project ID, Agency, Season, Event, Date, and Time) remain the same as the original sample. The only thing to change is the Sample Type, which should be MS. For a list of QA sample types required for each type of chemical analysis, see the Section: SWAMP Laboratory QA Checklist below.

All samples generated from within the laboratory, such as LabBlank, LCS, CRM, etc. have specific alternative business rules as follows:

Replicate: 1 for single samples, incrementing by one for each replicate split within a batch. There are situations within a batch when 2 identical sample types are used for QA reasons and the only way to differentiate between them is to give them each a different sample replicate number. In such situations, include an explanation in Comments.

Agency: Analyzing agency, as selected from the dropdown list.

ProjectID: Use a conventional id code to indicate a lab sample. For example, SWAMP uses yySWLAB, where yy refers to last 2 digits of the fiscal year used in the *ProjectID* for the field-generated samples. When ProjectIDs for related samples span multiple years, use the later year.

Station: LABQA

Date: Date sample was analyzed on instrument, expressed as dd/mm/yyyy (same as Digest/Extract Date or Analysis Date when no digestion/extraction is performed).

Time: 0:0 0

Event: WaterChem or SedChem, as appropriate to the sample Matrix

Sample Type: Select the appropriate QA Sample Type from the dropdown list.

Depth Collected: -88.

Units: m for water or cm for sediment.

Season: Not Applicable.

Fail Reason: None.

Note: The matrix for constituent codes of these samples should be labwater or blankwater if the sample is water.

3.2.1.4. Non-Project MS and Duplicate Samples

At times, laboratories use samples not generated through a project in order to satisfy batch QA requirements. These samples have different business rules, as follows:

Agency: Lab Agency Code

ProjectID: Use a conventional id code to indicate a lab sample. For example, SWAMP uses yySWLAB, where yy refers to last 2 digits of the fiscal year used in the *ProjectID* for the field-generated samples. When ProjectIDs for related samples span multiple years, use the later year.

Station: Use a conventional station id to indicate a lab sample. For example, SWAMP uses 000NONPJ.

Date: Analysis Date

Time: 0:00

Season: Not Applicable

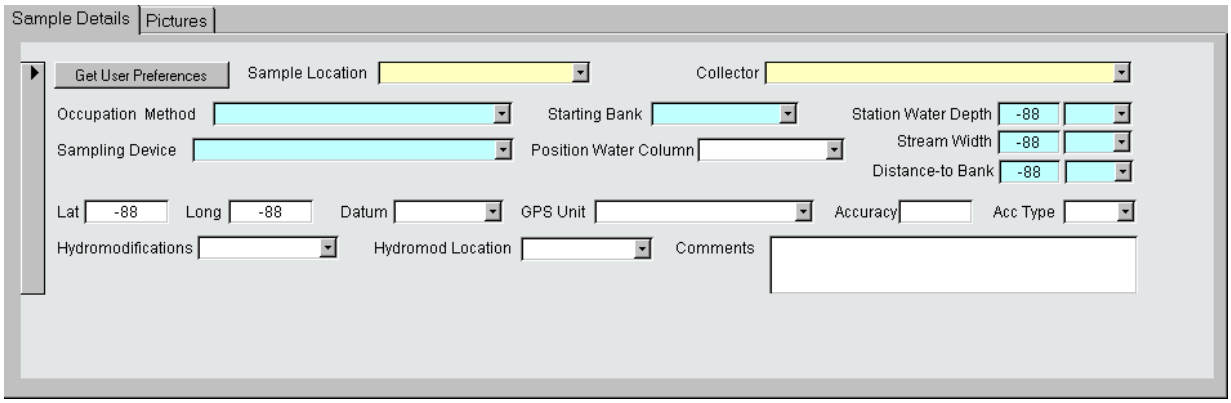
Depth Collected: -88

3.2.2. Sample Details

The purpose of the Sample Details section is to document conditions under which samples were collected. Each of the fields includes an option for Not Recorded and/or Not Applicable for those situations in which there is no applicable response. Many of the fields have Other as a choice. If Other is the selection made, specific information can be entered in the Comments field in this section of the form.

Note: Click Get User Preferences to instantly populate one or more fields with the default values entered in the User Preferences form.

Sample Details are not entered for Field Observations.



Sample Location: The Sample Location refers where in the water body the sample was taken. Options include: Open Water, Bank, Midchannel, Thalweg, Bank/Thalweg, or Not Recorded.

Collector: Select the name of the lead crew member or other person making the collection from the dropdown list.

Occupation Method: Refers to the way in which the sample was collected. The options to choose from are: From Bridge, Walk In, RV (recreational vessel), Other or Not Recorded. If RV is selected, place the cursor in the box next to RV enter a space and then type the name of the vessel used.

Sampling Device: This field describes the equipment used in collecting the sample. For the Sample Type of FieldMeasurement, Sampling Device should be "Field Equipment described w/result."

Starting Bank: Refers to the bank from which the sample is taken, with options of LB (left bank), RB (right bank), NR (not recorded) or NA (not applicable).

Position Water Column: The position in the water column from which the sample was collected. This field is particularly important for samples taken at multiple depths. Options are nearbotton, subsurface, midcolumn or Not Applicable.

Station Water Depth: Enter in meters, the maximum depth of the water at the position where the sample was taken, rather than the actual depth of the sample collected, which is recorded in the Sample Information section of the form. If the measurement is not taken or if it is not applicable, enter *-88*.

Stream Width: Enter the width of the stream in meters at the point of the sample, where applicable. If the measurement is not taken or if it is not applicable, enter -88.

Distance-Bank: Enter the distance from the bank of the water body from which the sample was taken, in meters. If it is not applicable to record data in this field, enter -88.

Latitude: Enter the Actual Latitude at which the sample was collected rather than the Target Latitude used to describe where the station should be located. Enter decimal degrees with up to five decimal places. The Target Latitude is stored in the Stations Lookup table and may be edited through the Stations Metadata form. (See the Section: Metadata below).

Longitude: Enter the Actual Longitude at which the sample was collected rather than the Target Longitude used to describe where the station should be located and is recorded as negative (-) decimal degrees with up to five decimal places. The Target Longitude is stored in the Stations Lookup table and may be edited through the Stations Metadata form. (See the Section: Metadata below).

Datum: Datum used when latitude and longitude are recorded.

GPS Unit: The type of GPS equipment used to record the latitude and longitude for the sample.

Accuracy: GPS Accuracy.

Acc Type: Units used to define Accuracy.

Hydromodifications: Refers to any man-made structure that appears at the station that could have an effect on the condition of the water body. Options include: drop, grade control, bridge or other (such as drain pipe). If the chosen option is other, details about the hydromodification can be recorded in the Comments field.

Hydromod Location: The location of the hydromodification refers to its location in relation to that from which the sample was collected. Options include US (upstream), DS (downstream), NR (not recorded) or NA (not applicable) are available.

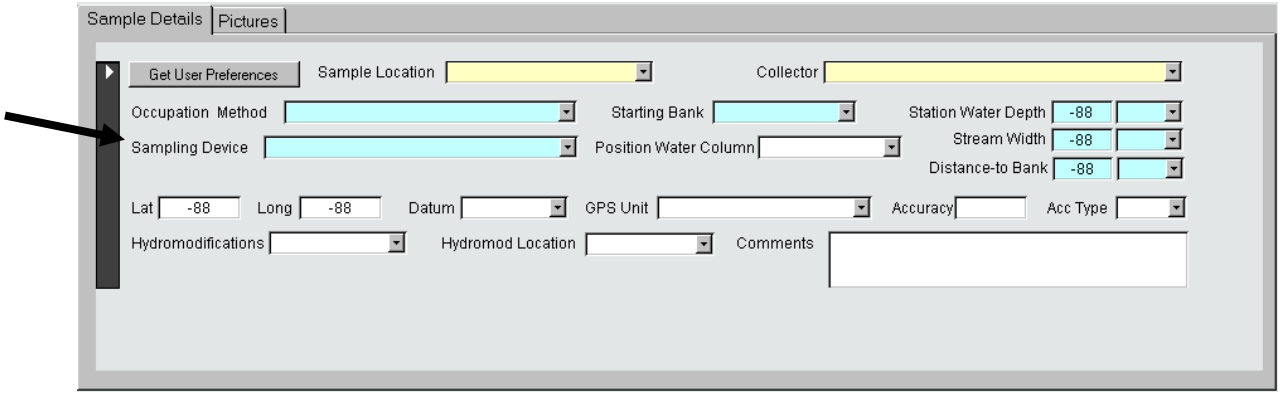
Comments: Record any notes or additional information related specifically to the conditions under which the sample was collected.

Once this section has been completed, click the Save button to save the record.

3.2.2.1. Copy and Paste Sample Details Information

Since some or all of the information recorded in Sample Details may be repeated for a different Sample Type, it may be helpful to copy data once entered and paste it into the next Sample. Follow these steps:

1. Access the Sample Details section to be copied.
2. On the left side of the form, click the arrow box which will cause it to darken in color.

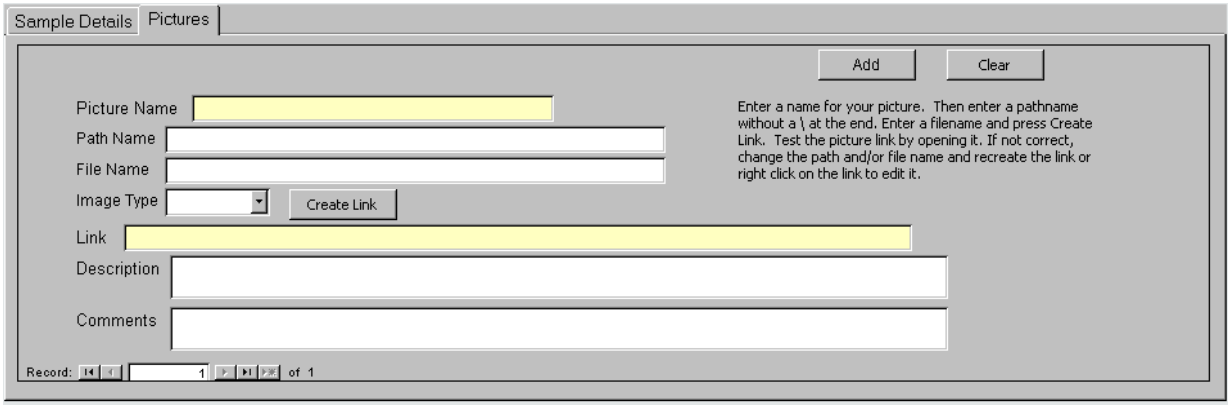


3. On the keyboard, hit the Control + C buttons to copy the data to the clipboard.
4. Select either Add New or Add Carryover at the top of the form, or Retrieve Sample to access the sample in which these Sample Details will be pasted.

5. After the new sample information has been added or the existing sample retrieved, click the arrow box once again on the left side of the Sample Details section.
6. On the keyboard, hit the Control + V button to paste the data into the form.
7. Make any modifications necessary to the Sample Details data for the new sample.
8. Click Save on the right side of the form to save the information.

3.2.3. Pictures

The form on the Pictures tab allows the user to link electronic images to a sample. Images should pertain to the sampling event. Enter data as follows:



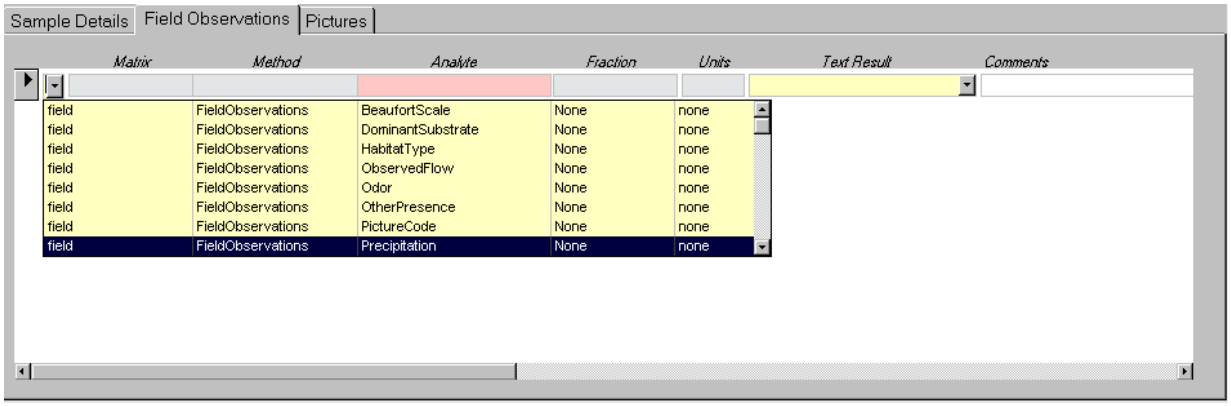
1. Picture Name: Provide a name for the image.
2. Path Name: Computer or network path where the image is stored. Will default to the path entered in User Preferences if there is one.
3. File Name: Name of the file containing the image.
4. Image Type: Select the image format from the dropdown. Click Create Link.
5. Link: When you click Create Link, the link with the path and image name will appear. Double clicking on the link will open the default image viewer assigned by the system to the image type. Description: Enter a description of the image.
6. Comments: Enter any additional comments pertaining to the image.

3.2.4. Results

3.2.4.1. Field Observations

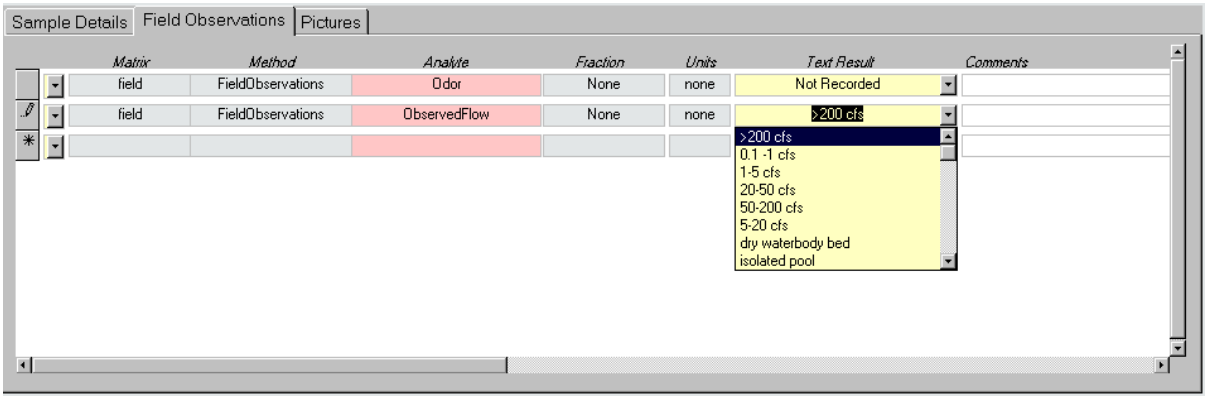
When FieldDescription is the Event selected, the Field Observations tab will display in the tab frame in the lower half of the form.

Select the appropriate constituent from the dropdown list as shown.



The list will display only active constituents eligible for field observations from the Constituents Lookup table (See the Section: Metadata below). Constituents are combinations of Matrix, Method, Analyte, Fraction, and Units where applicable. Be sure to select the appropriate combination and note that many analytes are represented as multiple constituents.

Next, select the result which represents the observation made from the Text Result drowpdown list. Text Result options are created for each analyte in the Metadata section of the database (See the Section: Metadata below). For any observation that needs to be further described or for which the result option selected is Other, enter details in the Comments box.

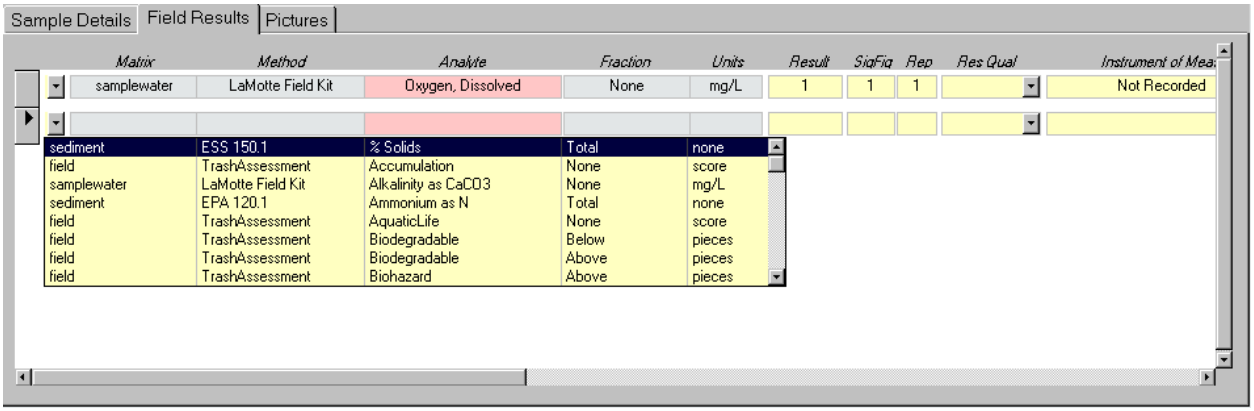


Repeat these steps for each observation to be recorded.

3.2.4.2. Field Results

When WaterChem or SedChem is the Event selected and Sample Type is FieldMeasure, the Field Results tab will display in the tab frame in the lower half of the form. Field Results are probe measurements taken in the field during the sampling event.

For each measurement, select the appropriate constituent from the dropdown list as shown.



The list will display only active constituents with methods applicable to field analysis, from the Constituents Lookup table (See the Section: Metadata below**).** Constituents are combinations of Matrix, Method, Analyte, Fraction, and Units where applicable. Be sure to select the appropriate combination and note that many analytes are represented as multiple constituents.

Complete the record by entering values in the remaining fields. Note that default values entered through the User Preferences form will be populated automatically. Also note that the choices available on dropdown lists are maintained in a separate part of the database and are accessible through the main form within the Metadata frame. (See the Section: Metadata below).

Result: reading taken from the field probe or meter.

SigFig: Number of significant figures. This is necessary for the database, as it does not retain trailing zeros. For example, if the result is 13.0, the only way to communicate the significance of the '.0' is to state that there are 3 significant figures.

Rep: Replicate number. This is an incremental number beginning with 1.

Res Qual: Results qualifier, selected from the dropdown list. This field provides additional information necessary to describe the Result. The field is yellow to signify that an entry must be made, however in this case, a blank entry is permitted and represents "No Qualifier".

Sampling Device: The sampling device, selected from the dropdown list.

QA Code: Select a QA Code, which provides information as to special QA conditions or situations. Choose *X* if there is no special circumstance. The list of QA codes is fixed, both in the SWAMP database and NPStoret. New codes cannot be created by the user, however, new records can be added to the QACode lookup table to represent combinations of QA codes where more than one is relevant to the sample. To create a new combination of QA codes, double-click on the QA Code dropdown list and follow the instructions on the popup form.

Calib Date: The Calibration Date for the measurement instrument. If there is no date to record, enter *1/1/50*.

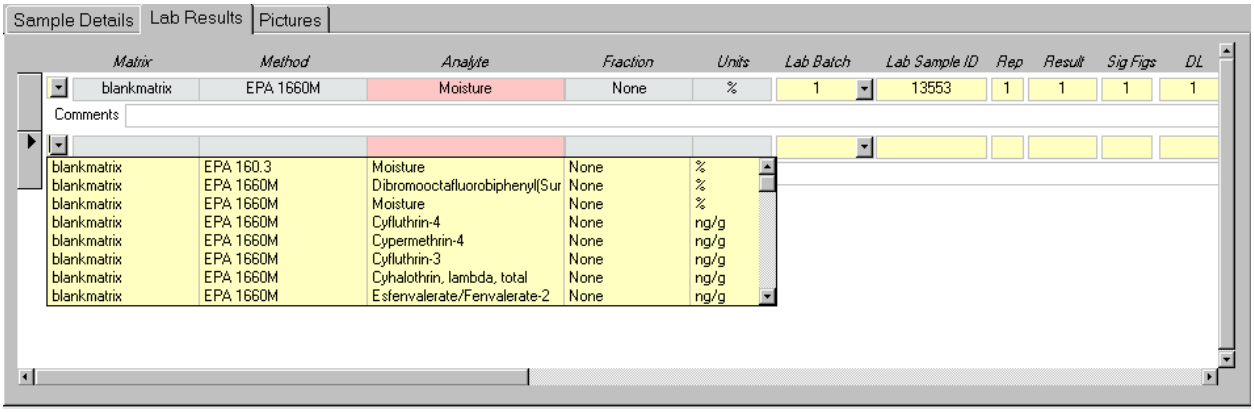
Comments: Enter any comments necessary to further describe the data in any of the other fields for the record.

Click the save button to save the record.

3.2.4.3. Lab Results

When WaterChem or SedChem is selected under Event and the Sample Type is any choice other than Field Measurement, the Lab Results tab will display in the tab frame in the lower half of the form. Lab Results are results of measurements made in a laboratory.

For each measurement, select the appropriate constituent from the dropdown list as shown.



The list will display only active constituents with methods applicable to laboratory analysis, from the Constituents Lookup table (See the Section: Metadata below**).** Constituents are combinations of Matrix, Method, Analyte, Fraction, and Units where applicable. Be sure to select the appropriate combination and note that many analytes are represented as multiple constituents.

Complete the record by entering values in the remaining fields. Note that default values entered through the User Preferences form will be populated automatically. Also note that the choices available on dropdown lists are maintained in a separate part of the database and are accessible through the main form within the Metadata frame. (See the Section: Metadata below).

Lab Batch: A Lab Batch Code is assigned to and identifies all samples digested or extracted together. When there is no digestion or extraction, Lab Batch is all samples part of a single analytical run. See Appendix A for examples of the SWAMP batch naming convention. Lab Batch groups all samples with their supporting QA samples and is used to verify completeness based on the QAPP.

Lab Sample ID: Lab-specific identification for an analyzed sample, with the format and content determined by the lab.

Rep: Lab sample replicate number, an incremental number beginning with 1.

Result: Result of analysis expressed as a real number rather than a calculation. The result should be reported with appropriate number of significant figures. For example, a result of 3.7266945 with a SigFig of 3 should be reported as 3.73.

SigFig: Number of significant figures. This is necessary for the database, as it does not retain trailing zeros. For example, if the result is 13.0, the only way to communicate the significance of the '.0' is to state that there are 3 significant figures.

DL: Detection Limit, or Method Detection Limit. The amount of an analyte that must be present in order to be detectable by the analytical equipment used.

LRL: Lower Reporting Limit. The lowest concentration of an analyte at which the result can be reported with confidence. Established by the reporting laboratory.

URL: Upper Reporting Limit. The highest concentration of an analyte at which the result can be reported with confidence. Established by the reporting laboratory.

Res Qual: Results qualifier, selected from the dropdown list. This field provides additional information necessary to describe the Result. The field is yellow to signify that an entry must be made, however in this case, a blank entry is permitted and represents "No Qualifier". **NOTE**: if the value in this field is NR (Not Reported), then an explanation must be entered into Comments.

Preparation: Describes any preparation or preservation done on the samples prior to analysis. Select the appropriate preparation method from the drowpdown list.

Prep Date: Date the preparation or preservation is performed and must be formatted as dd/mmm/yyyy. If there is no preparation (None) then PrepDate should be entered as 01/Jan/1950 (to indicate none).

Digest Extraction: Describes any digestion or extraction performed on the sample prior to analysis.Select the digestion extraction method from the dropdown list.

Dig Ext Date: Date of digestion extraction. Should be entered as dd/mmm/yyyy. If there is no digestion or extraction (None) then the DigestExtractDate should be entered as 01/Jan/1950 (to indicate none).

Anal Date: Date the sample was analyzed. Should be expressed as dd/mmm/yyyy.

Basis: Basis of analysis (e.g., dry weight, wet weight).

QA Code: The QA Code describes any special conditions or situation occurring during or prior to the analysis to achieve the result. The default code, indicating no special conditions, is X. If more than one code should be applied to a record, the convention is to list them in alphabetical order separated by commas and no spaces. Each unique combination of codes must be represented by a record in the QA Lookup Table. To create a new combination of

QA codes, double-click on the QA Code dropdown list and follow the instructions on the popup form. NOTE: If the code is not X, then a comment is required in Lab Results Comments.

Exp Value: Expected value, the concentration of the parameter in a reference or matrix spike sample, meaning the original concentration plus the spike amount. Applies to QA samples only. Required for Matrix Spikes and Certified Reference Materials, and surrogates. For surrogate samples, the expected value should be 100, representing 100%.

Value Type: How the result was obtained. Actual (single direct reading), Calculated, Estimated.

Status: Result status. P (Preliminary), A (Actual).

Bias: A consistent deviation of measured values from the true value, caused by systematic errors in an analytical method, as determined by applying identical procedures to a specimen of known properties.

Corr: A code (Y/N) indicating whether the confidence level has been corrected for bias.

Precision: Estimate of the maximum possible error in the result. Example: +/- .004.

CI: Confidence Interval. Select from the dropdown list. Confidence interval associated with the Precision. Only applicable when a Precision value has been entered.

RAN: Replicate Analysis Number. The number of replicate analyses conducted to determine the result value.

Comments: Enter any comments necessary to clarify any portion of the analysis or which is not accommodated by any other field, such as Percent Recovery or Dilution Factor. The convention for Percent Recovery is PR *xx*.

Click the save button to save the record.

3.2.4.4. Special Circumstance Samples: Pore water analysis

Preparation: Centrifuged plus any additional preparation done at the lab (Centrifuged, X)
Prep Date: Date of analyzing laboratory preparation, with the data of centrifuge noted in Sample comments. If no preparation at the analyzing lab, enter the centrifuge date for Prep Date.
Basis: ww (wet weight).

3.2.4.5. Calculating Matrix Spike Percent Recovery

The reported LabResult is the number gathered from the instrument and is the net amount recovered from the sample including the spike concentration. For spiked samples, the Expected Value is the total concentration of the analyte in the native sample plus the spiked concentration. Matrix Spike Percent Recovery will be calculated by subtracting the native result from both the

MS LabResult and the MS ExpectedValue, then dividing the two by each other and multiplying by 100. To illustrate:

$$\frac{\textbf{MS Lab Result – Native}}{\textbf{MS Expected – Native}} \times 100 \quad \textbf{or} \quad \frac{5-1}{10-1} = \frac{4}{9} \times 100 = 44\%$$

If the sample being used for the matrix spike requires dilution, the reported values for the SampleType MS are the dilution corrected values, not the actual values from the instrument. The dilution factor is reported in the Lab Results Comments field as "DF=x".

3.2.4.6. Non-Project MS and Duplicate Samples

QA Code: QAX, when the native sample is not included in the batch reported.

3.3. Verifying and Validating the Data

Although it is the responsibility of the submitting laboratory to insure the accuracy and completeness of the data, it is necessary to verify data received prior to entering it into the database. This process should include ensuring that all data fields are complete, that required QA data is included and properly notated with recoveries, estimated values and RPDs, when applicable, as well as seeing that appropriate replicate values are assigned. Please see Submitting Samples to the Lab below for submission requirements.

Once data have been key entered into the database, they should again be verified for accuracy. Only users with manager level permission will be allowed to certify that verification is complete for a record. The checkbox Verification Complete at the top of the Data Entry and Edit form will be disabled for any user without the appropriate permission.

Validation procedures are usually run on blocks of records to assure completeness and check for possible errors in the data. The SWAMP program has developed a series of queries to perform a standard set of validation procedures (see Appendix D). Copies of this query database tool may be obtained from the SWAMP Data Management Team (DMT). Most should work with little or no modification with the SIEN Water Quality and Streamflow Monitoring Database.

3.4. Editing Data

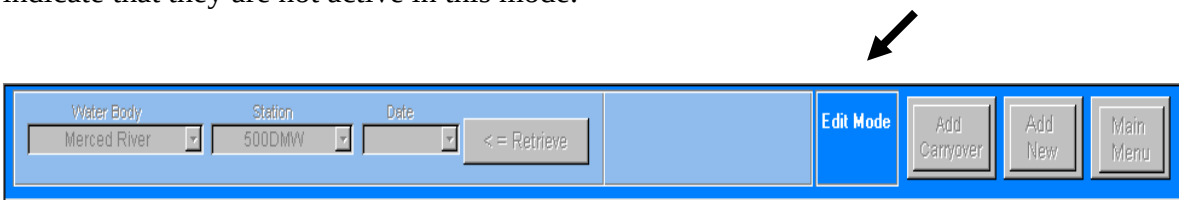
The Data Entry Forms Program may be used to view and edit existing data as well as entering new data.

Retrieve existing records by identifying the appropriate Waterbody, Station, and Date from the top of the Data Entry form. Selecting only a waterbody will retrieve all records entered for a particular lake or stream. Select records from a specific station by first narrowing the list of station codes by choosing the appropriate waterbody and click Retrieve. Select records for samples collected on a specific date by first selecting a station code.

The record counter in the middle of this panel will display the number of records retrieved. Use the back and forth arrows to navigate through records. Records will be displayed in alphabetic order by station code, and then by date.

This section of the panel also displays the mode of the form. When records are initially retrieved, the mode is set to browse and changes cannot be made to the contents of the records. All selection buttons are active in this mode.

To make changes, click the Edit button in the middle panel of the form to switch to edit mode. When you do this, Edit Mode will be displayed in the top panel and all buttons will be faded to indicate that they are not active in this mode.

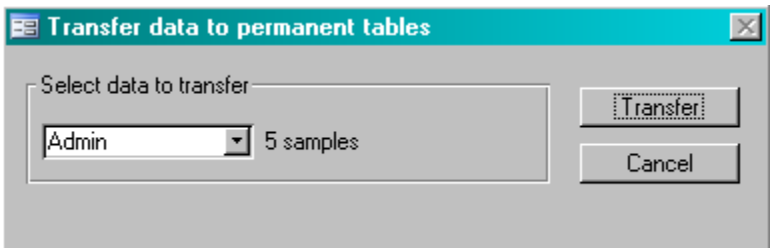


Any and all necessary changes may now be made to any of the data fields in the record either by typing different information into a text box or selecting different options from dropdown lists. Comments fields may be updated with additions, as well.

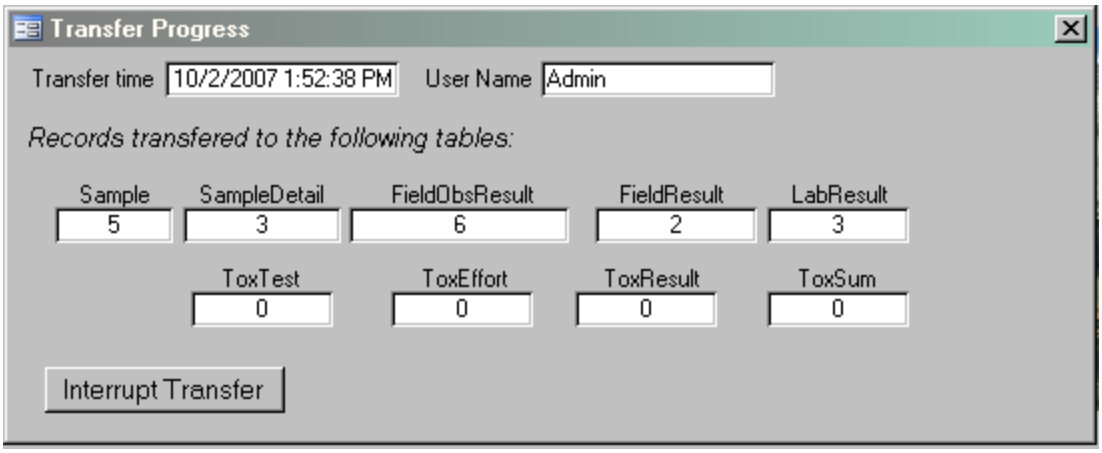
Click the Save button to save all changes and switch mode back to Browse.

3.5. Entry to Permanent

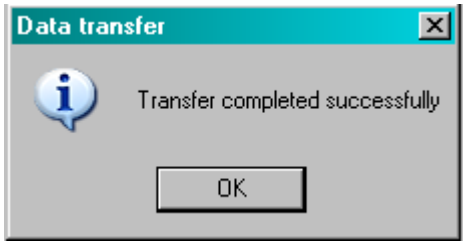
Once data records have been verified and validated, they may be transferred to the permanent side of the database. Click on the Commit button on the Database Procedures frame in the middle of the Main Menu form. This will open the following dialog box.



Select data to transfer by username and click Transfer. Another dialog box will appear to display the progress of the transfer.



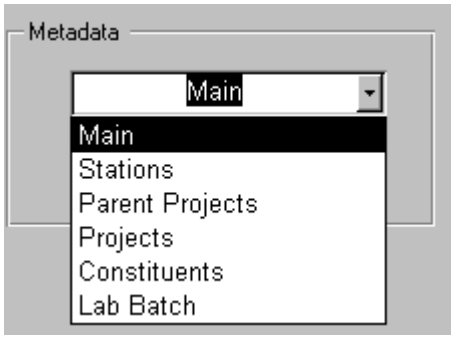
When the transfer is complete, the following dialog box will appear. Records on the Permanent side of the database can still be edited, but new records can only be entered on the Entry side.



3.6. Metadata

Entry of data into the SWAMP Data Entry Forms is based on built-in business rules and selections from a number of Lookup Tables. These lookup tables also contain all of the metadata required by SWAMP and the NPS Water Resources Division through NPStoret.

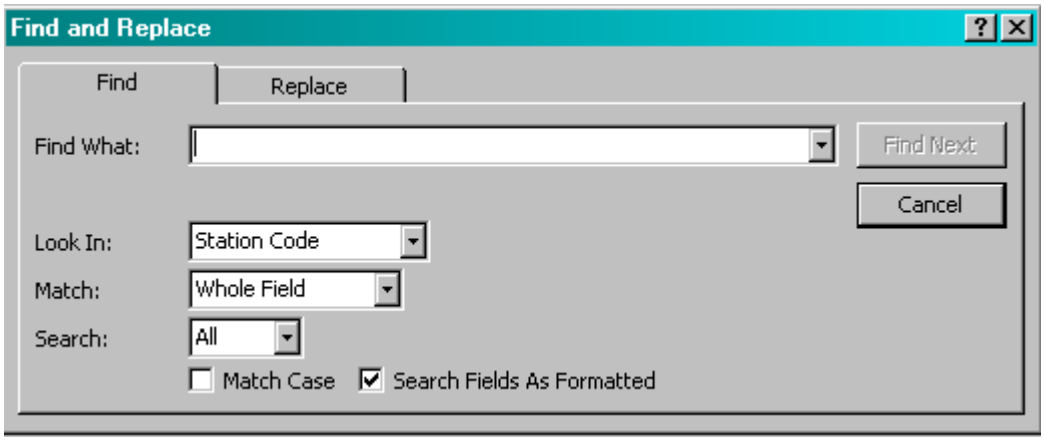
All lookup tables and their associated information are organized under the Metadata frame at the bottom of the Main Menu. All lookup tables used in the database are accessible through these forms. Use of the database requires that much of this information be completed before sample results can be entered.



3.6.1.1. Locating Existing Records

To find an existing record in any lookup table, place the cursor in any field on its form and click the spyglass icon on the Access menu bar.

Then enter the value for the field of the record you want to find in the Find and Replace dialog box.



Editing Records

Most of the metadata forms allow existing records to be edited. Exceptions are described below.

NOTE: In most lookup tables, a unique code value is assigned to each record. These codes populate the data entry forms. So, when an option is chosen from a dropdown list, it will be the code that populates the data record, regardless of whether a text description is displayed on the form. It is very important to remember that any changes made to these codes in the lookup tables will change their values throughout the database. Use extreme caution when editing these values. **Codes provided by SWAMP should never be changed**. Normally, the only time a change might be made is when a new record is being created and an error is detected before the value is used in data entry. Or when an error is detected in a code unique to a project, such as a sampling station code.

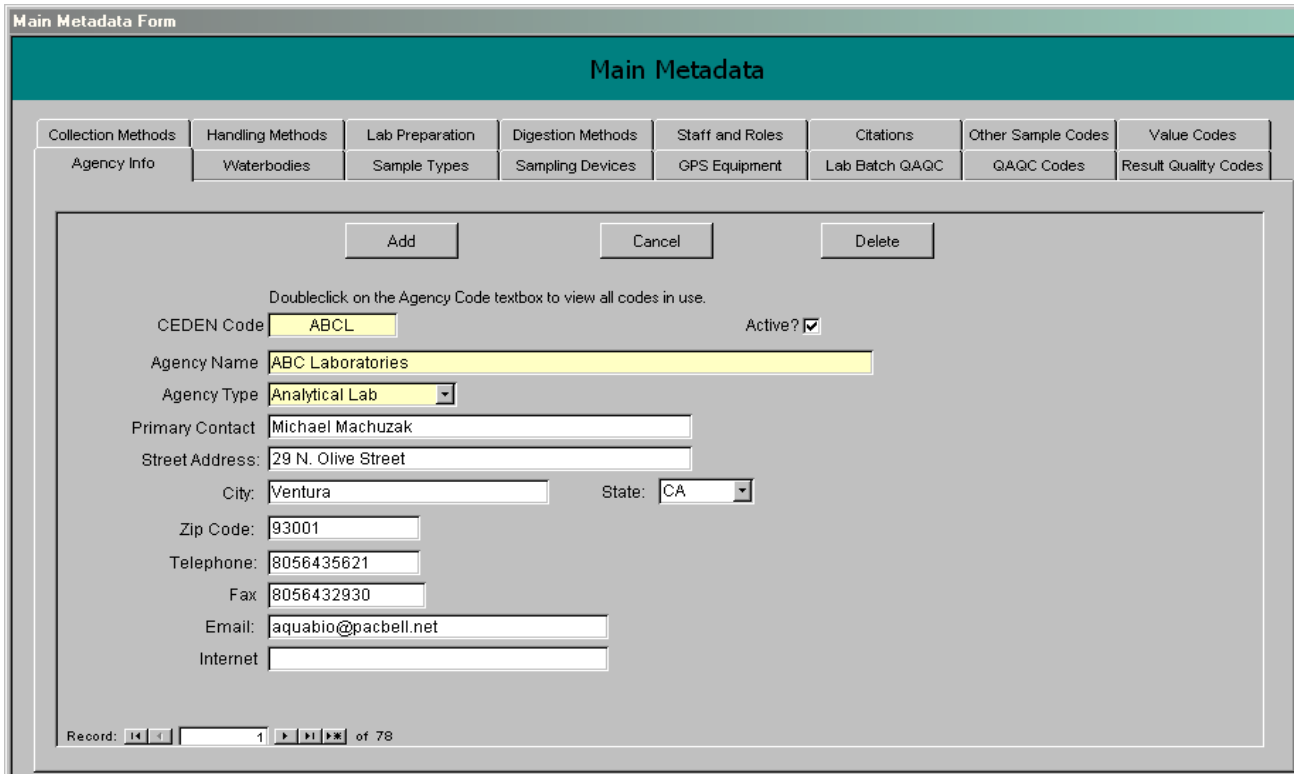
Deleting Records

NOTE: Existing records should not be deleted from lookup tables. Many forms allow for deletions to be made, however, only records entered in error should be deleted and before the lookup table is ever used.

3.6.1.2. Restricting Lookup Lists

Users have the option of using the complete list of values in each applicable lookup list or restricting the values available for data being entered. This is accomplished with a Boolean (containing values of true or false) field named Active in all tables and symbolized on forms as a checkbox. Checking a record on (value equals true) will enable it to be displayed on dropdown lists used on other forms in the database. Checking it off will disable it from view on the dropdown lists. It is always best to use the Active box to control data entry rather than to delete lookup table records, even if they will never be used for a particular project.

3.6.2. Main Metadata Form



3.6.2.1. Agency Information

The Agency Lookup table is populated on the Agency Info tab above. The Agency Lookup Table stores the Agencies involved in collecting and analyzing the data in the SWAMP Database. Required fields are marked in yellow. To add a new Agency record, click the Add button and enter the information on the form.

<u>CEDEN Code</u>: Code for the Agency used by SWAMP and CEDEN. No more than 20 characters. Double-click in the combobox to view all previously entered codes.

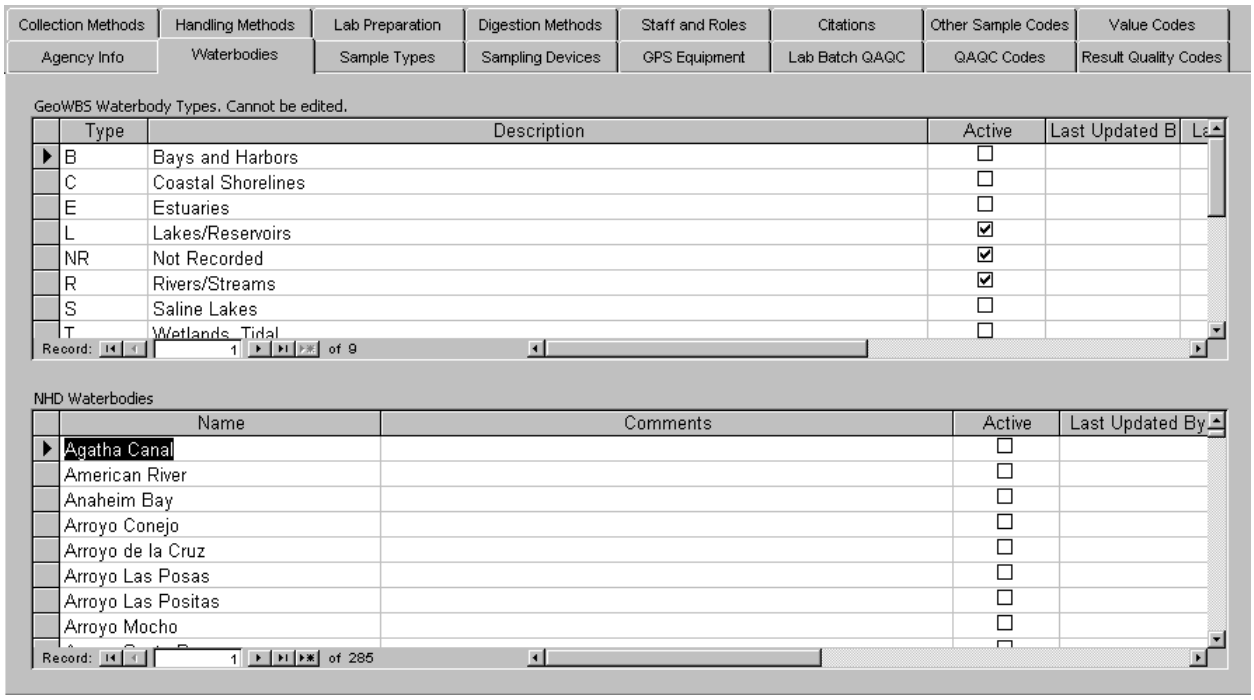
<u>Active</u>: Indicates whether this station code will appear on dropdown lists used in the database.

<u>Agency Name</u>: Descriptive name of the Agency.

<u>Agency Type</u>: Select from the dropdown list.

3.6.2.2. Waterbodies

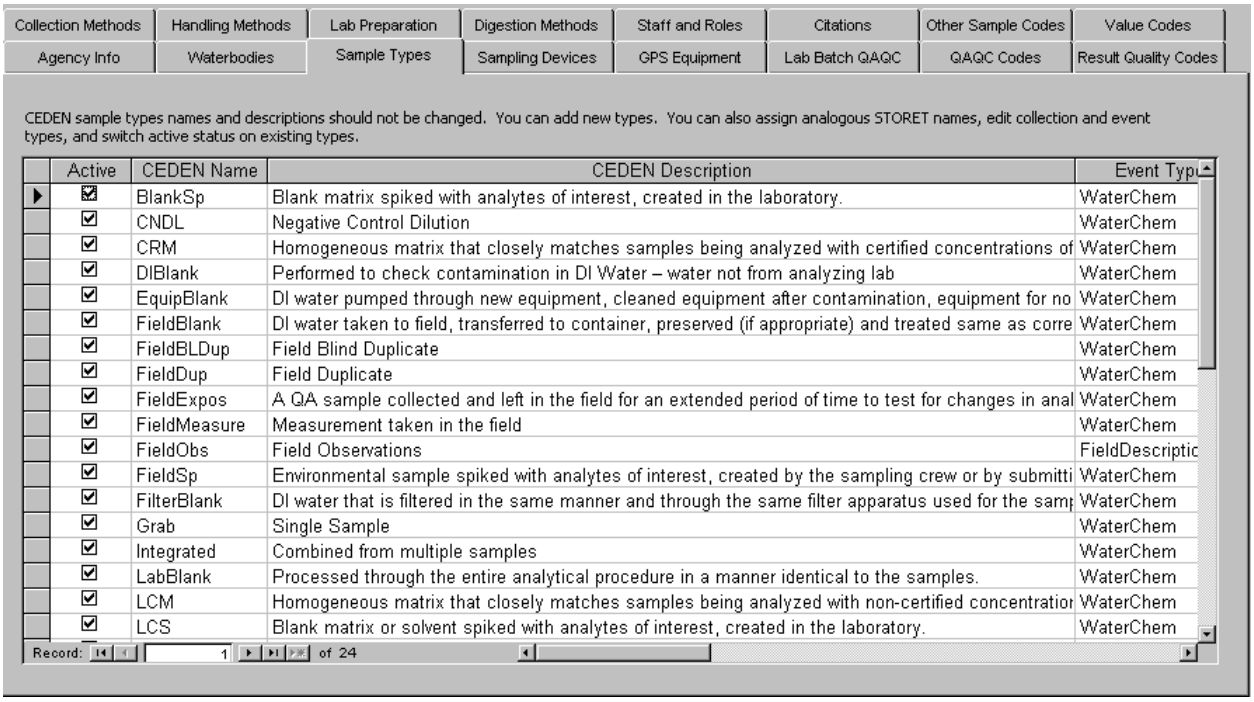
The waterbodies tab contains subforms for two lookup tables, GEOWBS Waterbody Types and National Hydrologic Database (NHD) Waterbodies. The first table cannot be edited or added to. Only the active field can be changed.



NHD Waterbodies can be added to but names must conform to those in the U.S. Geological Survey's National Hydrologic Database.

3.6.2.3. Sample Types

Sample Type values should not be edited or added to. CEDEN Name and Descriptions are provided by CEDEN and part of the data reporting standards used by the State of California. Event Type indicates the type of sampling event for which the Sample Types apply and control the options available for FieldDescription, WaterChem, and SedChem sampling events.



Collection Methods | Handling Methods | Lab Preparation | Digestion Methods | Staff and Roles | Citations | Other Sample Codes | Value Codes
Agency Info | Waterbodies | Sample Types | Sampling Devices | GPS Equipment | Lab Batch QAQC | QAQC Codes | Result Quality Codes

CEDEN sample types names and descriptions should not be changed. You can add new types. You can also assign analogous STORET names, edit collection and event types, and switch active status on existing types.

Active	CEDEN Name	CEDEN Description	Event Typ
☑	BlankSp	Blank matrix spiked with analytes of interest, created in the laboratory.	WaterChem
☑	CNDL	Negative Control Dilution	WaterChem
☑	CRM	Homogeneous matrix that closely matches samples being analyzed with certified concentrations of	WaterChem
☑	DIBlank	Performed to check contamination in DI Water – water not from analyzing lab	WaterChem
☑	EquipBlank	DI water pumped through new equipment, cleaned equipment after contamination, equipment for no	WaterChem
☑	FieldBlank	DI water taken to field, transferred to container, preserved (if appropriate) and treated same as corre	WaterChem
☑	FieldBLDup	Field Blind Duplicate	WaterChem
☑	FieldDup	Field Duplicate	WaterChem
☑	FieldExpos	A QA sample collected and left in the field for an extended period of time to test for changes in anal	WaterChem
☑	FieldMeasure	Measurement taken in the field	WaterChem
☑	FieldObs	Field Observations	FieldDescriptic
☑	FieldSp	Environmental sample spiked with analytes of interest, created by the sampling crew or by submitti	WaterChem
☑	FilterBlank	DI water that is filtered in the same manner and through the same filter apparatus used for the samp	WaterChem
☑	Grab	Single Sample	WaterChem
☑	Integrated	Combined from multiple samples	WaterChem
☑	LabBlank	Processed through the entire analytical procedure in a manner identical to the samples.	WaterChem
☑	LCM	Homogeneous matrix that closely matches samples being analyzed with non-certified concentratior	WaterChem
☑	LCS	Blank matrix or solvent spiked with analytes of interest, created in the laboratory.	WaterChem

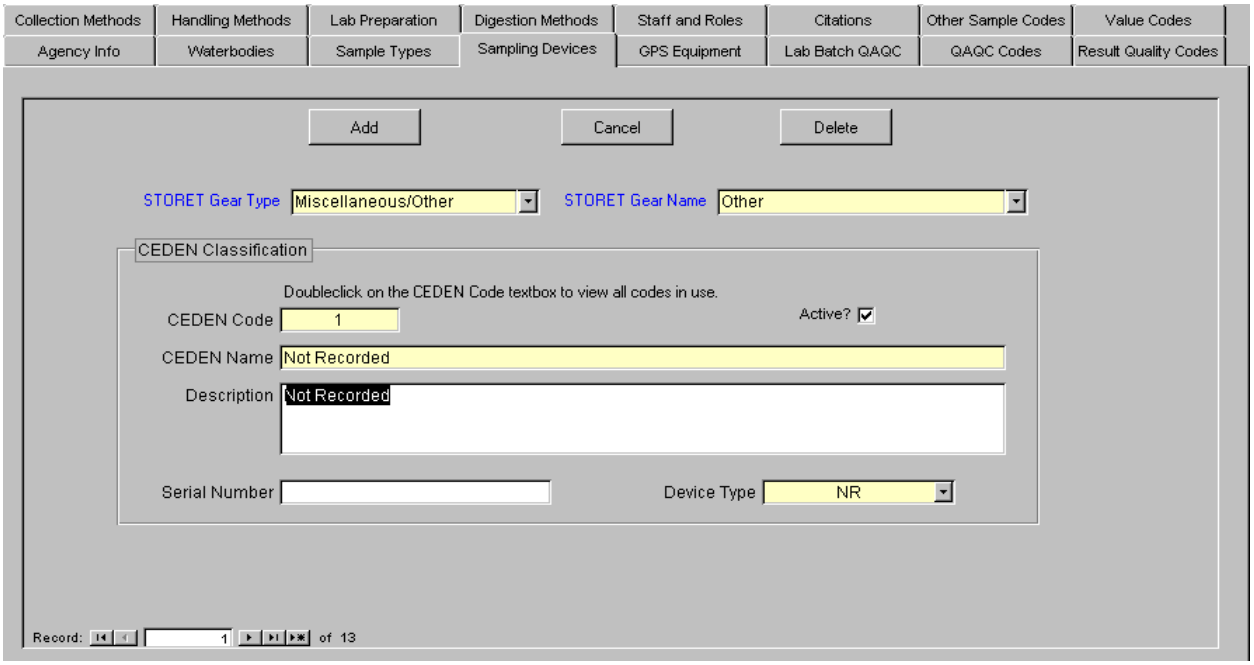
Record: 1 of 24

Not shown in the figure above is the field Collection Type, which indicates whether the Sample Type is collected in the field or created in the lab for QA purposes. Also not shown is the matching STORET Name which is crosswalked from a Lookup Table provided with NPStoret.

NOTE: The STORET Name must be populated for all Sample Types collected for a project. Right-click inside the STORET Name field and select the appropriate value matching rhe CEDEN description from the dropdown list that appears.

3.6.2.4. Sampling Devices

The Sampling Device Lookup Table describes equipment that is or may be used to make measurements on samples collected in the field.



Adding New Records: Click the Add button and enter the following information.

STORET Gear Type: Select from the dropdown list of Gear Types provided by STORET.

STORET Gear Name: Select from the dropdown list of Gear Names provided by STORET.

CEDEN (Sample Device) Code: Enter a numerical ID for the Sampling Device, incrementally from last-entered Code.

Active: Enter a checkmark to have the sampling device appear in dropdown lists used on other forms.

CEDEN (SampleDevice) Name: Enter the name of the Sampling Device. There are two different types of equipment listed in this table:

- General pieces of sampling equipment, such as "Individual Bottle by hand"
- Specific pieces of equipment, such as YSI Meter 600 XL.

The convention used in the SWAMP Database is to name the specific pieces of equipment beginning with the Agency name owning that device. This may make devices listed many times, once for each actual piece of equipment for each agency using it. For instance, if a YSI Meter 600 XL is used by many agencies, it will be listed for each agency with the agency name listed first (i.e. MPSL YSI Meter 600 XL). Some agencies may also have many of the same type of device and could then list them each with a "#1" and "#2" tagged on to the end of the name (SampleDevice).

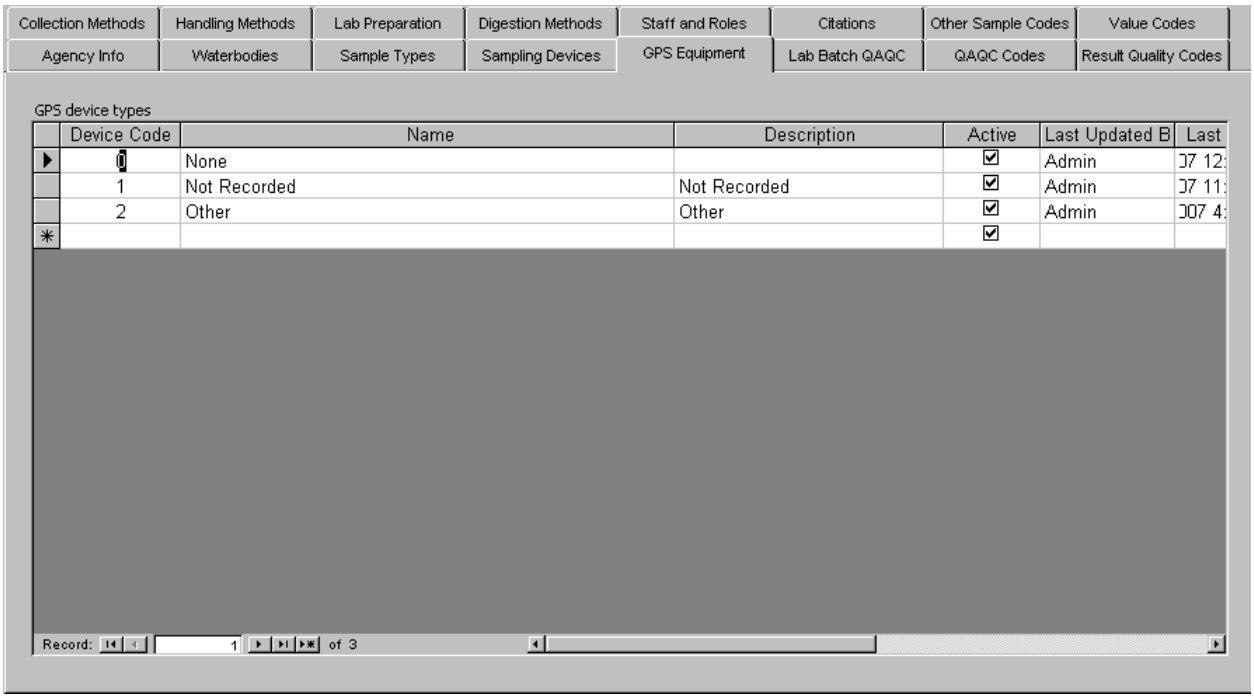
Description: Enter the complete Description of the Sampling Device.

SerialNumber: Enter the Serial Number of the equipment, if desired.

Device Type: Used to determine which area of the Data Entry Forms the Sampling Device should appear for selection. Options are:

- Field Equipment: The Sampling Device "Field Equipment described w/result" is used when completing Sample Details when Event is FieldDescription. In these cases, the Sampling Device is recorded with each probe measurement rather than applied overall for a sampling event.
- Field Prob: Used for all field probe measurements.
- Sediment Sampler: Used for devices collecting sediment samples. Devices with this designation will appear when the EventType is SedChem.
- Water Sampler: Used for devices collecting water samples. Devices with this designation will appear when the EventType is WaterChem.

3.6.2.5. GPS Equipment

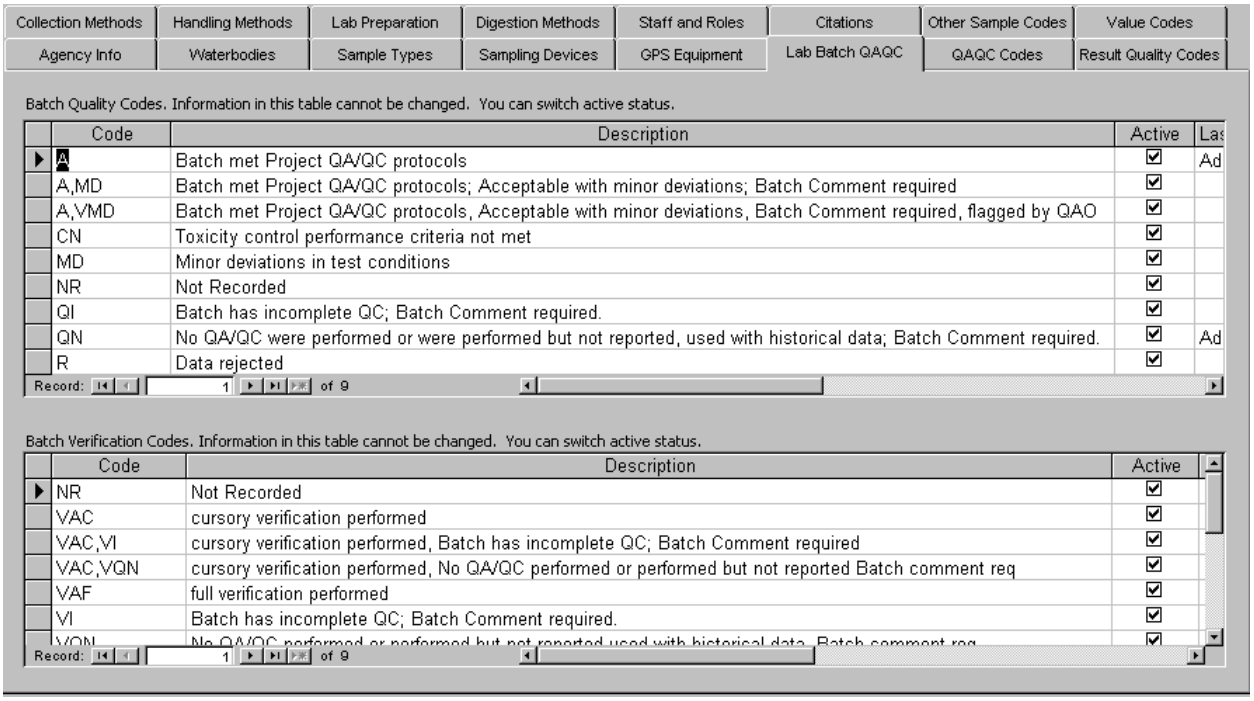


To add GPS Equipment, create a new device code (incrementally from last-entered code) and type in the name and description of the device.

The convention used by SWAMP is to create a name beginning with the name of the Agency that owns the device. This may mean that the same device model is listed many times, once for each actual piece of equipment used by an individual agency. For instance, if a Trimble Geo Explorer 3 is used by many agencies, it will be listed for each agency with the agency name listed first (i.e., MPSL Trimble Geo Explorer 3). Some agencies may also have many of the same type of device and could then list them each with a "#1" and "#2" or a serial number tagged on to the end of the name (GPSDevice).

3.6.2.6. Lab Batch QAQC

The Lab Batch QAQC contains subforms for two lookup tables, Batch Quality Codes and Batch Verification Codes. This information is entered into the Lab Batch Lookup Table on the Lab Batch Metadata form described above. Neither of these two tables can be edited or added to. Only the active field can be changed.



3.6.2.7. QA Codes

QA codes are referred to as Lab Remarks by STORET. The QA Code describes any special conditions or situation occurring during or prior to the analysis to achieve the result. These are used to provide an indication of quality assurance in reported sample results. Most are used by laboratories during reporting, but some apply to field sample analysis as well. The fields Type1, Type2, and Type 3 denote the situations in which they can be used.

SWAMP and STORET each use a standard set of codes, which are supplied to the laboratory for use in reporting results. The codes are different in the two systems and it is necessary to crosswalk any QA code that will be used by a project with an analogous STORET lab remark.

Each set of codes is fixed. However, new records containing strings of codes can be added to the QACode Lookup Table to be used in those cases where more than one code is reported with a sample. A special form has been created for adding such records and it is accessible through the Field Results and Lab Results sections of the Data Entry and Edit form (by double-clicking on the QACode combobox). Strings of codes should be created by listing codes in alphabetic order, with the entries separated by commas (SWAMP codes) and by forward slash marks (STORET). The special form facilitates this kind of formatting, so new entries to the table should be made there.
Do not use the form below for adding records. Use this form only for changing the active status of a record, or for crosswalking STORET codes with SWAMP codes.

Collection Methods | Handling Methods | Lab Preparation | Digestion Methods | Staff and Roles | Citations | Other Sample Codes | Value Codes
Agency Info | Waterbodies | Sample Types | Sampling Devices | GPS Equipment | Lab Batch QAQC | QAQC Codes | Result Quality Codes

Active	CEDEN Code	CEDEN Description	STORET Code	Type1	Type2	Ty
☑	BB	Sample > 4x spike concentration	0	Lab		
☑	BE	Low surrogate recovery; analyzed twice	0	Lab		
☑	BLM	Compound unidentified or below the RL due to overdilution	0	Lab		
☑	BRK	No concentration sample container broken.	0	Lab		To
☑	BRKA	Sample container broken but analyzed	0	Lab		
☑	BS	Insufficient sample available to follow standard QC procedures	0	Lab		To
☑	BT	Insufficient sample to perform the analysis	0	Lab		To
☑	BV	Sample received after holding time expired	0	Lab		
☑	BY	Sample received at improper temperature	0	Lab		To
☑	BZ	Sample preserved improperly	ISP	Lab	Field	To
☑	CJ	Analyte concentration is in excess of the instrument calibration; cor	1	Lab	Field	
☑	CQA	Concentration not reported for QA sample only % Recovery reportec	0	Lab		
☑	CS	QC criteria not met due to analyte concentration near RL	1	Lab		
☑	CT	QC criteria not met due to high level of analyte concentration	1	Lab		
☑	D	EPA Flag - Analytes analyzed at a secondary dilution	0	Lab		
☑	DB	QA results outside of acceptance limits due to matrix effects	0	Lab		
☑	DF	Reporting limits elevated due to matrix interferences	INT	Lab		
☑	DO	Coelution	0	Lab		
☑	DRM	Spike amount less than 5X the MDL	0	Lab	Field	To
☑	DS	Batch Quality Assurance data from another project	0	Lab		To
☑	EU	LCS is outside of acceptance limits. MS/DMS are accept.. no corr.	1	Lab		

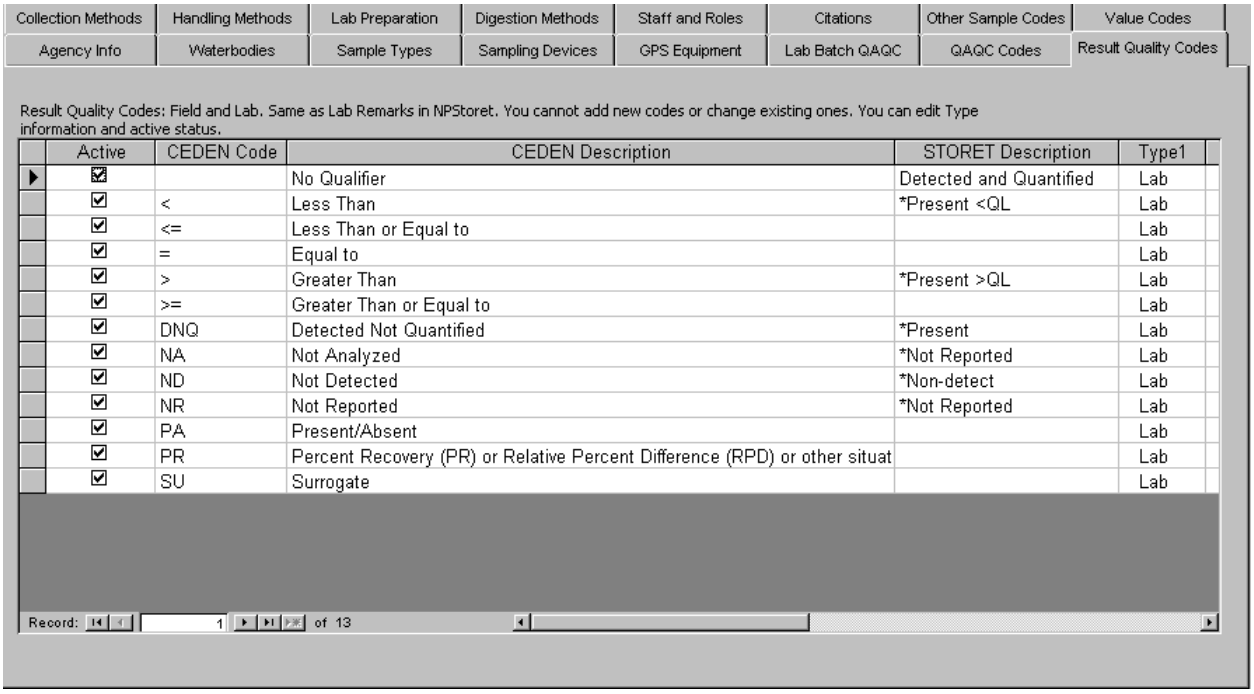
Record: 1 of 86

The SWAMP database uses more codes than does STORET. For each of the SWAMP codes that will be used for a project, identify an analogous STORET code. Right-click the mouse inside the STORET Code field and select the proper value from the dropdown list that appears.

If there does not exist an analogous STORET code for a SWAMP code needed for a project, then contact the NPS Water Resources Division and request an addition be made to STORET.

3.6.2.8. Result Quality Codes

Result Quality Codes provide additional information about the quality of results. They "qualify" the result, indicating whether the measured quantity is at or below the detection limit of the analytical equipment, or out of bounds of laboratory-established reporting limits. They are referred to as Detection Conditions by STORET. SWAMP and STORET use their own set of qualifiers. STORET descriptions must be matched with any SWAMP code used in reporting project results. Both lists are fixed and cannot be modified.



Collection Methods | Handling Methods | Lab Preparation | Digestion Methods | Staff and Roles | Citations | Other Sample Codes | Value Codes
Agency Info | Waterbodies | Sample Types | Sampling Devices | GPS Equipment | Lab Batch QAQC | QAQC Codes | Result Quality Codes

Result Quality Codes: Field and Lab. Same as Lab Remarks in NPStoret. You cannot add new codes or change existing ones. You can edit Type information and active status.

Active	CEDEN Code	CEDEN Description	STORET Description	Type1
☑		No Qualifier	Detected and Quantified	Lab
☑	<	Less Than	*Present <QL	Lab
☑	<=	Less Than or Equal to		Lab
☑	=	Equal to		Lab
☑	>	Greater Than	*Present >QL	Lab
☑	>=	Greater Than or Equal to		Lab
☑	DNQ	Detected Not Quantified	*Present	Lab
☑	NA	Not Analyzed	*Not Reported	Lab
☑	ND	Not Detected	*Non-detect	Lab
☑	NR	Not Reported	*Not Reported	Lab
☑	PA	Present/Absent		Lab
☑	PR	Percent Recovery (PR) or Relative Percent Difference (RPD) or other situat		Lab
☑	SU	Surrogate		Lab

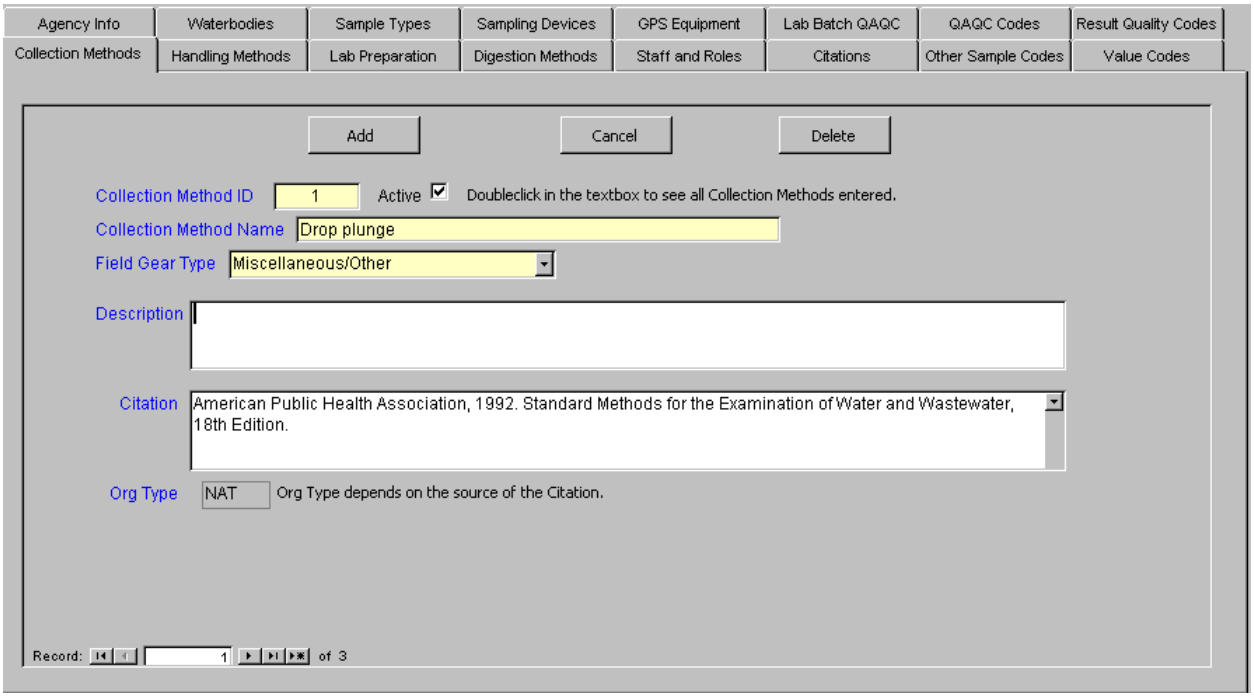
Record: 1 of 13

The SWAMP database uses more codes than does STORET. For each of the descriptions associated with any SWAMP code that will be used for a project, identify an analogous STORET qualifier. Right-click the mouse inside the STORET Description field and select the proper value from the dropdown list that appears.

If there does not exist an analogous STORET description value for a SWAMP code needed by a project, then contact the NPS Water Resources Division and request an addition be made to STORET.

3.6.2.9. Collection Methods

Collection Methods are the methods used to collect samples in the field. Information in the Collection Methods table is used to define characteristics in STORET but is not currently used by SWAMP. New records can be added to this table. Click the Add button and enter the following.



Collection Method ID: Enter an abbreviated numeric code for the method. Double-click the textbox to view all methods previously entered.

Collection Method Name: Enter the name of the method.

Field Gear Type: Select from the list of gear types provided by STORET. This list cannot be changed without contacting the NPS Water Resources Division and requesting an addition be made to STORET.

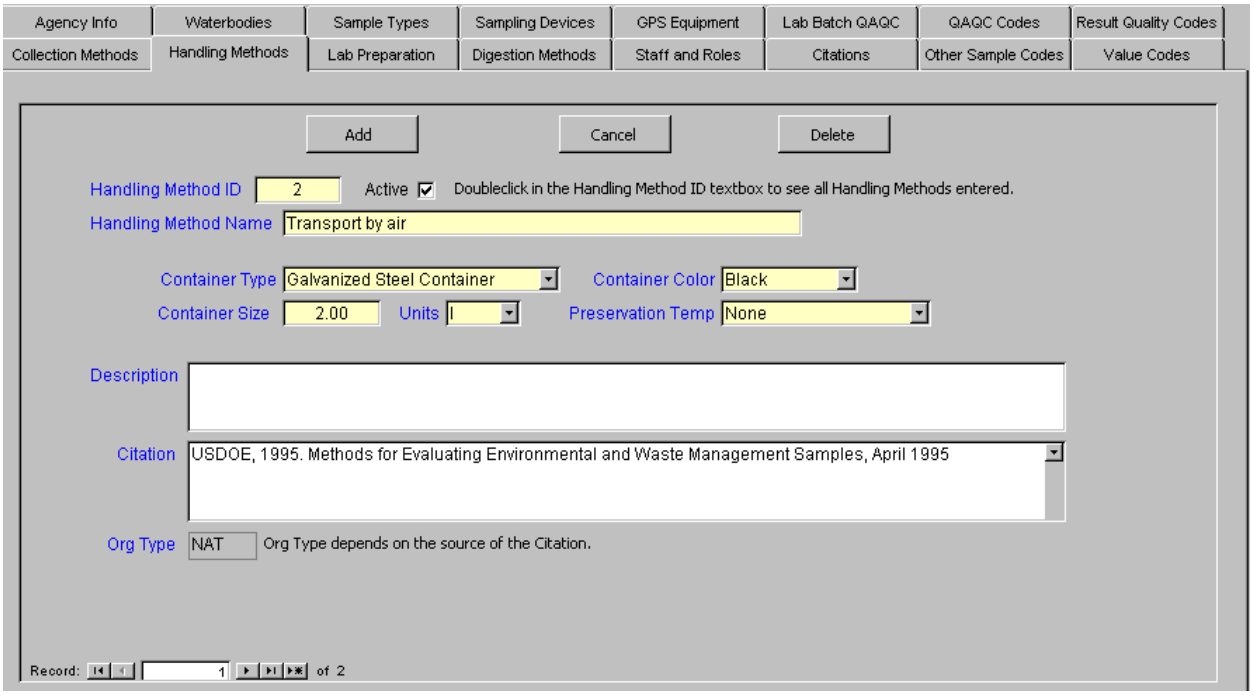
Description: Enter a description of the method. This is a memo field.

Citation: Select from the dropdown list. The source of records for this list is the Citations Lookup table, accessible on the Citations tab of the Main Metadata form. Citations must already be present in the table in order to be selected here.

Org Type: ORG (project organization), NAT (National). Will appear automatically depending on the type of citation selected.

3.6.2.10. Handling Methods

Handling Methods are the methods used to preserve and transport samples. Information in the Handling Methods table is used to define characteristics in STORET but is not currently used by SWAMP. New records can be added to this table. Click the Add button and enter the following:



Handling Method ID: Enter an abbreviated alpha-numeric code for the method. Double-click the textbox to view all methods previously entered.

Handling Method Name: Enter the name of the method.

Container Type: Select from the list of gear types provided by STORET. This list cannot be changed without contacting the NPS Water Resources Division and requesting an addition be made to STORET.

Container Color: Select from the list provided by STORET. This list cannot be changed without contacting the NPS Water Resources Division and requesting an addition be made to STORET.

Container Size: Select from the list provided by STORET. This list cannot be changed without contacting the NPS Water Resources Division and requesting an addition be made to STORET.

Units: Select from the list provided by STORET. This list cannot be changed without contacting the NPS Water Resources Division and requesting an addition be made to STORET.

Preservation Temp: Select from the list provided by STORET. This list cannot be changed without contacting the NPS Water Resources Division and requesting an addition be made to STORET.

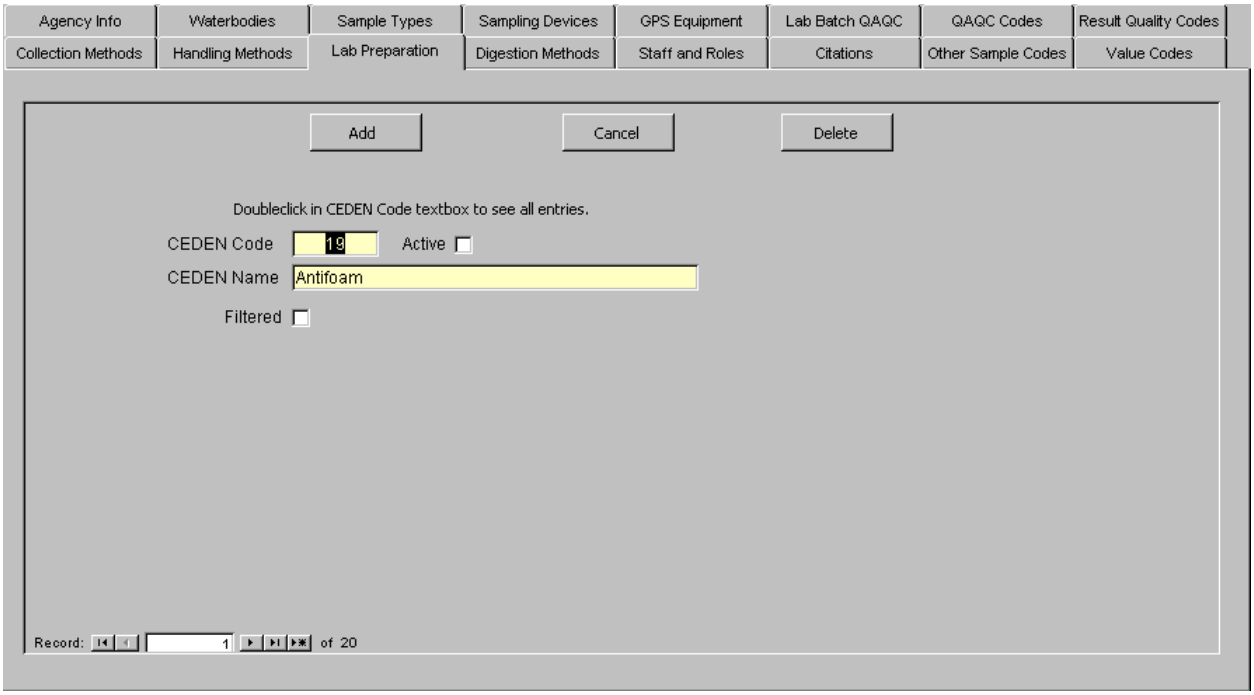
Description: Enter a description of the method. This is a memo field.

Citation: Select from the dropdown list. The source of records for this list is the Citations Lookup table, accessible on the Citations tab of the Main Metadata form. Citations must already be present in the table in order to be selected here.

Org Type: ORG (project organization), NAT (National). Will appear automatically depending on the type of citation selected.

3.6.2.11. Lab Preparation

Method of sample preparation used by labs.



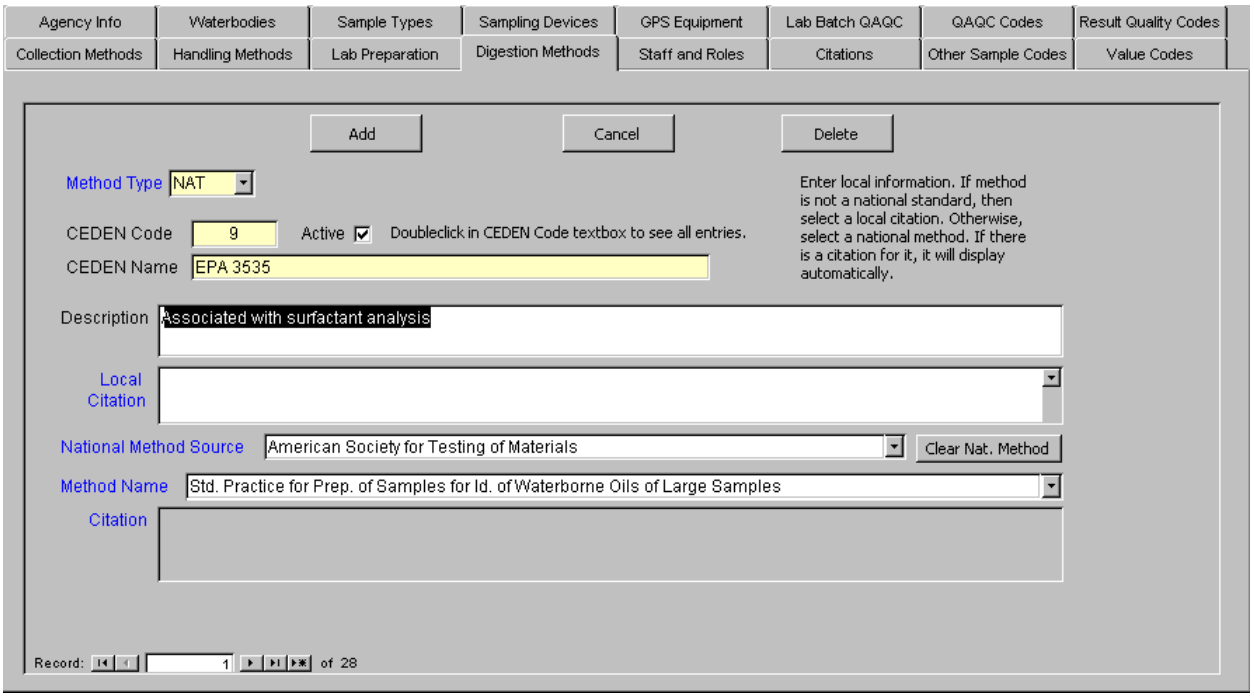
CEDEN Code: Enter a numerical ID for the Lab Preparation Method, incrementally from the last-entered Code.

CEDEN Name: Enter the name of the Preparation Method.

Filtered: Check if the method involved filtration.

Active: Enter a checkmark to have the sampling device appear in dropdown lists used on other forms.

3.6.2.12. Digestion Methods



Method Type: Choose either ORG for a method of analysis created locally (by the project organization) or NAT for a national method, such as those published by the EPA.

CEDEN Code: Code for the Method used by SWAMP. Create new codes in sequential numeric order. Double-click the textbox to view all codes and methods entered previously.

CEDEN Name: Name of the Method, recognized by SWAMP.

Description: Describe the method of analysis.

Local Citation: If the method is of local origin (i.e., not a National Method), then enter a citation for it. The citation must already have been created and added to the Citations Lookup Table which is accessed through the Citations tab on the Main Metadata form. When citation records are created, they are attributed as either local (ORG) or national (NAT) meaning that the citation is for a nationally-recognized method (e.g., EPA). Only ORG citations will appear as options to choose from in this combobox.

National Method Source: If the method is a national one, then choose the source agency for the method from the dropdown list. The list is defined by STORET and cannot be added to or edited without contacting the NPS Water Resources Division.

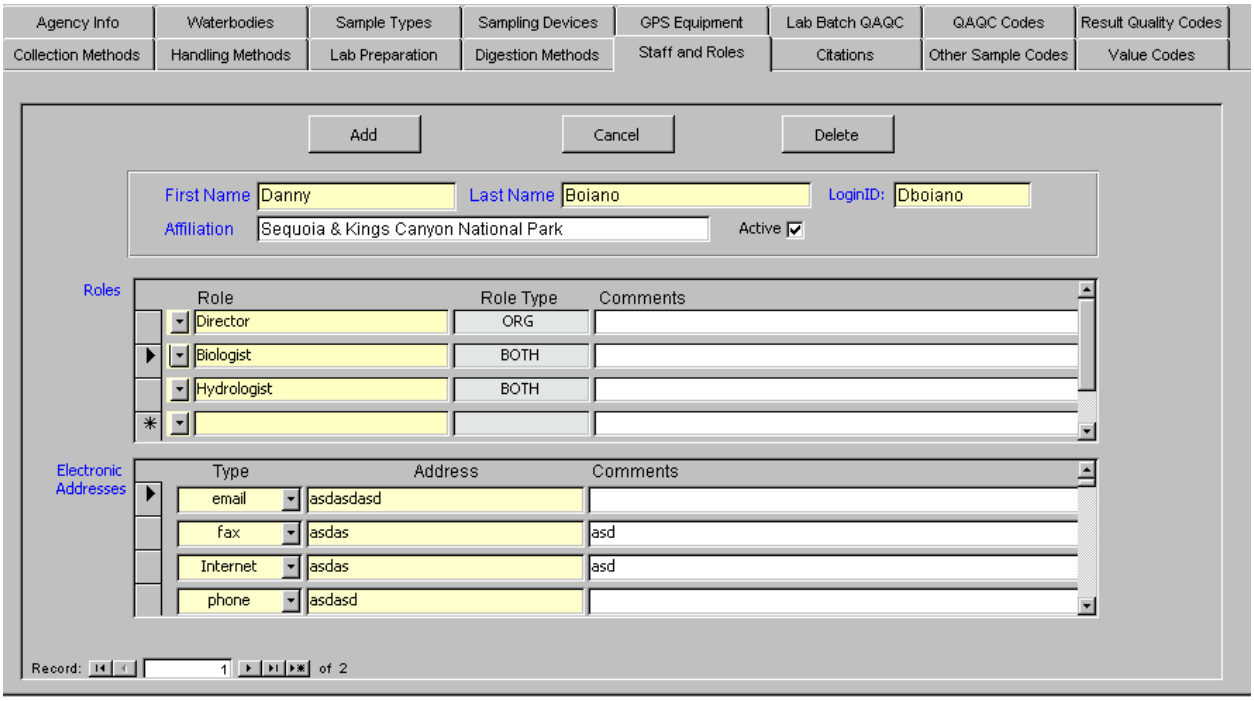
Method Name: Choose the specific method name from the dropdown list. This list will contain only names for the Method Source chosen above.

Citation: The citation for the National Method Name will appear automatically when the Method Name is selected. For National Methods, the citation does not have to already exist in the Citations Lookup table. Citations for National Methods are provided by STORET in a lookup table that has been incorporated into the database. If the citation for the method selected in not presently in the Citations Lookup Table, it will be added automatically.

NOTE: You can clear the National Method Name from a record by clicking the Clear Nat. Method button. This will however, not remove citations from the Citations Lookup table that were added automatically when this field was populated. To delete a citation, go to the Citations tab on the Main Metadata form, locate the citation, and delete it.

3.6.2.13. Staff and Roles

This form populated the Personnel Lookup Table. Use it to identify staff and any other individuals associated with a project and their roles within the project and organization. Roles are defined by STORET and cannot be added to without the records also added to the STORET database. Role types are also predefined for specific roles. These will be displayed automatically on the form, are used internally by the STORET database, and cannot be changed.



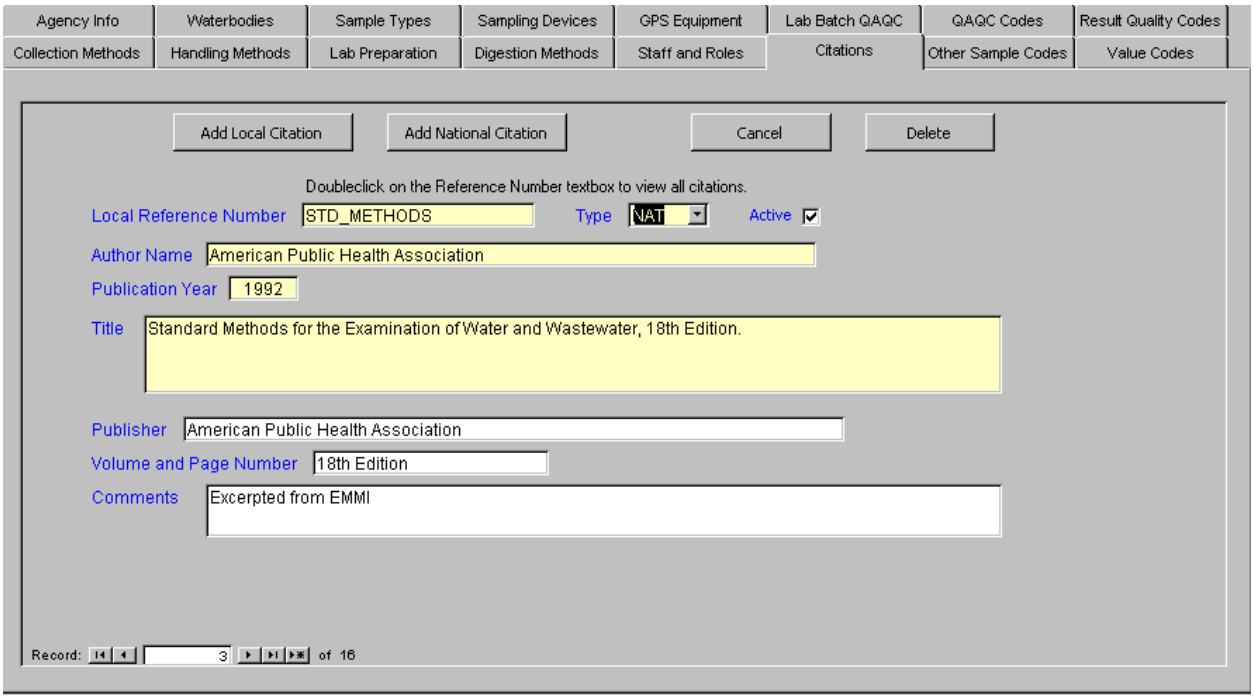
Adding Personnel: Enter a First and Last Name, Affiliation, and LoginID. The LoginID is the defined by the Workgroup file associated with this database (See the Section: Database Setup above).

Select from the dropdown list under Role, as many of the roles that apply to this person. Enter any comments about a person's role in the Comment field.

Enter electronic address information for the person. Select the type of address from the dropdown list and enter the address. Enter any comments about the address that apply.

3.6.2.14. Citations

This form populates the Citations Lookup Table. Through this form, both local and national citations can be added.



Add a Citation: Click the Add Local Citation button at the top of the form. Then enter the information requested.

Local Reference Number: This is a reference number given by the project to a citation.

Type: Indicates whether the citation is an organizational (ORG) one (e.g., a project report) or a National one (i.e., a published document).

Author Name: Enter first name, middle, and last.

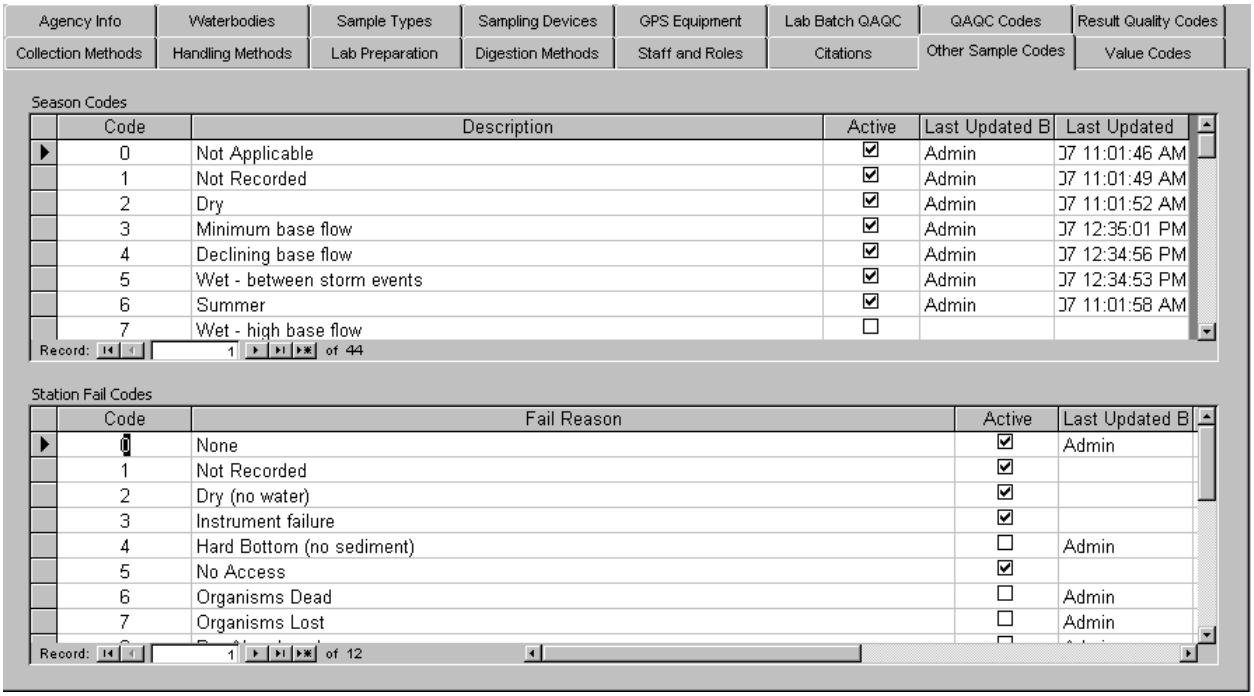
Deleting Citations: **NOTE:** Citations should not be deleted once they are entered. Only delete a citation if you are sure that it has not been used already (as for example, in defining Analytical, Collection, Handling, or Digestion Methods).

3.6.2.15. Other Sample Codes

Two lookup tables are populated through this form, the Seasons Lookup Table and Station Fail Lookup Table.

Season codes allow users to group results by season (such as Winter, Spring, Summer or Fall) or by some other discrete period of time or weather conditions, such as Wet and Dry. They are often unique to individual projects.

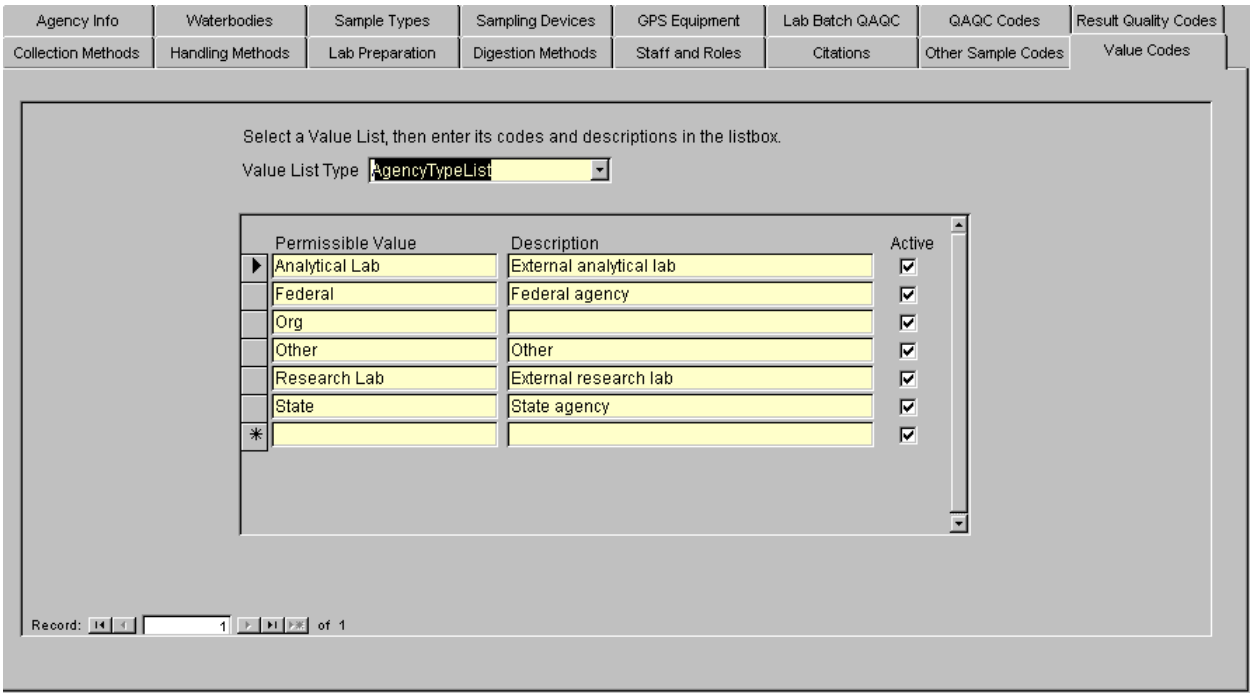
Fail Reason is used to provide an explanation for failure to collect a sample at a scheduled time and place.



Both tables can be added to. In each case, identify the last numeric code used and enter the next largest number. Then, enter a description.

3.6.2.16. Value Codes

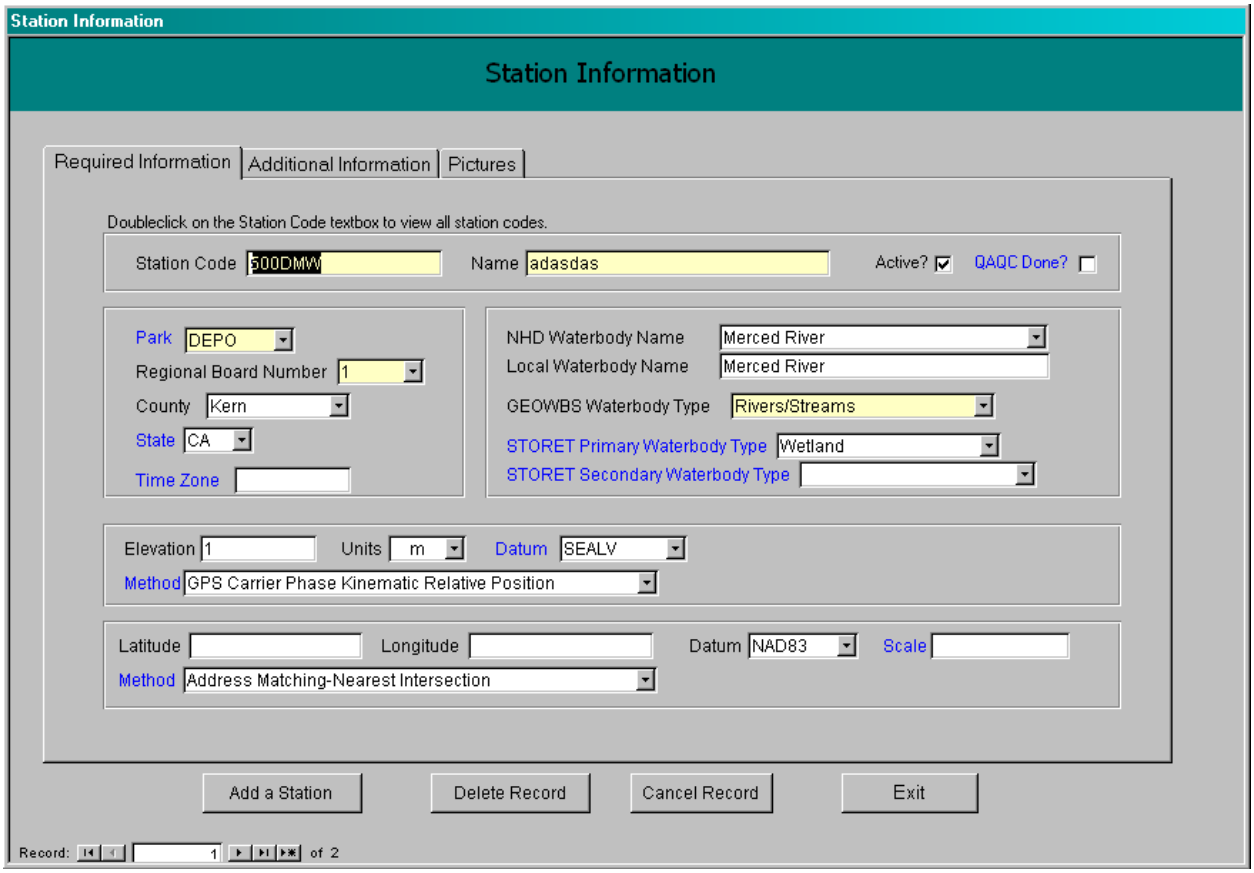
Value codes are a collection of value lists that have been combined into one table. They are used like lookup tables to provide lists of options in comboboxes on forms. Access to value lists used in the SWAMP database is provided through this form. Not all lists can be modified. STORET value lists are also used in this database, but will not show on this form as none of them can be changed or added to without making changes to the STORET database. Contact the NPS Water Resources Division if it is necessary to make additions to STORET Lookup lists (denoted with blue labels on Metadata forms).



Select a value list from the dropdown list at the top of the form and view the permitted values. New values can be entered, but exiting ones cannot be edited.

3.6.3. Stations

The Station Look-up List contains all sampling stations, or all stations for a particular region, with descriptive information related to the station.



3.6.3.1. Add a Station Record

To add a station record, click Add a Station at the bottom of the form. Then enter the following information. Note: required data fields are in yellow. Blue text indicates that the information is requested by NPStoret.

Required Information

Station Code: Enter a station code. Double-click on the textbox to view all previously entered codes.

Name: Descriptive name of the station.

Active: Indicates whether this station code will appear on dropdown lists used in the database.

QAQC Done: To be completed by the project manager. Indicates that all information has been verified for the station record.

Park: Select from the dropdown list.

Regional Board Number: Select one of 10 State Water Resources Control Board Regions the station is located within.

County: The county where the station is located. Select from dropdown.

State: Select from the dropdown.

Time Zone: Enter time zone where the station is located. For SIEN parks, the time zone is always PST.

NHD Waterbody Name: Name of the waterbody where the station is located. From the U.S.G.S. National Hydraulogy Database. Many waterbodies in California are not yet named in the database. Leave blank if no name is available.

Local Waterbody Name: Defaults to NHD Waterbody Name if available. Otherwise, enter the name of the waterbody as it is used in the park.

GEOWBS Waterbody Type: A California classification system for types of waterbodies. Select from the dropdown list.

STORET Primary Waterbody Type: Defined by STORET. Select from the dropdown list.

STORET Secondary Waterbody Type: Defined by STORET. Select from the dropdown list.

Elevation: Elevation of the sampling station.

Units: Units of elevation.

Datum: Datum used in deriving elevation.

Method: Method used to derive the elevation.

Latitude: Expressed in decimal degrees.

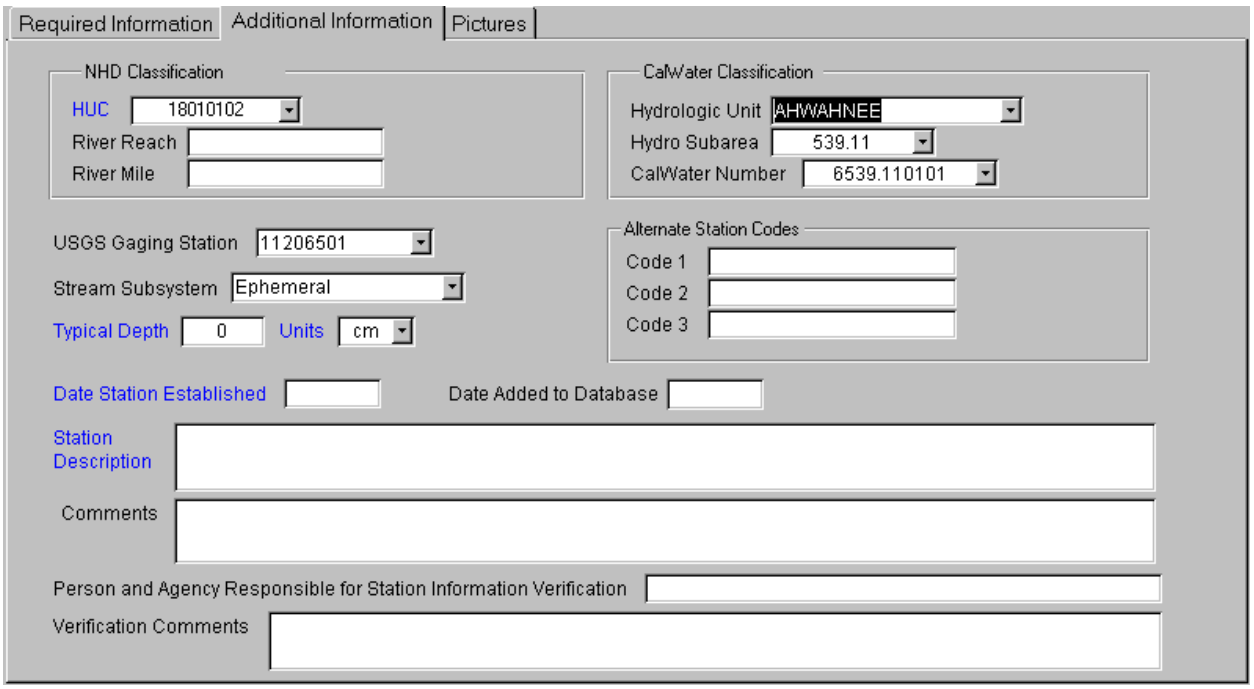
Longitude: Expressed in decimal degrees. Negative (-) for SIEN parks.

Datum: Datum used in deriving the geographic coordinates.

Scale: Scale used to derive the geographic coordinates.

Method: Method used to derive the geographic coordinates.

Additional Information



HUC: Select the appropriate 8-digit NHD Hydrounit code from the dropdown list.

River Reach: Enter the river reach code for samples collected on streams or rivers.

River Mile: Enter the river mile for samples collected on streams and rivers.

CalWater Hydrologic Unit: From the CalWater database. Select from the dropdown list.

Hydro Subarea: A subdivision of Hydrologic Units. From the CalWater database. Select from the dropdown list.

CalWater Number: Represents the smallest hydrologic area defined in the CalWater database. Select from the dropdown list.

USGS Gaging Station: Select from the dropdown list of gaging stations in the parks.

Stream Subsystem: Type of stream Select from the dropdown list. Options are Ephemeral, Intermittent, Perennial, and Tidal.

Typical Depth: Typical depth of the water at the location of the sampling station.

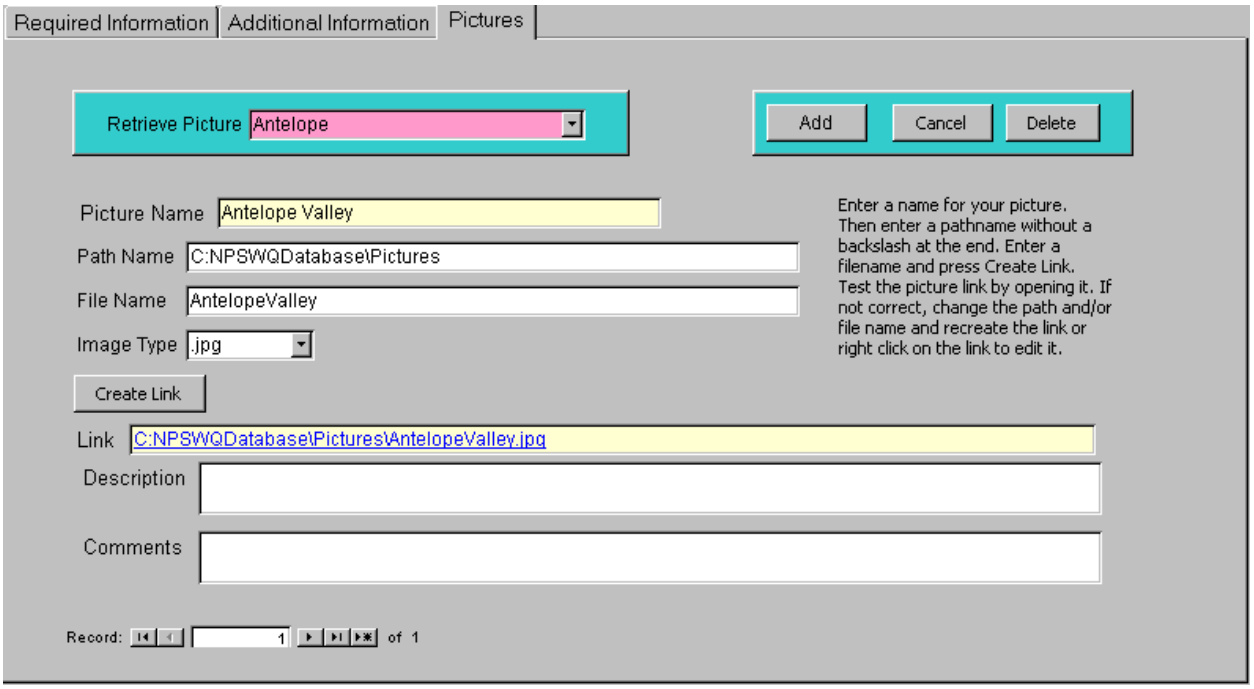
Units: Depth units used.

Alternate Station Codes: Enter any other codes used by other agencies for this station.

Station Description: Provide a description of the station and its surroundings.

Comments: Any other comments relative to the information above.

Pictures: Use this form to link information about digital images to image files on system computers. Images should be of the sampling station.



Retrieve picture records by selecting from the dropdown list at the top of the form. Add new picture records by clicking Add and entering the following information.

Picture Name: Provide a name for the image.

Path Name: Computer or network path where the image is stored. Will default to the path entered in User Preferences if there is one.

File Name: Name of the file containing the image.

Image Type: Select the image format from the dropdown. Click Create Link.

Link: When you click Create Link, the link with the path and image name will appear. Double clicking on the link will open the default image viewer assigned by the system to the image type. Description: Enter a description of the image.

Description: Description of the picture.

Comments: Enter any additional comments pertaining to the image.

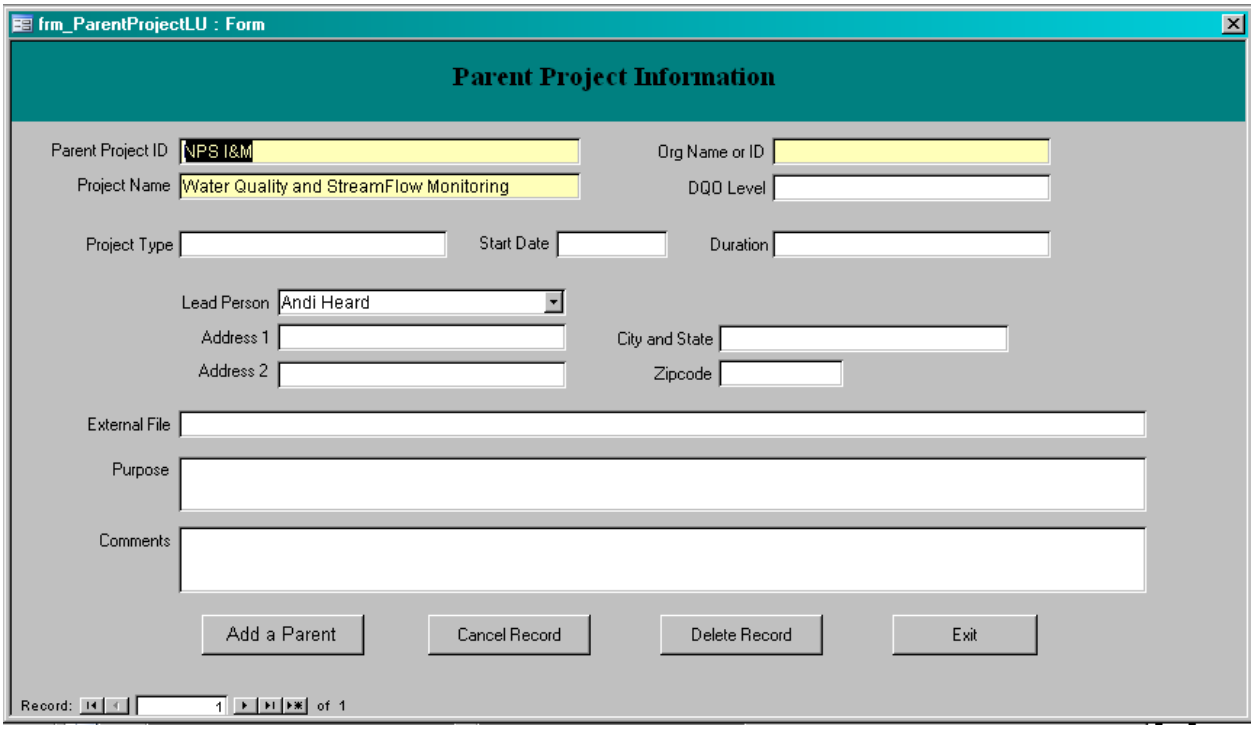
3.6.3.2. Editing an Existing Station Record

All fields may be edited for a given station by anyone with access to the Station Metadata Form, so great care must be taken while editing these data.

NOTE: Editing the Station Code will update every record containing this code in the database. Only make changes if you are sure you want to change this code throughout.

3.6.4. Parent Projects

Enter information about the parent project on this form. Users create and organize parent projects as needed. For example, SIEN I&M could be a parent project. Note: required data fields are in yellow.



Parent Project ID: Unique code that represents the parent project.

Project Name: Name of the parent project

Org Name or ID:

DQO Level:

Project Type:

Start Date: Date the parent project began.

Duration: How long the parent project is expected to last.

Lead Person: Select name from the dropdown list. This list is drawn from the Personnel Lookup Table, which can be accessed on the Personnel tab of the Main Metadata form.

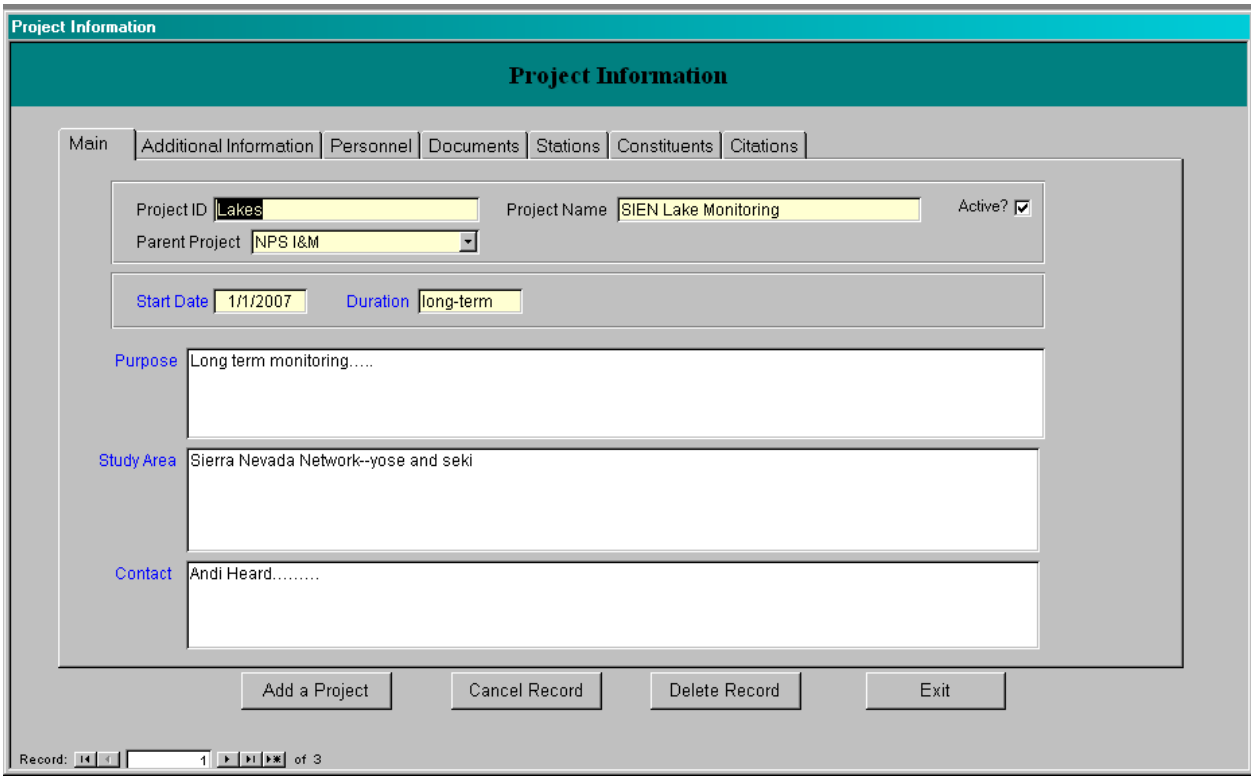
External File: This can be any document that describes the project. For Inventory and Monitoring parent projects, this document would most likely be the formal Monitoring Protocol.

Purpose: Purpose of the project.

Comments: Any additional comments.

3.6.5. Projects

Projects are described on this form. Users create and organize projects as needed. For example, Lake Monitoring could be a project under the SIEN I&M parent project. Note: required data fields are in yellow. Blue text indicates that the information is requested by NPSStoret.



NOTE: Editing the ProjectID will update every record containing this code in the database. Only make changes if you are sure you want to change this code throughout.

To add a project record, click Add a Project at the bottom of the form, then enter the following information. Note: required data fields are in yellow. Blue text indicates that the information is requested by NPStoret.

3.6.5.1. Main

ProjectID: A unique project code.

Project Name: Descriptive name of the project.

Parent Project: Parent Project ID, from the Parent Project Lookup Table, created through the Parent Project metadata form (above).

Active: Indicates whether this record will appear on dropdown lists used on other forms.

Start Date: Date the project started.

Duration: How lone the project is expected to last.

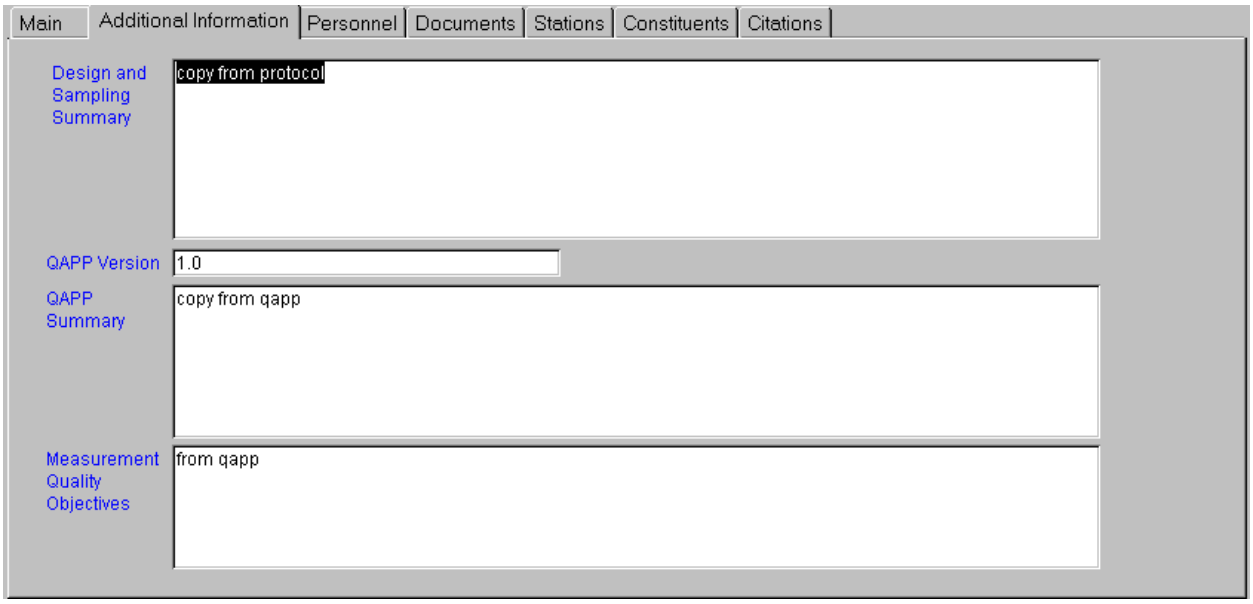
Purpose: Describe the purpose of the project. Can be long as this is a memo field.

Study Area: Description of the study area. Can be long as this is a memo field.

Contact: Name and address information for the principal contact person.

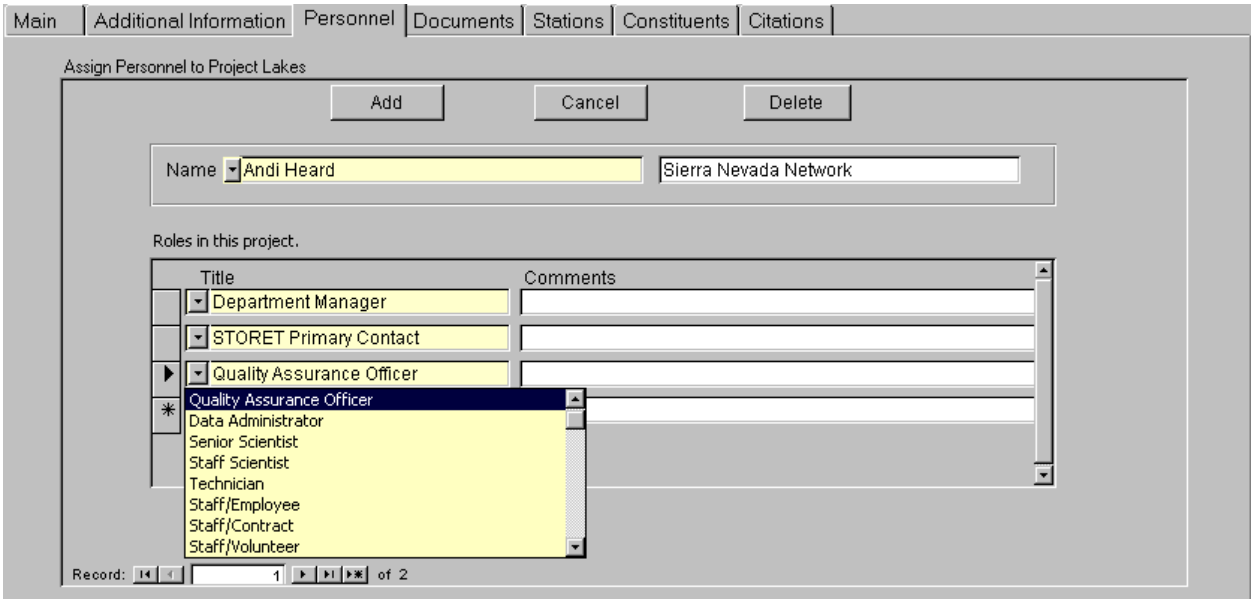
3.6.5.2. Additional Information

Enter the requested information in the memo fields on this form.



3.6.5.3. Personnel

Use this form to associate personnel with a project. List all people involved.



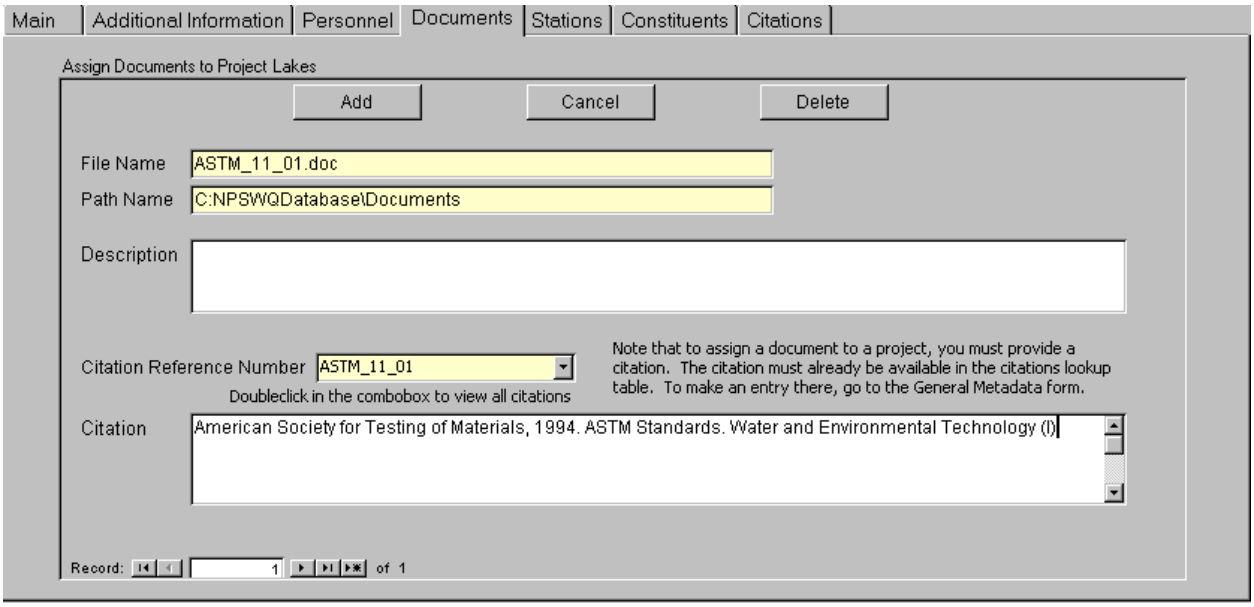
First select the name of the person from the dropdown at the top of the form. The source of this list is the Personnel Lookup Table which is accessed through the Personnel tab on the Main

Metadata form. Affiliation, as it has been entered in the Personnel Lookup Table will appear automatically.

Next, select from the list of possible titles, provided by STORET. This list cannot be updated without contacting the NPS Water Resources Division and requesting a change to the STORET lookup table that contains the list.
Enter any comments associated with this each person's role in the project.

3.6.5.4. Documents

Use this form to associate documents with a project. Documents should be in electronic form and reside on a network computer.



File Name: Name of the file containing the electronic document.

Path Name: Computer directory path where the document is located. Will default to the User Preference value if one has been supplied.

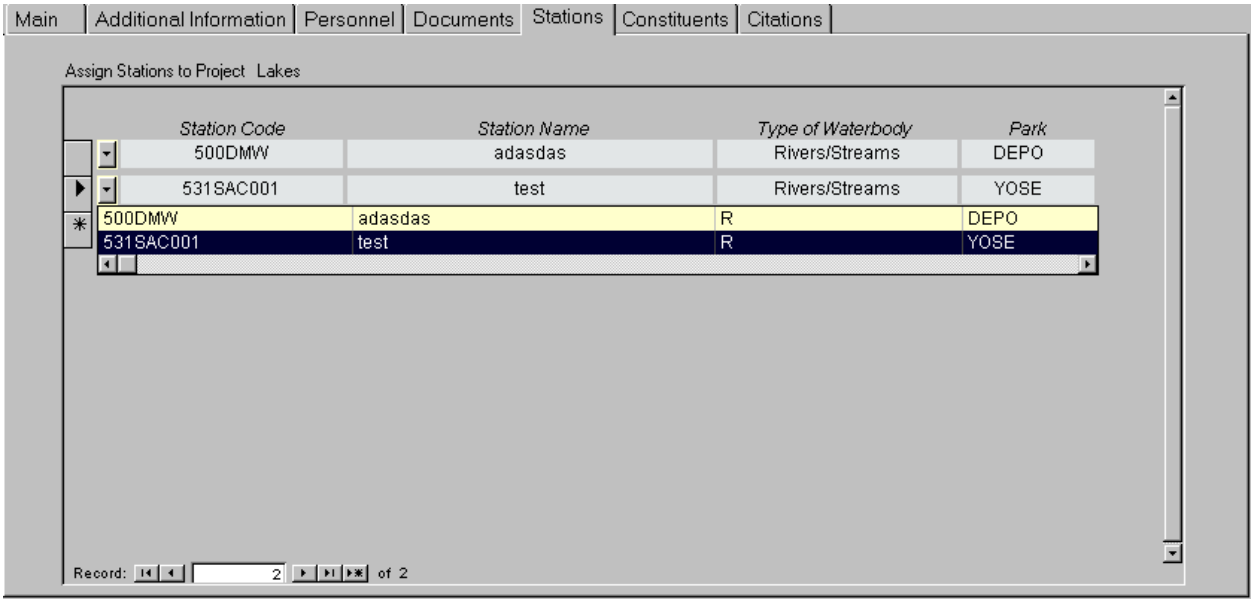
Description: Description of the document.

Citation Reference Number: The reference number given to the document in the Citations Lookup Table. Any documents assigned to a project must first have a citation in the Citations Lookup Table, which can be edited or added to through the Citations tab on the Main Metadata form.

Citation: The citation corresponding to the Citation Reference Number will display in this box automatically once a reference number is entered.

3.6.5.5. Stations

Use this form to associate documents with a project.



Station information must already have been entered in the Stations Lookup Table (through the Stations Metadata form described above).

Select station codes from the dropdown list for all stations that are a part of the project. Associated station name, waterbody type, and park information will display automatically.

3.6.5.6. Constituents

Use this form to associate constituents with a project. List all constituents analyzed for the project. The source of records for this form is the Constituents Lookup table which can be added to or edited through the Constituents Metadata form.

Main | Additional Information | Personnel | Documents | Stations | Constituents | Citations

Assign Constituents to Project Lakes

Matrix	Method	Analyte	Fraction	Units	Type1	Type2
blankwater	EPA 120.1	ElectricalConductivity	Total	µS/cm	Lab	Field
interstitialwater	EPA 8270M	Acenaphthene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Acenaphthene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Acenaphthene-d10(Surrogate)	None	%	Lab	
interstitialwater	EPA 8270M	Acenaphthylene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Anthracene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Benz(a)anthracene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Benz(a)anthracene-d12(Surrogate)	None	%	Lab	
interstitialwater	EPA 8270M	Benz(e)pyrene-d12(Surrogate)	None	%	Lab	
interstitialwater	EPA 8270M	Benzo(a)pyrene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Benzo(b)fluoranthene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Benzo(e)pyrene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Benzo(g,h,i)perylene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Benzo(g,h,l)perylene-d12(Surrogat	None	%	Lab	
interstitialwater	EPA 8270M	Benzo(k)fluoranthene	None	µg/L	Lab	
interstitialwater	EPA 8270M	Biphenyl	None	µg/L	Lab	
interstitialwater	EPA 8270M	Biphenyl-d10(Surrogate)	None	%	Lab	

Record: 2 of 7

3.6.5.7. Citations

List all citations associated with the project. Citations include all electronic documents listed under the Documents tab, and any other references relevant to the project.

Main | Additional Information | Personnel | Documents | Stations | Constituents | Citations

Assign Citations to Project Lakes

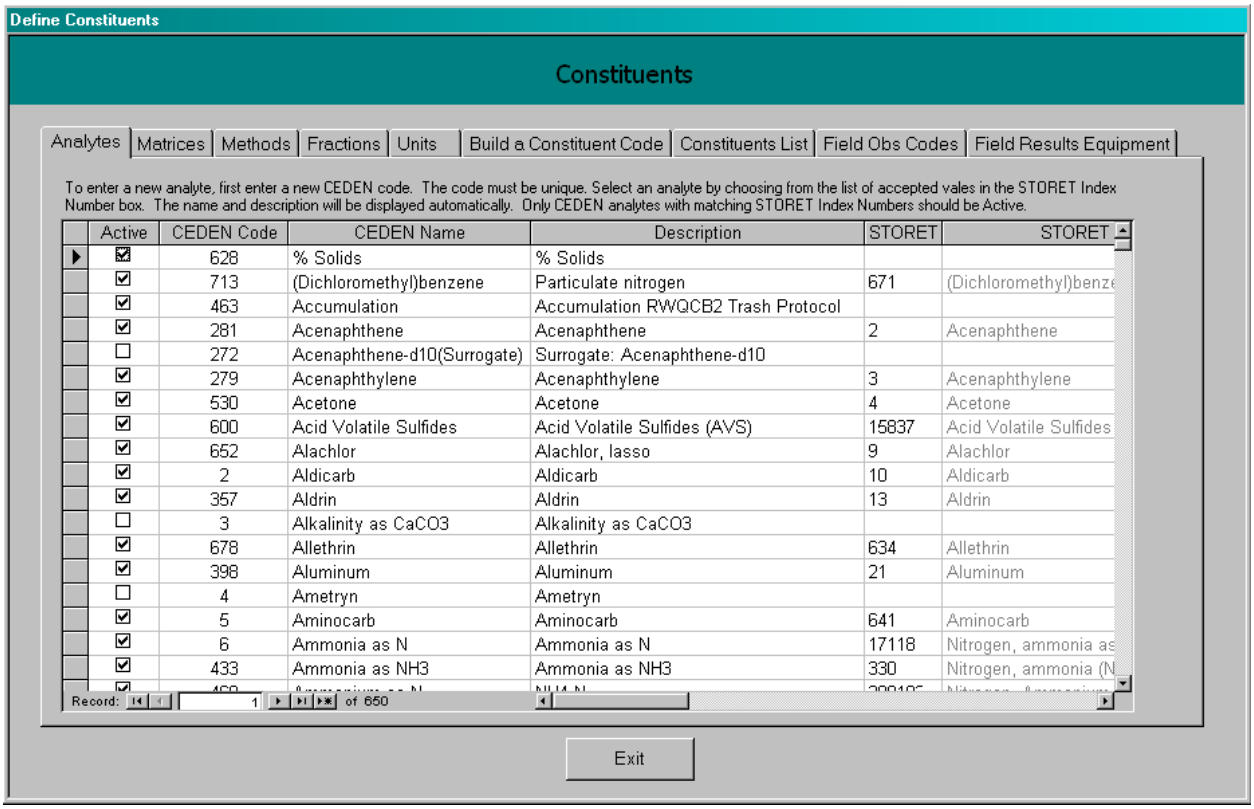
Ref Number	Author Name	Year	Title	
ASTM_11_02	American Society for Testing of Materials	1994	ASTM Standards. Water and Environmental Technology (I	Ame
STD_METHODS	American Public Health Association	1992	Standard Methods for the Examination of Water and Was	Ame
STD_METHODS	American Public Health Association	1992	Standard Methods for the Examination of Water and	
STD_METHODS	American Public Health Association	1998	Standard Methods for the Examination of Water and	
ASTM_11_02	American Society for Testing of Materials	1994	ASTM Standards. Water and Environmental Techno	
ASTM_11_01	American Society for Testing of Materials	1994	ASTM Standards. Water and Environmental Techno	
EPS1_RM_1	Environment Canada	1989	Reference Method for Source Testing: Measuremer	
EPS1_RM_15	Environment Canada	1990	Reference Method for the Monitoring of Gaseous Er	
FISONS_DOC	Fisons Instruments Co, Applied Research Labs	1991	Direct Current Plasma (DCP) Opt. Emission Spectr	
WATER_HANDBOOK	Hach Chemical Company	1992	Hach Water Analysis Handbook.	

Record: 3 of 3

All fields may be edited for a given project by anyone with access to the Projects Metadata Form, so great care must be taken while editing these data.

3.6.6. Constituents

The Constituents Metadata form is shown below. Use this form to create constituent codes and to add to the list of potential Analytes, Matrices, Methods, Fractions, and Units that make up constituent codes. Use this form also to generate a list of options for constituent codes used for Field Observations (Event: FieldDescription), and a list of sampling devices used to analyze samples in the field.



Active	CEDEN Code	CEDEN Name	Description	STORET	STORET
☑	628	% Solids	% Solids		
☑	713	(Dichloromethyl)benzene	Particulate nitrogen	671	(Dichloromethyl)benz
☑	463	Accumulation	Accumulation RWQCB2 Trash Protocol		
☑	281	Acenaphthene	Acenaphthene	2	Acenaphthene
☐	272	Acenaphthene-d10(Surrogate)	Surrogate: Acenaphthene-d10		
☑	279	Acenaphthylene	Acenaphthylene	3	Acenaphthylene
☑	530	Acetone	Acetone	4	Acetone
☑	600	Acid Volatile Sulfides	Acid Volatile Sulfides (AVS)	15837	Acid Volatile Sulfides
☑	652	Alachlor	Alachlor, lasso	9	Alachlor
☑	2	Aldicarb	Aldicarb	10	Aldicarb
☑	357	Aldrin	Aldrin	13	Aldrin
☐	3	Alkalinity as CaCO3	Alkalinity as CaCO3		
☑	678	Allethrin	Allethrin	634	Allethrin
☑	398	Aluminum	Aluminum	21	Aluminum
☐	4	Ametryn	Ametryn		
☑	5	Aminocarb	Aminocarb	641	Aminocarb
☑	6	Ammonia as N	Ammonia as N	17118	Nitrogen, ammonia as
☑	433	Ammonia as NH3	Ammonia as NH3	330	Nitrogen, ammonia (N

3.6.6.1. Analyte

The form above displays the contents of the Analyte Lookup Table. Analytes are the parameter for which an analysis is conducted and result is reported. Records should not be deleted from this list, although records for analytes not on it can be added. To add a record, scroll to the bottom of the list and enter the information in the blank record that appears as follows.

Active: Indicates whether the analyte will show up in dropdown lists used on other forms, particularly the constituent builder. Will be check by default.

CEDEN Code: Code for the analyte used by SWAMP and CEDEN. To enter a new code, sort the table by code and identify the last code used. Then, enter a code larger than this largest one shown.

CEDEN Name: Name of the analyte, recognized by SWAMP and CEDEN.

Description: Description of the analyte. Usually the same as the name except where abbreviations are used in the name.

STORET Code: The code given the analyte by STORET. This list can only be added to by contacting the NPS Water Resources Division and requesting an addition to the STORET database. For new records or for existing records, select the appropriate matching STORET code from the dropdown list that appears when you left click the mouse inside of this field. When a value is selected, the name given the analyte by STORET will appear in the column titled STORET Name.

3.6.6.2. Matrix

A Matrix will be either sediment or the specific form of water in which the sample was collected. For field-generated water samples, the Matrix is samplewater**.** For lab-generated samples, the Matrix should be that which was used in the analysis of the sample. The following should be used for lab-generated water samples:

- labwater: water coming either directly from the tap in the laboratory or bottled water.
- blankwater: Type I or Type II water. It is water that is run through a filtration process in a laboratory, such as DI or MQ.

NOTE: QA for sediment samples may actually use "blankmatrix**"** if water is the Matrix used. Blankmatrix is defined as "matrix used to identify commercial-/lab-produced medium in tissue and sediment QA samples."

Analytes | Matrices | Methods | Fractions | Units | Build a Constituent Code | Constituents List | Field Obs Codes | Field Results Equipment

This list includes all CEDEN Matrix values. CEDEN Codes must be unique. STORET values can be blank.

Active	CEDEN Code	CEDEN Name	Storet Name	Description
☑	3	blankwater	water	laboratory Type II water
☑	1	not recorded		not recorded
☑	11	field	other	
☑	10	air	air	
☑	7	sediment	sediment	
☑	2	unknown		Unknown
☑	8	tissue	biological	
☑	14	blankmatrix	other	matrix used to identify Commercial/Lab-produced medium in
☑	6	interstitialwater	water	same as pore water
☑	4	labwater	water	laboratory tap water
☑	5	samplewater	water	all water collected from the field
☑	12	elutriate	other	
☑	13	referencetoxicant	other	
☑				

Record: 1 of 13

Active: Indicates whether the Matrix will show up in dropdown lists used on other forms, particularly the constituent builder. Will be check by default.

CEDEN Code: Code for the Matrix used by SWAMP and CEDEN. To enter a new code, sort the table by code and identify the last code used. Then, enter a code larger than this largest one shown.

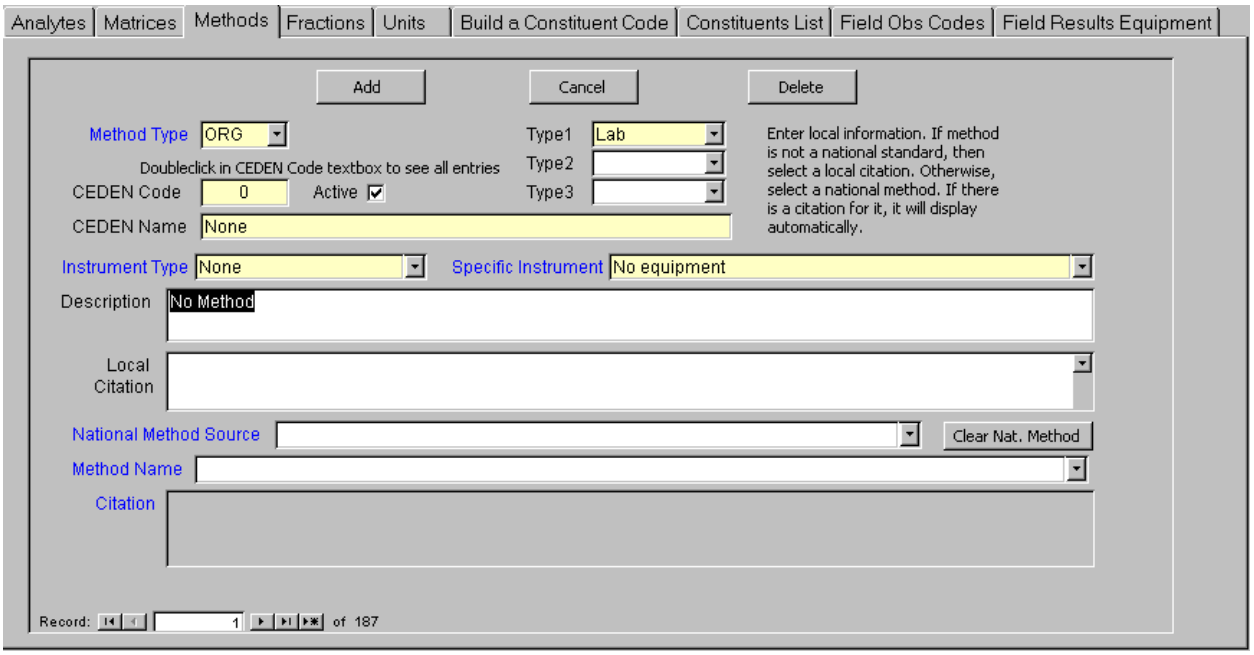
CEDEN Name: Name of the Matrix, recognized by SWAMP and CEDEN.

Description: Description of the Matrix. Usually the same as the name except where abbreviations are used in the name.

STORET Code: The code given the Matrix by STORET. This list can only be added to by contacting the NPS Water Resources Division and requesting an addition to the STORET database. For new records or for existing records, select the appropriate matching STORET code from the dropdown list that appears when you left click the mouse inside of this field. When a value is selected, the name given the Matrix by STORET will appear in the column titled STORET Name.

3.6.6.3. Method

The Method is the analytical method that is used by the laboratory to analyze the sample. Methods are expressed in the Lab Results table with a Method Name such as EPA 300.0 and must be fully described in the Method Lookup Table and in the laboratory records. If a laboratory has modified an EPA standard method, the laboratory agency needs to add "M" to the MethodName. In such situations, the modification should be documented and communicated to CEDEN for notation in the database. For instance, a lab would report a modified EPA 300.0 as EPA 300.0M accompanied by a description of the modification made.



Method Type: Choose either ORG for a method of analysis created locally (by the project organization) or NAT for a national method, such as those published by the EPA.

Type 1, 2, 3: The situation in which an analysis using this method can be performed. Options include lab, field, and FieldObs (Field Observation). The three comboboxes allow for one or more of these values to be entered. At least one is required.

CEDEN Code: Code for the Method used by SWAMP and CEDEN. To enter a new code, sort the table by code and identify the last code used. Then, enter a code larger than this largest one shown.

CEDEN Name: Name of the Method, recognized by SWAMP and CEDEN.

Instrument Type: Classes of instruments used for analysis. The list is defined by STORET and cannot be added to or edited without contacting the NPS Water Resources Division. Select from the dropdown list.

Specific Instrument Type: The specific instrument of the Instrument Type class selected. The list is defined by STORET and cannot be added to or edited without contacting the NPS Water Resources Division. Select from the dropdown list.

Description: Describe the method of analysis.

Local Citation: If the method is of local origin (i.e., not a National Method), then enter a citation for it. The citation must already have been created and added to the Citations Lookup Table which is accessed through the Citations tab on the Main Metadata form. When citation records are created, they are attributed as either local (ORG) or national (NAT) meaning that the citation is for a nationally-recognized method (e.g., EPA). Only citations attributed ORG will show up as option to choose in this combobox.

National Method Source: If the method is a national one, then choose the source agency for the method from the dropdown list. The list is defined by STORET and cannot be added to or edited without contacting the NPS Water Resources Division.

Method Name: Choose the specific method name from the dropdown list. This list will contain only names for the Method Source chosen above.

Citation: The citation for the National Method Name will appear automatically when the Method Name is selected. For National Methods, the citation does not have to already exist in the Citations Lookup table. Citations for National Methods are provided by STORET in a lookup table that has been incorporated into the database. If the citation for the method selected in not presently in the Citations Lookup Table, it will be added automatically.

NOTE: You can clear the National Method Name from a record by clicking the Clear Nat. Method button. This will however, not remove citations from the Citations Lookup table that were added automatically when this field was populated. To delete a citation, go to the Citations tab on the Main Metadata form, locate the citation, and delete it.

3.6.6.4. Fraction

The Fraction is a more specific descriptor of the Analyte. For instance, metals are often expressed as Total or Dissolved, each of which would be expressed as the Fraction, distinguishing the appropriate Analyte.

Analytes | Matrices | Methods | Fractions | Units | Build a Constituent Code | Constituents List | Field Obs Codes | Field Results Equipment

To enter a new fraction, first enter a new CEDEN code. The code must be unique. Select a fraction by choosing from the list of accepted vales in the STORET Index Number box. The name and description will be displayed automatically. Only CEDEN fractions with matching STORET Index Numbers should be Active.

Active	CEDEN Code	CEDEN Name	CEDEN Description	STORET I	STORET
☑	24	Low Slack	Used with Tides		
☐	12	Fibers > 0.5 and < 10 µm			
☐	72	Below	below waterline;Reg2 trash Assesment		
☐	62	Fine 0.0078 to <0.0156 mm	Fine Silt; 0.0078 to <0.0156 mm Phi 7 to >6; W		
☐	15	Storage	Used with temperature to distinguish the temp ot		
☐	55	V. Large 32 to <64 mm	Very Large Pebble; 32 to <64 mm Phi -5 to >-6;		
☐	1	Not Recorded	not recorded		
☐	63	V. Fine 0.0039 to <0.0078 mm	Very Fine Silt; 0.0039 to <0.0078 mm Phi 8 to >		
☐	52	Coarse 0.5 to <1.0 mm	Coarse Sand; 0.5 to <1.0 mm Phi 1 to >0; Went		
☑	14	Total Residual	Total Residual	465	Total Residu
☑	4	Particulate	Filterable Portion	147	Filterable
☑	2	Total	Unfiltered	142	Total
☐	46	Threshold	Used with Odor		
☐	73	Fine 0.075 to <0.425 mm	Fine Sand 0.075 to <0.425 mm; ASTM Scale		
☐	60	Coarse 0.031 to <0.0625 mm	Coarse Silt; 0.031 to <0.0625 mm Phi 5 to >4; \		
☐	11	Fibers > 10 µm			
☐	23	High Slack	Used with Tides		
☐	8	Volatile Suspended			
☐	22	Purge	Used with Pathogen State		

Record: 1 of 52

Active: Indicates whether the Fraction will show up in dropdown lists used on other forms, particularly the constituent builder. Will be checked by default.

CEDEN Code: Code for the Fraction used by SWAMP and CEDEN. To enter a new code, sort the table by code and identify the last code used. Then, enter a code larger than this largest one shown.

CEDEN Name: Name of the Fraction, recognized by SWAMP and CEDEN.

Description: Description of the Fraction. Usually the same as the name except where abbreviations are used in the name.

STORET Code: The code given the Fraction by STORET. This list can only be added to by contacting the NPS Water Resources Division and requesting an addition to the STORET database. For new records or for existing records, select the appropriate matching STORET code from the dropdown list that appears when you left click the mouse inside of this field. When a value is selected, the name given the Fraction by STORET will appear in the column titled STORET Name.

3.6.6.5. Unit

The Unit with which the analytical result is measured or expressed. Each combination of Analyte and Matrix requires that a specific Unit be used. Note: Surrogate-Recovery Data will have units of %.

Analytes | Matrices | Methods | Fractions | Units | Build a Constituent Code | Constituents List | Field Obs Codes | Field Results Equipment

To enter a new unit, first enter a new CEDEN code. The code must be unique. Select a unit by choosing from the list of accepted values in the STORET Index Number box. The name will be displayed automatically. Only CEDEN units with matching STORET Index Numbers should be Active.

Active	CEDEN Code	CEDEN Name	STORET Index Number	STORET Name
☐	11	oocysts/L		
☑	9	NTU	128	NTU
☐	21	psu		
☑	36	mins	136	Min
☑	22	m	64	m
☐	37	mE/m2/s		
☐	16	Num/Rep		
☑	29	ft	67	ft
☑	32	µg/g	40	ug/g
☑	19	ft/s	169	ft/sec
☑	28	ng/g	39	ng/g
☑	25	µS/cm	206	uS/cm
☑	23	m/s	167	m/sec
☐	3	µmhos/cm		
☑	30	ppt	287	ppt
☐	14	cells/ml		
☑	6	mg/L	15	mg/l
☐	15	mg/ind		

Record: 1 of 39

Active: Indicates whether the Unit will show up in dropdown lists used on other forms, particularly the constituent builder. Will be checked by default.

CEDEN Code: Code for the Unit used by SWAMP and CEDEN. To enter a new code, sort the table by code and identify the last code used. Then, enter a code larger than this largest one shown.

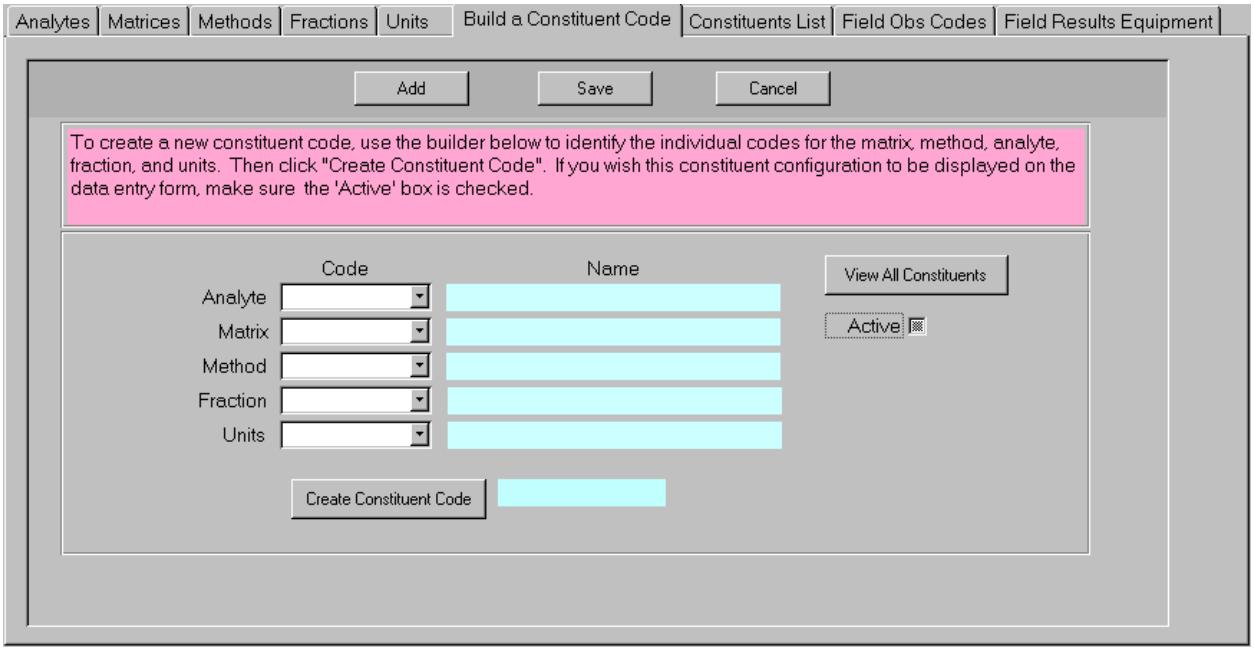
CEDEN Name: Name of the Unit, recognized by SWAMP and CEDEN.

Description: Description of the Unit. Usually the same as the name except where abbreviations are used in the name.

STORET Code: The code given the Unit by STORET. This list can only be added to by contacting the NPS Water Resources Division and requesting an addition to the STORET database. For new records or for existing records, select the appropriate matching STORET code from the dropdown list that appears when you left click the mouse inside of this field. When a value is selected, the name given the Unit by STORET will appear in the column titled STORET Name.

3.6.6.6. Constituent Codes

Constituent codes are assembled in the following form.



Add a Constituent: Click Add and select from the dropdown lists, an Analyte, Matrix, Method, Fraction, and Unit to create a new constituent. The codes for each element will appear in the comboboxes and their CEDEN names will display next to them. Click Create Constituent Code and the new code will be displayed next to the button. Active indicates whether the code will display in dropdown lists used on other forms and is checked by default.

Click Save to save the record. If the same constituent has been created previously, an error message will appear.

View/Edit Constituent Codes: Click View All Constituents to view the list of constituent codes currently in the database. Or go to the Constituents List tab and view them there. NOTE: Existing codes should not be modified or deleted. However, if you make a mistake on creating a new code, the best thing to do is delete it and start again. Check Active if you want a code to appear on dropdown lists used on other forms or remove the check to inactivate it from dropdown lists.

Analytes | Matrices | Methods | Fractions | Units | Build a Constituent Code | Constituents List | Field Obs Codes | Field Results Equipment

Active	Constituent Code	Analyte	Matrix	Method	Fraction	Units
☑	5-63-403-0-6	Suspended Sediment Concentration	samplewater	ASTM D3977	None	mg/L
☑	3-63-403-0-6	Suspended Sediment Concentration	blankwater	ASTM D3977	None	mg/L
☑	5-185-403-0-6	Suspended Sediment Concentration	samplewater	ASTM D3977M	None	mg/L
☑	3-185-403-0-6	Suspended Sediment Concentration	blankwater	ASTM D3977M	None	mg/L
☑	7-69-705-0-13	Silt 0.005 to <0.075 mm	sediment	ASTM D422	None	%
☑	7-69-414-74-13	Sand 0.075 to <4.75 mm	sediment	ASTM D422	ı 0.425 to <:	%
☑	7-69-415-0-13	Fine <0.075 mm	sediment	ASTM D422	None	%
☑	7-69-414-75-13	Sand 0.075 to <4.75 mm	sediment	ASTM D422	ɜ 2.0 to <4.7	%
☑	7-69-704-0-13	Clay <0.005 mm	sediment	ASTM D422	None	%
☑	7-69-414-73-13	Sand 0.075 to <4.75 mm	sediment	ASTM D422	075 to <0.4:	%
☑	7-69-413-0-13	Gravel 4.75 to <75 mm	sediment	ASTM D422	None	%
☑	7-83-427-0-13	Moisture	sediment	DFG SOP 103	None	%
☑	7-83-50-0-27	Mercury	sediment	DFG SOP 103	None	mg/Kg
☑	3-64-32-0-2	Diazinon	blankwater	ELISA	None	µg/L
☑	5-64-21-0-2	Chlorpyrifos	samplewater	ELISA	None	µg/L
☑	4-64-32-0-2	Diazinon	labwater	ELISA	None	µg/L
☑	5-64-32-0-2	Diazinon	samplewater	ELISA	None	µg/L
☑	3-64-21-0-2	Chlorpyrifos	blankwater	ELISA	None	µg/L
☑	4-64-21-0-2	Chlorpyrifos	labwater	ELISA	None	µg/L
☑	6-82-21-0-2	Chlorpyrifos	interstitialwater	ELISA SOP 3.3	None	µg/L

Record: 1 of 2808

3.6.6.7. Field Observation Codes

Assign values to constituent codes used in Field Observations. These will determine the list of options available to enter as Text Result under the Field Observations tab of the Data Entry and Edit form.

Analytes | Matrices | Methods | Fractions | Units | Build a Constituent Code | Constituents List | Field Obs Codes | Field Results Equipment

Creates a list of value codes for Field Observation analytes. First select an analyte, then enter its value codes and details in the listbox. The list will only display active analytes.

Select an Analyte: Composition

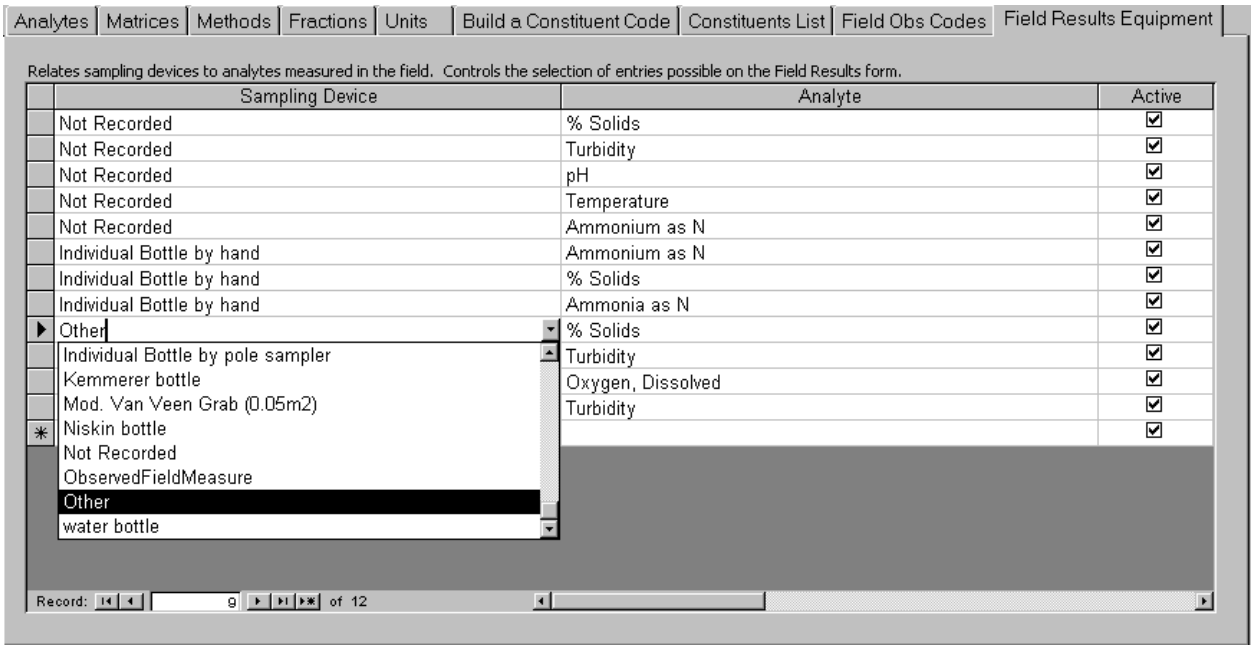
Active	Value Code	Description	STORET Index Number
☑	coarse Sand	Coarse Sand	
☑	cobble	cobble	
☑	gravel	Gravel	
☑	fine Sand	Fine Sand	
☑	fine Sand/Course Sand	combined Fine Sand/Course Sand	
☑	mixed	Mixed	
☑	Not Recorded	Not Recorded	
☑	Hard Pan Clay	Hard Pan Clay	
☑	fine Sand/Silt/Clay	combined Fine Sand/Silt/Clay	
☑	silt/Clay	Silt/Clay	
☑	gravel/cobble	gravel/cobble	
☑			

1. First select the analyte of interest from the combobox at the top of the form.
2. Then enter as many (short) value codes to it as needed. Use the Description field to provide a more detailed description.

3. Right-click in the STORET Index Number box to display a list of STORET accepted values for the analyte. In many cases, none will exist. The list of STORET codes can only be added to by contacting the NPS Water Resources Division and requesting an addition to the STORET database.

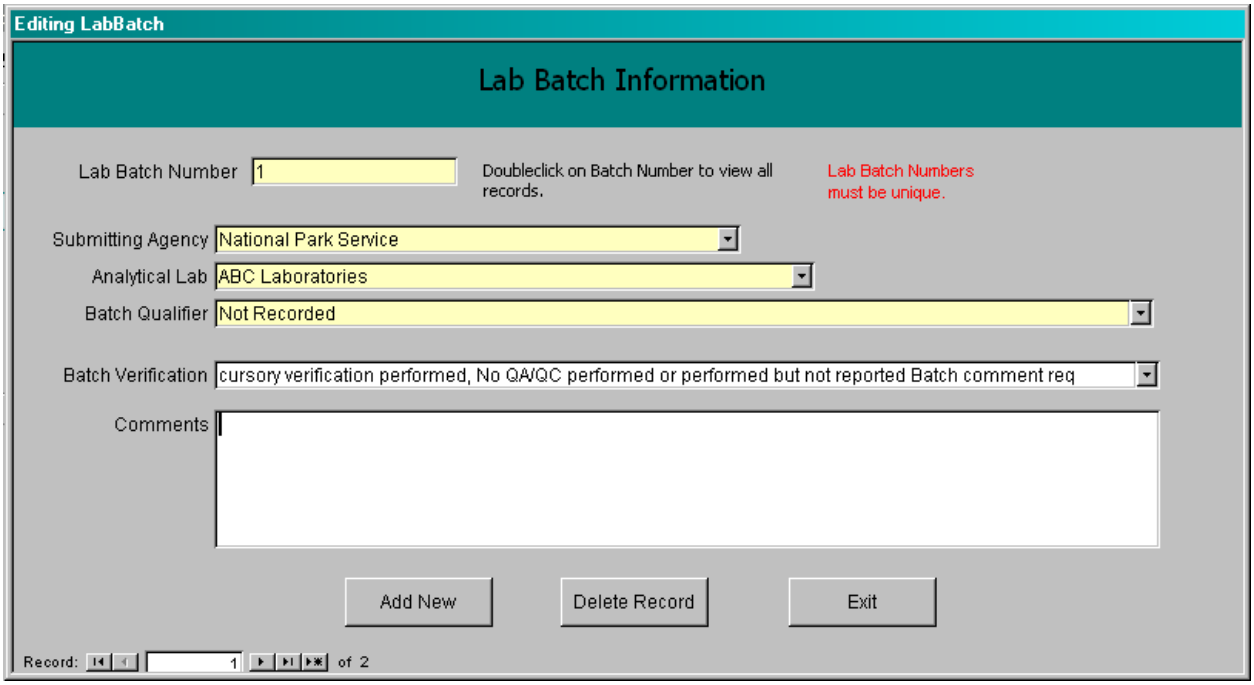
3.6.6.8. Field Results Equipment

Use this form to link sampling devices (defined in the Sampling Device Lookup Table which is accessible through the Sampling Device tab on the Main Metadata form) with specific analytes that may be analyzed in the field. This table is used to narrow the list of choices for sampling device in the Field Results section of the Data Entry and Edit form. Create a record for each Sampling Device/Analyte combination that will be used to report results.



3.6.7. Lab Batch

Enter Lab Batch information on this form.



Lab Batch Number: A unique identifier for each lab batch. **NOTE**: editing this field on existing records will cause a cascade update to occur throughout the database.

Submitting Agency: Name of agency submitting the samples to be analyzed. Select from dropdown list. This list is derived from the Agency Lookup Table which can be access through the Agency tab on the Main Metadata form.

Analytical Lab: Name of lab performing the analysis on the batch of samples. This list is also derived from the Agency Lookup Table which can be access through the Agency tab on the Main Metadata form.

Batch Qualifier: Represents batch quality with respect to how well the results of analysis on the batch meet protocol QAQC standards. Select from the dropdown list. This list is derived from the BatchQual Lookup Table which can be accessed through the Batch QAQC tab on the Main Metadata form.

Batch Verification: Indicates the level of data quality verification performed on the batch results. Select from the dropdown list. This list is derived from the BatchQual Lookup Table which can be accessed through the Batch QAQC tab on the Main Metadata form.

Comments: Enter any comments relative to the sample batch.

4. Submitting Samples to the Lab

4.1. Analysis Authorization Forms

Prior to sampling, it is helpful to organize, for the laboratories involved, an expectation of analyses to be performed on those samples that will be collected. For organizations contracting with the Department of Fish and Game (DFG) for sampling activity through the SWAMP Program, the tool used for this expectation of work is called an Analysis Authorization Form.

The Analysis Authorization is provided separately to the labs in an electronic format and is used as a more detailed supplement to the Chain of Custody (COC) documentation that travels with the samples from the field to the labs.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	**Analysis Authorization**		**Project ID:**	02SW7001		Contact Person:		Marco Sigala										
2	**Fiscal Year:**	02	**Season:**	Fall		Phone:		831-771-4173										
3	**Region:**	7	**Date:**	11/3/2003		email:		msigala@mlml.calstate.edu										
4						Mailing Address:		7544 Sandholdt Rd.										
5								Moss Landing, CA 95039										
6																		
7		Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Sediment	Sediment	Sediment	Sediment	Sediment
8		Inorganics	Inorganics	Inorganics	Inorganics	Inorganics	Inorganics	Organics	Organics	Organics	Organics	Organics	Organics	Organics	Organics	Organics	Organics	Metals
9		Nutrients*	Ammonia	TKN	Alkalinity	Hardness	Perchlorate	Conv.**	PCBs	PAHs	TPHs	MTBE-	VOCs	Conv.**	PCBs	PAHs	TPHs	Selenium
10	Station		total					Pesticides				BTEX		Pesticides				
11	000TRV007											x	x					
12	000TRV008											x	x					
13	700FDQ008	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
14	713CRNVBD	x	x	x	x	x	x	x	x	x	x	x	x					
15	715CRIDG1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
16	715CPVLG1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
17	715CPVOD2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
18	723ARGRB1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
19	723ARINTL	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
20	723NROTWM	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
21	723NRBDRY	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
22	728SSGS02	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
23	728SSGS07	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
24	728SSGS09	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
25	728SSDNW2	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
26	719CVSCOT	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
27	**TOTAL**	14	14	14	14	14	10	14	14	14	14	16	16	13	13	13	13	13
28																		
29	*Nutrients: sulfate, chloride, nitrite, nitrate, ortho-phosphate, total phosphate																	
30	**Conv. (Conventional): includes OC pesticides and most conventional OP pesticides																	
31	NOTE: Stations in yellow highlight will have high salinities																	

An Analysis Authorization Form is an Excel workbook with various components.

- A worksheet for each laboratory involved in analyzing samples and contains
  - Sample Information, including Fiscal Year, Region, Season and Project ID. This information assists in maintaining consistency in reporting for all components of the sample in the database.
  - A list of the Stations for which the samples are being collected, cross-referenced with a list of analytes grouped by matrix.
- Two additional worksheets that serve as the templates for the lab, a form for reporting all analytical results, including QA data, and a Lab Batch Worksheet for information specific to the batch in which data are analyzed.

Regardless of whether an organization chooses to use these templates or others like them that serve the same purpose, they are useful tools to help communicate and maintain consistency about samples collected and analyzed. If interested, contact the SWAMP DMT for electronic copies.

4.1.1. Format Specifications

The SWAMP program has developed an Excel spreadsheet template for laboratories to use for formatting results data in a manner that can easily be loaded into the SWAMP Database. Copies may be obtained from the SWAMP DMT and modified to suit the SIEN Water Quality Monitoring and Streamflow Database. Or, similar templates may be developed from scratch.

The template travels with the samples and Chain of Custody and should contain two worksheets. The first holds all chemistry results, including QA data and should be named Results in its worksheet tab. The second holds information specific to the laboratory batch in which data is analyzed.

4.1.2. Chemistry Results Worksheet

Each record in this sheet represents a result from a specific analysis for a particular constituent at a single station or for a single QA sample. All results, including all supporting QA analyses will be reported on this worksheet. See the Section: Lab Results, under Entering New Data above for a list of fields and formatting specifications for this worksheet.

This worksheet should also contain the basic Sample Information recorded in the field: Station Code, Event, Sample Type, Project ID, Season and Agency Code. These may be pre-populated before sending to the lab.

4.1.3. LabBatch Worksheet

This worksheet should be named LabBatch (with no spaces) in its worksheet tab. The fields in this sheet are and should be completed as follows:

LabBatch: There should be one record (and only one record) for each unique Lab Batch ID found in the Results spreadsheet in the field LabBatch.

AgencyCode: This is the Agency Code of the agency or lab performing the analysis. See Agency Lookup in the Chem Analysis Data Template for specific codes.

BatchQualifierCode: Qualifies the batch as a whole. Applicable codes can be found in the Batch Qualifier lookup table in the Chem Analysis Data Template. Please note that if the qualifier is ‘A’, meaning Acceptable, the lab is ensuring that all SWAMP QAQC protocols were met for the batch.

LabBatchComm: Use this field for any comments relating to the batch as a whole. *(Not required).*

4.2. Reformatting Lab Data

In many laboratories, analytical results are produced in a format that does not easily fit into the one used by SWAMP. For example, many labs’ instruments provide reports in a vertical rather than horizontal format. The SWAMP DMT has developed a program to assist in the conversion of data from the instrument-provided format to that required by the SWAMP Database for uploading lab results data electronically. While this conversion program does not complete all of the work for the lab personnel, it greatly reduces the effort involved. Contact the SWAMP DMT for a copy of it.

4.3. SWAMP Laboratory QA Checklist

A laboratory QA checklist describes in detail, which QA procedures should be performed with each batch of samples. Additional detail may be included, such as percent recoveries, RPD and calibration requirements. See the SWAMP QAPP (*http://www.swrcb.ca.gov/swamp/qapp.html*) for an example.

Generally, laboratories must include with their data reports each QA sample type once per 20 samples or per batch, whichever is more frequent. For instance, if an analytical batch contains 10 samples, there must be one of each sample type included with the data report. If the batch contains 21 or 38 samples, two of each type of QA samples must be included. The table below provides an example.

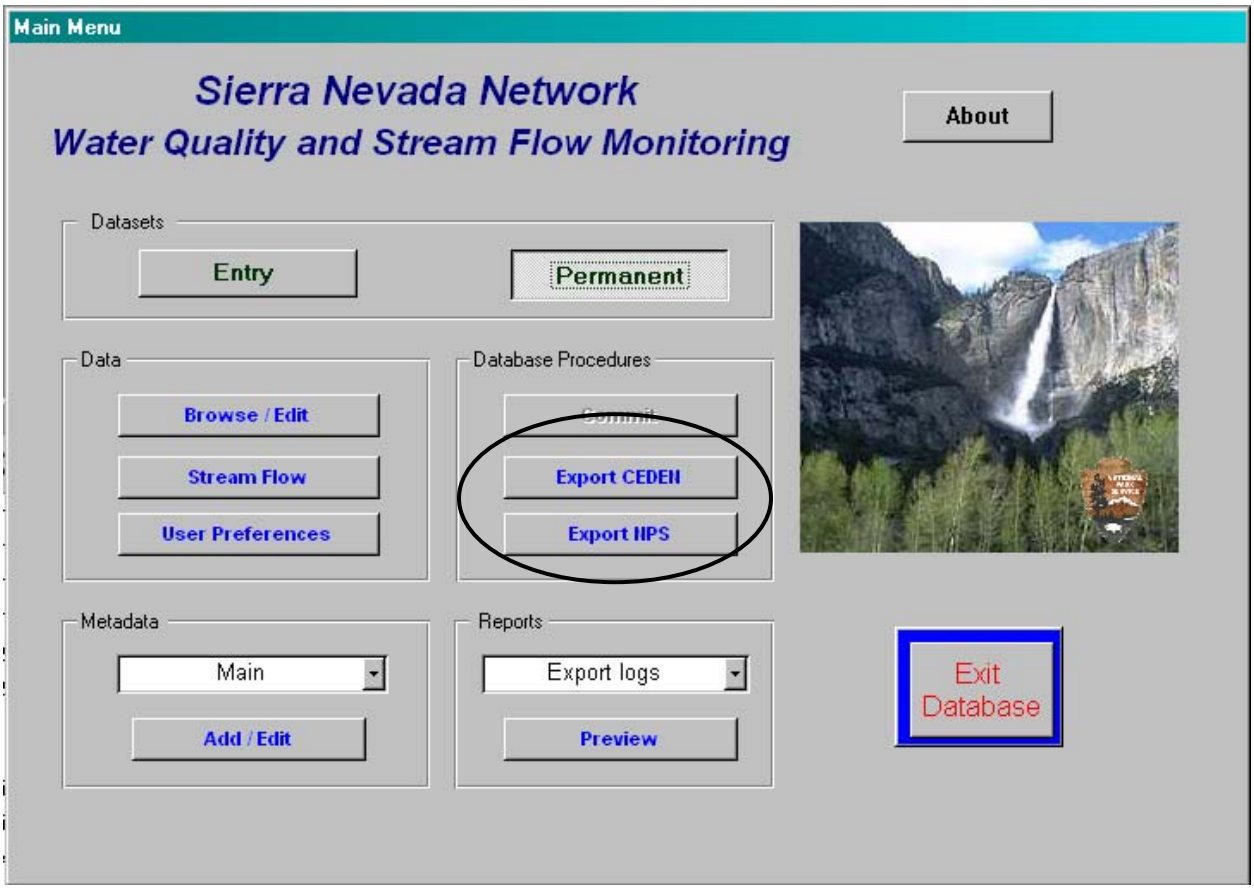
Analyte Group	Matrix	Per ? Samples	# MS	#MSD	# Blanks	# CRM, LCS, or LCM *	#Dups
Pathogens	Water	20	n/a	n/a	1	n/a	1
Conventionals**	Water/Sediment	20	1	1	1	1	1
Inorganics	Water/Sediment	20	1	1	1	1	1
Method 8081 Pesticides	Water/Sediment	20	1	1	1	1	n/a
Method 8141 Pesticides	Water/Sediment	20	1	1	1	1	n/a
Method 8082 PCB	Water/Sediment	20	1	1	1	1	n/a
Method 8260 Volatiles	Water/Sediment	20	1	1	1	1	n/a
Method 8270 Semi-Volatiles	Water/Sediment	20	1	1	1	1	n/a
Method 8270 PAH	Water/Sediment	20	1	1	1	1	n/a
Method 8310 PAH	Water/Sediment	20	1	1	1	1	n/a
Metals	Water/Sediment	20	1	1	1	1	1
MeHg	Water/Sediment	20	1	1	1	1	1
Grain Size	Sediment	20	n/a	n/a	n/a	1	1
TOC	Sediment	20	n/a	n/a	1	1 CRM & 1 LCM	1
TDS/TSS/SSC	Water	20	n/a	n/a	1	1	1
Chlorophyll/Pheophtyin	Water	20	n/a	n/a	1	n/a	1

*CRM Preferred

**Conventionals include: Ammonia as N, BOD, Boron, Calcium, Chloride, Chlorophyll a, COD, Fluoride, Iron, Magnesium, Manganese, Ntrate as N, Nitrite as N, Nitrate+Nitrite, OilandGrease, Organic Carbon, OrthoPhosphate as P, Pathogens, Potassium, Silica, Sodium, Sulfate, Suspended Sediment Concentration, Alkalinity as CaCO3, Total Dissolved Solids, Hardness as CaCO3, Total Kjeldahl Nitrogen, Total Phosphate as P, Total Suspended Solids.

5. Exporting Data

The database contains automated procedures for exporting data to Excel spreadsheets in a form that will allow them to be readily imported into the NPStoret and CEDEN corporate databases. Only data committed to the permanent side can be exported. To export data, activate the Permanent side of the database by clicking the Permanent button in the Datasets frame at the top of the Main Menu form. This will enable the Export buttons inside the Database Procedures frame in the middle of the form.



5.1. CEDEN

This procedure is not yet available, but will be created by California Department of Water Resources staff in the near future.

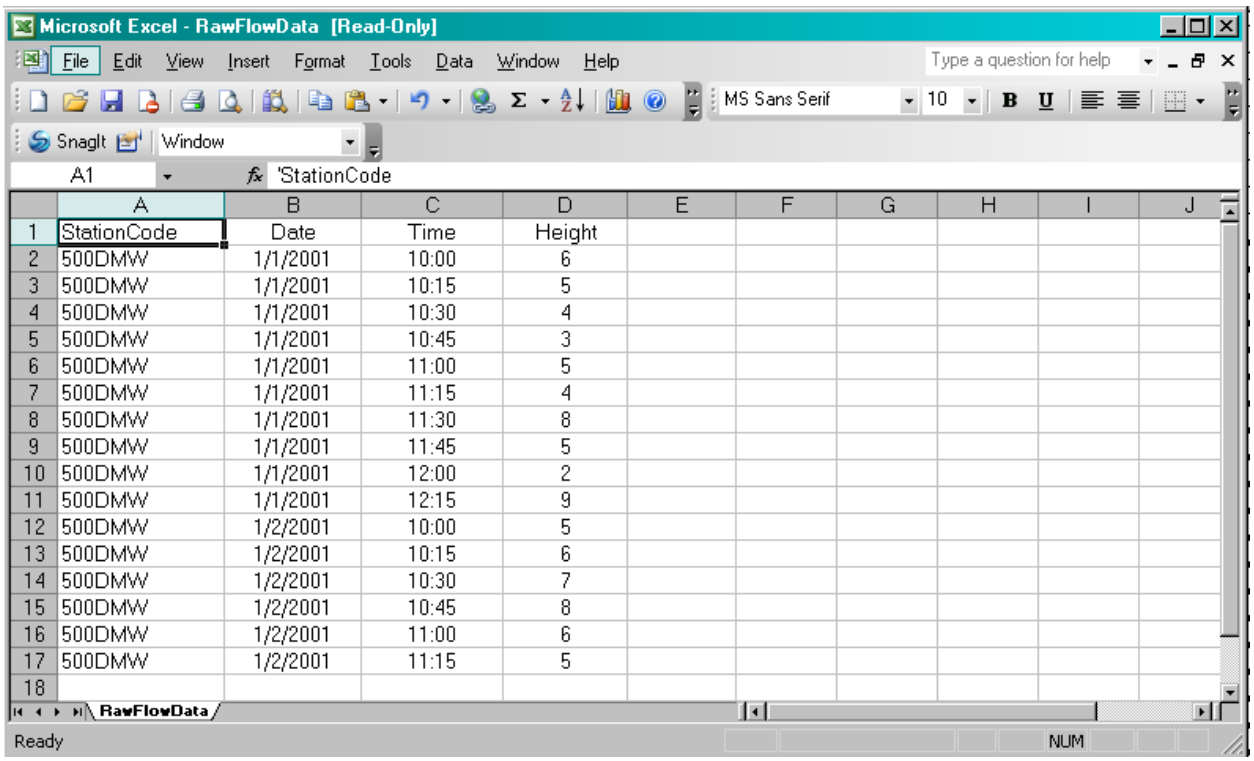
5.2. STORET

Click the Export NPS button. This will run a procedure that will export all water quality monitoring data in STORET-ready format as specified by the NPS Export Data Deliverable (NPSEDD) spreadsheets.

6. Streamflow Monitoring

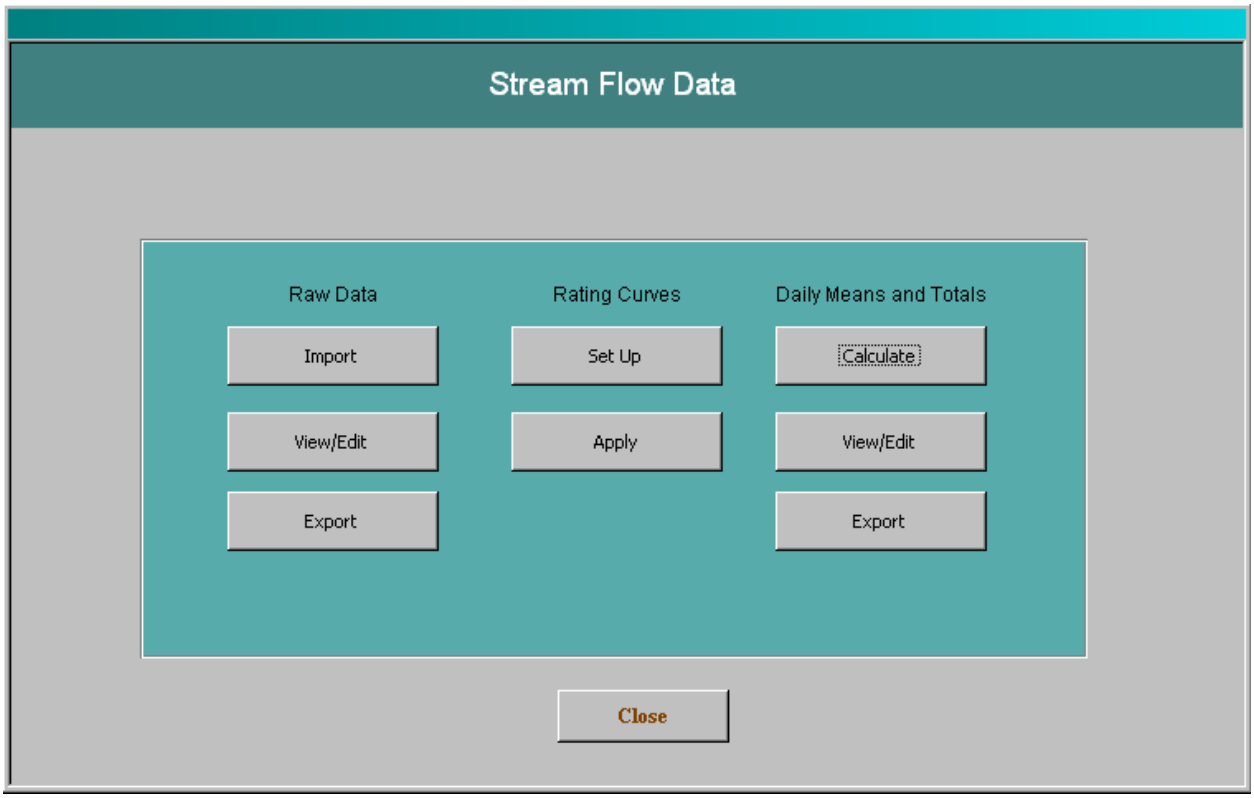
Continuous time streamflow monitoring data will be collected in the field by data loggers. Prior to loading into the database, the raw data should be uploaded to an Excel spreadsheet like the one illustrated below. It is recommended that these raw data files be archived in their own folder system on the user's computer or network and named according to the conventions outlined in the SIEN Data Management Plan. Each set of raw data to be uploaded to the database should be copied to the folder in which the database resides and given a name reserved for these data sets. Currently, the database is set to read from a file named RawFlowData.xls stored in the folder C:\NPSWQDatabase as specified in the module "ImportRawFlowData.

NOTE: Procedures for collecting raw streamfow data and calculating station rating curves are presently in development. The following illustrates the general approach to be taken for managing these data within the database and will be completed once all details are available. Here, we assume that stream height will be collected and a function applied to it to calculate flow rate. This function is temporarily represented as the sum of the height times each of two variables.



	A	B	C	D
1	StationCode	Date	Time	Height
2	500DMW	1/1/2001	10:00	6
3	500DMW	1/1/2001	10:15	5
4	500DMW	1/1/2001	10:30	4
5	500DMW	1/1/2001	10:45	3
6	500DMW	1/1/2001	11:00	5
7	500DMW	1/1/2001	11:15	4
8	500DMW	1/1/2001	11:30	8
9	500DMW	1/1/2001	11:45	5
10	500DMW	1/1/2001	12:00	2
11	500DMW	1/1/2001	12:15	9
12	500DMW	1/2/2001	10:00	5
13	500DMW	1/2/2001	10:15	6
14	500DMW	1/2/2001	10:30	7
15	500DMW	1/2/2001	10:45	8
16	500DMW	1/2/2001	11:00	6
17	500DMW	1/2/2001	11:15	5
18				

To access and work with streamflow monitoring data, click the Streamflow button on the Data frame in the middle of the Main Menu. This will display a form like the following.

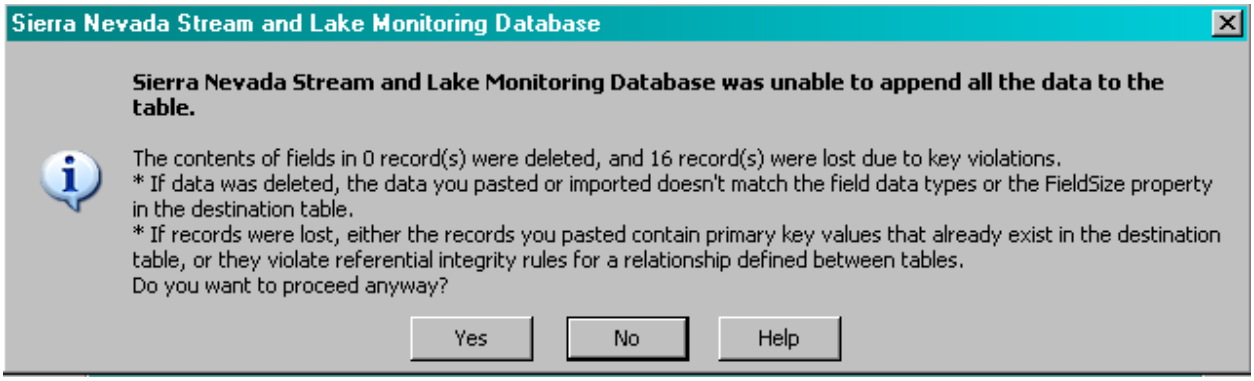


6.1. Raw Data

6.1.1. Importing

To import raw data from Click the Import button under the Raw Data label on the form. The database is set to read from a file named RawFlowData.xls stored in the folder C:\NPSWQDatabase as specified in the module "ImportRawFlowData. The path and file name can be changed if desired by editing the File Name property of the module.

Clicking the Import button will run the module. An error message will occur if the Excel spreadsheet containing the raw data is not found. If the file is found but some or all of its records have already been uploaded, you will see a dialog box like the one below.



In this example, the message tells you that 16 records were lost due to key violations. This means that 16 of the records in the Excel spreadsheet that you tried to upload are already in the Raw Data table in the database. Records are recognized as unique by their station code, and the date and time the data were recorded.

6.1.2. Viewing/Editing

Once the raw data have been uploaded, they may be viewed. Open a form view of the Raw Data Table by clicking on the View/Edit button under the Raw Data label.

RawFlowData

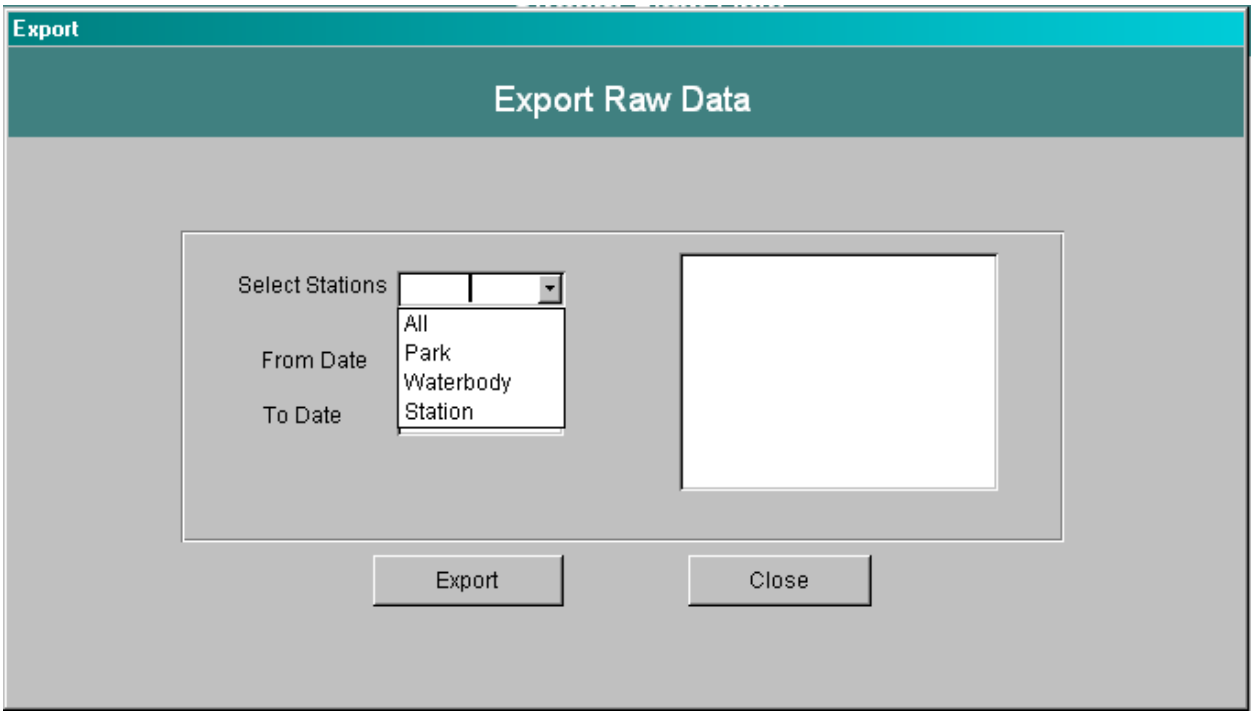
StationCode	Date	Time	Height	Calculated Speed	Comments
531SAC001	1/1/2001	10:45	8		
500DMW	1/1/2001	11:45	5		
500DMW	1/1/2001	12:00	2		
500DMW	1/1/2001	12:15	9		
500DMW	1/1/2001	11:15	4		
500DMW	1/1/2001	11:00	5		
500DMW	1/1/2001	10:45	3		
500DMW	1/1/2001	10:30	4		
500DMW	1/1/2001	10:00	6		
500DMW	1/1/2001	10:15	5		
500DMW	1/1/2001	11:30	8		
531SAC001	1/1/2001	10:30	7		
531SAC001	1/1/2001	10:00	7		
531SAC001	1/1/2001	11:00	5		

Record: 1 of 32

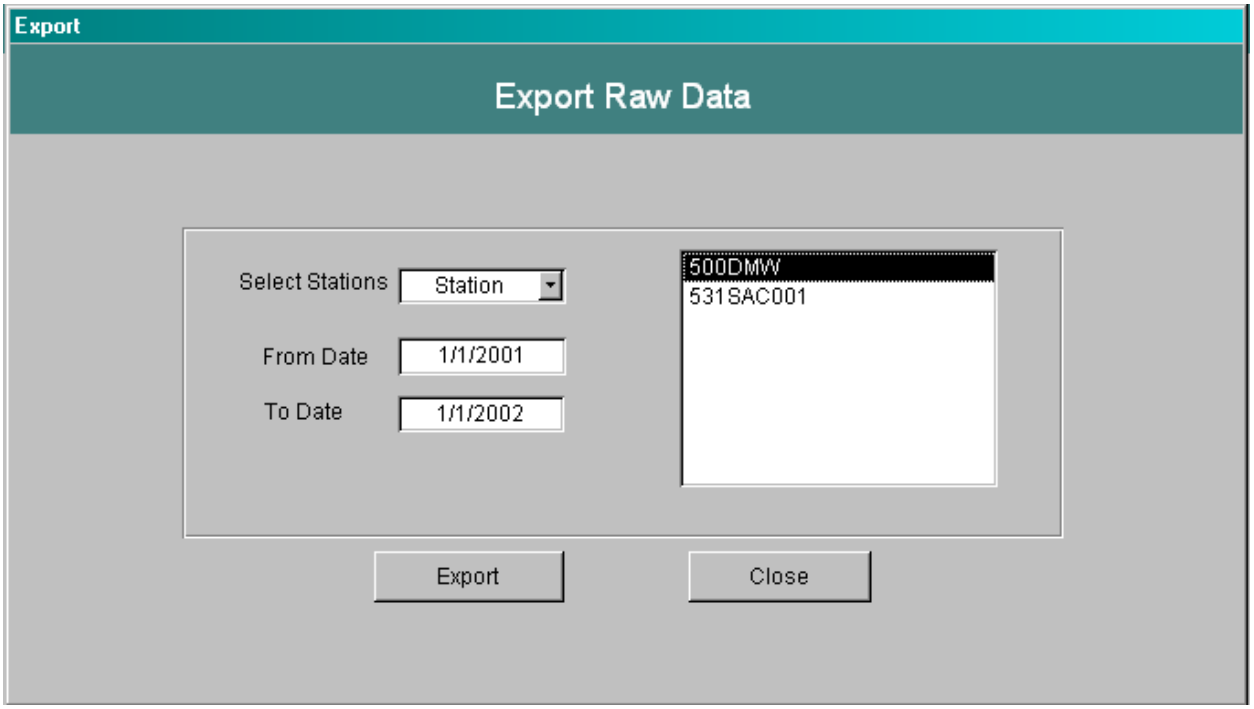
The field Calculated Speed is calculated using the rating curve functions defined for each station (below). This field will be empty for raw data that have just been imported. Station Code, Date, and Time values for these records cannot be edited, however, values of Height can be. Also, comments about a particular records can be added using the Comments field.

6.1.3. Exporting

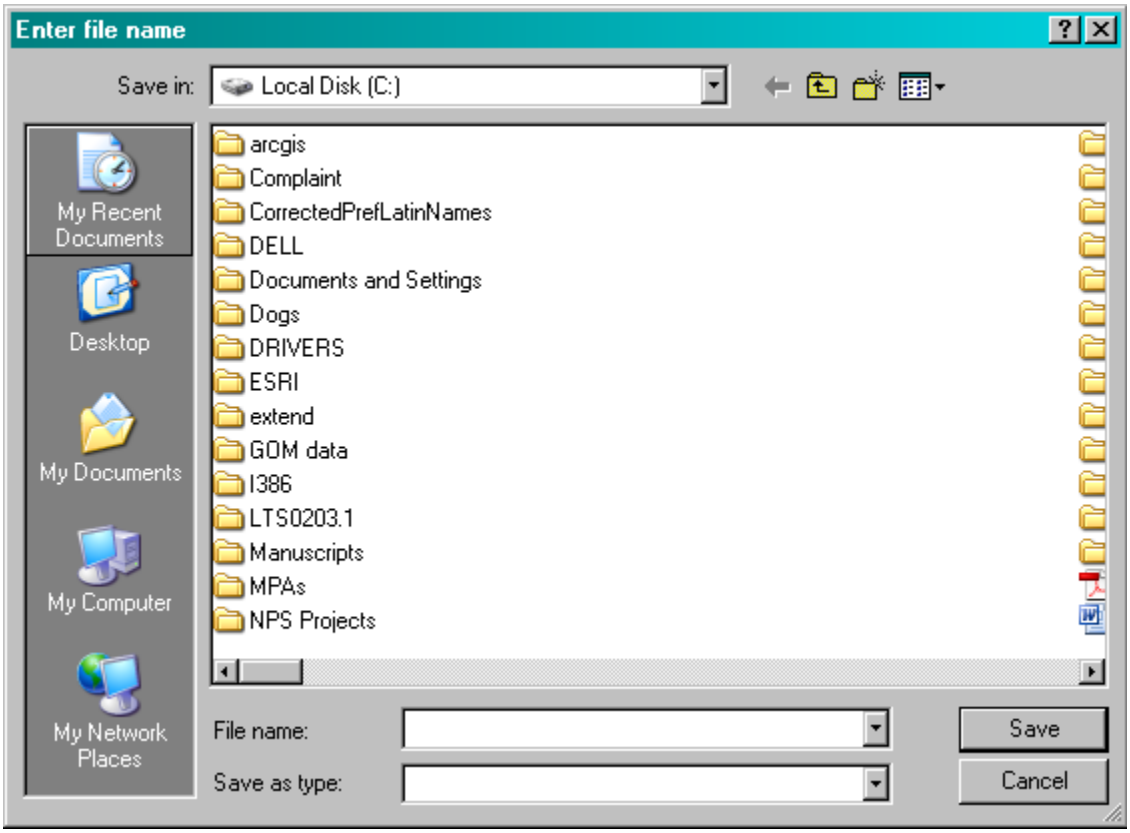
Raw data can be exported to an Excel workbook. Click the Export button to open the following form.



Next, select the data set you would like to export. Data sets can include All raw data records, or only data records for one or more parks, waterbodies, (as defined by Local Waterbody name), or stations. Selecting station grouping variable will display all values of that group in the listbox on the right side of the form. In the example below, the station variable was selected. The Raw Data Table contains data for two stations as listed. A single station can be selected or multiple stations selected by holding down the Ctrl key and clicking on the names.



Next, enter a date range for the records you wish to export and click the Export button at the bottom of the form. The following window will appear. Navigate to the folder you wish to store the exported file and enter a name for it. Then click Save.

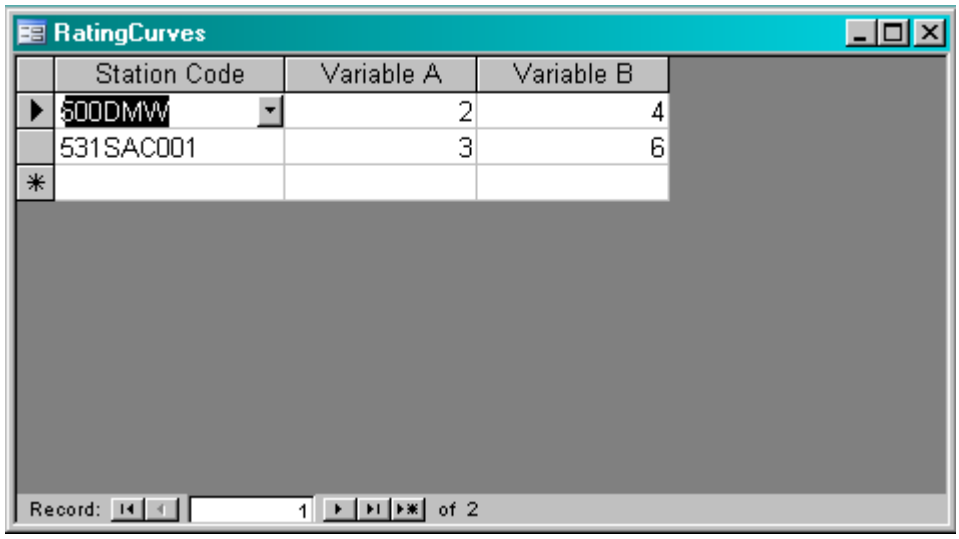


6.2. Rating Curves

A unique rating curve can be applied to each station. In the database, a table called RatingCurves stored the station code and values of the variables used to define the rating curve function. These can be accessed through the main Streamflow Form under the Rating Curves label.

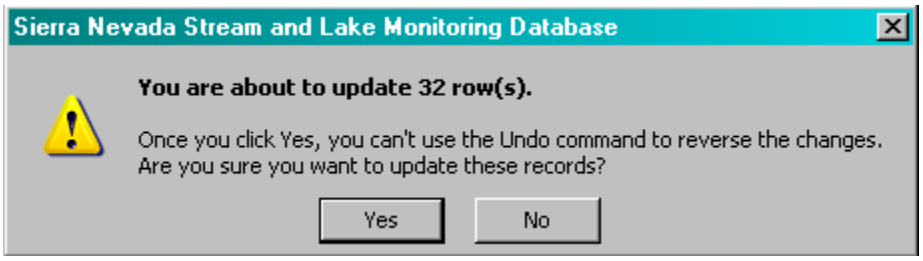
6.2.1. Setting Up

Click the Set Up button to open the RatingCurves table. It will appear as below. You can edit the Station Code field by selecting from the dropdown list of station code values that appear in the combobox when you right-click inside the StationCode field on a record. The source of these values is the Station Code Lookup Table. You can edit each of the variable fields to define a function for the associated station.

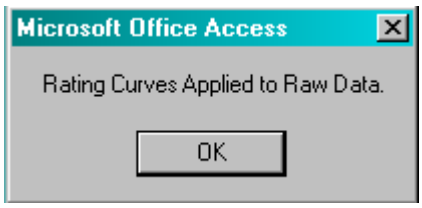


6.2.2. Applying

Once the variables for the rating curve functions have been defined, they can be applied to the Raw Data records by clicking the Apply button. The procedure that is run will perform the calculations and update the CalculatedSpeed field in the Raw Data Table. The database will display a dialog box showing how many records will be updated. Only records without existing CalculatedSpeed values will be updated (i.e., calculations performed and added to records). To recalculate a CalculatedSpeed value, erase the value from the record (Add/Edit Raw Data) and run the procedure.



If the update is successful, the following dialog box will appear.

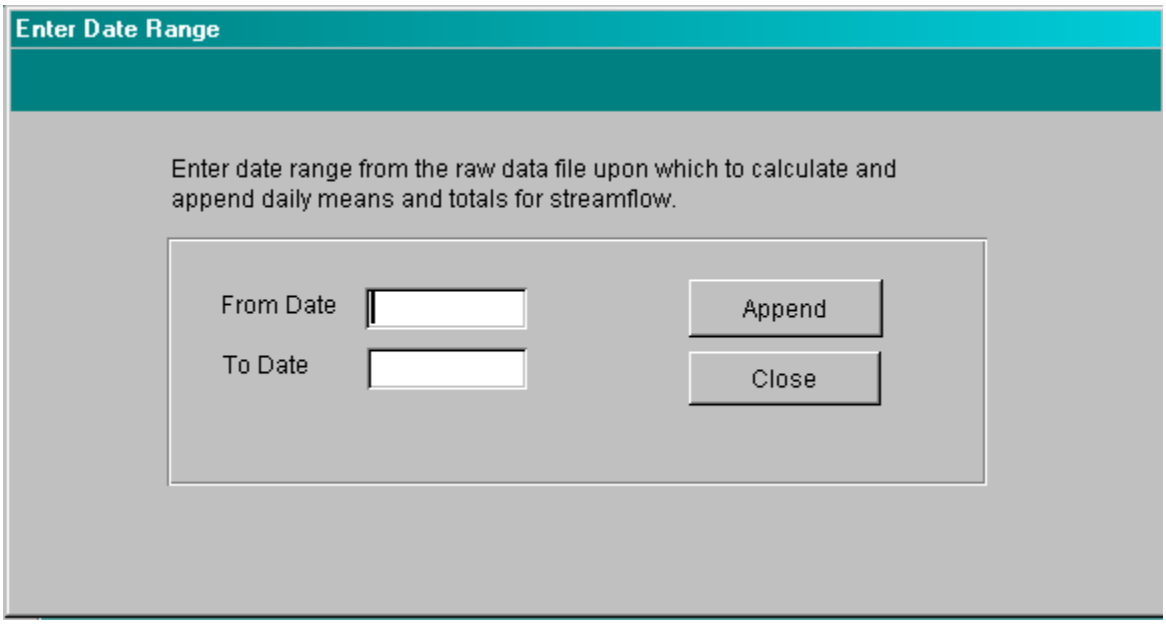


View the results by clicking on the View/Edit button under the Raw Data label.

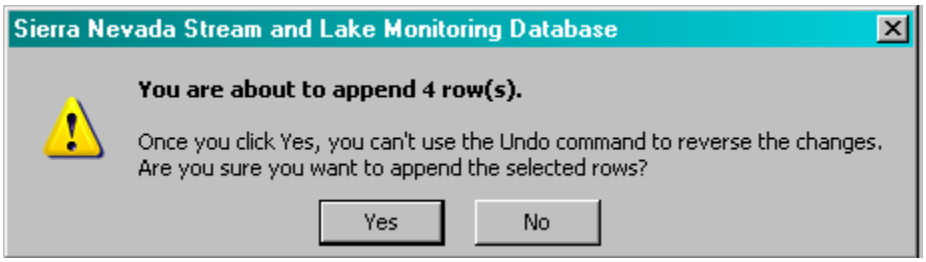
6.3. Daily Means and Totals

6.3.1. Calculating

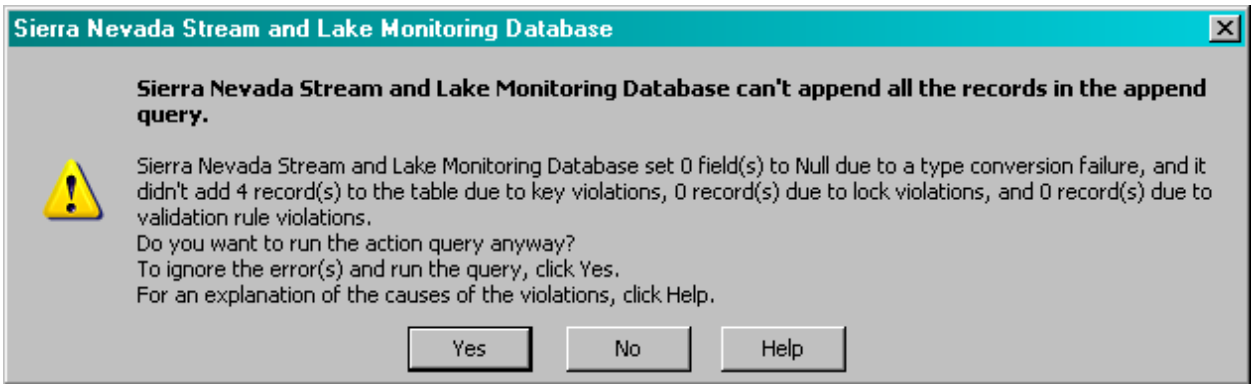
Click the Calculate button under Daily Means and Totals. This will display the following form. Use this form to perform the calculations and add the calculated value records to the DailyTotals table.



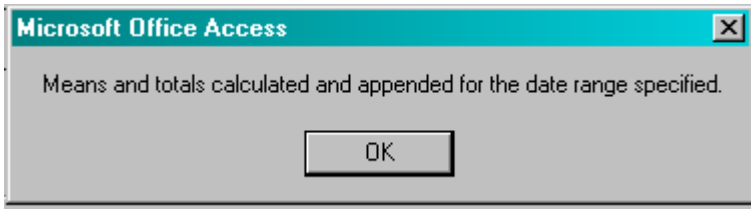
Enter the range of dates (inclusive) for which you wish to perform the calculations and click Append, or Close to exit. The following dialog box will display the number of days for which calculations will be performed and for which records will be added to the DailyTotals table.



If the DailyTotals table already contains records for any of these days (you have already performed the calculations), you will see an error message like the following:

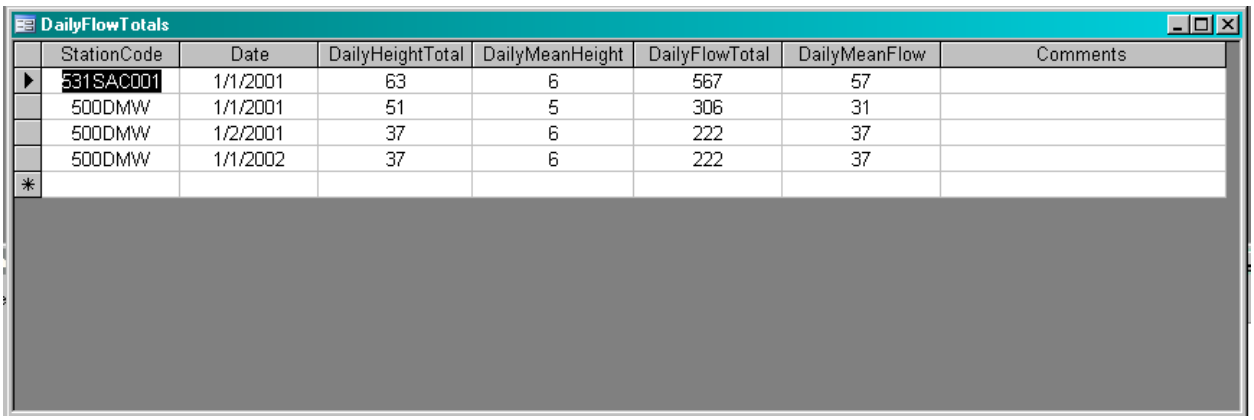


This shows you that 4 key violations have occurred in this example. That means that daily totals and means have already been calculated for the 4 days represented by the date range specified above and have records in the DailyTotals table. If you wish to recalculate any of these values, open the DailyTotals table (see Viewing/Editing below) and delete the records. If no error has occurred, the following message will appear.



6.3.2. Viewing/Editing

Click the View/Edit button under the Daily Totals and Mean label to open the DailyTotals table. Here, you can make edits directly to the calculated values if needed and enter comments, but you cannot change the station code or date values. To recalculate a set of values for a station and date, delete the record and perform the calculation procedure described above.

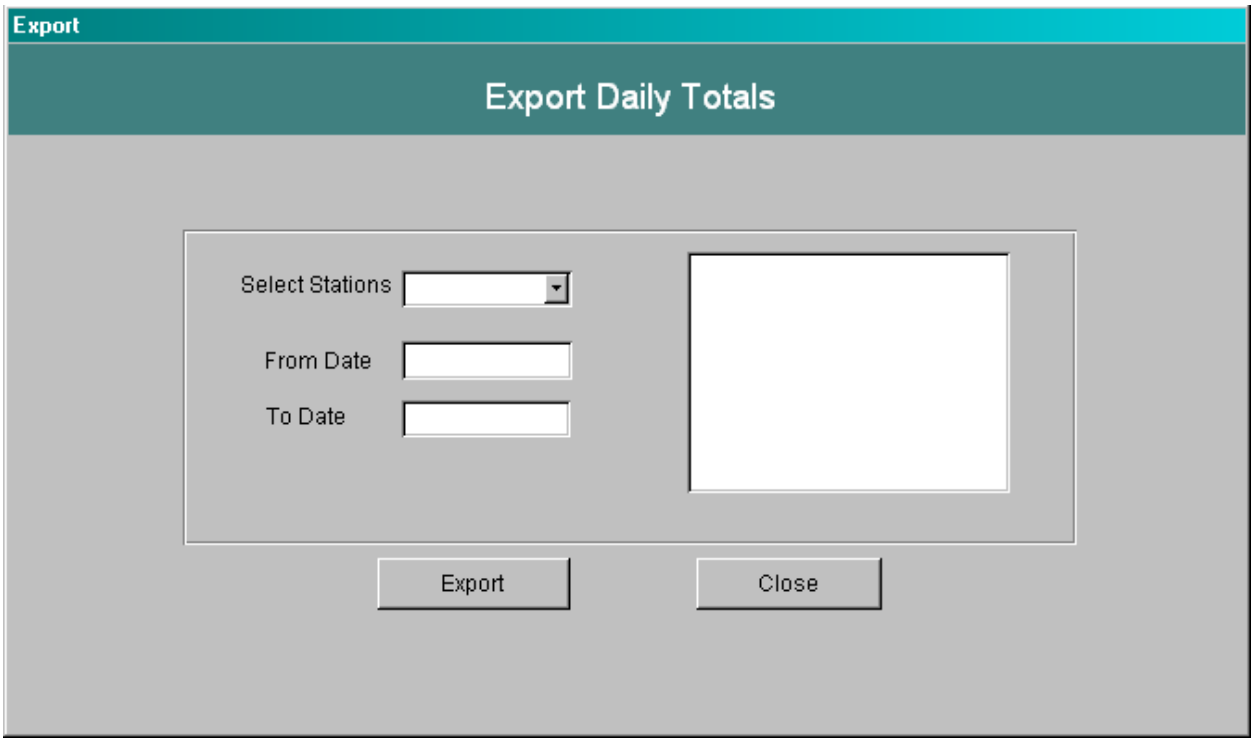


DailyFlowTotals

StationCode	Date	DailyHeightTotal	DailyMeanHeight	DailyFlowTotal	DailyMeanFlow	Comments
531SAC001	1/1/2001	63	6	567	57	
500DMW	1/1/2001	51	5	306	31	
500DMW	1/2/2001	37	6	222	37	
500DMW	1/1/2002	37	6	222	37	

6.3.3. Exporting

Export Daily Totals and Means as described above for Raw Data. Click the Export button to open the following form, and specify a data set and date range.



Appendix SOP 13.A. SWAMP Laboratory File and Batch Naming Conventions

FILE NAME CONVENTION:

Regions_Matrix_Analyses_LabAgency_XXXXX_SampleDates

XXXXX = Lab specific (same as in batch name)

Examples:
R2_S_Hg_MPSL_Dig15_Jan_Apr04

R2_7_9_T_OCH_PCB_PAH_WPCL_L-142-149-02_Sept03

R4_7_W_TOX_GC_97MGSWI_Jul02

BATCH NAME CONVENTION:

LabAgency_XXXXX_Matrix_Analysis

XXXXX = Lab specific (same as in file name)

Examples:
MPSL_Dig15_S_Hg

WPCL_L-142-149-02_T_OCH

GC_97MGSWI_W_TOX

AMS_051603-01_S_GS

SFL_82122_W_CHL

CRG_2341_W_BAC

Appendix SOP 13.B. Example Acronym List (from database lookup tables)

LAB AGENCIES	
Applied Marine Sciences, Inc.	AMS
Babcock	BAB
California Laboratories Services	CLS
CRG Marine Labs	CRG
DFG-Marine Pollution Studies Lab	MPSL
DFG-Water Pollution Control Lab	WPCL
Sierra Foothill Laboratory, Inc.	SFL
UCD-ATL	ATL
UCD-GC	GC

CONVENTIONAL WATER CHEM ANALYSES	
Alkalinity as CaCO3	ALK
Ammonia as N	NH3
Biological Oxygen Demand	BOD
Boron	B
Chemical Oxygen Demand	COD
Chloride	CL
Chlorophyll a	CHL
Dissolved Organic Carbon	DOC
Fluoride	F
Hardness as CaCO3	HARD
Nitrite as N	NO2
Nitrate as N	NO3
Nitrate + Nitrite as N	NO3+2
Orthophosphate as P	OPO4
Perchlorate	ClO4
Pheophytin a	PH
Phosphorous, Total as P	TPHOS
Sulfate	SO4
Suspended Sediment Conc.	SSC
Total Dissolved Solids	TDS
Total Kjeldhal Nitrogen	TKN
Total Organic Carbon	TOC
Total Suspended Solids	TSS

SEDIMENT PHYSICAL CHAR. ANALYSES	
Grain Size	GS

TRACE METAL CHEMISTRY ANALYSES	
Mercury	Hg
Selenium	Se

MATRICES	
Interstitialwater	I
Sediment	S
Tissue	T
Water	W

Trace Metals – High Salinity	TMHS
Trace Metals – Low Salinity	TMLS

ORGANIC CHEMISTRY ANALYSES	
BTEX-MTBE	BTEX
Carbamates	CARB
Chlorothalonil/PCNB	C-PCNB
ELIZA - Chlorpyrifos/Diazinon	EL-OP
Glyphosate	GLY
Organochlorine Pesticides	OCH
Organophosphate Pesticides	OP
Polychlorinated Biphenyls Congeners	PCB
Polynuclear Aromatic Compounds	PAH
Pentachlorophenol/Trichlorophenol	PCP-TCP
Pyrethroids / Pyrethrins	PYD-PYN
Surfactants	SURF
Tributyltin / Dibutyltin	TBT
Triazines	TRIAZ
Volatile Organic Compounds	VOC

TOXICITY ANALYSES	
All analyses	TOX

BACTERIA ANALYSES	
All analyses	BAC

Appendix SOP 13.C. Access to Statewide SWAMP Data

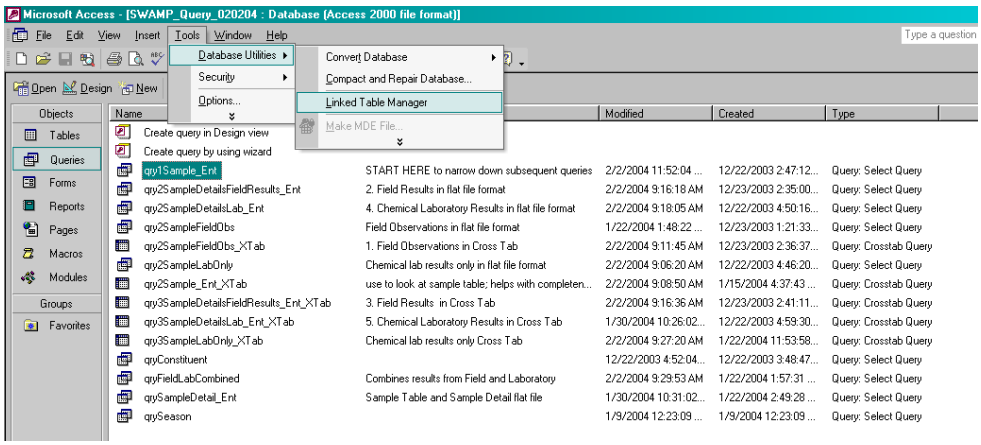
The SWAMP Database stores a great deal of data representing water quality programs throughout the State of California. It exists not only as a tool to store the data, but to extract and analyze data for a variety of purposes. To accommodate the needs of the various parties desiring access to the data, a Query Tool has been created. This tool provides read-only access to the database and allows users to run existing standard queries as well as create their own queries of the SWAMP database.

C.1 Query Tool Program and Database Set-up

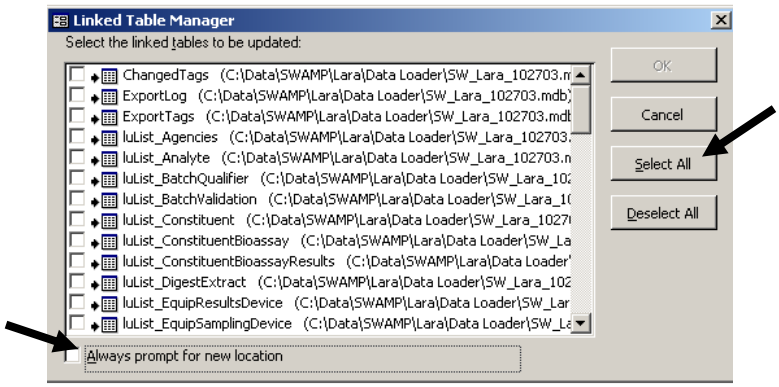
Upon receipt of the Query Tool program from the SWAMP DMT, save it to the SWAMP Database folder set up on the designated system. It is highly recommended that it also be saved in a "backup" folder of some type. It is possible when manipulating queries within the Query Tool that users make changes that they then cannot reverse when they want. If there is a backup on the system, it prevents users from having to contact the SWAMP DMT for a replacement. Of course, if necessary, the SWAMP DMT will provide replacements if requested.

The first thing that must be done is to link the Query Tool to the latest version of the database.

1. First, locate the Query Tool in the SWAMP Database folder. It will be named with the format of SWAMP_Query_DATE. Open the Query Tool program by double-clicking on the name.
2. A login box will appear. Type **fido** into the Name text box with no password and click **Okay**. The query program will open.
3. Link the Query Tool to the latest version of the database through the following steps:
    a. Select Tools from the MSAccess toolbar.



b. Select Database Utilities.
c. Select Linked Table Manager, which will cause the Linked Table Manager window to appear.



d. Mark the box at the bottom of the window which states “Always prompt for new location”.
e. Select the button “Select All”.
f. Click **OK**. A dialog box will appear with the message “Select New Location of Changed Tags”.
g. Browse to the appropriate file location on the computer and select the new database, which should be formatted as SW_DB_RegX_DATE.mdb (where X is the appropriate region number). The program will perform the function of linking the program to the database tables.
h. When the message “All selected linked tables were successfully refreshed” appears, click **OK** and then click **Close** on the Linked Table Manager window to complete the process.
i. Compact the database by selecting Tools from the Menu, then Compact and Repair Database (be sure not to pick “Convert Database”). The tables will disappear when the process is occurring. When they reappear, the Query Tool is ready to be used. If this does not occur as described above and an error appears, contact the SWAMP DMT for assistance.

C.2 Standard Query Overview

Standard Queries have been created to allow users to report on the data in the database without having to have specific knowledge of Access or of writing queries. There are three types of Standard Queries in the Query Tool. These are the Single-Table Queries, Combined Queries and Cross-tab Queries and are described below

These queries can be used for a variety of purposes other than analyzing results of field or laboratory work. They can be used to verify completeness of data from a particular project or sample design, as well as for quality assurance purposes.

C.2.1 Single-Table Queries

The first type of Standard Query found in the Query Tool is a Single-table query. Each query involves only a single table and displays all information within that table in a flat-file format.

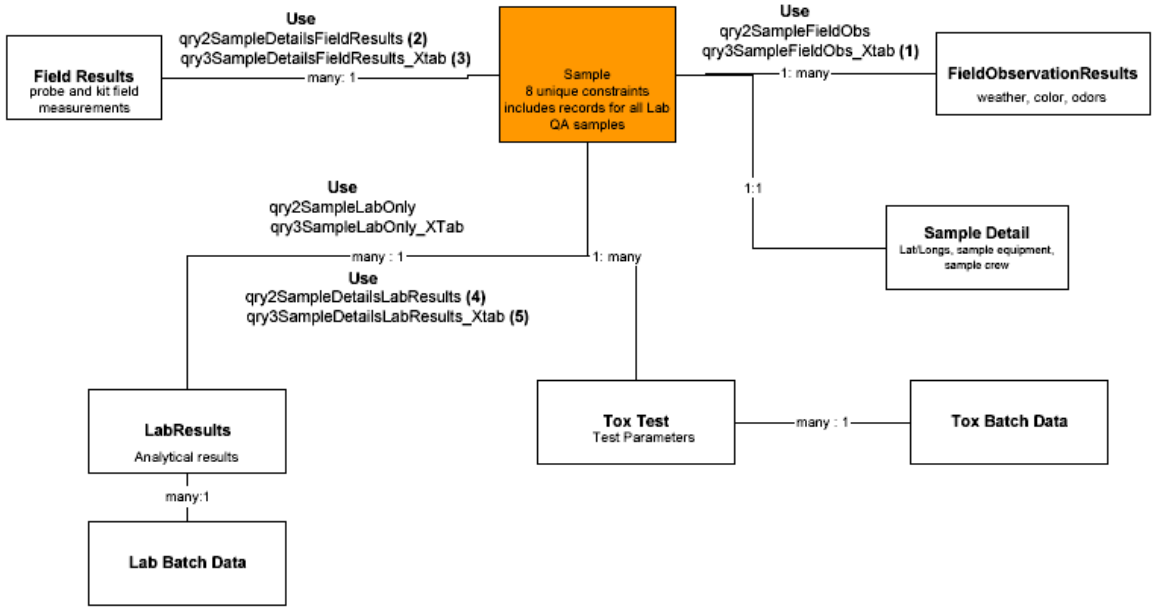
C.2.1.1 Sample Query

The Sample Query extracts data from the Sample Table to provide a high-level flat file view of the samples now in the database for all projects, regions and locations.

C.2.1.2 Sample Relationships

The structure of the database is sample-driven, meaning that all data relates back to a single sample, regardless of additional relationships. Consequently, the primary query is the Sample Query, on which all other Standard Queries depend.

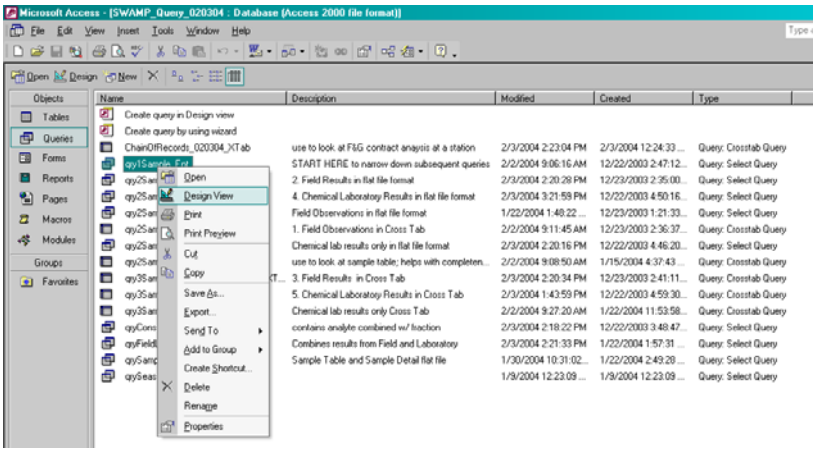
Fig. X Simplified diagram of relational data tables in SWAMP database. Associated query names are shown between sample and related table. Query names with "Details" have "sample details" information built into the query.



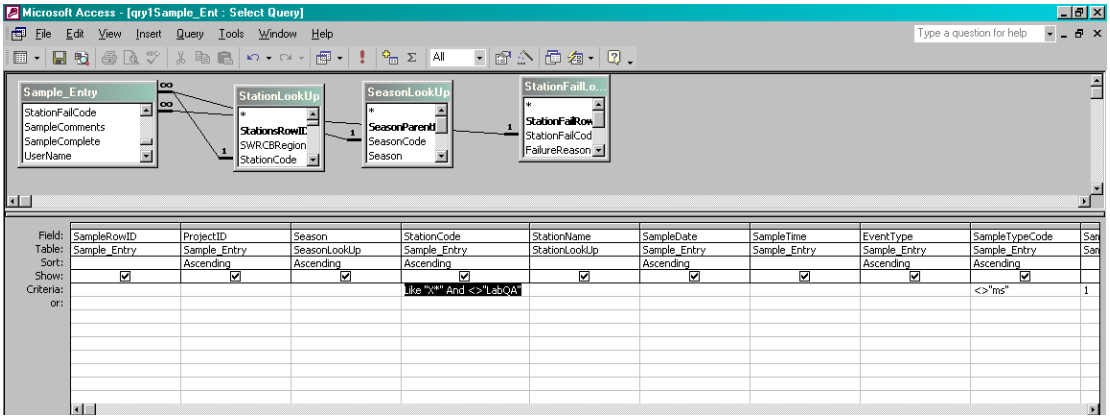
C.2.1.3 Restricting Sample Data

In many cases, the agency using the Query Tool will want to limit reports to a subset of the data in the SWAMP database, such as a single region. To restrict the query results to those of a specific region, start with the Sample Query.

1. Once the Query Tool is open, select the Sample Query, named qry1Sample_Ent, from the list.

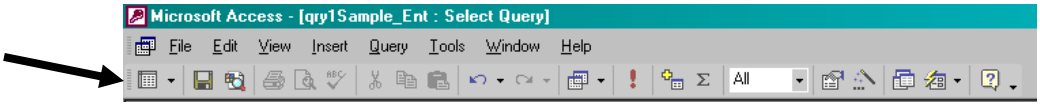


2. Right-click on the Sample Query file name using the mouse.
3. Click Design View to open the query design
4. On the bottom half of the window, locate the column for *StationCode*.
5. Within the *StationCode* column in the row for *Criteria* the statement <>**"LABQA"** appears, which restricts QA data from appearing in the queries. (To view all QA samples, remove this statement, although this is not recommended.) Place the cursor immediately to the left of the statement <>**"LABQA"** within the *StationCode* column.



6. Type **Like "X*" and** (plus a space) with X being the region for which the data is requested. The asterisk tells the database to provide all data for Station Codes beginning with the number input as criteria.
7. Place the cursor in any other field to activate the criteria.
8. On the toolbar, click the **Save** icon to save the changes made.

9. On the toolbar, click the View option on the left of the toolbar

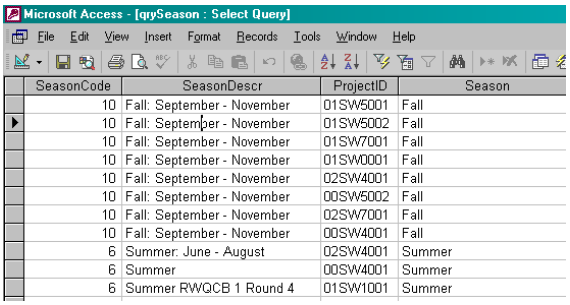


10. The Sample Query will appear with only the desired data. As all other Standard Queries are based upon the Sample Query, all other queries will also now be similarly restricted.

Please note that the Sample Query is distributed with automatic restrictions for ease of use. It excludes QA Samples, such as Lab or Method Blanks, Matrix Spikes and any Sample Replicates or splits. Although not recommended for general viewing of sample data, these restrictions may be removed using the Sample Query Design View.

C.3 Season Query

The Season Query (qrySeason) provides a view on the various Seasons in the SWAMP Database as they relate to individual Project IDs as well as the full description of each Season Code.



SeasonCode	SeasonDescr	ProjectID	Season
10	Fall: September - November	01SW5001	Fall
10	Fall: September - November	01SW5002	Fall
10	Fall: September - November	01SW7001	Fall
10	Fall: September - November	01SW0001	Fall
10	Fall: September - November	02SW4001	Fall
10	Fall: September - November	00SW5002	Fall
10	Fall: September - November	02SW7001	Fall
10	Fall: September - November	00SW4001	Fall
6	Summer: June - August	02SW4001	Summer
6	Summer	00SW4001	Summer
6	Summer RWQCB 1 Round 4	01SW1001	Summer

C.4 Combined Queries

The second type of query combines the basic information in the Sample Table with information in one or more of the other tables, providing a view of all associated types of data. As stated earlier in this document, any restrictions placed on the Sample query (qrySample_Ent) will also apply to these queries. Combined Queries are displayed in a flat file, or vertical format.

- Sample/Sample Details/Field Results Query (qry2SampleDetailsFieldResults_Ent): This query combines sample information with Field Probe Results in a flat file or vertical format along with associated Sample Details information, such as field equipment used, latitude and longitude of sample taken, etc.
- Sample/Sample Details/Lab Results Query (qry2SampleDetailsLab_Ent): This query primarily shows Chemistry and Bacteria Laboratory Results in a flat file format along with associated Sample Details information, such as field equipment used, location of sample taken, etc.
- Sample/Field Observations Query (qry2SampleFieldObs): This query primarily shows Field Observations Results for selected samples in a flat file format.

- Sample/Lab Results Query (qry2SampleLabOnly): This query details the Chemistry and Bacteria Laboratory Results for selected samples in a flat file format.
- Sample/Field Results/Lab Results Query (qryFieldLabCombined): This query shows both Field Results and Chemistry or Bacteria Laboratory Results for selected samples in a flat file format.
- Sample/Sample Details Query (qrySampleDetail_Ent): This query shows Sample Details data for selected samples in a flat file format.

C.5 Cross-tab Queries

The last type of Standard Query is a cross-tab query based on the Combined Queries. For each of the Type 2 combined queries, there will be a Type 3 cross-tab query which allows the user to view the data in a summarized and horizontal rather than vertical manner. Users should note that any modifications made and saved to a Combined Query will be reflected in the corresponding Cross-tab Query.

- Sample Table Cross-tab Query (qry2Sample_Ent_XTab): This query displays the information in the Sample Table in a cross-tab format.
- Sample/Field Observations Cross-tab Query (qry2SampleFieldObs_XTab): This query primarily shows Field Observations Results for selected samples in a cross-tab format.
- Sample/Sample Details/Field Results Cross-tab Query (qry3SampleDetailsFieldResults_Ent_XTab): This query primarily shows Field Probe Results in a cross-tab format with the added information provided with the Sample Details information, such as field equipment used, location of sample taken, etc.
- Sample/Sample Details/Lab Results Cross-tab Query (qry3SampleDetailsLab_Ent_XTab): This query primarily shows Chemistry and Bacteria Laboratory Results in a cross-tab format with the added information provided with the Sample Details information, such as field equipment used, location of sample taken, etc.
- Sample/Lab Results Cross-tab Query (qry3SampleLabOnly_XTab): This query details the Chemistry and Bacteria Laboratory Results for selected samples in a cross-tab format.

C.6 Working with the Queries

Many options are possible while accessing the various queries in the Query Tool. While this document strives to provide the basic information for viewing data, it is highly recommended that users wanting more instruction take a class in Microsoft Access.

Data are displayed for each of the fields within the requested tables in no specific order or with no specific emphasis. Data can be reordered or further filtered quickly without having to access the Design View.

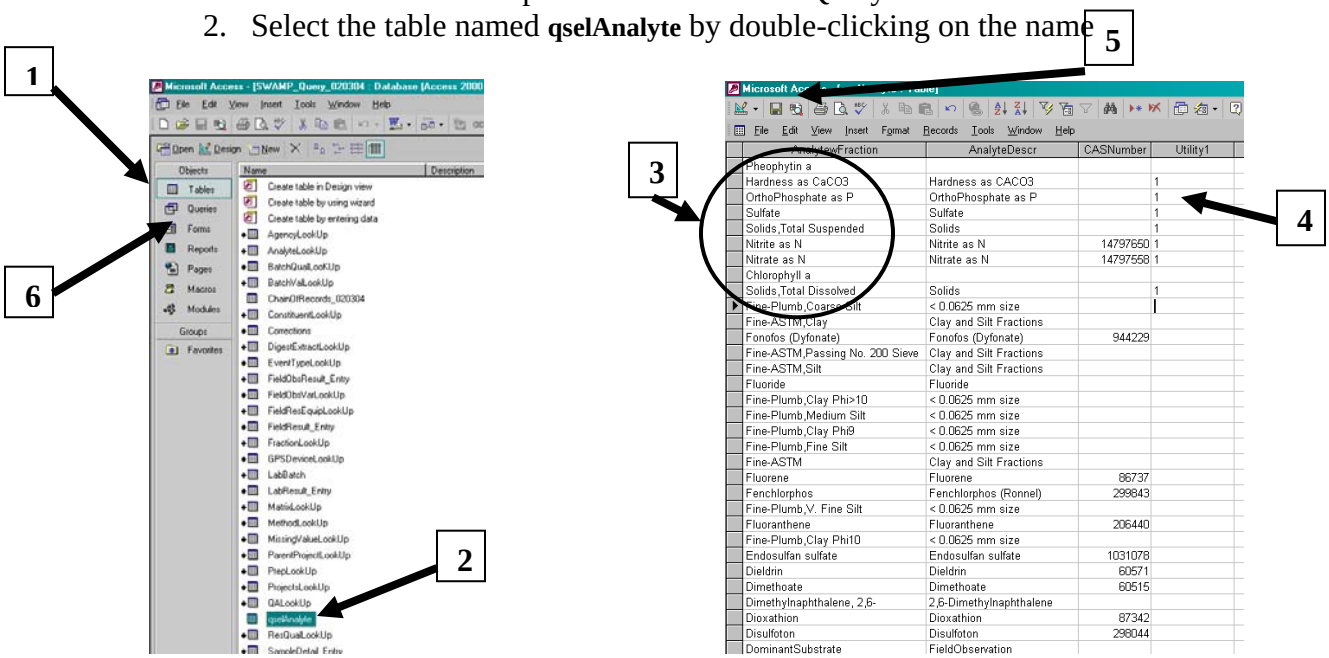
- To view the results of any query, double-click on that query name.

C.6.1 Restricting Analyte Data

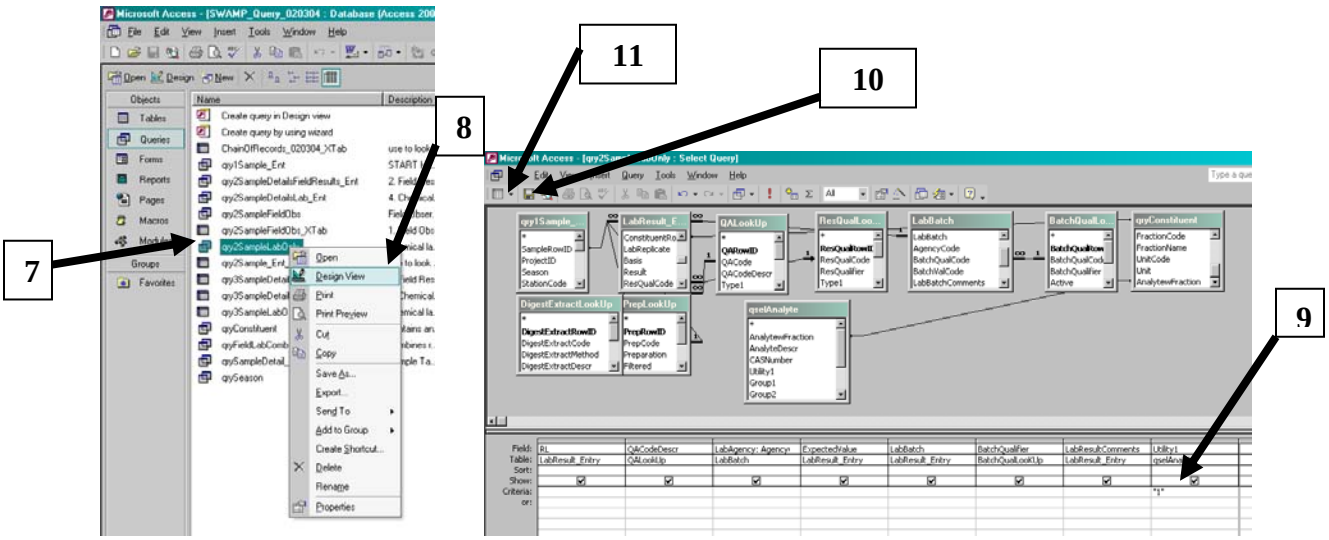
The SWAMP Database contains over 450 different analytes (parameters) that are analyzed, measured or observed. Users may want the option to limit the analytes that appear in a query for one reason or another, such as to a particular grouping like "Nutrients".

To limit analytes that will appear in a query:

1. Select the "Tables" option at the left of the Query Tool.
2. Select the table named **qselAnalyte** by double-clicking on the name



3. Find those analytes to appear in the query.
4. Type the number **1** in the field Utility1 for each of the desired analytes.
5. Click **Save** (or type **Control+S** on the computer's keyboard) to save the changes.
6. Select the "Queries" option at the left of the Query Tool.

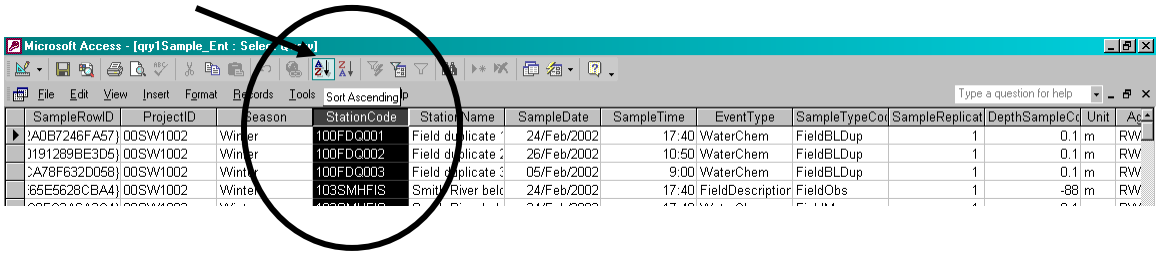


7. Select the desired query to be run.
8. Right-click on the query name and select Design View from the available options.
9. Within the query design, scroll to the farthest right field, called Utility1. In the criteria field beneath Utility1, type the number **1**. Unclick the check box in the row called "Show". This will prevent the 1 from displaying in the query. **Please note that ANY changes made to this query will apply to ALL queries in the Query Tool that display analytes**.
10. Click the **Save** icon on the toolbar (or type **Control+S** on the keyboard) to save changes.
11. Click on the Spreadsheet View icon on the toolbar to view the query results with only those selected analytes shown.

C.6.2 Reorder Data

Reordering or sorting is a common need while viewing query results. To reorder the data once the query is open:

1. Highlight the column by which the data should be sorted. For instance, to sort by Station Code, highlight the Station Code column.
2. Sort Data:
    a. To sort in **ascending** order, click the button on the toolbar which shows the letters A and Z with the A on top and arrow. This will sort all data in ascending order according to the Station Code.
    b. To sort in **descending** order, click the button on the toolbar which shows the letters A and Z with the Z on top and arrow. This will sort all data in decending order according to the Station Code.

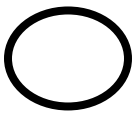


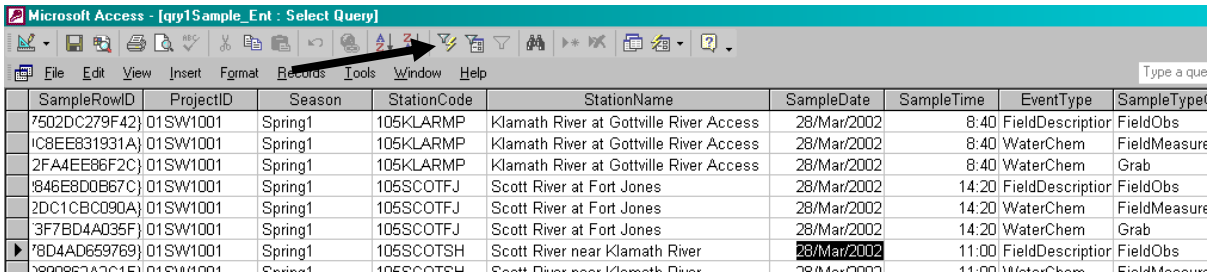
Data may also be sorted in groups by following the above steps but highlighting multiple adjacent columns together. Such a sort would order the data by the first highlighted column, then the second and on through to the last highlighted column.

C.6.3 Filter Data

It is often necessary to filter data while viewing query results. To do so, open the desired query by double-clicking on that query name.

1. Select the criteria for which the data should be filtered. For instance, to view only data sampled on a single date, place the cursor in a cell containing that date.
2. On the toolbar, click the button that looks like a lightening bolt. This will cause the data only for that date selected to be displayed.





SampleRowID	ProjectID	Season	StationCode	StationName	SampleDate	SampleTime	EventType	SampleTypeC
7502DC279F42}	01SW1001	Spring1	105KLARMP	Klamath River at Gottville River Access	28/Mar/2002	8:40	FieldDescriptior	FieldObs
1C8EE831931A}	01SW1001	Spring1	105KLARMP	Klamath River at Gottville River Access	28/Mar/2002	8:40	WaterChem	FieldMeasure
2FA4EE86F2C}	01SW1001	Spring1	105KLARMP	Klamath River at Gottville River Access	28/Mar/2002	8:40	WaterChem	Grab
846E8D0B67C}	01SW1001	Spring1	105SCOTFJ	Scott River at Fort Jones	28/Mar/2002	14:20	FieldDescriptior	FieldObs
2DC1CBC090A}	01SW1001	Spring1	105SCOTFJ	Scott River at Fort Jones	28/Mar/2002	14:20	WaterChem	FieldMeasure
3F7BD4A035F}	01SW1001	Spring1	105SCOTFJ	Scott River at Fort Jones	28/Mar/2002	14:20	WaterChem	Grab
8D4AD659769}	01SW1001	Spring1	105SCOTSH	Scott River near Klamath River	28/Mar/2002	11:00	FieldDescriptior	FieldObs

3. It is possible also to filter for a specific month by highlighting only that desired month' name within the date.

Other suggested filters: Highlight the word Water within EventType to view only and all samples with the event type WaterChem WaterTox or WaterTox_Chem; highlight the first two digits of the ProjectID to filter on Project Year.

To release all filters created in this manner, click the funnel-shape in the toolbar.

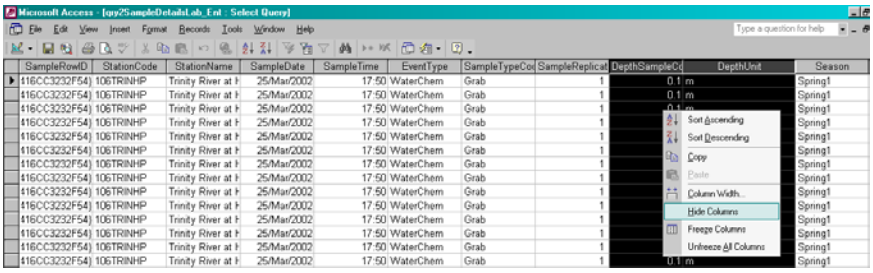
C.6.4 Format Data

Data is formatted by default in the order of the fields' positions within the database tables. There are many options for either lessening the data displayed or changing the order in which it is displayed, making it easier to view and analyze within a set of query results. This document currently discusses three of those options: Hide Columns, Freeze Columns and Move Columns.

C.6.4.1 Hide Columns

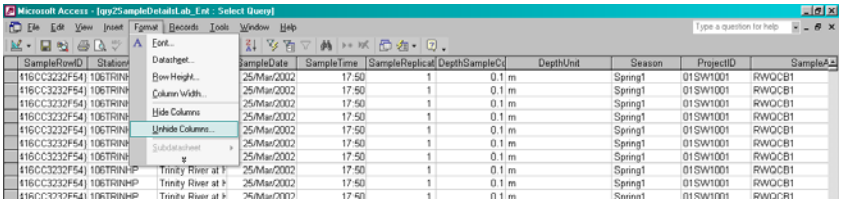
Within the query results, there may be some individual fields that the user does not need to view. These fields can simply be hidden without changing the results of the query. To do so:

1. Select the column or adjacent columns to hide.
2. Right-click with the mouse to bring up editing options.
3. Select the option Hide Columns and those columns will disappear.
4. Repeat this for each column or adjacent set of columns to be hidden from view.

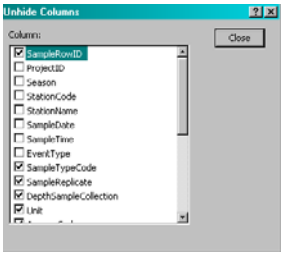


To UNHIDE columns previously hidden:

1. Select the Format option from the toolbar within the query.
2. Select the option Unhide Columns.



3. Another window will appear which says "Unhide Columns" showing each of the columns of the query listed with a checkbox to the left. Check the box next to all columns to be unhidden. This will cause all hidden columns to reappear.

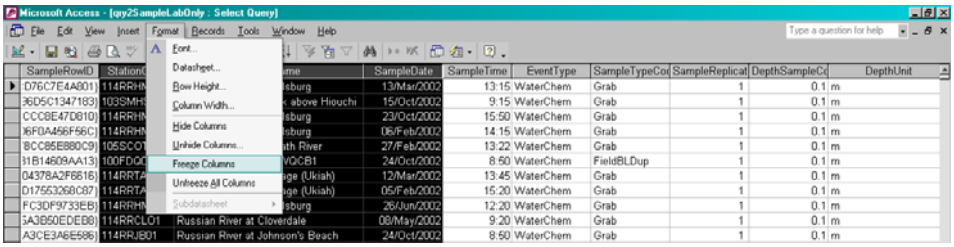


C.6.4.2 Freeze Columns

When viewing data that extends vertically on the page further than the computer's monitor size, it is helpful to "freeze" some columns so that the data is easier to analyze. For instance, a user may want to "freeze" the Station Code and Sample Date columns while viewing laboratory results data. Columns that are frozen will stay in place while the user tabs or scrolls to the right or left to view additional fields.

To freeze columns:

1. Select the column(s) to be frozen by highlighting from the field name.
2. Select the Format option from the toolbar within the query.
3. Select the option Freeze Columns. Those columns will now remain stationary while the user scrolls through the query.



To UNFREEZE columns:

1. Select the Format option from the toolbar within the query.
2. Select the option Unfreeze All Columns. Columns will no longer be frozen, or stationary.

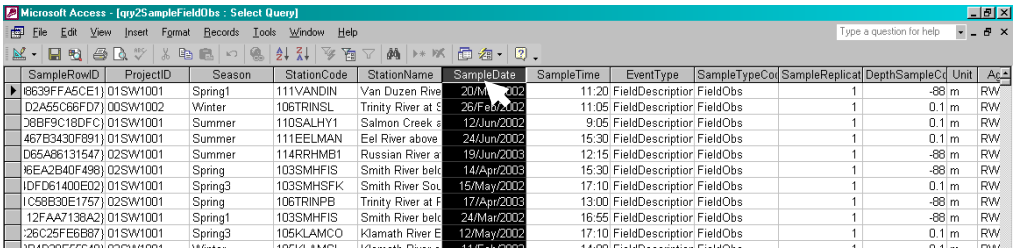
C.6.4.3 Move Columns

Entire columns within query results may be moved around throughout the results display. This is often helpful when seeking to sort data by multiple columns that are not adjacent.

To move columns:

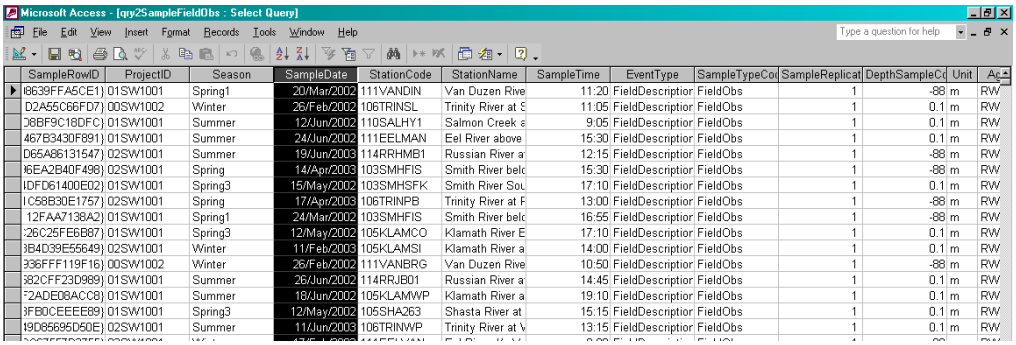
1. Select the column to be moved by highlighting from the field name.
2. Place the cursor which should appear as an arrow over the field name of the highlighted column and click with the left mouse button, holding down on the button.

Before Move



SampleRowID	ProjectID	Season	StationCode	StationName	SampleDate	SampleTime	EventType	SampleTypeCo	SampleReplicat	DepthSampleCo	Unit	Ac
{8639FFA5CE1}	01SW1001	Spring1	111VANDIN	Van Duzen Rive	20/M 002	11:20	FieldDescriptior	FieldObs	1	-88	m	RW
D2A55C66FD7}	00SW1002	Winter	106TRINSL	Trinity River at S	26/Feb/2002	11:05	FieldDescriptior	FieldObs	1	0.1	m	RW
08BF9C18DFC}	01SW1001	Summer	110SALHY1	Salmon Creek a	12/Jun/2002	9:05	FieldDescriptior	FieldObs	1	0.1	m	RW
467B3430F891}	01SW1001	Summer	111EELMAN	Eel River above	24/Jun/2002	15:30	FieldDescriptior	FieldObs	1	0.1	m	RW
D65A86131547}	02SW1001	Summer	114RRHMB1	Russian River a	19/Jun/2003	12:15	FieldDescriptior	FieldObs	1	-88	m	RW
6EA2B40F498}	02SW1001	Spring	103SMHFIS	Smith River belc	14/Apr/2003	15:30	FieldDescriptior	FieldObs	1	-88	m	RW
DFD61400E02}	01SW1001	Spring3	103SMHSFK	Smith River Sou	15/May/2002	17:10	FieldDescriptior	FieldObs	1	0.1	m	RW
C58B30E1757}	02SW1001	Spring	106TRINPB	Trinity River at F	17/Apr/2003	13:00	FieldDescriptior	FieldObs	1	-88	m	RW
12FAA7138A2}	01SW1001	Spring1	103SMHFIS	Smith River belc	24/Mar/2002	16:55	FieldDescriptior	FieldObs	1	-88	m	RW
:26C25FE6B87}	01SW1001	Spring3	105KLAMCO	Klamath River E	12/May/2002	17:10	FieldDescriptior	FieldObs	1	0.1	m	RW

After Move



SampleRowID	ProjectID	Season	SampleDate	StationCode	StationName	SampleTime	EventType	SampleTypeCo	SampleReplicat	DepthSampleCo	Unit	Ac
{8639FFA5CE1}	01SW1001	Spring1	20/Mar/2002	111VANDIN	Van Duzen Rive	11:20	FieldDescriptior	FieldObs	1	-88	m	RW
D2A55C66FD7}	00SW1002	Winter	26/Feb/2002	106TRINSL	Trinity River at S	11:05	FieldDescriptior	FieldObs	1	0.1	m	RW
08BF9C18DFC}	01SW1001	Summer	12/Jun/2002	110SALHY1	Salmon Creek a	9:05	FieldDescriptior	FieldObs	1	0.1	m	RW
467B3430F891}	01SW1001	Summer	24/Jun/2002	111EELMAN	Eel River above	15:30	FieldDescriptior	FieldObs	1	0.1	m	RW
D65A86131547}	02SW1001	Summer	19/Jun/2003	114RRHMB1	Russian River a	12:15	FieldDescriptior	FieldObs	1	-88	m	RW
6EA2B40F498}	02SW1001	Spring	14/Apr/2003	103SMHFIS	Smith River belc	15:30	FieldDescriptior	FieldObs	1	-88	m	RW
DFD61400E02}	01SW1001	Spring3	15/May/2002	103SMHSFK	Smith River Sou	17:10	FieldDescriptior	FieldObs	1	0.1	m	RW
C58B30E1757}	02SW1001	Spring	17/Apr/2003	106TRINPB	Trinity River at F	13:00	FieldDescriptior	FieldObs	1	-88	m	RW
12FAA7138A2}	01SW1001	Spring1	24/Mar/2002	103SMHFIS	Smith River belc	16:55	FieldDescriptior	FieldObs	1	-88	m	RW
:26C25FE6B87}	01SW1001	Spring3	12/May/2002	105KLAMCO	Klamath River E	17:10	FieldDescriptior	FieldObs	1	0.1	m	RW
3B4D39E55649}	02SW1001	Winter	11/Feb/2003	105KLAMSI	Klamath River a	14:00	FieldDescriptior	FieldObs	1	0.1	m	RW
936FFF119F16}	00SW1002	Winter	26/Feb/2002	111VANBRG	Van Duzen Rive	10:50	FieldDescriptior	FieldObs	1	-88	m	RW
82CFF23D989}	01SW1001	Summer	26/Jun/2002	114RRJB01	Russian River a	14:45	FieldDescriptior	FieldObs	1	0.1	m	RW
F2ADE08ACC8}	01SW1001	Summer	18/Jun/2002	105KLAMWP	Klamath River a	19:10	FieldDescriptior	FieldObs	1	0.1	m	RW
3FB0CEEEE89}	01SW1001	Spring3	12/May/2002	105SHA263	Shasta River at	15:15	FieldDescriptior	FieldObs	1	0.1	m	RW
19D85695D50E}	02SW1001	Summer	11/Jun/2003	106TRINWP	Trinity River at V	13:15	FieldDescriptior	FieldObs	1	0.1	m	RW

3. While still clicked on the column heading, drag the column with the mouse to the desired position within the query. When it is in the desired position, it is no longer necessary to hold down on the mouse button.
4. Repeat for each column needing to be relocated. It is also possible to perform all of the above steps while highlighting and dragging multiple adjacent columns.

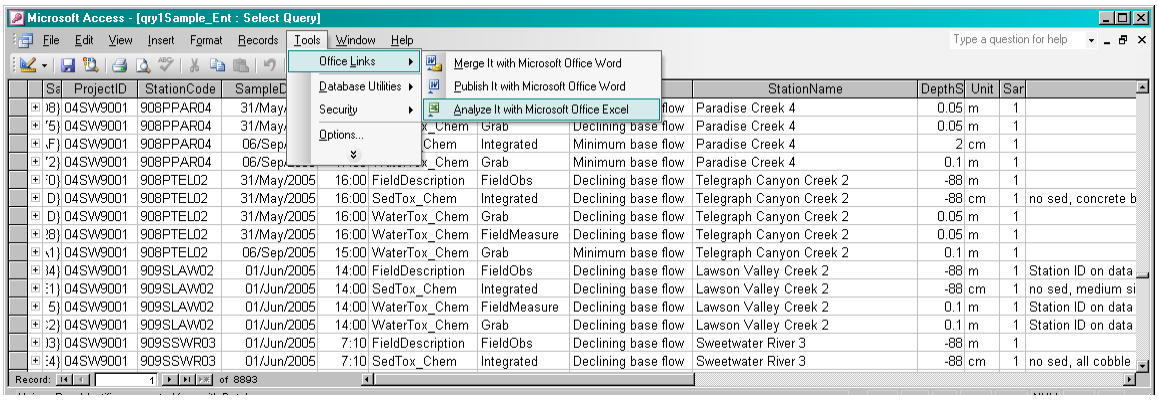
PLEASE NOTE: If the query is saved upon exit, the relocated column(s) will remain in their new locations, therefore changing the default layout of the query. To maintain the original layout of the query, do not save the format of the query when finished with it.

C.7 Exporting Data to Excel

For a variety of reasons, query users may want to see and manipulate the SWAMP data in Excel. There is a provision for doing so in the Access Query Tool.

To do so, once the query has been created,

1. Go to the Tools menu.
2. Select Office Links
3. Select Analyze it with Microsoft Excel



4. The computer's copy of Excel will open and transfer the data from the query into a spreadsheet, named with the name of the query.

Appendix SOP 13.D. Using the Query Tool to Verify and Validate Data

D.1. Checking for Completeness

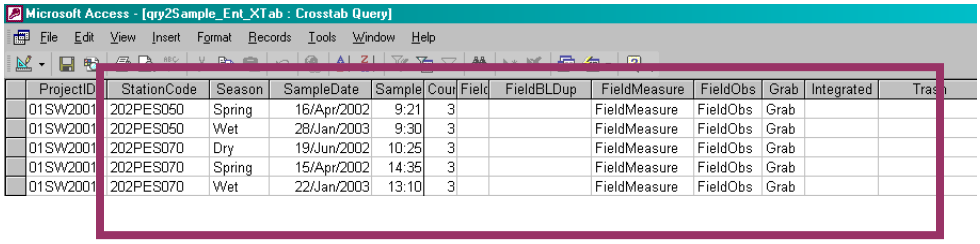
One goal of data analysis is to ensure that all data expected from a sample design or particular project have been loaded into the SWAMP Database. In many situations, data are being loaded from a variety of different sources, including Sampling Crews and multiple Chemistry and Toxicity labs. Some of the Standard Queries will help to determine whether all expected field and lab samples have been loaded into the database.

- Sample Table Cross-tab Query (qry2Sample_Ent_XTab)

This query provides a view of all samples and related Sample Types for easy viewing of missing sample types. For instance, each sample generally has a Field Observation, Field Measure and either Grab or Integrated entry associated. (Some may have both Grab and Integrated, if there are both water and sediment samples.) A viewing of this query can often point out 'holes' or duplicates in data that will then tell the User what needs to be tracked down for entry or resolution.

1. Be sure that the Sample Query has been limited as desired to that region and/or projects applicable. (See Appendix C.2.1.3)
2. Run the Sample Cross-tab query with the changes made in Step 1.
3. Scroll through the list of samples, noticing any missing Sample Type for a particular sample (station/date/time combination).
4. Change the sort criteria to begin with Station/Date/Time, then Project ID (or vice versa) to view the samples in more than one way. This often shows anomalies that otherwise would not be as evident. For assistance in re-sorting data, see Appendix C.6.2: Reorder Data.

A "complete"-looking sample will look like these below:



ProjectID	StationCode	Season	SampleDate	Sample	Cour	Field	FieldBLDup	FieldMeasure	FieldObs	Grab	Integrated	Tras
01SW2001	202PES050	Spring	16/Apr/2002	9:21	3			FieldMeasure	FieldObs	Grab		
01SW2001	202PES050	Wet	28/Jan/2003	9:30	3			FieldMeasure	FieldObs	Grab		
01SW2001	202PES070	Dry	19/Jun/2002	10:25	3			FieldMeasure	FieldObs	Grab		
01SW2001	202PES070	Spring	15/Apr/2002	14:35	3			FieldMeasure	FieldObs	Grab		
01SW2001	202PES070	Wet	22/Jan/2003	13:10	3			FieldMeasure	FieldObs	Grab		

Follow-up on Anomalous Samples: When all does not appear to be uniform during the Sample Cross-tab query, follow-up will be necessary. As a cross-tab query is a summary-type of query, users will need to access others of the queries to look into potential problems. For this Sample Cross-tab query, the user will want to access the Sample Query (qry1Sample_Ent) to find more details.

> *For example:* The top sample in the query window below appears to be complete for the 3 Sample Types, whereas the bottom sample appears to be missing a Field Measure.

Microsoft Access - [qry2Sample_Ent_XTab : Crosstab Query]

ProjectID	StationCode	Season	SampleDate	Sample	Cour	Field	FieldBLDup	FieldMeasure	FieldObs	Grab	Integrated
01SW4001	404SMB016	Spring	24/Mar/2003	16:15	2				FieldObs	Grab	
01SW400	404SMB017	Spring	11/Mar/2003	9:30	3			FieldMeasure	FieldObs	Grab	
01SW400	404SMB017	Spring	25/Mar/2003	15:30	2				FieldObs	Grab	
01SW4001	404SMB018	Spring	04/Mar/2003	16:40	3			FieldMeasure	FieldObs	Grab	
01SW4001	404SMB018	Spring	24/Mar/2003	16:40	2				FieldObs	Grab	
01SW4001	404SMB020	Spring	11/Mar/2003	10:00	3			FieldMeasure	FieldObs	Grab	
01SW4001	404SMB020	Spring	24/Mar/2003	17:05	2				FieldObs	Grab	
01SW4001	404SMB021	Spring	11/Mar/2003	11:00	3			FieldMeasure	FieldObs	Grab	
01SW4001	404SMB021	Spring	25/Mar/2003	16:15	2				FieldObs	Grab	

To discover more information, run the Sample Query by double-clicking on its name (qry1Sample_Ent). Locate the sample in question. Analyze the sample information, especially the Comments field, to determine whether there is documentation as to why the Sample Types are incomplete for this date.

In this example, the Sample Query does not show comments to help explain the anomaly.

Microsoft Access - [qry1Sample_Ent : Select Query]

ProjectID	Season	StationCode	StationName	SampleDate	SampleTime	EventType	SampleTypeCode	SampleComments
01SW4001	Spring	404SMB017	Escondido Canyon Creek Upper	25/Mar/2003	15:30	FieldDescription	FieldObs	
01SW4001	Spring	404SMB017	Escondido Canyon Creek Upper	25/Mar/2003	15:30	WaterChem	Grab	

Another resource for Sample Cross-tab questions is the Chain of Records Table if the project in question is part of the DFG Master Contract. Access this table by clicking Tables on the left side of the Query Tool, then double-clicking on Chain of Records_DATE.

Name	Description	Modified	Created	Type
BatchWalLookUp		4/9/2004 4:08:12 PM	4/9/2004 4:08:12 PM	Table: Linked Access
ChainOfRecords_020304		2/3/2004 12:23:41 PM	2/3/2004 10:29:57 ...	Table
ConstituentLookUp		4/9/2004 4:08:13 PM	4/9/2004 4:08:12 PM	Table: Linked Access
Corrections		4/9/2004 4:08:13 PM	4/9/2004 4:08:13 PM	Table: Linked Access
DigestExtractLookUp		4/9/2004 4:08:14 PM	4/9/2004 4:08:14 PM	Table: Linked Access

This is a complete listing of all samples scheduled through the DFG Contract and includes additional comments about sampling events and laboratory situations.

Once this table is opened, locate the sample in question. Again, look at the Comments field. Here (below), the comments explain that there was a problem with a previous grab sample that needed to be corrected in this later sampling. Probe measurements were not taken in the second sampling, explaining the missing Field Measure Sample Type. In this situation, it is a good idea to add the comments found in the Chain of Records table to the Sample Comments field.

Microsoft Access - [ChainOfRecords_020304 : Table]

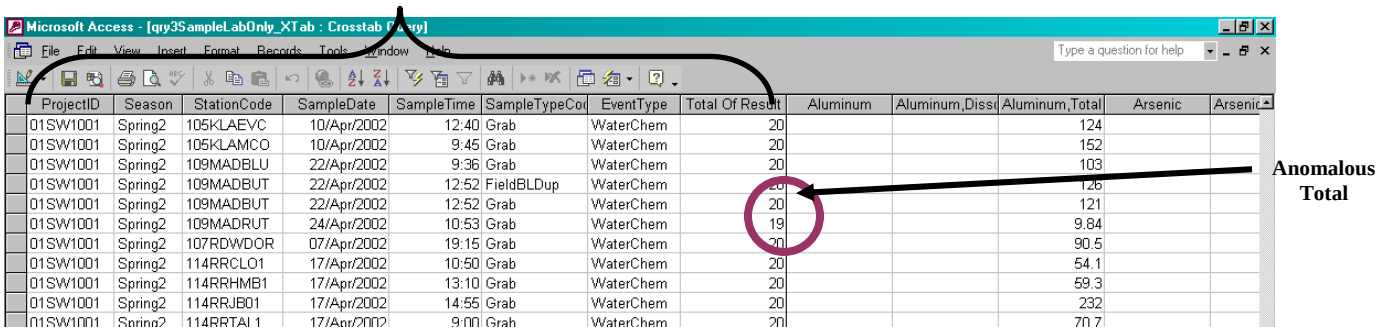
ProjectID	Region	StationID	Event	Matrix	AnalysisTy	SampleDate	Sampl	Failure	ShipDate	Lab	
01SW4001	4	404SMB017	3	WaterChem	Chl a	3/25/2003	15:30	☐	3/28/2003	MPSL-DFG	Re-sampled because first sample was compromised
01SW4001	4	404SMB017	3	WaterChem	Inorganic	3/25/2003	15:30	☐	3/26/2003	DFG-WPCL	Re-sampled because of problem with chlorophyll; only nitrate species and total P
01SW4001	4	404SMB017	2	WaterTox_Chem	Bacteria	3/11/2003	9:30	☐	3/11/2003	CRGML	

- Sample/Lab Results Cross-tab Query (qry3SampleLabOnly_XTab)

This query provides an overall view of all lab results for selected samples. For each sample, the query lists analytes in columns with the result of that analyte in the appropriate sample row. If the analyte was not analyzed for a particular sample, it will remain blank. To use this query to determine completeness, it is best to know the sample design for the applicable projects.

1. Be sure that the Sample Query has been limited as desired to that region and/or projects applicable. (*See Appendix C.2.1.3.*)
2. In order to view results in this query, due to MSAccess limitations, the list of analytes must first be limited in number. To do this, follow the steps in *Appendix C.6.1: Restricting Analyte Data* before running this query.
3. Run the Sample/Lab Results Cross-tab query with the changes made in Steps 1 and 2.
4. Freeze the Sample columns (through Total of Result) at this point to make the data easier to evaluate. (*See Appendix C.6.4.2: Freeze Columns*.)
5. The column named "Total Of Result" holds a tally for each sample of the number of analyte results in the database. If the sample design called for 20 analytes to be analyzed among those selected in Step 2, the user could quickly look down the Total Of Result column to find those samples where the amount is not 20.
6. When any anomalies are found, as in the example below with 19 in the Total Of Result column, scroll to the right to determine which analytes are missing results.

Freeze columns



ProjectID	Season	StationCode	SampleDate	SampleTime	SampleTypeCo	EventType	Total Of Result	Aluminum	Aluminum,Diss	Aluminum,Total	Arsenic	Arsenic
01SW1001	Spring2	105KLAEVC	10/Apr/2002	12:40	Grab	WaterChem	20			124		
01SW1001	Spring2	105KLAMCO	10/Apr/2002	9:45	Grab	WaterChem	20			152		
01SW1001	Spring2	109MADBLU	22/Apr/2002	9:36	Grab	WaterChem	20			103		
01SW1001	Spring2	109MADBUT	22/Apr/2002	12:52	FieldBLDup	WaterChem	20			126		
01SW1001	Spring2	109MADBUT	22/Apr/2002	12:52	Grab	WaterChem	20			121		
01SW1001	Spring2	109MADRUT	24/Apr/2002	10:53	Grab	WaterChem	19			9.84		
01SW1001	Spring2	107RDWDOR	07/Apr/2002	19:15	Grab	WaterChem	20			90.5		
01SW1001	Spring2	114RRCLO1	17/Apr/2002	10:50	Grab	WaterChem	20			54.1		
01SW1001	Spring2	114RRHMB1	17/Apr/2002	13:10	Grab	WaterChem	20			59.3		
01SW1001	Spring2	114RRJB01	17/Apr/2002	14:55	Grab	WaterChem	20			232		
01SW1001	Spring2	114RRTAL1	17/Apr/2002	9:00	Grab	WaterChem	20			70.7		

7. Once those analytes missing results are discovered, there are a variety of possibilities for investigation.
   a. Look for the particular sample(s) in question in the more detailed Sample/Lab Results Query (qry2SampleLabOnly) to view any comments that may explain the anomaly.
   b. View the comments for the sample in the Chain of Records Table for any explanation of the missing data.
   c. View the Chain of Records Table to see if the data has been received and loaded into the database. Find the sample in this table and look in the columns called RsltsDate_hard, RsltsDate_soft and DataUploaded

for dates that results were received and/or data was loaded into the database.

d. If there are no comments explaining the anomaly and no dates are in the fields above in option c., the laboratory conducting the analysis should be contacted.

e. If there are no comments explaining the anomaly and dates are in some but not all fields in option c., the data should be in the database if the RsltsDate_hard or RsltsDate_soft is greater than one month old. If this is the case, contact the SWAMP DMT for resolution.

D.2. Detecting Errors

The Query Tool can be useful in detecting errors in data entry or other anomalies needing further investigation and possible correction.

D.2.1. Field Data

The following queries are recommended for checking for errors in field data entry:

- Sample/Sample Details/Field Results Cross-tab Query (qry2SampleDetailsFieldResults_Ent_XTab)

This query allows users to view and compare in summary form information about each sample, the details about sample collection methods and locations, and probe measurements taken while sampling.

1. Be sure that the Sample Query has been limited as desired to that region and/or projects applicable. (*See Appendix C.2.1.3.*)
2. Scan through results to be sure that data for each of the fields appears to be correct. Look for any significant anomalies in results, such as those that may be exponentially different from any other.
3. Examine fields for any missing data or other anomalies that may exist. Use filters and other data viewing options suggested above in *Appendix C.6: Working with the Queries*.
4. For any anomalies found, it may be necessary to look at the more detailed original query (not cross-tab) to discover reasons why.
5. To change data found to be incorrect, return to the Forms Entry Program, and follow the instructions for Editing Data.

- Sample/Sample Details/Field Results Query (qry2SampleDetailsFieldResults_Ent)

Use this query to examine the sample, sample details and field probe measurements in a more detailed format.

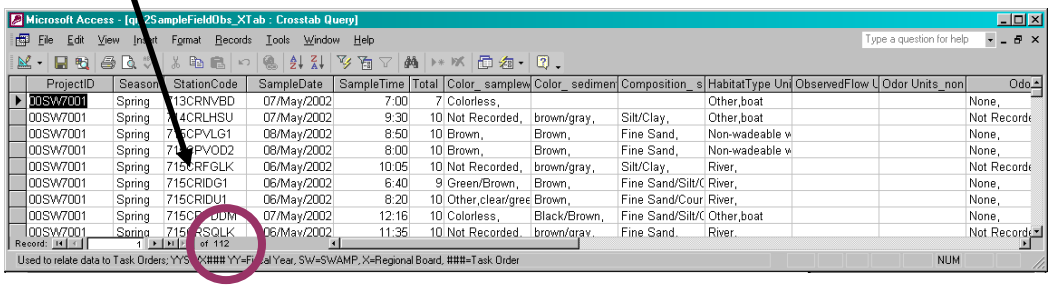
1. Be sure that the Sample Query has been limited as desired to that region and/or projects applicable. (*See Appendix C.2.1.3.*)
2. Look over comments, equipment used, significant figures and QA data for inconsistencies or anything that stands out as unusual.

- Sample/Field Observations Cross-tab Query (qry2SampleFieldObs_XTab):

1. Be sure that the Sample Query has been limited as desired to that region and/or projects applicable. (*See Appendix C.2.1.3.*) Also, limit the Sample Type in the Sample Query by typing <>"fieldbldup" and <>"ms*" into the Criteria field beneath the Sample Type column and limit the

Failure Reason to “none” (type “none” in the Criteria field beneath the Failure Reason column). Click **Save**.

2. Check that the number of records in the Sample/Field Observations Query is the same as the number of records in the Sample Query. If the numbers are not the same, it may be necessary to create and run an Unmatched Records query.



3. Examine records that show up in this query for any errors.
4. Scan through the results for problems with information on any of the different parameters or questionable comments.

- Sample/Sample Details Query (qrySampleDetail_Ent)

Use this query to examine the data for sample collection methods for inconsistencies and errors.

1. Be sure that the Sample Query has been limited as desired to that region and/or projects applicable. (*See Appendix C.2.1.3.*)
2. Examine the different data points for anything that seems odd or incorrect. Look at the Sampling Crew, compare the Latitude and Longitude to the Target Lat/Long for the station, and examine the Sample Detail Comments for anything that stands out.

D.2.2. Laboratory Data

The following queries are recommended for checking for errors in laboratory data entry:

- Sample/Lab Results Query (qry2SampleLabOnly): Use this query to compare laboratory results and associated information in a variety of ways.
  - With a LabBatch, it is possible to determine whether the expected number of supporting QA sample records were run.
    - Compare the number of records included in a LabBatch with the number expected based on the SWAMP QAPP.
    - Verify that sample duplicates were within an acceptable range of the native sample.
    - Verify that Matrix Spike duplicates were within an expected range of the Matrix Spike sample.
    - Verify that any Field Blind Duplicate samples were within an expected range of the native sample.
  - Compare results for a single station over a period of time. Look for exponential differences in results numbers. For instance, out of 4 instances, results may be 3.96, 4.1, 300.6 and 3.88. The value 300.6 should raise a flag as to the accuracy of that number. In such a situation,

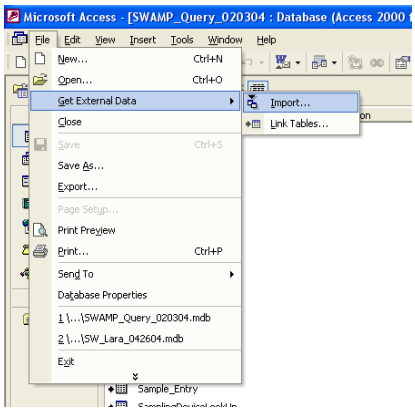
the user should use other queries to determine whether there is a reason for the anomaly. Any comments in the Lab Results, or comments and data in the Field Results or Field Observations queries may point out a logical reason for such a difference. If not, contact the analyzing laboratory for resolution. If it is discovered to be a mistake, correct the data as needed.

- Sample/Lab Results Cross-tab Query (qry3SampleLabOnly_XTab): This query provides another way of looking at the data than the Sample/Lab Results Query. For each sample, the query lists analytes in columns with the result of that analyte in the appropriate sample row. If the analyte was not analyzed for a particular sample, it will remain blank. Data are displayed in a vertical, rather than horizontal format which may make it easier to view results for a single analyte across many stations or the same station over a time period.
    - Be sure that the Sample Query has been limited as desired to that region and/or projects applicable. (*See Appendix C.2.1.3.*)
    - In order to view results in this query, due to MSAccess limitations, the list of analytes must first be limited in number. To do this, follow the steps in *Appendix C.6.1: Restricting Analyte Data* before running this query.
    - Run the Sample/Lab Results Cross-tab query with the changes made in Steps 1 and 2.
    - Freeze the Sample columns (through Total of Result) at this point to make the data easier to evaluate. (*See Appendix C.6.4.2: Freeze Columns*.)
    - Identify the analytes and/or stations to view.
    - Compare results across different stations or the same station at different times.
    - Look for any results that stand out as significantly different from the others.
        - If any are identified, run the Sample/Lab Results query to see more information for that sample.
        - Any comments in the Sample/Lab Results query or even in the Field Results or the Field Observations queries can help to determine whether a reason exists for the anomaly.
        - If no explanation is found, contact the analyzing laboratory to verify the accuracy of the results.
        - If a correction needs to be made, correct the data as needed.

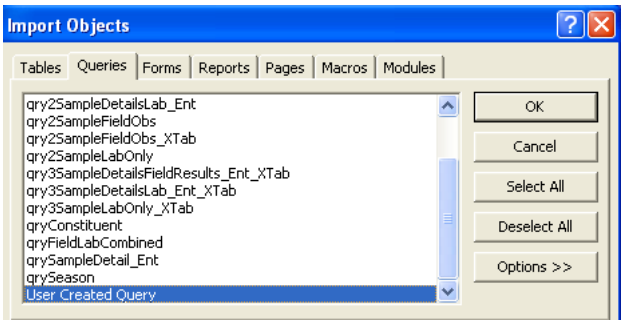
Appendix SOP 13.E. Creating Custom Queries

For those users who are or become more familiar with using queries in Access, there will be situations where additional queries are created to be used with the SWAMP database. It is important to remember to save these queries separately before importing or overwriting the SWAMP Query Tool with a new version so that the user-created queries do not get overwritten as well. To do so,

1. Save the entire Query Tool program, including the user-created queries, to a backup folder.
2. Download the new Query Tool program to the appropriate SWAMP folder.
3. Import the user-created queries from the saved Query Tool.
    a. Open the Query Tool
    b. Login as 'fido' with no password
    c. From the toolbar, select File, then Get External Data, then Import.



    d. Browse to the folder where the saved Query Tool resides, select the file and click Import.
    e. An Import Objects window will appear for selecting the query or table to be imported.
    f. Select the Queries tab.



g. Scroll to the query or queries to import and select by clicking Shift + mouse click on each query name to be imported.

h. Click OK. The query will now appear in the newer Query Tool file.

i. Link the new Query Tool to the database. (See Appendix C1 Query Tool Program and Database Setup.)