AWQMS

Ambient Water Quality Monitoring System

Version 5.0
Getting Started Guide

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Prepared for

US EPA, Region 8

By

goldsystems
INNOVATION THROUGH TECHNOLOGY

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Basic Assumptions of This Guide

Reader has basic Windows and web browser skills.

Reader has a basic understanding of the EPA Water Quality eXchange (WQX).

Reader has a basic understanding of Water Quality and WQX terminology. For a detailed glossary of WQX and AWQMS terms, please see the AQWMS User Guide.

Reader has basic spreadsheet skills such as how to insert new rows and columns, how to move rows and columns of data around, how to use basic text manipulation functions, and how to sort rows of data in their spreadsheet.

This guide uses the AWQMS Demo (awqmsdemo.goldsystems.com) web site and associated demo data files.

Reader has a decent Internet connection.

Guide Organization

This guide is organized in a manner that follows the basic process of using AWQMS to consolidate water quality data and submitting it to WQX. This guide does not attempt to cover every aspect of AWQMS nor every scenario. Where appropriate, the guide addresses common, basic "what if" questions that would naturally arise. The guide also references related sections of the AWQMS User Guide where possible.

This guide presents step-by-step tutorials with corresponding screen shots from AWQMS. The screen shots have numbered arrows that correspond to the numbers of the written steps. Sometimes there are numbered lists that describe what you will see on screen and there will be an associated screen shot with numbered arrows that correspond to the numbered items in the written list. If a numbered step would cause AWQMS to either display a new page or refresh the page the user was already on, the guide provides a new screen shot and the numbered steps continue from that point.

Getting Access to AWQMS

You do not need to download or install software on your computer to use AWQMS. AWQMS is a web-based database application; which means you can interact with the system using a common web browser such as Microsoft Internet Explorer, Google Chrome, Apple Safari, or Mozilla Firefox. All you need is an assigned user name and a password and the web site address (also called a "URL"). The URLs are provided below.

AWQMS-Demo System – Take a test drive!

Most, if not all of the exercises in this guide are shown using the AWQMS Demonstration and training system, commonly referred to as "AWQMS-Demo". If you would like access to AWQMS-Demo (AKA "AWQMS Test Drive"), please send email to awqms@goldsystems.com . The AWQMS Demo web address is: http://awqmsdemo.goldsystems.com

AWQMS "Live" Data Systems

AWQMS-Cloud (Most tribal and volunteer group users)

Gold Systems also hosts a copy of AWQMS known as "AWQMS-Cloud" for certain customers who wish to avoid the hassles and expense of hosting a copy of AWQMS on their own servers. AWQMS-Cloud holds real data (not demo or training data). The URL for AWQMS-Cloud is: http://awqms.goldsystems.com .

If you need a user name and password for accessing AWQMS-Cloud, the Water Quality or Environmental supervisor or key AWQMS user for your organization must request access for you by sending an email request to awqms@goldsytems.com.

Deployed AWQMS (Most state users)

If you work for an organization that hosts its own copy of AWQMS, you should talk to your supervisor or IT department about getting access to your organization's copy of AWQMS. They should know how to go about getting you a user name and password and can provide you the URL for accessing your organization's copy of AWQMS.

Logging into AWQMS

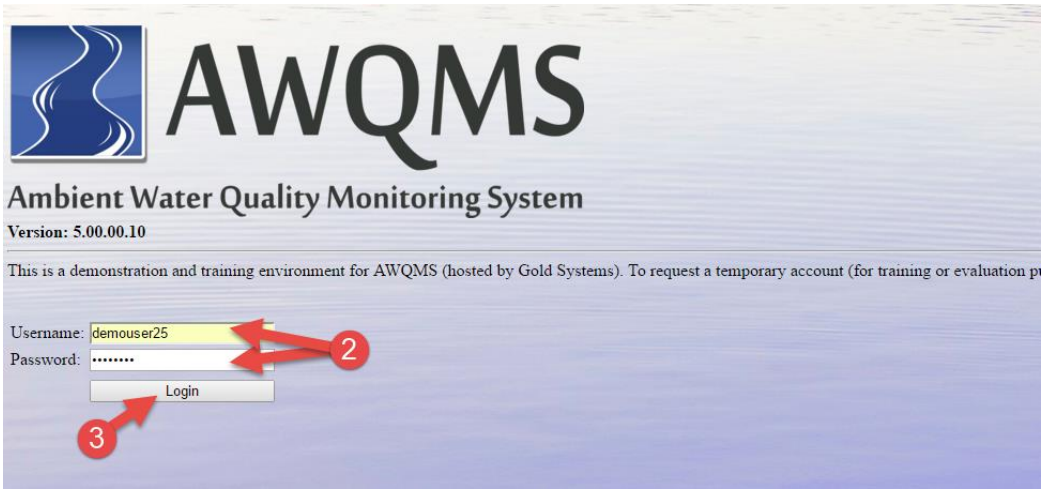
This section describes logging into either the AWQMS-Demo site or the AWQMS live-data system site. The steps are the same regardless of whether you are using AWQMS-Demo, AWQMS-Cloud, or a deployed copy of AWQMS.

1. Open your web browser and enter the web site address for the instance of AWQMS you wish to use into the web browser's address field. Hit your Enter button or click the browser's Go button. In a *training situation*, that is typically: awqmsdemo.goldsystems.com.

   Or, *for working with your live data*, use AWQMS-Cloud use: awqms.goldsystems.com

   For *deployed copies of AWQMS*, your IT personnel can tell you what the web site address is.
   The AWQMS login screen appears.

2. Regardless of which environment you are using, you enter your AWQMS user name and password into the fields on the login form. Be sure your CapsLk (caps lock) button is not on.
3. Click the Login button.

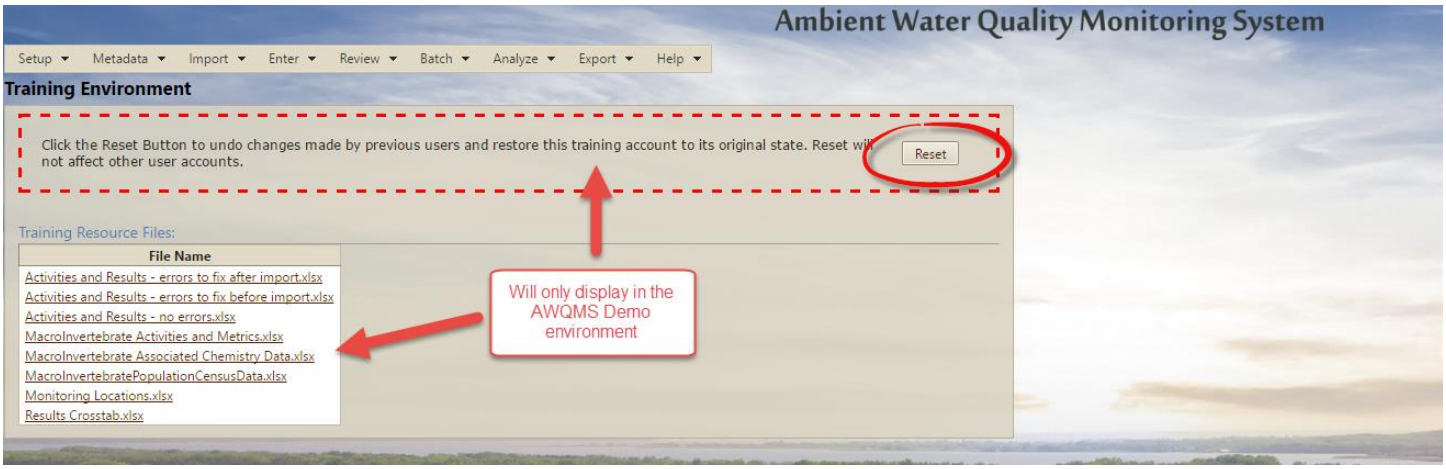


If the user name and password you entered are correct, the system will display the AWQMS navigation menu. If you are logged into the AWQMS-Demo environment. The system will display the navigation menu and the **Training Environment** page.

The AWQMS Training Environment Page and the Navigation Menu

In the AWQMS-Demo environment, the Training Environment page displays links to training resource files that can be downloaded. There is also a Reset button that allows you to clear out any data a previous user of your user name might have added or changed and put the account back to a baseline state. These links and button are not displayed when you log into the AWQMS-Cloud environment nor if you log into a deployed copy of AWQMS.

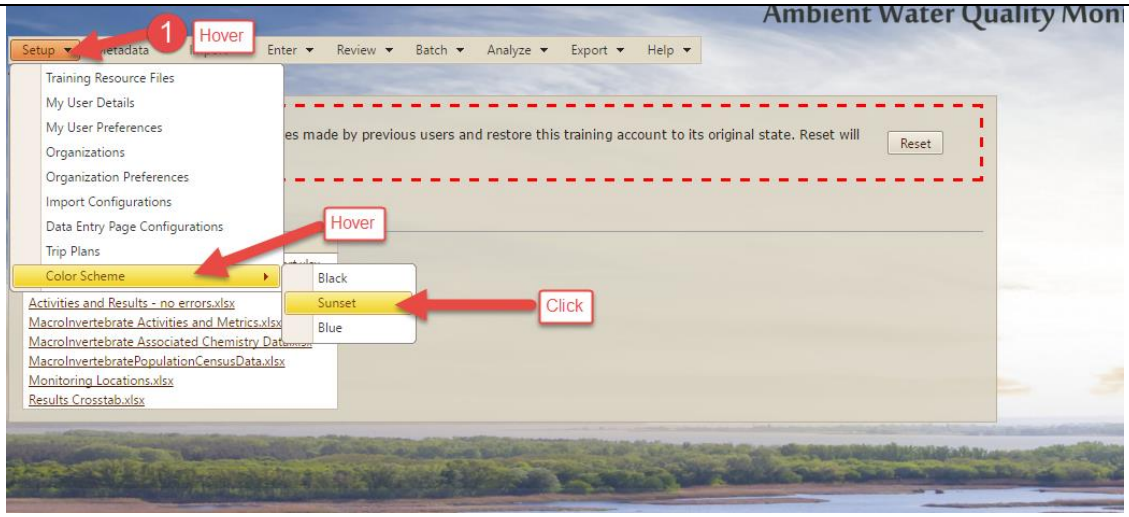
If you are using the AWQMS-Demo environment, click the **Reset button** to put AWQMS in a pre-defined, known state.



Here's what the Home page looks like when you first log into the AWQMS-Cloud environment (no training resources):

The drop down menus on the navigation bar will allow you to use the various AWQMS features. You can hover your mouse over a menu item to expand the sub-menu for that item, if there is one. If you wish to navigate to a feature in a submenu, you can click on the item. Let's practice some system navigation.

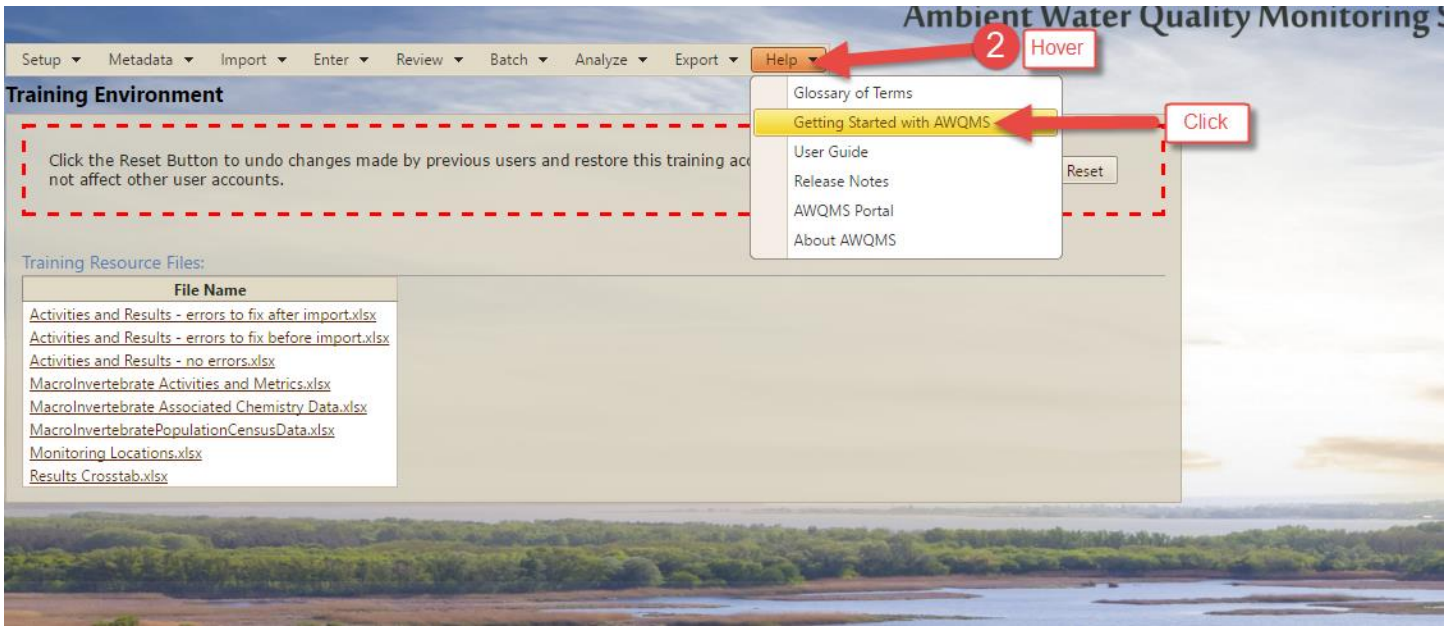
1. Hover over the **Setup** menu, then over the **Color Scheme** submenu, and then click on the **Sunset** option.



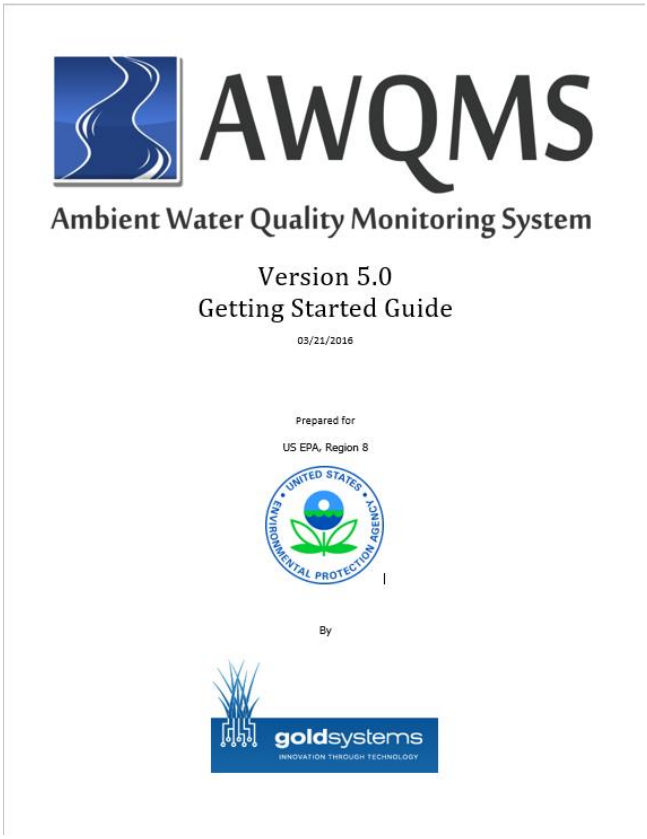
If your color scheme wasn't already set to **Sunset**, the page will refresh and you'll see a background and color scheme similar to the one shown above.

The **Help** menu on the right end of the Navigation Bar allows you to download various AWQMS guides and provides access to a glossary of terms.

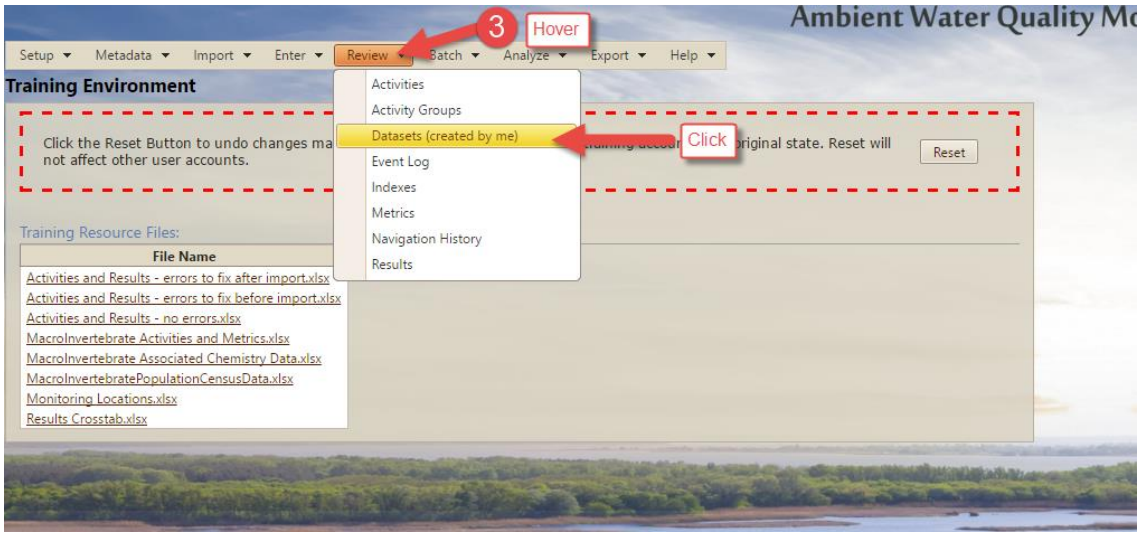
2. Now hover your mouse pointer over the **Help** menu item and then click on the **Getting Started with AWQMS** item in the drop-down menu.



The Getting Started with AWQMS guide downloads to your browser as a .pdf file.

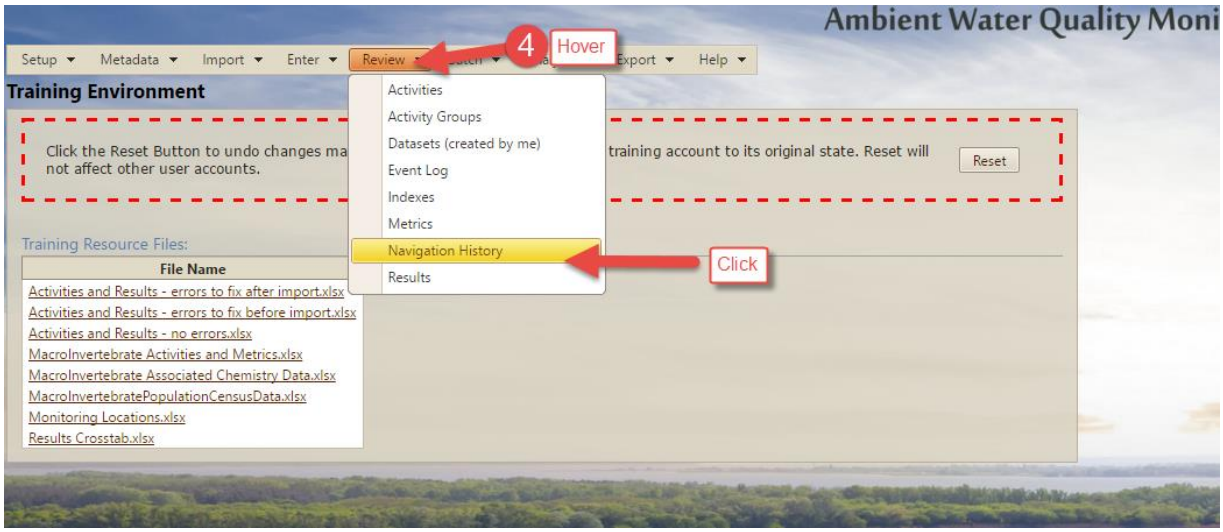


3. AWQMS has a **Datasets (created by me)** menu item that allows you to view a list of datasets you have been working with. Hover your mouse pointer over the **Review** menu item in the **Navigation Bar** and then click on the **Datasets (created by me)** menu item.

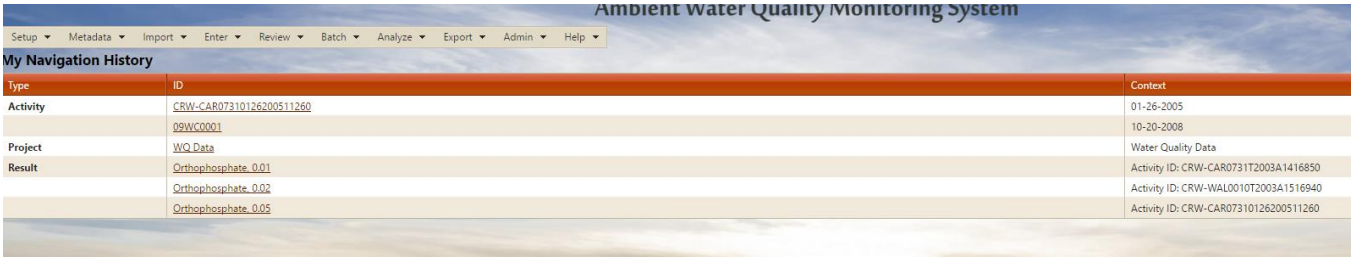


The **Datasets (created by me)** page is displayed. If you haven't yet been working any datasets you may see a message that says "No records to display". Otherwise, the list will include the file name, type, and status for any datasets you have been working with.

4. In AWQMS, you can view a list of links to records you've recently been working with and then quickly jump to one of those records to continue working. Hover over the **Review** menu item in the **Navigation Bar** and then click on the **Navigation History** menu item.



AWQMS will display the **Navigation History page**. If you haven't done much previously in AWQMS, you may see a message that says "No records to display". Otherwise the list will provide links to navigate directly to records you've recently worked with in the system.



Key Steps of Using AWQMS

This is a high level overview of what you do in AWQMS.

STEP 1: Lay the Foundation by Adding Your Meta Data

1a. Enter or import your list of monitoring locations.

1b. Enter or import your list of projects.

1c. Enter needed lookup table values.

STEP 2: Add Your Data to AWQMS

2a. Enter or import activities and results data into the AWQMS validation area.

2b. Migrate your data from the validation area to the management and analysis area.

STEP 3: Manage and Analyze Your Data

3a. QA/QC your data using reports and graphs.

3b. Correct errors in your data using the management pages.

STEP 4: Submit Your Data to WQX

4a. Export and submit your initial batch of data to WQX.

4b. Export and submit on-going changes to your data to WQX.

A Brief Word about QA/QC Data (Duplicates and Blanks)

Every activity in WQX and AWQMS must have an activity type. QA/QC duplicate and blank samples should not be included as normal activities. Rather, they should be included using the special QA/QC activity types defined in the Activity Type lookup tables. This will allow you to filter them out, if desired, when analyzing/reporting on the data.

Note that using a different activity type causes the activity ID for the QA/QC samples to be different than for the normal samples, assuming you are following the activity ID format suggested in this guide.

See Appendix D, below for more considerations regarding QA/QC samples.

There are other things you can do using AWQMS, such as exporting data and planning out your trips. But this overview sums up the basic process. Definitions for terms used in the Key Steps are found in the next sections and in the full **User Guide**.

Now we will get into more detail for each of the Key Steps.

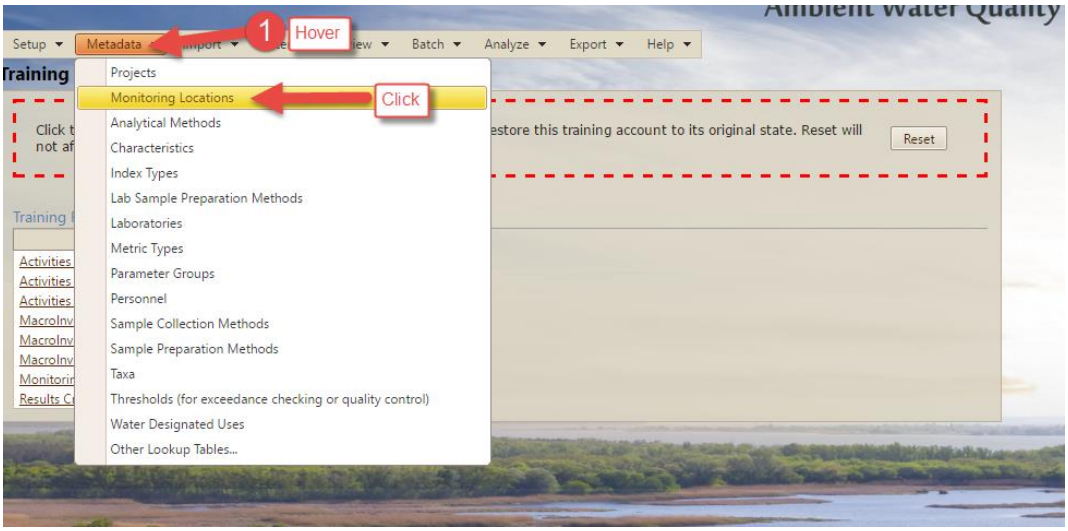
STEP 1: Lay the Foundation by Adding Your Meta Data

1a. Enter or import your list of monitoring locations

Monitoring Locations are records that represent the physical site where you took a sample or made an observation. A unique ID, a name, the coordinates for the location, horizontal reference datum, and horizontal collection method are all required data elements.

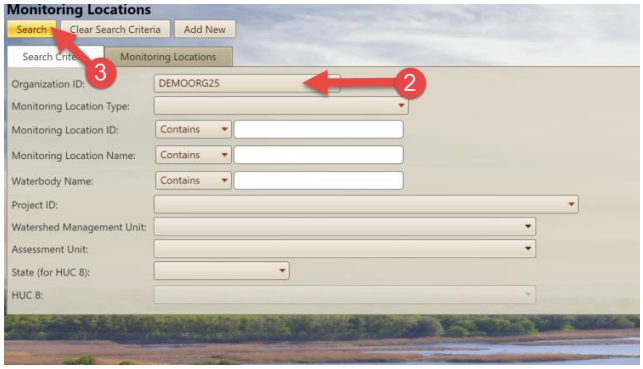
How can I tell if I already have monitoring locations in AWQMS?

1. Hover your mouse cursor over **Metadata** then click on the **Monitoring Locations** menu option.

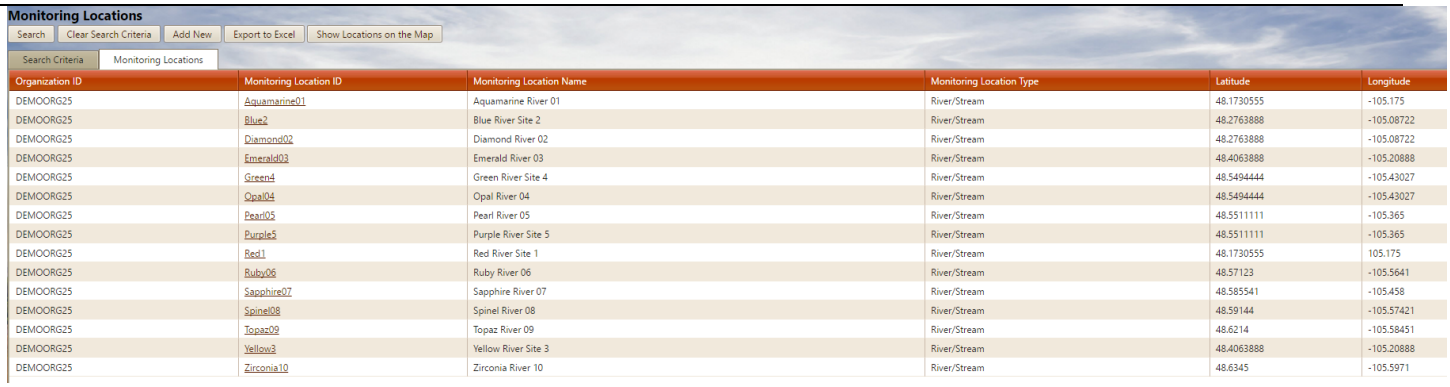


The system will display two tabs: **Search Criteria** and **Monitoring Locations**. The **Search Criteria** tab allows you to specify search criteria to filter for the list of Monitoring Locations. The Monitoring Locations tab allows you to see a list of Monitoring Locations that match the search criteria you specify. Note; the buttons above the tabs. They are always visible/accessible when you are in this Monitoring Locations list page.

2. Select your organization ID from the **Organization ID drop-down list**.



3. Click the **Search** button.
   The system will display a list of Monitoring Locations you already have in the system. If there are none, the system will display a message stating so.



Organization ID	Monitoring Location ID	Monitoring Location Name	Monitoring Location Type	Latitude	Longitude
DEMOORG25	Aquamarine01	Aquamarine River 01	River/Stream	48.1730555	-105.175
DEMOORG25	Blue2	Blue River Site 2	River/Stream	48.2763888	-105.08722
DEMOORG25	Diamond02	Diamond River 02	River/Stream	48.2763888	-105.08722
DEMOORG25	Emerald03	Emerald River 03	River/Stream	48.4063888	-105.20888
DEMOORG25	Green4	Green River Site 4	River/Stream	48.5494444	-105.43027
DEMOORG25	Opal04	Opal River 04	River/Stream	48.5494444	-105.43027
DEMOORG25	Pearl05	Pearl River 05	River/Stream	48.5511111	-105.365
DEMOORG25	Purple5	Purple River Site 5	River/Stream	48.5511111	-105.365
DEMOORG25	Red1	Red River Site 1	River/Stream	48.1730555	105.175
DEMOORG25	Ruby06	Ruby River 06	River/Stream	48.57123	-105.5641
DEMOORG25	Sapphire07	Sapphire River 07	River/Stream	48.585541	-105.458
DEMOORG25	Spinel08	Spinel River 08	River/Stream	48.59144	-105.57421
DEMOORG25	Topaz09	Topaz River 09	River/Stream	48.6214	-105.58451
DEMOORG25	Yellow3	Yellow River Site 3	River/Stream	48.4063888	-105.20888
DEMOORG25	Zirconia10	Zirconia River 10	River/Stream	48.6345	-105.5971

What should I do if I don't have any monitoring locations in AWQMS or if some of my locations aren't in AWQMS yet?

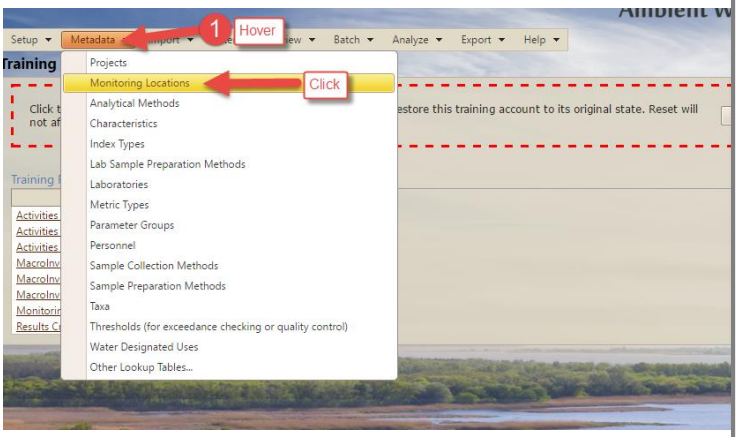
If you are missing monitoring locations in AWQMS, you can easily add them manually using the Monitoring Location detail page. You can also import a list of monitoring locations.

If you only have a few monitoring locations that are not yet in AWQMS…

If you have fewer than, say, 12 monitoring locations, we recommend manually entering them into AWQMS under the **Meta-Data**.

Step by Step Tutorial: manually entering Monitoring Locations.

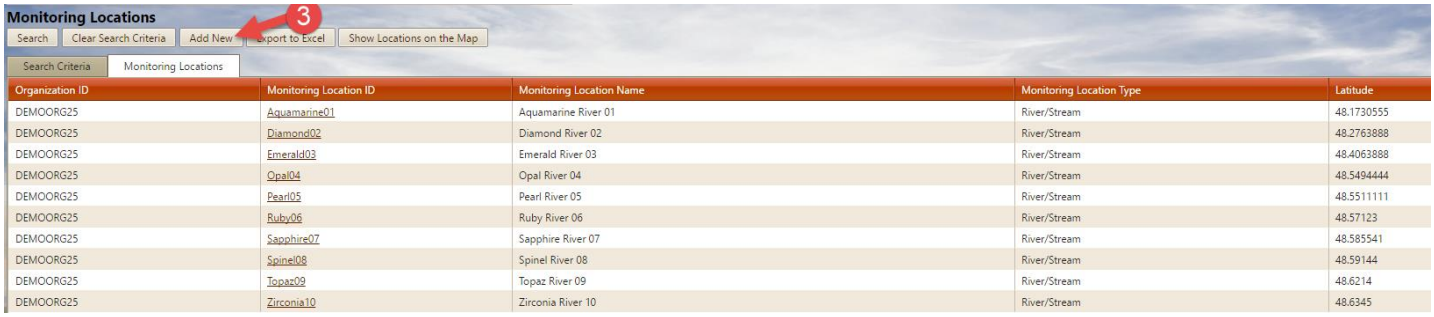
1. Hover on the **Metadata** --> Click on **Monitoring Locations**.



Monitoring location identifiers and names should be managed carefully to prevent accidental creation of multiple location records for the same real-world location. Also, if monitoring location IDs and/or names are modified after-the-fact in AWQMS, be aware that all the historical activities and results associated with the location record will be associated with the new ID or name and not with the old ID or name. Be sure to document changes made to the IDs or names so that you or others will understand why/how the IDs and/or names changed.

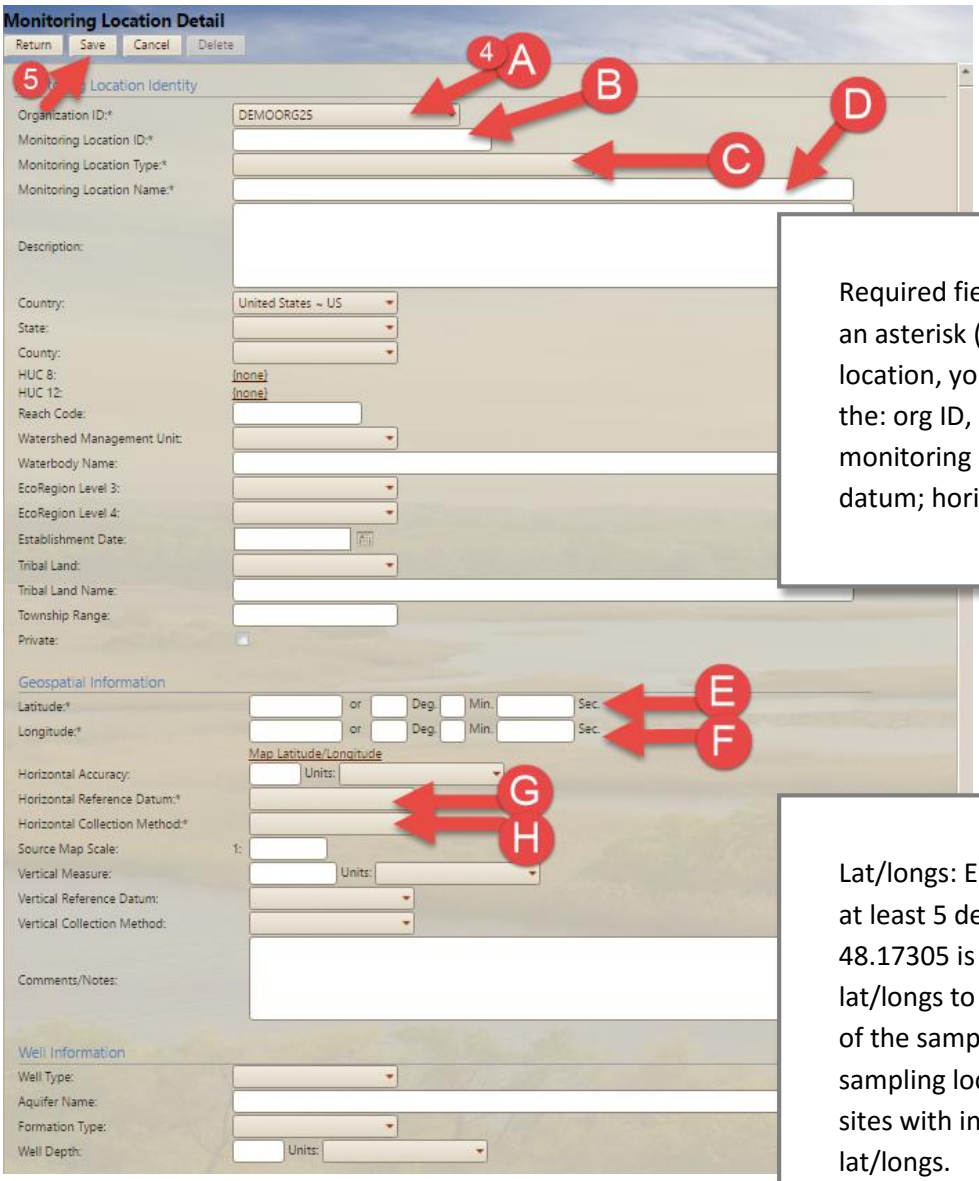
2. Verify that the location you want to add is not already in the list by searching through your organization's locations.

3. Let's assume the location you wish to add is not there. Click the **Add New** button at the top of the list page.



Organization ID	Monitoring Location ID	Monitoring Location Name	Monitoring Location Type	Latitude
DEMOORG25	Aquamarine01	Aquamarine River 01	River/Stream	48.1730555
DEMOORG25	Diamond02	Diamond River 02	River/Stream	48.2763888
DEMOORG25	Emerald03	Emerald River 03	River/Stream	48.4063888
DEMOORG25	Opal04	Opal River 04	River/Stream	48.5494444
DEMOORG25	Pearl05	Pearl River 05	River/Stream	48.5511111
DEMOORG25	Ruby06	Ruby River 06	River/Stream	48.57123
DEMOORG25	Sapphire07	Sapphire River 07	River/Stream	48.585541
DEMOORG25	Spinel08	Spinel River 08	River/Stream	48.59144
DEMOORG25	Topaz09	Topaz River 09	River/Stream	48.6214
DEMOORG25	Zirconia10	Zirconia River 10	River/Stream	48.6345

A blank **Monitoring Location Detail form** will be displayed.

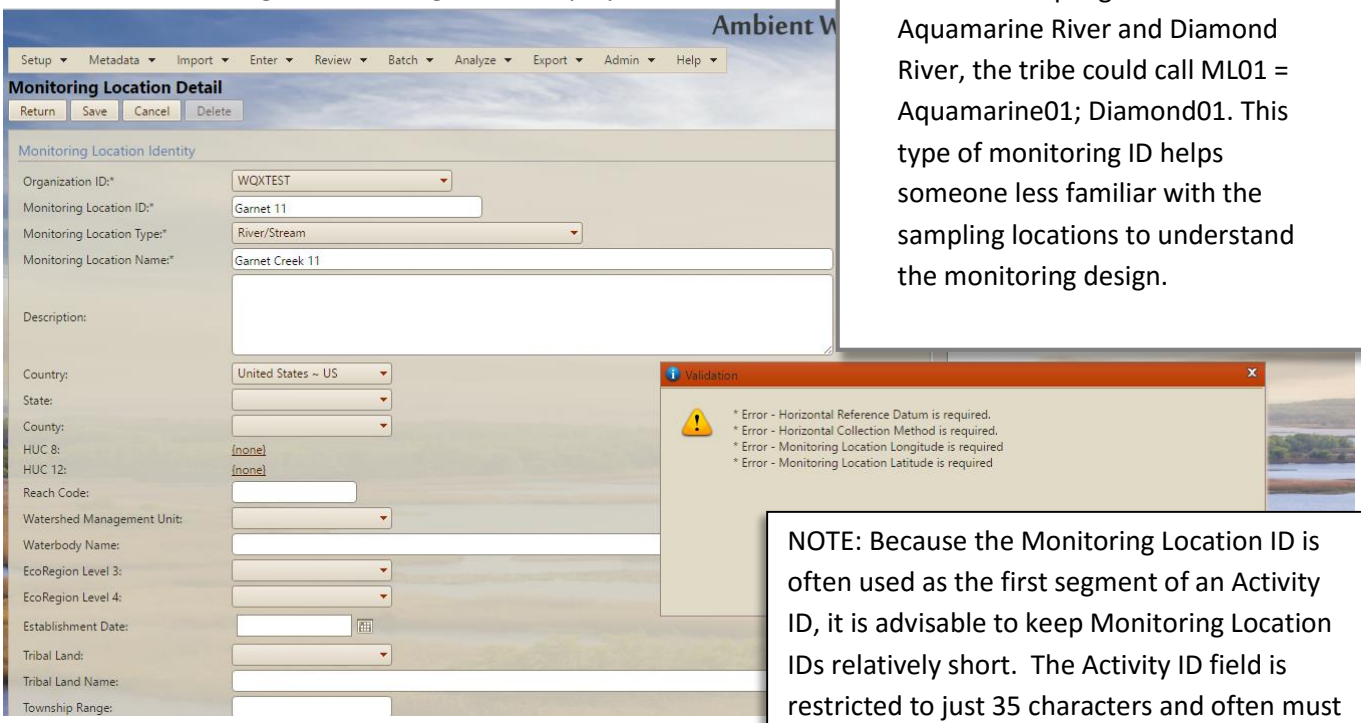


Required fields are denoted with an asterisk (*). For each monitoring location, you will need to enter the: org ID, monitoring location ID, monitoring location name, lat/long, datum; horizontal collection

Lat/longs: EPA recommends using at least 5 decimal degrees (e.g., 48.17305 is 5 decimal degrees) for lat/longs to improve the accuracy of the sampling location. Mapping sampling locations helps identify sites with incorrect or inaccurate lat/longs.

4. (See callouts A through H) Fill in at least the required fields on the form. Required fields are denoted with an asterisk ("*") character in the label.
5. Click the **Save** button at the top of the form.

   The system will indicate whether a new location record saved successfully. If there are issues with the record, either an error message or a warning will be displayed.



In this example, we needed to fill in the Geospatial section at the bottom of the form with valid coordinates and a Horizontal Reference Datum and Horizontal Collection Method. (We used Latitude: 48.06523, Longitude: -106.40259, NAD83, GPS Unspecified).

EPA encourages tribes to use monitoring location IDs reflective of their sampling location instead of generic acronyms. For example, instead of using ML01 and ML02 to describe sampling sites on the Aquamarine River and Diamond River, the tribe could call ML01 = Aquamarine01; Diamond01. This type of monitoring ID helps someone less familiar with the sampling locations to understand the monitoring design.

NOTE: Because the Monitoring Location ID is often used as the first segment of an Activity ID, it is advisable to keep Monitoring Location IDs relatively short. The Activity ID field is restricted to just 35 characters and often must also include date, time, depth, and activity type information to make it unique. Therefore, we recommend keeping your Monitoring Locations to a maximum of 6 characters. For example, if the Monitoring Location name is "Rio Piedras 05" then the ID could be "RP05". The details such as "5 feet north of the foot bridge" can be stored in the Description field.

6. Resolve any errors you might have in your form and then click the **Return** button at the top of the page to return to the **Monitoring Location list page.**

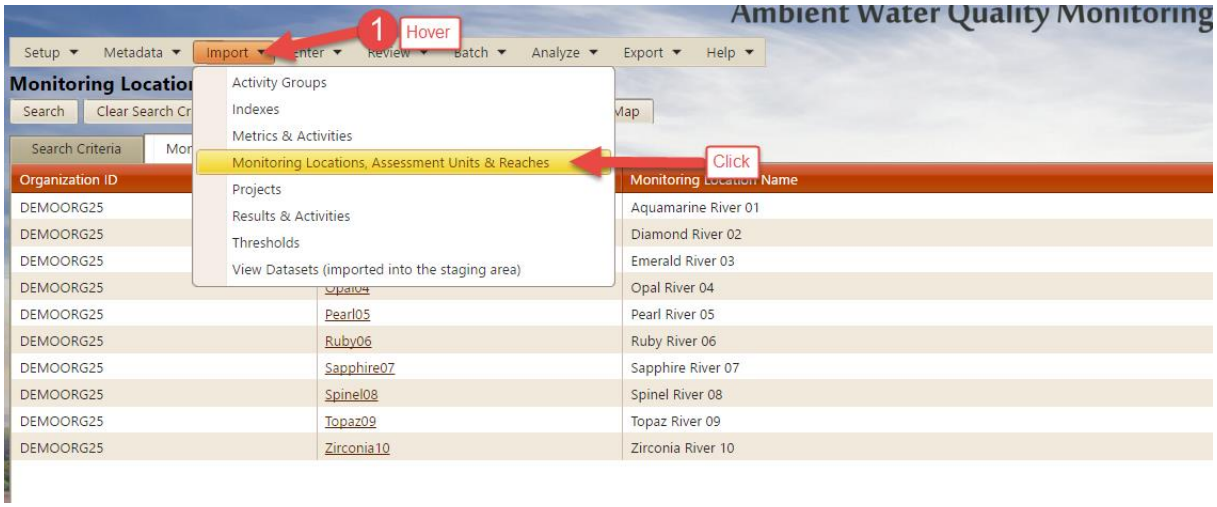
If you have a lot of monitoring locations that are not yet in AWQMS…

If you have more than approximately 12 monitoring locations that are not yet in AWQMS, you can import a text file of location records under **Import**. This approach may be faster than entering each one manually. When you import a file of locations, the imported data becomes an "import dataset". (See the AWQMS User Guide section on WORKING WITH IMPORT DATASETS).

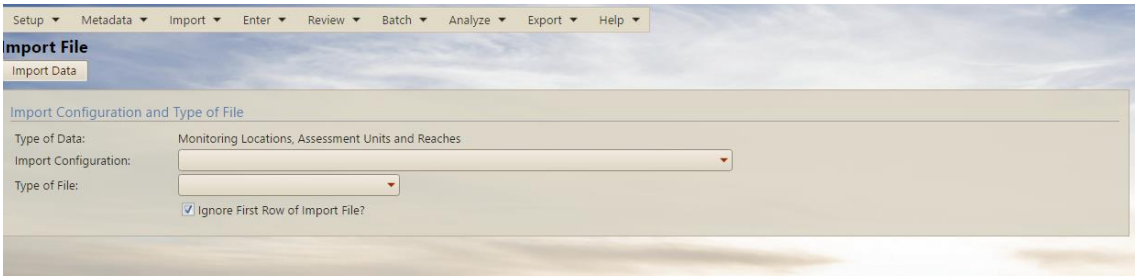
The AWQMS-Demo site has an example file on the Training Environment page that you can download and import into AWQMS-Demo. However, if you are using either AWQMS-Cloud or a deployed copy of AWQMS, you'd use your own file of actual locations. *To download the demo file to your machine, hover over the **Setup** menu item, click on the **Training Resource Files** sub-menu item, then click on the **Monitoring Locations.xlsx** link. Be sure to remember where the file has been saved. It may be in your browser's **downloads folder**.*

Step by Step Tutorial: import a file of Monitoring Locations.

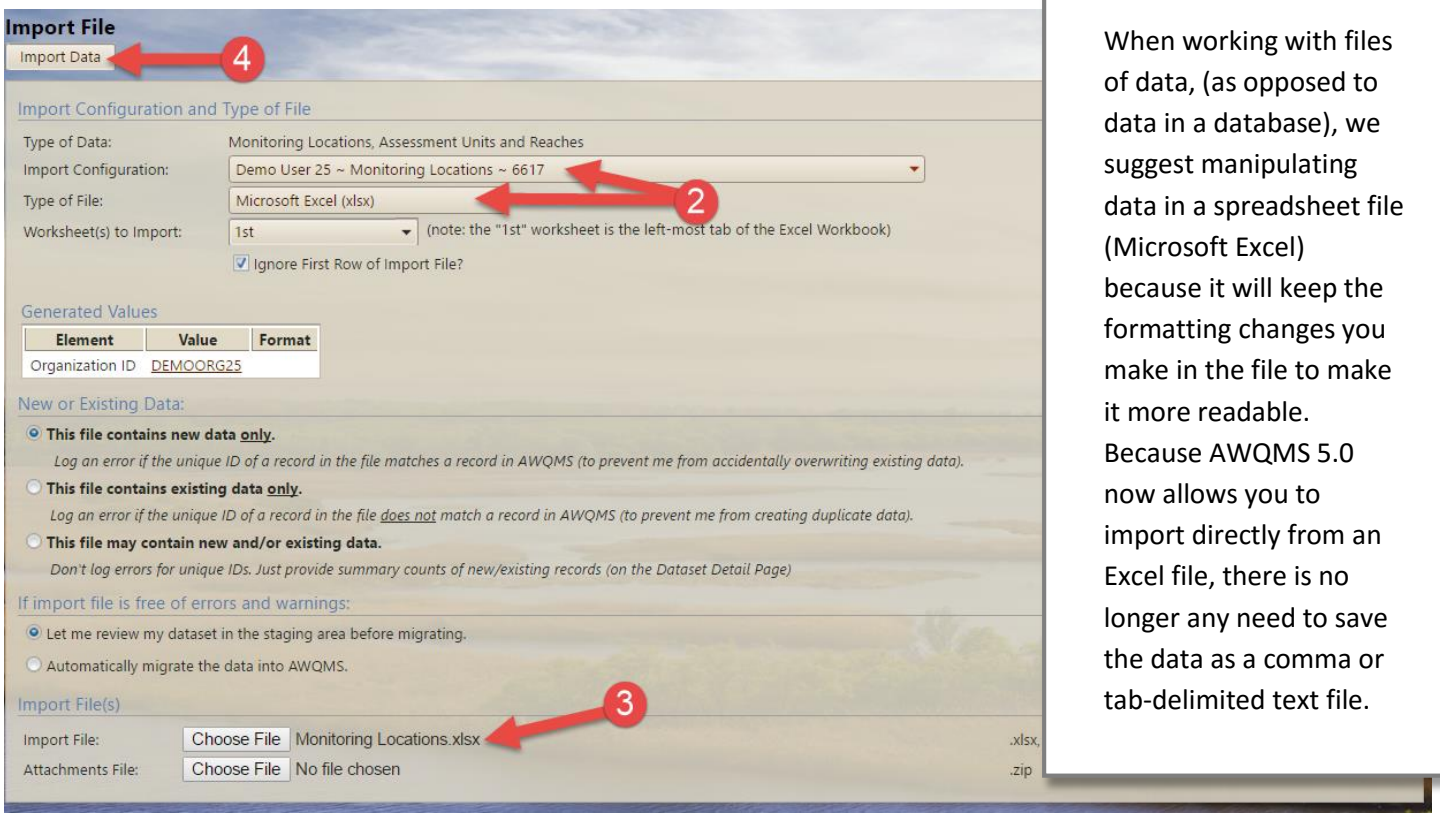
1. Hover on the **Import** then click on import **Monitoring Locations, Assessment Unit & Reaches**.



The **Import a File (Choose File) page** will be displayed.

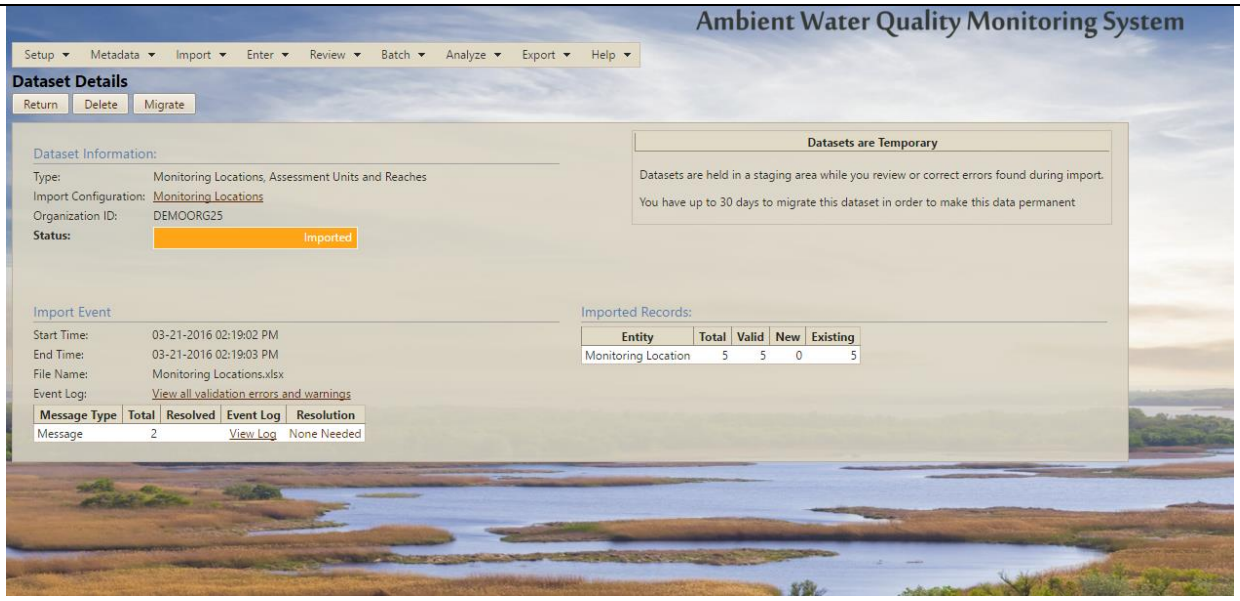


2. Indicate which **Import Configuration** you will be using to import the file. For the demo file, choose the option that has the words **Demo User <##> ~ Monitoring Locations ~.** Also, select the type of file **(.xlsx).**
3. Click the **Choose File button** and browse to and select the **Monitoring Locations.xlsx** training file you downloaded.
4. Click the **Import Data** button at the top to begin importing your file.



When working with files of data, (as opposed to data in a database), we suggest manipulating data in a spreadsheet file (Microsoft Excel) because it will keep the formatting changes you make in the file to make it more readable. Because AWQMS 5.0 now allows you to import directly from an Excel file, there is no longer any need to save the data as a comma or tab-delimited text file.

5. The system will display the **Dataset Summary** page. The page will display a message stating that it is importing the file.



If all goes well, the **Dataset Summary page** will refresh and indicate that it has completed importing the file.

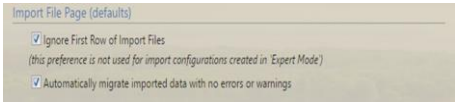
The Status will say **Imported (highlighted in yellow in the image)**. The page will indicate that five locations were imported and that, of those five locations, zero were invalid, five were new, and zero were existing.

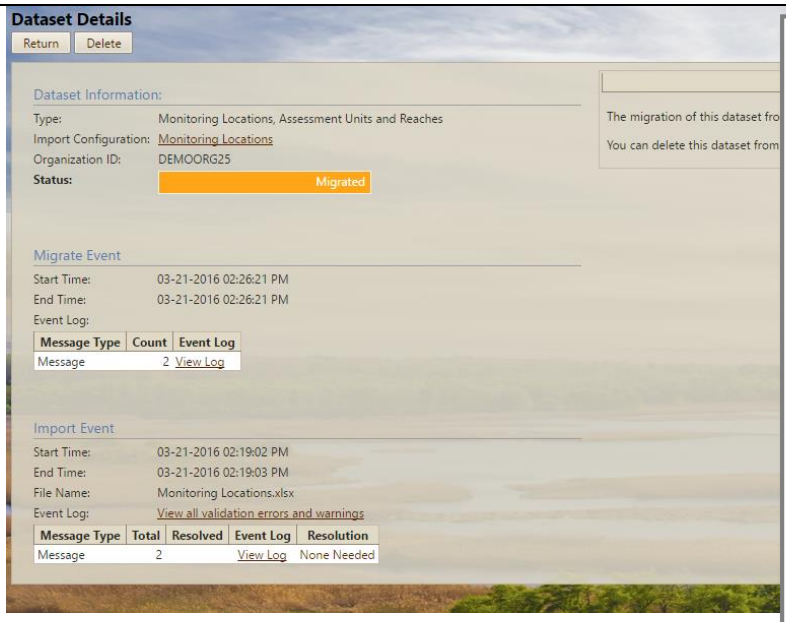
6. Click the **Migrate** button.
   The system will indicate that the data is being migrated from the AWQMS staging area to the AWQMS management area.
   NOTE: Migrating an import dataset in AWQMS is NOT the same as submitting data to WQX!

   If all goes well, the Dataset Summary page will refresh and indicate that the locations migrated into AWQMS successfully. The status of the dataset will say **Migrated** (highlighted in yellow, below).

You can choose to "Auto Migrate" your datasets that have no errors/warnings in your User Preferences

Setup-> My User Preferences ->





If you get an error, take note of what the error message says. If you are contacting another person for assistance, you should copy the error message to an email message or copy an image of the page to an email message. Take note of when the error occurred such as "After I clicked on the Continue button." Provide both the file to be imported and the ID number of the import configuration you are using to anyone from whom you are requesting assistance.

7. Click the **Return** button.

You could now go to the **Monitoring Locations list page** and search for the new locations you imported.

What if things don't go well? How do I fix import errors?

As a matter of fact, things rarely go perfectly the first time you try to import a file; and the process of importing data into AWQMS tends to be iterative and might involve a little "trial and error." If the system displays error messages during an import or shows that your import data set has a status of "Failed" there is no need to panic. You still have your import file and can always try importing it again. Here are some general guidelines for resolving errors when importing data files into AWQMS:

- If the problem is an import configuration-to-import file mismatch error, such as the columns in your spreadsheet not matching up with the columns "mapped" in your import configuration, you will need to either adjust the import configuration, the import file, or both and then attempt to re-import the data. It is best to fix these types of errors first, because they require you to re-import the file. Once these types of errors are addressed, you can address four other typical types of errors within the system without having to re-import the file.
- If the problem is that a required value was missing from your file, the system will provide a link to a page that allows you to provide the missing value without having to re-import the file.
- If the problem is that your file contains values for a data element that are not in the list of acceptable values for that data element, the system will provide a link to a page that allows you to provide the correct value without having to re-import the file.
- If the problem is that your file contains data values for a data element that don't match the expected format, (such as a date format), the system will provide a link to a page that allows you to specify the format your data values are in.

- If the problem is that your file contains data values that are too long to fit into the matching AWQMS/WQX data elements, the system will provide a link to a page that allows you to change the data so that it will fit into the AWQMS/WQX data element.

See the AWQMS User Guide section, **working with Input Datasets**, for more information on resolving validation errors in a dataset.

Location Import Configuration – Do I have one and what should I do if I don't?

In the exercise above, we assumed you already have an import configuration for importing your list of locations. We used the import configuration for monitoring locations that is built into the AWQMS-Demo environment. In AWQMS 5.0 every user of the system has read-only access to at least one system-owned import configuration for Monitoring Locations. The system-owned import configuration for monitoring locations matches the output format of the Monitoring Locations export file that is generated when you export from the Monitoring Locations List page. You can make a copy of that import configuration and tweak it as needed. This is a very simple way to get started. You can also do one of the following to get one:

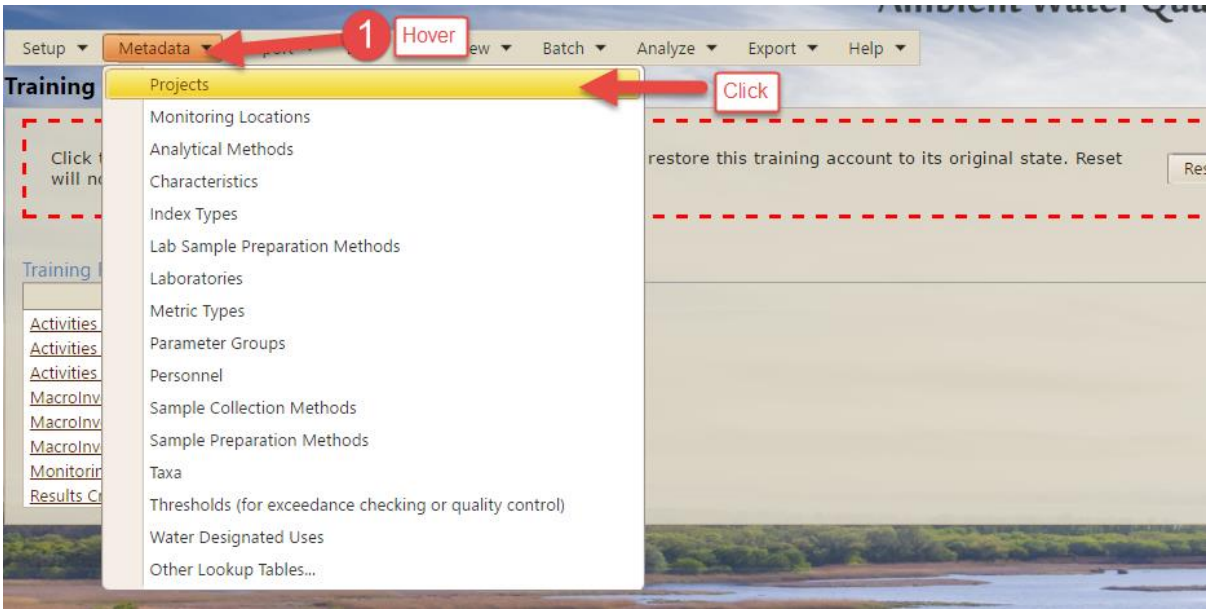
1. Ask someone who already has one (such as Gold Systems or a co-worker) to share theirs with you (give you rights to view or even edit theirs). The AWQMS user guide has instructions on how to share an import configuration with someone else. Just do a search on **Rights on an Import Configuration** in the **AWQMS User Guide.** Once you have access to someone else's import configuration, you can just make a copy of theirs and "tweak" it to meet your needs. Frankly, monitoring location import files are typically quite simple and it may actually be easier to just modify your file to match whatever import configuration you have access to.
2. Save the demo import configuration from the demo environment as a file and then create a new import configuration in your live AWQMS account based on the saved file. From the Demo environment, you just click the **Save to File** button at the bottom of the import configuration detail page. Then in your live account, you create a new import configuration by importing a saved file. (Search for **Create an import configuration from a saved file** in the AWQMS user guide).
3. Build your own from scratch. (Search for **Creating a New Import Configuration** in the **AWQMS user guide**).
4. Download the **WQX Web template** from the EPA WQX Web Downloads web site and import the monitoring locations template import configuration. This is not worth explaining in this context; especially when there are much easier methods. However, it is essentially similar in concept to #2, above. The EPA has created some import configurations and saved them as files that you can download and the use as the basis for a new one in AWQMS. There are links to the EPA template at the AWQMS portal documentation / tutorials page.

1b. Enter or Import Your List of Projects

Each organization must have at least one project in AWQMS because every activity recorded in AWQMS must be associated with at least one project. Your organization may wish to have more than one project so that you can search, sort, or filter your activities by project. Examples of projects might include "Annual 106 Monitoring" or "2013 Summer Special Nutrient Study".

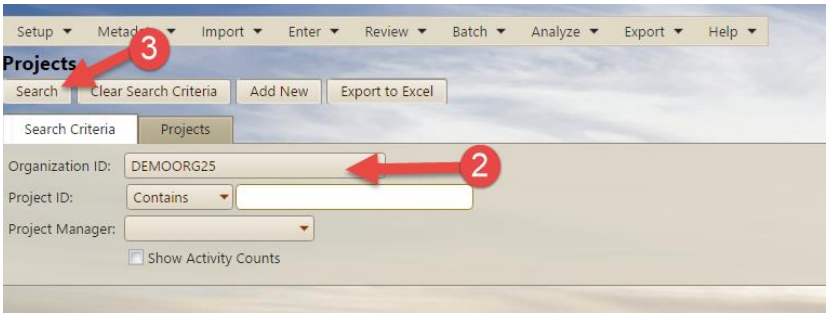
Do I already have projects in AWQMS?

1. Hover over the **Metadata** menu item in the **Navigation Bar** and click on **Projects.**



The system will display the **Projects** list page. The first tab on the page allows you to filter the **Project** list by adding search criteria in the fields and clicking the **Search** button.

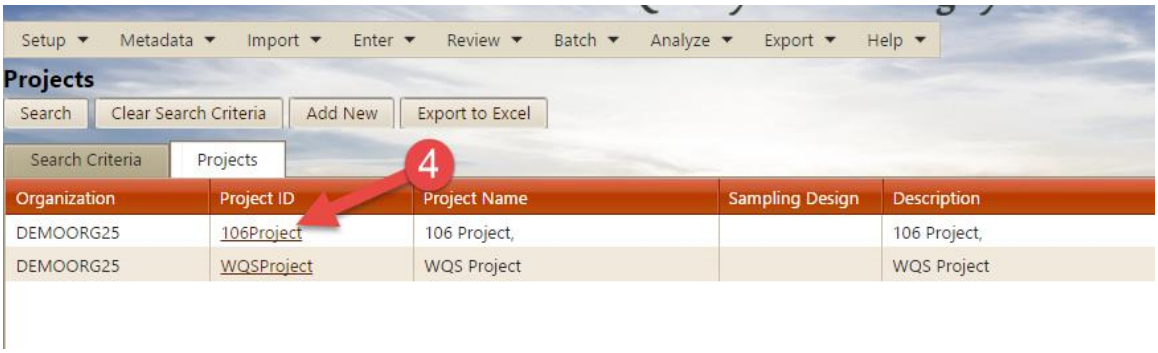
2. Make sure your organization ID is in the **Organization ID field**.



Most EPA Region 8 tribes with 106 programs probably already have existing projects in AWQMS.

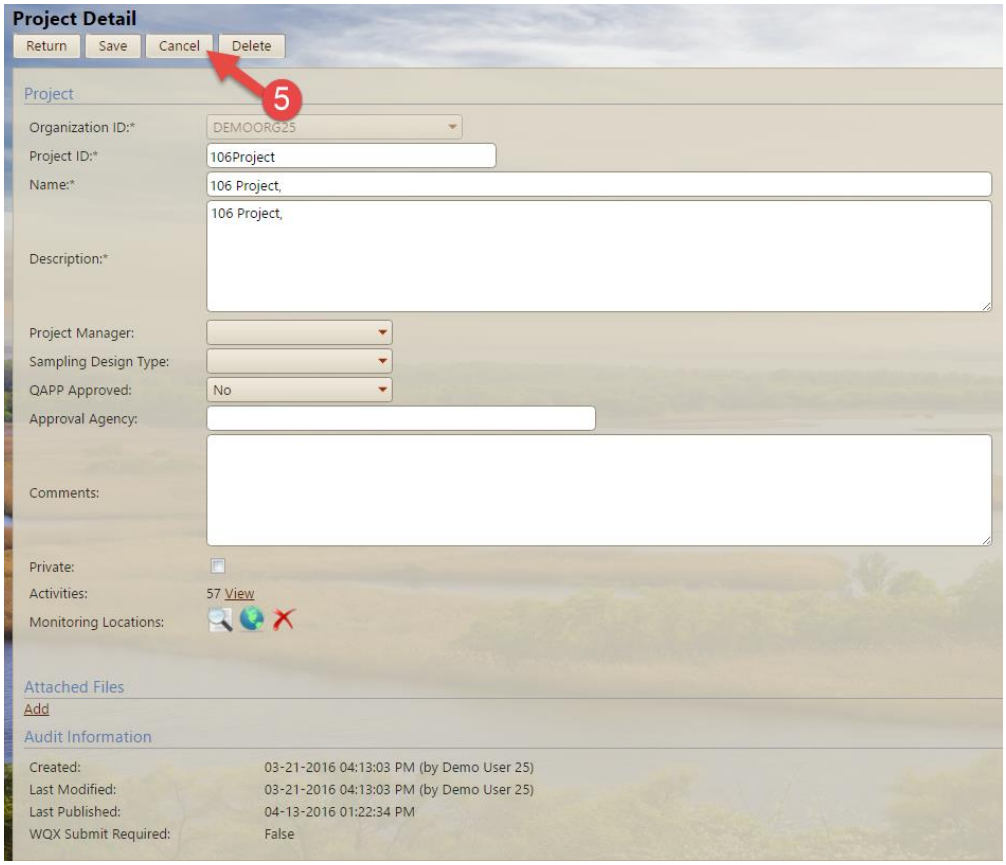
3. Click the **Search** button.
   The system will flip to the **Projects tab** and display a list of **Projects** you already have in the system. If there are none, the system will display a message stating so.

4. Click on the **project ID links** to view or edit the details of a project.



The system will display the **Project Detail page**.

****Note:** The **Return** button saves your changes since the last save and returns you to the **Projects list page**. The **Save** button saves your changes since the last save and keeps you on the **Project Detail page**. The **Cancel** button returns you to the **Projects list page** but does not save your changes since the last save**



5. Click the **Cancel button.**

The **Projects list page** will be displayed with either the **Search Criteria tab** or the **Projects tab** displayed.

What should I do if I don't have any projects in AWQMS or if some of my projects aren't in AWQMS yet?

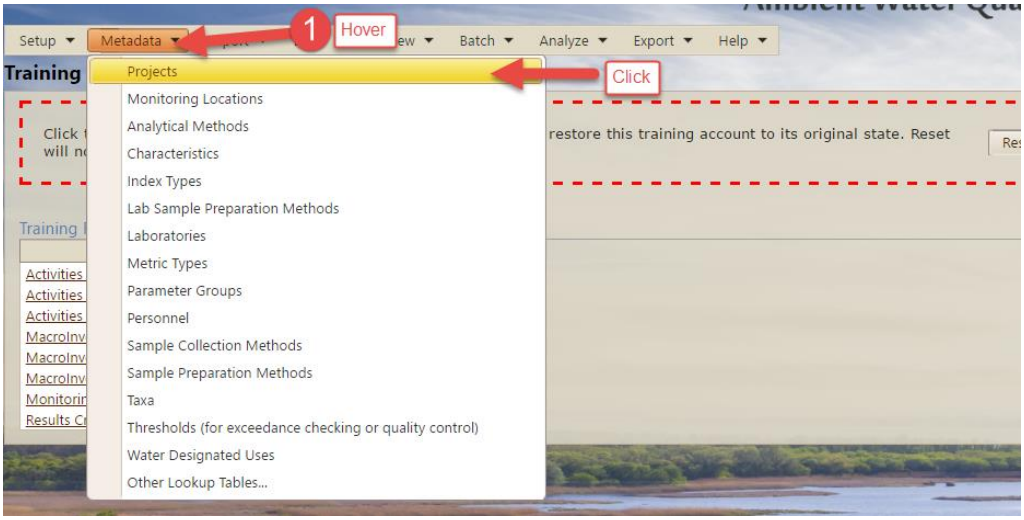
If you are missing projects in AWQMS, you can easily add them manually using the Project detail page. You can also import a list of Projects.

If you have a small number of projects that are not yet in AWQMS…

If you have fewer than 10 projects, we recommend manually entering them into AWQMS.

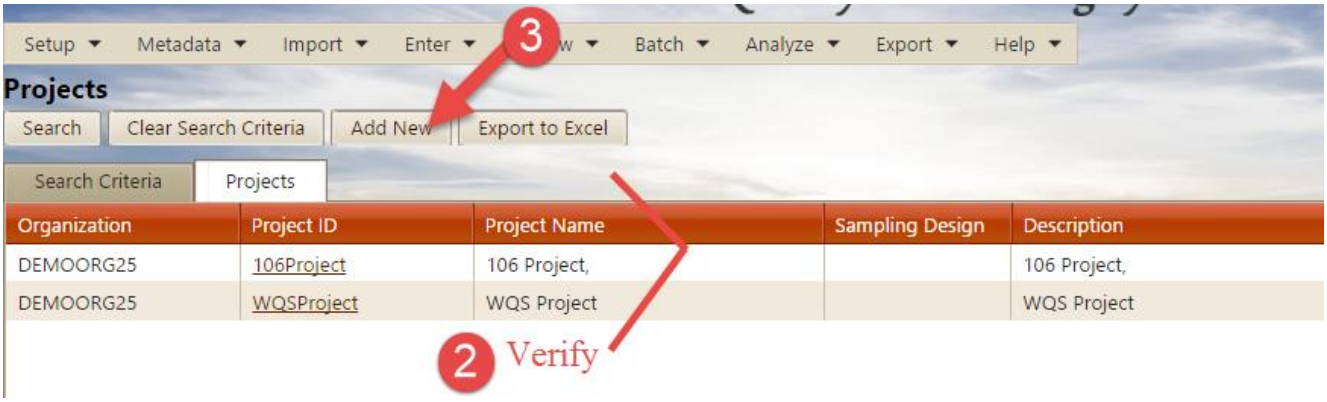
Step by Step Tutorial: manually entering Projects.

1. Hover over the **Metadata**, Click on the **Projects** menu item.

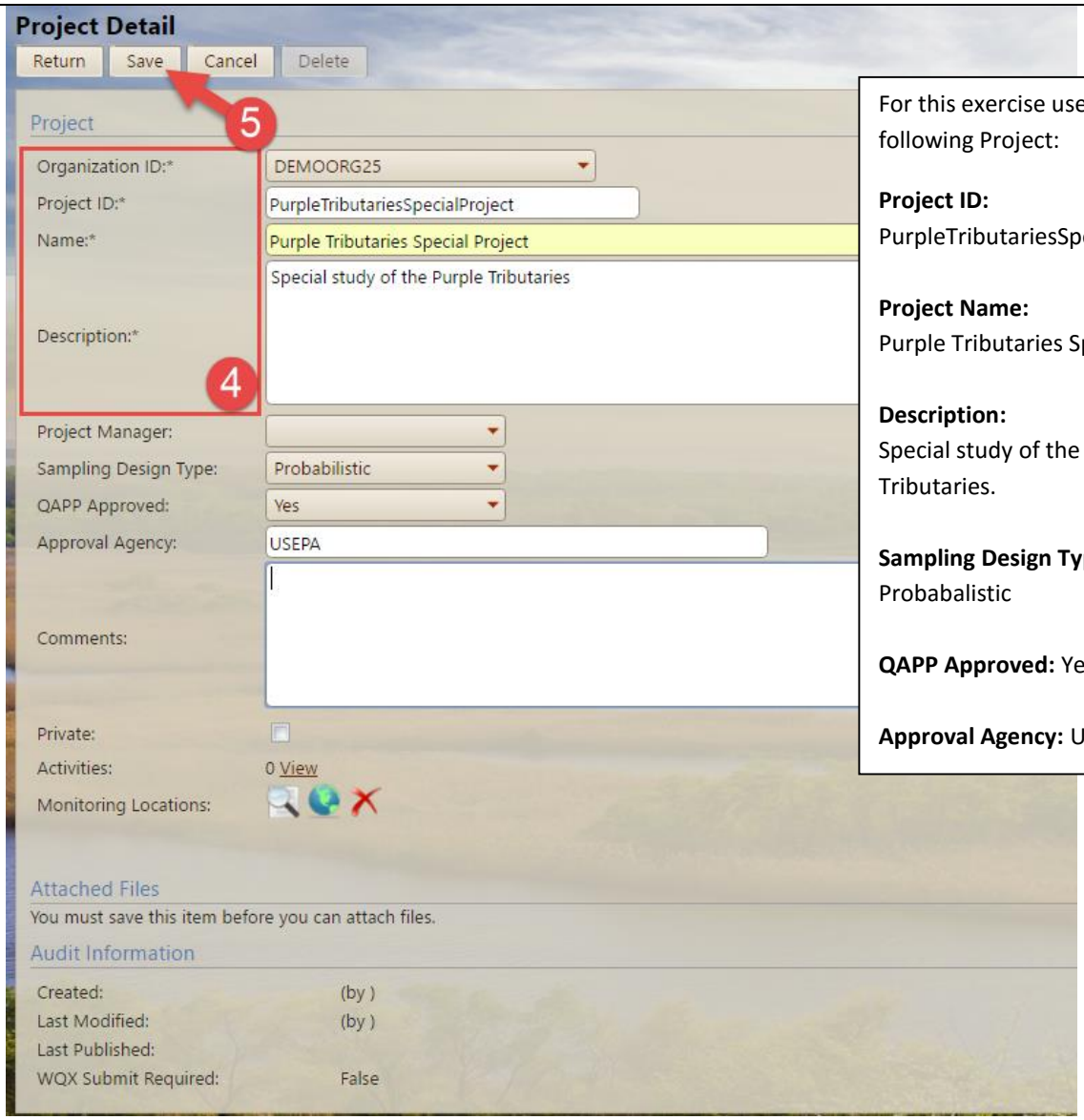


The **Projects List Page** will be displayed with a **Search Criteria tab** and a **Projects tab**. *Note: You may not see every project shown in the image below.*

2. Verify that the project you want to add is not already in the list.
   (Do a search through your organization's projects.)



3. If you are sure the project you wish to add is not already in the list, click the **Add New** button at the top of the page.
   A blank **Project Detail form** will be displayed.
4. Fill in at least the required fields on the form. Required fields are denoted with an asterisk ("*") character in the label.
5. Click the **Save** button at the top of the form.



For this exercise use create the following Project:

Project ID:
PurpleTributariesSpecialProject

Project Name:
Purple Tributaries Special Project

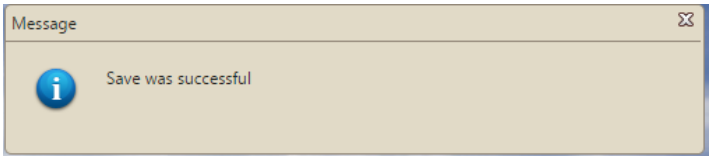
Description:
Special study of the Purple Tributaries.

Sampling Design Type:
Probabalistic

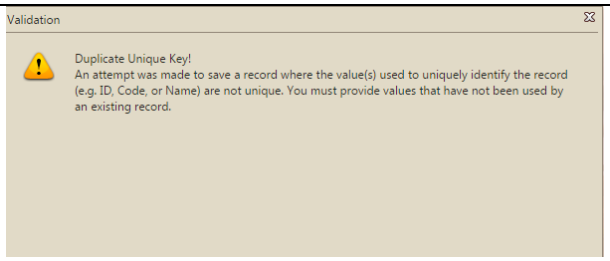
QAPP Approved: Yes

Approval Agency: US EPA

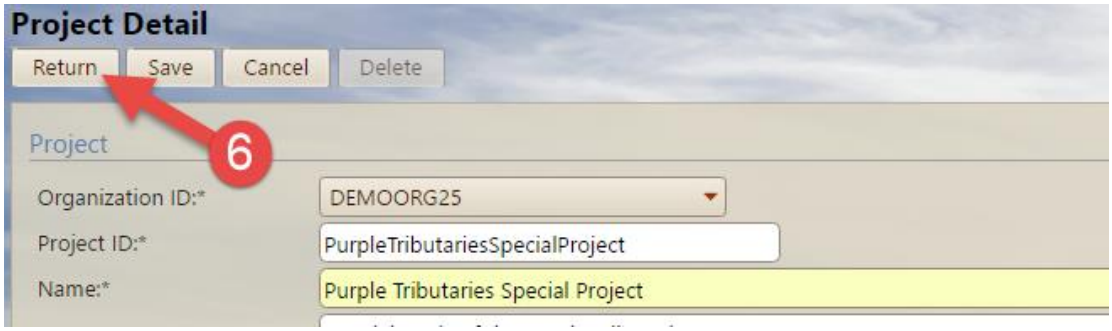
The system will indicate whether the new project record saved successfully.



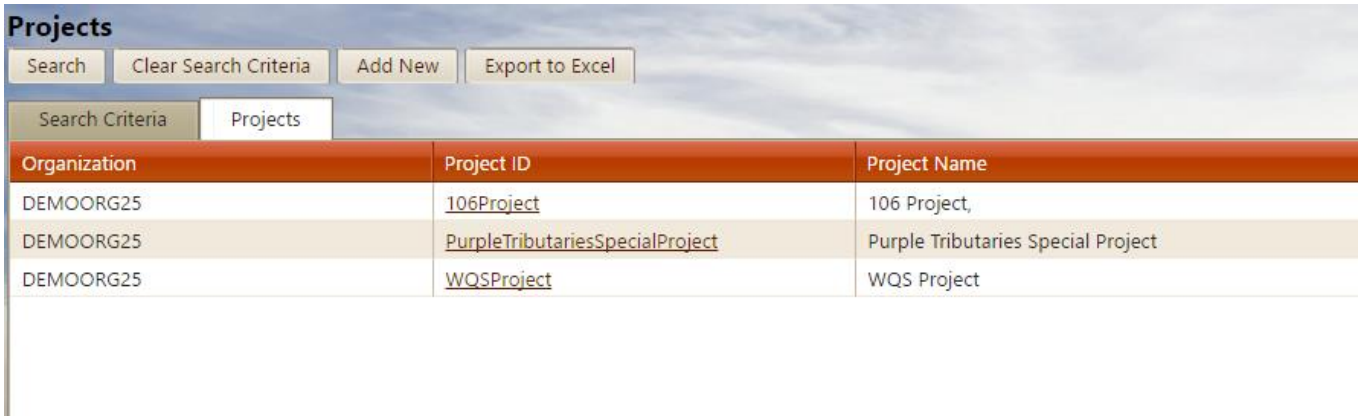
If there are issues with the record, either an error message or a warning will be displayed. For example, this error message is telling us that we mistakenly re-used the same project ID as one that has already been used.



6. Once any errors have been resolved, click the **Return** button at the top of the page to return to the **Projects list page**.



The **projects list page** will be displayed with either the **Search Criteria tab** or the **Projects tab** displayed. *Note: if the Search Criteria tab is displayed, click the Search button and you'll see your new project in the list.*



1c: Enter your lookup table values

We recommend reviewing lookup table values at least annually. Be sure any changes to analytical methods, etc. are reflected in the lookup table values.

What are lookup tables?

Sometimes a data element in AWQMS can only have a value from a specified list of choices; called a **Domain Value List (DVL).** Sometimes these lists are called **pick lists or lookup tables**. If your data contains values for a WQX/AWQMS data element that is constrained by a lookup table, your value must either match a value already in the lookup table or the data value has to be added to the lookup table as one of the allowed values. Otherwise, the record won't be allowed into AWQMS and WQX.

Some lookup tables might be completely under your control. These are called **Internal Tables**. Other Tables might be under EPA's control. These are called **EPA Managed Tables**. Other times, part of the list might be under EPA control while part of the list might be under your control (known as a **hybrid table**).

All organizations using AWQMS have access to reference the lookup tables. However, only the administrative user(s) for an organization has privileges to modify the allowed values in the **internal** and **hybrid** lookup tables. AWQMS users do not have privileges to change, add to, or remove the values in the **EPA Managed** lookup tables.

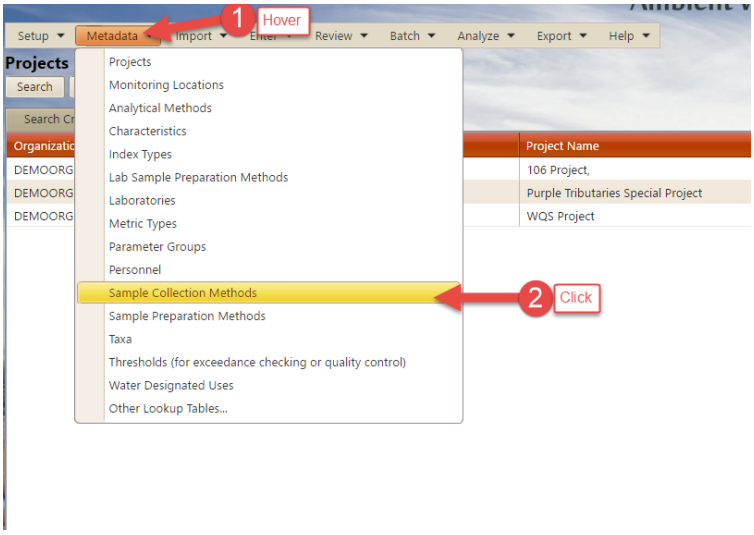
You view and manage lookup tables under **Metadata.** Before reviewing the lookup tables, we recommend having the following documentation available: lab reports, QAPP, tribal water quality standards or EPA criteria, SOPs or field manuals. For the purposes of this tutorial, the following lookup tables are important to fill out before going further:

- **Sample Collection Methods** – These are referenced by the activities you wish to enter or import into the system.
- **Sample Preparation Methods** – These are referenced by the activities you wish to enter or import into the system.
- **Analytical Methods** (where your method isn't already available in the US EPA or other standard method "context" tables) - These are referenced by the sample results you wish to enter or import into the system.
- **Sample Preservation Methods** – required under certain conditions.
- **Thresholds**– These are referenced when you import or enter data - the system validates data against the thresholds as the data is imported/entered into the system.

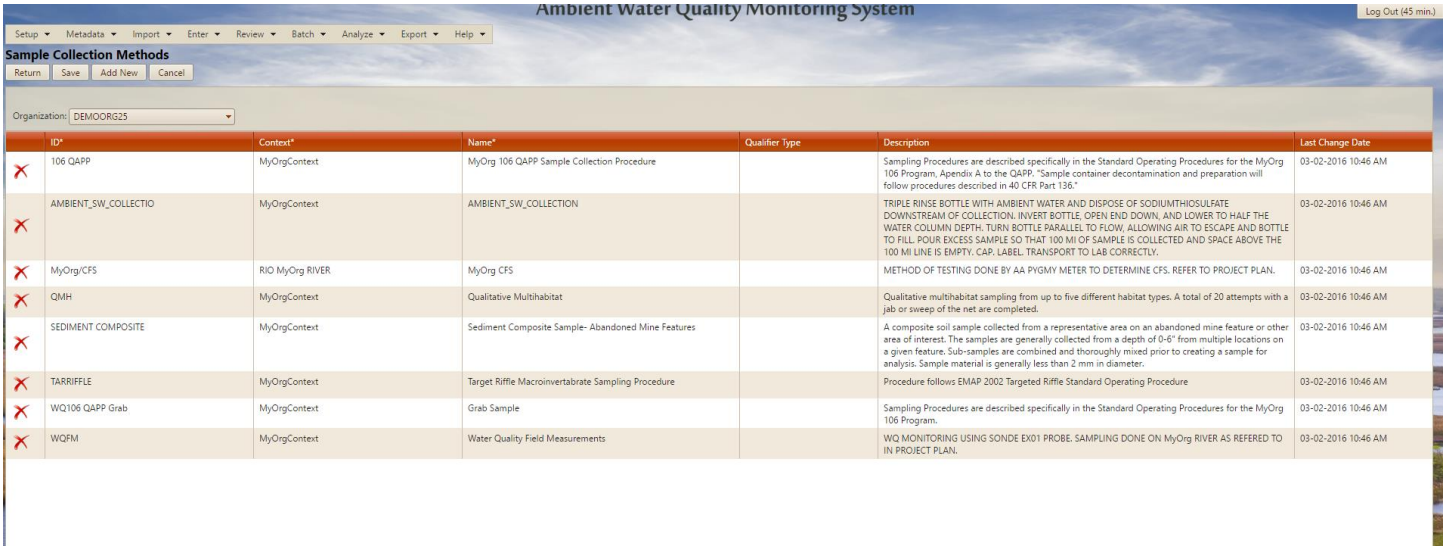
Do I already have values in my lookup tables?

You can see what values are stored in your lookup tables in AWQMS. *The step by step guide below uses sample collection methods as an example; but you can use the same steps to view the values in any of the lookup tables.*

1. From the navigation bar Hover on **Metadata.**



2. Click on the **Sample Collection Method**. The **Sample Collection Methods lookup table** will be displayed.



3. After reviewing the list of methods in the lookup table, click the Cancel button to return to the Lookup Tables page without saving any changes.

What should I do if I'm missing lookup values?

If you are missing lookup values for tables in the **Internal Tables**, you can easily add them to AWQMS yourself for your own organization's needs. Check with your EPA water quality lead or Gold Systems if you have questions.

If you are missing values for tables in the **Hybrid Tables**, you could add the missing values yourself for only your own organization. However, if the missing value is a value that you think other organizations will need, (e.g. an EPA Analytical Method), then you should send an email to storet@epa.gov and ask the WQX/STORET help desk to add the value to the lookup table under the appropriate "context" (e.g. "EPA") for everybody's use. Please CC awqms@goldsystems.com when you send such requests to storet@epa.gov.

If you are missing values for tables in the **EPA Managed Tables**, you should send an email to storet@epa.gov and ask the WQX/STORET help desk to add the value to the lookup table under the appropriate "context" (e.g. "EPA") for everybody's use. Please CC awqms@goldsystems.com when you send such requests to storet@epa.gov.

Adding Sample Collection Methods

Sample Collection Method ID and a related Context (Method Source) is required information for any activity that has an Activity Type that contains the word **Sample.** The Context is almost always going to be your Organization ID. If possible, list actual methods your organization uses, rather than just 'QAPP' since 'QAPP' is not very descriptive. Fill in as many of the data elements as you can so that the data will be meaningful.

1. Follow steps 1 and 2 from the previous exercise to get to the Sample Collection Method lookup table page. The Sample Collection Methods lookup table will be displayed. The column headers with asterisks ("*") denoted fields that are required and must be filled in.
   Note: **Most people have access to only one organization and it will automatically be selected in the "Organization" field at the upper left of the form. However, if you have access to more than one organization, you may need to choose the organization for which you wish to view Sample Collection Methods.**
2. Click the **Add New** bottom at the top of the page and a blank row will appear for you to fill in accordingly. Fill in the **Sample Collection Method ID**. Make sure you enter an ID that has not already been used for this organization. Enter the **Context**. You can think of the context as the "source" of the method. For example, it may be a home-grown method developed by your own organization. In that case, you would enter your own organization name or ID as the context. Enter the **name of the method** (not your own name and not the name of the organization). Leave the Qualifier Type field blank unless you have information that you already know should be added there. Add a **description** of the method. Some people type a full description while others enter a simple reference to an external document.

   For this exercise you can use the following values:
   ID: MyCollectionMethod
   Context: DemoOrg
   Name: My Collection Method
   Description: Dip it. Dip it good.

3. Click the **Save** button.
   The system will refresh **the Sample Collection Methods Lookup Table page** and you will see your new sample collection method in the list with a blank row at the bottom of the list. If there were no errors, there will be a message at the top of the page stating that the item was saved successfully. If there were issues with the attempt to save the new method, there will be one or more warnings and/or error messages displayed at the top of the page.

(You can repeat steps 3 and 4 for as many methods as are needed).

4. Click the **Return** button at the top of the page to return to the Lookup Tables page.

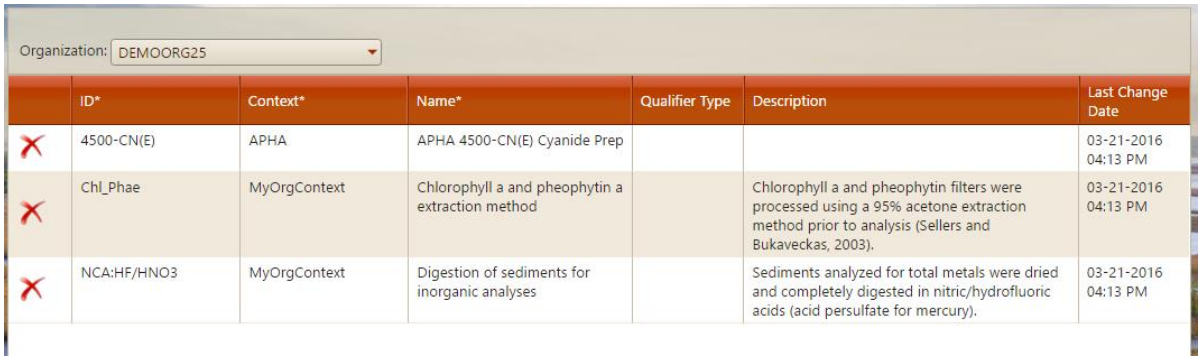
A note on adding Sample Preservation Methods as Sample Preparation Methods

If you identify a sample preparation method for an activity, WQX requires you to either provide a chemical preservation method or a thermal preservation method (or you can provide both). You also have to report container type and color as well as a description of how the sample is handled and transported.

For your Sample Preparation Methods lookup table, you may want to think through the set of Sample Preparation Methods that you use and add a corresponding Preservation Method name and identifier for each (i.e. EPA2014-METALS).

Adding Sample Preparation Methods to the Lookup Tables

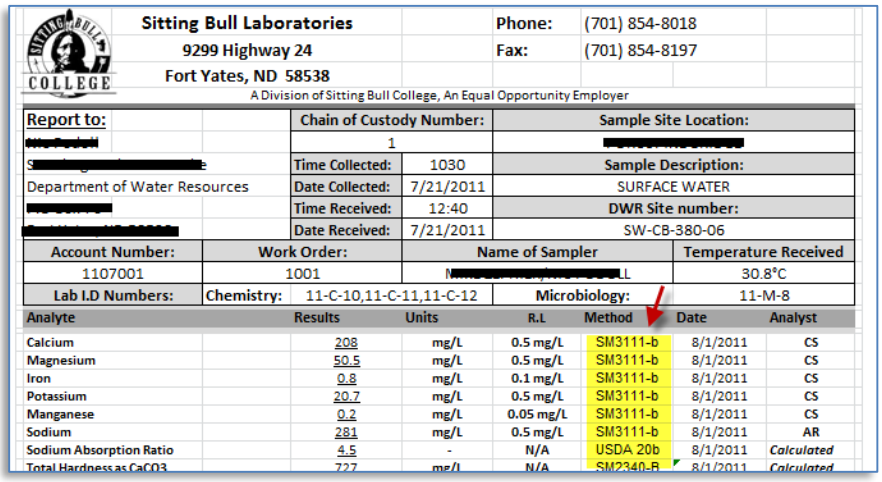
Adding sample preparation methods to the lookup tables is very similar to adding sample collection methods to the sample collection methods lookup table. The only real difference is that you would choose **Sample Preparation Method** from the Lookup Tables page (or from the **Metadata menu**). Here's what they looked like when we added ours. In the AWQMS-Demo environment, yours should look the same.



ID*	Context*	Name*	Qualifier Type	Description	Last Change Date
4500-CN(E)	APHA	APHA 4500-CN(E) Cyanide Prep			03-21-2016 04:13 PM
Chl_Phae	MyOrgContext	Chlorophyll a and pheophytin a extraction method		Chlorophyll a and pheophytin filters were processed using a 95% acetone extraction method prior to analysis (Sellers and Bukaveckas, 2003).	03-21-2016 04:13 PM
NCA:HF/HNO3	MyOrgContext	Digestion of sediments for inorganic analyses		Sediments analyzed for total metals were dried and completely digested in nitric/hydrofluoric acids (acid persulfate for mercury).	03-21-2016 04:13 PM

Adding Analytical Methods

When you are entering or importing results from a lab, WQX needs the Analytical Methods that were used to derive the result values. Any Analytical Methods referenced in your data have to exist in the AWQMS Analytical Methods lookup table before the results data can be brought into the system. Therefore, from time to time you may need to add an analytical method to the lookup table.



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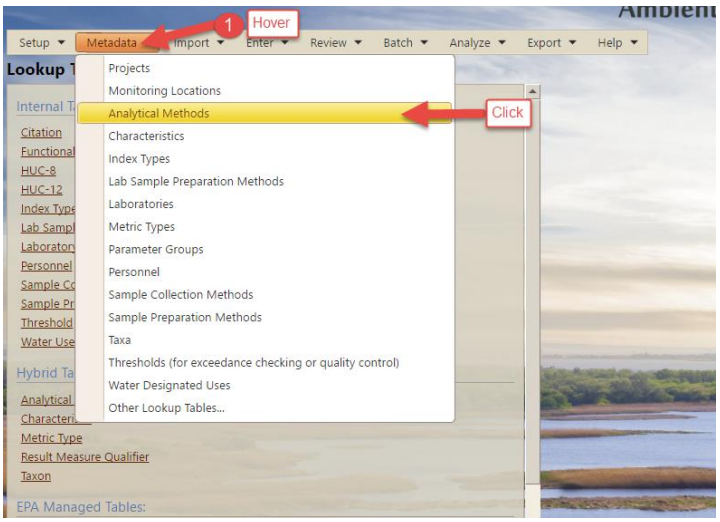
Report to:	Chain of Custody Number:		Sample Site Location:
[redacted]	1		[redacted]
[redacted]	Time Collected:	1030	Sample Description:
Department of Water Resources	Date Collected:	7/21/2011	SURFACE WATER
[redacted]	Time Received:	12:40	DWR Site number:
[redacted]	Date Received:	7/21/2011	SW-CB-380-06

Account Number:	Work Order:	Name of Sampler	Temperature Received
1107001	1001	[redacted]LL	30.8°C
Lab I.D Numbers:	**Chemistry:** 11-C-10,11-C-11,11-C-12	**Microbiology:**	11-M-8

Analyte	Results	Units	R.L	Method	Date	Analyst
Calcium	208	mg/L	0.5 mg/L	SM3111-b	8/1/2011	CS
Magnesium	50.5	mg/L	0.5 mg/L	SM3111-b	8/1/2011	CS
Iron	0.8	mg/L	0.1 mg/L	SM3111-b	8/1/2011	CS
Potassium	20.7	mg/L	0.5 mg/L	SM3111-b	8/1/2011	CS
Manganese	0.2	mg/L	0.05 mg/L	SM3111-b	8/1/2011	CS
Sodium	281	mg/L	0.5 mg/L	SM3111-b	8/1/2011	AR
Sodium Absorption Ratio	4.5	-	N/A	USDA 20b	8/1/2011	*Calculated*
Total Hardness as CaCO3	727	mg/L	N/A	SM2340-B	8/1/2011	*Calculated*

Before adding new Analytical Methods under your own "context" (organization), you should follow the steps above under "Do I already have values in my lookup tables" and be sure the analytical method you wish to add isn't already available under one of the contexts such as "US EPA", "HACH", "APHA", etc. Once you are confident that the desired analytical method is not already available, you can add it to your own organization's context using the following steps.

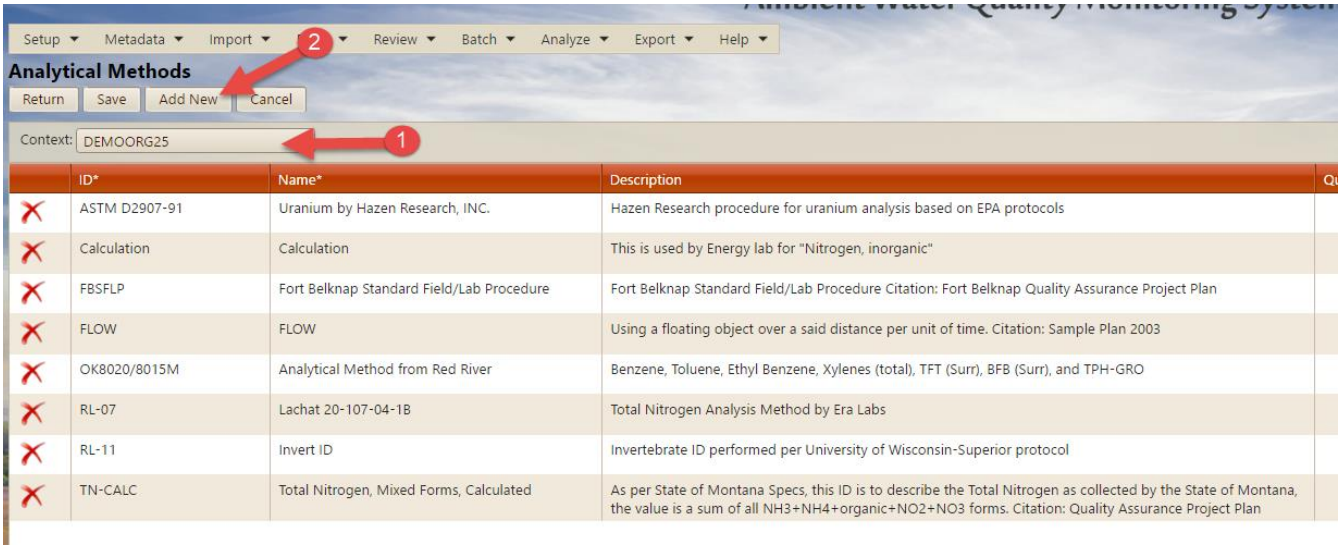
1. Hover on the **Metadata** and click on **Analytical Methods**.



Most of the time, labs use standard methods from the EPA or the manufacturer of a kit or piece of lab equipment. You should rarely have to add analytical methods in your own lookup table; but you may have to ask your lab to provide the "context" of the methods they use.

The **Analytical Methods table** page will be displayed, but no list will show until you've selected the context.

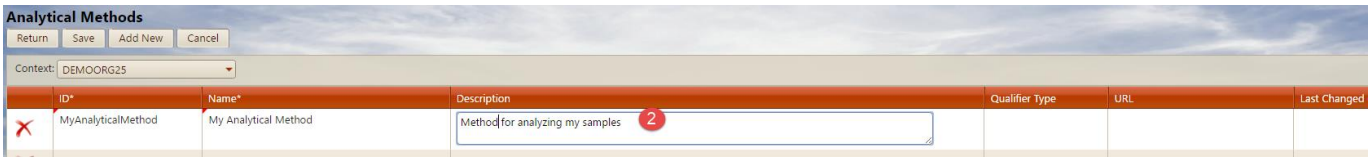
1. Select your **"context" (your organization)** from the drop-down list.



The list of analytical methods for your "context" (your organization) will be displayed. (These are just examples we copied into your demo account). There will be a blank row for adding a new method at the bottom of the list. Column headers with asterisks ("*") denote required fields that must be filled in.

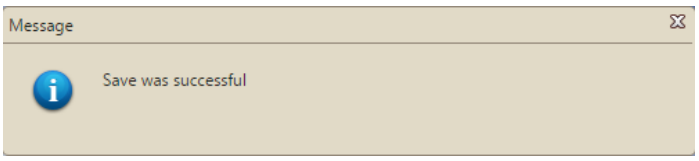
2. Click on **Add New** at the top of the page. A blank row will appear. Fill in at least the required fields.
For this exercise you could use the following fake data:

   ID: MyAnalyticalMethod
   Name: My Analytical Method
   Description: Method for analyzing my samples.



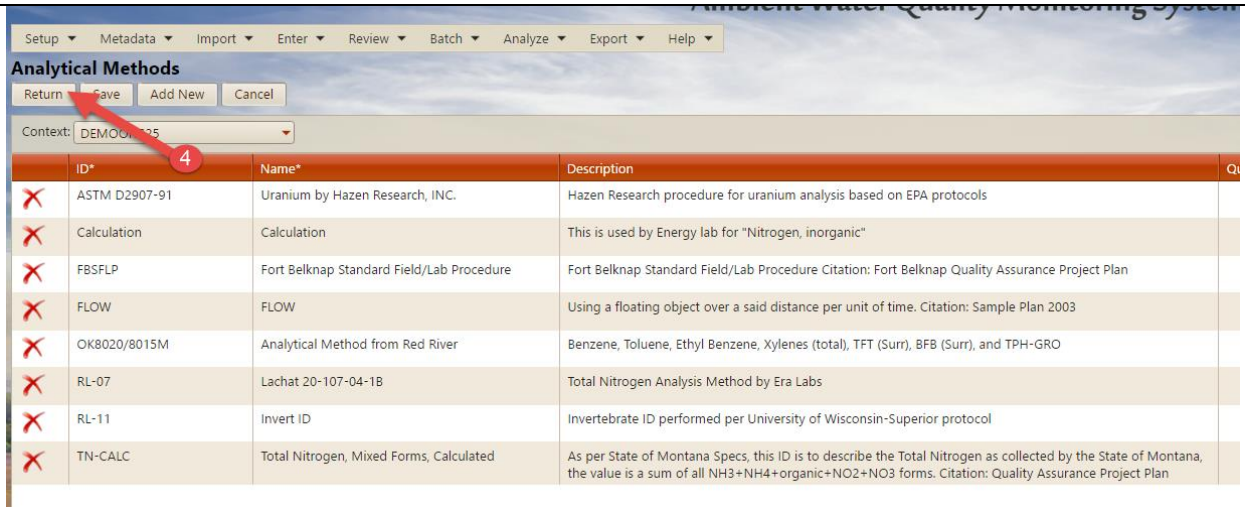
3. Click the **Save** button.

The page will refresh and there will be a message at the top of the form indicating that the data saved successfully. If there were any problems when attempting to save the new data, the system will display warnings or error messages.



Repeat steps 2 and 3 as many times as needed.

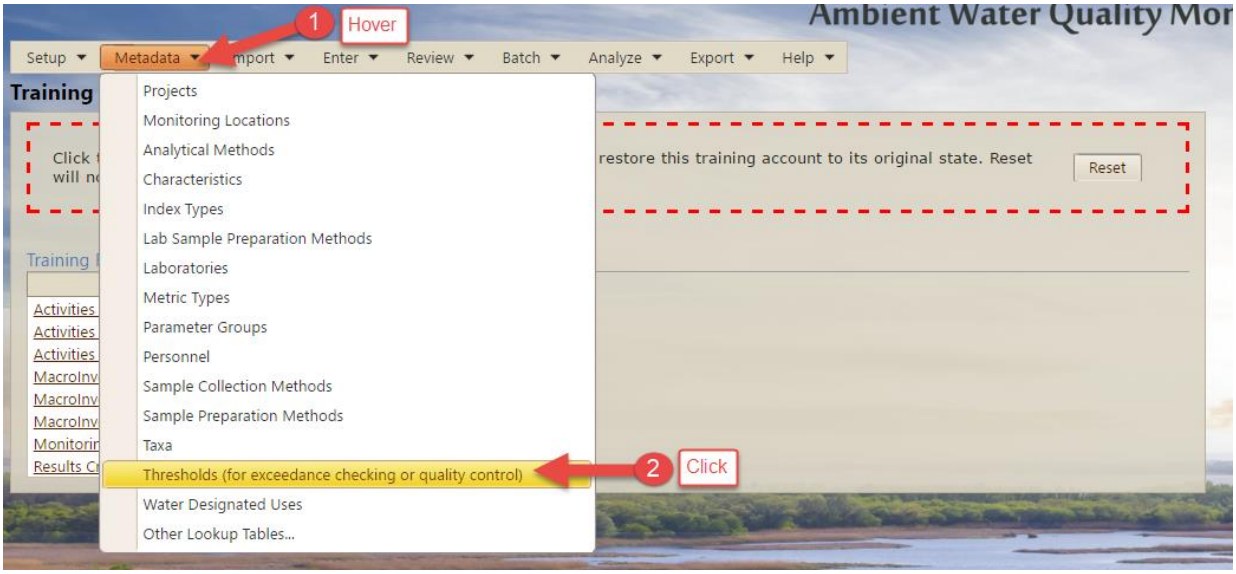
4. Click the **Return** at the top of page.



Adding QA/QC validation thresholds

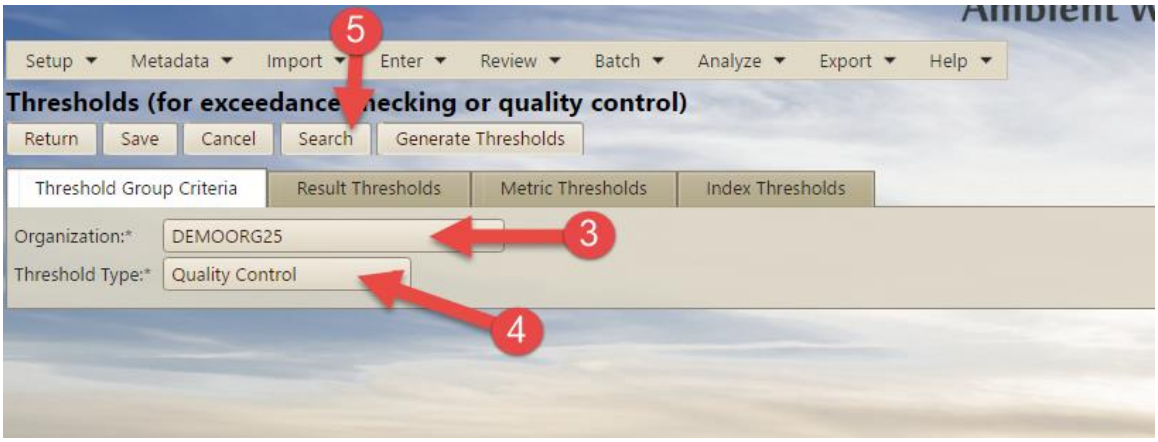
You should add QA/QC Thresholds to your lookup tables before importing activity and result data because the system can't check whether your result values are within a reasonable range without these in place. Also, the system can't check for consistency in the combinations of characteristic name, unit of measure, sample fraction, and method speciation until you have added the list of thresholds to your lookup tables. For the rest of this tutorial, we will refer to a characteristic name, unit of measure, sample fraction, and method speciation combination simply as an **analyze.**

1. Hover on **Metadata** on the **navigation bar**, you'll get a drop down menu.



2. Click on the **Thresholds (for exceedance checking or quality control**) menu item.
   The **Lookup Table Threshold** page will be displayed; but there will be no data showing. There are four tabs. One for **Threshold Group Criteria,** one for **Result Thresholds**, one for **Metric Thresholds,** and one for **Index Thresholds**. In this example, we will only be working with the second tab, **Result Thresholds**, but do not click on it yet.
3. While on the **Threshold Group Criteria** tab, select your organization from the Organization drop-down list.
4. In the **Threshold Type** drop-down list, select **Quality Control**.

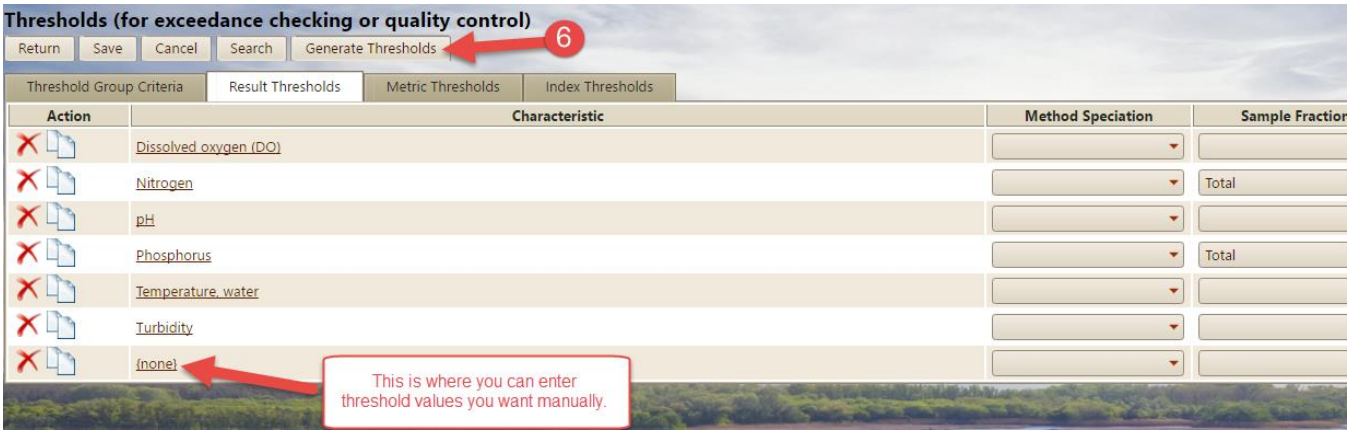
<u>Note:</u> There is a "Designated Use" field below the "Type" field. When you select "Quality Control" from the type list, the "Designated Use" field disappears because it is not applicable for Result Validation (QA/QC) type thresholds.



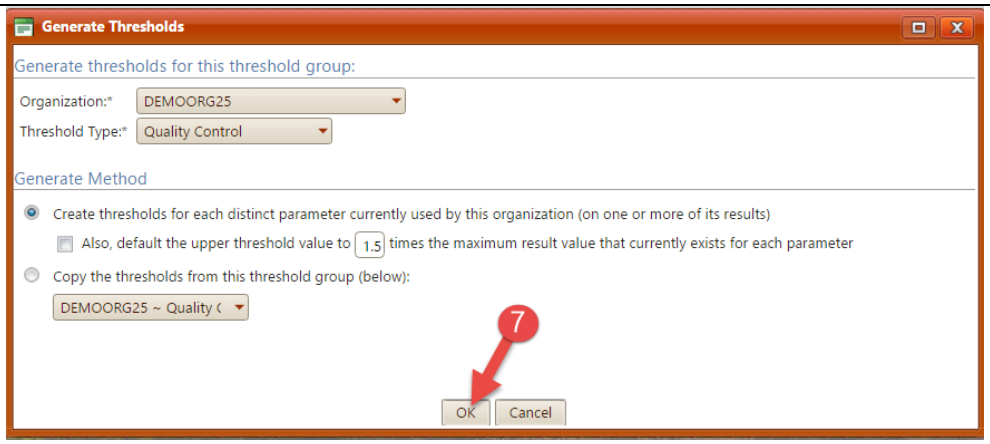
5. Click the **Search** button. The page will refresh but the **Results Thresholds** tab will be displayed.
   If you have entered result validation thresholds for your organization previously, they will be displayed in the list on the Result Thresholds tab. If you have not yet entered result validation thresholds, there will be a single empty row in the list.

   This list is intended to represent every parameter that you expect will be imported or entered into the system. Additionally, the list is intended to document the upper and lower bounds for what you consider to be reasonable measurement values for each parameter. There are no columns denoted as required fields but each row must have, at a minimum, the characteristic and the unit of measure specified.

   You could add each parameter (combination of characteristic name, unit of measure, sample fraction, and method speciation) one-by-one by filling out the blank row and clicking save, and so on. But that is a lot of work, so for this example, we are going to use a shortcut to create our parameters based on results data we already have in the system.
6. Rather than filling out the blank row, click on the **Generate Thresholds** button.



A dialog box will pop up asking you whether to proceed with generating the rows.



7. For this exercise, keep the default settings and click the **OK** button.

   The page will refresh and there will now be one row in the Result Thresholds tab for each distinct parameter in your organization's data.
   Note: the Lower and Upper columns allow you to enter lower and upper threshold values, as appropriate, for each distinct parameter. These lower and upper threshold values define the reasonable range of expected result values for the parameter.

Note: Appendix C contains recommended QA/QC Threshold values for EPA Region 8 Tribes who don't already have more specific QA/QC Thresholds. Tribes in other regions may want to work with EPA in their locale to decide on QA/QC Thresholds specific to your area.

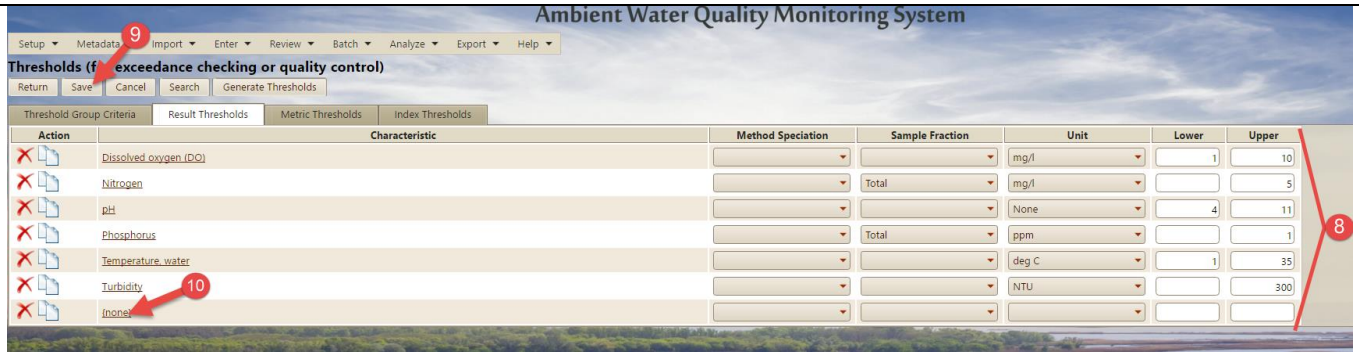
If you leave the lower value empty, you are telling the system that any value below the upper value is OK.

If you leave the upper value empty, you are telling the system that any value above the lower value is OK.

8. Enter your lower and upper values as follows.
   Dissolved Oxygen (mg/l) – Lower = 1 Upper = 10.
   Nitrogen Total mg/l Upper = 5
   pH None Lower = 4, Upper = 11
   Phosphorus ppm Upper = 1
   Temperature, water deg C Lower = 1 Upper = 35
   Turbidity NTU Upper = 300

9. Click the **Save** button.

The system will refresh the **Thresholds Lookup Table** page and you will see your parameter threshold list with a blank row labeled "{none}" at the bottom of the list. If there were no errors, there will be a message at the top of the page stating that the save was successful. If there were issues with the attempt to save the new index type, there will be one or more warnings and/or error messages displayed at the top of the page.

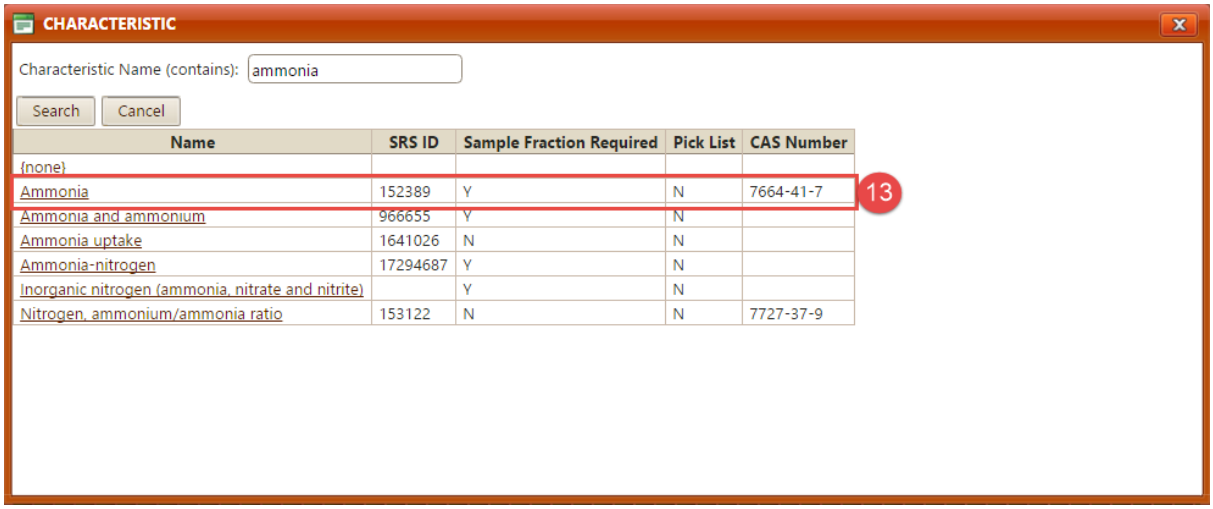


10. Click on the {none} link on the bottom row to add another characteristic to the list.
    A characteristic search form will pop open.

11. Type **Ammonia**
12. Click the **Search** button.

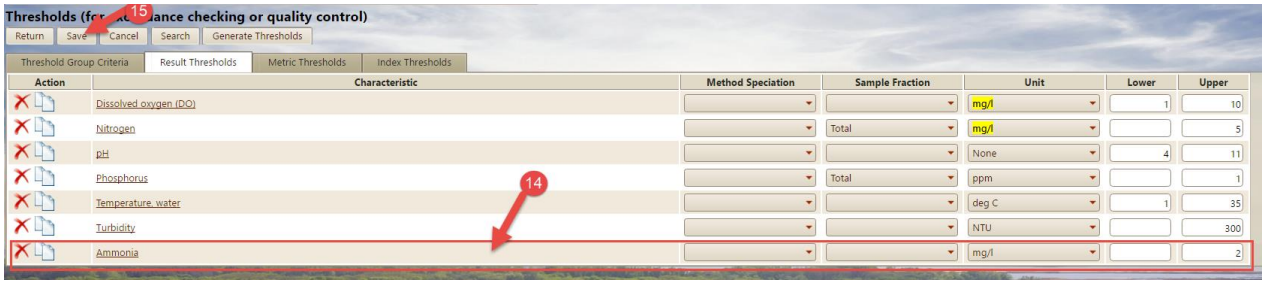
A list of characteristic names containing the word, **ammonia** will be displayed.

13. Select **Ammonia** from the list.

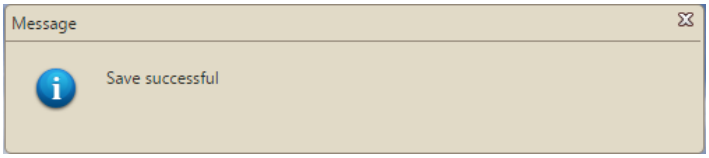


The list will close and **Ammonia** will be displayed as the new Characteristic in the new row in the list.

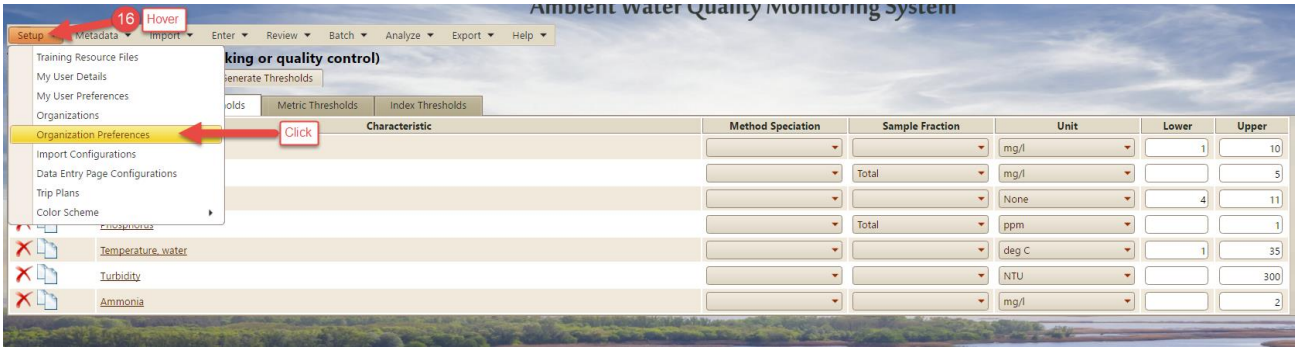
14. Fill in the Unit field with **mg/l** and the **Upper Threshold field** with a value of **2**.
15. Click the **Save** button at the top of the page to return to the Lookup Tables page.



Your updates have been saved successfully



16. Now that you have created Quality Control thresholds in your lookup tables, you can tell the system to check your results data against the thresholds whenever you import or manually enter data. In the Navigation menu click on **Setup → Organization Preferences**.

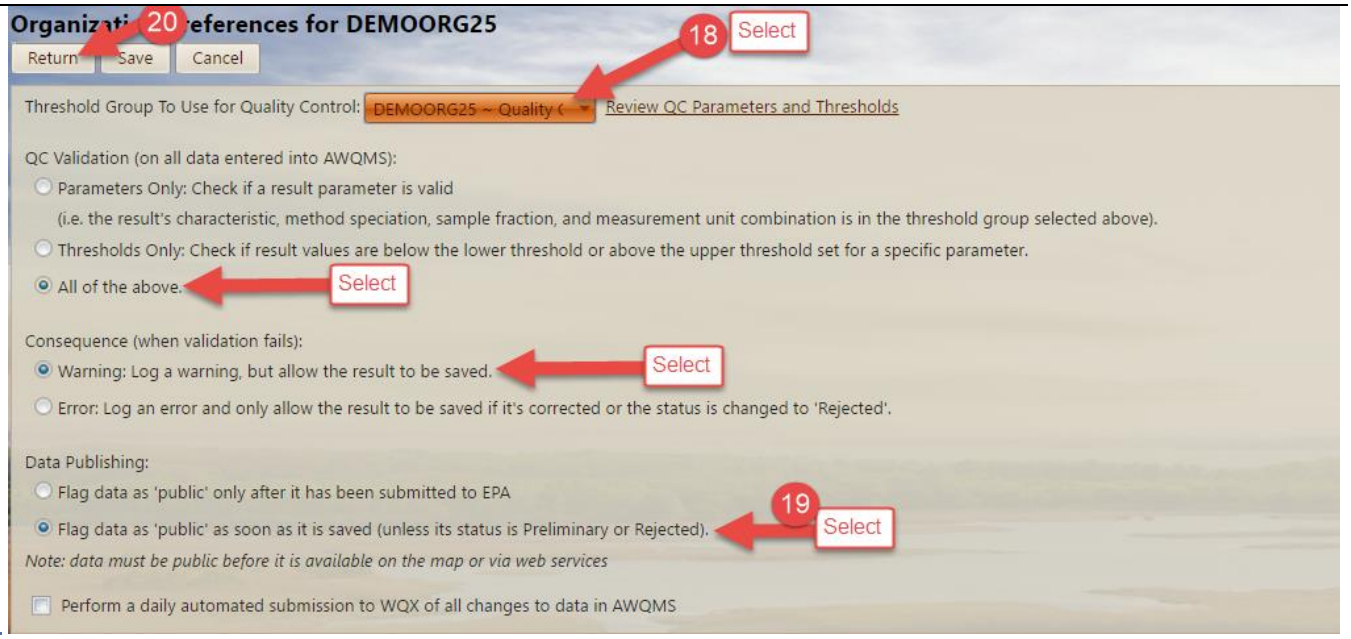


A list of organizations to which you have access will be displayed.

17. Select the organization for which you wish to apply your Quality Control thresholds.

The Organization Preferences page will be displayed.

18. Click on the drop-down list box and select the **Quality Control threshold group** we just created. Then select the validation type of **All of the Above**. The **All of the Above** Validation Type will both verify that each imported or entered result's characteristic, sample fraction, unit of measure, and method speciation combination exist in the threshold lookup table and verify that the result value is within the range specified in your threshold lookup table.



Select the first radio button under **Consequence (when validation fails):** which is labeled " Warning: Log a warning, but allow the result to be saved". This choice allows the data to be saved in the system, but displays a warning to alert you to the fact that either a result value is outside the expected range or that the result value is for an unexpected combination of Characteristic, Unit of Measure, Sample Fraction, and Method Speciation.

Clicking the Return button saves your changes before leaving the page you are on and returning you to the previous page. Clicking the Save button saves your changes and keeps you on the same page.

19. Click on the radio button under **Data Publishing** this will flag data as 'public' as soon as it is saved (unless its status is Preliminary or Rejected). *NOTE: This option is probably already selected by default.*
20. Click on the **Return** button to save your choices and return to the list of organizations.

STEP 2: Import or enter activities and results data into the AWQMS validation area and then migrate the data to the management area

If your data is in electronic files…

For any data you have in electronic spreadsheet or text files (**NOT .pdf files**) the goal should be to import that data into AWQMS so you don't have to enter it manually. You can think of it as three steps:

1. Create an **Activities and Results import configuration** to match your file. This is how you tell AWQMS how to read your file. As long as you continue to use the same file format for future data, you can continue to use the same import configuration.
2. Import the file of data into AWQMS using the **Import -> Activities & Results** menu item
3. After successfully importing your file and resolving any validation errors, you then **migrate** the files into the AWQMS management and analysis area.

We'll go into more detail in the following sections.

Activities and Results Import Configuration – Do I have one and what should I do if I don't?

You should have at least one **Activities and Results import configuration** for each type of data (chemistry, macroinvertebrate, field data, etc.) that you intend to import into AWQMS. In the exercise below, we use the import configuration for field measurement data that is built into AWQMS-Demo. Every AWQMS user has read only access to at least one system-owned Activities and Results-type import configuration. If you don't already have an import configuration for importing field measurements or any other Activities and Results type data, you can copy the system-owned one and use that as a good starting point. You can also do one of the following to get an Activities and Results-type import configuration:

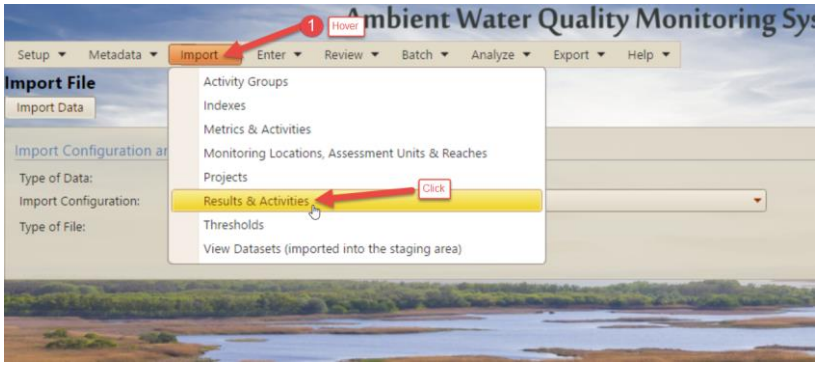
1. You can ask someone who already has one (such as a co-worker, another consortium member, Gold Systems, or maybe a regional EPA water quality lead) to share theirs with you (give you rights to view or even edit theirs). The AWQMS user guide has instructions on how to share an import configuration with someone else. Just do a search on **Rights on an Import Configuration** in the AWQMS User Guide. Once you have **Read access** to someone else's import configuration, you can just make a copy of theirs and "tweak" it to meet your needs.
2. You can save the demo import configuration from the demo environment as a file and then create a new import configuration in your live AWQMS account based on the saved file. From the Demo environment, you just click the **Save to File** button at the bottom of the import configuration detail page. Then in your live account, you create a new import configuration by importing a saved file. (Search for **Create an import configuration from a saved file in** the AWQMS user guide).
3. You can build your own from scratch. (Search for **Creating a New Import Configuration** in the AWQMS user guide).
4. You can download the **WQX Web template** from the EPA WQX Web Downloads web site and import the Activities and Results template import configuration. This is not worth explaining in this context; especially when there are much easier methods. However, it is essentially similar in concept to #2, above. The EPA has created some import configurations and saved them as files that you can download and the use as the basis for a new import configuration in AWQMS. There are links to the EPA template at the AWQMS portal documentation / tutorials page.

The AWQMS-Demo site has some example files on the Training Environment page that you can download and import into AWQMS-Demo. However, if you are using either AWQMS-Cloud or a deployed copy of AWQMS, you'd use your own file of actual Activities and Results. *To download the demo file to your machine, hover over the **Setup** menu item, click on the **Training Resource Files** sub-menu item, then click on the **Activities and Results – no errors.xlsx link**. Be sure to remember where the file has been saved. It may be in your browser's **downloads** folder.*

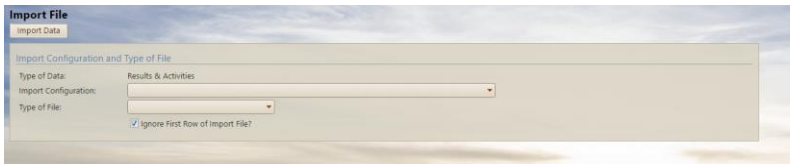
Example: Importing Field Measurement Activities and Results

Step by Step Tutorial

1. Hover over **Import** from the navigation bar, click on **Results & Activities**.



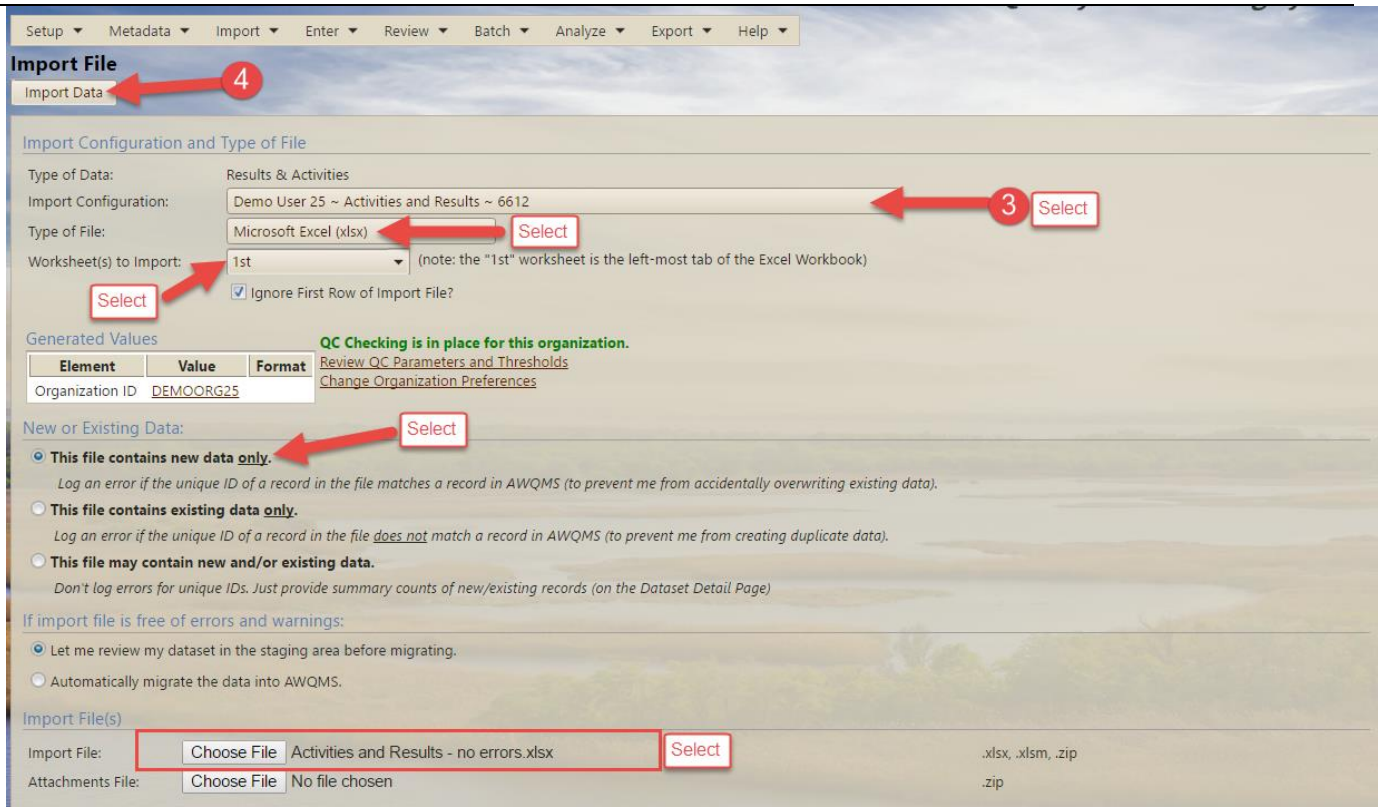
2. The **Import File** page will be displayed.



> ***Note:** Be sure to make the activity IDs in your file unique, such as a combination of the location ID, the date, the time, and the type of activity. If you use activity IDs that have been used previously, AWQMS and WQX will both assume you wish to update the existing activities with modified information and will also delete the existing result records for the existing activities and replace them with the new results you are importing. In other words, if you don't use unique activity IDs, you may accidentally overwrite existing data with new data!*

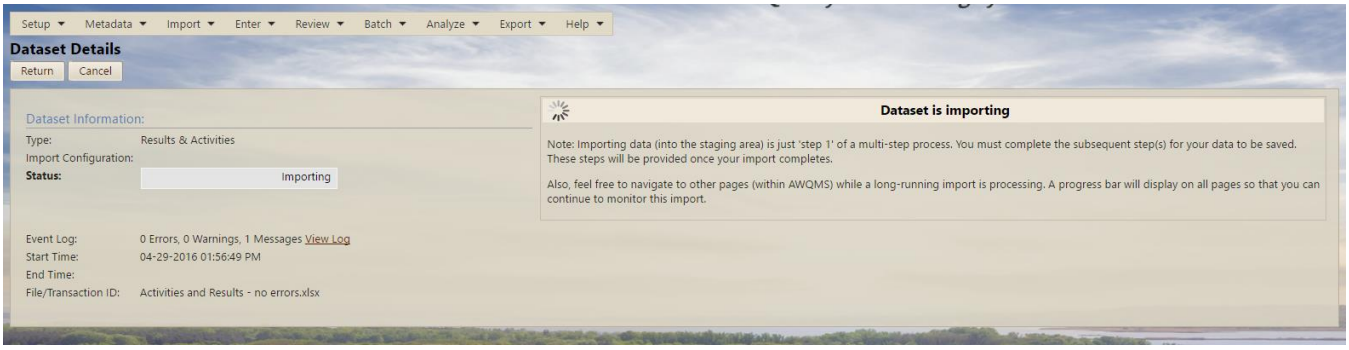
3. Fill in the **Import File form** to specify which file to import and how to import it. First you'll specify the import configuration to use when importing the file and then the type of file to be imported.
   For this demo exercise choose your demo user's **Activity and Results import configuration** and Microsoft Excel (xlsx). The page will refresh and show additional fields.

   Leave the sheet to be imported as the 1st sheet. Leave the checkbox for ignoring the first row of the file checked. Leave the Organization ID to be automatically generated/supplied for each row of data as your demo organization. Specify whether you expect your file to contain new or existing data (for this demo, choose **This file contains new data only**).
   Find and select the file you wish to import.

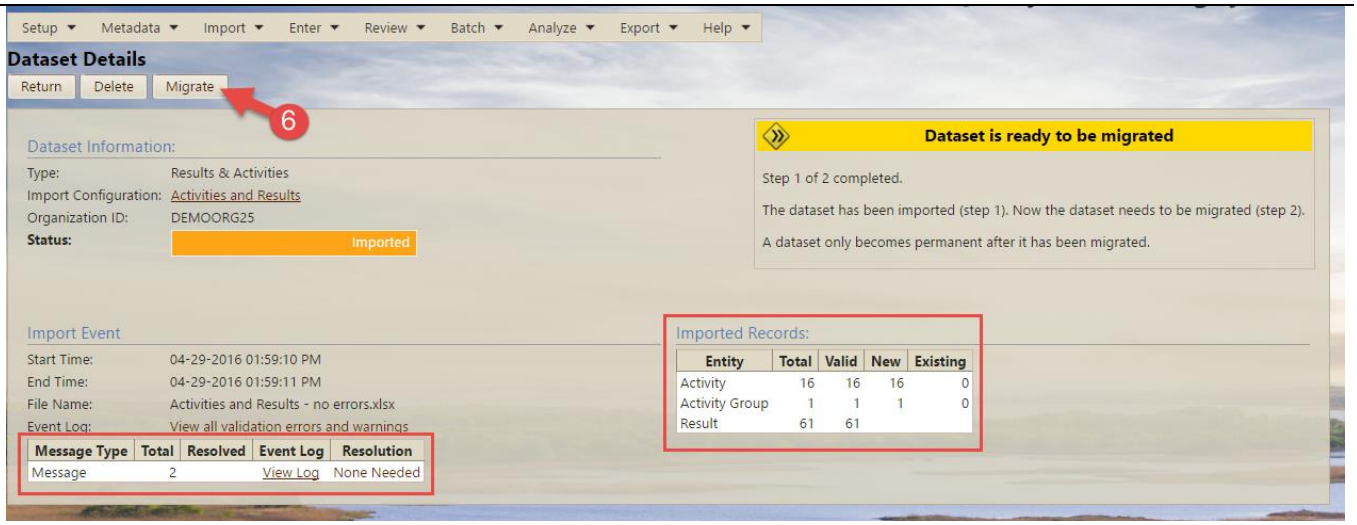


4. Click the **Import Data** button.

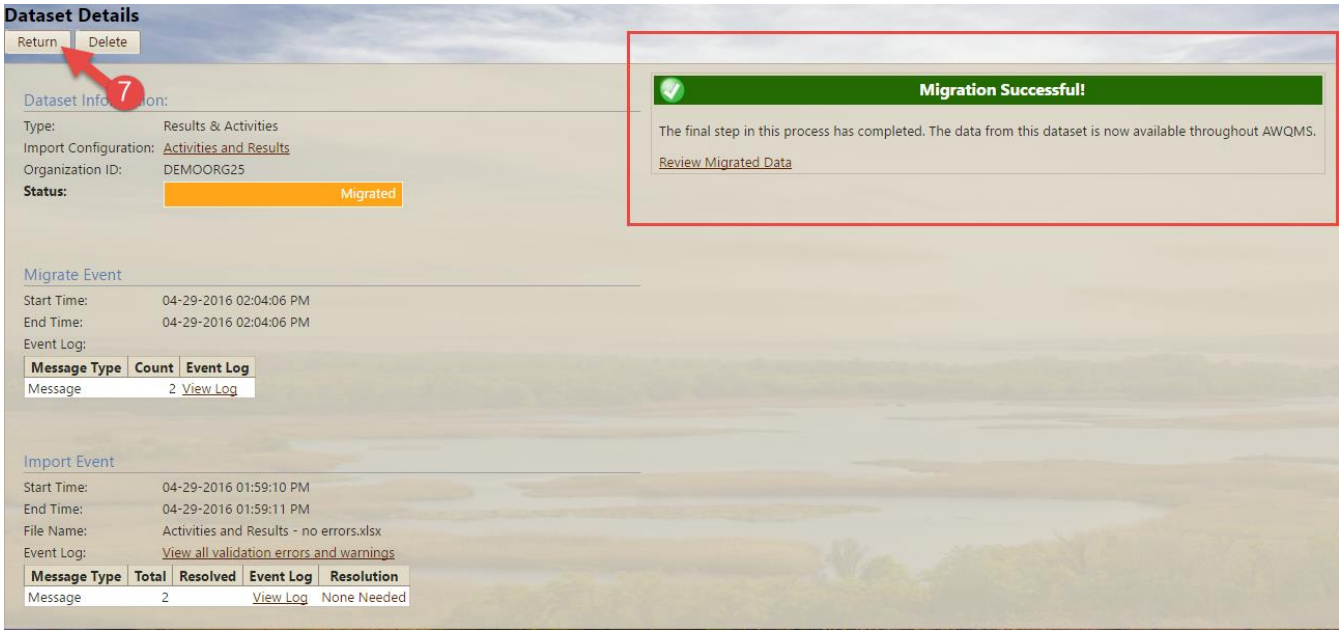
5. The **Dataset Summary page** will then begin the import. The page will automatically refresh approximately every 10 seconds. For larger uploads, the refresh will occur every 60 seconds after the first minute.



If all goes well, the system will eventually indicate that the import has completed. There will be a box in yellow stating your **Dataset is ready to be migrated**. The system will show how many activities, activity groups, and results were imported, under **Imported Records**. It will also display a **message box** – if there are no errors or warnings, it will just display messages.



6. Click the **Migrate** button.
   The dataset summary page will again refresh and indicate that the system is migrating the data from the AWQMS staging area into the AWQMS data management area.



   If all goes well, the Dataset Summary page will refresh and indicate that the activities, results, and activity groups migrated successfully!

7. Click the **Return** button to return to Home page.

   My Datasets page will be displayed; this shows what dataset you have been currently working on.

You could now go to **Review → Activities** and search for the new Activities you imported.

What if the system gives me errors during the import process?

AWQMS checks your data against numerous WQX rules. If the data violates any of these rules, the system logs error messages and/or warnings. The Dataset Summary page will display a list of the types of errors. For several of the more

common types of errors, there will be links on the Dataset Summary page that allow you to resolve the errors right in AWQMS without having to fix and reimport the data in the file.

If you would like to try this out, download and import the "Activities and Results - errors to fix after import.csv" file on the awqmsdemo.com website. This file is intentionally designed to cause various types of errors to occur.

See section "What if things don't go well? How do I fix import errors?", above. Note that you should typically resolve all of the errors in a dataset before migrating the data from the AWQMS staging area into the AWQMS management and analysis area.

If your data is on paper…

For any data you do not have in electronic spreadsheet or text files, the goal should be to enter the data manually directly into the AWQMS management and analysis area (and not into an intermediate file or spreadsheet). You do this via **Data Entry pages** in AWQMS. If configured optimally, data entry pages can save time and reduce data entry errors.

You can think of it as a two-step process:

1. Configure a **Data Entry page** to meet your data entry needs.
2. After your data entry page(s) is/are configured, use the **Enter -> Results and Activities** link to choose your page and then begin entering Results data one activity at a time.

Data Entry Page Configuration – Do I have one and what should I do if I don't?

The steps below assume you are using the data entry page that is pre-configured in the AWQMS Demo environment. Note, however, that you can configure as many different data entry pages as you need. For example, the demo environment has one configured for fish counts and another configured for field measurements. There's also a system-owned **Data Entry Page Configuration** specifically for entering bacteria tray count values if you use the **Quanti-Tray 2000 bacteria analysis kit.** If you don't already have a data entry configuration for entering field measurements or any other Activities and Results type data, you can do one of the following to get one:

1. Ask someone who already has one (such as a co-worker, another consortium member, Gold Systems, or maybe a regional EPA water quality lead) to share theirs with you (give you rights to view or even edit theirs). This is, by far, the easiest method! Sharing a data entry configuration works just like sharing an import configuration in AWQMS. The AWQMS user guide has instructions on how to share an import configuration with someone else. Just do a search on **Rights on an Import Configuration** in the AWQMS User Guide. Once you have access to someone else's data entry configuration, you can just make a copy of theirs and "tweak" it to meet your needs.

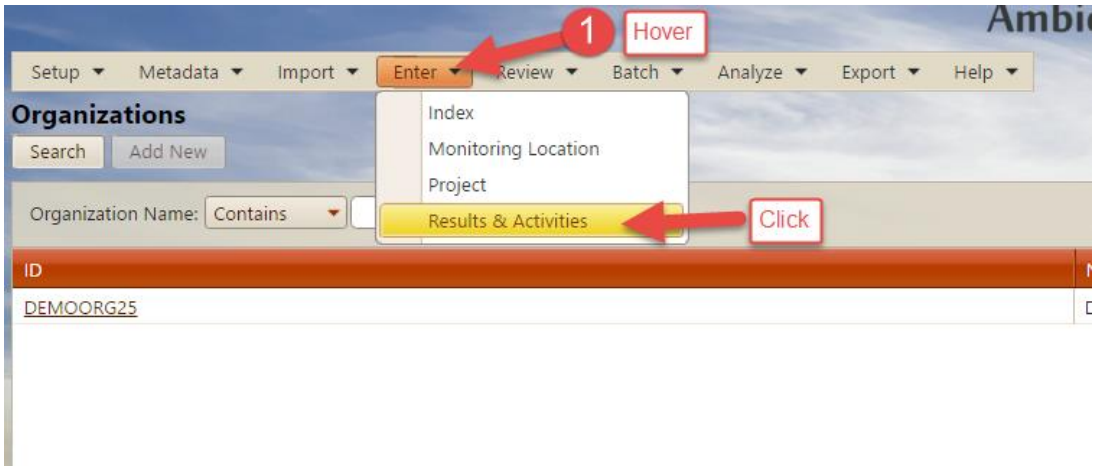
   Data Entry pages enforce any QA/QC validation thresholds you have set up in your Threshold lookup table.

2. Save the demo data entry configuration from the demo environment as a file and then create a new import configuration in your live AWQMS account based on the saved file. From the Demo environment, you just click the **Save to File** button at the bottom of the rapid entry configuration detail page. Then in your live account, you create a new import configuration by importing a saved file. (Search for **Create an import configuration from a saved file** in the AWQMS user guide).

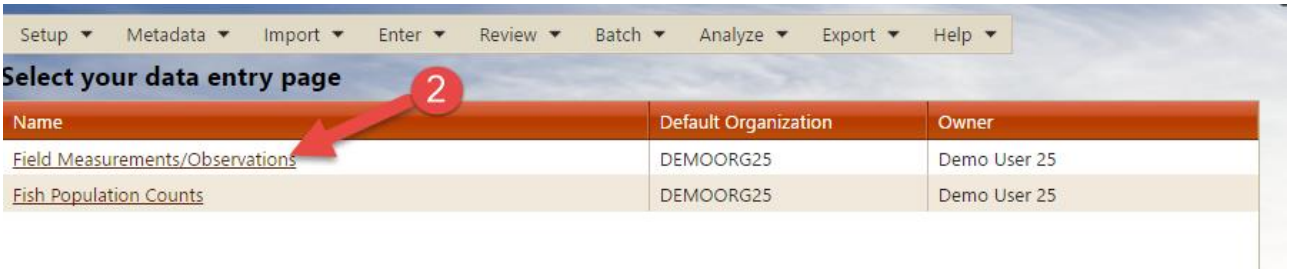
3. Build your own from scratch. (Building a new rapid entry configuration is very similar to building a new import configuration. Search for **Creating a New Import Configuration** in the AWQMS user guide).

Entering Field Measurements via Data Entry

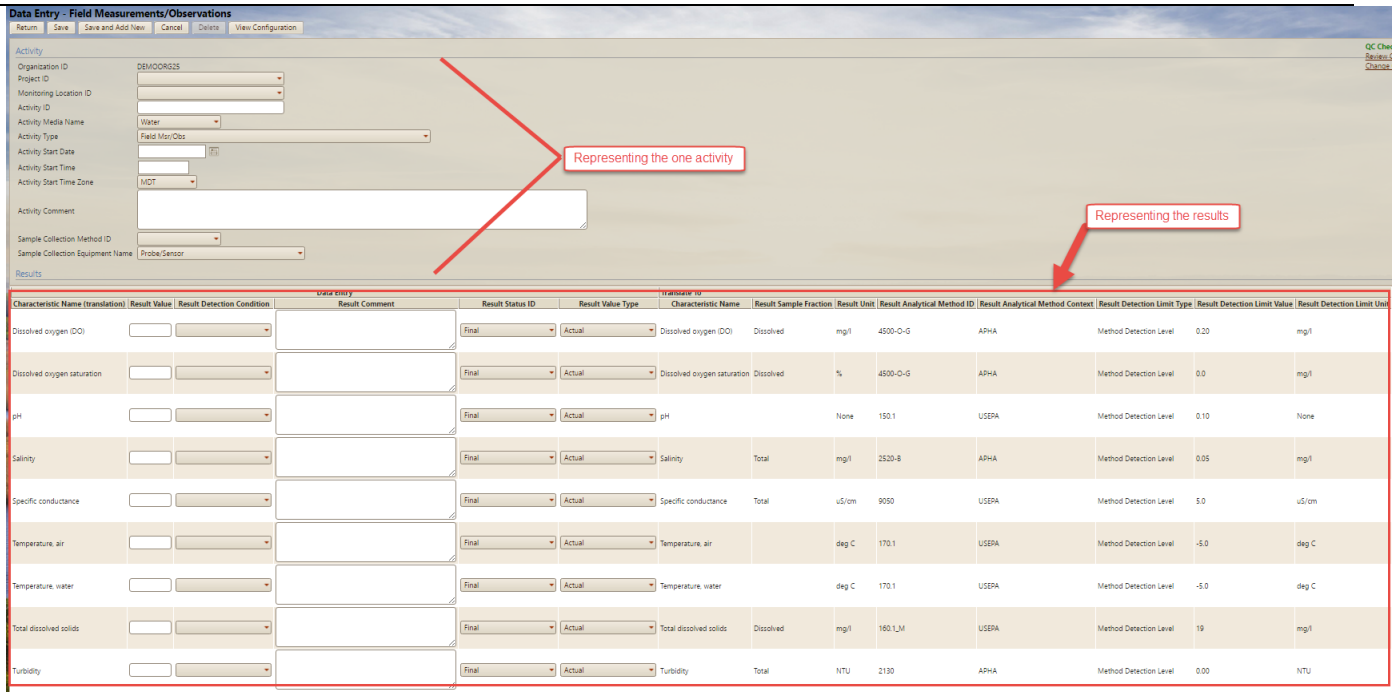
1. Hover on **Enter** and click on **Results and Activities** from the Menu on the top of the on home screen.



2. The system will take you to a page to select your Data Entry Page. For this demo we are choosing the **Field Measurements/Observations** Data Entry Page.



The data entry page is generated and displayed. It shows input fields and default values based on the associated Data Entry configuration. The top portion of the page represents one activity. Each row in the bottom portion represents one result associated with the activity.



> ***Note:*** *Be sure to make the activity ID unique, such as a combination of the location ID, the date, the time, and the type of activity. If you use activity IDs that have been used previously, AWQMS and WQX will both assume you wish to update the existing activities with modified information and will also delete the existing result records for the existing activities and replace them with the new results you are typing in. In other words, if you don't use unique activity IDs, you may accidentally overwrite existing data with new data!*

For this demo exercise we'll create three **Field Measurement/Observation** activities with associated results in the **106Project** project using the **WQFM** collection method based on the following field sheet:

[redacted]ENVIRONMENTAL OFFICE

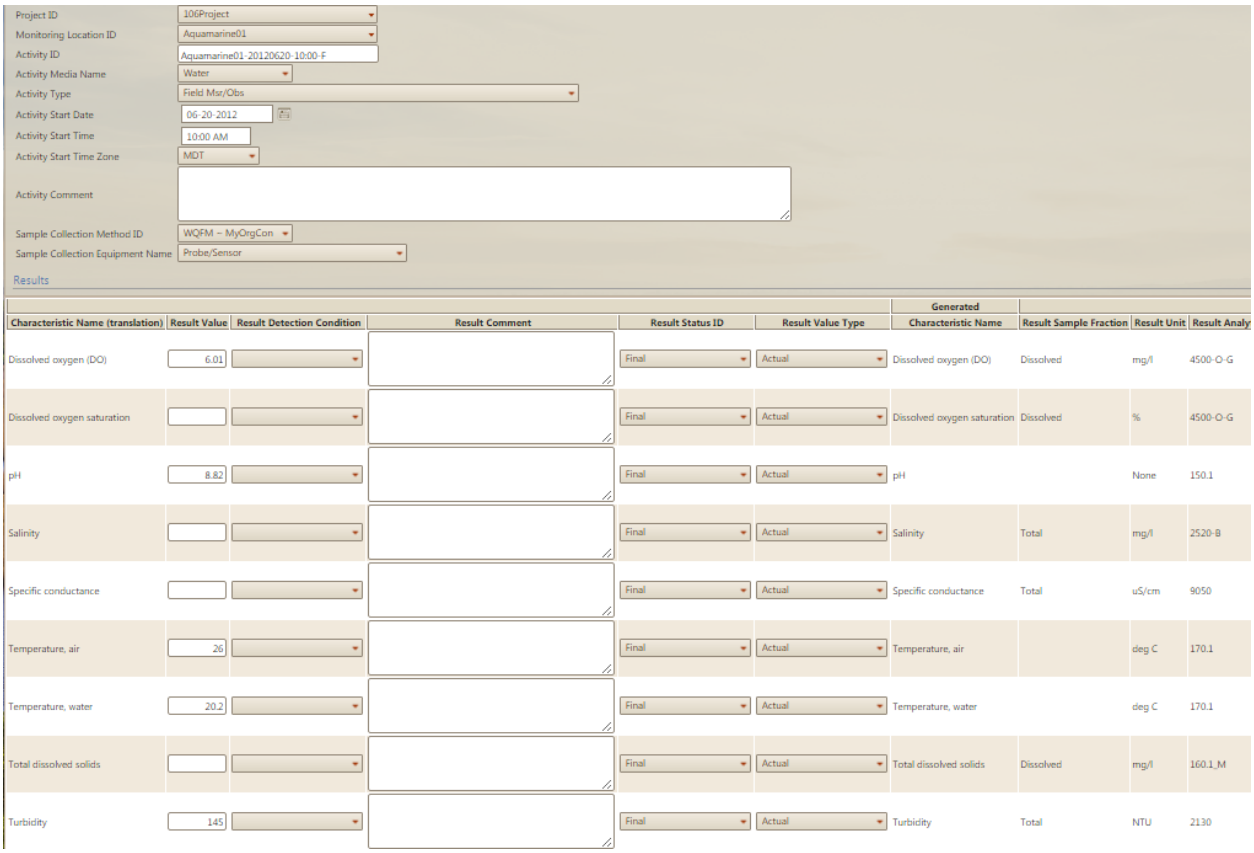
106 WATER QUALITY DATA COLLECTION SHEET - PHYSICAL PARAMETERS

Watershed		**Collected by**	[redacted]	**Duplicate #**	
Weather Conditions	Windy - Clear skies				
Comments					
Visited three sites which are all part of Project 1					
			Vehicle Mileage - Start	**Ending**	

Acitvity ID	Site #	Stream / River / Project	DOxygen	pH	Cond	Air Temp	H2o Temp	Turb	Date	Time	Initials
Aquamarine01-20120620-10:00-F	Aquamarine01	Aquamarine River / Project 1	6.01	8.82		26	20.2	145	6/20/2012	10:00	[redacted]
Diamond02-20120620-12:05-F	Diamond02	Diamond River / Project 1	6.51	8.86		27.4	21.4	198	6/20/2012	12:05	[redacted]
Emerald03-20120620-02:15-F	Emerald03	Emerald River / Project 1	7.23	8.76		30	21.8	1120	6/20/2012	2:15	[redacted]

Note that there are three activities, one on each row. An activity represents a measurement, observation, or sample taken at a location on a date at a time (and maybe at a depth). See the AWQMS user guide glossary of terms for more on the definition of an activity.

3. For the first activity, fill in the activity fields with appropriate values. In some cases, you should be able to just leave the defaults.
4. For the first activity, fill in the results fields with the DO, pH, Air Temp, H2o Temp, and Turbidity values. (Leave the result value fields for the other characteristics blank).

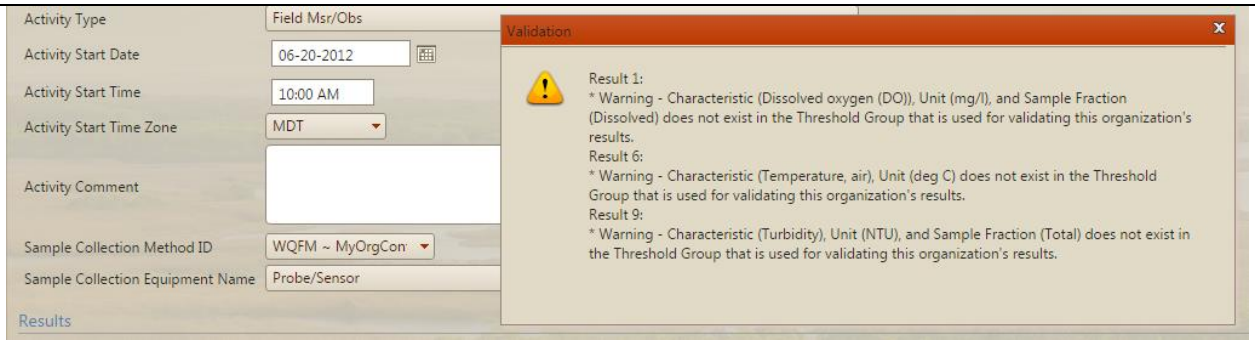


Project ID	106Project
Monitoring Location ID	Aquamarine01
Activity ID	Aquamarine01-20120620-10:00-F
Activity Media Name	Water
Activity Type	Field Msr/Obs
Activity Start Date	06-20-2012
Activity Start Time	10:00 AM
Activity Start Time Zone	MDT
Activity Comment	
Sample Collection Method ID	WQFM – MyOrgCon
Sample Collection Equipment Name	Probe/Sensor

Results

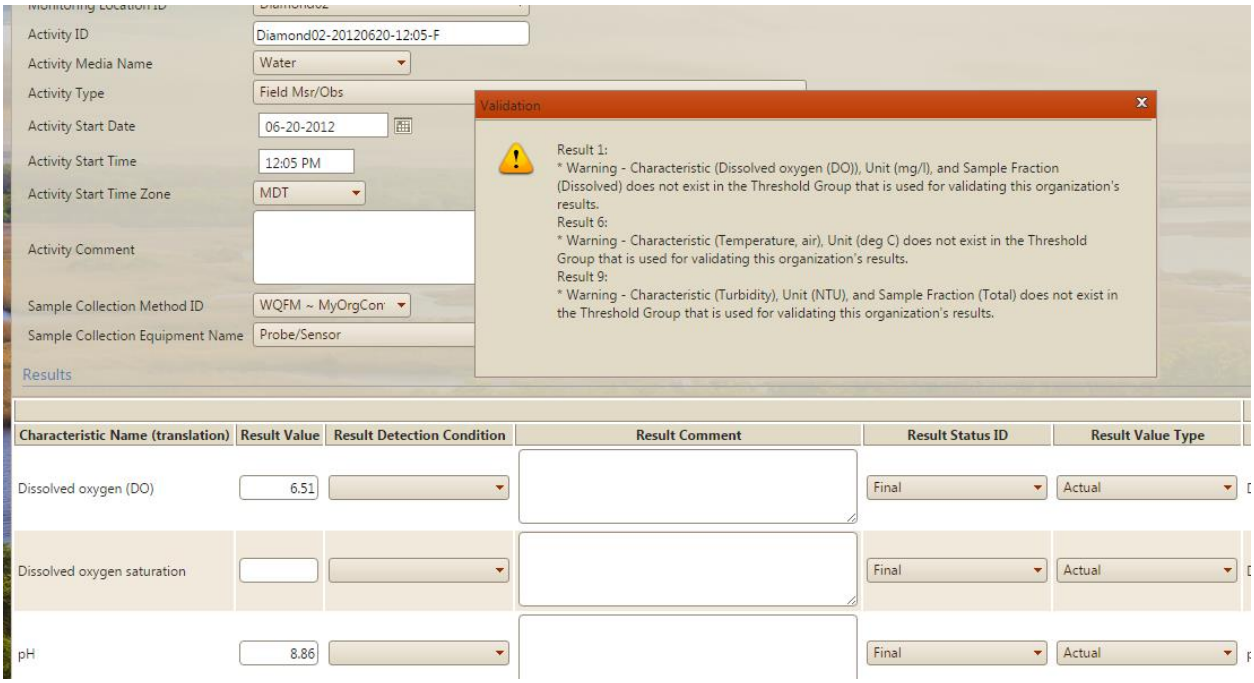
Characteristic Name (translation)	Result Value	Result Detection Condition	Result Comment	Result Status ID	Result Value Type	Generated Characteristic Name	Result Sample Fraction	Result Unit	Result Analy
Dissolved oxygen (DO)	6.01			Final	Actual	Dissolved oxygen (DO)	Dissolved	mg/l	4500-O-G
Dissolved oxygen saturation				Final	Actual	Dissolved oxygen saturation	Dissolved	%	4500-O-G
pH	8.82			Final	Actual	pH		None	150.1
Salinity				Final	Actual	Salinity	Total	mg/l	2520-B
Specific conductance				Final	Actual	Specific conductance	Total	uS/cm	9050
Temperature, air	26			Final	Actual	Temperature, air		deg C	170.1
Temperature, water	20.2			Final	Actual	Temperature, water		deg C	170.1
Total dissolved solids				Final	Actual	Total dissolved solids	Dissolved	mg/l	160.1_M
Turbidity	145			Final	Actual	Turbidity	Total	NTU	2130

5. Click the **Add New** button. This will attempt to save your new activity and result and then provide a blank form to allow you to add another new activity with associated results.
   In the case of our demo, we see some warnings:



These warnings are based on the QA/QC thresholds we created in a previous exercise. The system has saved our records but is warning us that we are entering values for some unexpected parameters. *This is a great example of the AWQMS Quality Control thresholds feature doing its job!* In a real world scenario like this, you would either want to either add the parameters to your thresholds list or "fix" the parameters in your data entry form to match expected parameters in your thresholds list. For this exercise, <u>just close the validation pop up warnings by clicking the X button in the upper right corner.</u>

6. Click the **Add New** button again to get a blank form.
7. Fill in the activity and result value fields for the second activity like you did for Steps 3 & 4.
8. Click the **Add New** button.



(You'll get the error pop-up again. <u>Just close it and click **Add New** again</u>).
The system displays another blank form.

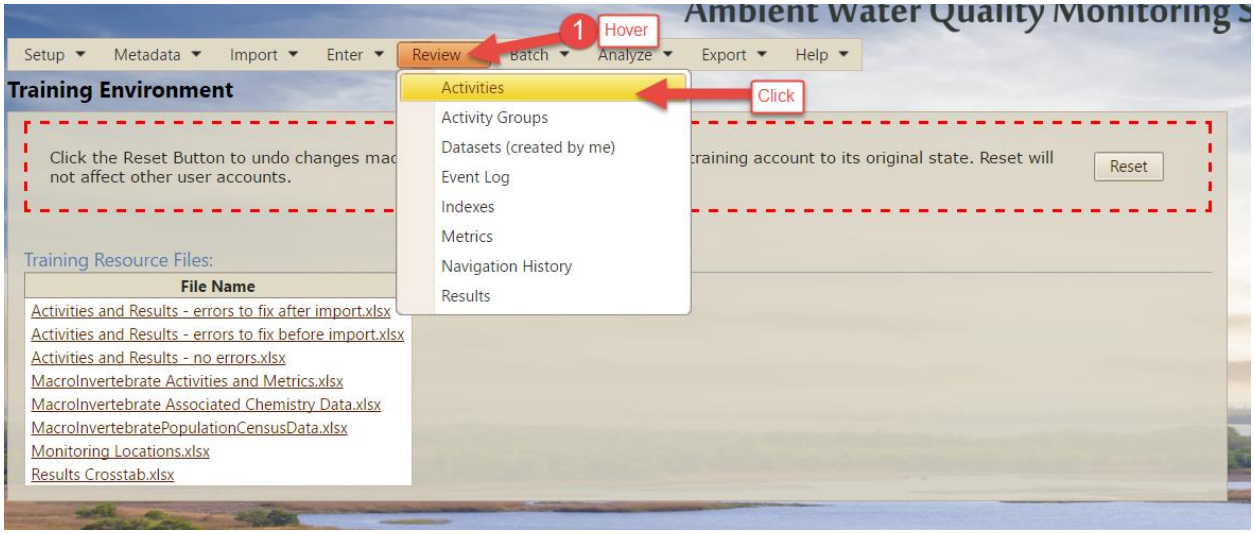
9. Fill in the activity fields and result values for the third activity.
10. Click the **Save** button.

(You'll get the error pop-up again. Just close it and click the Return button to go back to the "Select your data entry page" page).

STEP 3: Manage and Analyze Your Data

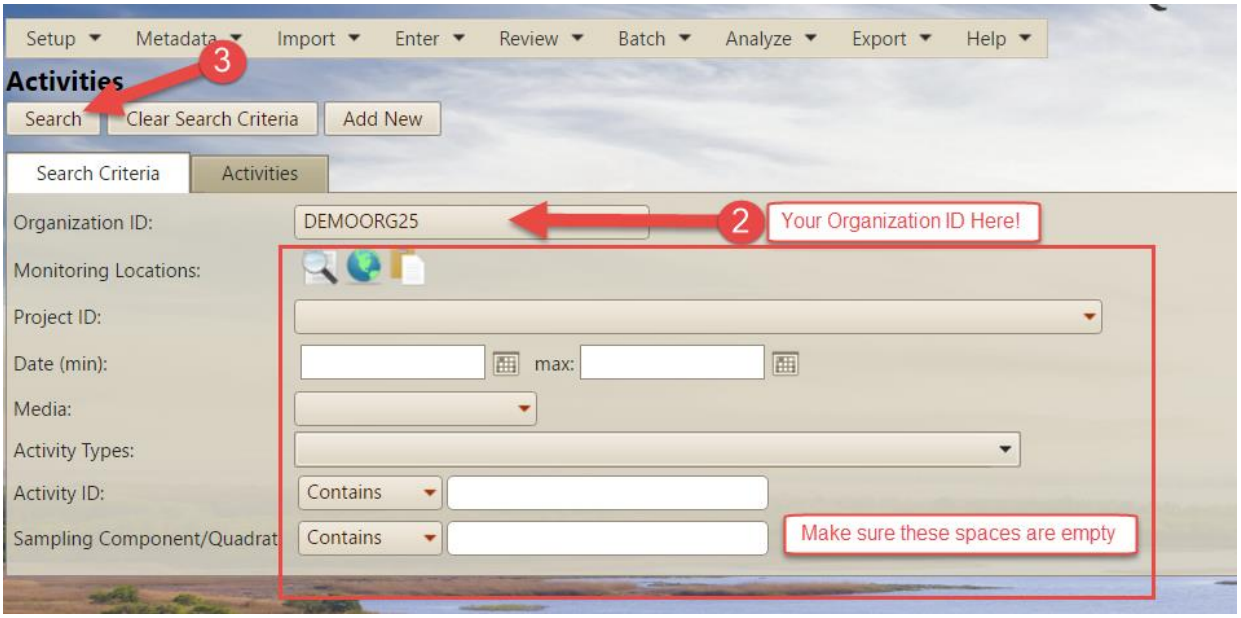
Now you could verify that the new activities and results you've imported and entered are in the system.

1. Hover over **Review** on the navigation bar and click on **Activities.**



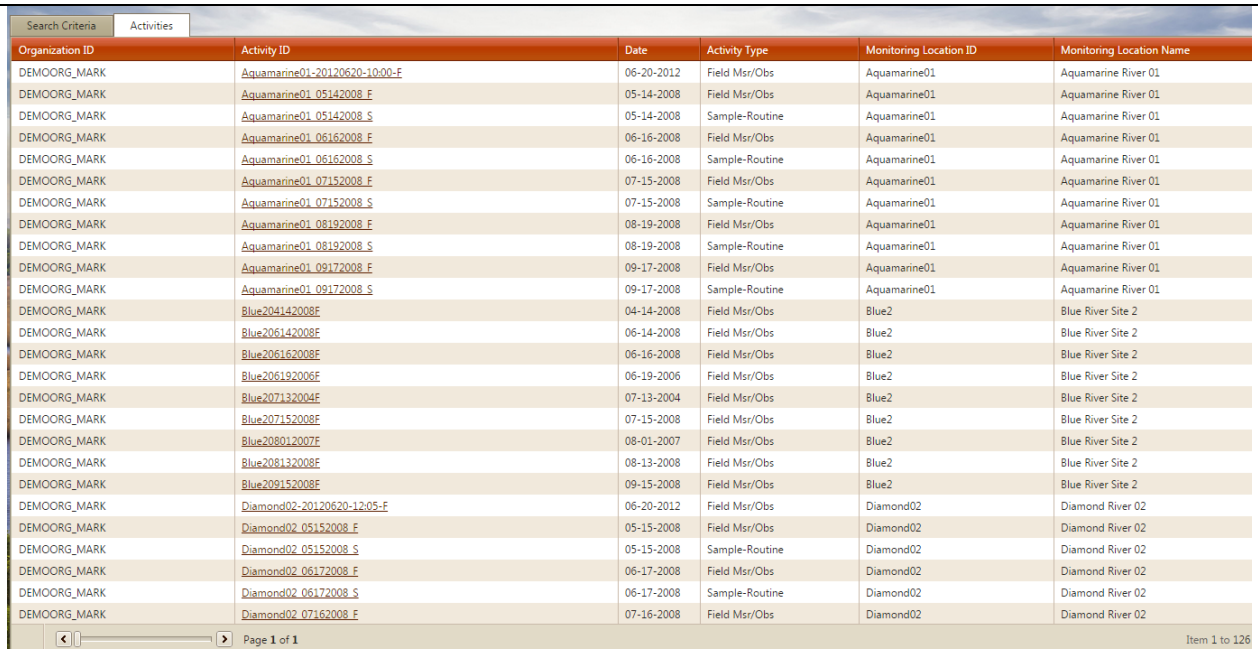
The **Activities page** will be displayed.

2. In the **Search Criteria tab**, make sure your Organization ID is selected. Make sure the other fields are empty.



3. Click the **Search** button.

The page will refresh but the **Activities tab** will be displayed. All activities in the system will be listed in the tab.

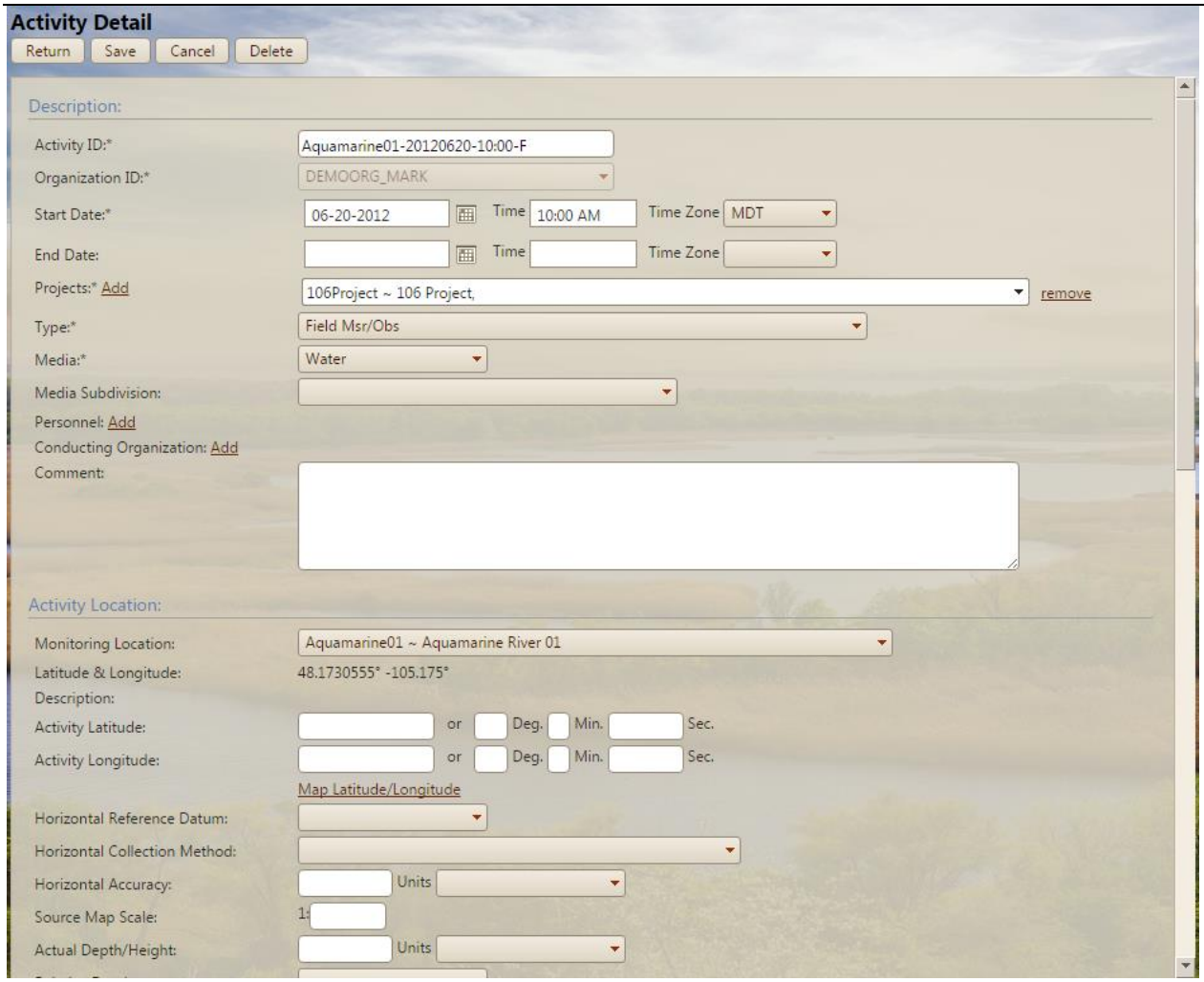


Search Criteria | Activities

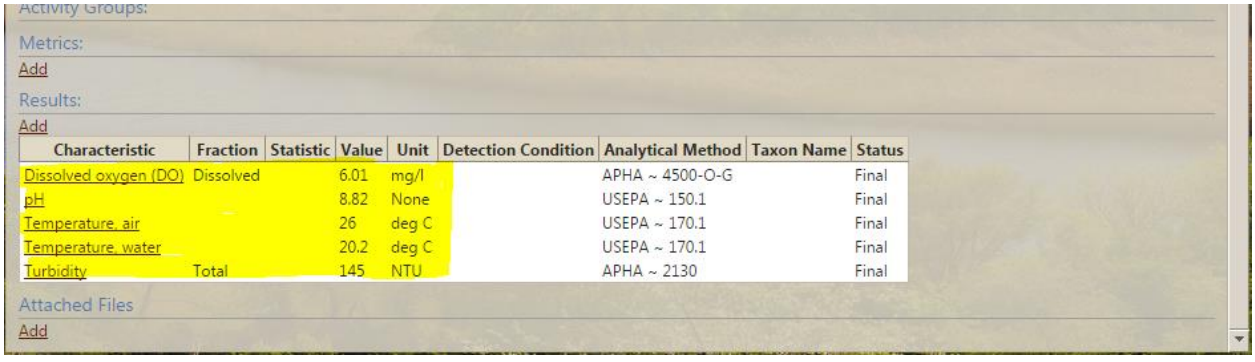
Organization ID	Activity ID	Date	Activity Type	Monitoring Location ID	Monitoring Location Name
DEMOORG_MARK	Aquamarine01-20120620-10:00-F	06-20-2012	Field Msr/Obs	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_05142008_F	05-14-2008	Field Msr/Obs	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_05142008_S	05-14-2008	Sample-Routine	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_06162008_F	06-16-2008	Field Msr/Obs	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_06162008_S	06-16-2008	Sample-Routine	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_07152008_F	07-15-2008	Field Msr/Obs	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_07152008_S	07-15-2008	Sample-Routine	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_08192008_F	08-19-2008	Field Msr/Obs	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_08192008_S	08-19-2008	Sample-Routine	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_09172008_F	09-17-2008	Field Msr/Obs	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Aquamarine01_09172008_S	09-17-2008	Sample-Routine	Aquamarine01	Aquamarine River 01
DEMOORG_MARK	Blue204142008F	04-14-2008	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue206142008F	06-14-2008	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue206162008F	06-16-2008	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue206192006F	06-19-2006	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue207132004F	07-13-2004	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue207152008F	07-15-2008	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue208012007F	08-01-2007	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue208132008F	08-13-2008	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Blue209152008F	09-15-2008	Field Msr/Obs	Blue2	Blue River Site 2
DEMOORG_MARK	Diamond02-20120620-12:05-F	06-20-2012	Field Msr/Obs	Diamond02	Diamond River 02
DEMOORG_MARK	Diamond02_05152008_F	05-15-2008	Field Msr/Obs	Diamond02	Diamond River 02
DEMOORG_MARK	Diamond02_05152008_S	05-15-2008	Sample-Routine	Diamond02	Diamond River 02
DEMOORG_MARK	Diamond02_06172008_F	06-17-2008	Field Msr/Obs	Diamond02	Diamond River 02
DEMOORG_MARK	Diamond02_06172008_S	06-17-2008	Sample-Routine	Diamond02	Diamond River 02
DEMOORG_MARK	Diamond02_07162008_F	07-16-2008	Field Msr/Obs	Diamond02	Diamond River 02

Page 1 of 1 Item 1 to 126

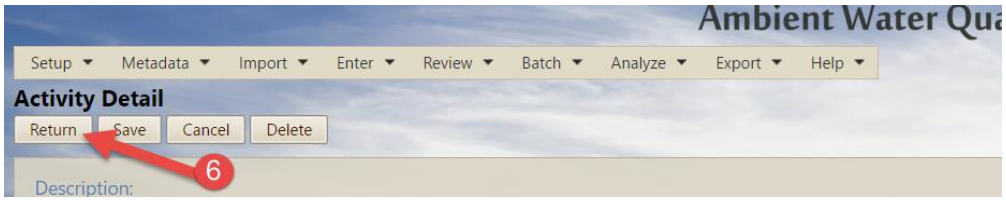
4. Click on the **Aquamarine01-20120620-10:00-F** activity link.
   The **Activity Detail page** will be displayed. Note that this is one of the activities you just entered via the data entry form.



5. Scroll to the bottom of the **Activity Detail page**. Note that the parameter result values you entered are listed.



6. Click the **Return** button to return to the Activities list page.



QA/QC your data using reports and graphs

AWQMS has numerous graphs and reports for analyzing your data for assessment purposes. But you can also use some of those same graphs and reports to help QA/QC data that you have in AWQMS. These tools are found under **Analyze** in the **Navigation Bar**. For example, recall that you can create both **Exceedance** and **Quality Control** thresholds in the **Threshold lookup table**. You can run a line graph that plots result values for a characteristic and visually displays whether any values in your data are outside the lower/upper *Quality Control* threshold range you created in your thresholds lookup table. You could also run the percent exceedance report to show the same thing.

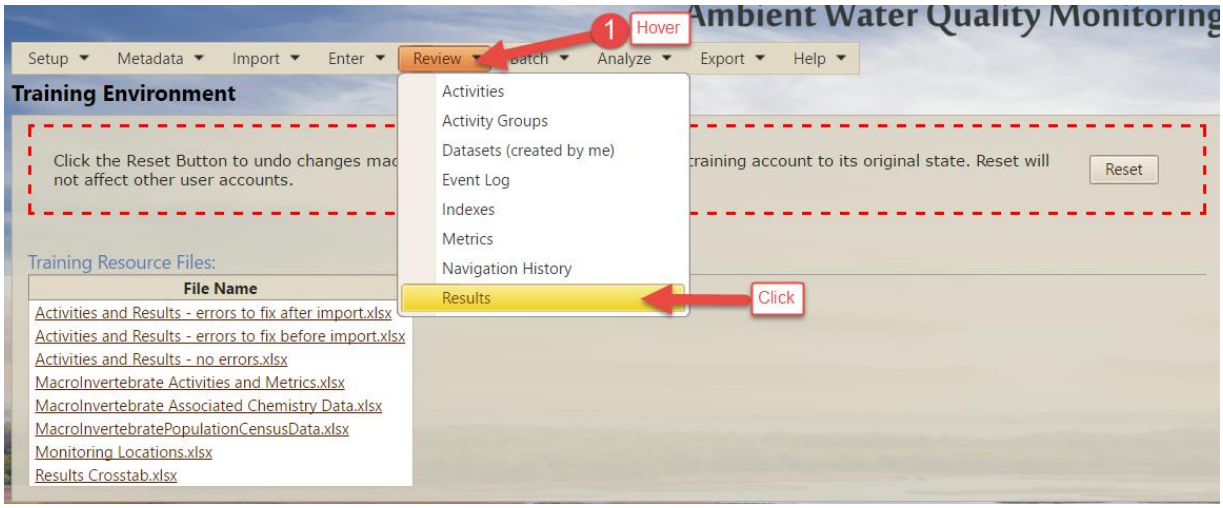
While using the graphs and reports can be a useful approach to validating your data, the purpose of this guide is to provide a brief overview of the process with particular emphasis on getting data into AWQMS and submitting it to the EPA's WQX. Therefore, no further discussion of using data analysis tools is provided here. If you'd like to learn more about this topic, refer to Appendix B.

Correct errors in your data

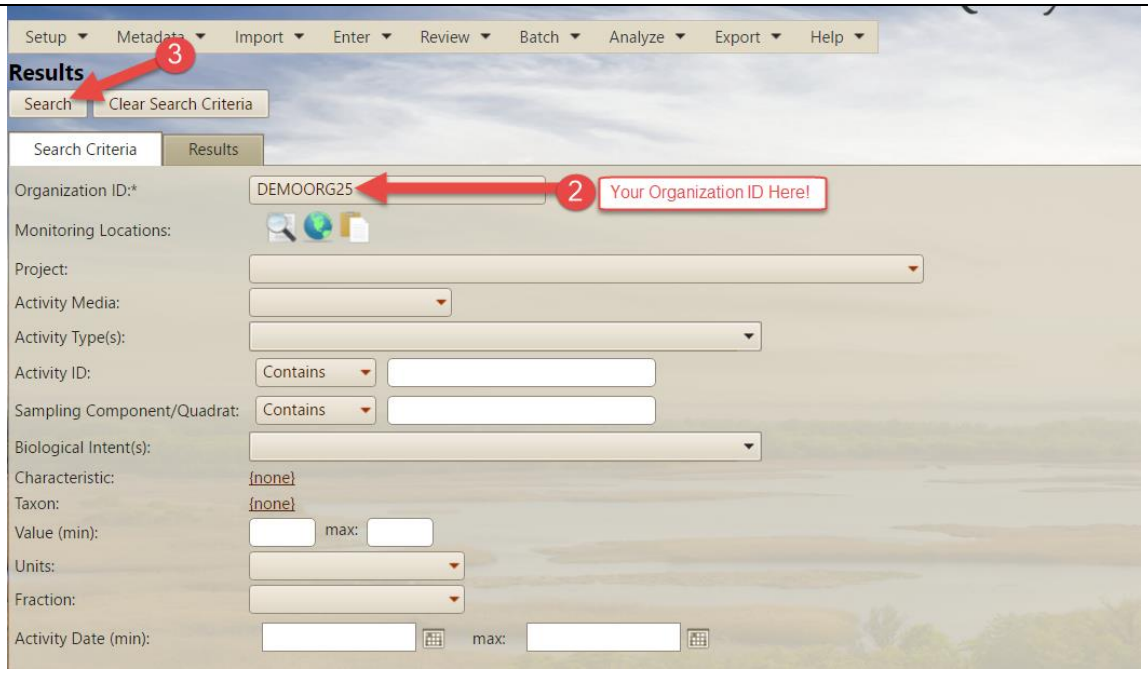
You can correct errors in your data (if any) in AWQMS. In this exercise we'll show the more typical approach to navigating to the Result List Detail page and correct an erroneous value.

An advantage within AWQMS is the ability to manually navigate to a result detail page and modify the result manually.

1. Hover on the **Review** menu item then Click on **Results**.

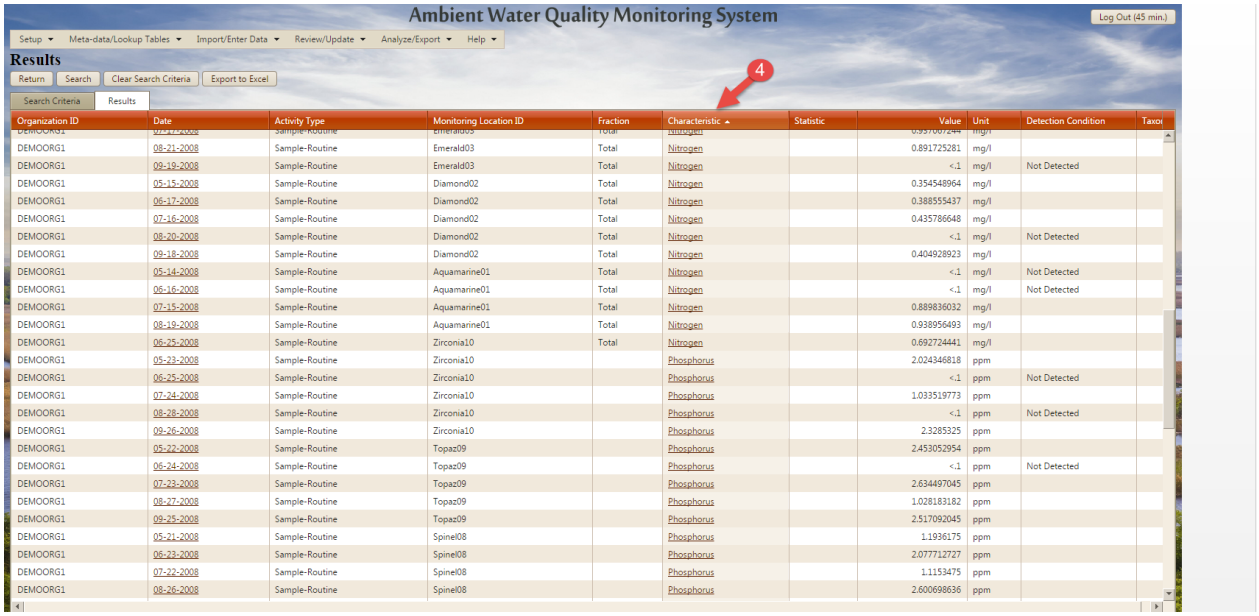


   The **Results list page** will be displayed.
2. In the **Search Criteria tab** fill in the search criteria for the result(s) you are looking for. For this example, choose your Organization ID. Just leave the Activity Type(s) search criteria empty.

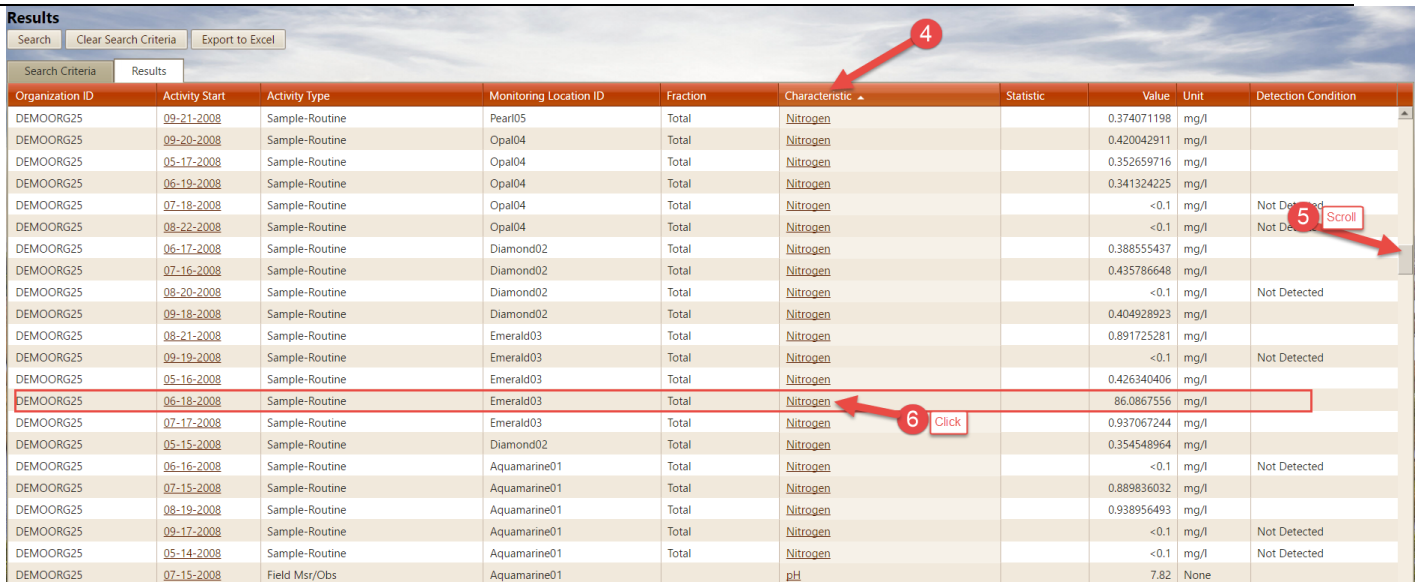


3. Click the **Search** button.

   The page will refresh with the list of results that match the search criteria showing in the bottom portion of the page. Most column headers in the AWQMS list page function as list sorting mechanisms.
4. Click on the **Characteristic** column header link.



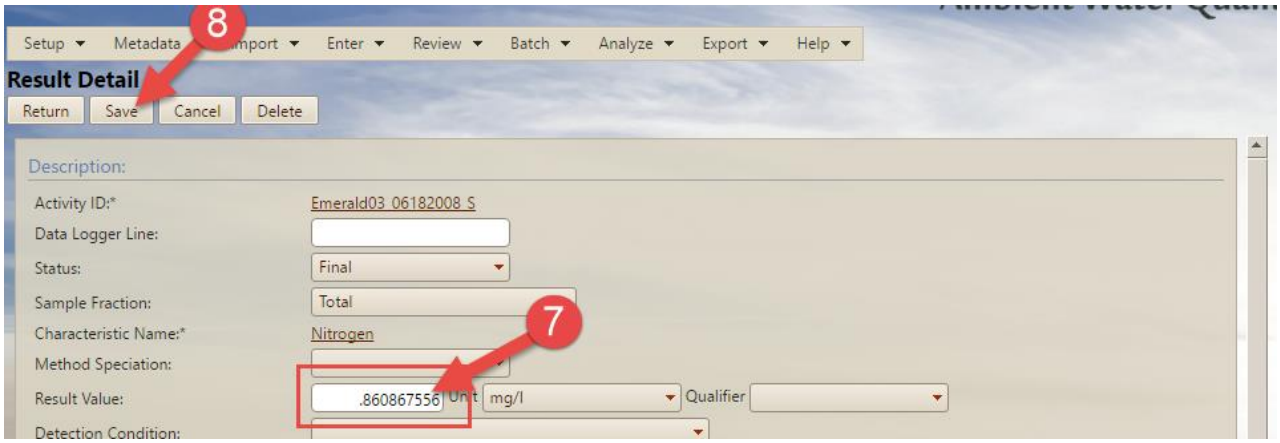
   The page will refresh, but the list will now be sorted by characteristic. This will help you to find the value you wish to fix. Notice how all the Dissolved Oxygen results are now grouped together.
5. Drag the scroll bar down until you find the Nitrogen value of 86.0867556 dated 6/18/2008 at Emerald03.
6. Click on the characteristic name for the row (in this case, it is the word **Nitrogen**).



Organization ID	Activity Start	Activity Type	Monitoring Location ID	Fraction	Characteristic	Statistic	Value	Unit	Detection Condition
DEMOORG25	09-21-2008	Sample-Routine	Pearl05	Total	Nitrogen		0.374071198	mg/l	
DEMOORG25	09-20-2008	Sample-Routine	Opal04	Total	Nitrogen		0.420042911	mg/l	
DEMOORG25	05-17-2008	Sample-Routine	Opal04	Total	Nitrogen		0.352659716	mg/l	
DEMOORG25	06-19-2008	Sample-Routine	Opal04	Total	Nitrogen		0.341324225	mg/l	
DEMOORG25	07-18-2008	Sample-Routine	Opal04	Total	Nitrogen		<0.1	mg/l	Not Detected
DEMOORG25	08-22-2008	Sample-Routine	Opal04	Total	Nitrogen		<0.1	mg/l	Not Detected
DEMOORG25	06-17-2008	Sample-Routine	Diamond02	Total	Nitrogen		0.388555437	mg/l	
DEMOORG25	07-16-2008	Sample-Routine	Diamond02	Total	Nitrogen		0.435786648	mg/l	
DEMOORG25	08-20-2008	Sample-Routine	Diamond02	Total	Nitrogen		<0.1	mg/l	Not Detected
DEMOORG25	09-18-2008	Sample-Routine	Diamond02	Total	Nitrogen		0.404928923	mg/l	
DEMOORG25	08-21-2008	Sample-Routine	Emerald03	Total	Nitrogen		0.891725281	mg/l	
DEMOORG25	09-19-2008	Sample-Routine	Emerald03	Total	Nitrogen		<0.1	mg/l	Not Detected
DEMOORG25	05-16-2008	Sample-Routine	Emerald03	Total	Nitrogen		0.426340406	mg/l	
DEMOORG25	06-18-2008	Sample-Routine	Emerald03	Total	Nitrogen		86.0867556	mg/l	
DEMOORG25	07-17-2008	Sample-Routine	Emerald03	Total	Nitrogen		0.937067244	mg/l	
DEMOORG25	05-15-2008	Sample-Routine	Diamond02	Total	Nitrogen		0.354548964	mg/l	
DEMOORG25	06-16-2008	Sample-Routine	Aquamarine01	Total	Nitrogen		<0.1	mg/l	Not Detected
DEMOORG25	07-15-2008	Sample-Routine	Aquamarine01	Total	Nitrogen		0.889836032	mg/l	
DEMOORG25	08-19-2008	Sample-Routine	Aquamarine01	Total	Nitrogen		0.938956493	mg/l	
DEMOORG25	09-17-2008	Sample-Routine	Aquamarine01	Total	Nitrogen		<0.1	mg/l	Not Detected
DEMOORG25	05-14-2008	Sample-Routine	Aquamarine01	Total	Nitrogen		<0.1	mg/l	Not Detected
DEMOORG25	07-15-2008	Field Msr/Obs	Aquamarine01		pH		7.82	None	

The **Result Detail page** will be displayed for the Result value we clicked on.

7. Change the value from **86.0867556 to .867556**



8. Click the **Save** button at the top of the result detail page.

Your change will be saved and the page will refresh. There will be a notification indicating that your change was saved.

STEP 4: Export and submit your data to WQX

Once your data is ready to submit to WQX, AWQMS makes it a simple process.

What is WQX?

WQX stands for "Water Quality eXchange". WQX is an EPA database and set of related "web services" for consolidating surface water quality data via the Internet. For more information on WQX, see the following web page: http://www.epa.gov/storet/wqx.

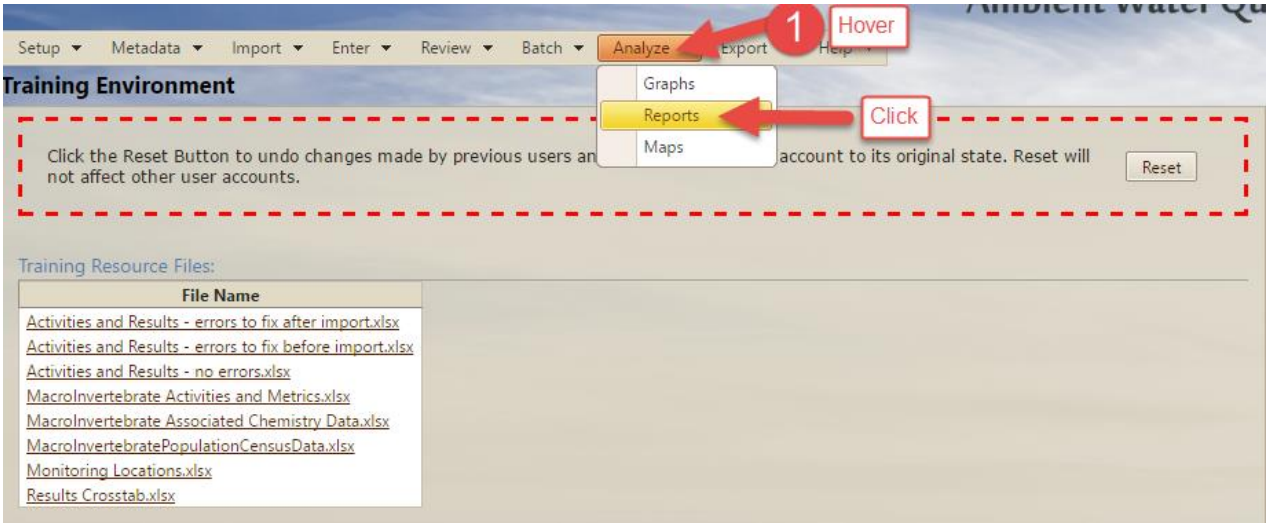
The WQX website mentions a tool called "WQX Web". Do I need that?

No. If you have AWQMS, you do not need to use the EPA's **WQX Web** tool for submitting data. In fact, AWQMS can do everything WQX Web can do, and much more.

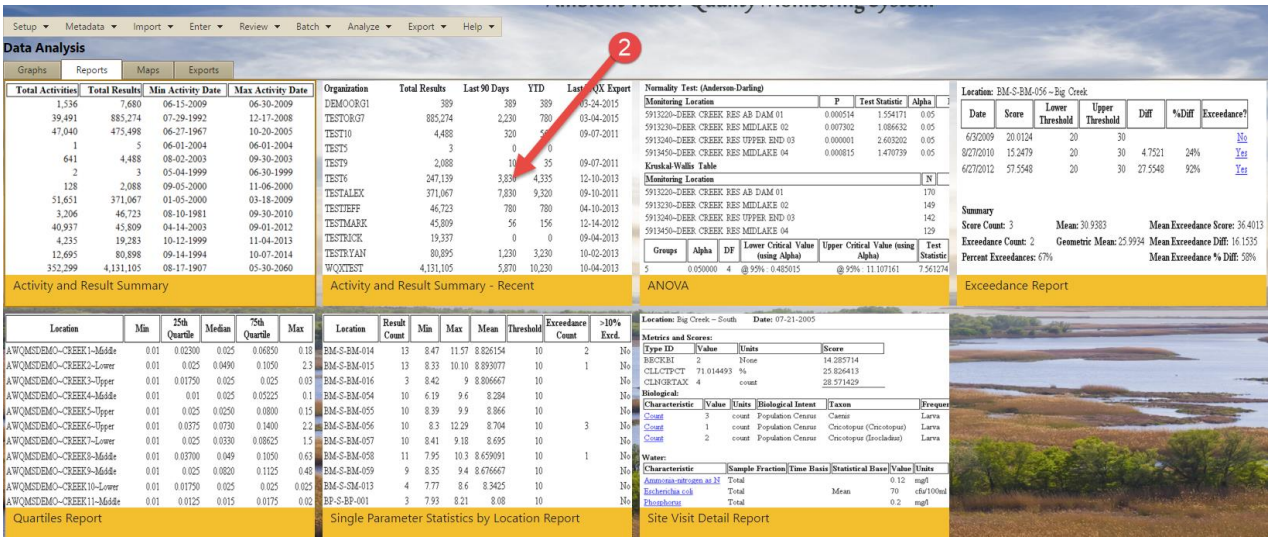
Has my organization submitted data to WQX previously from AWQMS?

How can you tell whether your organization has ever submitted data to WQX through AWQMS? This is simple.

1. Hover over the **Analyze** menu option in the navigation menu and select **Reports**.



The **Data Analysis page** will display with the **Reports tab** selected.



2. Click on the **Activity and Result Summary - Recent** report icon.

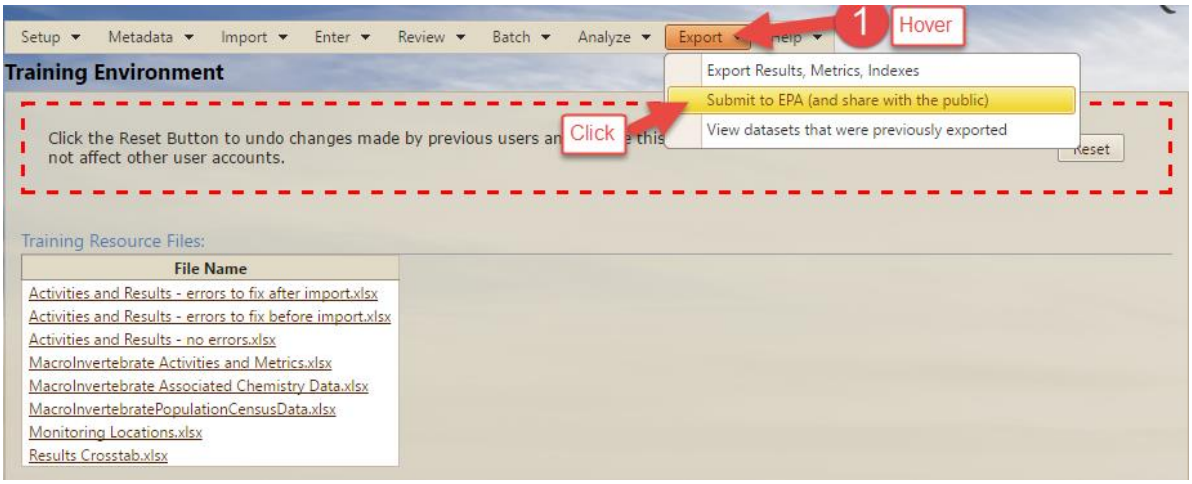
AWQMS will display a report that lists organizations to which you have access in AWQMS. For each organization the report will show the date of the last time the organization has exported and submitted data to WQX.

Who submits our data to WQX from AWQMS?

From a technical standpoint, it just has to be an AWQMS user with the administrative privilege for your organization. Other than that, this is a policy decision that your program needs to make. We recommend designating one person in your program who is responsible for submitting the data from AWQMS to WQX. There could also be a "backup" person with the administrative privilege in case the primary person is unavailable for an extended period.

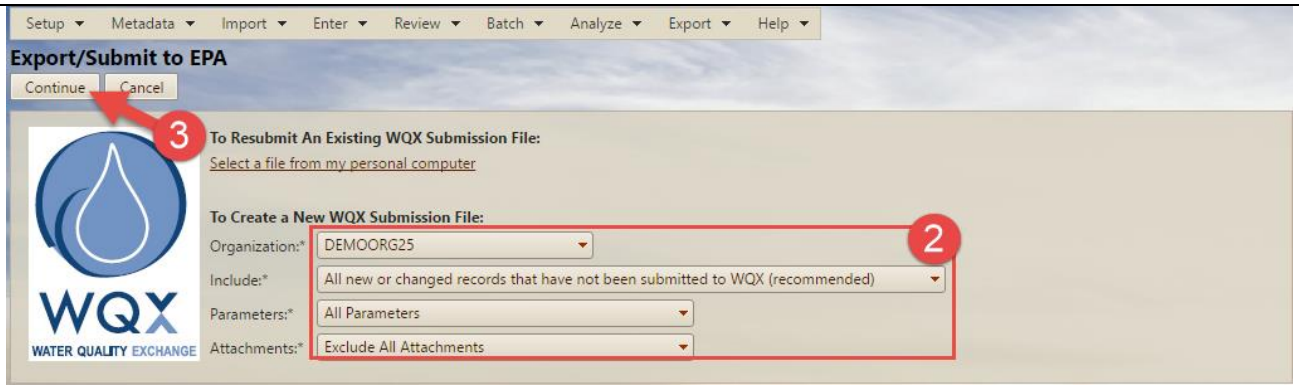
Submitting data to WQX from AWQMS…

Regardless of whether you've submitted data to WQX from AWQMS before, the process is the same.



1. From the **Navigation bar** hover over **Export** then click on the **Submit data to EPA (and share with the public).**
   The **Export/Submit to EPA** page will be displayed.
2. Fill in the fields on the form. Choose your organization. Be sure to include all new or changed records that have not been submitted to WQX. Choose to include all parameters and include all attachments.
3. Click the **Continue** button.

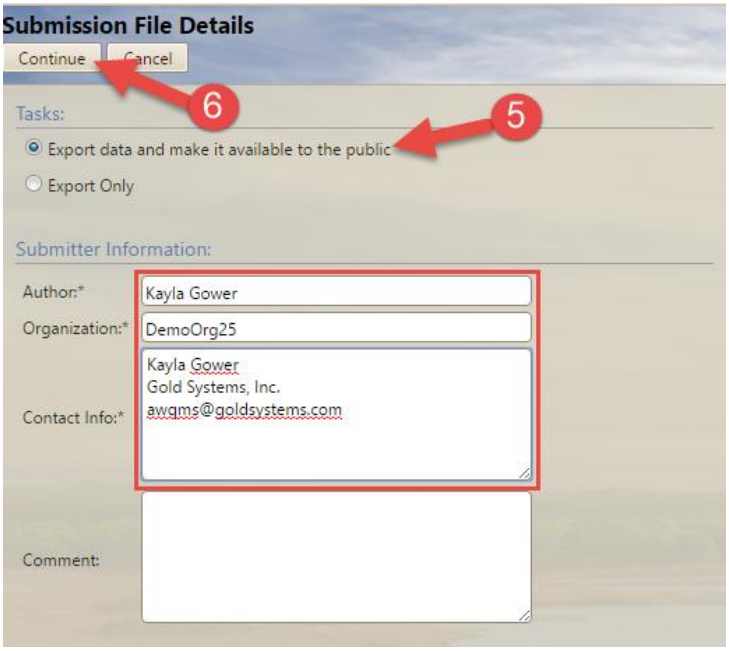
Generally speaking, personnel from the AWQMS developer/supporter, Gold Systems, Inc. should not submit the data for you.



A summary of the records that will be included in the WQX Submission File will appear.

4. Click the **OK** button.

The **Submission File Details** form will be displayed. Fill in or modify the information as you see fit.



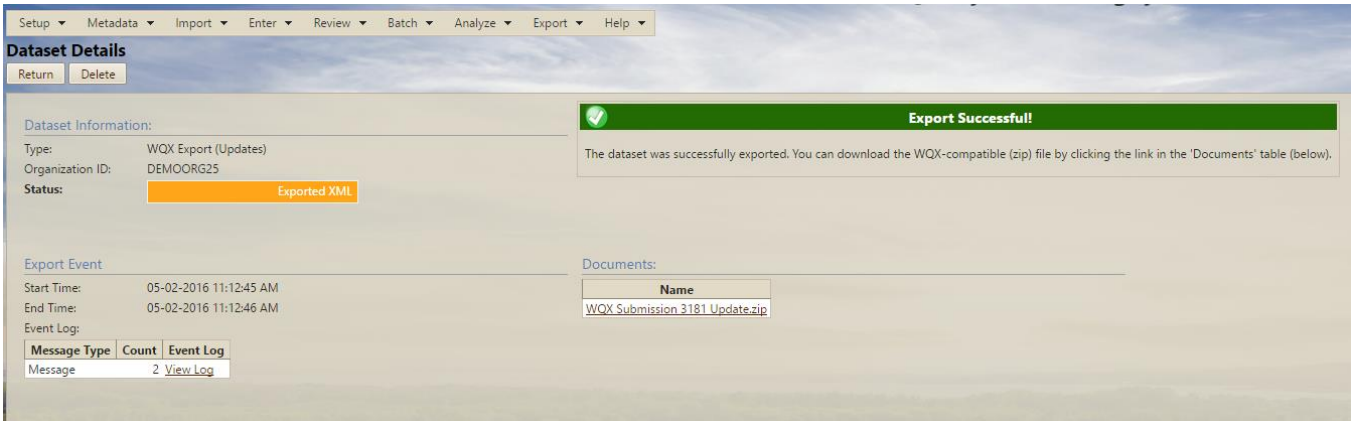
For the demo environment, it doesn't matter what you put for each section but in the production environment it of course is important to have accurate contact information.

5. Select the **Export data and make it available to the public** radio button.
6. Click the **Continue** button.

The system will attempt to export your data as a WQX-compatible file and then submit the file to WQX via the EPA's Central data eXchange (CDX). The Dataset Summary page will appear and will auto-refesh every few seconds to provide status as to how well the process is working.

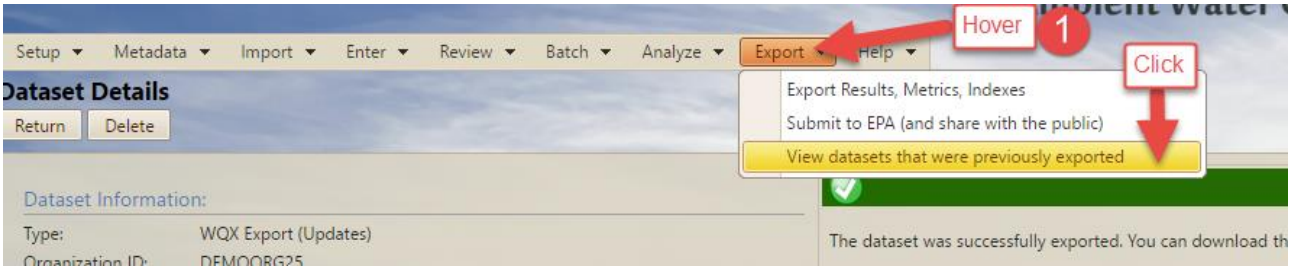
NOTE: If it looks like the process is going to take a while, you don't need to stay on this page waiting for the process to complete. In fact, it is best if you don't. You can continue doing work in other parts of AWQMS or you can exist AWQMS altogether. You can come back to the Dataset Summary page later and check on the progress by going to "Review/Update -> My Datasets" then clicking on the ID of the dataset being exported.

Once the process has completed, the Dataset Summary page will show that the process has completed in the **Status field**. In our case, the example says **Exported XML** because we are working in our demo environment.

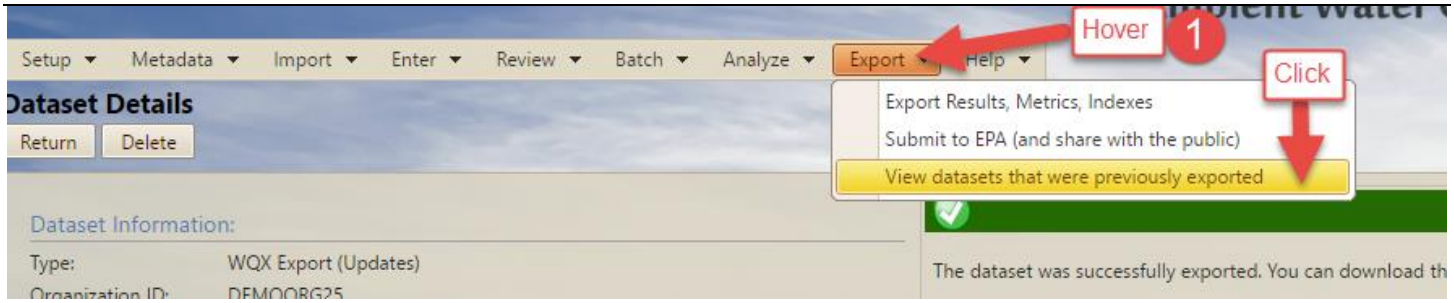


To view datasets that have been previously exported:

1. Hover over **Export** then click on **View datasets that were previously exported.**



2. The system will take you to the Datasets (Exported) page, where a list of your recent exports will be displayed from all the organizations you have rights to.



Other Sources of Information

The AWQMS User Guide

The AWQMS User Guide is a detailed reference manual and is available via a link at the bottom of every AWQMS web page. Additionally, it is available from the AWQMS portal at: http://awqms.goldsystems.com/download/AWQMS%20User%20Guide.pdf

The AWQMS Documentation / Tutorials Web Page

The AWQMS Documentation / Tutorials Web Page provides a list of web links to general AWQMS Information, AWQMS Tutorials, AWQMS release notes, guidance for labs, and template spreadsheets with matching import configurations that can be used to import data into AWQMS. *This web page is extremely useful for new AWQMS users.* Available at the AWQMS portal at: http://www.awqms.com/node/2.

The Region 8 AWQMS Tribal Consortium Web Page

The Region 8 AWQMS Tribal Consortium Web Page is a "work in progress". For members of the Region 8 AWQMS Tribal Consortium, it provides a flow chart of the AWQMS support process, a list of available support tools (such as FAQs), a list of webinar recordings for those who were not able to participate in the webinars at the time they were conducted, and information about how to use the consortium's email list. The page is available on the AWQMS portal at: http://awqms.com/node/13.

The EPA's WQX Web Page

The EPA's WQX Web Page provides a useful description of what the Water Quality eXchange is. The web page is available at: http://www.epa.gov/storet/wqx/.

Conclusion

In this tutorial we have discussed the following:

- Different modes of AWQMS availability: AWQMS-Demo, AWQMS-Cloud, Deployed AWQMS;
- How to log into AWQMS;
- An overview of the AWQMS/WQX process;
- Getting Projects, Monitoring Locations, and other Meta-data into AWQMS;
- Getting Activities and Results Data into AWQMS;
- Managing, Quality Checking, and Fixing Data in AWQMS;

- Submitting Data from AWQMS to WQX;
- Where to Find Additional Information about AWQMS.

Appendices

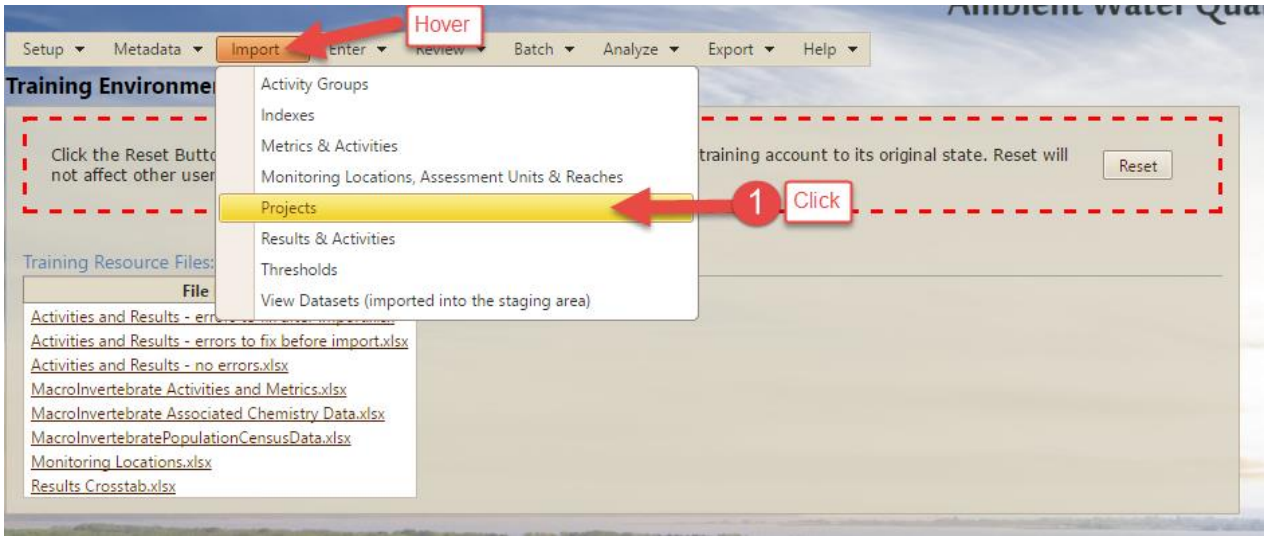
The following appendices contain more information on advanced topics and also reference information.

Appendix A - If you have a lot of projects that are not yet in AWQMS…

The tutorial in the Getting Started Guide assumes that you only have a few projects and that you have manually added them to AWQMS using the steps above. However, if you have a lot of projects that are not yet in AWQMS and you feel that it would be overly-tedious to manually enter your projects into AWQMS, you could import a text file of project records under **Import.** This approach may be faster than entering each project manually.

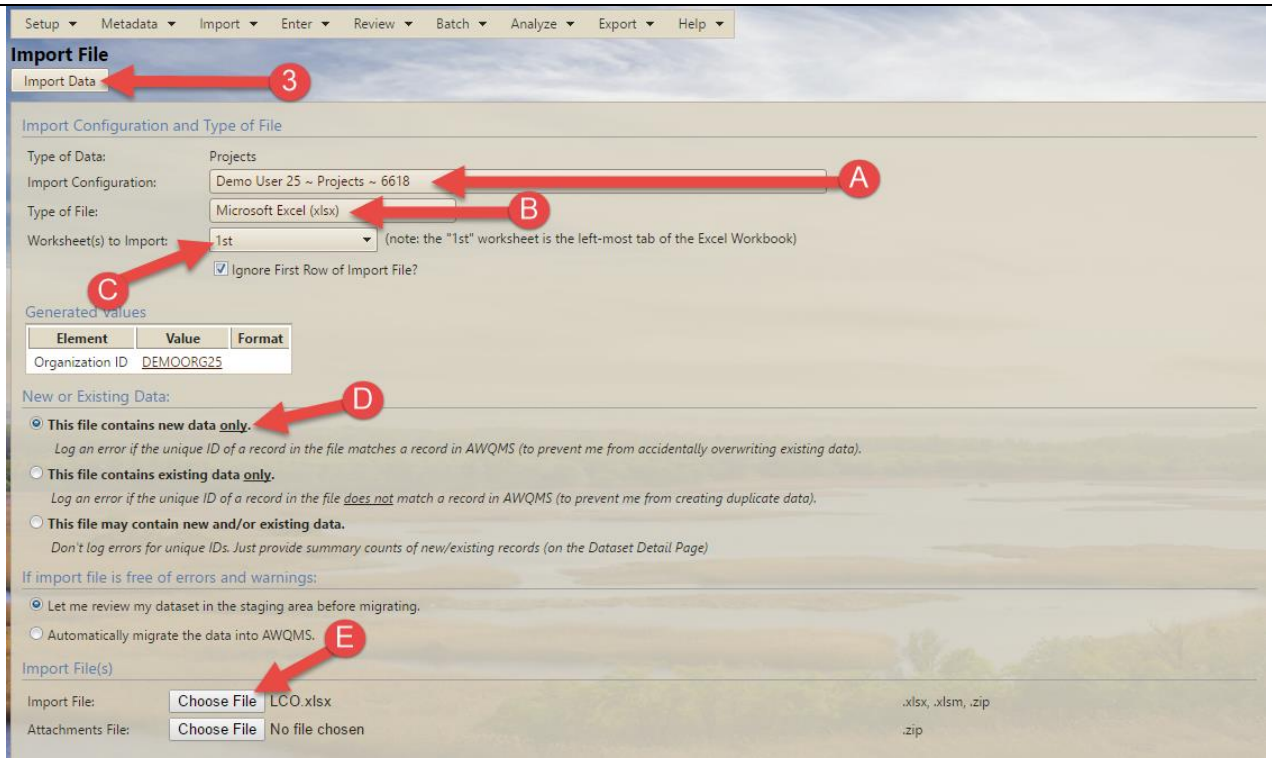
You would follow almost the exact process as for importing a file of monitoring locations, except that you'd import a file of projects. When you import a file of projects, the imported data becomes an **input dataset.** (See AWQMS User Guide Section 5. WORKING WITH INPUT DATASETS).

1. Hover on the **Import** on the navigation bar and click on **Projects**.



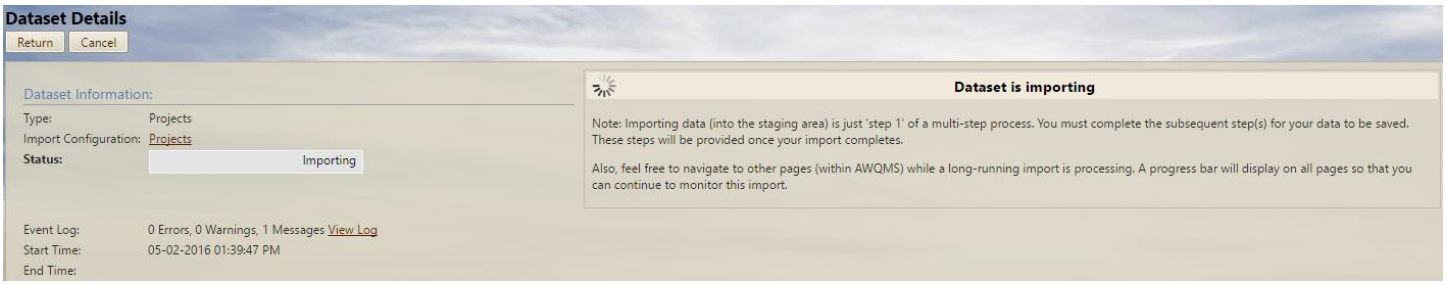
The Import File page will then be brought up to your screen.

2. Fill in the form to specify what file to import and how to import it
   A) Choose what import configuration you want to use
   B) What type of file it is you are importing (.txt .xlsx, etc)
   C) Which worksheet you want to import
   D) Choose the radio button that identifies if you are importing new, old, or a combo of projects
   E) Select your file you want to import

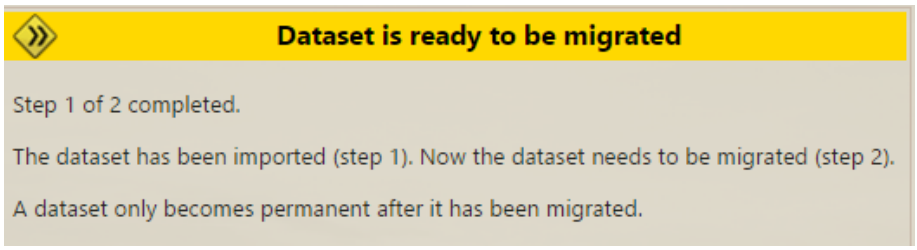


3. Click the **Import Data** button to begin importing your file.

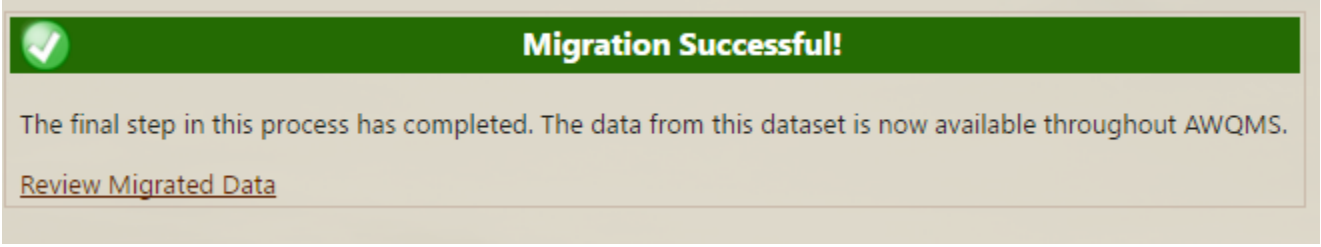
   The system will display the **Dataset Details** page. The page will tell you that it is importing the file.



If all goes well, the **Dataset Details page** will refresh and indicate that it has completed importing the file.



4. Click the **Migrate** button.
   The Dataset Information Page will indicate that the data is being migrated from the AWQMS staging area to the AWQMS management area. ***NOTE: Migrating in AWQMS is NOT the same as submitting data to WQX!***



If all goes well, the Dataset Information page will refresh and indicate that the projects migrated successfully.

5. Click the **Return** button to return to the Home page.

You could now hover on **Metadata** and click on the **Projects** in the navigation menu and search for the new projects you imported to verify they are in the system.

Project Import Configuration – Do I have one and what should I do if I don't?

In the exercise above, we assumed you already have an import configuration for importing your list of projects. We used the import configuration for projects that is built into the demo environment. If you don't already have an import configuration for importing projects, you can do one of the following to get one:

1. Ask someone who already has one (such as Gold Systems or a co-worker) to share theirs with you (give you rights to view or even edit theirs). This is, by far, the easiest method! The AWQMS user guide has instructions on how to share an import configuration with someone else. Just do a search on **Rights on an Import Configuration** in the AWQMS User Guide. Once you have access to someone else's import configuration, you can just make a copy of theirs and "tweak" it to meet your needs. Frankly, project import files are typically quite simple and it may actually be easier to just modify your file to match whatever import configuration you have access to.
2. Save the demo import configuration from the demo environment as a file and then create a new import configuration in your live AWQMS account based on the saved file. From the Demo environment, you just click the **Save to File** button at the top of the import configuration detail page. Then in your live account, you create a new import configuration by importing a saved file. (Search for **Create an import configuration from a saved file** in the AWQMS user guide).
3. Build your own from scratch. (Search for **Creating a New Import Configuration** in the AWQMS user guide).
4. Download the **WQX Web template** from the EPA WQX Web Downloads web site and import the projects template import configuration. This is not worth explaining in this context; especially when there are much easier methods. However, it is essentially similar in concept to #2, above. The EPA has created some import configurations and saved them as files that you can download and the use as the basis for a new one in AWQMS. There are links to the EPA template at the AWQMS portal documentation / tutorials page.

Appendix B – Using the AWQMS Data Analysis Tools as a QA/QC Check

AWQMS has numerous graphs and reports for analyzing your data for assessment purposes. But you can also use some of those same graphs and reports to help **QA/QC (Quality Control)** data that you have in AWQMS. These tools are found under **Analyze**. For example, recall that you can create both **Exceedance** and **Quality Control** thresholds in the **Threshold lookup table**. You can run a line graph that plots result values for a characteristic and visually displays whether any values in your data are outside the lower/upper **QA/QC** threshold range you created in your thresholds lookup table. You could also run the percent exceedance report to show the same thing.

Why would I use the AWQMS Data Analysis Tools as a QA/QC Check

The primary reason to use the AWQMS data analysis tools as a QA/QC Check would be to validate data that was imported or entered into AWQMS prior to the implementation of the QA/QC Result Validation Thresholds checking capabilities. It is important to perform such a check and either correct or flag anomalous data prior to submitting it to WQX and prior to using the data to make local decisions regarding water quality. Otherwise, the anomalous values might be used inappropriately to make policy decisions at national or local levels.

How do I establish my QA/QC thresholds in AWQMS?

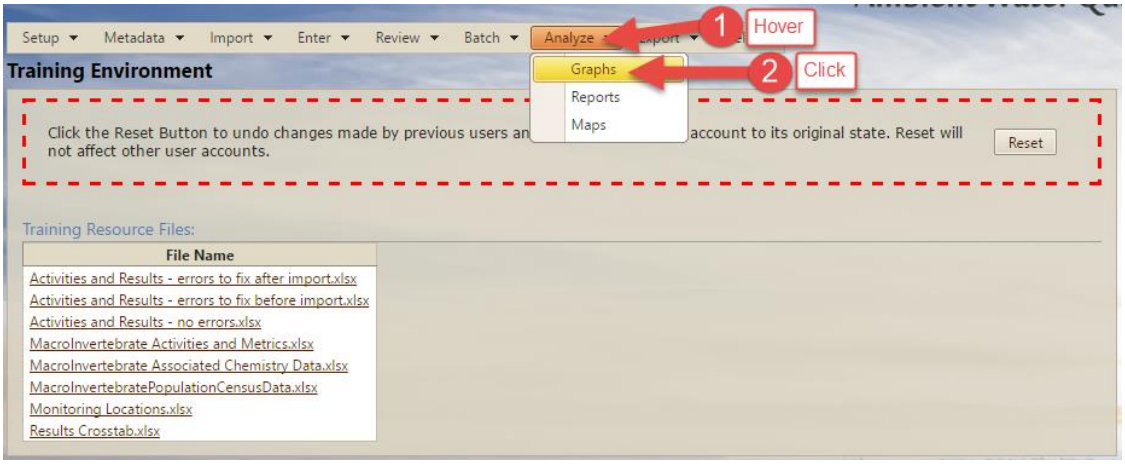
See the section above in this document on *Adding QA/QC validation thresholds*. Also, see *Appendix C – QA/QC Threshold Recommendations for Region 8 Tribes* below for suggested QA/QC validation threshold values.

Some Examples

AWQMS has numerous graphs and reports for analyzing your data for assessment purposes. But you can also use some of those same graphs and reports to help QA/QC data that you have in AWQMS. This document is focused on data input and validation; not assessment. Therefore, we are only going to talk about the graphs and reports in that context. These tools are found under **Analyze --> Graphs.** For example, you can run a line graph that plots result values for a characteristic and visually displays whether any values in your data are outside the lower/upper QA/QC threshold range you created in your thresholds lookup table. You could also run the exceedance report for results using QA/QC thresholds to show the same thing.

Using the line graph

1. Hover on the **Analyze** on the navigation bar, a drop down menu will display.
2. Click on the drop down **Graphs**.

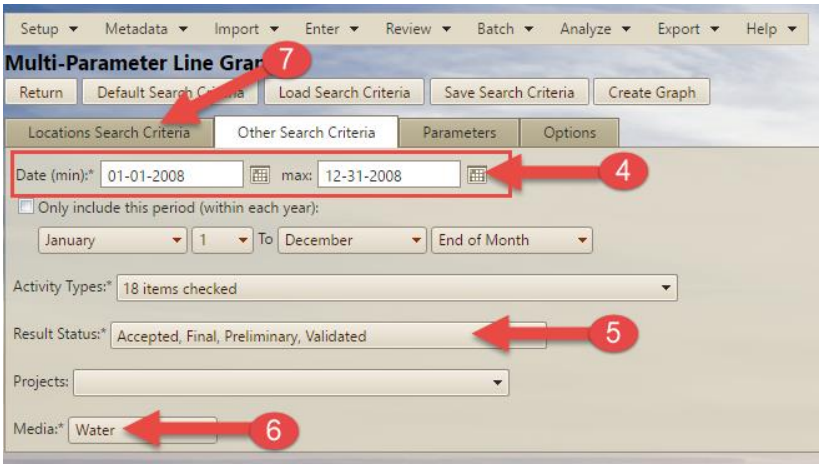


The **Data Analysis page** will be displayed.

3. Click on the type of Graph you would like to view your data, **Multi-Parameter Line Graph**

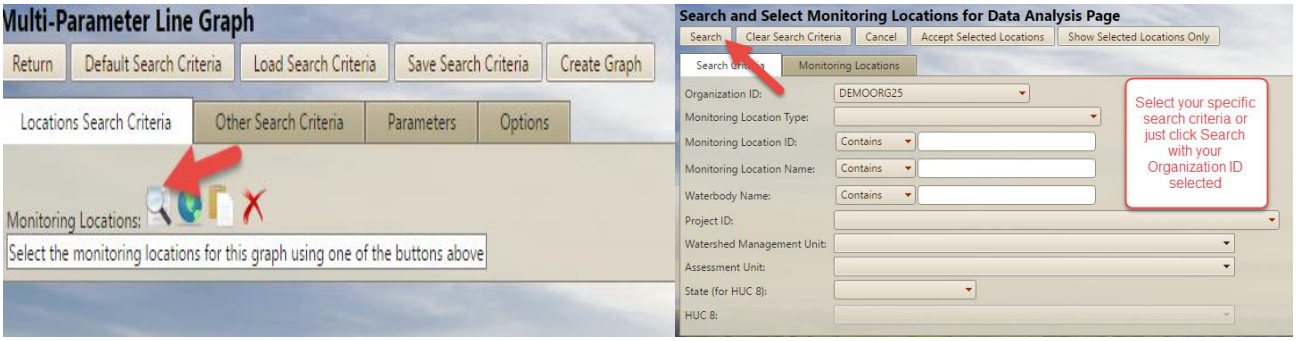
The search criteria page for the **Multiple Parameter Line Graph** will be displayed.

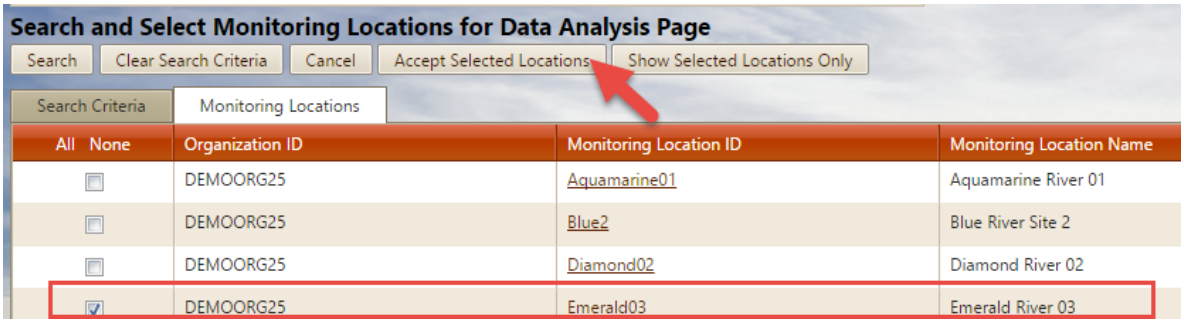
4. Click on the **Other Search Criteria Tab** and change the date range to cover all of 2008.



5. Click the **Result Status** and select the results to be graphed.
6. Select the **Media** you want to display on your graph.
7. Click on the **Locations Search Criteria** tab:

8. Select your Monitoring Location using the **Magnifying Glass/Search Button** and select your location from the search page.

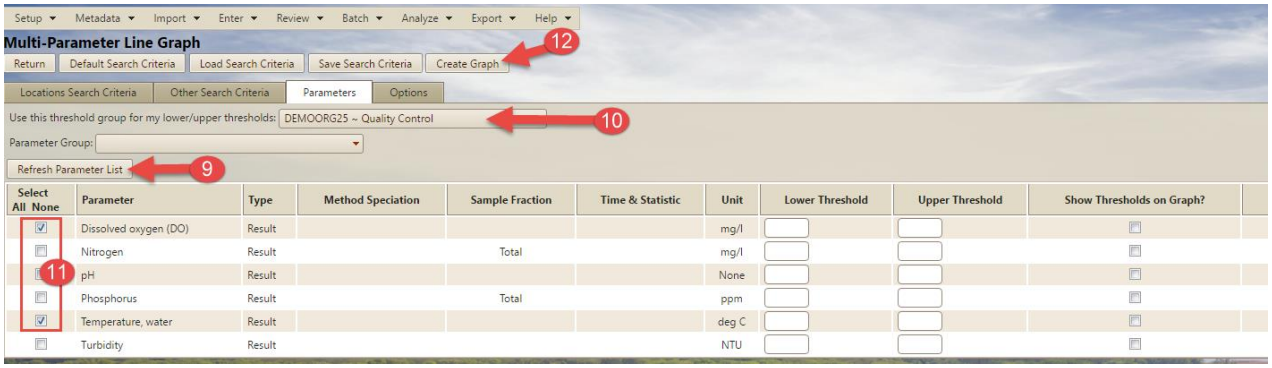




The **search criteria page** for the **Multiple Characteristic Line Graph** will again be displayed and will show the **Emerald River location as selected**.

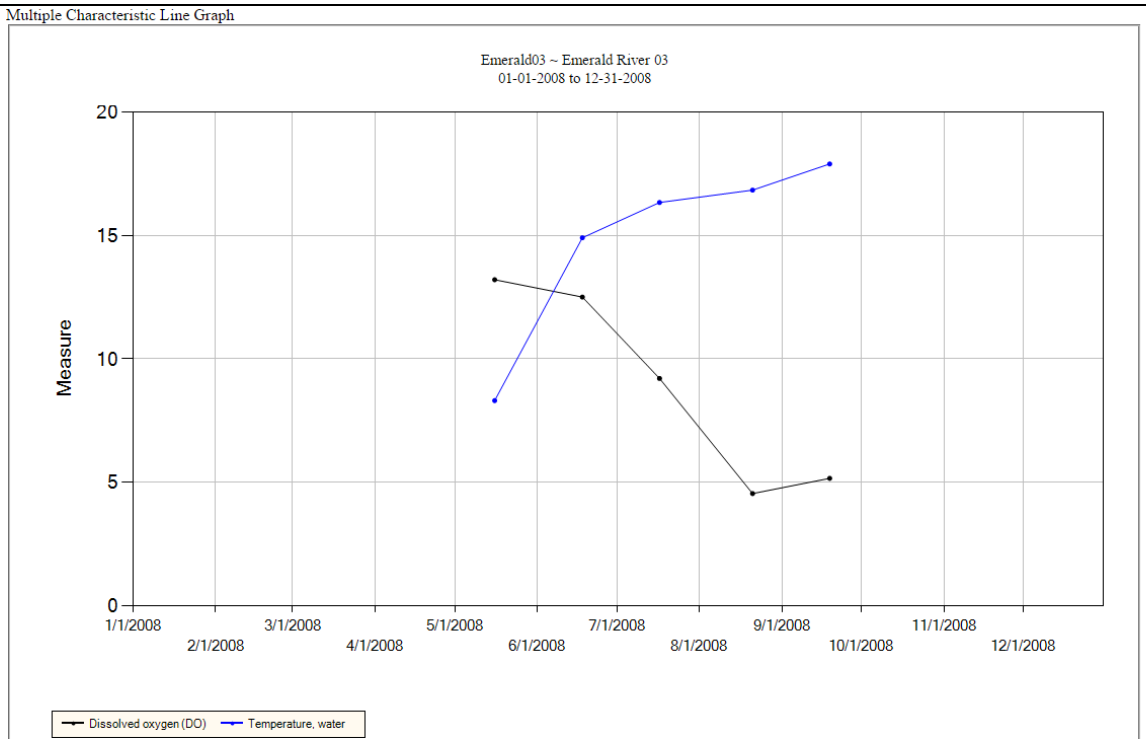
9. Select the **Parameters Tab** and click **Refresh Parameter List**.

The page will refresh and show the various analytes for which the location actually has result values in the system. The **Threshold Group** drop-down list will become visible.



There are two types of threshold groups: **Quality Control** and **Exceedance.** **Quality Control**-type thresholds are for making sure you don't have data unexpected/invalid values in your data. **Exceedance**-type thresholds are for figuring out if the water quality at a site is bad. Typically, **Quality Control**-type thresholds cover a wider range than **Exceedance**-type thresholds. The **Threshold Group** drop-down list allows you to select several types of **Quality Control** or **Exceedance** thresholds. In this demonstration, however, we have only set up the **Quality Control** thresholds.

10. Select the **Quality Control** thresholds from the **Threshold Group drop down list**.
11. Check the box next to **Dissolved oxygen (DO)**. And check the box next to **Water Temperature**
12. Click **Create Graph** at the top to generate the graph.

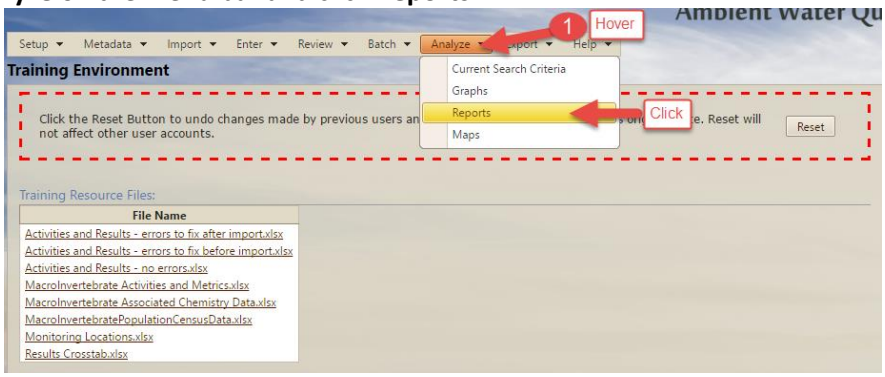


The graph will be displayed in a separate window. Notice how there is a correlation when the water temperature rises the Dissolved oxygen goes down.

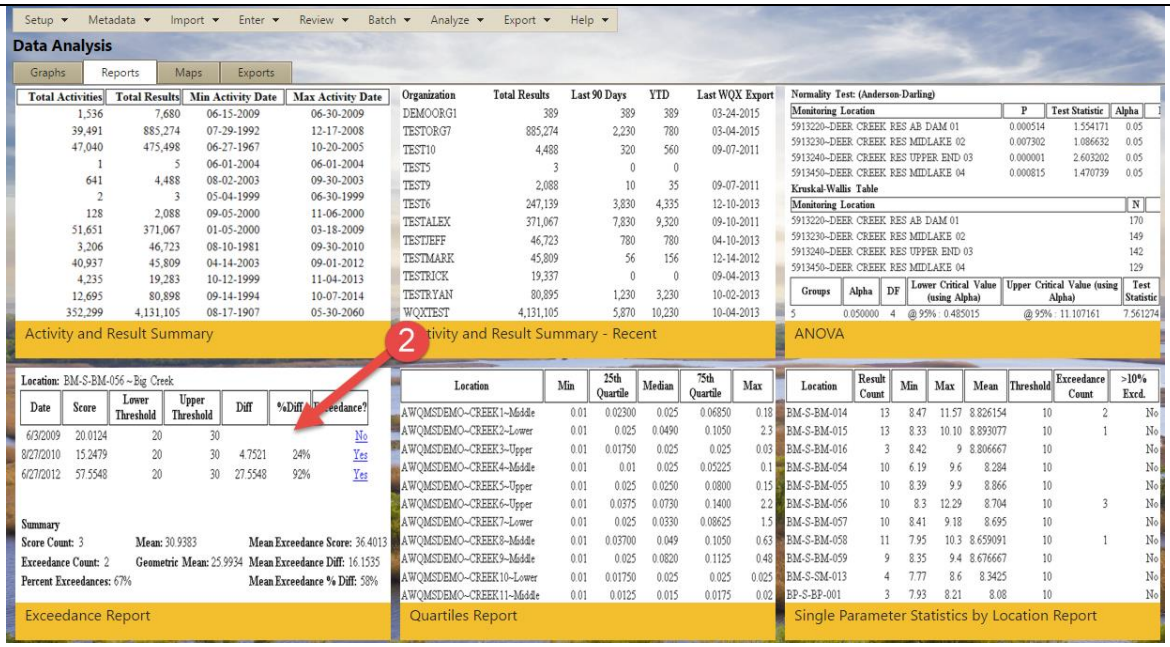
Using the Report

We will use the same search criteria for running the Result Exceedance Report that we used for the Multiple Characteristic Line Graph.

1. Hover over **Analyze** on the menu bar and click **Reports**.



2. Select the **Result Exceedance Report** from the report menu, a click **Current Search Criteria**.



The **Exceedance Report for Result page** will be displayed.

3. Confirm that your current search criteria continued to the Report and then click on **Create Report**
4. The report is generated and displayed. Any values that are outside the lower and upper thresholds are annotated as exceedances.
   Click on the **Yes** (exceedance) link for the 6/18/2008 value.

Exceedance Report
05-02-2016 02:50:02 PM

Report Criteria
01-01-2008 to 12-31-2008

Location: DEMOORG25 Emerald03 ~ Emerald River 03

Date	Parameter	Fraction	Time Basis	Statistical Base	Value	Units	Lower Threshold	Upper Threshold	Diff	%Diff	Exceedance?
5/16/2008	Dissolved oxygen (DO)				13.2	mg/l	0.5	1.0	12.2	1220%	Yes
6/18/2008	Dissolved oxygen (DO)				12.4960	mg/l	0.5	1.0	11.4960	1150%	Yes
7/17/2008	Dissolved oxygen (DO)				9.2	mg/l	0.5	1.0	8.2	820%	Yes
8/21/2008	Dissolved oxygen (DO)				4.5353	mg/l	0.5	1.0	3.5353	354%	Yes
9/19/2008	Dissolved oxygen (DO)				5.1510	mg/l	0.5	1.0	4.1510	415%	Yes

Summary

Result Count: 5 **Mean:** 8.9165 **Mean Exceedance Value:** 8.9165
Exceedance Count: 5 **Geometric Mean:** 8.1269 **Mean Exceedance Diff:** 7.9165
Percent Exceedances: 100% **Mean Exceedance % Diff:** 792%

The **Result Detail page** is displayed for the result value that was an exceedance. You can use this page to investigate and learn more about this exceedance value. If you find that the value is in error (such as a typo),

you could fix the error in the Result Detail page and click the **Save** button. For this demo, though, we will leave the value as-is and return to our report.

Appendix C – QA/QC Threshold Recommendations for Region 8 Tribes

The QC values presented below can reflect true values observed at a site. Therefore, if AWQMS reports indicate that these values are exceeded, it is important to closely review the data using the following steps before deciding on a corrective action:

a) Review the lab sheets/data to ensure the data were entered correctly.
b) For field parameters, review the original field sheet and check for data entry errors.
c) Review the calibration log to see if meters were properly calibrated. If meters are not properly calibrated on a regular basis, it is not uncommon to have record odd/ inaccurate result values.
d) Review any blank and duplicate data collected at the site.

Corrective Actions:

- If data were incorrectly entered into AWQMS, enter the correct value.
- If meters were not properly calibrated, we recommend flagging the data as "Validated", meaning "Reported result has been verified and reviewed") [Choices are: "Accepted", "Final", "Preliminary", "Rejected", or "Validated"].
- If the result appears to be valid, it may suggest a water quality concern. We suggest revisiting the site as soon as possible to obtain additional data.

Validation Values:

Nutrients: The list below is not intended as a recommended suite for nutrients. Please refer to EPA's document (Nutrient Characteristic List) for recommendations. In general, we suggest collecting TN and TP unless there is a specific point source concern:

- **Total Nitrogen**: Likely to see a lot of Nondetect values; important to enter the detection limit. Upper QC value – 5 mg/L
- **Ammonia**: Likely to see a lot of Nondetect values; important to enter the detection limit.
  - Upper value of 2 mg/L.
- **Total Phosphorus**: Likely to see a lot of Nondetect values; important to enter the detection limit.
  - Upper Value of 1 mg/L?
- **Phosphate**: Likely to see a lot of Nondetect values; important to enter the detection limit.
  - Upper value of 1 mg/L

Metals: Similar to nutrient, nondetect results are common for metals. It is important to enter the detection limit. It all depends on land use, geology, historic mining, etc. One suggestion is to only use ALC for screening. Another suggestion is to pull together human health values which tend to be much greater than the ALC.

Field Parameters:

Validation Values	Lower QC Value	Upper QC Value
Total Nitrogen mg/L	None	4
Ammonia mg/L	None	2
Total Phosphorus mg/L	None	1
Phosphate mg/L	None	1
Metals	TBD	TBD
Temperature Deg C	1	35
pH	4	11
Dissolved Oxygen mg/L	1	14

Dissolved Oxygen Percent Saturation	10	200
Turbidity NTU	None	300

Appendix D – QA/QC Activities and Results (Duplicates and Blanks)

Recommendations for labeling QC samples and recording QC samples on field and lab forms.

The EPA provides a web page on "Quality Assurance, Quality Control, and Quality Assessment Measures" at: http://water.epa.gov/type/rsl/monitoring/132.cfm.

QA/QC Activity and Result Data in WQX and AWQMS

Every activity in WQX and AWQMS must have an activity type. QA/QC duplicate and blank samples should not be included as normal activities, such as "Field Msr/Obs" or "Sample-Routine". They should, instead, be included using the special QA/QC activity types defined in the Activity Type lookup tables. This approach will allow you to filter them out, if desired, when analyzing/reporting on the data. The list of allowed activity types is:

Code	Description	Analytical Method Required	Monitoring Location Required
Field Msr/Obs	MEASUREMENTS involve something measured in its environmental setting usually using some type of equipment. OBSERVATIONS are made by people, usually without the use of equipment, and are frequently qualitative.	N	Y
Field Msr/Obs-Habitat Assessment	A field activity conducted to evaluate a habitat, according to an organizations pre-defined habitat assessment scheme.	N	Y
Field Msr/Obs-Portable Data Logger	Measurements made in the field by an automated data logging device, running unattended and producing a suite of data values at repeating intervals set by its owner/operator.	N	Y
Quality Control Alternative Measurement Sensitivity	A repeated measurement of the same field (also a lab where detection limits do not apply) sample collected to control sensitivity typically for a specific instrument in order calculate the alternative measurement sensitivity (AMS). AMS is the standard deviation of 7 measurements of a sample (with a signal in the quantitative range) times the two-sided critical t-value for 99% confidence (3.708)	Y	N
Quality Control Alternative Measurement Sensitivity Plus	A repeated measurement of different field samples collected to control sensitivity typically for a specific instrument/sensor in order calculate the alternative measurement sensitivity (AMS+). AMS+ is defined as the standard deviation of 7 measurements of samples collected very closely in time and space times the two-sided critical t-value for 99% confidence.	Y	N
Quality Control Field Calibration Check	A standard independently prepared (different source, different analyst) from the calibration standards and run after the original calibration to verify the original calibration. There is usually one calibration check standard per batch.	N	N

Code	Description	Analytical Method Required	Monitoring Location Required
Quality Control Field Replicate Habitat Assessment	A habitat measurement or evaluation collected to assess the reproducibility of the sampling technique.	N	Y
Quality Control Field Replicate Msr/Obs	A field measurement or observation taken to assess the reproducity of the sampling technique or analytical method.	N	Y
Quality Control Field Replicate Portable Data Logger	A measurement taken to verify the quality of data taken by a data logger.	N	Y
Quality Control Field Sample Equipment Rinsate Blank	A sample of analyte-free media that has been used to rinse the sampling equipment. It is collected after completion of decontamination and prior to sampling. This blank is useful in documenting adequate decontamination of sampling equipment.	N	N
Quality Control Sample-Blind Duplicate	The duplicate samples are identical samples (collected from same source and same time) however blind duplicates are submitted to the laboratory by an identification scheme so that the laboratory does not know the samples are identical. The purpose of blind duplicates is to test for laboratory bias.	Y	Y
Quality Control Sample-Equipment Blank	A sample of analyte free water analyzed with field samples to assess the presence or absence of equipment or instrument contamination.	Y	N
Quality Control Sample-Field Ambient Conditions Blank	The analyte free media is tested to assure the preciseness of ambient conditions. It helps in controlling the effects of environment on the sample.	Y	Y
Quality Control Sample-Field Blank	A sample of analyte free water poured into a sample container in the field, preserved and shipped to the laboratory with field samples. The purpose of a field blank is to assess contamination from field conditions during sampling.	Y	N
Quality Control Sample-Field Replicate	Multiple samples taken within each combination of time, location, and any other controlled variables. The purpose of collecting replicate samples is to obtain precision. For a large size field it is important to break field into homogeneous sub-areas and collect samples proportions to the size of each sub-area.	Y	Y
Quality Control Sample-Field Spike	A known mass of target analyte added to a blank sample or subsample in the field. The pupose of a field spike is to show that sample preperation procedures do not contribute to loss of analytes.	Y	Y
Quality Control Sample-Field Surrogate Spike	A pure substance with properties that mimic the analyte of interest is called surrogate. Target Surrogate is added in sample to determine the recovery efficiency for quality control purposes.	Y	Y

Code	Description	Analytical Method Required	Monitoring Location Required
Quality Control Sample-Inter-lab Split	Split samples are obtained by dividing one sample into two or more identical sub-samples, and analyzed at different laboratories. Interlaboraory splits are used to compare the accuracy and precision of the laboratories doing the analyses.	Y	Y
Quality Control Sample-Lab Blank	Lab Blanks are analyte-free matrices prepared in the lab and analyzed with samples to identify potential lab sources of contamination.	Y	N
Quality Control Sample-Lab Control Sample/Blank Spike	In the lab deionized water is spiked with all the analytes in concentrations close to those in the field samples, prepared as a sample, and run/re-run on a set frequency.	N	N
Quality Control Sample-Lab Control Sample/Blank Spike Duplicate	In the lab deionized water is spiked with all the analytes in concentrations close to those in the field samples, prepared as a sample, and run/re-run on a set frequency.	N	N
Quality Control Sample-Lab Duplicate	One of two samples taken from the same population and carried through all steps of the sampling and analytical procedures in an identical manner. Duplicate samples are used to assess variance of the total method including sampling and analysis.	Y	N
Quality Control Sample-Lab Matrix Spike	An aliquot of an environmental sample to which known quantities of analytes are added in the laboratory. The matrix spike is analyzed in an identical manner as the sample.	Y	N
Quality Control Sample-Lab Matrix Spike Duplicate	An aliquot of an environmental sample to which known quantities of analytes are added in the laboratory. The matrix spike is analyzed in an identical manner as the sample.	N	N
Quality Control Sample-Lab Re-Analysis	A sample that is analyzed more than once.	Y	N
Quality Control Sample-Lab Spike	A known mass of target analyte added to a blank sample or subsample in the laboratory. The pupose of a laboratory spike is to show that sample preperation procedures do not contribute to loss of analytes.	Y	N
Quality Control Sample-Lab Spike of a Lab Blank	The lab blank (method blank) is prepared in the lab to represent the matrix as closely as possible, then spiked with known concentrations of the analytes.	N	N
Quality Control Sample-Lab Split	A sample split in the laboratory from half of a mother or parent sample.	Y	N
Quality Control Sample-Measurement Precision Sample	A sample (i.e., test sample or control sample/standard) used either singly or in replicate, as appropriate, to monitor the precision of method.	Y	N
Quality Control Sample-Other	This category contains quality control measures of any other process to which a sample is subjected, and not included in this list.	Y	N

Code	Description	Analytical Method Required	Monitoring Location Required
Quality Control Sample-Post-preservative Blank	The analyte-free media which has undergone the same preserving process as the samples. This Blank is tested to check the quality of the preservation process.	Y	N
Quality Control Sample-Pre-preservative Blank	The analyte-free media tested before undergoing the same preserving process as the samples. This Blank is tested to check the quality of preservation process.	Y	N
Quality Control Sample-Reagent Blank	Reagent Blank is analyte free water analyzed with samples, one per sample test. The reagent blank is analyzed to control the quality.	Y	N
Quality Control Sample-Reference Sample	A sample (i.e., test sample or control sample/standard) with known analyte concentration used either singly or in replicate, as appropriate, to monitor method performance characteristics.	Y	N
Quality Control Sample-Trip Blank	Trip blanks are test samples of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. They are used to measure cross-contamination from the container and preservative during transport, field handling, and storage. Usually, at least one trip blank should be prepared for each sample type per trip.	Y	N
Quality Control-Negative Control	The process to control the quality of measurement with absence of analyte or habitat is negative control.	Y	N
Sample-Composite With Parents	A sample split in the laboratory from half of a mother or parent sample.	Y	N
Sample-Composite Without Parents	Describes a sample which is a composite of either several discrete sampling events not described elsewhere, or is a sample collected by a continuous process over some time period. No database record exists as its parent.	Y	Y
Sample-Depletion Replicate	Lab Blanks are analyte-free matrices prepared in the lab and analyzed with samples to identify potential lab sources of contamination.	N	Y
Sample-Field Split	A sample created in the field from half of a mother or parent sample.	Y	Y
Sample-Field Subsample	A sample created in the field from a portion of a mother or parent sample	Y	N
Sample-Integrated Cross-Sectional Profile	A discrete/integrated sample, usually derived from a continuous record, representing cross-section of the stream.	Y	Y
Sample-Integrated Flow Proportioned	A sample integrated over an interval or space within which changes in flow are used to alter the proportion of the sampled medium contributing to the integrated sample.	Y	Y
Sample-Integrated Horizontal Profile	A sample integrated over an interval or space within which changes in flow are used to alter the proportion of the sampled medium contributing to the integrated sample.	Y	Y

Code	Description	Analytical Method Required	Monitoring Location Required
Sample-Integrated Time Series	A discrete/integrated sample, usually derived from a continuous record, representing some portion or segment of elapsed time within the overall activity duration or sample period.	Y	Y
Sample-Integrated Vertical Profile	A discrete/integrated sample, usually derived from a continuous record, representing some portion or segment of a vertical track within the study area.	Y	Y
Sample-Negative Control	A controlled sample with absence of analyte.	Y	Y
Sample-Other	This category contains a sample collected following a process which is not included in this list.	Y	Y
Sample-Positive Control	A controlled sample with presence of analyte.	Y	Y
Sample-Routine	A sample gathered using straightforward grab procedures for purposes of a general evaluation of the environment at the site.	Y	Y

Note that using a different activity type for the QA/QC samples inherently forces you to have a separate activity for the QA/QC samples than for the routine ones. It follows, then, that the activity ID for the QA/QC samples has to be different than for the normal samples because every activity in the system must have a unique ID. For example, let's say you have a routine water chemistry sample that was taken at Monitoring Location A on April 1, 2014 at 1:21:33PM and an associated QA/QC duplicate taken at the same place on the same date at the same time. The routine sample might have an activity ID of "MonLocA-20140401-01:21:23-WC-***SR***" (for "Sample-Routine"-type); and the duplicate might have an activity ID of "MonLocA-20140401-01:21:23-WC-***QCSFR***" (for "Quality Control Sample-Field Replicate"-type). If you tried to give them both the same ID, the system would either error or replace whichever activity was entered first with whichever was entered last, depending on exactly what you are doing at the time.