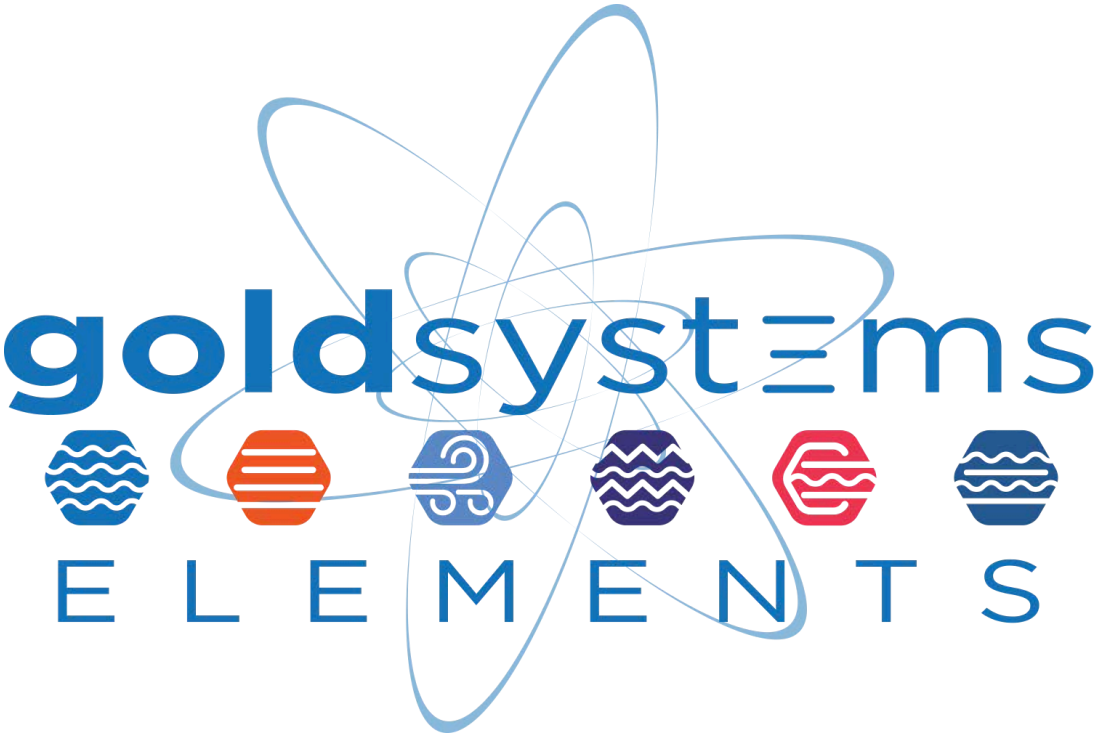


Water Quality System User Guide

Version 11.1
April 2025

Developed by:

goldsystems

Glossary **5**
Introduction **14**
1 GSE-WQ Overview **14**
1.1 What Does GSE-WQ Do? 14
1.2 How Does GSE-WQ Fit into the Big Picture? 14
1.3 Overview of GSE-WQ Security 15
1.4 Understanding the GSE-WQ Data Structure **16**
1.5 Overview of GSE-WQ Work Flow **17**
1.5.1 Prepare the Data File for Import 17
1.5.2 Create an Import Configuration 18
1.5.3 Import the Data File 18
1.5.4 Resolve Validation Errors 18
1.5.5 Migrate the Dataset 18
1.5.6 Data Entry 18
1.5.7 Managing Data in the Database 18
1.5.8 Exporting/Submitting the Dataset to WQX 19
1.6 Standard Page Features 19
1.6.1 General Page Features 19
1.6.2 List Page Features 20
1.6.3 Pages with search criteria will include the following: 20
1.6.4 Detail Page Features 21
1.6.5 Lookup Table Pages 21
1.7 Providing Public Access to GSE-WQ 21
2 Managing Import Configurations **22**
2.1 Creating an Import Configuration 22
2.1.1 Generated Values (not in your import file) 23
2.1.2 Columns (in your import file) 24
2.1.3 Managing Translations 27
2.1.4 Saving your import configuration as a file 29
2.2 Viewing/Editing an Import Configuration 29
2.3 Deleting an Import Configuration 30
2.4 Managing Users' Rights on an Import Configuration 31
2.5 Import Configuration - Advanced Features 32
2.5.1 Copying one value from your file to more than one element in GSE-WQ 33
2.5.2 Generating a Value Conditionally 34
2.5.3 Using Translations to Populate Many Related Elements 36
2.5.4 Using a Data Element Multiple Times in an Import Configuration 38
2.5.5 Special Case: Activity Groups in a file of Activities and Results 41
2.5.6 Attachments 44
2.5.7 Discarding a Result using Translations 45
2.5.8 "Options" button 45

2.6 Expert Mode 47
2.6.1 Header-Row Columns 47
2.6.3 Creating an Import Configuration to Support a Crosstab-style Import File 56
2.6.4 Expressions 60
3 Managing a Data Entry Page Configuration 64
3.1 Creating Translations for Data Entry Page Configurations 67
4 Working with Imported Datasets 70
4.1 Import Dataset Purpose and Type 71
4.1.1 Import Dataset Purpose 71
4.1.2 Import Dataset Types 71
4.2 Creating a New Import Dataset 73
4.3 Continuing with Existing Datasets 76
4.3.1 To View Event Log Messages: 78
4.4 Resolving Validation Errors in a Dataset 78
4.4.1 Resolving Invalid Domain Values 79
4.4.2 Resolving Invalid Formats or Values 81
4.4.3 Resolving Values that Exceed Maximum Length 81
4.4.4 Resolving Required Values that are Missing 81
4.5 Migrating an Imported Dataset 81
4.6 Deleting an Imported Dataset 81
4.7 Import a WQX-XML File into GSE-WQ 82
4.8 NARS NRSA App 84
4.8.1 Adding a Site to the App 84
4.8.2 Obtaining the JSON files during Submission of Forms Data 89
4.8.3 How to Import the Output JSON files into GSE-WQ 98
5 Viewing the Event Log 98
6 Calculating Metrics in GSE-WQ 100
Requirements for Metric Calculation 100
Order: Ephemeroptera (Mayflies) 100
Order: Diptera (True Flies) 101
Order: Plecoptera (Stoneflies) 101
Order: Trichoptera (Caddisflies) 101
Class: Clitellata (Segmented Worms & Leeches) 101
Other Taxa 101
6.1 Biological Profile 102
6.2 Biological Profile Details 104
Key Attributes Used in Metric Calculations: 104
6.3 Monitoring Locations 106
6.4 Seasons 107
6.5 Metric Types 109
How Coefficient Changes Are Applied: 111

Best Practices for Managing Coefficient Periods: 112
Managing Periods in GSE-WQ: 112
6.6 Index Types 112
6.7 Organization Preferences 113
6.8 Additional Information for Calculated Metrics 113
7 Calculate a Relative Percent Difference (RPD) between 'dissolved' and ' total results 118
8 Managing Data in GSE-WQ 119
8.1 Project List Page 120
8.1.1 Project Detail Page 121
8.1.2 Project Detail Rules 122
8.2 Monitoring Location List Page 122
8.2.1 Monitoring Location Detail Page 127
8.2.2 Monitoring Location Detail Rules 128
8.3 Activities List Page 128
8.3.1 Activity Detail Page 130
8.3.2 Activity Detail Rules 132
8.3.3 Metric Detail Page 134
8.3.4 Result Detail Page 136
8.3.5 Result Detail Rules 138
8.4 Activity Groups List Page 140
8.4.1 Activity Groups Detail Page 140
8.4.2 Activity Group Detail Rules 141
8.5 Indexes List Page 141
8.5.1 Index Detail Page 142
8.5.2 Indexes Detail Rules 143
8.5.3 Add Metrics to Index 143
8.6 Data Entry Page 144
9 FCAS 145
9.1 Enter Fish Consumption Metadata 145
9.1.1 Fish Consumption Characteristics Coefficient 146
9.1.2 Fish Consumption Population Group 150
9.1.3 Fish Consumption Zone 153
9.2 FCAS Exports 158
10 Publishing / Submitting Data to WQX 172
11 Data Analysis using Graphs, Reports, Maps, and Exports 175
11.1 Common Steps and Features When Generating Graphs, Reports, Maps, and Exports 175
11.1.1 Saving your Search Criteria 182
11.2.1 Graphs 183
11.2.2 Maps 185
11.2.3 Reports 185

11.2.4 Exports 185
12 Setting your User Preferences 186
13 Changing Your User Details 190
14 Administration 191
14.1 Roles 191
14.1.1 System Administrator 191
14.1.2 Domain Administrator (Users/Organizations) 192
14.1.3 Domain Administrator (Users Only) 192
14.1.4 Standard User 192
14.1.5 Public User 192
14.1.6 Training User 193
14.2 Organization Hierarchy 193
14.2.1 How to Setup Organization Hierarchy 193
14.3 Managing Users 196
13.3.1 Disabling a User Account 197
13.4 Managing User Rights to Organizations, Projects and Import Configurations 197
14.4.1 Viewing and Changing Rights for a User 198
14.4.2 Viewing and Changing Rights on an Organization 203
14.4.3 Viewing and Changing Rights on an Import Configuration 204
14.4.4 Viewing and Changing Rights on a Project 204
14.5 Managing Organizations 205
14.5.1 Organization Detail Rules 206
14.6 Managing Lookup Tables 207
14.6.1 Viewing the Values in a Lookup Table 207

Glossary

The following is a glossary of some of the acronyms or terms used in this document (and the GSE-WQ Application). If a definition includes a term that is also in the glossary, it is displayed like THIS.

ACRONYM/TERM	Definition
ACTIVITY	A general term for a field sampling activity that produces one or more RESULTS or METRICS. In GSE-WQ, an Activity tracks the location, date, and time of the sample or field measurement, as well as the equipment and methods used to collect, transport and store the sample. Each Activity must have its own Activity ID which is used to identify it in the system. An Activity ID must be unique (within your ORGANIZATION). Accidentally reusing an Activity ID would result in data being overwritten in the system, therefore it's important to follow a standard that guarantees that each

	Activity ID is unique.
ACTIVITY GROUP	A Group of Activities that are related. Each Activity Group must have an ID, a Type and include at least two ACTIVITIES. The following types of groups are currently supported: *Field Set*: all of the field observations, measurements, and samples collected at a monitoring location on a specific date (known in STORET as a "Visit") *QC Sample*: groups the samples and their related QC sample(s). For example, you might group a "Trip Blank" with all the samples from the trip. *Replicate*: links a replicate sample with the original sample (that it would be compared against) *Subsample*: groups composites, splits, or subsamples with their respective parent or related samples.
ATTACHMENT	Also known as an Attached Object (in WQX). This is an external file that is attached to a record in the database. The attachment may be a photo, a document, a spreadsheet, etc. The following entities allow attachments: PROJECT, MONITORING LOCATION, ACTIVITY, and RESULT.
GSE-WQ	Previously named the Ambient Water Quality Monitoring System (AWQMS). The name for the system described in this document. In 2023, it was renamed GSE-WQ (GS Elements - Water Quality System) to match our new system branding and better represent the diverse nature of data we can now support
CDX	[The] Central Data Exchange. EPA's name for their NODE on the EXCHANGE NETWORK. Software, like GSE-WQ, communicates with CDX when it submits data to EPA and checks on the status of those data submissions.
CHARACTERISTIC	Also known as an analyte or parameter. "Characteristic" is the ELEMENT which identifies what is being measured in a field/lab RESULT. For example, a characteristic of "Dissolved oxygen (DO)" indicates that a particular RESULT is a measurement of the Dissolved Oxygen in a water sample. Some characteristics include a "Pick List" for the respective RESULT Value. For example, when the characteristic is set to "Turbidity severity" the RESULT Value must be

	one of the following: EXTREME, MILD, MODERATE, NONE, SERIOUS
CSV	Comma Separated Value. A data file formatted as a table, where each column is separated by a comma. Software like Microsoft Excel can export spreadsheets into a CSV format. Files in this format can be imported into GSE-WQ.
DATA FLOW	A named standard for a specific type of data exchanged on the EXCHANGE NETWORK. Each data flow has a documented format (typically based on XML) that must be used when submitting that type of data to a node. WQX is the only data flow that is relevant to this document.
DATASET	In the context of GSE-WQ, a dataset is a collection of data which has been imported into, or exported from, the system. A dataset is a copy of the original data and is temporary. An imported dataset only becomes permanent once it has been MIGRATED successfully. A dataset can be deleted without affecting the original data. In fact, it should be deleted as soon as it is no longer needed. Likewise, after a system-defined number of days (since it was imported/exported), a dataset will be automatically deleted from the system. This prevents the system from getting overloaded with temporary data that is no longer used.
DOMAIN VALUE	Another word for a lookup table value. For example, "Water" is a domain value in the "Activity Media" Domain Value List (or Lookup Table). "Kick Net" is a domain value in the "Sample Collection Equipment" Domain Value List. In this document we will generally use the terms "Lookup Value" and "Lookup Table" rather than "Domain Value" and "Domain Value List".
ELEMENT (or Data Element)	In the context of GSE-WQ, an Element is a piece of information stored in the database. Examples of data elements are "Latitude", "Longitude", "Project Name" and "Activity Start Date". An IMPORT CONFIGURATION allows users to map columns in their import files with elements in the database.
ENTITY	A concept represented by a record in the database. PROJECTS, MONITORING LOCATIONS, and RESULTS are examples of entities. An entity has a collection of ELEMENTS whose values describe it. For example: each PROJECT (entity) has a Project ID, Name, and

	Description (ELEMENTS) whose values describe that specific project. The concepts of Entities and Elements are particularly relevant when working with IMPORT CONFIGURATIONS.
EPA	*[United States] Environmental Protection Agency*
EXCHANGE NETWORK	Short for the National Environmental Information Exchange Network (NEIEN). The Exchange Network is an Internet-based system used by states, tribes, and other public/private organizations to securely share environmental data with one another and the EPA. Partners exchange data using a software application known as a NODE. The largest trading partner on the Exchange Network is the EPA. Their NODE is known by the acronym CDX.
IBI	*Index of Biological Integrity* (or *Index of Biotic Integrity*). An IBI uses the results of fish assemblage surveys to assess the ecological quality of waters. An IBI Score is the assessment score for a particular MONITORING LOCATION on a particular date. An IBI is one type of INDEX that is supported by WQX and GSE-WQ.
ID (or Unique ID)	An abbreviation for "*Identifier*" (or "*Unique Identifier*"). IDs can generally contain letters, numbers and other characters and are case-insensitive (e.g. "ABC-1" would be considered the same as "abc-1"). Most ENTITIES that are imported into the system include an ID. For example: Project ID, Monitoring Location ID, Activity ID, Activity Group ID, Index ID, and Metric ID. IDs are also used to uniquely identify a value in a lookup table. For example: Sample Collection Method ID, or Metric Type ID. All lookup tables have a unique ID, but they are not always called an ID. Sometimes it's the "Name" or "Code" that is the unique ID. For example, "Characteristic Name" is the unique identifier for a Characteristic and "Result Laboratory Comment Code" is the unique identifier for a Result Laboratory Comment. In GSE-WQ, uniqueness is enforced within a certain "context": ● For ENTITIES that are imported… ○ the context is an ORGANIZATION. For example, one organization can have a MONITORING LOCATION with an ID of "BEAR-RIVER-1", and

	this will not prevent another ORGANIZATION from also having a Monitoring Location with an ID of "BEAR-RIVER-1". ● For most lookup tables… ○ the context is the entire system. In other words, there is only one Characteristic Name of "Dissolved oxygen (DO)" in the system and only one Result Laboratory Comment Code of "EHT" in the system (and these IDs can be used by anyone). ● For these lookup tables (Sample Collection Method, Sample Preparation Method, Lab Sample Preparation Method, and Citation)… ○ the context is an ORGANIZATION. In other words, values in these tables can only be used by the ORGANIZATION they were created for, and one ORGANIZATION might have an ID that is identical to another ORGANIZATION (without causing any harm to the system). ● For these lookup tables (Analytical Method and METRIC TYPE)… ○ the context is a parent table called "Analytical Method Context" or "Metric Type Context". The "context" represents the group that manages the list of values. This group can be an external organization (like, "IDEXX Laboratories" or "American Society for Testing of Materials") or an WQX/GSE-WQ Organization (like "Utah Department of Environmental Quality" or "Bishop Paiute Tribe"). ○ For example: when a Result references an Analytical Method (in an import file), your file must provide an "Analytical Method ID" (like "D1126 ") and an "Analytical Method Context ID" (like "ASTM").
INDEX	The general term for each occurrence of a biological or habitat index record within the system. For example, if a habitat assessment is performed each year, for 3 years, on each of 5 monitoring locations, then there will be 15 Index records in the system. Each one will store the

	habitat assessment score for a particular MONITORING LOCATION on a particular date. An Index Score is generally the result of aggregating a collection of METRIC Scores. For example, individual METRIC scores are often summed or averaged to determine an overall biological or habitat assessment score for a MONITORING LOCATION.
INDEX TYPE	The ELEMENT which describes the type of INDEX that is being evaluated. Before an ORGANIZATION can begin importing their [Biological or Habitat] INDEX data, they must first populate the table of Index Types that they will be referencing in their files. For example, before importing your IBI data, you must first create an Index Type for your ORGANIZATION. The Index Type ID could be "IBI" and the Index Type Name could be "Index of Biotic Integrity". Each organization can create as many Index Types as they wish.
IMPORT CONFIGURATION	A User-defined description (or map) for each type of file that is imported into the system. In other words, the way that you tell the system how it should interpret your import file is with an "Import Configuration". Import Configurations allow you to list each column that you have in your import file and map it to data ELEMENTS that exist in WQX. You can create (and save) an unlimited number of Import Configurations, and you can share them with others, as needed.
METRIC	The general term for each occurrence of a biological or habitat metric record within the system. A Metric record holds a value (which is optional) and a score. For example: a metric for "Riparian Vegetation Zone Width" may have a value of "12.5 ft." and a score of "4". Like RESULTS, each Metric in the system, must be part of an ACTIVITY. Also, Metrics do not have a [Unique] ID. Because of this, there is no way to add, update, or delete an individual Metric via an import file. You must import an entire ACTIVITY (and all of its Metrics). To update a Metric, you need to reimport the Activity and all of its Metrics, rather than just the Metric that changed. A Metric may, optionally, relate to one or more INDICES. For example, each metric that is used in determining an IBI score, would have a reference to the INDEX record which holds the IBI Score.

METRIC TYPE	The ELEMENT which describes the type of metric that is being evaluated. Before an ORGANIZATION can begin importing their METRIC data, they must first create the list of Metric Types that they will be using. Examples of habitat metric types are "Riparian Vegetation Zone Width" and "Bank Stability". Examples of biological metric types are "Percent of Tolerant Species" and "Percent of Hybrids".
MIGRATE	Migrating, in GSE-WQ, refers to the process of making the data from an imported DATASET permanent, by moving it from a temporary staging area to the official GSE-WQ database.
MONITORING LOCATION	Also known as a site or station. This is the location (on a water body) where samples or field measurements and observations are collected. Before an ORGANIZATION's ACTIVITIES, RESULTS, METRICS and INDICES can be imported, their Monitoring Locations [List] must be imported and MIGRATED. Updating a Monitoring Location will not affect the ACTIVITIES, RESULTS, etc. below it. However, deleting a Monitoring Location will also delete the ACTIVITIES, RESULTS, etc. below it.
NAAS	Network Authentication and Authorization Services. The NAAS is used on the EXCHANGE NETWORK to validate a user before gaining access to a NODE. GSE-WQ uses a single NAAS Account for all users, so GSE-WQ Users do not need to have their own NAAS Account.
NODE	Software used to exchange data on the EXCHANGE NETWORK. Nodes can submit data to and request data from other nodes as well as receive data and respond to requests for data from other nodes. The most significant node on the EXCHANGE NETWORK is CDX (operated by the EPA). A limited node, known as a Node Client, is built into GSE-WQ, so that it can submit data to CDX.
ORGANIZATION	A state, tribe, volunteer monitoring group, or other public/private organization that manages water monitoring data. A physical organization in the real world may have multiple Organization records in GSE-WQ. For example, a state or tribe may choose to have separate Organizations [in GSE-WQ] for their beach monitoring program and their other monitoring programs. In GSE-WQ, an Organization is the entity that is the parent of all

	other entities (e.g. Projects, Monitoring Locations, Activities, etc.). Each Organization has a unique ID (which is approved by the EPA). Likewise, a user must be assigned rights to an Organization before he/she is allowed to import data belonging to it.
CONDUCTING ORGANIZATION	This is an organization that collects the field samples or measurements. These organizations are not official GSE-WQ ORGANIZATIONS and do not have unique IDs. An Activity can list as many Conducting Organizations as needed and these organizations are not validated in any way. Likewise, the Conducting Organization is not required and is not expected when the Conducting Organization is the same as the [GSE-WQ] ORGANIZATION for a particular Activity.
PROJECT	Typically refers to a water monitoring project with specific objectives and procedures. However, in the context of GSE-WQ, a project is an entity created to group monitoring data for a variety of reasons. A project may represent an actual monitoring project, a source of funding (or program), or a department or group within the organization who is interested in a specific set of data. Before an ORGANIZATION's ACTIVITIES, RESULTS, METRICS and INDICES can be imported, their Project [List] must be imported and MIGRATED. Updating a Project will not affect the ACTIVITIES, RESULTS, etc. below it. However, deleting a Project will also delete the ACTIVITIES, RESULTS, etc. below it (unless the Activity relates to more than one Project). A Project must include a project description or an ATTACHMENT (often for the QAPP). Each ACTIVITY in GSE-WQ must be linked to a Project, and can, optionally, be linked to multiple Projects. A Project is also an ENTITY to which a user's rights can be linked. For example, rather than granting a user rights to all data within an ORGANIZATION, a user might be granted rights to just certain projects.
QAPP	*Quality Assurance Project Plan*. Documents the planning, implementation, and assessment procedures for a particular PROJECT, as well as any specific quality assurance and quality control activities. All work performed or funded by EPA, that involves the acquisition of environmental data, must have an approved *Quality Assurance Project Plan*.

QA/QC	*Quality Assurance/Quality Control*
RESULT	This ENTITY describes the results of a field measurement, observation, or laboratory analysis. Each result in the system must be part of an ACTIVITY. Unlike most other ENTITIES in the system, Results do not have a Unique ID. Because of this, there is no way to add, update, or delete an individual Result via an import file. You must import an entire ACTIVITY (and all of its Results). For example, at a site you collect five Results from your probe. You import and submit these Results as part of a single Activity. You then discover a correction that needs to be made to one of the Results. To avoid any data being dropped from GSE-WQ, you need to import and resubmit the Activity and all five Results, rather than just the one that changed.
STORET	STOrage and RETrieval [System]. The original name for the system, created by the EPA in the late 1960's, to hold ambient water monitoring data throughout the country. In 1999, EPA created a new system, Modernized STORET, and began referring to the original system as Legacy STORET. In 2006, EPA released WQX to replace STORET. STORET was retired in 2009. Today, STORET no longer refers to a system, but is still used to refer to the national data warehouse that holds data from [Modernized] STORET and from WQX.
TAB-DELIMITED FILE	A data file formatted as a table, where each column is separated by a tab character. This is one type of file that is also known as a "text file" or "flat file". Software like Microsoft Excel can export spreadsheets into a tab-delimited format (.txt). Files in this format can also be imported into GSE-WQ.
WQX	Water Quality Exchange. The data flow (at CDX) and the system at The EPA which receives ambient water monitoring data from organizations throughout the United States. WQX replaced STORET in 2006.
WQX WEB	The system created for the EPA by Gold Systems to assist users with converting their data files (in a variety of formats) into the WQX standard format so that they can be submitted to CDX. WQX Web was adopted and greatly expanded into the GSE-WQ System. GSE-WQ users have no need to use EPA's WQX Web System (as GSE-WQ is a superset of WQX Web).

XML	*Extensible Markup Language*. A common standard for formatting data for computer systems to read. This is the basis for all data exchanged on the EXCHANGE NETWORK (including WQX). It is more difficult for humans to create and/or read than a spreadsheet or text file. GSE-WQ Users should not generally need to work with XML documents directly.

Introduction

The Water Quality Exchange (WQX) was implemented as the new mechanism for exchanging water quality data between the U.S. Environmental Protection Agency (EPA) and its partners. The WQX adopted a standard format for data submissions, based on Extensible Markup Language (XML) – a computer industry standard for formatted data. Adopting the WQX standard frees a data provider from a dependency on any specific local system for managing and submitting data to EPA.

As part of the transition to WQX and the Exchange Network, EPA discontinued support of the distributed STORET Data Entry Module in Fall 2009. The Ambient Water Quality Monitoring System (GSE-WQ) was developed as a WQX-compatible data management system, and as a replacement for STORET.

1 GSE-WQ Overview

1.1 What Does GSE-WQ Do?

GSE-WQ is a data management system for ambient water quality data. It was specifically designed for compatibility with EPA's WQX. Using GSE-WQ, you can import and validate your lab and field data, review, and modify the data for quality control or other purposes, and then export (and optionally submit) a WQX-compatible file to the EPA.

For installations without their own node on the National Environmental Exchange Network, GSE-WQ can be configured to directly interact with the Central Data Exchange (CDX), EPA Portal through which environmental data is expected to flow.

1.2 How Does GSE-WQ Fit into the Big Picture?

In February 2007, WQX 1.0 was released with the goal of providing EPA partners with a means of exchanging water quality monitoring data via CDX. WQX 1.0 supported physical, chemical, and fish tissue results. WQX 2.0, released in May 2008, incorporated biological and habitat data elements into the schema structure.

GSE-WQ provides a complete ambient water quality data management solution that is compatible with EPA's latest WQX standards, and includes support for data elements not

included in WQX. It provides the ability to import and validate lab and field data, review and analyze the data, and then export and submit data to WQX.

As of April 2025, GSE-WQ also has ADA/Section 508 Support which includes Accessibility features in User Preferences.

1.3 Overview of GSE-WQ Security

The following is a summary of the security features in GSE-WQ:

Users: Users are authenticated by user ID and password. Once a user logs into GSE-WQ, the user is issued a session. After inactivity (default is 45 minutes but can be configured), the user session is automatically terminated and logged out.

Password Security Levels: GSE-WQ supports per user password security levels (low, medium, and high). The level is set by the system administrator; not the user:

- Low: password must be 4 or more characters
- Medium: password must be 6 or more characters (including 1 letter and 1 number or special character)
- High: password must be 8 or more characters (including 1 capital letter, 1 small letter, 1 number, and 1 special character). Password expires every 90 days.

GSE-WQ Automatically locks user accounts after a number of failed login attempts depending on the user's password security level:

- Low: 8 attempts
- Medium: 5 attempts
- High: 3 attempts

A user can change his/her own password in accordance with their password security level. An administrator can reset a user's password. The next time the user logs in, the user will be required to change their password in accordance with their password security level. Passwords are stored in an encrypted format.

Roles: Each user is assigned to a role which will determine their access rights to certain pages or features within the system. Roles are not, for the most part, used to assign rights to data. See "Access Rights" below to understand how users gain access to data. Most users are assigned the "Standard User" role. There are also roles for "System Administrator", “Domain Administrator (Users/Organizations)”, “Domain Administrator (Users Only), "Public User”, "Public User - Custom", and “Secchi Dip-In User” which have different access rights. In general terms, roles grant a user access to pages or functionality in the system.

Access Rights: A user must be granted access to an organization or, optionally, a project within that organization before they can view, edit, or delete data in the system (relating to that organization or project). The highest access right of "Administrator" can also be assigned on an organization or project. An organization administrator can edit the organization (and all its data)

as well as manage all organization-specific lookup table values. A project administrator can edit the project he/she is assigned (and all its data).

Lookup tables: Lookup tables fall into one of three main categories:

EPA Managed Tables: Many of the lookup tables in GSE-WQ are copies of lookup tables from EPA's WQX System and need to stay in sync with WQX to maintain full compatibility. Once or twice a year, updates to these tables are typically included with an GSE-WQ application update. In a case where the update is needed immediately, a system administrator is allowed to change these tables manually within GSE-WQ, but caution should be used to make sure the spelling is exactly the same as the WQX System.

Locally Managed Tables: Some of the lookup tables in GSE-WQ do not exist in WQX. These tables can be managed locally. Many of these tables have values that are linked to a specific organization. When they are, only an organization administrator is allowed to change them. When they are not, only a system administrator is allowed to change them.

Hybrid Tables: A few tables can contain EPA-managed values and locally managed values. In the case of tables like "Analytical Method" and "Metric Type", EPA has built-in support for local values by providing an organization-specific context that can be used to designate local values. However, a few other tables (for example, "Characteristic", "Taxon", and "Result Measure Qualifier") are actually EPA-managed tables in WQX that have been extended in GSE-WQ to allow local values, which are flagged as "not WQX-compatible." This way, the system knows to not export them when sending data to WQX. Values with an organization-specific context can be modified by an organization administrator. All other values can only be modified by a system administrator.

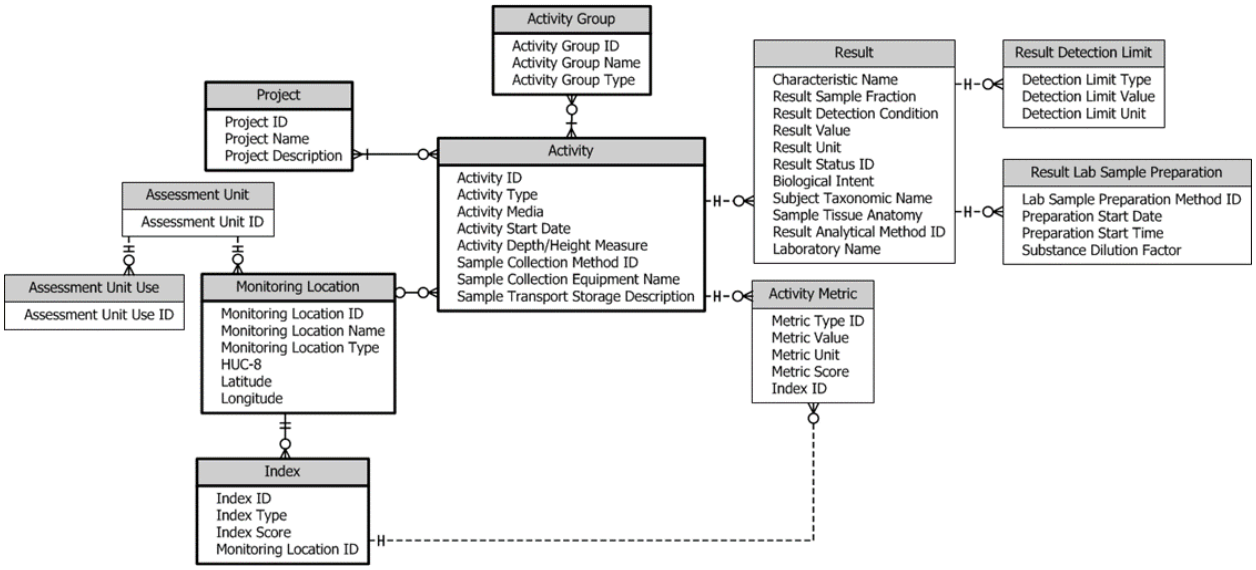
Note that when referencing lookup table values in an import file you typically just need to provide that value's unique ID or Code (such as a Result Status ID). However, with Analytical Method and Metric Type, two values are needed to uniquely identify them in an import file (the ID and Context).

Import Configurations: An import configuration is used to describe what an import file looks like. You can create as many import configurations as you like. By default, the import configuration is only accessible by the user who created it. However, you can assign rights to any additional users. You can also restrict access to be "Read-only", if you wish to allow someone to use it or create copies of it, but not be able to modify it.

Datasets: a collection of data that has been imported for an organization is accessible by anyone who has been granted at least "read-only" rights to the organization.

1.4 Understanding the GSE-WQ Data Structure

To fully understand how to use GSE-WQ, it is necessary to first understand the types of data GSE-WQ supports and how they relate to one another. Below is a simplified model of the entities and elements that exist in GSE-WQ (as well as the relationships between them).



See Section 0(Glossary) for a description of many of the entities (i.e. boxes) in the model above.

A box of related elements is known as an "entity". Lines connecting boxes represent relationships between entities. A three-pronged symbol (known as a crow's foot) on one end of a line, indicates that the entity on the other end of the line can relate to more than one of the entity with the crow's foot. For example, an Activity (e.g. a water sample) can relate to more than one Result and a Result can have more than one Result Detection Limit.

1.5 Overview of GSE-WQ Work Flow

1.5.1 Prepare the Data File for Import

The user gathers their water quality monitoring data into a series of files (.txt, CSV, or .xls/.xlsx). The files are organized into rows and columns with the columns delimited by a predetermined character such as a comma or a tab for text files. Rows will be designated by a carriage return or line feed. This is convenient if your data is already in a spreadsheet. Lab data or probe data is often in a format supported by GSE-WQ. In some cases, it may be useful to load it into a spreadsheet to do clean up or to add additional values required by GSE-WQ.

The following types of import files are supported by GSE-WQ:

- Projects
- Monitoring Locations, Assessment Units, and Reaches
- Biological/Habitat Indices
- Activities and Results
- Activities and Metrics
- Activity Groups
- Thresholds

1.5.2 Create an Import Configuration

Before importing a file, a matching import configuration must be defined. An import configuration describes the columns in your import file and maps them to data elements in GSE-WQ. You can provide default values for elements that may not have a value or that are not included in the file. Additionally, you can define translations to convert values in your files to valid values in GSE-WQ. You may leverage existing import configurations that have been shared with you (if you belong to a group that follows a standard format for your import files), or you can create import configurations from scratch to match your own proprietary file format.

1.5.3 Import the Data File

To import a file, you will need to indicate the import configuration that describes your import file format. Then browse to your file and begin the import process. As the file is being processed, the system will load your data into a temporary table in the database. This will be called a "Dataset" by the system. The system will also log any warnings or errors that it encounters into an "Event Log". Once the import has completed, a "Dataset Summary Page" will display the following:

- The number of valid and invalid records
- The number of each type of validation error and, in some cases, a link to a page where that type of error can be corrected.
- A link to the Event Log where you can review all errors and warnings encountered while processing the file.

1.5.4 Resolve Validation Errors

There are two approaches to resolving errors with your import file (or dataset).

1. Review the errors in the Event Log, modify the original data file, then reimport the file.
2. Use “Resolution Pages” to fix errors in the dataset and then revalidate the changes.

1.5.5 Migrate the Dataset

Once you have resolved the validation errors in the dataset, you then migrate the dataset into the GSE-WQ Database using the Migrate button at the top of the Dataset Summary Page.

There is also an option, when migrating metrics, to have the system automatically calculate certain types of index scores that are simple sums or averages of the metric scores.

1.5.6 Data Entry

As an alternative to importing data files (as outlined above), you can also hand-enter data into GSE-WQ using a Data Entry Page. This is a customizable page for data entry of field activities and results.

1.5.7 Managing Data in the Database

Once data is imported or entered into the system, it can be viewed, updated, or deleted. Your list pages can be used to search for data in the system (e.g. project, monitoring locations,

results, etc.) From the List Page, you can click a link to navigate to the respective "Detail Page" where the specific record can be viewed, updated, or deleted from the system.

1.5.8 Exporting/Submitting the Dataset to WQX

You can export and (optionally) submit a WQX compatible file. If you belong to an agency or organization with its own Exchange Network Node, you will likely wish to export and download the file and submit the file to WQX via your own node, rather than having GSE-WQ perform this step.

If you choose to submit your file directly to WQX, the status of that submission will be displayed and you can download related documents once the submission has been processed by the WQX System.

1.6 Standard Page Features

There are many features within GSE-WQ that are common to all pages or to a group of pages. The subsequent sections describe those common features.

1.6.1 General Page Features

All dates in the system will be formatted as “MM-DD-YYYY”.

Pages are designed for screens that are at least 1,280 pixels wide (the size of a typical modern laptop).

A navigation bar exists on the top of the page to assist you in accessing the system’s main pages. (Figure 1)

All of the links will navigate to a new page.

The “Sign Out” link is a special case that deserves some explanation. When you click the link, your session will be closed and you will return to the Login Page. This is a good practice when you are done using the application because it frees up resources that are used by your application session.

You will be automatically logged out due to inactivity. Any time you perform an action that causes a page to be accessed, the time will reset to its default (45 minutes). (Figure 2)

1.6.2 List Page Features

All pages whose purpose is to display a list / table of data will have the following standard features:

- Tables will display a user-specified number of rows (e.g. 500) as defined in your user preferences.
- Row numbers will be displayed to indicate what portion of the total rows you are viewing (Row 1 - 500 of 29072)
- Column headings can be clicked to sort the list by the selected column. One click will sort in ascending order. A second click will sort in descending order.
- Search bar – You can select from the drop-down menu what kind of search it is (Figure 3)

- The page will only display data which you have been granted access to.
- **Return** button – Returns you to the previous page or the page above it in the hierarchy.
- **Add New** button – Initiates the process of creating a new record for the type of list you are viewing (in most cases this takes you to a detail page where you can add a new record).

1.6.3 Pages with search criteria will include the following:

- **Search** button – this will initiate the query and return the results to the page.
- **Clear Search Criteria** button – this will clear the search criteria and previous results.
- Search Criteria – the following types of controls are used for search criteria:
    - Dropdown List - provides you a list of allowed values for the criteria. If there is a blank row in the list, the criteria is optional.
    - Link - click the link to view a full-page list of allowed values. Some lists (like Taxon or Characteristic may include search criteria to find the value you are looking for). If so, enter a partial name and click the Show Values button. Then click the value you are interested in to select it.
        - A value of **{none}** indicates the criteria should be ignored.
    - Date - you may enter a date in the box (with the keyboard), or click on the calendar icon to view a calendar, where you can select a date.
        - If there is a date range for criteria:
            - Entering just a beginning date, will find all values on or after that date.
            - Entering just an end date will find all values before or on that date.
            - Entering both dates will find values between (and including) those dates.
    - Text Box - Allows you to enter any value you wish

1.6.4 Detail Page Features

All pages whose purpose is to serve as a form for viewing and editing records have the following standard features:

- The **Save** button – will validate the data that has changed and then save any changes made to data in the form and then refresh the page. If validation errors are found, the record will be redisplayed (and not saved) and the errors messages will be listed on the page. One exception exists: the Import Configuration Page will save your changes and mark the record invalid if there are validation errors, so you can return and correct them at a later time.
- The **Return** button – will save your changes (if any) and will return you to the previous page, as long as there were no errors while saving.
- The **Cancel** button – will abort any changes made to data on the page since the data was last saved (or since it was retrieved) and then return you to the previous page.
- The **Delete** button – will delete the record displayed on the page. The system will prompt you for confirmation before the record is deleted.
- An asterisk at the end of a field label will indicate that the field is always required. However, some fields will be conditionally required based on the existence/non-existence of other values and will not necessarily have an asterisk on their label. The system will notify you of these conditionally required fields when you save the record.

1.6.5 Lookup Table Pages

Lookup tables share many of the features of list pages and detail pages. See section 11.6 Managing Lookup Tables for more details.

1.7 Providing Public Access to GSE-WQ

GSE-WQ provides some specific features to support public access to your water quality data. This can be a cost-effective way to share your data with the public. It may also fulfill the "freely and publicly accessible" requirement of the Google Maps API License, if you choose to enable the integrated map in GSE-WQ.

GSE-WQ provides a configurable message on the login page that can be used to inform the public of a special username and password that the general public can use to access the system (See the GSE-WQ Installation Instructions for more information). Alternatively, the message could simply notify users that they can request a username/password and provide them a "mailto" link to use for that request. An administrator can then respond to the email requests with an GSE-WQ username and password for that user. The administrator could:

- Create a new user account in GSE-WQ and respond to the requestor with the specific username/password to use;
- Respond with the same username and password to every public requestor (all public users could use a single username and password);

- Respond with one of several public usernames that the administrator rotates through when responding to requestors.

The decision depends on how much detail your organization wants to track about each individual public user's usage of the system.

Each user that is created for public access should be assigned the role of "Public User". Public users also need to be granted read-only data access rights for the appropriate organizations. When a public user logs in, the system restricts the user's navigation and only displays a limited number of options in the GSE-WQ navigation panel.

See the "Roles" section of this document for more information on the "Public User" Role.

2 Managing Import Configurations

An import configuration defines how GSE-WQ should interpret an import file. Import Configurations define each column that you will have in your import file, the data elements each column maps to and the format you will use for date, time, latitude, longitude, etc. You can have an unlimited number of Import Configurations. You can limit access to your Import Configuration to specific users or organizations.

The following types of import configurations are supported:

- Projects
- Monitoring Locations, Assessment Units, and Reaches
- Biological/Habitat Indices
- Activities and Results [& Activity Groups]
- Activities and Metrics [& Activity Groups]
- Activity Groups
- Thresholds

There are two methods for creating an Import Configuration:

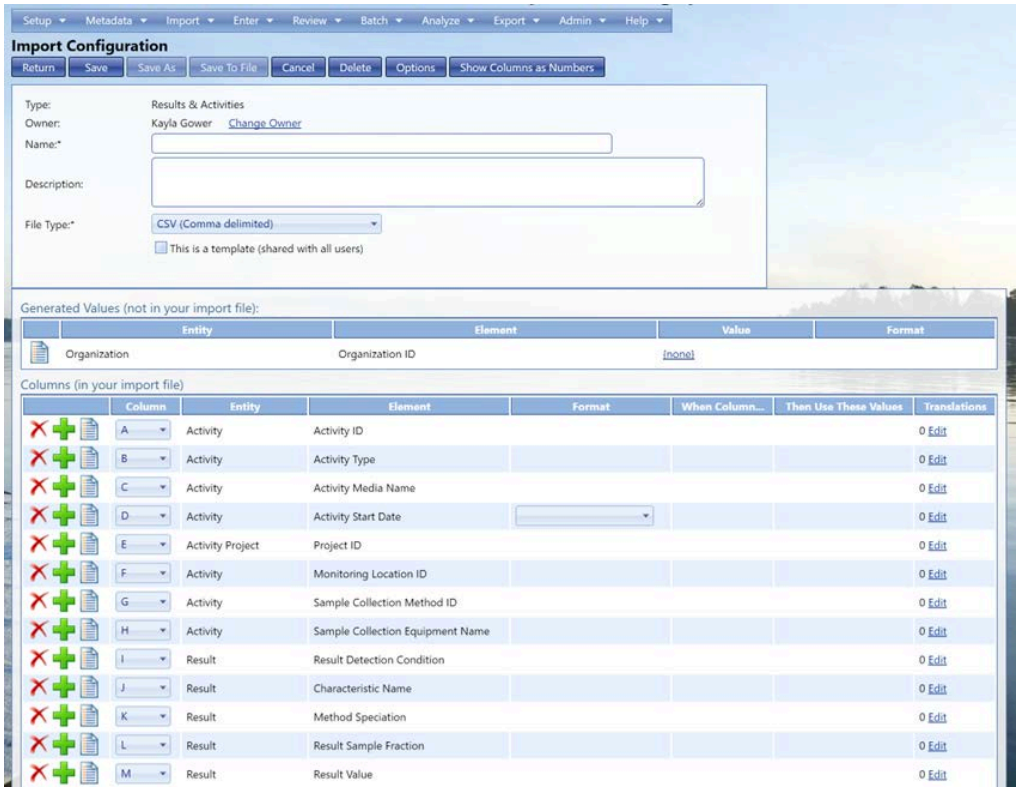
1. Create a Configuration for import file.
2. Create a Configuration for Data Entry Pages.

2.1 Creating an Import Configuration

1. Hover over **Setup** on the navigation bar then Click on **Import Configurations**.
2. Click the **Add New** button.
3. The **Add New Import Configuration Page** will display.
    - Select which method to use to create a new import configuration: *from scratch, from an existing configuration or template,* or *from a configuration file*
    - Then select the Import Configuration Type
    - If you select to create a new import configuration *from an existing configuration or template,* you will have to select a Configuration To Copy. If you select to create a

new import configuration *from a configuration file,* then you can select the Browse button and select a previously saved import configuration file.

4. Once you have selected which import configuration you will be working with, click the **Continue** button to go to the Import Configuration Page, where you can edit and save your new import configuration.



Now you can modify the import configuration to match your import file.

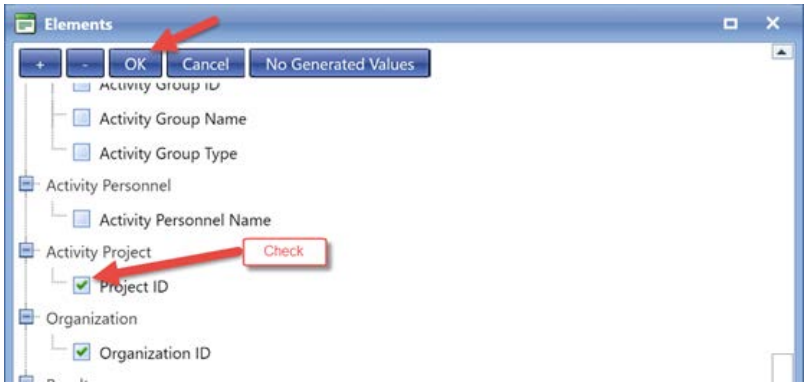
2.1.1 Generated Values (not in your import file)

This section of the page is for managing data elements whose values will be generated by the system. This is useful for an element that is not included in your import file and whose value will be the same for every row of the file.

New import configurations include one generated element by default: “Organization ID”. Since only one Organization ID is allowed per file, it’s simpler to generate the value for Organization ID (for each record), rather than having to provide the same value on every row of your file.

To Add a Generated Value…

Click the **Pick List** button  to display a list of data elements.



When you check the box next to an element in the list and click the OK button, the system will add that element to the table of Generated Values.

Likewise, if you uncheck the box next to an element in the list and click the OK button, the element will be removed.

Each generated value [row} includes an Entity [name], Element [name], Default Value, and, if appropriate, a Format. The Default Value will be displayed as a link or in a text box:

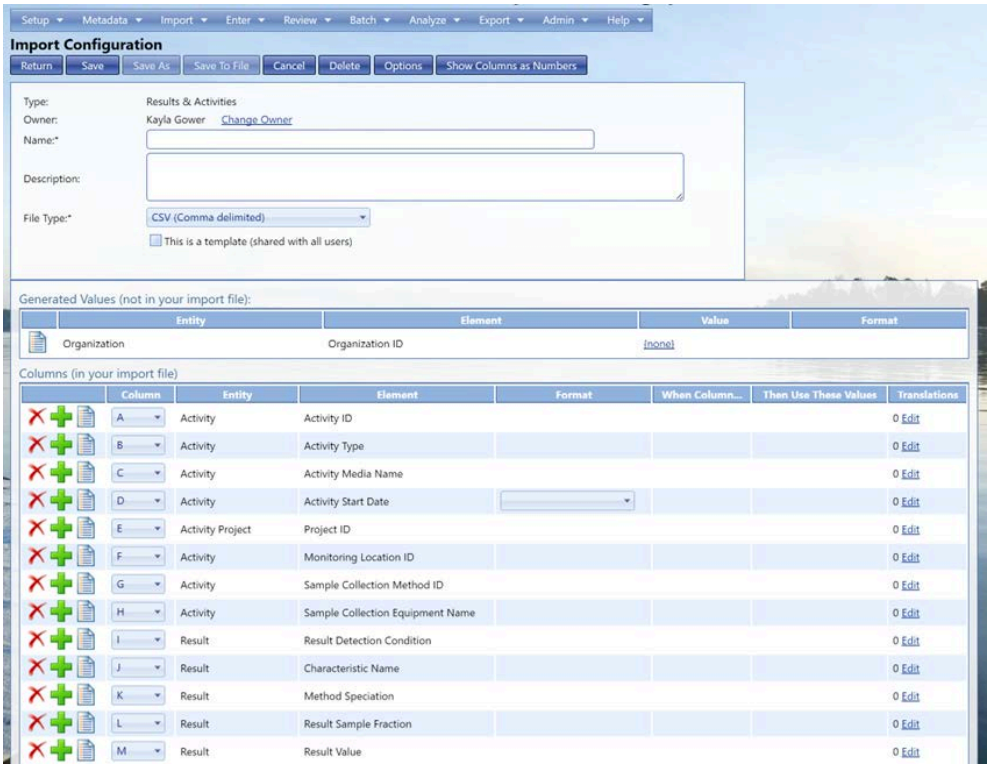
> **Link**: If the element is constrained by a list of allowed values, then it will be displayed as a link. Links display "{none}" when no value has been set. When you click the link, a list of allowed values will be displayed. If this list is large, you may also be presented with criteria to find the value you are interested in. Click the link for the desired value, and that value will now be displayed as the Default Value in your import configuration.
>
> **Text Box**: If the generated element is not constrained by a list of values, its default value will be displayed in a text box. The text box allows any value you wish to enter.

Note: Although generated values must have a value when you import a file, it is not mandatory to set their value in your import configuration. You are given another opportunity to set generated values each time you import a file. See Section 0 for more details.

2.1.2 Columns (in your import file)

This section of the page is used to map the columns in your import file to data elements in GSE-WQ.

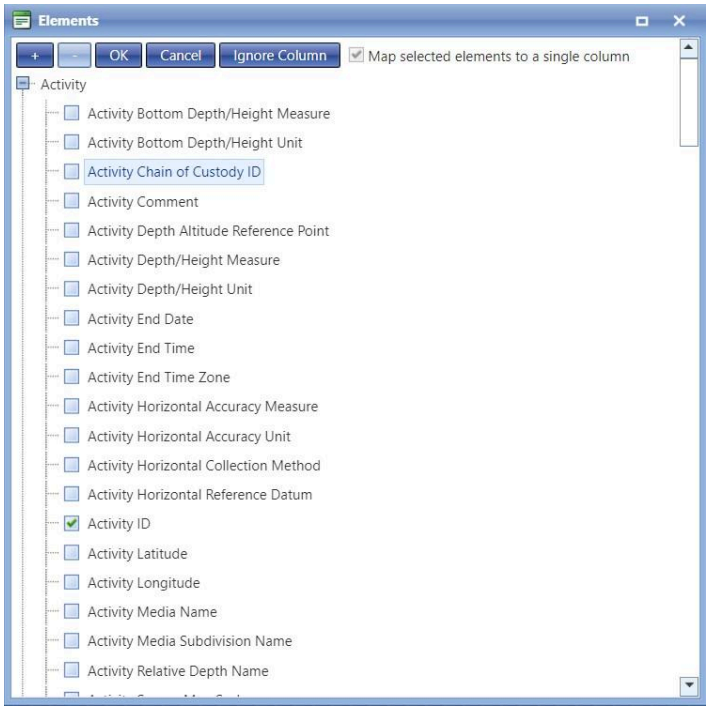
For a new import configuration, you are provided with an initial set of columns and elements that are commonly used.



Each row in the table represents a column in your import file and describes how that column maps to one or more elements in GSE-WQ.

Each row has the following features.

- **"Remove"** Link: click the "X" to remove a row (i.e. import column).
- **"Add"** Link: click the "+" button to add a row (i.e. import column).
- **"Pick"**:  Click this button to pick the data element(s) that are mapped to an import column. After clicking this button a list of elements will display:



Elements are grouped by the entity they belong to. For example, Activity elements and Result elements are grouped separately.

Select one or more elements that you wish to add.
(The order isn't important at this time)

After you click the **OK** button at the top, the elements will be added to your import configuration.

You are allowed to map more than one data element to a single import column. To do this, you need to check the checkbox at the top of the list (titled **"Map selected elements to a single column"**).

You are also allowed to have a column mapped to no elements. This tells the system to ignore the column in that position in your import file. A quicker way to do this is to click the **Ignore Column** button on the Elements Pick List and then the column will be ignored.

- **Column**: This represents the column's position in your import file. Depending on the value in your user preferences, the position will be represented by a number (1, 2, 3…) or a letter (A, B, C…). Likewise, you can temporarily toggle this setting by clicking on the **"Show Columns as Numbers"** or **"Show Column as Letters"** link.
    - If you typically view your import file using a tool like Microsoft Excel, then letters may be preferred (to numbers) because Excel uses letters for each column in a spreadsheet.
    - If you wish to change a column's position, select a new value from the dropdown list.

- **Entity**: This shows the name of the entity that an element belongs to. If a column is not mapped to any elements, then “{Ignore Column}” will be displayed (which means this column in your import file will be ignored).
- **Element**: This shows the name of the data element(s) that are mapped to a specific import column.
- **Format**: For the system to know how to interpret certain types of data in your import file, a format may need to be selected. The system requires that you indicate the format you plan to use for the following types of data: dates, times, latitude, longitude, and yes/no fields. For example: below we have indicated that our Activity Start Date will be formatted as "MM/DD/YYYY" (e.g. 05/04/2013, 05-04-2013, or 05.04.2013)
- **When Column…/Then Use These Values**: Displays certain values you may have defaulted based of translations created for when the column is blank or is not blank.
- **Translations**: Displays the number of translations that have been created for a specific import column. Also, provides a link to add or edit the list of translations.

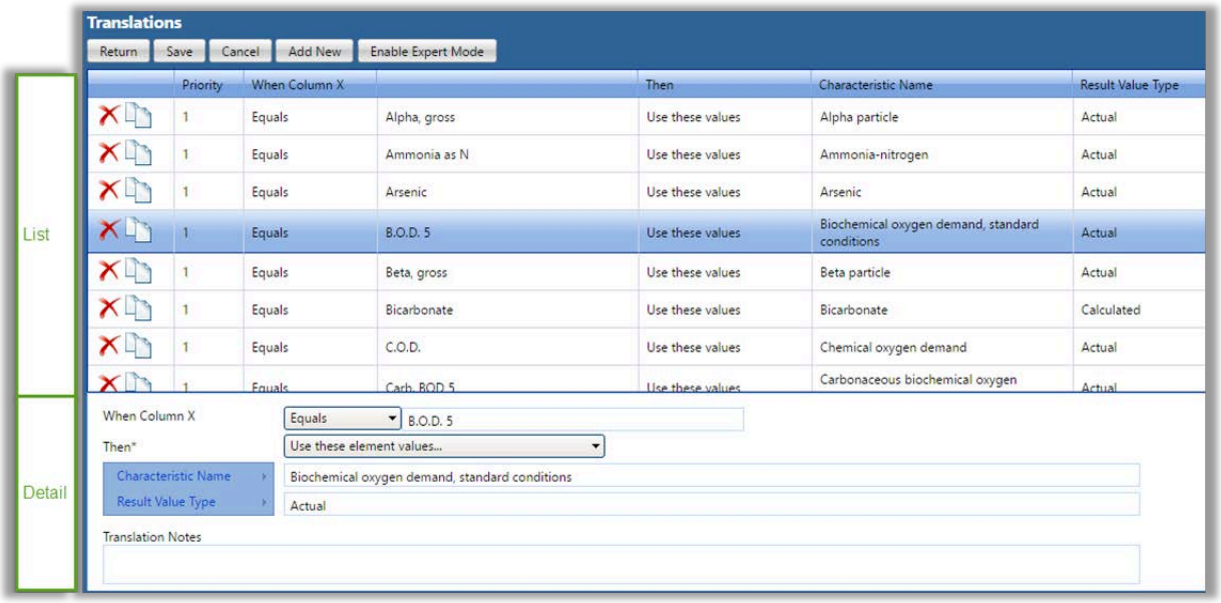
Once you have completed the mapping process, click the **Save** button (or **Return** button) to save your changes.

Your import configuration will then be checked to make sure it is valid. If there are any errors, they will be displayed in the center of the page.

2.1.3 Managing Translations

Translations are used to automatically convert a value in your import file to an alternate value in the dataset that will be sent to EPA. Most often, translations are used to convert a value that is not compatible with WQX into something that is. For example, a translation could be used to convert “DO” in your import file to “Dissolved oxygen (DO)” in your dataset (making the value valid for WQX).

Translations can also be used to convert one value in the import file to multiple values in your dataset. Translations are divided into two sections. The top section includes the **list** of translations. The bottom section includes the **details** for the translation row that is selected. All editing is done in the bottom section.



To help make translations more understandable, the translation details read like a sentence that describes how to find a match and what action to take when a match is found. For example, the translation above states the following:

When Column X equals "B.O.D. 5"

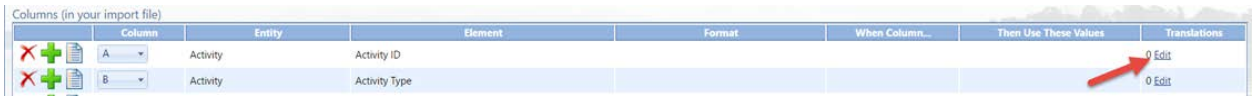
Then use these element values [for]

Characteristic Name: "Biochemical oxygen demand, standard conditions"

[and] Result Value Type: "Actual"

To add or edit translations:

Select the **Edit** link in the Translations column of your import configuration.



This takes you to the Translations Page for the import column.

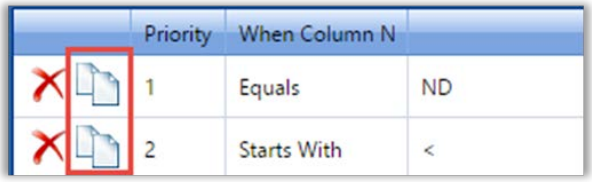
To add a new translation, click **Add New** at the top of the page.The page will then display a blank row where you can enter your translation information at the bottom of the page. The row will be highlighted that you will be entering the translation information for. Clicking the **Save** button will create the translation.

To delete a translation:

Click the red “X” on the far left of your translation. Then, click **Save** (or **Return**) to save those changes.

To copy a translation:

The Translations Page includes a **“Copy”** button, which will create a duplicate copy of translation. This is useful when you wish to create a new translation that is similar to an existing one.



2.1.4 Saving your import configuration as a file

Import Configurations can be saved to a file and restored from a file for the purposes of:

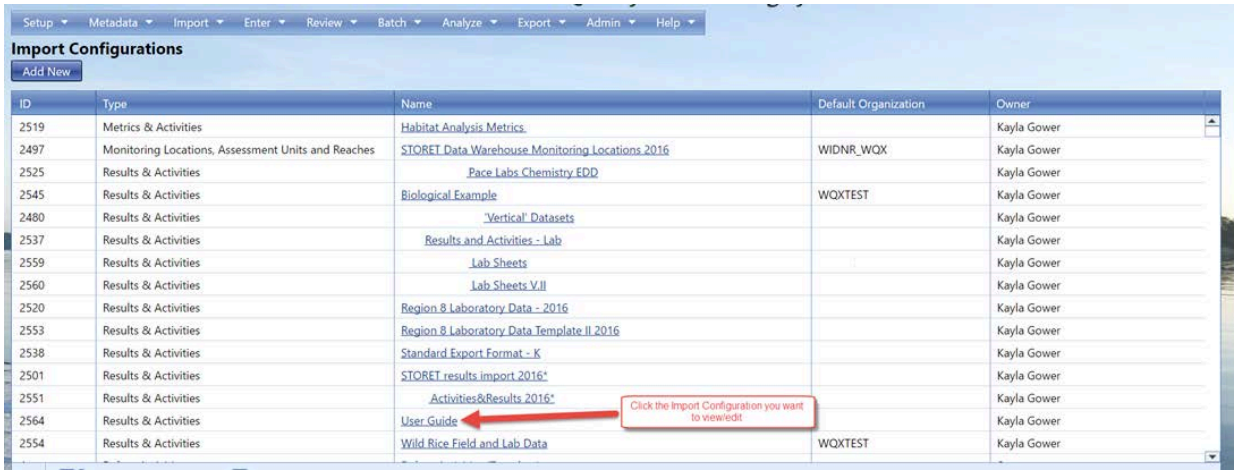
- backing up import configurations for safe keeping;
- archiving old import configurations that are no longer used;
- providing GSE-WQ template import configuration files that match template data spreadsheet files;
- sharing import configurations between users.

Click **Save To File** to save your import configuration as a file.

2.2 Viewing/Editing an Import Configuration

Hover on **Setup** then click on the **Import Configurations** link on the navigation panel to display the import configurations list page.

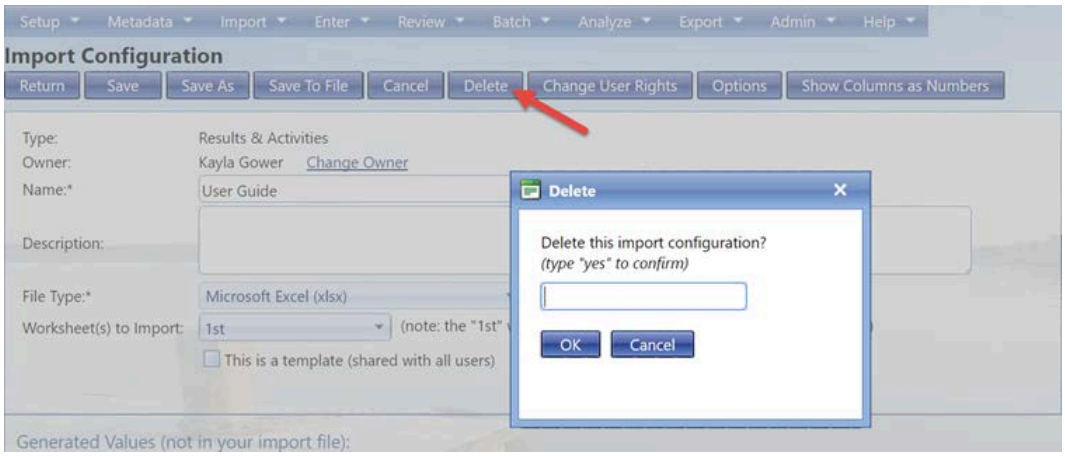
Click on the link for the import configuration you wish to view. The Import Configuration Details page will be displayed, where you can view or edit the import configuration.



Note: While you have a dataset in the system that relates to an import configuration, certain types of changes to the import configuration are not allowed (such as changing column positions, data elements that map to them, or deleting the import configuration). The system will display a message at the top of the Import Configuration Details page for any Import Configuration that has associated datasets. You will have to delete the associated dataset(s) before you will have full access to change the import configuration.

2.3 Deleting an Import Configuration

You can delete an import configuration by clicking the Delete button on the Import Configuration Detail page.

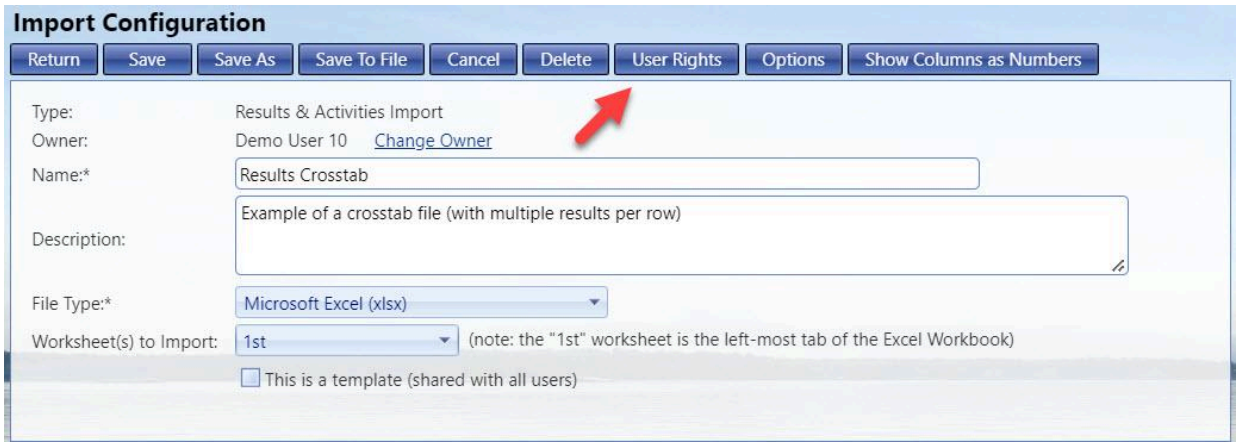


Confirm the deletion by typing "Yes" in the box and clicking the **OK** button.

The system will return you to the Import Configuration list page after performing the delete.

2.4 Managing Users' Rights on an Import Configuration

Click the **User Rights** link on the top-right side of the Import Configuration Detail page.

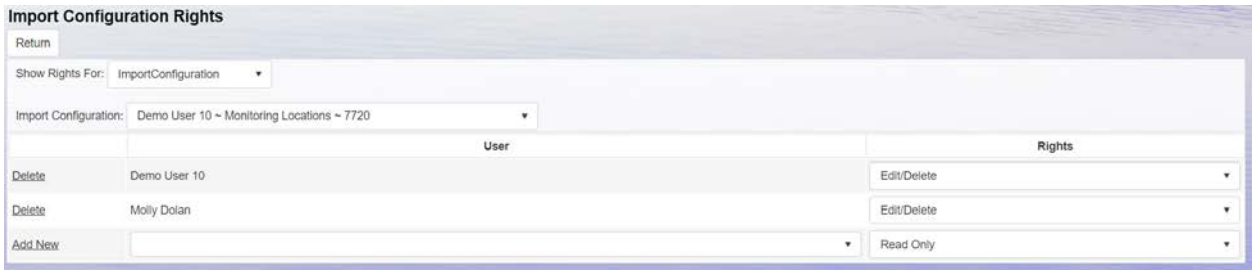


The User Rights page will then be displayed.

Please note that this can only be updated by a user that has Edit/Delete rights to this configuration.

To assign a new user rights to this import configuration:

1. Navigate to the last row of the list labeled "Add" and click on the drop-down arrow.
2. Choose the user.
3. Choose the access type on the right you wish the user to have:
    a. Read Only - User can view the import configuration but can't modify or delete it.
    b. Edit - User can view and edit the import configuration but can't delete it.
    c. Edit/Delete - User can view, edit, and delete the import configuration



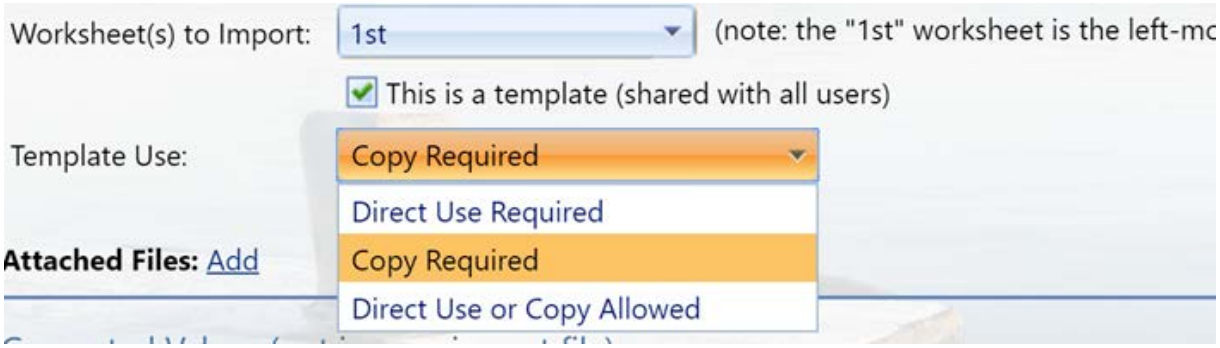
To remove a user's rights to an organization:

Click the **Delete** link for the appropriate row.

Click the **Save** button to save your changes (and remain on the page). Click the **Return** button to save and return to the previous page.

2.4.2 Making an Import Configuration a “Template”

Administrators can easily manage the list of “template” Import Configurations and GSE-WQ provides several features to support them.



Once the box is checked for the configuration to be a template, the system will require you to choose the template’s use. Either by direct use (anyone can use it) or copy required (they have to make a copy then manipulate it from there).

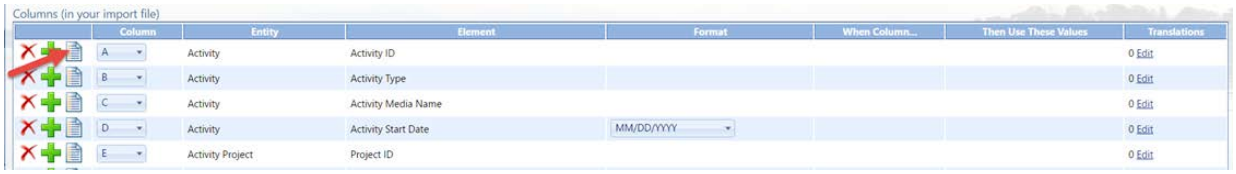
- System administrators can flag an import configuration as a "template" and it will automatically be shared with all GSE-WQ users.
- Import Configuration Templates can include attached documents that users can download from the Import Configuration Page within GSE-WQ. These documents could include an example import file, documentation, etc.
- An import configuration will always include "(template)" at the end of its name (whenever it's displayed on a web page) so it's clear to users that it is a shared template.

2.5 Import Configuration - Advanced Features

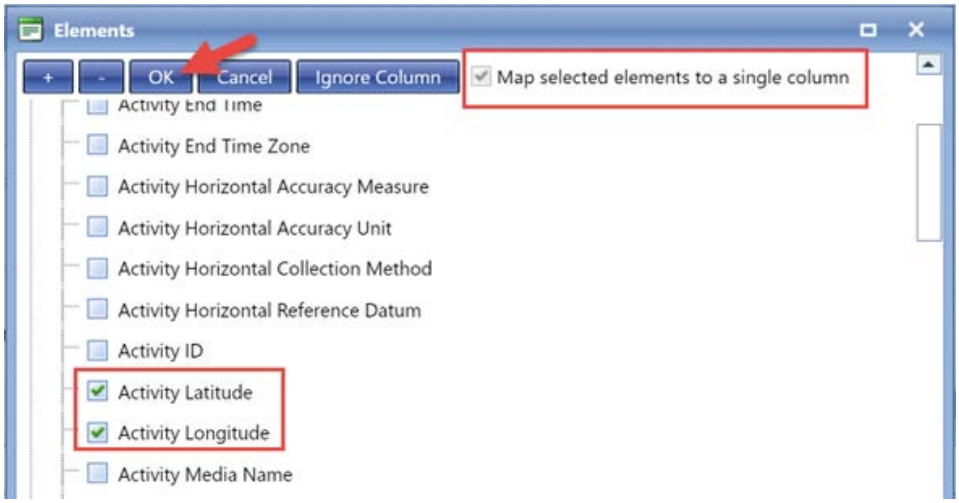
Import Configurations can be leveraged in several powerful ways. However, that power also comes with some extra complexity. This section will highlight some of the powerful features and provide some specific examples of how to solve some problems that you may be faced with.

One of the features of an import configuration is the ability to map one import column to more than one GSE-WQ element.

To do this, click on the **Pick List** button.



This will open the Elements Pick List. At the top of the page, check the box that says, "**Map selected elements to a single column**". If this is the pick list for an existing import column, rather than a new import column, then this box will be checked automatically.



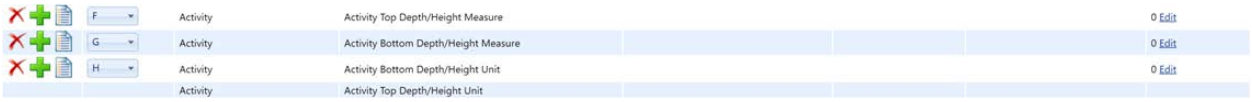
Now, all the elements that are checked (above) will be mapped to a single column (e.g. Column "A" below)

The following sections will describe some specific ways that this feature can be used.

2.5.1 Copying one value from your file to more than one element in GSE-WQ

One reason to map a column to more than one element is when you actually want to populate both elements with the same value from your import file. Although this is not common, there may be times that it is useful. In this case, you would map the column to the data elements and make sure to not set the default values for any of them and to not create any translations on the column (because defaults and translations will change the behavior).

For example: You want to provide a Top and Bottom Depth on an Activity and do not want to have to provide the Units twice. In the example below, we have mapped the Top Depth Measure to column F, the Bottom Depth Measure to column G, and the units for both to column H (rather than having to provide the units in columns H and I of our file)



Keep in mind that this is only appropriate when you know you would always populate both of these element values together. If it were not true that top and bottom depth are always provided together, it wouldn't be appropriate to always populate their measurement units from the same column in the import file (because the system will log an error whenever there are units without its respective measurement).

2.5.2 Generating a Value Conditionally

Remember that Generated Values are used to populate an element with a single default value on every row of your file. For example, if you add the element *Activity Start Time Zone* to the Generated Values Section and set its value to "EST" (Eastern Standard Time), then every row of your imported data will get a generated value of "EST" for its *Activity Start Time Zone*. This would be appropriate if you always include a Start Time on every row. However, if there are activities that have a Start Time and some that do not, then a generated value for the Time Zone would not be appropriate.

Suppose you have the following import configuration:

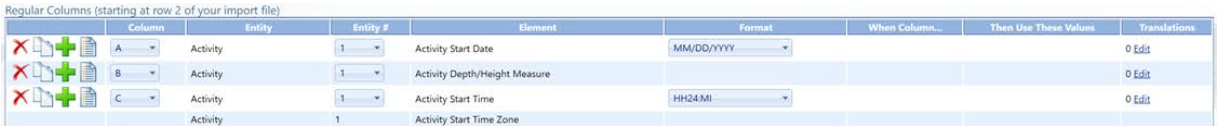
And the following (partial) import file:

A	B
Date	Time
09/05/2013	10:35:12 AM
09/06/2013	

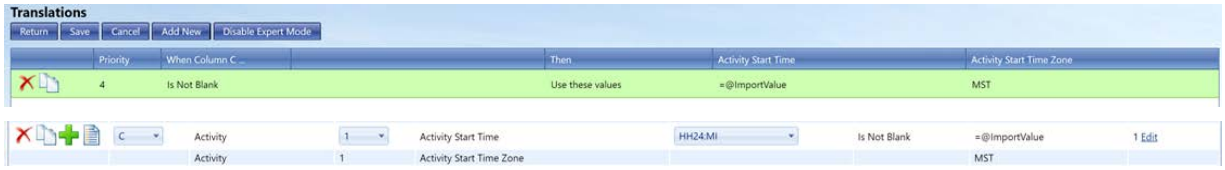
Then the GSE-WQ Elements would be populated as follows, and would cause an error on row 2:

Activity			
Activity Start Date	Activity Start Time	Activity Start Time Zone	
09/05/2013	10:35:12 AM	EST	
09/06/2013		EST	Error: Activity Start Time is required when Activity Start Time Zone is provided

To avoid this error, we want to only generate a value for Time Zone when there is a value for Time in the import file. You can accomplish this by mapping the Time and Time Zone in the same column:



You then can map the default time zone by creating a translation (see section 2.1.3 for more information on translations)



With this import configuration, the same import file…

A	B
Date	Time
09/05/2013	10:35:12 AM
09/06/2013	

Will populate the GSE-WQ Elements as follows (avoiding the previous error on row 2):

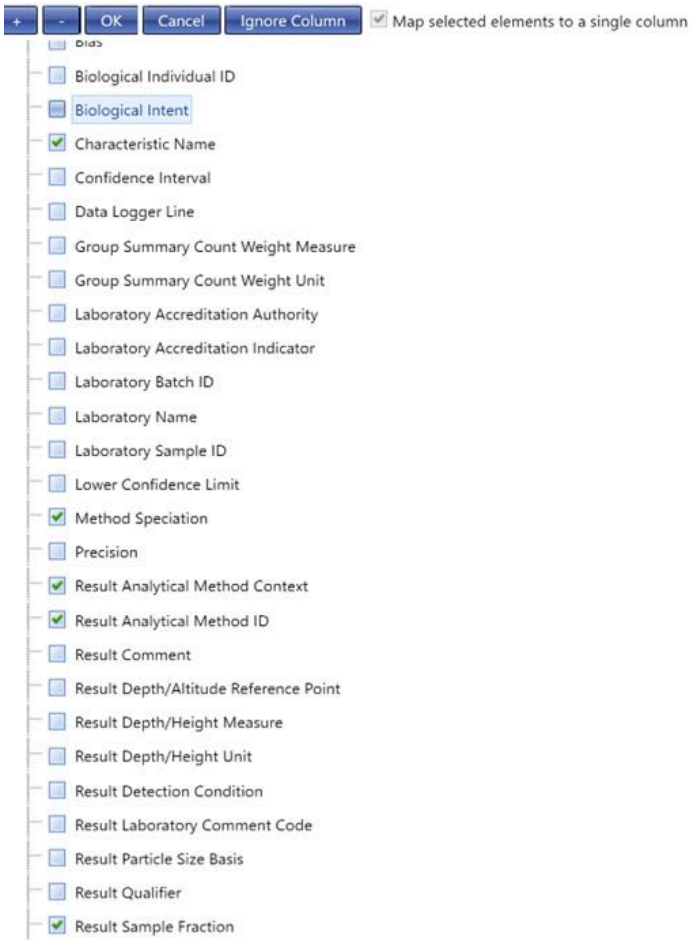
Activity

Activity Start Date	Activity Start Time	Activity Start Time Zone
09/05/2013	10:35:12 AM	EST
09/06/2013		

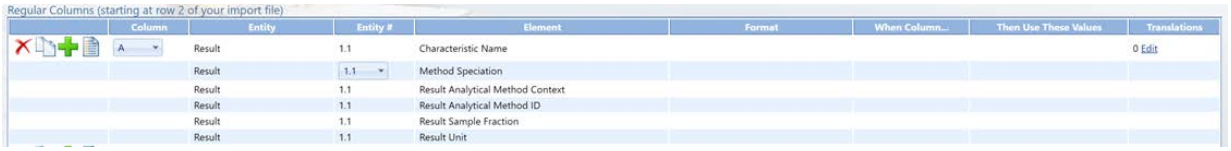
2.5.3 Using Translations to Populate Many Related Elements

One common reason to map one column to more than one element is when the value in your file contains more than one piece of information. Using translations, you can break the value into its relevant components. For example: Your lab provides you with a file that includes a parameter code from which you can derive the analyte, sample fraction, units, and analytical method used for a particular result. You could open the file with Microsoft Excel, create four new columns, and manually type in the values for each of these items on every row, or you could map that one import column to the data elements you want to populate and then create translations to document how you want them to be populated. The advantage of this approach is that you only have to do it once in your import configuration and the system will perform the conversion every time you import a file.

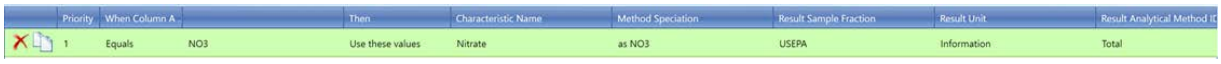
For example, if you selected the following elements from the Elements Pick List and checked the box to "Map selected elements to a single column"…



Then these elements would all be mapped to a single column:



Now, click the Edit link for the column to add translations. The Translations page will open. Fill in the appropriate values for the translations.



Select the Return button to save your translation. Then, if you imported a file like this…

A	B	C
Parameter	Activity ID	Value
NO3	M192-2013-05-04F	.183

The GSE-WQ Elements would be populated as follows:

Activity	Result						
Activity ID	Characteristic Name	Method Speciation	Result Analytical Method Context	Result Analytical Method ID	Result Sample Fraction	Result Unit	Result Value
M192-2013-05-04 F	Nitrate	as NO3	USEPA	353.3	Total	mg/l	.183

This is a powerful feature for minimizing unnecessary data in your import file (when values can be derived).

See Section 2.1.3 for more information on the rules of translations.

2.5.4 Using a Data Element Multiple Times in an Import Configuration

There are places in the Data Model where an element or entity (i.e. set of elements) can have more than one value. Think of this as an element that has more than one value per row in your import file. Here are some examples:

- A Monitoring Location can have multiple Alternate IDs
- An Activity can have multiple…
    - Project IDs
    - Conducting Organizations
- A Metric can have multiple Index IDs
- A Result can have multiple sets of…
    - Frequency Class Information
    - Detection Limit Information
    - Lab Sample Preparation Information
- A Taxon (within a Result) can have multiple…
    - Habits
    - Functional Feeding Groups

To model these scenarios in an import configuration, you should add the repeating elements as many times as needed (each to their own import column). For example: If you know that, in your situation, an Activity can relate to up to two projects, you should add the Project ID twice.

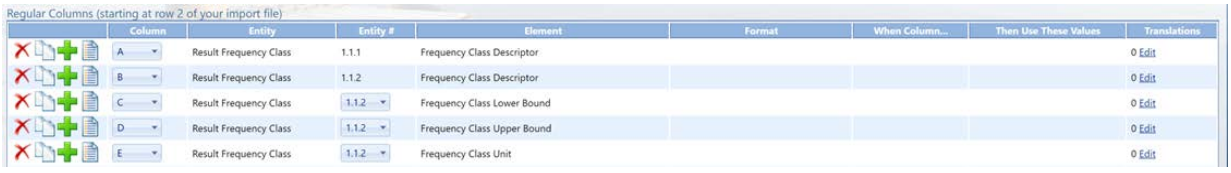
In this case, column D and E of your import file will be used for the Project IDs on an Activity. If an Activity in your import file has only one project, then put the Project ID value in column D or E and leave the other column blank. If it has two projects, then put them in column D and E of your file.

Note, in the image above, that when you include an element more than once in your import configuration, the Entity [Name] includes a #. For example, when you only have one Project ID, the entity is "Activity Project", but when you add a second Project ID, the entities change to "Activity Project #1" and "Activity Project #2" respectively. This highlights the fact that up to two Project references can be made per row of your import file.

A more complex example of repeating elements might be something like Frequency Class Information, which is used to classify a group of taxa that are being counted in a biological survey. Frequency Classes include a descriptor, and for certain types of classes, an upper and lower bound and units. For example: You may be conducting a fish survey and counting the number of fish (of a particular species) and grouping your counts by sex and weight. In this case, sex and weight are each Frequency Class Descriptors and the weight needs a lower/upper bound with a measurement unit. Your import file would need two Frequency Class Descriptors and might contain values, as shown in the table below:

A	B	C	D	E	F
Descriptor 1	Descriptor 2	Lower Bound	Upper Bound	Units	Count
Male	Weight	0	100	g	3
Male	Weight	101	300	g	6
Female	Weight	0	100	g	1
Female	Weight	101	300	g	5

To support this data, your import configuration would look something like the following:



This allows a Result, in your import file, to have two sets of Frequency Class Information: the first set (#1) starting at Column A and the second set (#2) starting at Column B. In this example,

the first set of Frequency Class Information does not need a Lower/Upper Bound or Units, so they are not included. Otherwise, they could be added (after Column A).

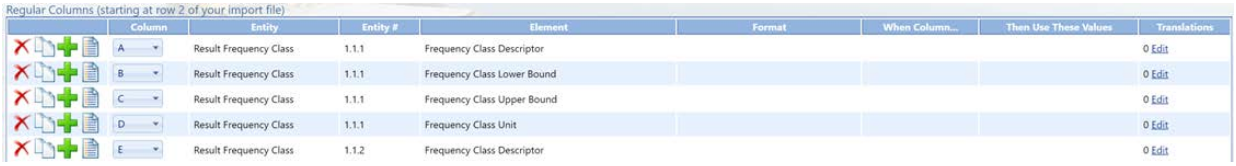
It's useful to understand that, when an import configuration contains an element more than once, the entity # that's assigned is based on the column it is mapped to. Once an element is reused, a new entity # is started, and all elements mapped to subsequent columns will relate to that new entity #.

In the previous example, Column B includes a second Frequency Class Descriptor, which starts "Result Frequency Class #2". All other frequency-class elements (Lower Bound, Upper Bound, and Unit) on Columns C, D, and E, all relate to #2. These entity # assignments are appropriate. However, consider the following example, where that is not the case:

What if we wanted to change our column order in our file like this (with the second "Frequency Class Descriptor" in column E)?

A	B	C	D	E	F
Descriptor 1	Lower Bound	Upper Bound	Units	Descriptor 2	Count
Male	0	100	g	Weight	3
Male	101	300	g	Weight	6
Female	0	100	g	Weight	1
Female	101	300	g	Weight	5

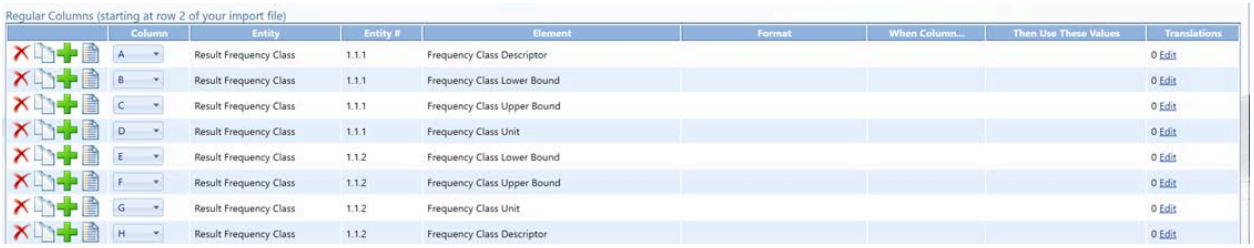
Our intention is to have the Lower Bound, Upper Bound, and Units (in columns B, C, and D) to be part of the Frequency Class that includes the Descriptor in Column E. However, because of the entity # assignment rule, mentioned previously, that does not happen:



Because the Descriptor is the first [Frequency Class] Element to be repeated, that marks the beginning of Frequency Class #2. This highlights the importance of checking the entity # when

you repeat elements in your import configuration, to make sure your file will be interpreted the way you intend.

If you were to add a Lower Bound, Upper Bound, and Unit before our first descriptor, then the entity #s are correct again.


Regular Columns (starting at row 2 of your import file)

Column	Entity	Entity #	Element	Format	When Column...	Then Use These Values	Translations
A	Result Frequency Class	1.1.1	Frequency Class Descriptor				0 Edit
B	Result Frequency Class	1.1.1	Frequency Class Lower Bound				0 Edit
C	Result Frequency Class	1.1.1	Frequency Class Upper Bound				0 Edit
D	Result Frequency Class	1.1.1	Frequency Class Unit				0 Edit
E	Result Frequency Class	1.1.2	Frequency Class Lower Bound				0 Edit
F	Result Frequency Class	1.1.2	Frequency Class Upper Bound				0 Edit
G	Result Frequency Class	1.1.2	Frequency Class Unit				0 Edit
H	Result Frequency Class	1.1.2	Frequency Class Descriptor				0 Edit

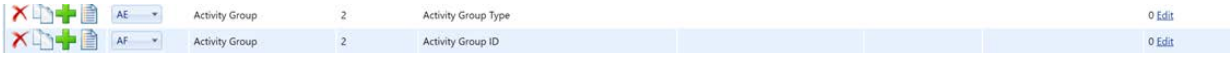
In conclusion: if you create more than one entity in an import configuration, it's safest to include the same elements on each entity. If you chose to eliminate some unnecessary elements from one of the entities, be sure that the first element on the second entity is an element that is common to both entities (as was done on the first Frequency Class example).

2.5.5 Special Case: Activity Groups in a file of Activities and Results

Activity Groups are useful when you have a collection of related Activities that you wish to group together for various purposes which include (Field Sets, Replicates, grouping Samples and Subsamples, and grouping Routine Samples with their related Quality Control Samples). In data-modeling terms, the relationship between Activities and Activity Groups is referred to as "many to many" which means that an Activity can belong to many Activity Groups and an Activity Group can contain many Activities. Addressing this complex relationship in a flat file could be challenging, but with the support of some specific features, there are ways to address this that are fairly simple.

An Activity Group contains the following elements: Activity Group ID, Type, Name (optional), and two or more Activity IDs. GSE-WQ understands the relationship between Activities and Activity Groups and does not require that you indicate the Activity ID (for the Activity Group), because you've already provided it for the Activity on that row. So, at a minimum, you will need a way to provide the Activity Group ID and Type (and optionally Activity Group Name) on a row of your import file.

One way to address this in your import configuration is to map one column to the Activity Group ID and another column to the Type.



In this example, if you wanted to include a specific Activity in Activity Group, you would list the Activity Group's ID in column A and its Type in column B. For example:

A	B	C	D	E

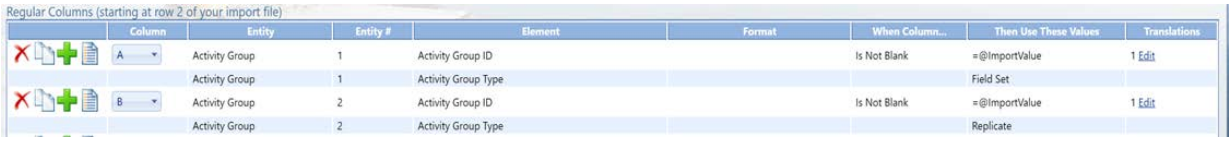
Group ID	Group Type	Activity ID	Parameter	Value
F1	Field Set	M192-2013-05-04F	pH	8.3
		M192-2013-05-04F	DO	10.9
F1	Field Set	M192-2013-05-04B	Fecal Coliform	180
R1	Replicate	M192-2013-05-04C1	Chlorophyll a	4.63
		M192-2013-05-04C1	Escherichia	4.63
R1	Replicate	M192-2013-05-04C2	Chlorophyll a	4.63
		M192-2013-05-04C2	Escherichia	5.12

This would create two Activity Groups with two Activities in each group:

Activity Group		Activity
Activity Group ID	Activity Group Type	Activity ID
F1	Field Set	M192-2013-05-04F
		M192-2013-05-04B
R1	Replicate	M192-2013-05-04C1
		M192-2013-05-04C2

If you wanted to avoid the need to provide the Activity Group Type for every group, you could map the Activity Group ID and Type to the same column and provide a default value for the Type. For example, this import configuration would use Column A for "Field Set" Groups and

Column B for "Replicate" Groups:



This would also allow one Activity to belong to two Activity Groups (if needed) because there are now two Activity Groups per row (in your import file):

This import file…

A	B	C	D	E
Field Set Group ID	Replicate Group ID	Activity ID	Parameter	Value
F1		M192-2013-05-04F	pH	8.3
		M192-2013-05-04F	DO	10.9
F1		M192-2013-05-04B	Fecal Coliform	180
F2	R1	M192-2013-05-04C1	Chlorophyll a	4.63
		M192-2013-05-04C1	Escherichia	4.63
F2	R1	M192-2013-05-04C2	Chlorophyll a	4.63
		M192-2013-05-04C2	Escherichia	5.12

…would create three Activity Groups with two Activities in each:

Activity Group		Activity
Activity Group ID	Activity Group Type	Activity ID

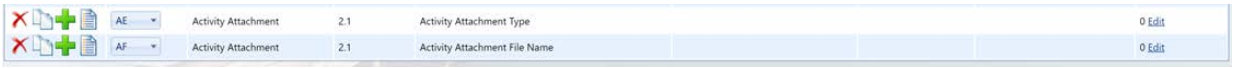
F1	Field Set	M192-2013-05-04F
		M192-2013-05-04B
F2	Field Set	M192-2013-05-04C1
		M192-2013-05-04C2
R1	Replicate	M192-2013-05-04C1
		M192-2013-05-04C2

2.5.6 Attachments

GSE-WQ allows you to attach external files (like pictures, documents, etc.) to any Project, Monitoring Location, Activity or Result. There are two parts to doing this:

- Reference the file name and type for each attachment in your import file.
- Include all of the attachment files in a zip file and upload it at the same time as your import file.

To allow you to include the attachment file name and type in your import file, you need to create two columns in your import configuration and map them to these two elements.



Then, if you imported a file like this:

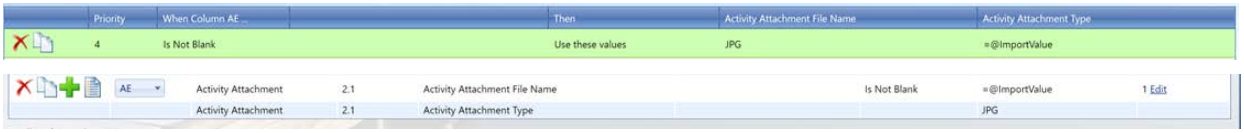
A	B	C	AF	AE
Activity ID	Parameter	Value	Photo File Name	File Type
M192-2013-05-04F	pH	8.3	P1070346.JPG	JPG
M192-2013-05-04F	DO	10.9		
M192-2013-05-04B	Fecal Coliform	180	P1070347.JPG	JPG

M192-2013-05-04C1	Chlorophyll a	4.63		
M192-2013-05-04C1	Escherichia	4.63		
M192-2013-05-04C2	Chlorophyll a	4.63	P1070348.JPG	JPG
M192-2013-05-04C2	Escherichia	5.12		

You would have three Activities with attachments (photos) related to each one.

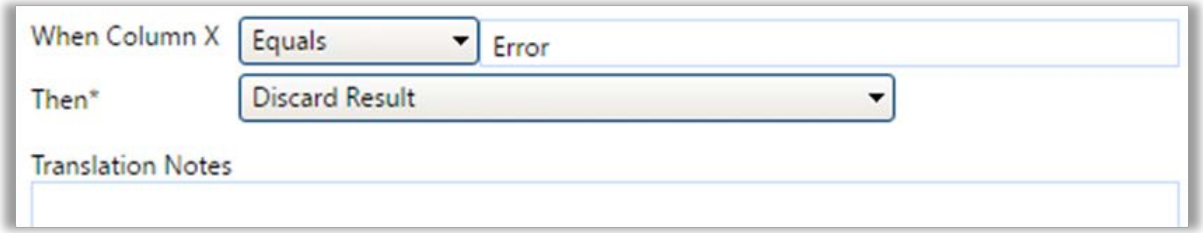
If all of your attachments were the same type, you could map both to the same column like this:

You would also have to create a translation to default the Attachment type.

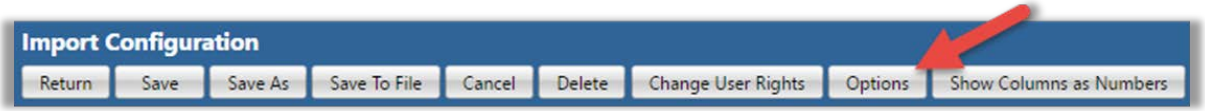


2.5.7 Discarding a Result using Translations

Occasionally you need to be able to discard an entire record in your import file. For example: you may wish to discard a Result whenever a dummy value (e.g. 999999) is used, or you may have header information or other annotations on rows of your spreadsheet other than the top row(s). This new feature allows you to avoid errors when they are caused by data that you do not wish to import.



2.5.8 “Options” button



This button opens a window with several import configuration options (as well as the “Expert Mode”). The following is an explanation of the Import Configuration Options available:

- **Expert Mode (for Configuration)**: It enables advanced features for those that are very comfortable with import configurations. It supports header rows and columns and provides better support for crosstab formats, such as a file with multiple results per row.
- **Expert Mode (for Translations)**: This allows more complex comparison options and expressions on the Translations Page.

The following options are only available when the import configuration is for "Results & Activities" or "Metrics & Activities":

- **Generate an Activity ID**: Rather than building your own Activity ID in your import file, you can enable this option and an Activity ID will be generated for you. It will be created from the values (in your file) for Monitoring Location ID, Activity Start Date, Activity Start Time, and Activity Type.

  The following is an example of the Activity ID that would be generated when the following values were provided:

Monitoring Location ID	Activity Start Date	Activity Start Time	Activity Type	Activity ID (generated)
BEARLAKE-123	05/04/2016	15:22:01	Field Msr/Obs	BEARLAKE-123:201605041522:FM

  Note: Although Activity Start Time is an optional element in GSE-WQ, it is highly recommended that you always provide one in your import file, when you are using this option (to Generate an Activity ID). This will help the system to generate an appropriately unique Activity ID for each Activity.

- **Generate Detection Condition and Limits from Result Value**: This will automatically convert Result Values that start with “<” or “>” into an appropriate Detection Condition and Detection Limit Value. The table below shows an example of the conversion that will be performed when a value starts with “<” or “>”:

Import Value	Detection Condition (generated)	Detection Limit Value (generated)	Detection Limit Type (generated)
<0.25	Present Below Quantification Limit	0.25	Lower Quantitation Limit
>2419	Present Above Quantification Limit	2419	Upper Quantitation Limit

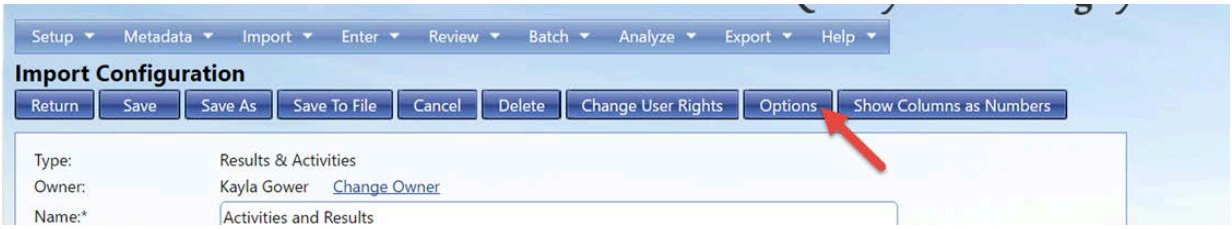
- **Populate Detection Limit Unit from Result Unit**: If the value for Detection Limit Unit is blank, and it is required by WQX in a particular context, then the value you provide for the Result Unit will be used for the Detection Limit Unit as well. Note: this option is enabled automatically whenever you enable the option to “Generate Detection Condition and Limits…”, because GSE-WQ needs a way to populate the Detection Limit Unit that it generates from certain result values (like “<0.25”).

2.6 Expert Mode

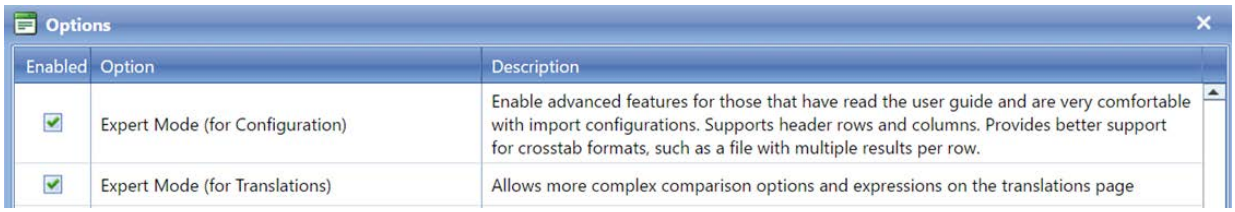
Several additional features of an import configuration are only made available when "Expert Mode" is enabled. As the name implies, this mode is intended for users that have a very good understanding of an import configuration and the WQX Data Model. It is highly recommended that a user review all of the previous sections before reading this section.

One of the primary reasons to enable Expert Mode is for support of crosstab files. However, some of the additional features may be useful in other contexts as well.

To enable Expert Mode, click **Options** at the top of your import configuration.



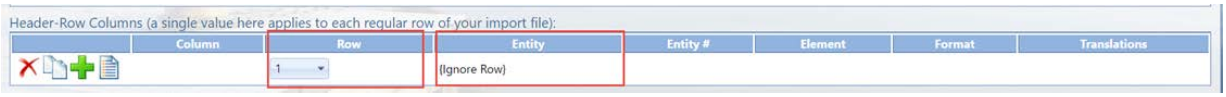
From there you can choose to enable **Expert Mode for Configurations and/or Translations**. Click **OK** when you are finished.



2.6.1 Header-Row Columns

In Expert Mode, there is a new section of the page called "Header-Row Columns". This section of the page is used to indicate header rows (in your import file) which you want to ignore, or to map specific header rows and columns (in your import file) that contain data that you wish to map to elements in GSE-WQ.

The "Header-Row Columns" section looks similar to the "Columns" section on a standard import configuration, but it includes two additional attributes (Row and Entity):

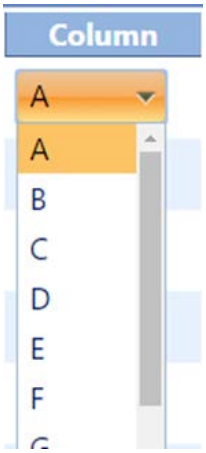


- **Row**: This indicates the row number (e.g. 1, 2, 3) for the header row. The Row # can be changed by picking a new value from the drop-down list.

  The values in the list are always one more than the current number of rows. For example: if you have created 3 rows so far, then the list will include 1-4.

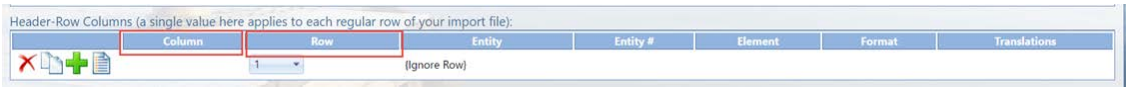
- **Entity**: This indicates the entity number that a particular element belongs to. If you had multiple Activities, for example, you would be able to tell that a particular element is for the first Activity (i.e. "1") or second Activity (i.e. "2") or even that an element is for the first Result under the second Activity (i.e. Result "2.1"). *This will be covered in more detail later on*.
- **Column**: This represents the column position of an element in a header row of your import file. In conjunction with the Row #, this targets a specific row and column (i.e. cell - in spreadsheet terms). In other words, elements in the header relate to a specific row and column (i.e. cell) in the header.

  The column position can be changed by picking a new value from the drop-down list



The values in the list are equal to the number of Regular Columns currently defined in the import configuration. Because of this, it is often preferable to set up your Regular Columns before setting up your Header-Row Columns (here).

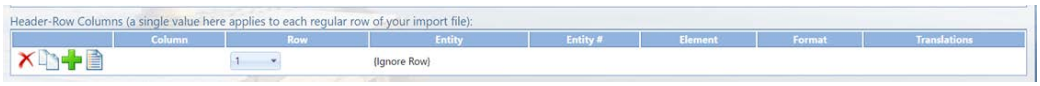
The list of Header-Row Columns can also be sorted by their Row [Position] or Column [Position] by clicking on the links at the top of the list. In cases where you have many Header-Row Columns it can be useful to sort them one way or the other.



Header-Row columns have two purposes, detailed in the next two sections:

- **Ignoring a row in your file**

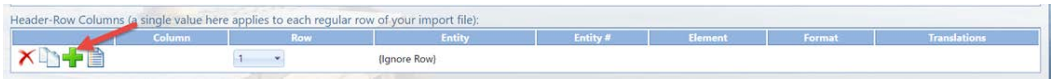
  When you first enable Expert Mode, the Header-Row Columns section looks like this:



  Notice that Row 1 says “{Ignore Row}”. This indicates that the first row of your file will be ignored. This is useful when the first row of your import file has column headings that you do not want to import.

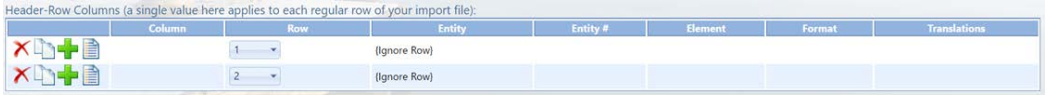
  In Expert Mode, you are allowed to ignore many header rows, if needed.

  Click on the **Add New** button…



  And then click on the **Ignore Row** button on the Elements Pick List that pops up…

  Now you will have two header rows that are ignored:



- **Mapping a header row and column to an element**

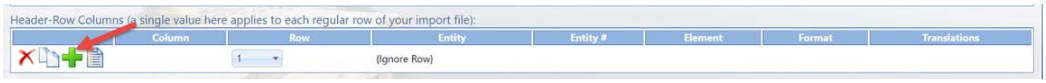
  A header row and column can be mapped to an element whose value should be applied to all (regular) rows of your import file. This allows you to avoid creating a column in your import file when the value on every row will be the same. Instead, you can provide the value once at the top of your file.

  Suppose we want to relate an entire file of activities and results with up to three projects and also be able to enter a single comment for all of the activities in our file. We might build a file like this (with the first three rows as header rows):

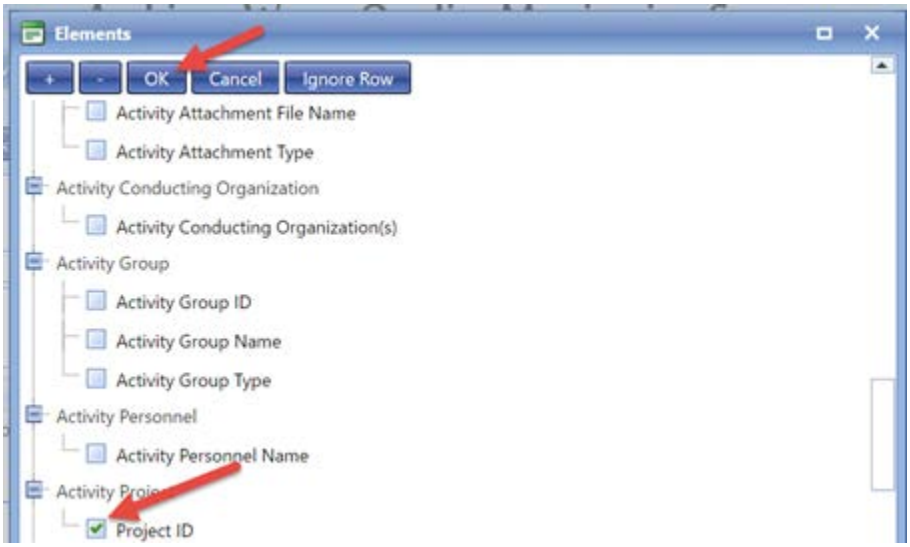
A	B	C	D	E
Project ID (1-3):	MAIN	PUB	VOL-SP	
Activity Comment:	Earth Day Volunteer Sampling			
Date	Activity ID	Location ID	Parameter	Value
05/04/2013	M192-2013-05-04F	M192	pH	8.3
05/04/2013	M192-2013-05-04F	M192	DO	10.9
05/04/2013	M192-2013-05-04F	M192	Temperature	20.6
05/04/2013	M121-2013-05-04F	M121	pH	9.1
05/04/2013	M121-2013-05-04F	M121	DO	13.48
05/04/2013	M121-2013-05-04F	M121	Temperature	19.7

  Then, to support these three header rows in our import file, we would make the following changes in the **Header-Row Columns** section of our import configuration:

Click on the **Add New** button…

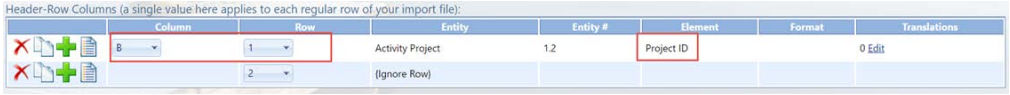


Then check the box for Project ID on the Element Pick List. Click **OK**.

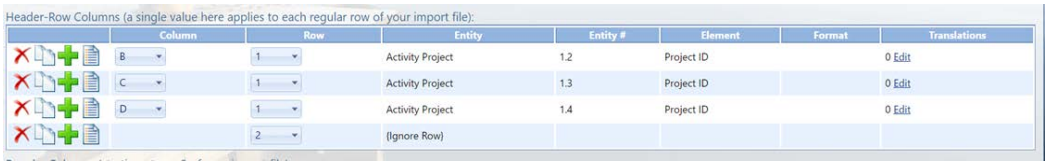


Now Project ID will be mapped to Row 2, Column A (by default):

Change it to Row 1, Column B to match our import file. This will also cause the "Ignore Row" to move to Row 2.

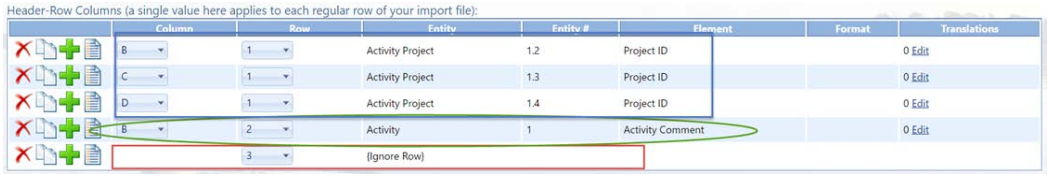


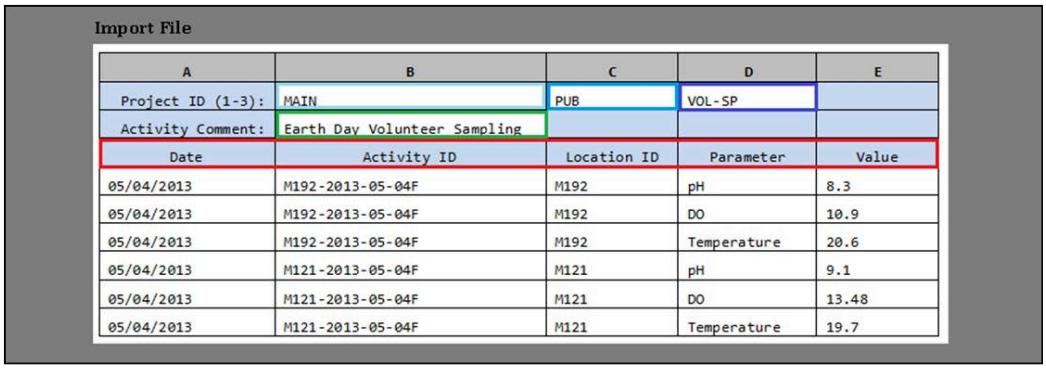
Repeat this process to add two more Project ID elements and move them to Row 1 Column C and Row 1 Column D:



Now, add an "Activity Comment" element and map it to Row 2 Column B.

See below how our Import Configuration now fully describes the first three header rows of our import file (colored boxes have been added to highlight how the import configuration maps to the import file):





1B, 1C, and 1D of our file map to a Project ID

2B of our file maps to an Activity Comment

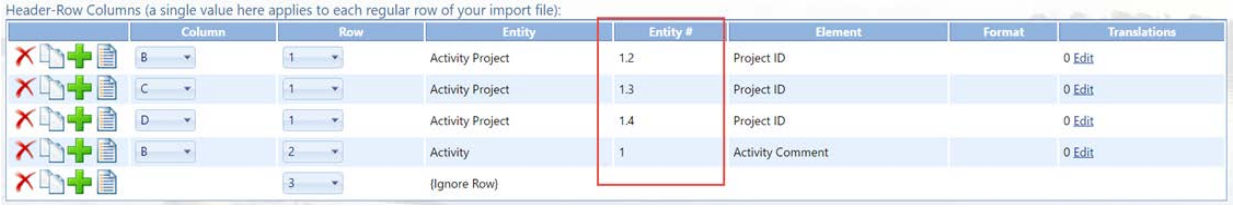
Row 3 is ignored

If we were to complete the Import Configuration, by defining all of the Regular Columns, and then import this file, then the following GSE-WQ Elements would be populated. The elements populated from a Header-Row column are highlighted in red.

Activity				Activity Project			Result	
Date	Activity ID	Location ID	Activity Comment	Project ID	Project ID	Project ID	Parameter	Value
05/04/2013	M192-2013-05-04F	M191	Earth Day Volunteer Sampling	MAIN	PUB	VOL-SP	pH	8.3
							DO	10.9
							Temperature	20.6

05/04/2013	M192-2013-05-04F	M121	Earth Day Volunteer Sampling	MAIN	PUB	VOL-SP	pH	9.1
							DO	13.48
							Temperature	19.7

Before wrapping up our discussion of Header-Row Columns, let's clarify how the new Entity # attributes are assigned (in this example).



In Expert Mode the "Entity #" can be a compound value (e.g. "1.3" or "2.2" or even "2.3.1"). This value holds two pieces of information: which entity number an element belongs to, and, in some cases, which entity is the parent of that entity.

Entities exist in a hierarchy, where one can be the child of another. In our example above, we have an Activity with an Entity # "1", which means it's the first Activity. We also have several "Activity Project" entities with Entity #s "1.2", "1.3", and "1.4", which means that they are the second, third and forth "Activity Project" entities under the first Activity. Also, these Entity #s will be more useful when we discuss how to support a crosstab-style import file.

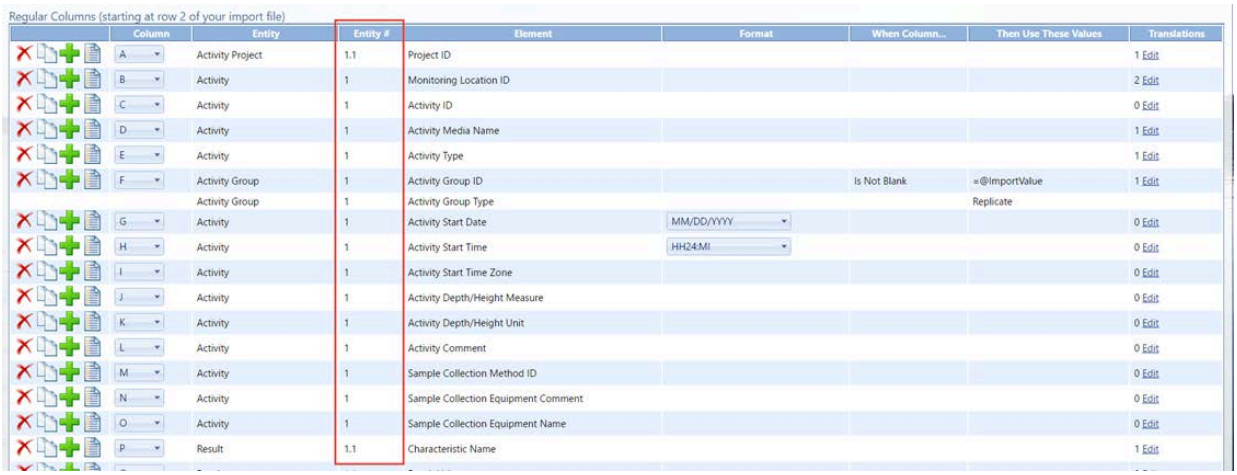
2.6.2 Regular Columns

In Expert Mode, the **Columns** sections is now called **Regular Columns** to distinguish it from the **Header-Row Columns** section which is also on the page. Initially, the label at the top of this section will indicate that the "Regular Columns [are] starting at row 2 of our import file". This is because Row 1 is defined as a header row (by default).

In other words, the Header-Row Columns section of the page is used to define the columns in each header row of our import file and the Regular Columns section of the page is used to define the columns that are in every subsequent row of our import file.

If we were to create 3 header rows, like we did previously, then the label on our Regular Columns would indicate that the Regular Columns start on row 4.

Regular Columns also have an "Entity #" attribute.

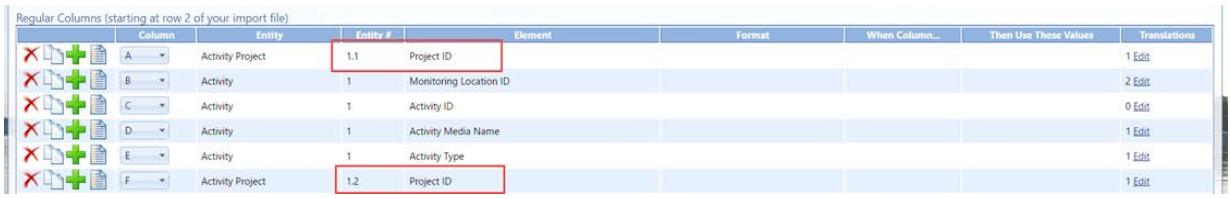

Regular Columns (starting at row 2 of your import file)

Column	Entity	Entity #	Element	Format	When Column...	Then Use These Values	Translations
A	Activity Project	1.1	Project ID				1 Edit
B	Activity	1	Monitoring Location ID				2 Edit
C	Activity	1	Activity ID				0 Edit
D	Activity	1	Activity Media Name				1 Edit
E	Activity	1	Activity Type				1 Edit
F	Activity Group	1	Activity Group ID		Is Not Blank	=@ImportValue	1 Edit
	Activity Group	1	Activity Group Type			Replicate	
G	Activity	1	Activity Start Date	MM/DD/YYYY			0 Edit
H	Activity	1	Activity Start Time	HH24:MI			0 Edit
I	Activity	1	Activity Start Time Zone				0 Edit
J	Activity	1	Activity Depth/Height Measure				0 Edit
K	Activity	1	Activity Depth/Height Unit				0 Edit
L	Activity	1	Activity Comment				0 Edit
M	Activity	1	Sample Collection Method ID				0 Edit
N	Activity	1	Sample Collection Equipment Comment				0 Edit
O	Activity	1	Sample Collection Equipment Name				0 Edit
P	Result	1.1	Characteristic Name				1 Edit

Initially, these will all be 1, 1.1, or even 1.1.1, because there is only one of each entity in a default import configuration.

However, if we were to add any element more than once, this would no longer be true.

For example, if we add a second Project ID, and move it to column F, its Entity # will be 1.2 (meaning it's the second Project under the first Activity):


Regular Columns (starting at row 2 of your import file)

Column	Entity	Entity #	Element	Format	When Column...	Then Use These Values	Translations
A	Activity Project	1.1	Project ID				1 Edit
B	Activity	1	Monitoring Location ID				2 Edit
C	Activity	1	Activity ID				0 Edit
D	Activity	1	Activity Media Name				1 Edit
E	Activity	1	Activity Type				1 Edit
F	Activity Project	1.2	Project ID				1 Edit

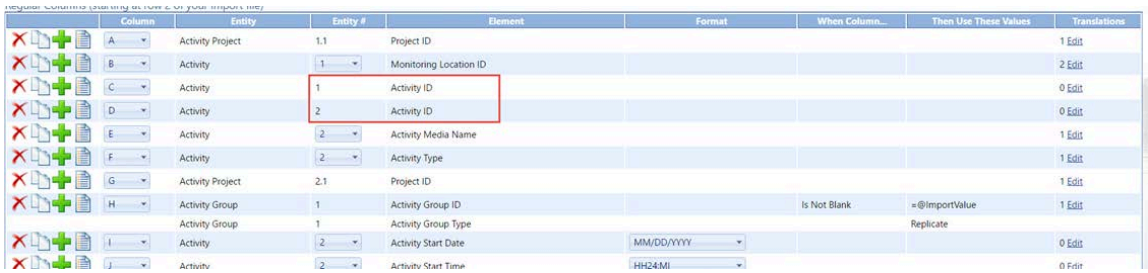
The assignment of Entity #s is straightforward for simple entities, like an Activity Project, with only one element (Project ID). However entities, like an Activity or Result, are more complex and merit additional clarification.

The following rule dictates how GSE-WQ assigns an Entity #:

When a duplicate element is added to an import configuration, a new entity instance is created at that column position and a new Entity # is assigned. All other elements that belong to that same entity, and are in a higher column position, will also be assigned that Entity #.

The following example will help demonstrate this rule:

Suppose we add a second Activity ID element to our import configuration and move it to Column D:



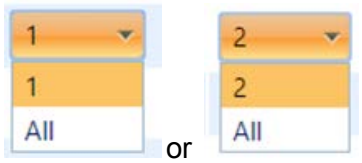
	Column	Entity	Entity #	Element	Format	When Column...	Then Use These Values	Translations
	A	Activity Project	1.1	Project ID				1 Edit
	B	Activity	1	Monitoring Location ID				2 Edit
	C	Activity	1	Activity ID				0 Edit
	D	Activity	2	Activity ID				0 Edit
	E	Activity	2	Activity Media Name				1 Edit
	F	Activity	2	Activity Type				1 Edit
	G	Activity Project	2.1	Project ID				1 Edit
	H	Activity Group	1	Activity Group ID		Is Not Blank	=@ImportValue	1 Edit
		Activity Group	1	Activity Group Type			Replicate	
	I	Activity	2	Activity Start Date	MM/DD/YYYY			0 Edit
	J	Activity	2	Activity Start Time	HH24:MI			0 Edit

Previously all Activity elements had an Entity # of "1". Now, Column D, is mapped to a second "Activity ID". Two Activity IDs can't exist on the same Activity, so a new Activity is started (i.e. Entity # "2") on column D.

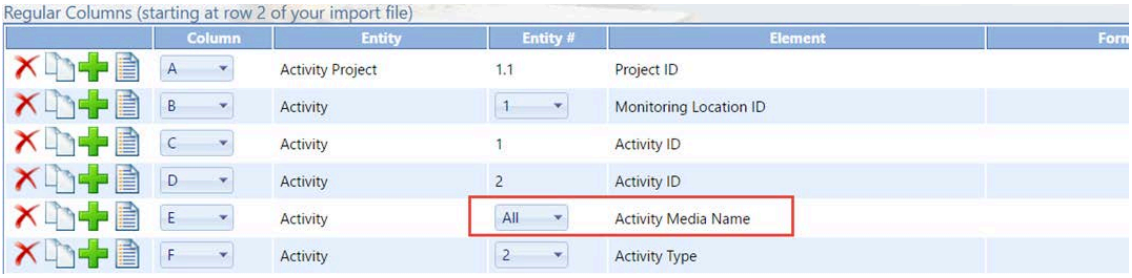
Also, notice that every subsequent Activity element (columns E and F for example) also has an Entity # of "2". Once a new entity is created, all subsequent elements (in higher column positions) relate to that same Entity #. Likewise, the Activity Project entities, and the Result entities have changed from 1.1 to 2.1, indicating that they now relate to the second Activity, because the second Activity starts at column D.

In addition to the Entity #s changing, notice that some of the Entity # values are in a drop-down list (for example columns B, E, F, I, J).

When there is more than one of a particular entity instance (e.g. Activity - in this example), but a particular element, on that entity instance, exists only once, then that element gets a drop-down list. There are only two values in the drop-down list: the default entity # assigned by the system, and "All".



If you were to select "All" from the drop-down list for "Activity Media Name" on Column E, for example, then you are saying that you want Column C (of your import file) to be used as the Activity Media Name for all Activities (on a particular row of the import file), not just for Activity #1.



If we were to add a second "Activity Media Name" element and move it to column D, then the drop-down list on Activity Media Name would go away, and the first one will be assigned to Activity #1 and the second one will be assigned to Activity #2.

Activity	1	Activity ID
Activity	1	Activity Media Name
Activity	2	Activity ID
Activity	2	Activity Media Name

This behavior will be leveraged in our crosstab example in the next section.

2.6.3 Creating an Import Configuration to Support a Crosstab-style Import File

A crosstab file is a special type of spreadsheet or flat file format where column headers contain data that relates to all the rows of the file, and, in some cases, row headers relate to all the columns on a particular row. A crosstab file is more concise than a standard file, because it avoids some of the repetition that occurs in a standard file and typically includes more than one of the same type of entity on a single row of the file. For example, you could include many results on a single row (rather than just one).

Here is an example of a crosstab file that has one Activity and three Results (for Temperature, DO, and pH) per row:

A	B	C	D	E	F	G	H
				Characteristic ->	Temperature	DO	pH
				Units ->	Deg C	mg/l	none

Activity ID	Date	Location ID	Result Depth (m)	Fraction ->		Dissolved	
A-1	5/4/2013	ML-1	1		-0.1	2.5	8.1
A-1	5/4/2013	ML-1	3			2.4	8.34
A-2	5/5/2013	ML-2	1		9.8	8.8	8.8
A-2	5/5/2013	ML-2	3		7	9.2	8.5
A-3	5/6/2013	ML-3	1		2.3	2.9	9.1
A-3	5/6/2013	ML-3	3		2.9	1.9	8.55

Now, let's build an import configuration to support this file.

As mentioned previously, it's recommended that you create the regular columns in your import configuration before the header-row columns (because a regular column must exist in a specific position before a header-row column can be placed in that position).

Start by mapping Column A to Activity ID, B to Activity Start Date, and C to Monitoring Location ID:

Column D is for our Result Depth (in meters), so map Result Depth Measure and Result Depth Unit to Column D and then set the default value for the Units to "m".

To set the default unit, click the translation edit button for the column.

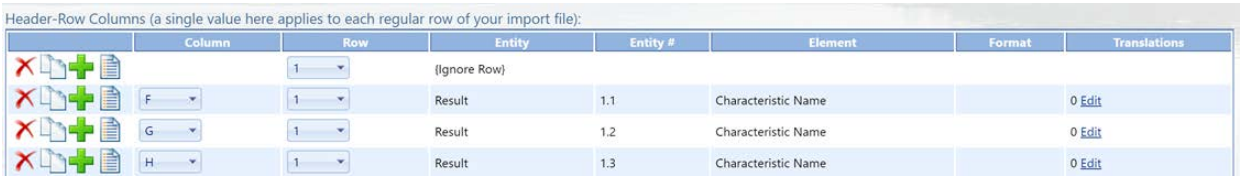
Save.

Column E of our file doesn't contain data, so we want to ignore it.

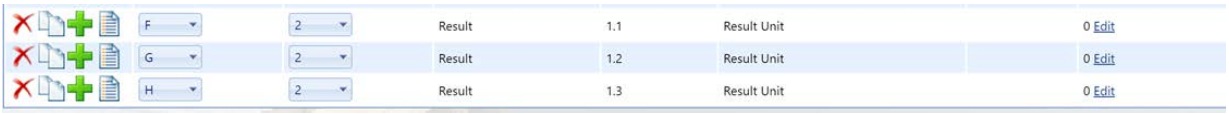
Columns F, G, and H will hold our three Result Values (for Temperature, DO, and pH):

Now let's create our Header-Row Columns:

Add three "Characteristic Name" elements to header row 1 and columns F, G, and H.



And add three "Result Unit" elements to row 2 and columns F, G, and H.

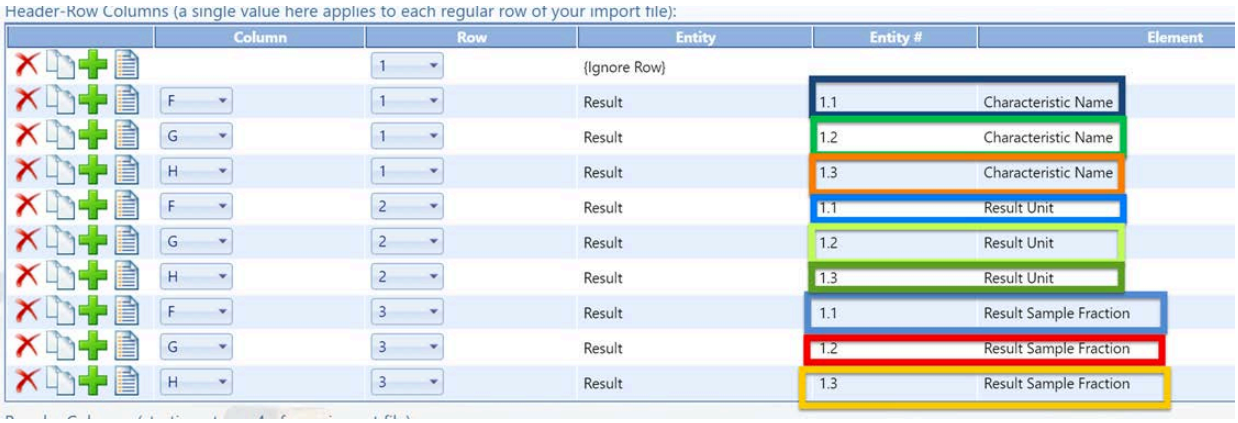


And add three "Result Sample Fraction" elements to row 3 and columns F, G, and H.

We have now completed mapping all of our header-row columns. As a final check to make sure our mapping is correct, click on the link at the top of the Column list to sort the Header-Row Columns by their column position. Note that Header-Row Column F and Regular Column F both map to Result #1.1. Likewise, Column G in both lists maps to Result #1.2 and Column H

to Result #1.

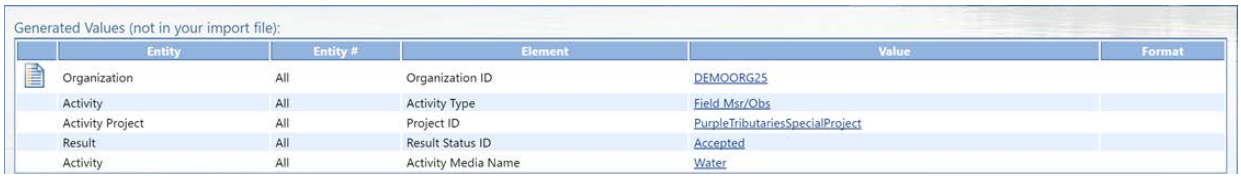
See below how our Import Configuration now fully describes the Header-Rows Columns of our import file (colored boxes have been added to highlight how the import configuration maps to the import file):



Import File

A	B	C	D	E	F	G	H
				Characteristic ->	Temperature	DO	pH
				Units ->	Deg C	mg/l	none
Activity ID	Date	Location ID	Result Depth (m)	Fraction ->		Dissolved	
A-1	5/4/2013	ML-1	1		-0.1	2.5	8.1
A-1	5/4/2013	ML-1	3			2.4	8.34
A-2	5/5/2013	ML-2	1		9.8	8.8	8.8
A-2	5/5/2013	ML-2	3		7	9.2	8.5
A-3	5/6/2013	ML-3	1		2.3	2.9	9.1
A-3	5/6/2013	ML-3	3		2.9	1.9	8.55

As a final step, create Generated Values for elements that are not included in our import file, such as the following example:



Our import configuration is now complete. If our file was imported, the following entities and elements would be populated in GSE-WQ.

Activity					Activity Project	Result						
Activity ID	Activity Start Date	Monitoring Location ID	Activity Media Name	Activity Type	Project ID	Result Depth / Height Measure	Result Depth / Height Unit	Characteristic Name	Result Unit	Result Sample Fraction	Result Value	Result Status
A-1	5/4/2013	ML-1	Water	Field Msr/Obs	1	1	m	Temperature	Deg C		-0.1	Final
						1	m	DO	mg/l	Dissolved	2.5	Final
						1	m	pH	none		8.1	Final
						3	m	DO	mg/l	Dissolved	2.4	Final
						3	m	pH	none		8.34	Final
A-2	5/5/2013	ML-2	Water	Field Msr/Obs	1	1	m	Temperature	Deg C		9.8	Final
						1	m	DO	mg/l	Dissolved	8.8	Final
						1	m	pH	none		8.8	Final
						3	m	Temperature	Deg C		7	Final
						3	m	DO	mg/l	Dissolved	9.2	Final
						3	m	pH	none		8.5	Final
A-3	5/6/2013	ML-3	Water	Field Msr/Obs	1	1	m	Temperature	Deg C		2.3	Final
						1	m	DO	mg/l	Dissolved	2.9	Final
						1	m	pH	none		9.1	Final
						3	m	Temperature	Deg C		2.9	Final
						3	m	DO	mg/l	Dissolved	1.9	Final
						3	m	pH	none		8.55	Final

2.6.4 Expressions

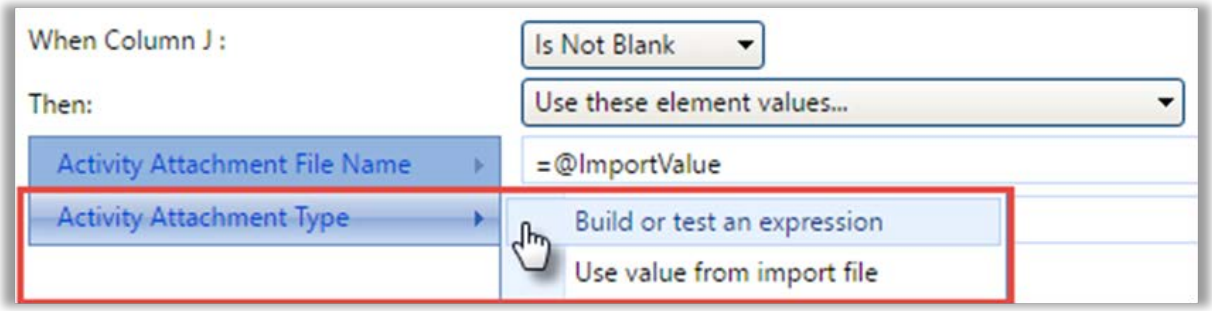
When in “Expert Mode”, translations can support a limited number of expressions for additional power and control. Expressions can be useful in certain specific situations where standard translations are insufficient. However, expressions are an advanced feature and are most appropriate for users who are very comfortable creating expressions in other tools, such as Microsoft Excel.

Expressions begin with "=" and then include one or more functions. For example, the following expression would remove the "<" sign from a value like "<0.025" and return only the numeric portion of the value:

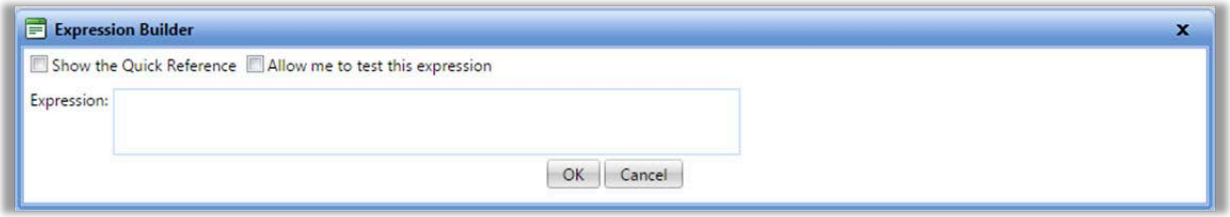
=Substitute(@ImportValue, "<", "")

Note: A special token "@ImportValue" is used to reference the value from the current column of your import file. GSE-WQ does not currently support expressions that reference a value from another column. There is only support for a reference to the column which contains the translation expression.

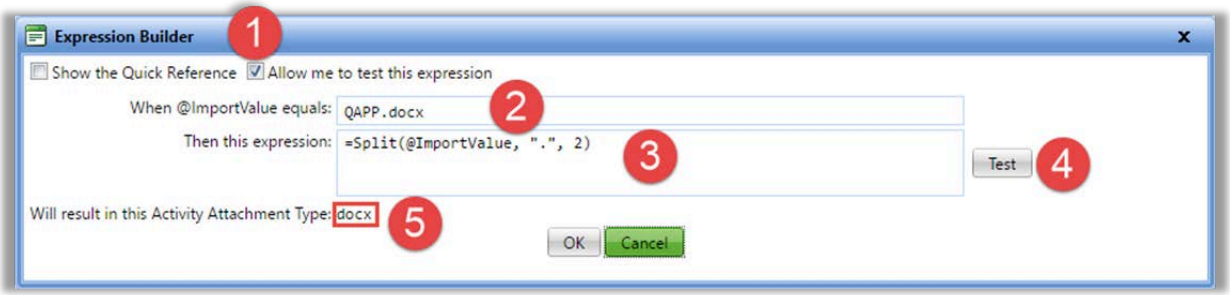
The translation page includes an "Expression Builder" to assist with the creation of expressions. To open the Expression Builder, hover over the element you wish to edit (e.g. Activity Attachment Type) to activate the menu. Then select the menu option "Build or test an expression".



The Expression Builder window will open.



It can be helpful to test your expression against a specific import value to confirm that it works as expected. The snapshot below outlines the steps.

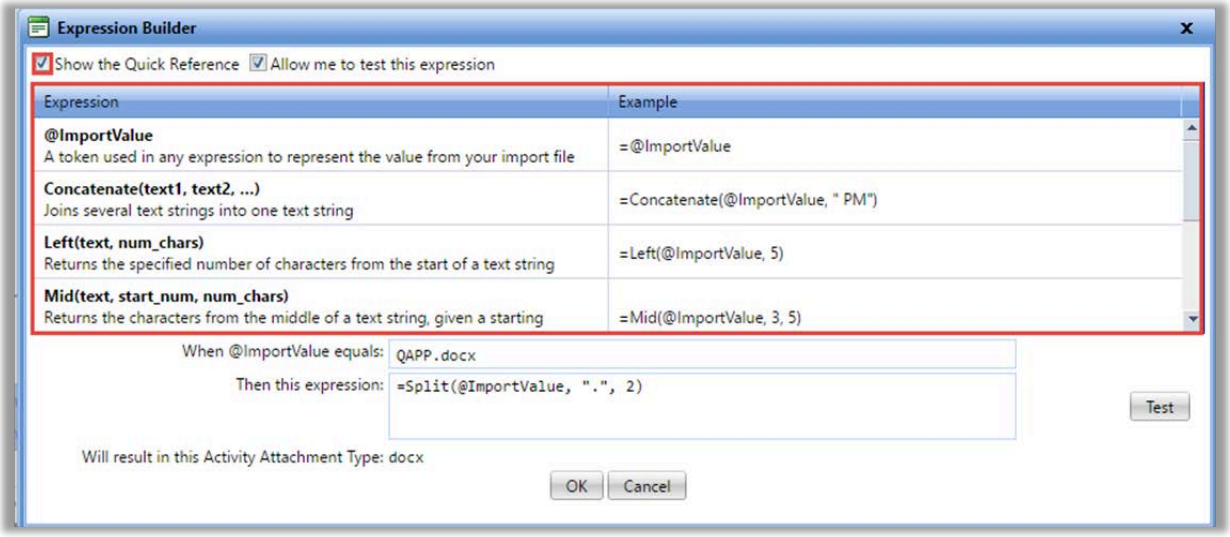


The following is an explanation for each step:

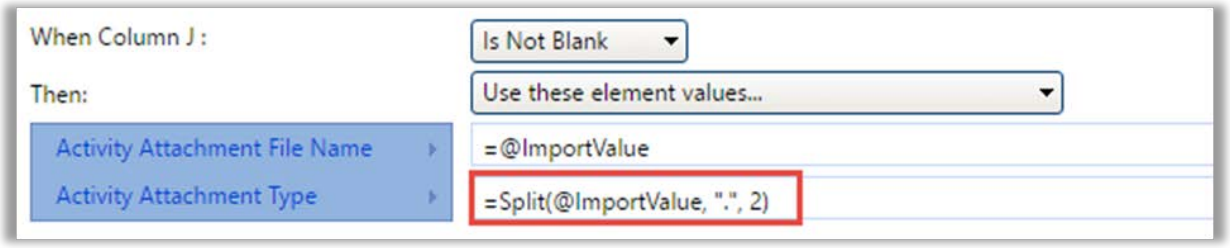
1. Check the box labeled "Allow me to test this expression",
2. A new text box will appear, where you can type an example value

3. Enter your expression
4. Then click the "Test" button
5. Your expression will be evaluated against the example value that you provided and the result will be displayed.

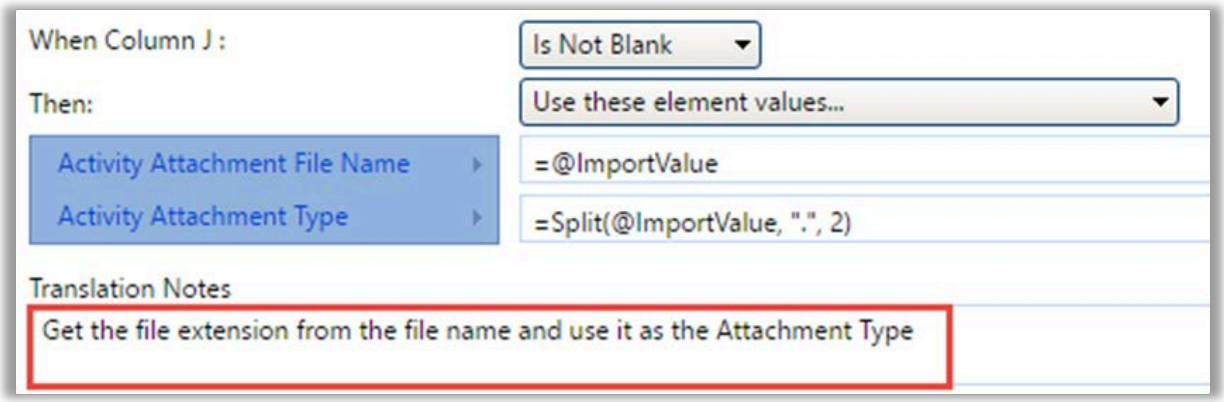
There is also a quick reference that you can view while creating your expression. Just check the box labeled "Show the Quick Reference". This will provide each function/expression that is supported, along with a brief description and an example of its use.



After clicking the OK button, your expression will be added to the translation, under the appropriate element (i.e. Activity Attachment Type)



Each translation includes an optional Translation Notes box. In cases where an expression is used, and may not be intuitive to read, it may be helpful to add notes.



Here are some of the possibilities available with expressions:

- Get the file extension (e.g. "docx") from a file name for an attachment and use it as the Attachment Type.

  For Example, if your imported value was: "Qapp.docx", then the following translation would result in the following element values.

Translation		Element Value (outcome)
When Column	Is Not Blank	
Then	Use these element values...	
Attachment File Name	=@ImportValue	Qapp.docx
Attachment Type	=Split(@ImportValue, ".", 2)	docx

- Split an Analytical Method ID and Context that are stored in a single column in your import file.

  For Example, if your imported value was: "ASTM D1886(C)", then the following translation would result in the following element values.

Translation		Element Value (outcome)
When Column	Is Not Blank	
Then	Use these element values...	
Result Analytical Method Context	=Split(@ImportValue, " ", 1)	ASTM
Result Analytical Method ID	=Split(@ImportValue, " ", 2)	D1886(C)

- Derive an Activity Group Type based on the starting letters in the Activity Group ID.

  For Example, if your imported value was: "QC-20160504ML35", then the following translation would result in the following element values.

Translation		Element Value (outcome)
When Column	Starts With QC	
Then	Use these element values...	
Activity Group ID	=@ImportValue	QC-20160504ML35
Activity Group Type	QC Sample	QC Sample

- Convert a Result Value that starts with "<" to an appropriate Detection Condition and Detection Limit

  For Example, if your imported value was: "<0.025", then the following translation would result in the following element values.

Translation		Element Value (outcome)
When Column	Begins With <	
Then	Use these element values...	
Result Value	*[Blank]*	
Result Detection Condition	Present Below Quantification Limit	Present Below Quantification Limit
Result Detection Limit Type	Lower Quantitation Limit	Lower Quantitation Limit
Result Detection Limit Value	=Substitute(@ImportValue, "<", "")	0.025

Note: If you enable the option (on an import configuration) to "Generate Detection Condition and Limits from Result Value", then it is unnecessary to create a translation like the one above. The conversion will be handled automatically by GSE-WQ.

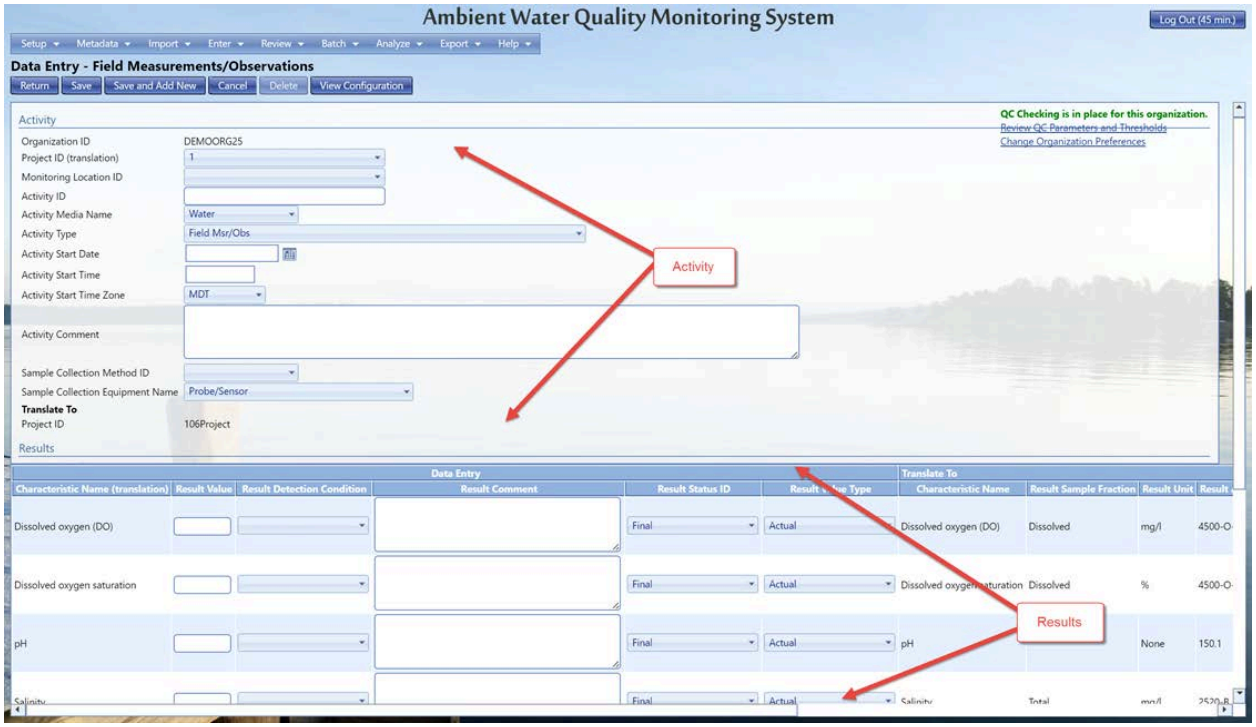
3 Managing a Data Entry Page Configuration

GSE-WQ provides a Data Entry Page that can be customized by a user for hand data entry of their Activities and Results. The Data Entry Page leverages the same Import Configuration Page that is used for import files, but in this context, the Data Entry Page Configuration defines:

- the fields that will be displayed on the Data Entry Page
- default values for certain fields
- drop-down lists of allowed values (populated by translations)
- rows that will be pre-populated in a table of Results at the bottom of the Data Entry Page

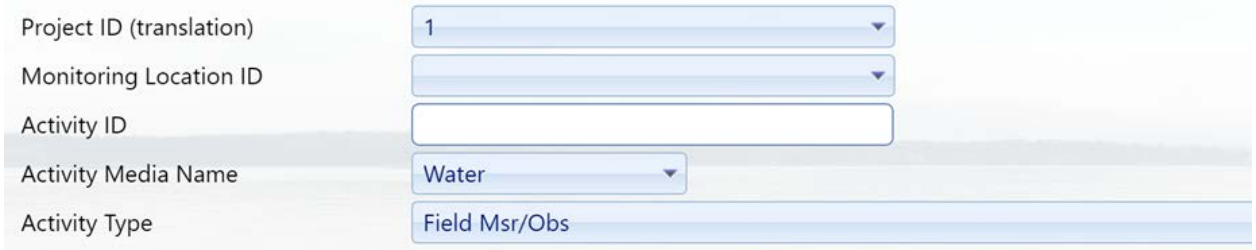
To create a Data Entry Page Configuration, go to the **Setup** tab and click **Data Entry Page Configuration**

It's helpful to have an understanding of the Data Entry Page before creating your configuration. The Data Entry Page has two main sections (as shown in the image below): Activity and Results (which are rendered as a table).



Elements in the data entry page configuration that relate to Activities will show up in the Activity Entity Type and elements that relate to Results will show up as columns in the Results Entity Type.

An element's position in the configurations will indicate its position on the Data Entry Page. For example, if Project ID is in position 1 (Field 1) in the import configuration. Then it will be in position for 1 on the Data Entry Page.



Likewise, if "Result Value" is the third Result-level element in the import configuration, then it will be displayed in the third column of the Results Table.

Setting a Default Value for an element in the import configuration will result in a default on the field in the Data Entry page (such as "Project 1" in the example above).

If an element is constrained by a lookup table (e.g. Activity Media Name), then it will be rendered as a drop-down list on the Data Entry Page.

The following rules must be understood and followed in order for your import configuration to work properly with the Data Entry Page:

1) **The configuration must contain a generated element for the Organization ID that has a default value set to something other than "{none}".** This will enforce that all data entered on the Data Entry page (using this configuration) will be related to this organization. If you wish to enter data for more than one organization on the Data Entry page, then you will have to create a copy of the import configuration for each organization.

2) **Any column that is mapped to more than one data element must have at least one translation.** The translations will either be used to populate a drop down list or to generate rows in a "Result" table on the Data Entry page (depending on the context – to be explained later).
    - When a column is mapped to many elements, the first element will be used for the field's label (or the column header – for Result elements) on the Data Entry page. In order to control which element is first, you should map the column to a single element and save it. After saving, you can map the column to additional elements (whose order is inconsequential).

3) **Default values on the data entry page configuration are ignored when a column is mapped to more than one element.** When a column is mapped to more than one element, the defaults are defined on the Translation Page. See the next section (on creating translations) for more information.

4) **Any column that maps to either Analytical Method ID or Analytical Method Context must map to both elements.** Analytical method is a special case in the context of a data entry configuration. As a result, if you plan to include an analytical method in the configuration, it must be in a single column that contains a mapping to both analytical method ID and analytical method context.

5) **At least one element from a "Result" (e.g. Characteristic Name, Taxonomic Name, etc.) must include translations and at least one of the translations must be checked as a default translation.** GSE-WQ uses these translations to generate the rows in the "Results" table (at the bottom of the Data Entry Page). See the next section for more details.

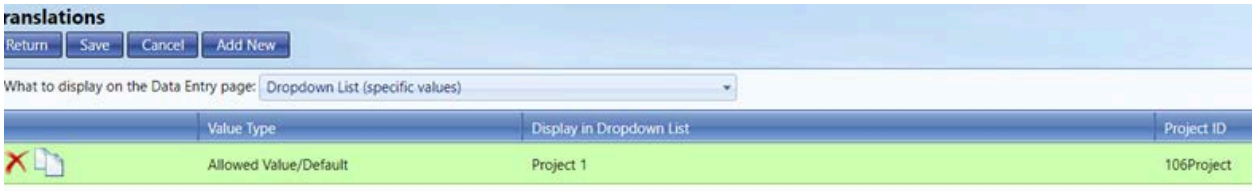
3.1 Creating Translations for Data Entry Page Configurations

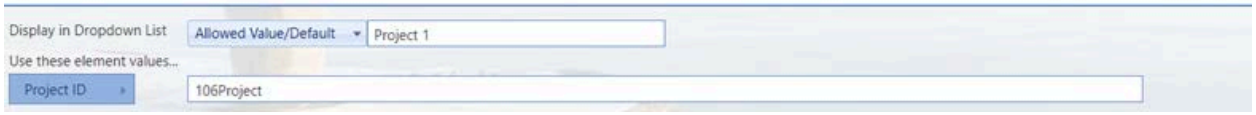
Translations work similarly in the Data Entry Configuration as compared to an import configuration with a few differences. The Data Entry Page responds to translations in one of two possible ways:

- Translations are rendered as a drop-down list on the Data Entry Page. This is always the behavior on Activity-level elements. For Result-level elements, the behavior below is also possible.
- Translations are used to generate a row in the Results Table on the Data Entry Page.

When you create translations for Data Entry Configurations, the Translation Page has an additional column “Displays”. This is where you see how the element will appear on the data entry page.

When drop-down lists on the Rapid Data Entry Page are created from translations, the drop-down list will be populated with the "Translate From" values in your translations. The "Translate To" values from your translations will be used when your Activities and Results are saved on the Rapid Data Entry Page. If a default translation is selected on the Translations Page, then the Rapid Data Entry Page will pre-select that value when it creates the drop-down list (for that set of translations).





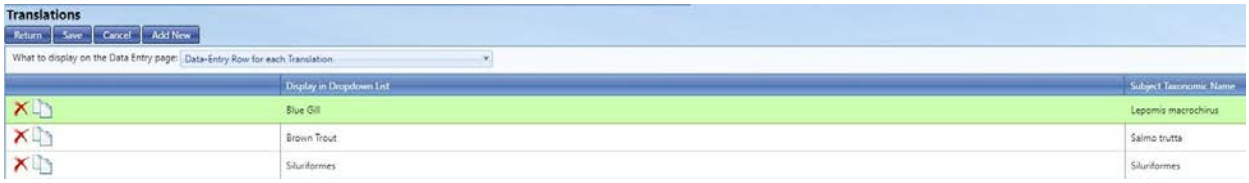
When a default translation is selected on Result-level elements, it has an expanded role – in addition to what was mentioned above. It also determines the number of rows that will be generated in the Results Table on the Rapid Data Entry Page. For example: if you created the following five translations, and selected each of them as defaults…

then the Rapid Data Entry Page will generate five Result rows in the Results table and each row will be pre-populated with one of the defaults above:

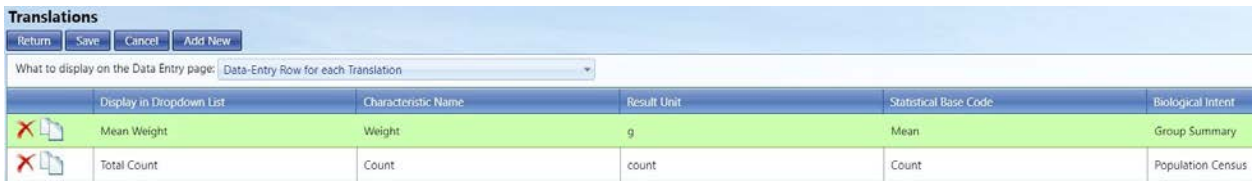
If all of your translations are selected as defaults (like the example above), then each row on the Rapid Data Entry Page will still be pre-populated with one of the defaults, but a drop-down list will not be created. Since every translation has its own row, there's no longer a need to allow the user to select which one they want.

The example above highlights a standard practice for a Rapid Entry [Import] Configuration. They should generally have at least one column that is mapped to at least one Result-level element, and that column should have many translations on it. Additionally, each translation should be selected as a default. This is commonly done with the "Characteristic Name" element (especially for physical/chemical results). Other elements, like "Subject Taxonomic Name", "Biological Intent", and "Frequency Class Descriptor" are also useful for biological data.

Not only do default translations generate rows on the Rapid Data Entry Page (for Result-level elements), but they have a multiplying effect in cases where you have created default translations on multiple columns in your import configuration. Suppose you created a column in your import configuration and mapped it to "Subject Taxonomic Name" and then created the following three translations (and selected them as defaults):



- Then you mapped another column in your import configuration to "Biological Intent", "Statistical Base Code", "Characteristic Name", and "Result Unit", and added the following two translations (also selected as defaults):



- Then, when the Rapid Data Entry Page was created, it would be created with every combination of default translation. So "Blue Gill" would have a row for "Mean Weight" and for "Total Count" (as would "Brown Trout" and "Catfish").

Results

Data Entry			Generated		Translate To				
Subject Taxonomic Name (translation)	Characteristic Name (translation)	Result Value	Result Status ID	Result Value Type	Subject Taxonomic Name	Characteristic Name	Result Unit	Statistical Base Code	Biological Intent
Blue Gill	Mean Weight		Final	Actual	Lepomis macrochirus	Weight	g	Mean	Group Summary
Blue Gill	Total Count		Final	Actual	Lepomis macrochirus	Count	count	Count	Population Census
Brown Trout	Mean Weight		Final	Actual	Salmo trutta	Weight	g	Mean	Group Summary
Brown Trout	Total Count		Final	Actual	Salmo trutta	Count	count	Count	Population Census
Siluriformes	Mean Weight		Final	Actual	Siluriformes	Weight	g	Mean	Group Summary
Siluriformes	Total Count		Final	Actual	Siluriformes	Count	count	Count	Population Census

This powerful behavior of default translations allows you to define every type of result that you may wish to enter and save yourself (and your other users) a great deal of time on data entry. In many cases, the user simply has to enter the "Result Value" on the appropriate row and they are done.

One additional behavior to point out from the examples above: if a column in your import configuration is mapped to multiple elements, and translations are added to those elements, then you can represent several distinct concepts with a single (translated) value. For example: the Results Table (above) displays the "Biological Intent (translation)" column in column 10 of the table. Additionally the page will display the "Translate To" values, in the far right columns of the table, so that the user can see what will actually be saved when the results are saved. For example: "Mean Weight" will cause the saved result to have a "Characteristic Name" of "Weight", a "Result Unit" of "g", a "Statistical Base Code" of "Mean" and a "Biological Intent" of "Group Summary".

4 Working with Imported Datasets

GSE-WQ has two main categories of datasets: Input and Output. Output datasets represent data that is exported (and in some cases submitted to CDX). These are explained in another section. Input Datasets are the result of importing your data file, applying defaults and translations (from your import configuration), and correcting validation issues that the system identifies.

Input datasets are temporary and do not represent data that is in the GSE-WQ Database. Importing, correcting, and deleting datasets has no effect on the data that is in GSE-WQ. **The data in an input dataset only becomes permanent once it has been migrated successfully (to the GSE-WQ Database).** You can work with a dataset in GSE-WQ for a maximum number of days, at which time it will be automatically purged from this system to keep the system from being overloaded with temporary data. The maximum number of days for you to work with your dataset is configurable for each installation of GSE-WQ.

Once you have migrated your dataset, you can delete it (since it is no longer needed).

4.1 Import Dataset Purpose and Type

4.1.1 Import Dataset Purpose

An input dataset can be created for the purpose of either Adding & Updating data or for Deleting data in GSE-WQ. **Add/Update** datasets contain a full set of data and will update records in GSE-WQ where the ID for the record matches an existing value. If no match is found, then the data will be added to GSE-WQ. **Delete** datasets include just one column which contains the unique ID of the record(s) you wish to delete from GSE-WQ.

Once a dataset is created in GSE-WQ, it will be available to anyone with rights to the organization referenced in the import file. Other users will not see it.

4.1.2 Import Dataset Types

The types of datasets supported by GSE-WQ are as follows:

- Projects
- Monitoring Locations
- Assessment Units
- Biological or Habitat Indices
- Activities and Results
- Continuous Results
- Activities and Metrics
- Activity Groups
- NARS JSON Files
- Delete Projects
- Delete Monitoring Locations
- Delete Activities
- Delete Activity Groups
- Delete Biological or Habitat Indices

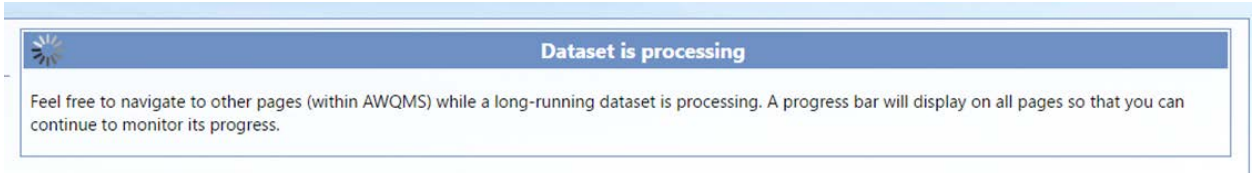
During the import/migration process, the data goes through several steps. The following icons will appear next to your dataset based on its status. Unless the final step is completed successfully, your data is only temporary (and will eventually be cleared from the system). To help highlight this multi-step process, icons have been added to the Datasets Page.

There are four icons on this page:

	This indicates a dataset that is actively being processed by AWQMS. It's associated with a status of "Importing", "Exporting", or "Processing at CDX"
	This indicates that one or more errors have been logged while processing a dataset, and those errors have not been resolved. This is associated with a status of "Import Failed", "Export Failed", "Failed at CDX", and "Imported" (when there are unresolved validation errors)
	This is associated with a status of "Imported" and it indicates that there were no validation errors logged, or that you have resolved all validation errors that were logged. Your dataset is now ready be submitted to the Central Data Exchange (CDX), which will pass your submission file on to the Water Quality Exchange (WQX) for final processing.
	This indicates that you have successfully completed all steps in the process. Your dataset has been submitted/migrated to CDX/AWQMS and completed without error.

When you are going through the process of importing/migrating your input dataset you will come across the following message boxes:

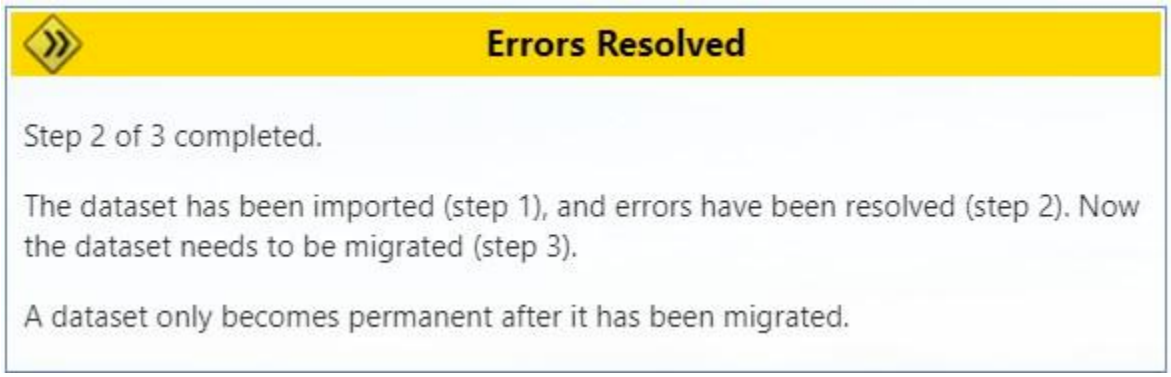
When importing…



If there were errors during the import…

If there were no errors during the import…

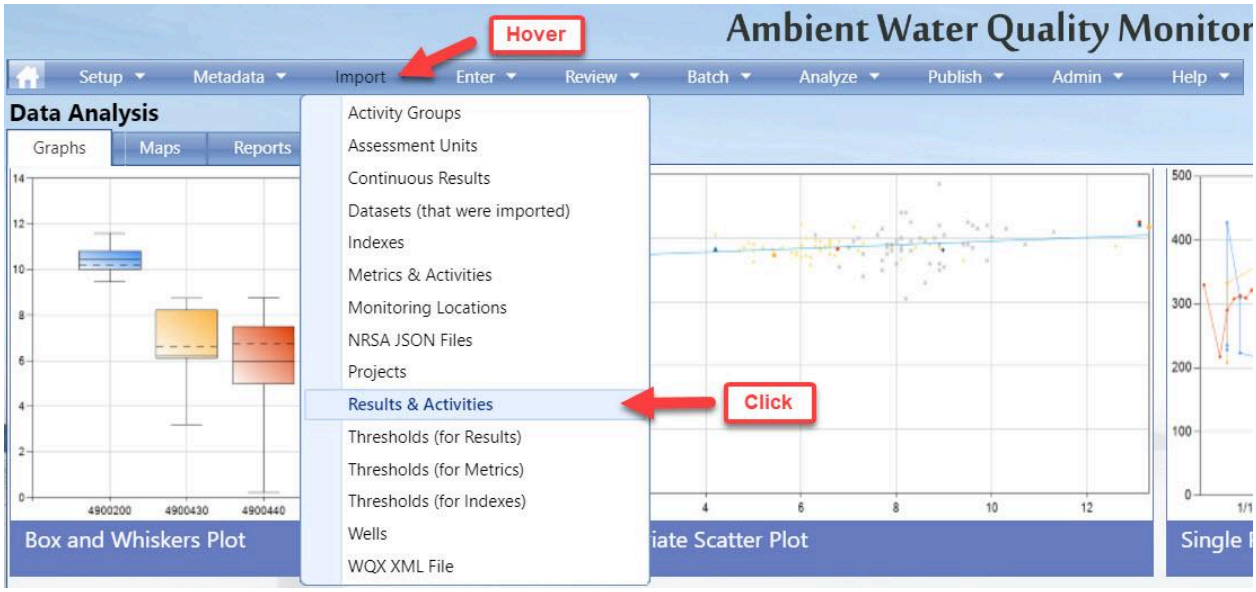
If all errors have been resolved…



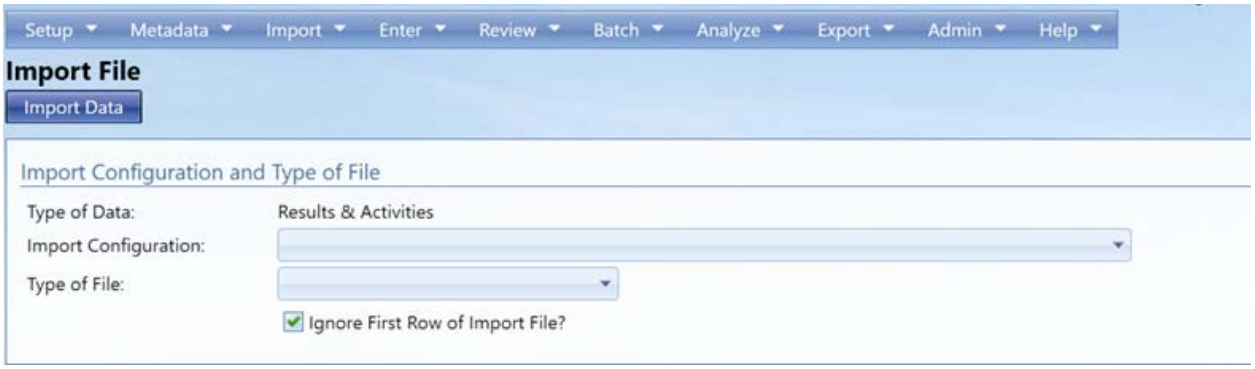
After a successful migration…

4.2 Creating a New Import Dataset

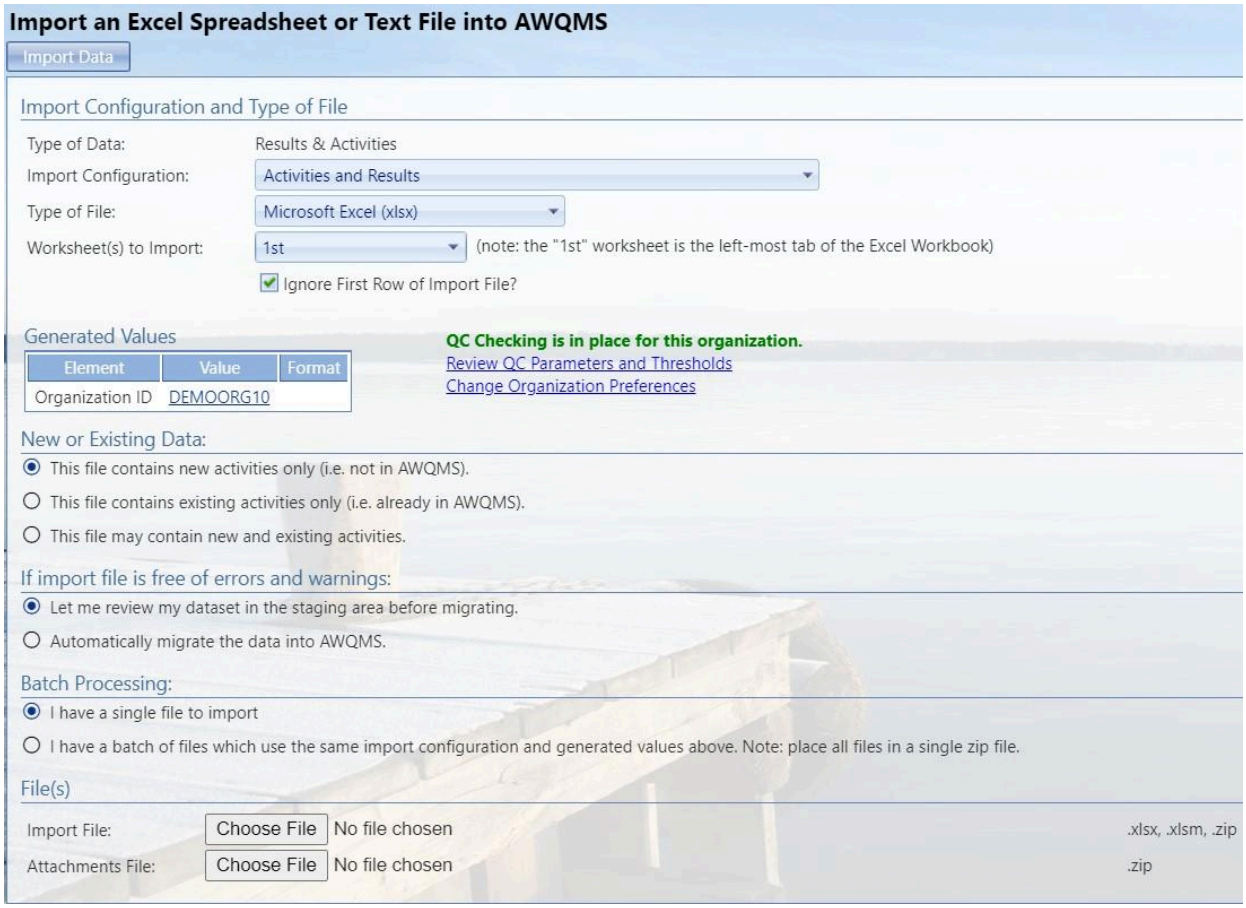
Hover on **Import** and click on the type of information file you want to load into the system. This example shows results and activities.



The system will display the Import File page.



Here you must select which import configuration you want to use to import your data. By doing so, the rest of the import file page will load accordingly.
Note: The list will be filtered to only show Impot Configurations that match the type you selected on the previous page.



- Select the Worksheet you wish to import. GSE-WQ can load up to 20 worksheets at a time.
- The file you select must have an extension of ”txt”, ”csv”, ”zip”, “xls”, or “xlsx” (not case sensitive). If it is a zip file, it must contain a TXT, Comma-Separated Value (CSV), or Excel file inside it.
- Review the table showing the generated values that will be used when importing this file. The Default Values are from the selected import configuration and can be overridden here for this file (without affecting the values in the import configuration). Change any values as needed.
- Choose whether you are importing a file or files that contain new activities only (i.e., not in GSE-WQ), existing activities only (i.e., already in GSE-WQ), or new and existing activities. Select the appropriate option to help prevent accidentally overwriting existing data or creating duplicate data.
- GSE-WQ allows you to batch process. Make sure the batch of files use the same import configuration and generated values and to place all files in a single zip file.
- Use the Choose File on the Import File field to browse and find the file to be imported.
- If you have attachments referenced in your import file, then use the Browse button on the Attachments File field to browse and find the zip file that holds all of the attachments. The file must be a .zip file.

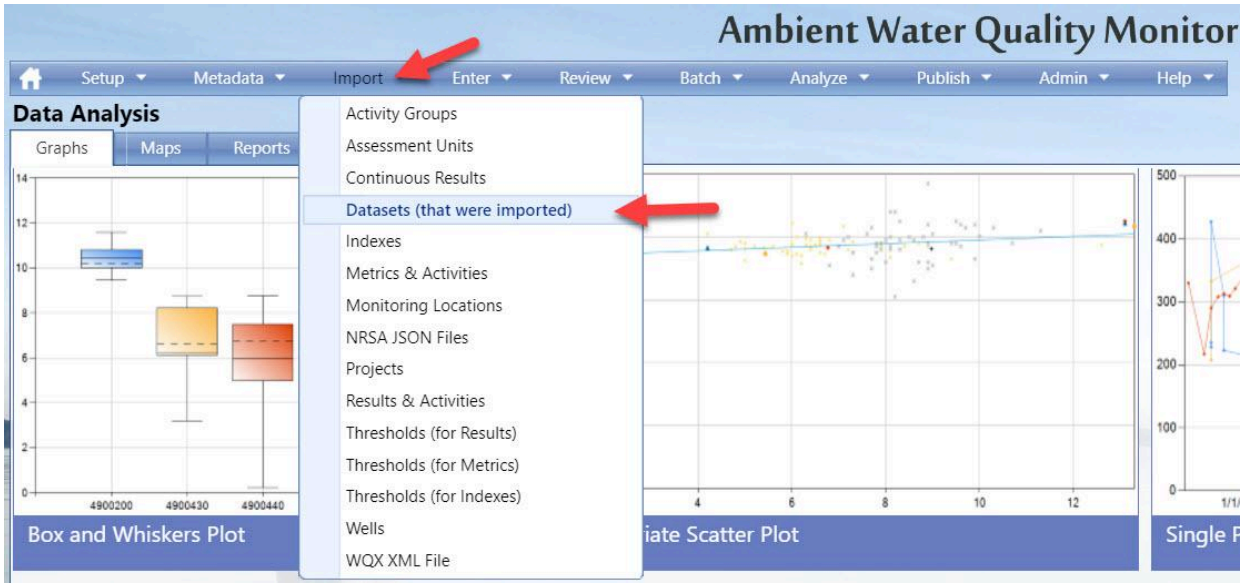
Select the **Import Data** button.

The system will display the Dataset Summary page. The Dataset Summary page provides information regarding the status of a dataset, including the percent complete and a count of any warnings or errors logged so far. An animated image will spin to remind you that an active process is running on the server. If it appears that it will take more than a few minutes to complete you can choose to navigate elsewhere in the system and perform other tasks or leave the system entirely and come back at a later time. The process will continue on its own and you can check back at any time by following the instructions in the next section.

4.3 Continuing with Existing Datasets

To find an existing dataset in the system:

Hover on **Import** and Click on **View Datasets (imported into the staging area)**

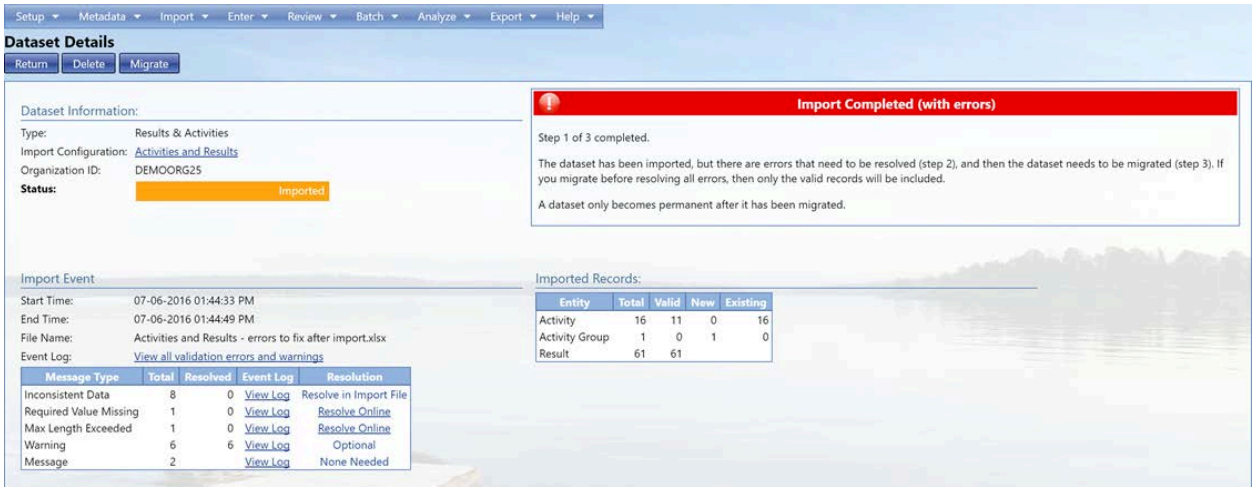


This will navigate to the Datasets (imported) list page. The page displays a list of datasets that you have created or were created by users that belong to organizations you have rights to.

ID	File Name	Type		Status	Organization	Created	Created By	Expires
18229	October 8 2015 and RR3 Oct 6 AWQMS.xlsx	Results & Activities		Migrated		06-30-2016 01:52 PM		24 Days
18219	1510020 FINAL 17&18 WORKING.xlsx	Results & Activities		Imported		06-29-2016 03:20 PM	Kayla Gower	53 Days
18216	2-9-15 data.xlsx	Results & Activities		Migrated		06-29-2016 12:30 PM	Kayla Gower	23 Days
18203	TPWQ_upload_1stQ2016.xls	Results & Activities		Migrated		06-27-2016 10:14 AM		21 Days
18201	USGS20150504SW (1).xlsx	Results & Activities		Imported		06-24-2016 01:41 PM	Kayla Gower	48 Days
18197	AWQMS I70 WQ 2000_2013 V2.csv	Results & Activities		Migrated		06-24-2016 11:32 AM		18 Days
18196	Activity ID Delete.xlsx	Delete Activities		Migrated		06-24-2016 09:09 AM		18 Days
18185	I70 Monitoring Locations.csv	Monitoring Locations, Assessment Units and Reaches		Migrated		06-22-2016 05:49 PM		16 Days
18179	USGS20150504SW (1).xlsx	Results & Activities		Imported		06-17-2016 10:48 AM		41 Days
18177	ResultListExport (02 03).txt	Results & Activities		Imported		06-16-2016 03:03 PM		40 Days
18144	Combined worksheet of lab data.xlsx	Results & Activities		Migrated		06-13-2016 03:56 PM	Kayla Gower	7 Days
18086	AWQMS Hoop Creek WQ 1997_2009.csv	Results & Activities		Migrated		06-10-2016 12:07 PM		4 Days

Select the link on the ID of the dataset you wish to work with.

The system will display the Dataset Summary page.



While the system is importing your file, it tracks errors in two manners:

As each Project, Activity, Result, etc. is processed, the system performs a number of specific validation checks on the data. If the validation fails, the record is flagged as invalid and the specific type of validation failure is recorded. A summary of the validation checks are provided in two tables on the Dataset Summary page (shown above). On the right is a summary of the number of records that are valid or invalid. On the left is a list of each type of validation error and count of the times the error occurred (originally and currently remaining). Each type of validation error has a link to a page where the validation issue can be resolved within the system.

All errors, warnings and messages that the system encounters during the import process will be recorded in a log for this dataset. The "Errors & Warnings" field displays a count of the number

of errors and the number of warnings. If either count is greater than zero, a link is provided to view the log. The log will include all of the errors from #1 above and may include additional errors, warnings, etc. that are only tracked here. These include issues with the file not matching the import configuration, problems reading the file, and any other unexpected issue that arose during the import process. In some cases, the unexpected issue may be caused by a bug in the system that needs to be resolved. If the system is unable to recover from the error that it has logged, it may stop importing the file and mark the dataset with a status of "Canceled or Failed Import".

4.3.1 To View Event Log Messages:

Select the **View all validation errors and warnings** link on the Dataset Summary Page. This will display the Event Log Messages page.

You can select the Summary View radio button at the top of the page to get a summary of each error or warning (and the number of times it occured). This is a quick way to assess the specific issues that need to be resolved.

To filter what type of messages/errors/warnings you want to see, select the type from the drop down list.

Select the **Return** button to navigate back to the Dataset Summary page.

4.4 Resolving Validation Errors in a Dataset

As mentioned previously, the import process performs validation checks on the data in your import file. A summary of the findings are displayed in a “Validation Errors” table on the Dataset Summary Page.

Message Type	Total	Resolved	Event Log	Resolution
Inconsistent Data	8	0	View Log	Resolve in Import File
Required Value Missing	1	0	View Log	Resolve Online
Max Length Exceeded	1	0	View Log	Resolve Online
Warning	6	6	View Log	Optional
Message	2		View Log	None Needed

Each type of validation error has a link to a page where the validation issue can be resolved within the system. You need to resolve these errors to successfully migrate the entire dataset. If you choose to export without resolving all of the validation errors, any invalid records will be excluded from the export.

There are 4 main types of validation errors that can be corrected in the system:

Maximum Length Exceeded – The length of a value in the import file exceeded the maximum allowable length of the corresponding data element.

Invalid Domain Value – A value in the import file didn't match any of the allowed values in the lookup table for the corresponding data element.

Invalid Format or Value – The format of a value in the import file didn't match the format you specified in your import configuration for the corresponding data element.

Required Value Missing – The import file was missing a value that is required to create a valid WQX Submission File.

There are 2 main types of validation errors that need to be corrected outside of the system in your file.

Risk of Overwriting Data - The data matches another dataset already in GSE-WQ. The system will alert you to help reduce the risk of duplicate data in GSE-WQ. You should review the data compared to the data you have in GSE-WQ. If it truly is new, then you should consider changing your Activity ID

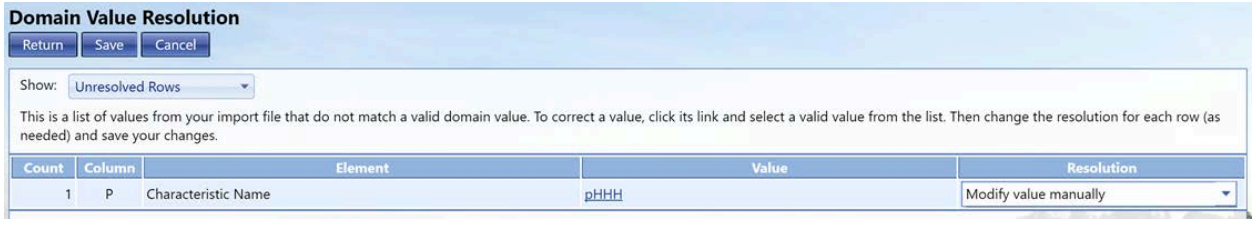
Inconsistent Data - A common example of this is when two activity IDs match but other activity elements don't match. Check to see if there is an error with your activity elements, or if the data should be mapped to two different activity IDs

4.4.1 Resolving Invalid Domain Values

To resolve domain value errors:

Select the "Resolve Online" link in the Validation Errors table on the Dataset Summary page. The system will display the Domain Resolution page.

This page allows you to resolve errors where the value in your import file did not match an allowed value for that data element.



Count - This column displays the number of times the error occurred (in a particular import column position).

Column - The column in your dataset which this occurred.

Element - This column displays the name of the data element that was used for the validation.

Value - This column displays the current value for the data element. Before the value is corrected, this displays the value from your import file. After it's been corrected, it displays the corrected value.

Resolution - This column displays a drop-down list allowing you to select the method of resolving the validation error:

- *Add a translation to the Import Configuration*: selecting this will create a translation in your Import Configuration so that any future file having the same value (in the same column) will be corrected automatically.
- *Modify value manually*: selecting this will update the value(s) in this dataset, but will not create a translation in your Import configuration.

Note: there is a preference on the User Preference Page where you can set the default value for the Resolution drop-down list, so that you only have to change the selection when it doesn't match your standard choice for Resolution.

Select the link in the Value column for the value you wish to change. A list of allowed values will be displayed.

Choose the link for the value you wish to select. The new value will be displayed on the Resolution Page.

Note that although "{none}" is a standard choice in the list of values, this page will not allow a value of "{none}"

Click the **Save** button to save your changes and refresh the page (showing the remaining unresolved rows). This is particularly useful if there are more than one page of errors. Otherwise, you can select the **Return** button to save your changes and return to the Dataset Summary page.

The Dataset Summary page will recalculate the unresolved validation errors and invalid records and display the new counts.

Message Type	Total	Resolved	Event Log	Resolution
Inconsistent Data	8	0	View Log	Resolve in Import File
Required Value Missing	1	0	View Log	Resolve Online
Domain Value Invalid	1	1	View Log	Resolve Online

4.4.2 Resolving Invalid Formats or Values

To resolve format errors, the method is the same, however, you will type in the valid value or adjust to the valid format.

4.4.3 Resolving Values that Exceed Maximum Length

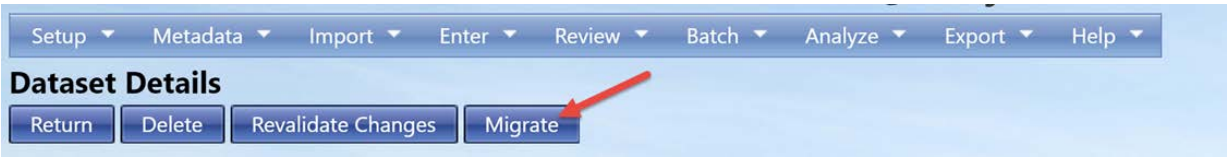
To resolve maximum length errors, the method is the same, however, you have two options: shorten the value until it's a valid length manually or truncate the value to fit.

4.4.4 Resolving Required Values that are Missing

To resolve required value errors, the method is the same, however, you will provide a value for a data element that was not provided in the import file but is required to create a valid WQX Submission File.

4.5 Migrating an Imported Dataset

Before you can begin managing, analyzing, or exporting data from an input dataset, the data must first be migrated into the GSE-WQ Database. Although the system doesn't enforce this, it is a good idea to have all import and other validation errors resolved prior to migrating a dataset. Once you've resolved all import and other validation errors, click the **Revalidate Changes** button. When the valid record count is refreshed and you are ready to migrate the dataset, simply select the **Migrate** button on the dataset summary page.



The page will refresh and tell you that the dataset is migrating. If you know that the size of the dataset is relatively small, you should be able to refresh the page within a few seconds of initiating the migration. However, if you know that the size of the dataset is relatively large, then you can navigate away from the Dataset Summary page and continue working elsewhere in the system. Return to the Dataset Summary (via the Dataset List page) at any time to check on the status of your migration. Once the migration has completed the status of the dataset will be "Migrated". You can delete your dataset at that point, as a copy of the data from the dataset will now be in the database.

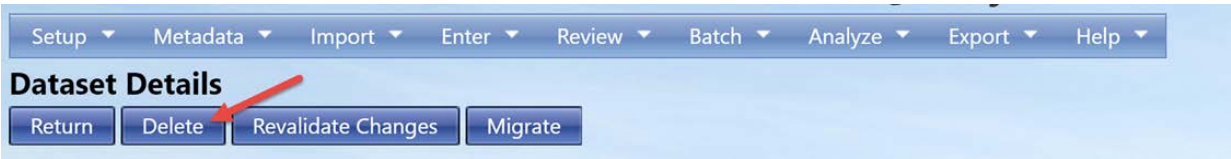
4.6 Deleting an Imported Dataset

Input Datasets in GSE-WQ are temporary and only become final after they have been migrated to the database. You are encouraged to delete your datasets once they have received a status

of “Migrated” or you are no longer working with them. **Deleting a dataset will have no effect on data that has been migrated. You are only deleting the temporary data that was in the staging area.**

To keep the system clean, datasets that reach a certain age will be automatically removed from the system. The dataset summary page will tell you how many days are remaining before the dataset will be automatically deleted.

To delete a dataset manually, select the Delete button on the Dataset Details Page.



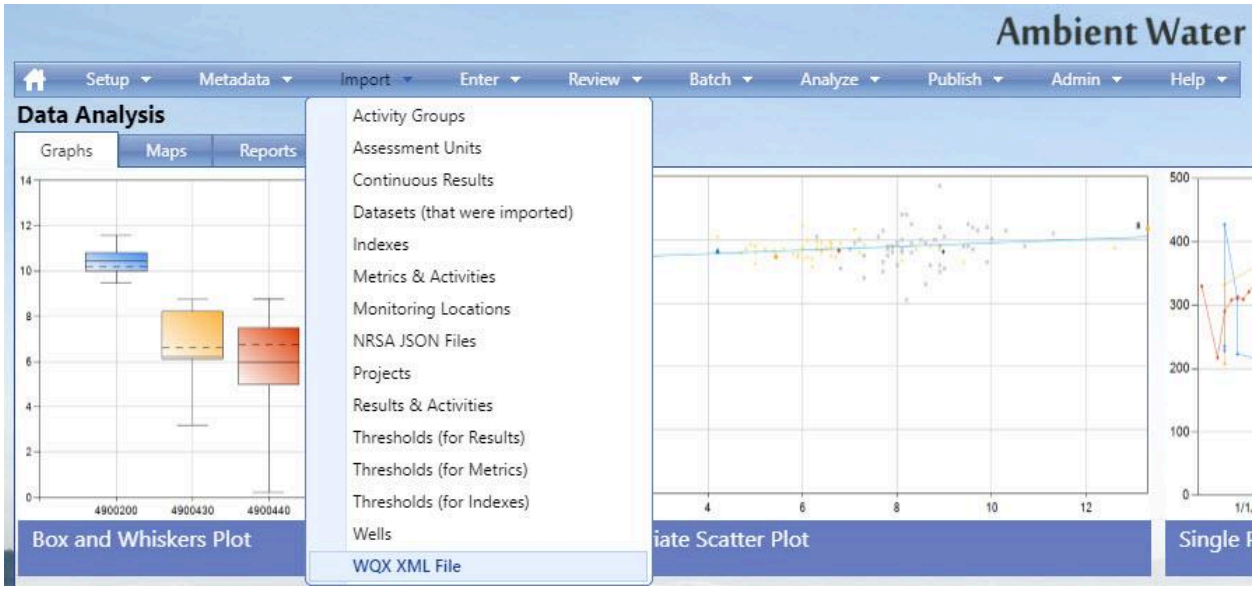
You will be asked to confirm before the dataset is deleted.

Click **OK** to proceed with the deletion. Depending on the number of records in the dataset and the interconnections between records, the delete could take from a few seconds up to two or three minutes; maybe even more for extremely large data sets. While waiting for a dataset to be deleted, there is no “Refresh” button. You must wait until the processing is complete. When the dataset has been deleted, you will be returned to the Dataset List page.

4.7 Import a WQX-XML File into GSE-WQ

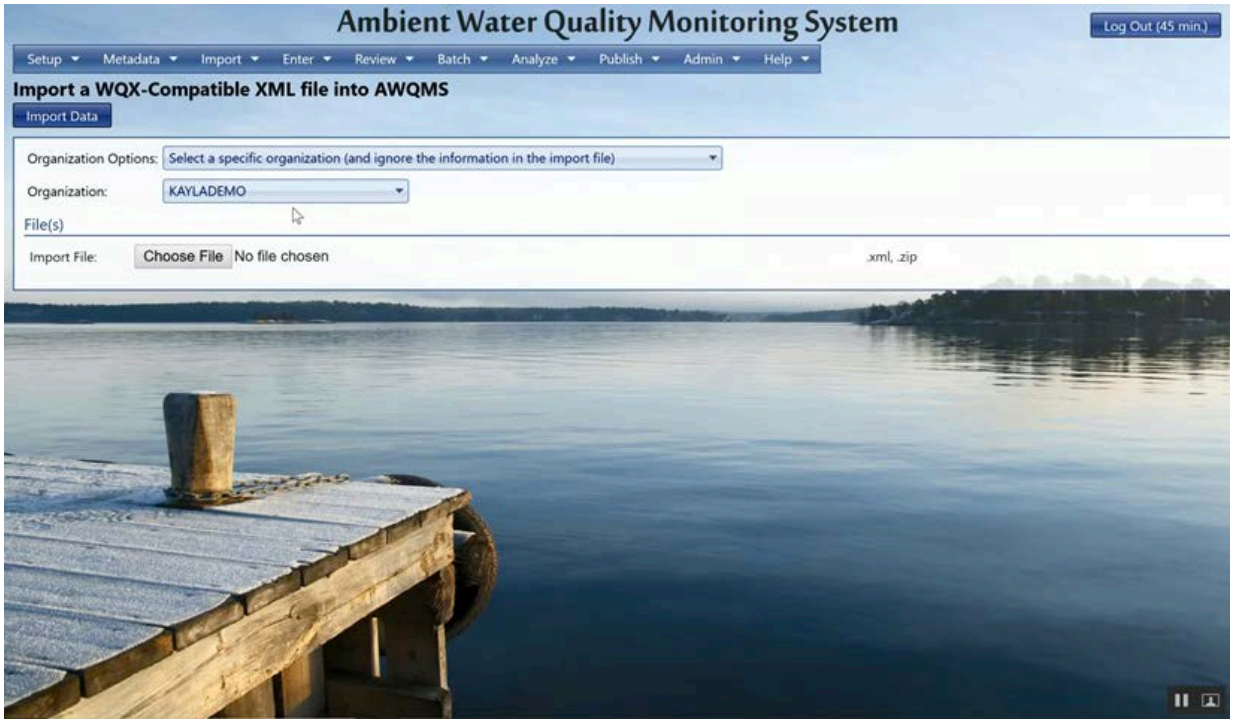
For users that have access to a WQX XML file - you may want to import that directly into GSE-WQ instead of building a configuration for your excel results.

Start by hovering over Import and select WQX XML File.



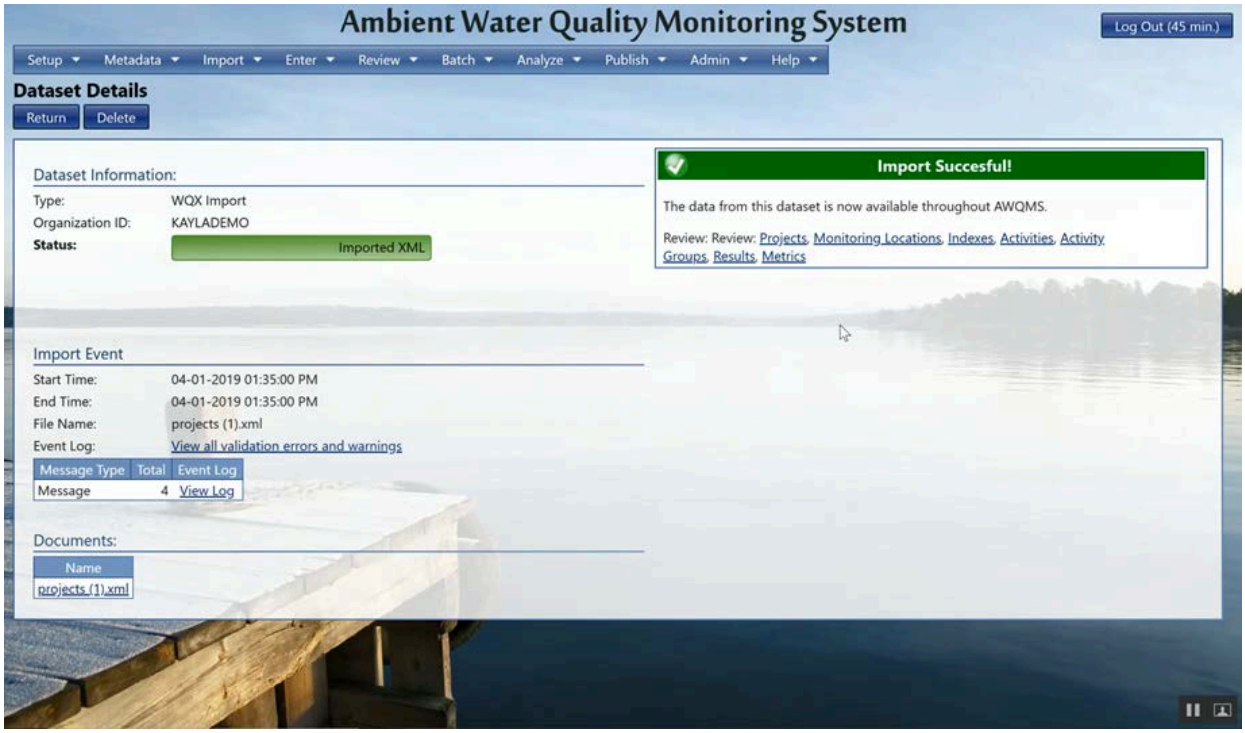
You can now select how you want the system to grab your organization information. The first option is to just let the system read your organization information directly from the file. At the same time, GSE-WQ can update organization detail information if you choose to.

The second option is to pre-select your organization ID before you import your XML file (as shown in the picture below)



Next select the XML file off your computer and click Import data.

The system will read your file and go through the import process completely before telling you if the import was successful or possibly failed due to errors in the XML file. There is no “staging area” when importing an XML file into GSE-WQ, so you will not be able to resolve those errors in real time in GSE-WQ. To resolve errors in an XML file you must correct the issues directly in the file, then re-import the data.



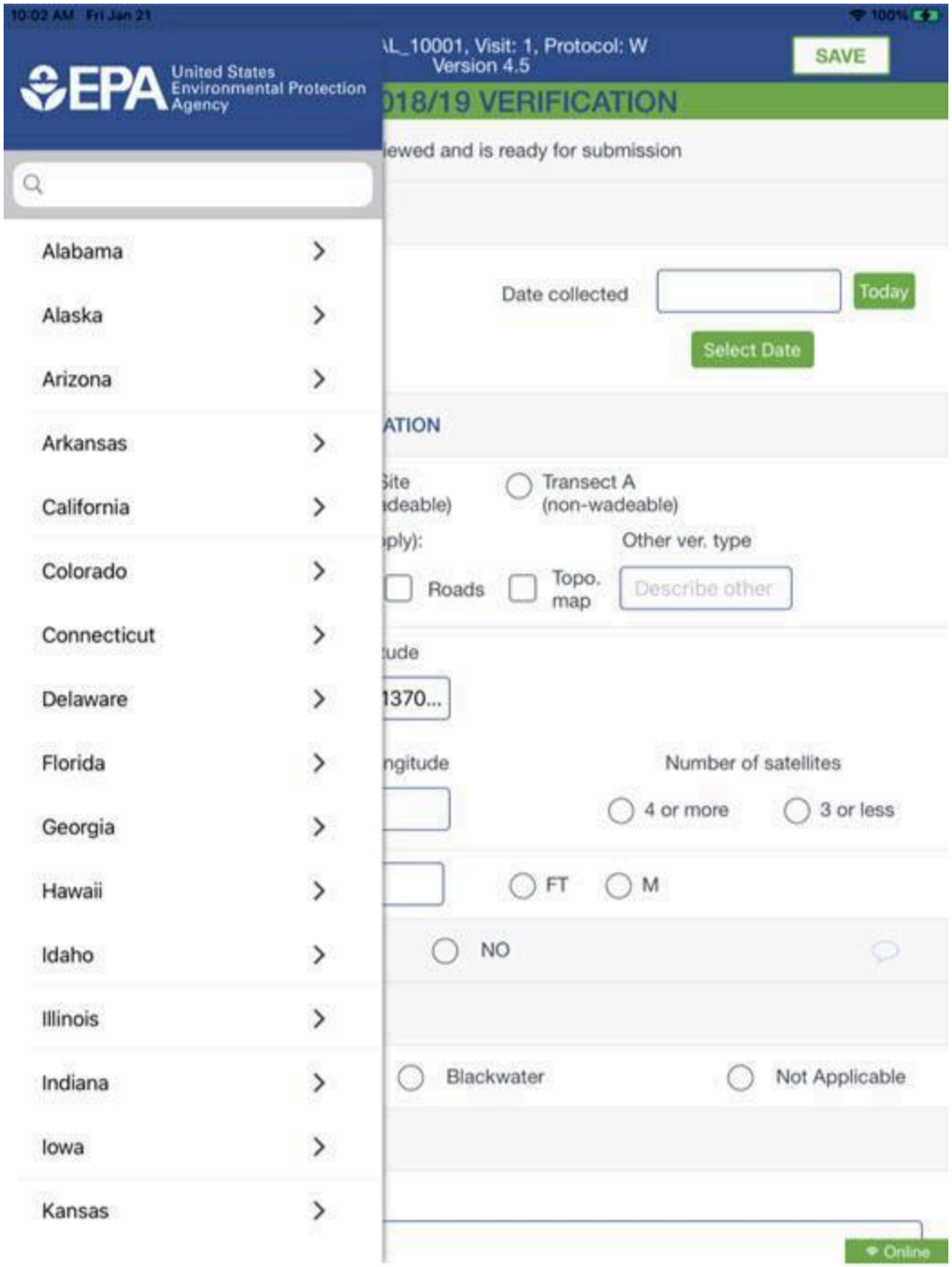
4.8 NARS NRSA App

NARS provides a mature, well-tested mobile app that can work offline for capturing a multitude of water quality monitoring sampling and observation activities for the National Rivers and Streams Assessment. The output of that mobile app is a JSON data file that is emailed to NARS from the email client on the mobile device. However, the email can be diverted to any desired email address. Thus, the NARS mobile app can be used for non-NARS purposes, such as regular state and tribal water quality monitoring.

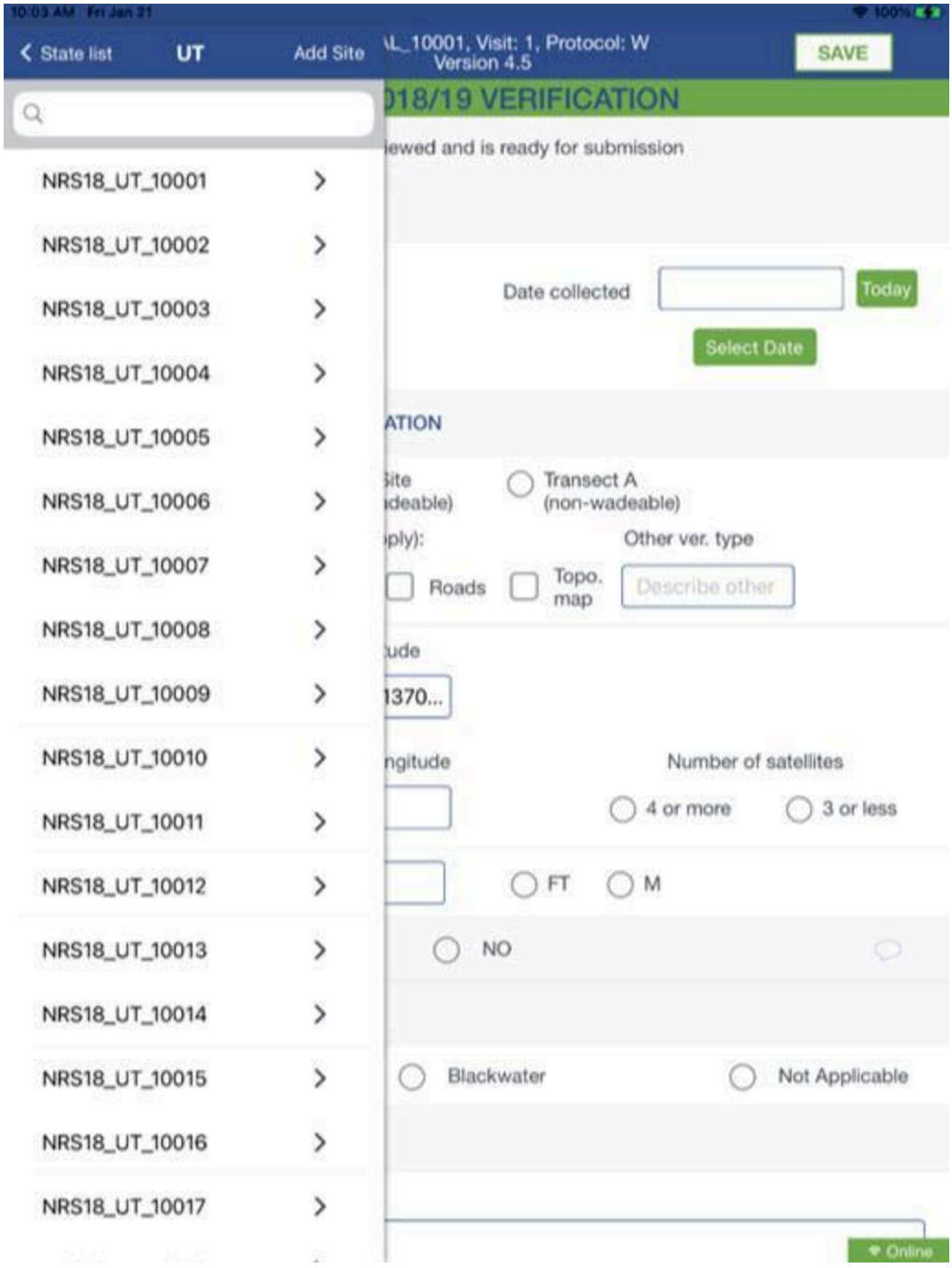
GSE-WQ will have capabilities to directly import NARS NRSA mobile app output for forms commonly thought of as Habitat Assessment forms to also directly import NARS NRSA mobile app output for forms associated with field measurements.

4.8.1 Adding a Site to the App

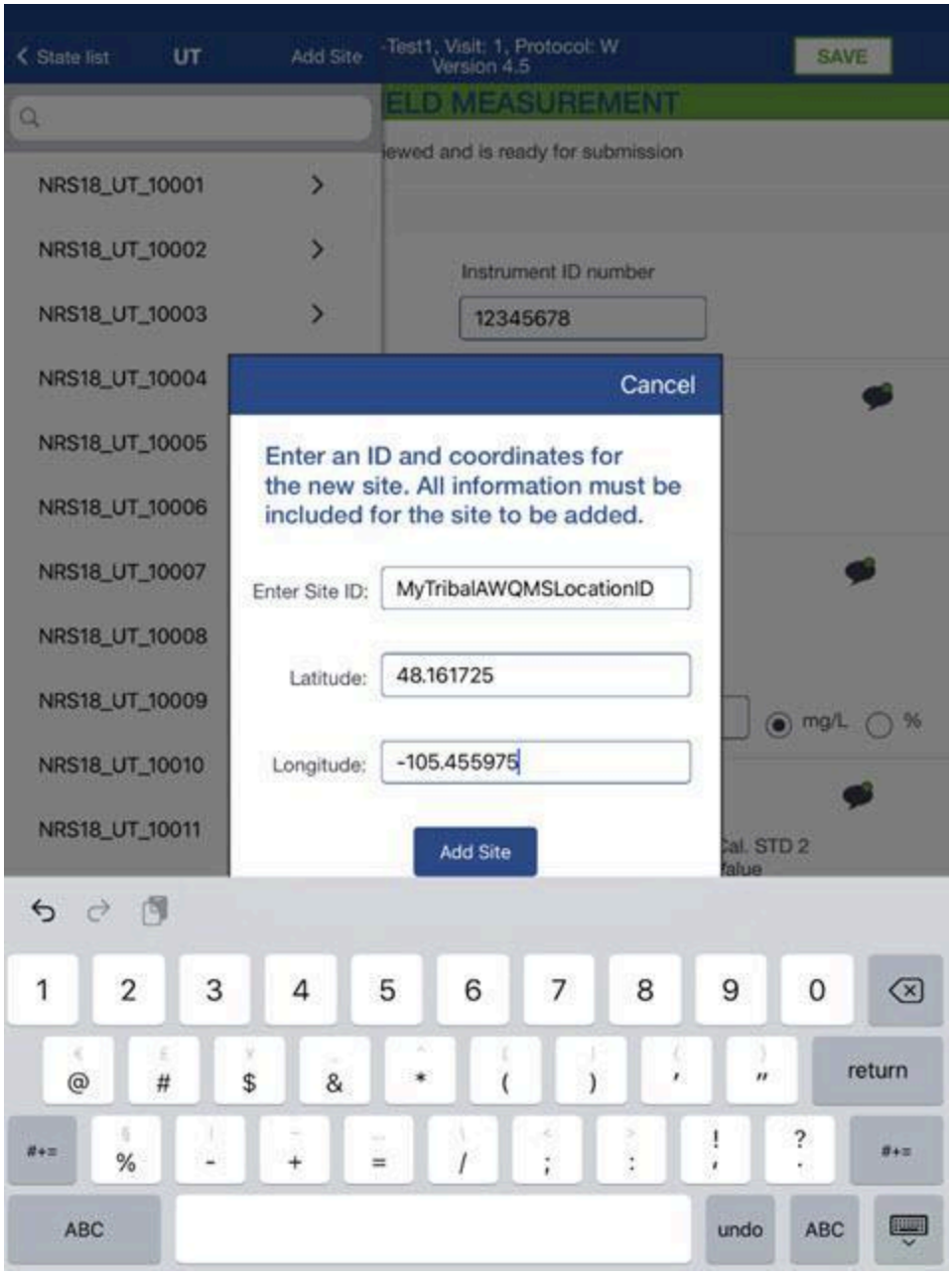
After logging into the app, you are presented a list of states. Search for and select the state within which the site is situated.



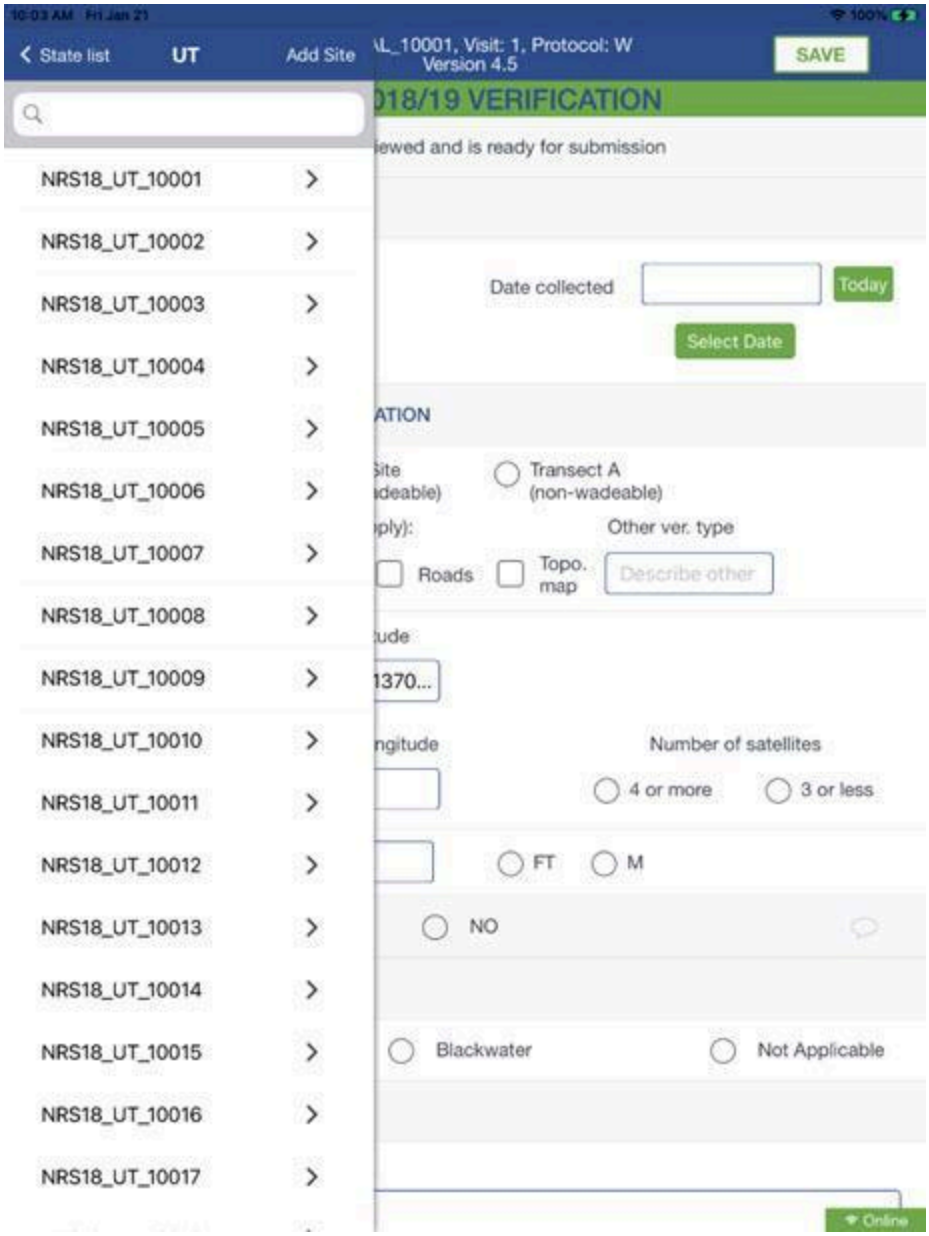
You'll be presented with a list of existing sites.

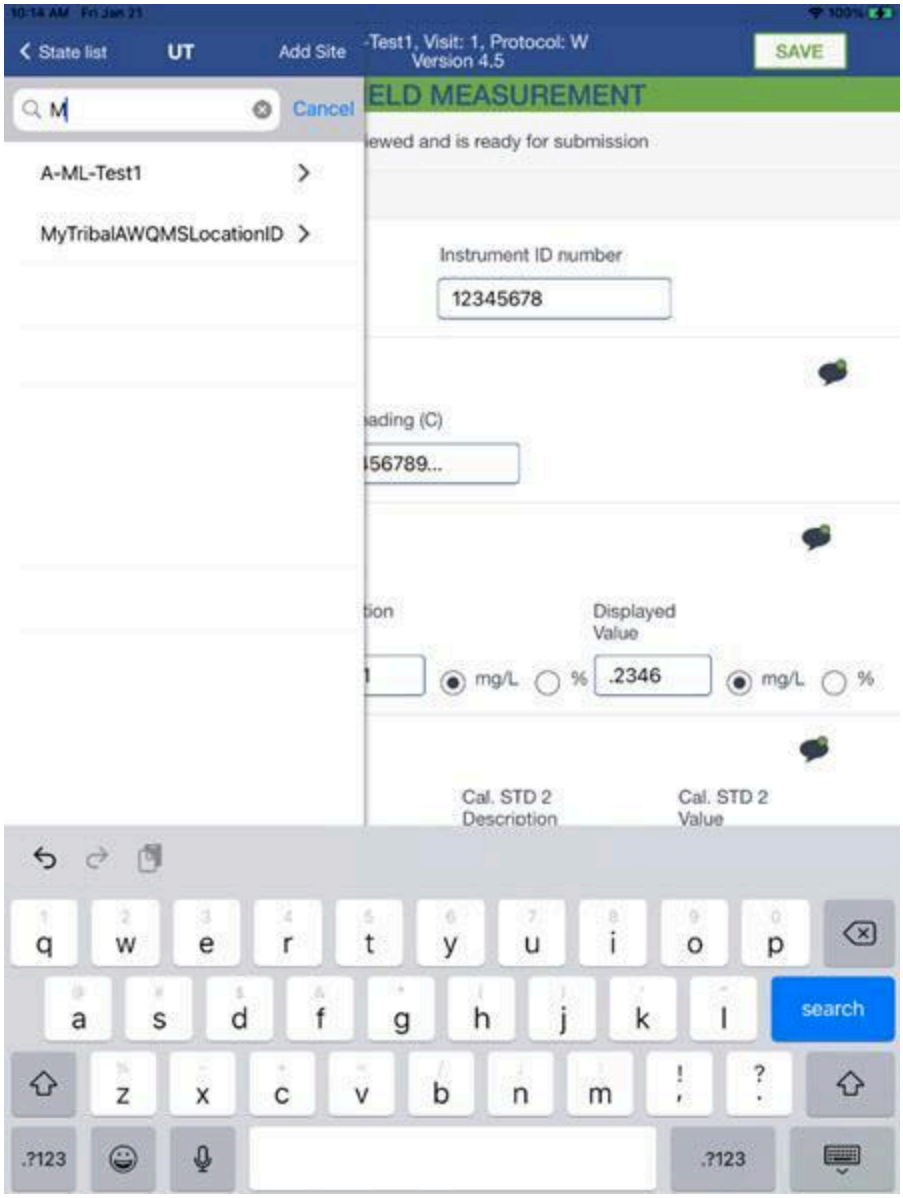


You simply click the “Add Site” link at the top of the site selection list.



When you add a site, the site ends up at the bottom of the list.

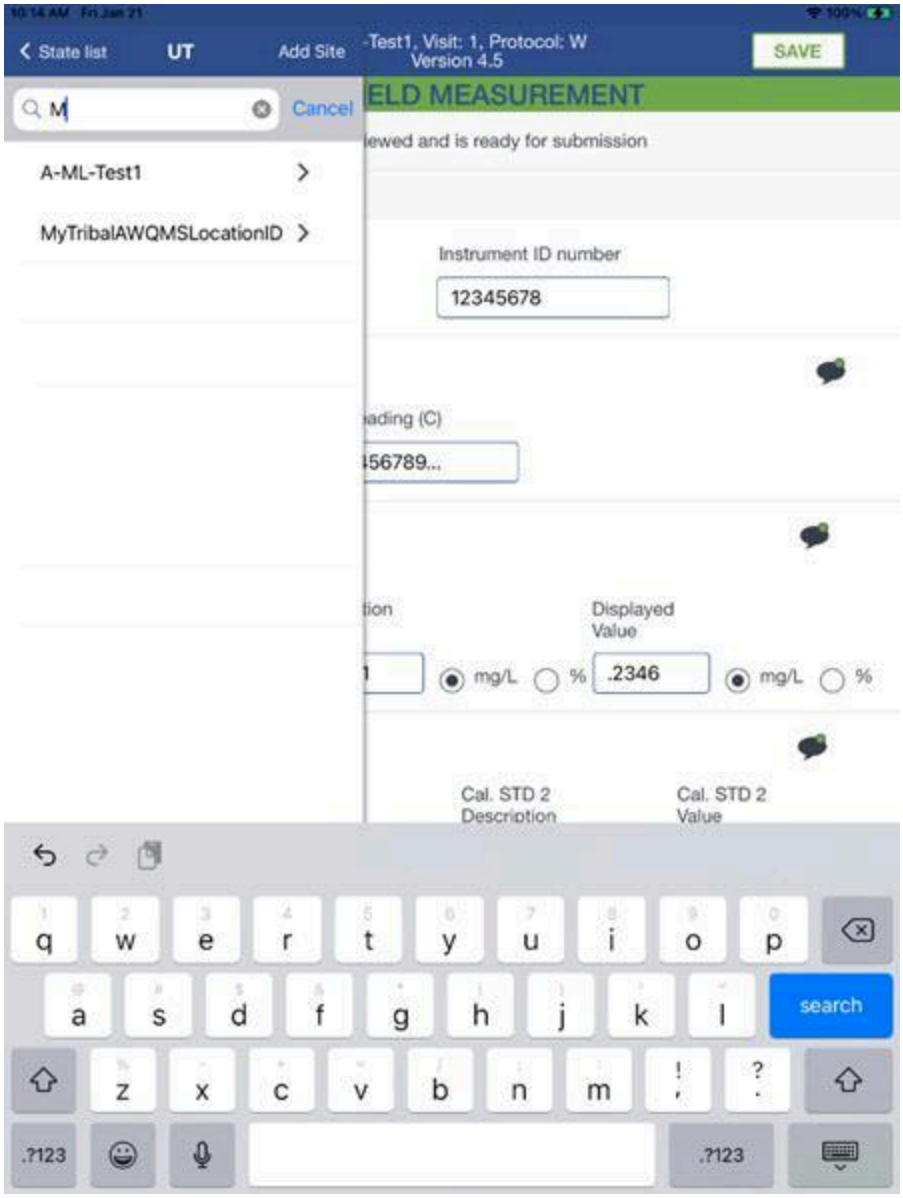

State list
UT
Add Site
SAVE
018/19 VERIFICATION
NRS18_UT_10001
NRS18_UT_10002
NRS18_UT_10003
NRS18_UT_10004
NRS18_UT_10005
NRS18_UT_10006
NRS18_UT_10007
NRS18_UT_10008
NRS18_UT_10009
NRS18_UT_10010
NRS18_UT_10011
NRS18_UT_10012
NRS18_UT_10013
NRS18_UT_10014
NRS18_UT_10015
NRS18_UT_10016
NRS18_UT_10017
Date collected
Today
Select Date
Transect A
(non-wadeable)
Other ver. type
Roads
Topo. map
Describe other
Number of satellites
4 or more
3 or less
FT
M
NO
Blackwater
Not Applicable

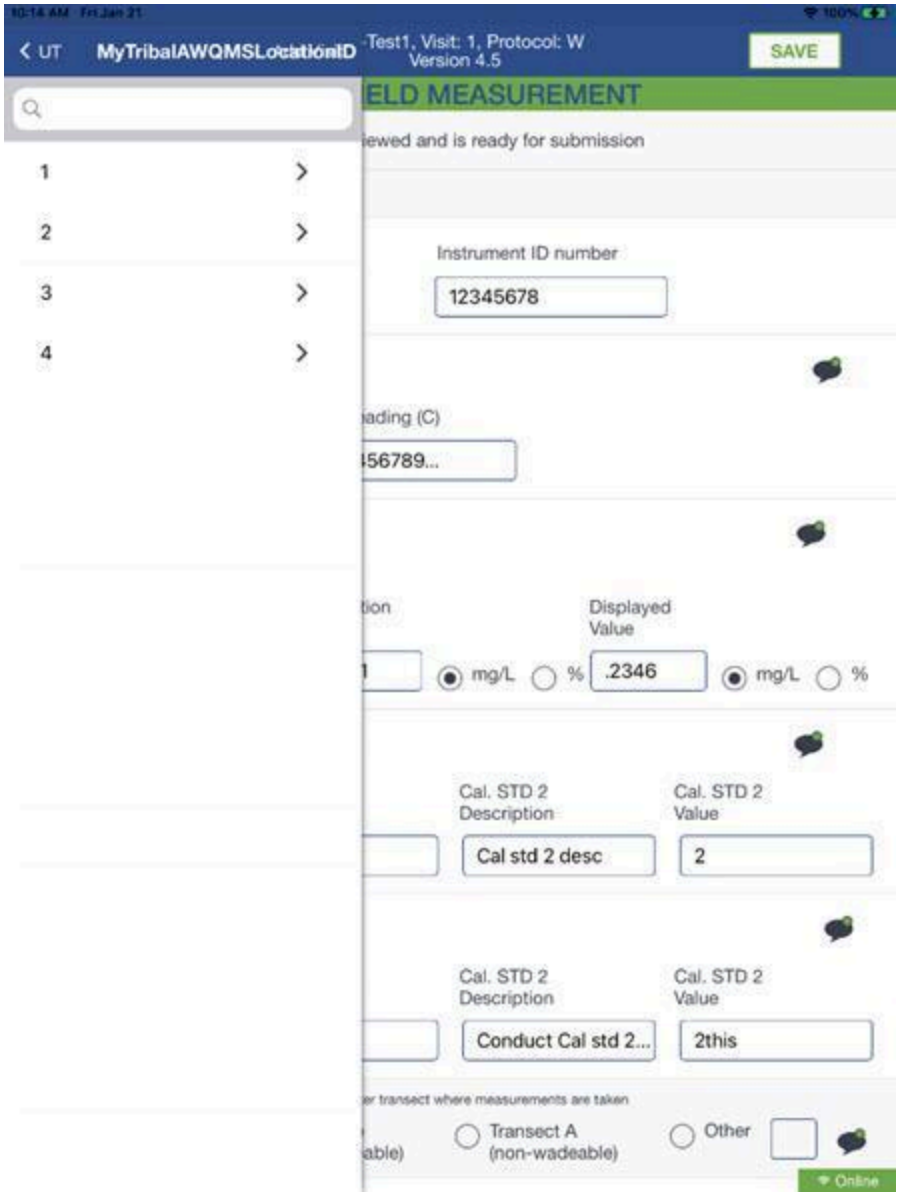


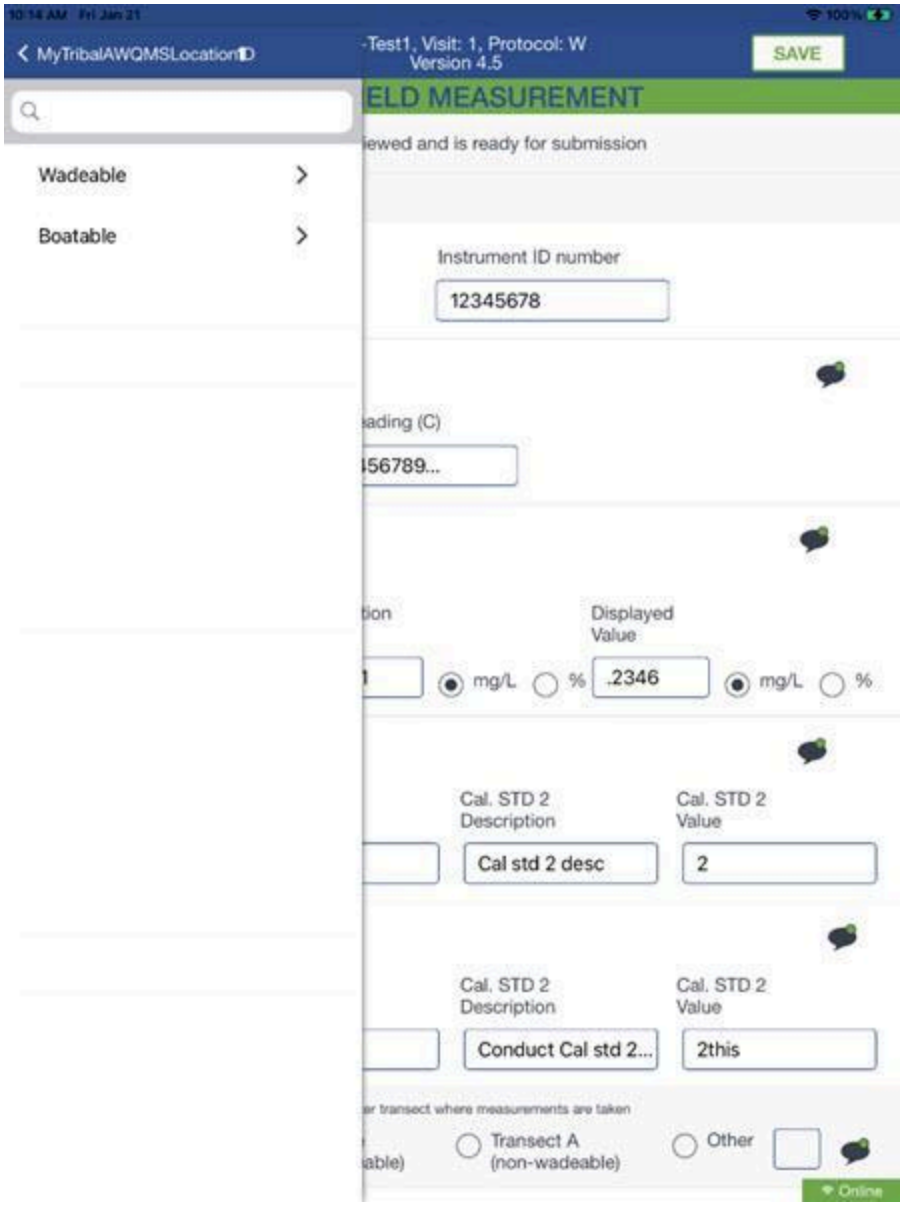
Once your site is in the app, you can select that site and start logging wadeable or boatable site visit measurements and results per normal use of the app.

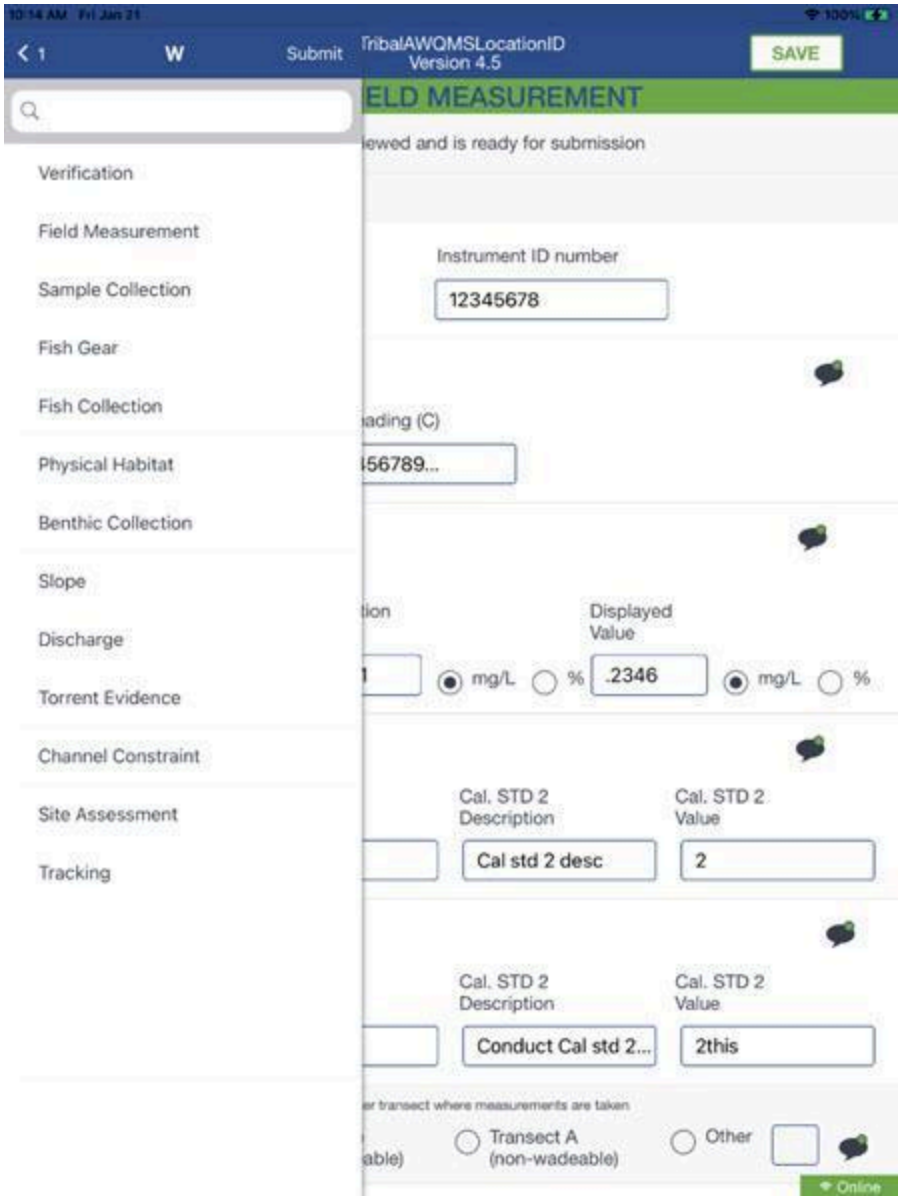
4.8.2 Obtaining the JSON files during Submission of Forms Data

The NRSA app submission process simply emails data attached as JSON files. After filling in and verifying the forms for a wadeable or boatable site visit, you can click on a **Submit** link at the top of the forms list. You can also navigate to the site visit forms list after the fact, like this:

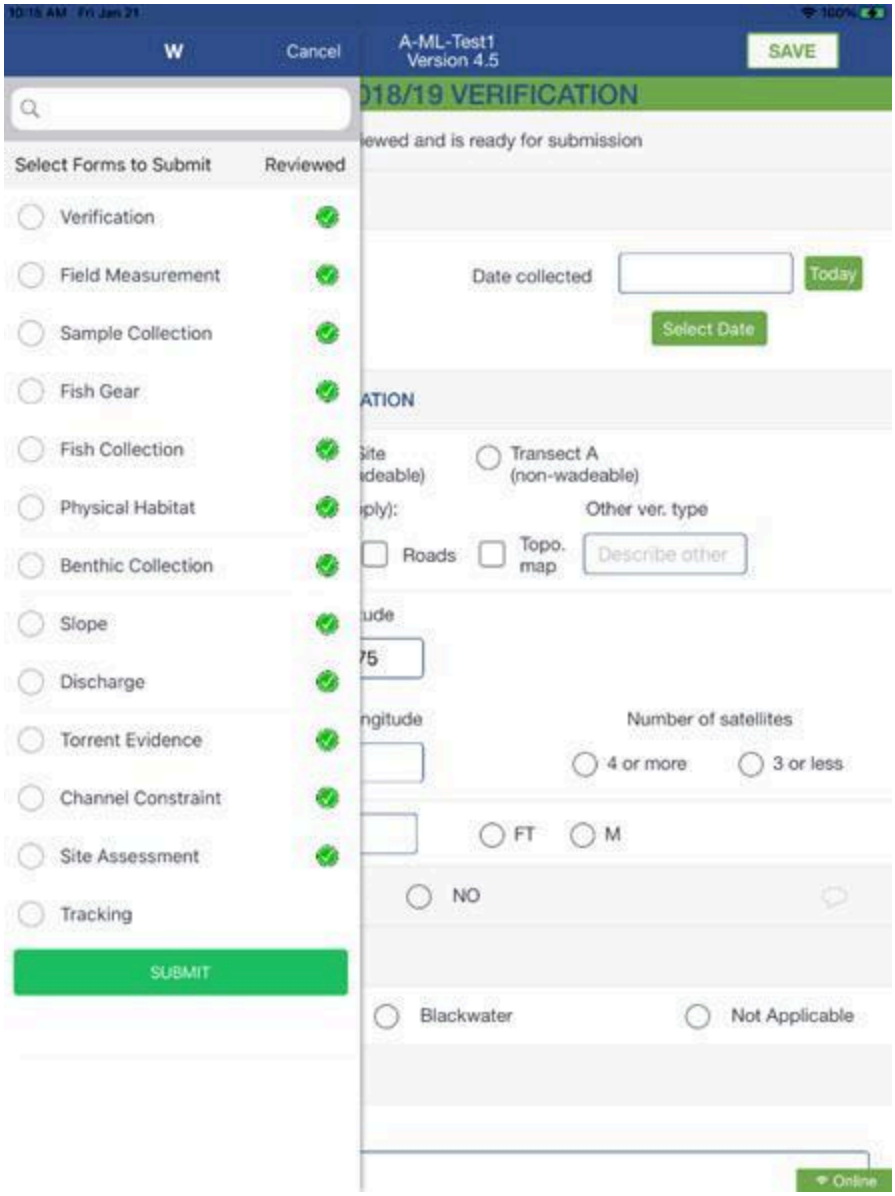

State list
UT
Add Site
-Test1, Visit: 1, Protocol: W
Version 4.5
SAVE
Cancel
ELD MEASUREMENT
ewed and is ready for submission
A-ML-Test1
MyTribalAWQMSLocationID
Instrument ID number
12345678
ading (C)
456789...
tion
Displayed
Value
mg/L
%
.2346
mg/L
%
Cal. STD 2
Description
Cal. STD 2
Value
search
.?123
.?123


UT
MyTribalAWQMSLocationID
Test1, Visit: 1, Protocol: W
Version 4.5
SAVE
ELD MEASUREMENT
ewed and is ready for submission
1
2
3
4
Instrument ID number
12345678
ading (C)
56789...
tion
Displayed
Value
mg/L
%
.2346
mg/L
%
Cal. STD 2
Description
Cal. STD 2
Value
Cal std 2 desc
2
Cal. STD 2
Description
Cal. STD 2
Value
Conduct Cal std 2...
2this
r transect where measurements are taken
able)
Transect A
(non-wadeable)
Other
Online

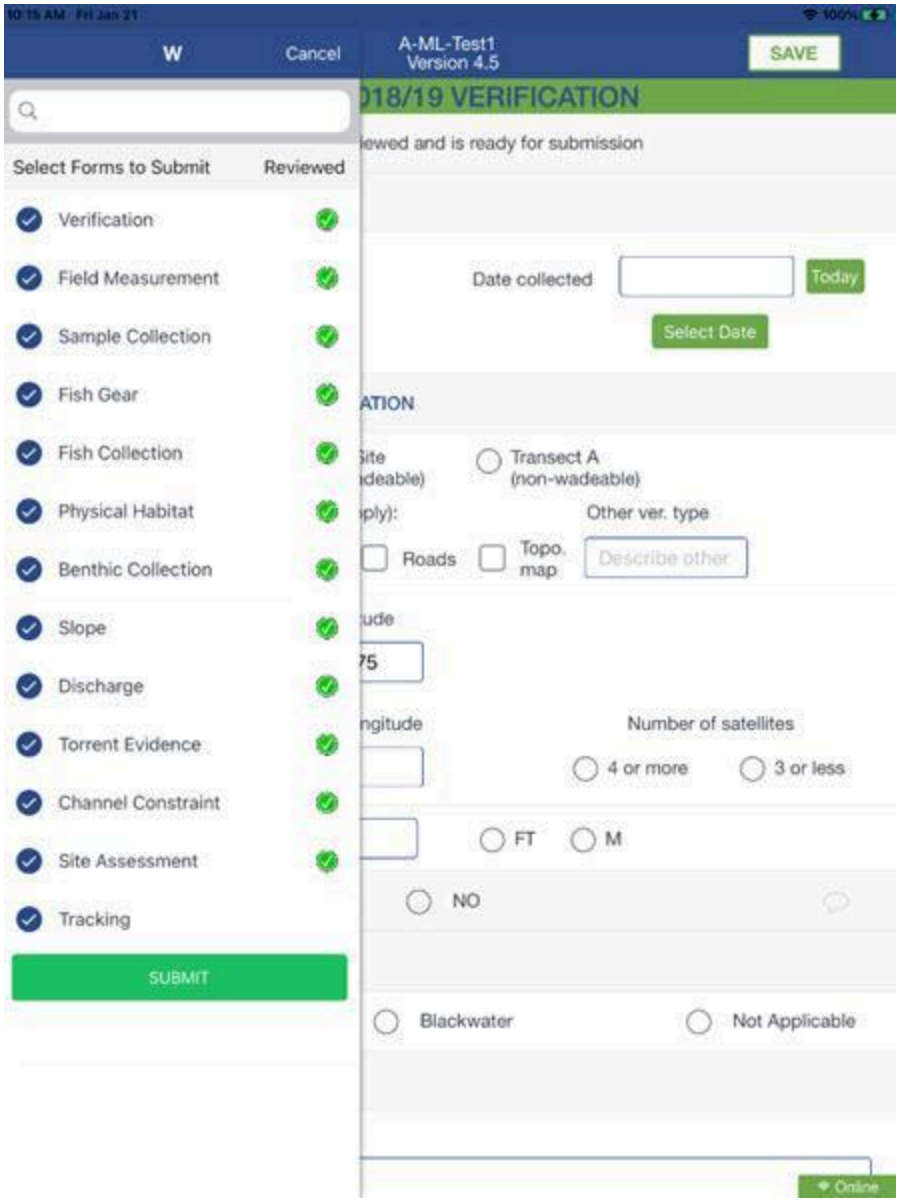

MyTribalAWQMSLocationID
-Test1, Visit: 1, Protocol: W
Version 4.5
SAVE
ELD MEASUREMENT
iewed and is ready for submission
Wadeable
Boatable
Instrument ID number
12345678
ading (C)
456789...
tion
Displayed
Value
mg/L
%
.2346
mg/L
%
Cal. STD 2
Description
Cal. STD 2
Value
Cal std 2 desc
2
Cal. STD 2
Description
Cal. STD 2
Value
Conduct Cal std 2...
2this
er transect where measurements are taken
able)
Transect A
(non-wadeable)
Other
Online



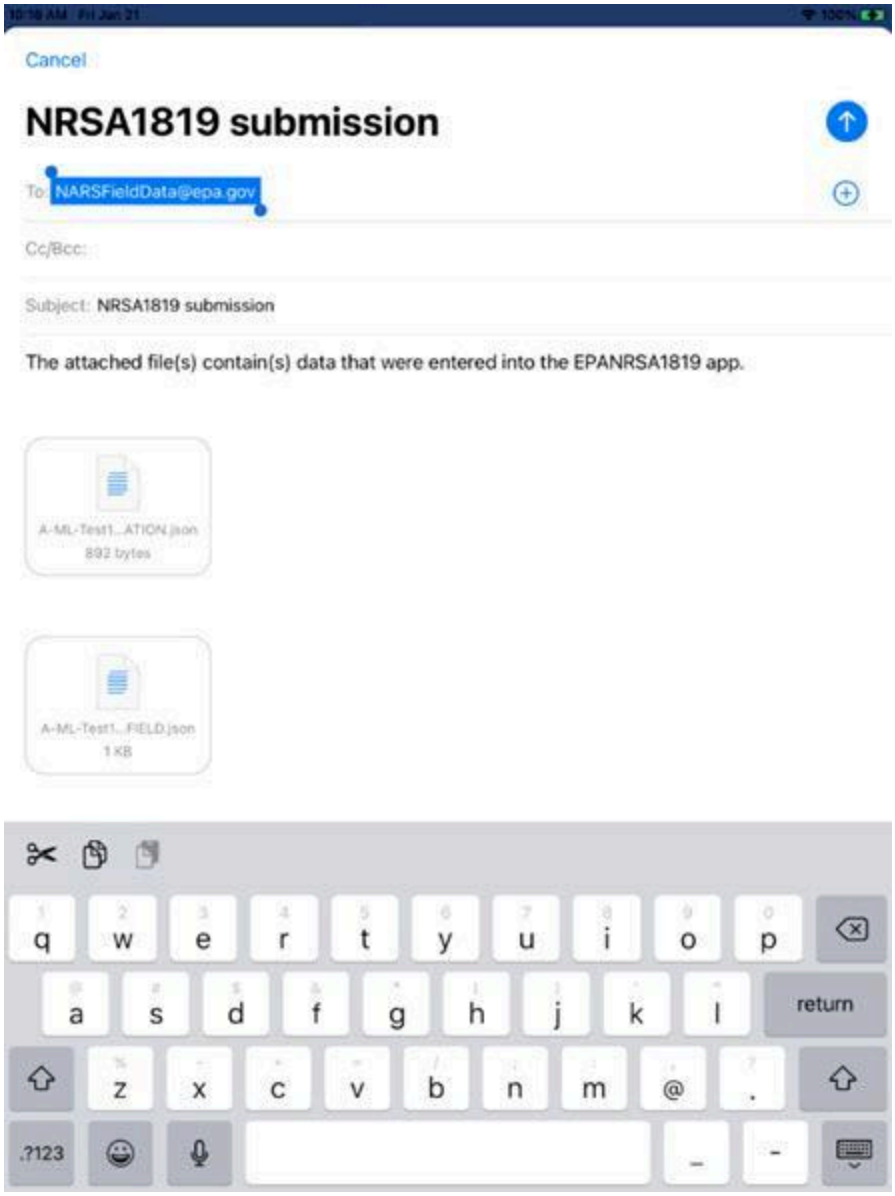
This link pops open a list of forms.

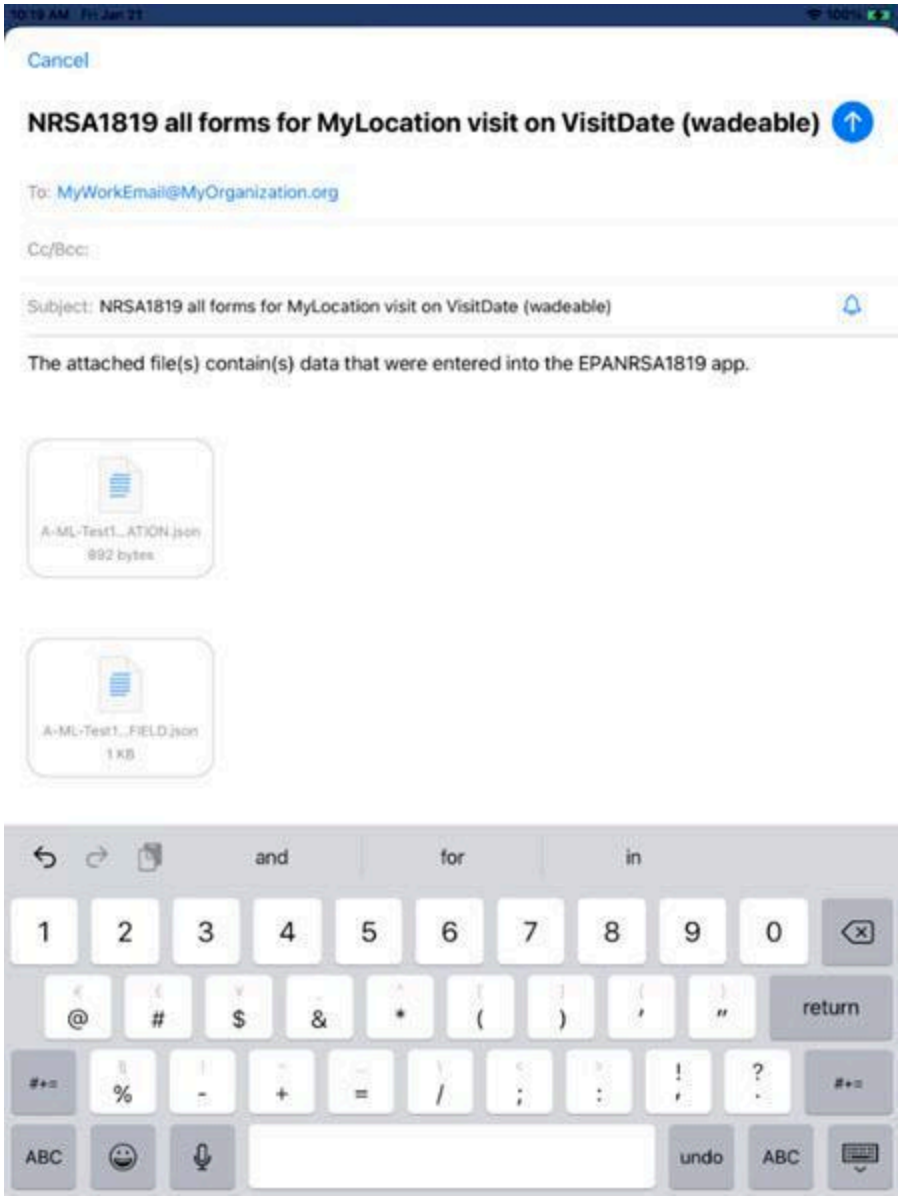


You check off the forms you wish to send. After selecting the forms you wish to send, you click the Submit button.



It literally pops open your devices' email app with the email form partially filled out. The JSON file is attached.Our current understanding is that each submission is or should be one or more forms for a single site visit. The recipient field is pre-filled with the NARS EPA address. However, there is nothing preventing the user from replacing that email address with another one so as to divert the output. Even after the fact, the files can still be found in the Sent mailbox and forwarded to another email address if needed.


Cancel
NRSA1819 submission
To: NARSFieldData@epa.gov
Cc/Bcc:
Subject: NRSA1819 submission
The attached file(s) contain(s) data that were entered into the EPANRSA1819 app.
A-ML-Test1...ATION.json
892 bytes
A-ML-Test1...FIELD.json
1 KB
return



They could then download the attachments and then import the output of that into GSE-WQ.

NOTE: GSE-WQ expects all the output files for a boatable or wadeable site visit to be compressed together into a single .zip folder before they can be imported into GSE-WQ.

4.8.3 How to Import the Output JSON files into GSE-WQ

First, you will need your output JSON files to be in a compressed (zipped) folder.

Then, you'll select an organization, project, horizontal reference datum, horizontal collection method, and result status.

The monitoring location field is optional but it is recommended. If you don't fill it in, it will try to pick the monitoring location from the JSON files.

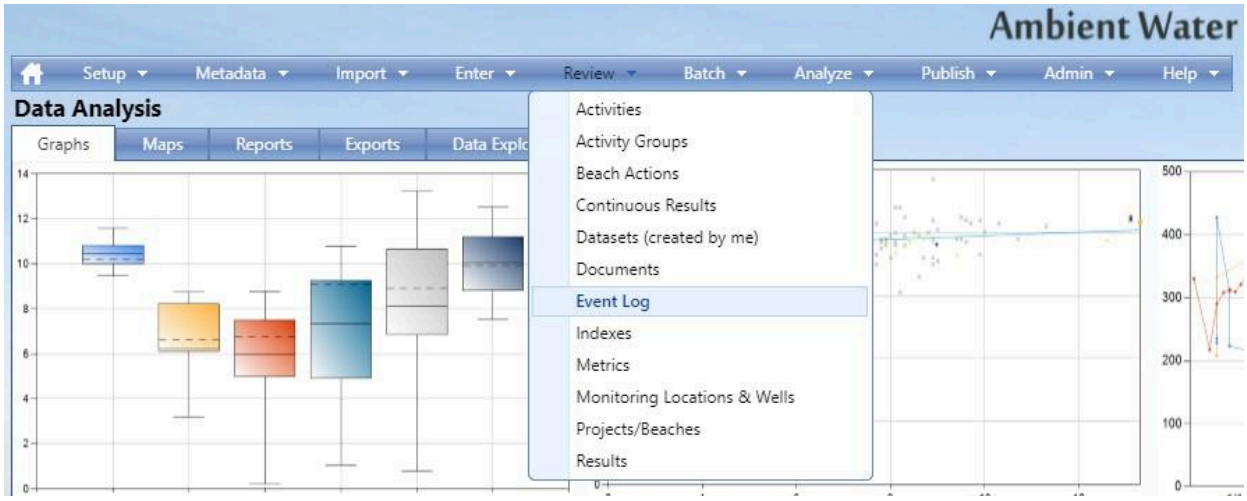
You can import new activities and results or you can import and update existing activities and results by checking the box, "This import file contains data that has been previously imported into GSE-WQ and those existing activities and results should be replaced".

Lastly, you'll click Choose File to select your JSON files in a compressed (zipped) folder.

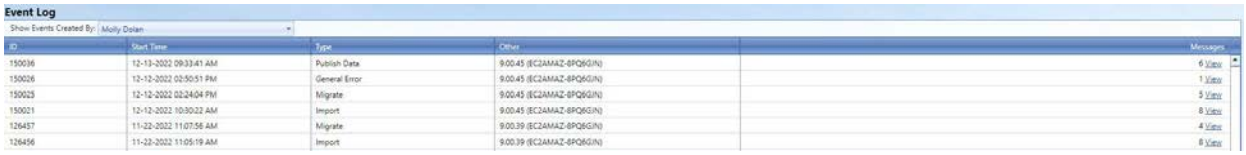
After clicking import data, you'll be brought to the dataset detail page where you can view messages and review activities and results that were imported.

5 Viewing the Event Log

To view the event log, Hover on Review and click on Event Log.



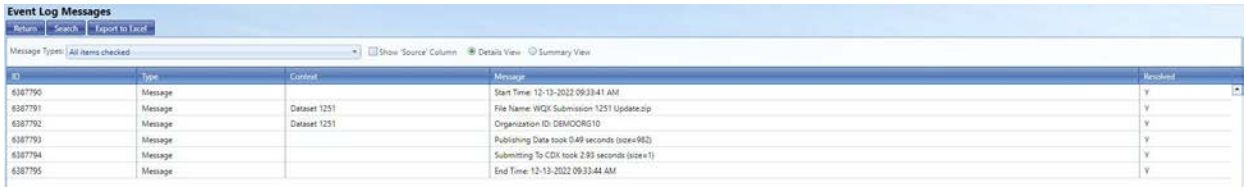
The filter for the event log will automatically be set to show events for the current user.



Pick a different user from the drop-down list titled "Show Events Created By:" to change the filter to another user. The drop-down list only includes users that belong to the same organizations that you belong to. If you are a system administrator, you can also view system events by picking "System" from the drop-down list.

To view individual event log messages, use the following steps.

Select the "View" link in the Messages column. This will display the Event Log Messages page.



You can select the Summary View radio button at the top of the page to get a summary of each error or warning (and the number of times it occurred).

You can also select which specific types of messages you would like shown to filter the list further.

6 Calculating Metrics in GSE-WQ

GSE-WQ can calculate biological and habitat metric scores automatically. Metrics are generated when an Activity is either created or updated.

Requirements for Metric Calculation

For GSE-WQ to calculate a metric, the following conditions must be met:

1. Biological Intent must be set to “Population Census.”
2. Characteristic Type must be one of the following:
    - Count
    - Total Sample Weight
    - Big Rare Count
    - Split Count
    - Taxon Name
    -

When these requirements are met, GSE-WQ will:

- Automatically add the calculated metric to the Activity if it does not already exist.
- Update the metric if it has already been previously calculated.

Within GSE-WQ, a taxon hierarchy is established using data from ITIS (Integrated Taxonomic Information System). GSE-WQ utilizes a TaxonTree, which includes Taxon Names required for Calculated Metric Types.

The TaxonTree is structured from the Family rank downward, enabling the system to determine which results are included in a given metric calculation.

For example, when calculating the "Ephemeroptera Richness" metric:

GSE-WQ will only include results where the Taxon is Ephemeroptera or belongs to a lower rank in the hierarchy (e.g., Genus, Species).
This ensures that all relevant taxa within the Ephemeroptera order are considered in the calculation.

Family-Rank Rax Currently Used in GSE-WQ:

******The following taxa ranks are currently utilized in GSE-WQ for metric calculations:*

Order: Ephemeroptera (Mayflies)

- Baetidae

- Ephemeroptera (Order-level)

Order: Diptera (True Flies)

- Chironomidae
- Tanytarsini (A tribe within Chironomidae)
- Diptera (Order-level)

Order: Plecoptera (Stoneflies)

- Plecoptera (Order-level)
- Pteronarcys (Genus within Plecoptera)

Order: Trichoptera (Caddisflies)

- Hydropsychidae
- Trichoptera (Order-level)

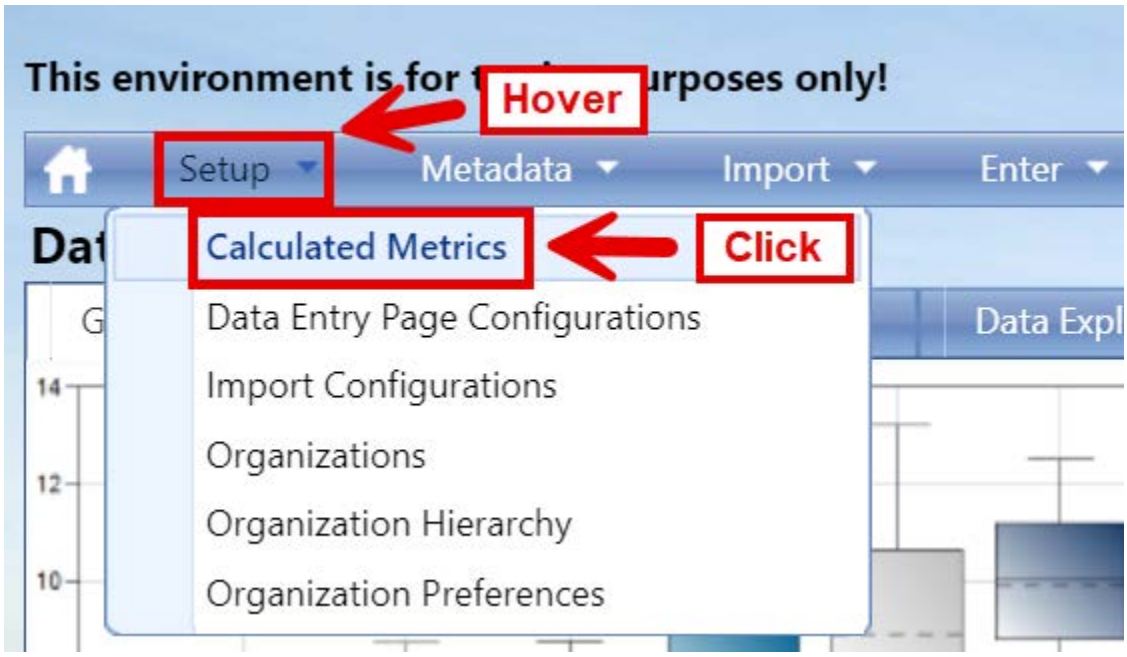
Class: Clitellata (Segmented Worms & Leeches)

- Oligochaeta (Subclass: Aquatic and terrestrial worms)
- Hirudinea (Subclass: Leeches)
- Clitellata (Class-level, includes Oligochaeta and Hirudinea)

Other Taxa

- Insecta (Class-level, encompassing all insect orders above)
- Corbicula (Genus-level; a type of freshwater clam)

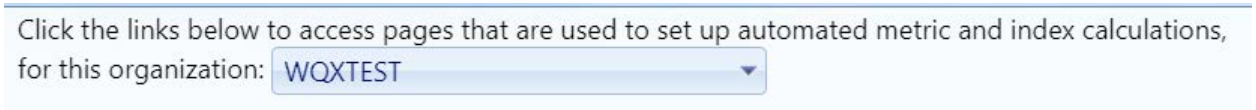
To access all things related to calculating metrics, hover over **Setup** and click **Calculated Metrics**.



Then the following page will appear.

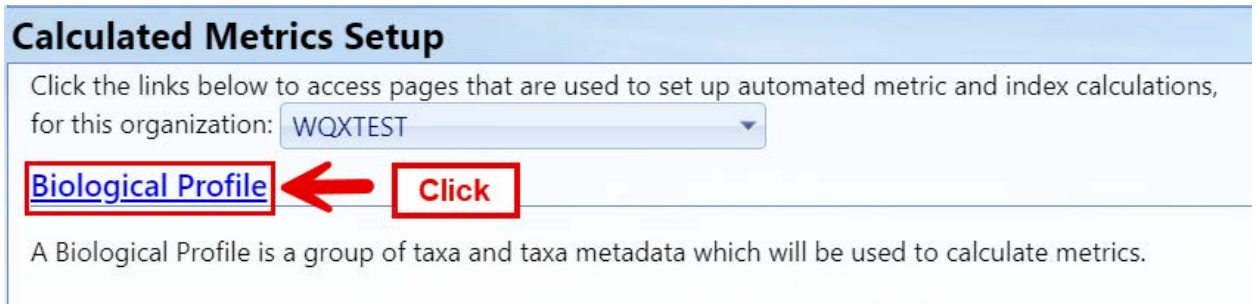
It requires a lot of related information to calculate metric as well as index values and scores. This page brings everything into one place. There are links to related pages and a brief description to go along with them.

If you set the organization in the dropdown list at the top of the page, then all related pages will default to viewing data for that organization.



6.1 Biological Profile

A Biological Profile is a group of taxa and taxa metadata which will be used to calculate metrics. To access the Biological Profile page, click **Biological Profile**.



The following table appears.

To add a new Biological Profile, click **Add New**.

Provide an ID and Name and click **Save** or **Return** to save your changes. Note: **Return** will save your changes but bring you to the previous page.

Before the details for a Biological Profile can be configured, you must create a “Period”.

- A “Period” is used to limit the time within which metrics should be calculated and used.

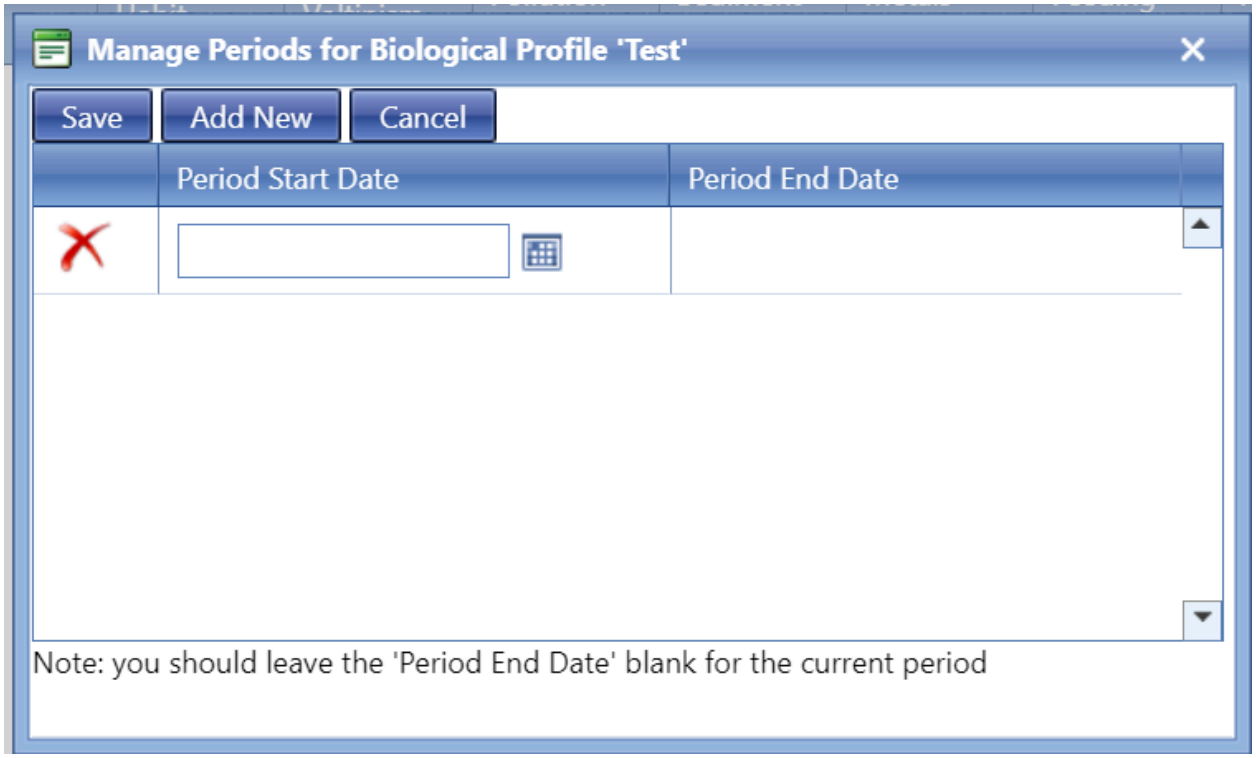
For example, if the profile has a single period that starts on 04/01/2010 and the end date is blank, then GSE-WQ will calculate metrics for activities and results whose Activity Start Date is on or after 04/01/2010. If at some point in the future you wish to change one or more of the taxon attributes used to calculate metrics, you would add a Period End Date (e.g. 03/30/2020), and then create a new period.

In this example, one would then go to the biological profile details for 04/01/2010 to 03/30/2020 and copy them to the new period, and then make changes to the taxon attributes in the new period.

Note: if one was to make changes to the taxon attributes in the original period, GSE-WQ would then carry out those changes and recalculate the metrics that are within that period, based on the attribute changes you made. In other words, any changes made to a biological profile (for a specific period) will be applied to existing data and future data within that period.

To create new and/or manage existing periods, click **Manage Periods**.

A pop-up window will appear.



To add a new Period, click **Add New** and input a Period Start and End Date. Note: you should leave the ‘Period End Date’ blank for the current period.

To exit the pop-up window and save your changes, click **Save**.

6.2 Biological Profile Details

The Biological Profile Details define the attributes of a particular taxon, which are essential for calculating metric values within a specific biological profile and time period.

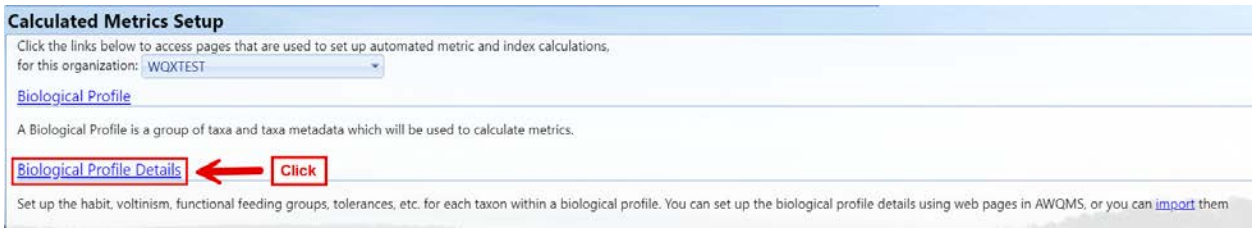
Key Attributes Used in Metric Calculations:

Each taxon is characterized by the following biological attributes:

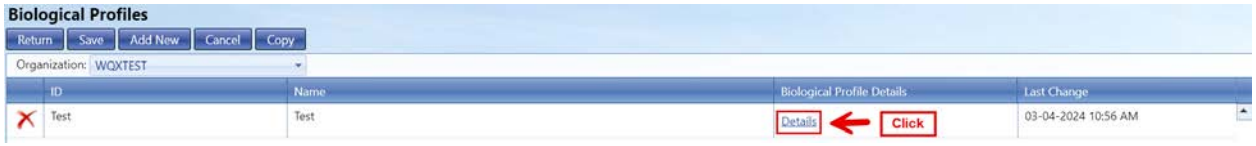
- Habit – Describes the organism’s movement or attachment behavior.
- Voltinism – Refers to the number of generations per year (e.g., univoltine, bivoltine).
- Pollution Tolerance – Indicates the taxon's ability to tolerate pollution.
- Sediment Tolerance – Measures sensitivity or tolerance to sedimentation.
- Metals Tolerance – Reflects the organism's tolerance to metal contamination.
- Functional Feeding Groups – Categorizes the taxon into up to three feeding groups based on how it obtains food.

- Cold Stenotherm – Identifies species that require consistently cold temperatures.
- Hemoglobin Bearer – Specifies whether the taxon contains hemoglobin for oxygen transport.
- Air Breather – Indicates if the organism breathes air rather than obtaining oxygen from water.
-

To access the Biological Profile Detail page, click **Biological Profile Details** on the Calculated Metrics Setup Page…



Or click **Details** on the Biological Profile page.



The following table appears:

To add a new Detail, click **Add New**.

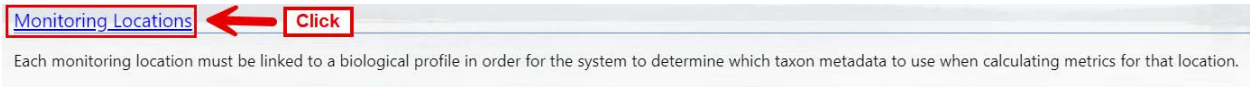
Provide a taxon, habit, voltinism, pollution tolerance, sediment tolerance, metals tolerance, functional feeding groups (up to 3), cold stenotherm, hemoglobin bearer, and airbreather. Click **Save** or **Return** to save your changes.

As an alternative to entering the taxon metadata into the page above, you can import an Excel spreadsheet with this data (including the biological profile ID and period for the metadata for a particular taxon).

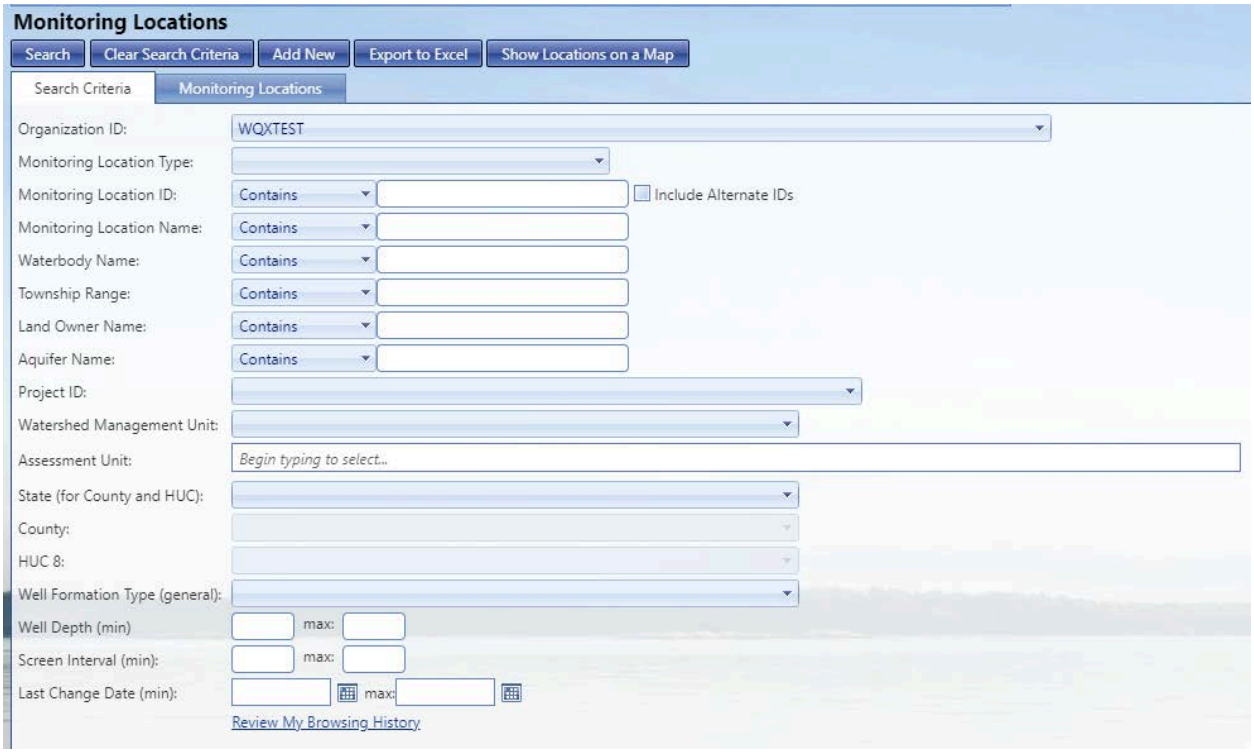
6.3 Monitoring Locations

Each Monitoring Location must be linked to a Biological Profile in order for the system to determine which taxon metadata to use when calculating metrics for that location.

To link a Monitoring Location to a Biological Profile, click **Monitoring Locations** on the Calculated Metrics Setup page.



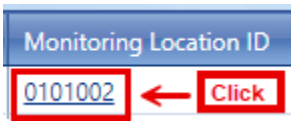
You will be taken to the Monitoring Location Search Criteria page.



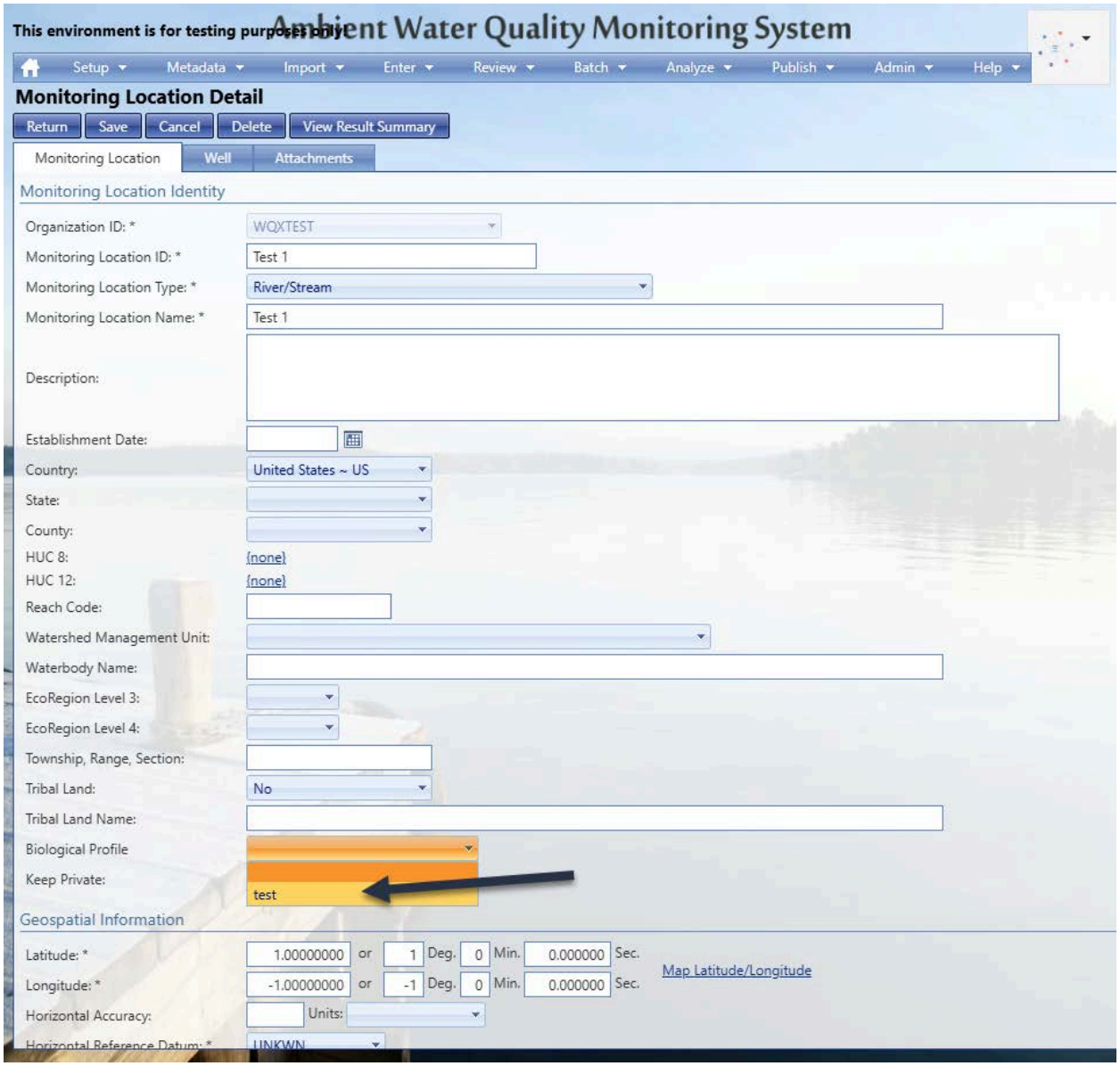
You can filter using the different options.

Click the **Search** button to bring you to the list of your Monitoring Locations in GSE-WQ under the output tab.

Click into the Monitoring Location ID that you wish to link to a biological profile.



In the Monitoring Location Detail Page under the Monitoring Location Identity section, there is a Biological Profile field with a drop down. Navigate to it, click the drop down, and select the appropriate Biological Profile.



Once you've selected the appropriate Biological Profile, make sure you click **Save** or **Return** on the Monitoring Location Detail page to successfully link the Biological Profile to a Monitoring Location.

6.4 Seasons

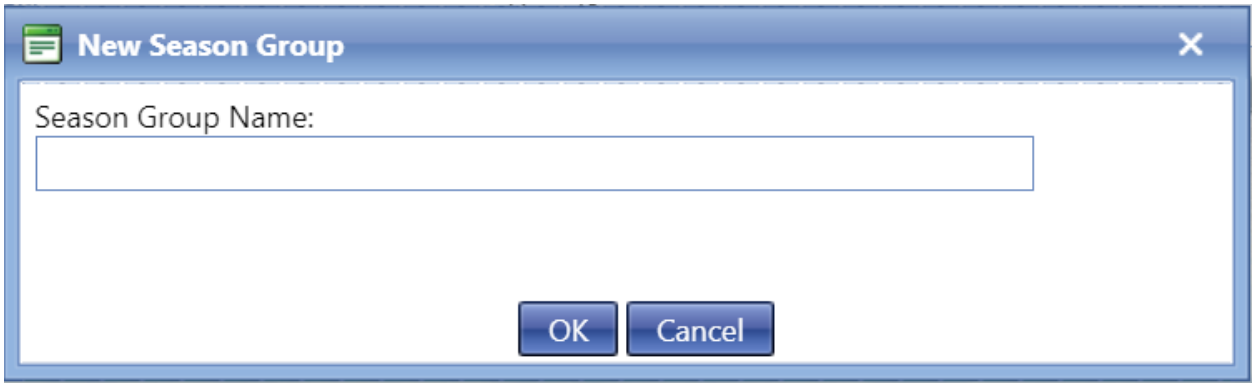
If the coefficients for calculating metrics will change at different times of the year, then you will need to define a group of seasons within the year. Your custom "season group" can then be

linked to a calculated metric type. Otherwise, you can use the default “Full Year” which is available to every organization.

To manage seasons, click Seasons on the Calculated Metrics Setup page.

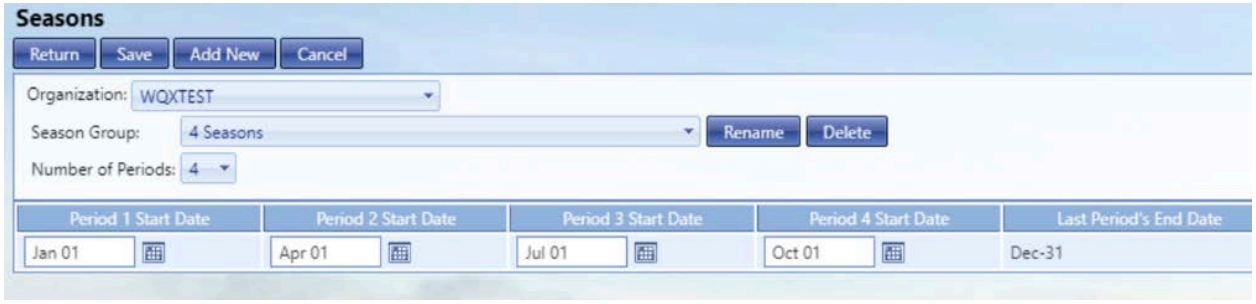
The following page will appear:

To add a new season, click **Add New**. A pop-up window will appear.



Provide the name and click **OK** to successfully add the season. Click **Cancel** or **X** to exit the pop-up window and not add a new season.

Set the number of periods and input the start date(s) and last period’s end date.

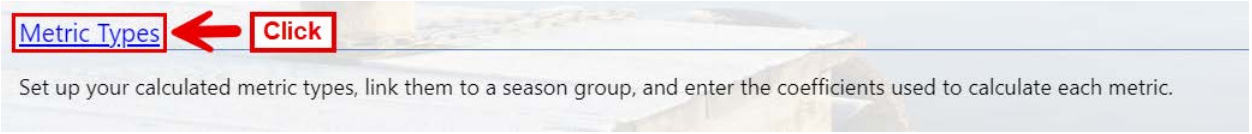


To modify an existing season, navigate to it via the dropdown for the field, Season Group. You will be able to rename it by clicking **Rename**, adjust the number of periods, start date(s), and last period's end date, and delete the season if you wish by clicking **Delete**.

Whether you add a new season or modify an existing one, click **Save** or **Return** to save your changes.

6.5 Metric Types

To set up your calculated metric types, click **Metric Types** on the Calculated Metrics Setup page.



The following table will appear:

Note: it defaults to the Calculated Metric Types tab.

There is a tab on the Metric Types page for Calculated Metric Types. It has the following additional attributes which are not part of the "General Metric Types:

- Calculated Metric Type - dropdown list to identify the type of calculated metric. This "type" will determine the formula and taxa used to calculate metrics of this type
- Calculation Method - Two Options:
    - Linear - this defines a line whose x/y values will be used to convert a metric value to a metric score
    - Value Bucket - a finite set of metric scores will be used and all metric values that fall within a particular range (aka.bucket) will receive the same score.
- Seasonality
    - Indicates if a particular metric type has seasonal variations in the way it is calculated or if the approach is the same throughout the year (i.e. "Full Year").
- Setup Coefficients
    - Opens a popup window where coefficients are managed for that particular metric type.

To add a new calculated metric type, click **Add New**.

The Type, ID, Context, Name, Calculation Method, and Seasonality at least is required to add a new season. Click **Save** or **Return** to save any changes. To see a list of Metric Types currently supported in GSE-WQ see section 6.8 and Table 1. To see a list of Metric Types **not** currently supported in GSE-WQ see section 6.8 and Table 2. To see a list of methods used for Calculating Metric Value see table 3 in section 6.8.

After you save the new Metric Types you will see a Coefficients button appear on the far right of the table. To set up coefficients, click **Coefficients** in the Setup column.

A pop-up window will appear where coefficients are managed for that particular metric type. Click **Save** or **Return** to save your changes.

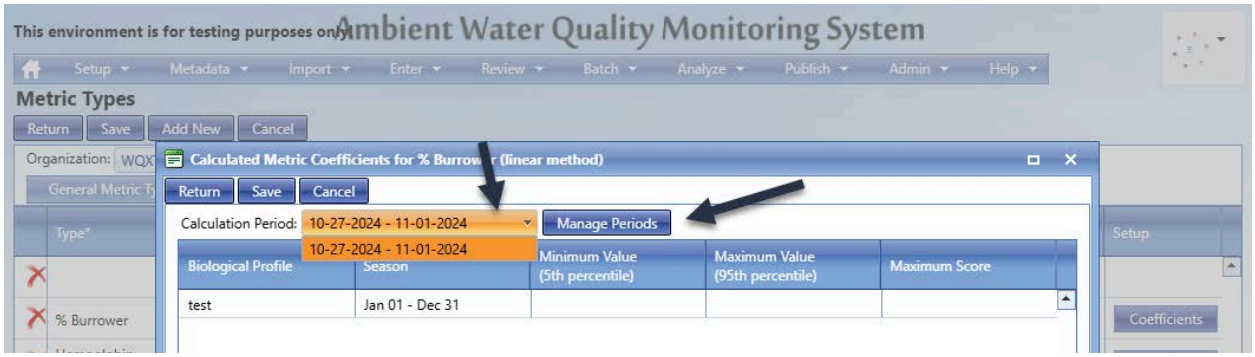
There are two methods for calculating metrics. Each method requires different information.

- Linear (method)
    - This will have 3 values for each season
    - These are for the Maximum Value (i.e., 90/95th percentile), Minimum Value (i.e. 5th/10th percentile), and the Maximum Score possible
    - “Linear” method uses the following formulas depending on whether the response to disturbance decreases or increases:

Response Decreases:	$MetricScore = \frac{100 * MetricValue}{95^{th} Percentile}$
Response Increases:	$MetricScore = \frac{100 * (95^{th} Percentile - MetricValue)}{95^{th} Percentile - 5^{th} Percentile}$

- Value Buckets (method)
    - Allows up to 8 value-range “buckets” per season
    - To define the range of values for a particular bucket, you only need to define the upper bound. The lower bound will be implied. In other words, zero will be the implied lower bound for your first range. The implied lower bound for your second range will be the upper bound of the first range.
    - “Value Buckets” method will simply use the score assigned to the relevant range of metric values.

Metric Type Coefficients (both Linear and Value Bucket types) are linked to a period (selected from a dropdown list after selecting Coefficients).



GSE-WQ allows you to modify coefficient values while ensuring that these changes apply only to activities and results within a specific date range.

How Coefficient Changes Are Applied:

- When GSE-WQ calculates a metric, it references the Activity Date associated with the results to determine the correct set of coefficients for that time period.

- This ensures that historical calculations remain unaffected by future coefficient adjustments.

Best Practices for Managing Coefficient Periods:

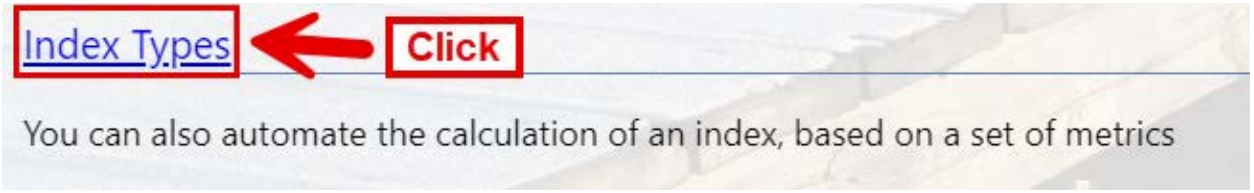
- Before making changes to coefficients that will impact metric calculations, it is recommended to create a new period.
- If changes are made within an existing period, GSE-WQ will recalculate all existing metrics within that period using the updated coefficients.

Managing Periods in GSE-WQ:

You can create and manage periods by clicking the **"Manage Periods"** button in GSE-WQ.

6.6 Index Types

You can also automate the calculation of an index, based on a set of metrics. To do so, click Index Types on the Calculated Metric Types page.



The following table will appear:

The ID, Context, Name, and Calculation Method at the least are required to add an index type. Click **Save** or **Return** to save any changes.

To select the metric types used to calculate the index score, click **Metric Types**.

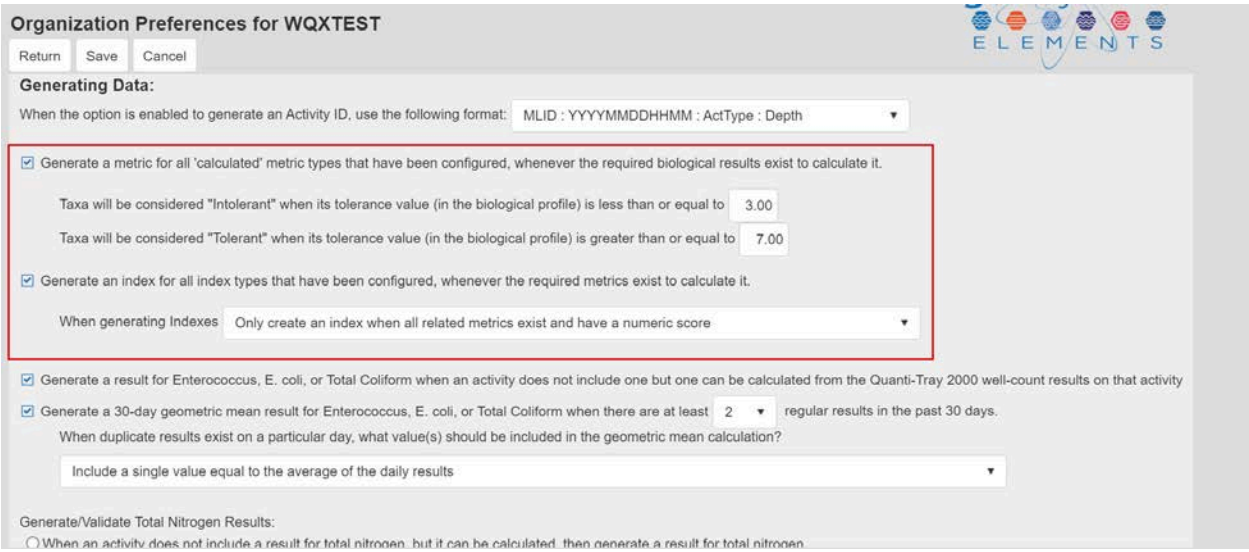
Select metric types by checking the box. Click **Return** to save your changes.

6.7 Organization Preferences

Once you have set up everything above, you need to enable the organization preferences for generating metrics or indexes. At that point forward, a metric or index record will be created automatically whenever a set of results is created which satisfies the requirements of that metric or index.

To enable the organization preferences for generating metrics or indexes, click **Organization Preferences**.

Click your Organization ID and navigate to the Generating Data section.



One can opt-in to generate a metric for all ‘calculated’ metric types that have been configured, whenever the required biological results exist to calculate it as well as to generate an index for all index types that have been configured, whenever the required metrics exist to calculate it.

6.8 Additional Information for Calculated Metrics

Table 1: Calculated Metric Types Currently Supported in GSE-WQ:

Calculated Metric Type	Expected to Increase/Decrease with Human Disturbance
% Air Breather	
% Baetidae to Ephemeroptera	
% Burrower	

% Chironomidae Taxa	Increase
% Clinger	Decrease
% Cold Stenotherm	
% Collector	
% Corbicula	Increase
% Diptera	Increase
% Diptera + Non-Insects	Increase
% Dominant Taxon	Increase
% Dominant Taxon (Top 10)	Increase
% Dominant Taxon (Top 2)	Increase
% Dominant Taxon (Top 3)	Increase
% Dominant Taxon (Top 4)	Increase
% Dominant Taxon (Top 5)	Increase
% Ephemeroptera Taxa	Decrease
% EPT Taxa	Decrease
% Filterers	Other
% Gatherers	Other
% Gatherers + Filterers	Other
% Grazers + Scrapers	Decrease
% Hemoglobin Bearer	
% Hydropsychidae to Trichoptera	Increase
% Intolerant Individuals	Decrease
% Multivoltine	Increase
% Oligochaeta	Other
% Oligochaeta + Hirudinea Taxa	Other
% Omnivores + Scavengers	Increase
% Other Diptera + Non-Insects	Increase
% Plecoptera	Decrease
% Pollution Tolerant	Decrease
% Predators	Other
% Scraper	
% Scraper + Filterer	
% Scraper + Shredder	Decrease
% Scraper to Filterer	
% Sediment Sensitive	Decrease
% Sediment Tolerant	Increase
% Shredder	Decrease

% Supertolerant Individuals	Increase
% Swimmer	
% Tanytarsini	Decrease
% Tolerant Individuals	Increase
% Trichoptera	Decrease
% Univoltine	Decrease
Air Breather Richness	
Beck Index	Decrease
Burrower Richness	
Chironomidae Taxa Richness	Decrease
Clinger Richness	Decrease
Cold Stenotherm Richness	
Coleoptera Taxa Richness	Decrease
Diptera Taxa Richness	Decrease
Ephemeroptera Taxa Richness	Decrease
EPT Taxa Richness	Decrease
Evennes	
Filterer Richness	Other
Florida Index	Decrease
Hemoglobin Bearer Richness	
Hilsenhoff Biotic Index	Increase
Intolerant Richness	Decrease
Margalef Diversity Index	
Metals Tolerant	Increase
Plecoptera Taxa Richness	Decrease
Pollution Sensitive Richness	Decrease
Predator Richness	Other
Pteronarcys Taxa Richness	Decrease
Sediment Sensitive Richness	Decrease
Sediment Tolerant Richness	Increase
Semivoltine Richness	Increase
Shannon Diversity Index (base 2)	
Shannon Diversity Index (base e)	
Simpson Diversity Index	
Swimmer Richness	
Total Taxa Richness	Decrease
Trichoptera Taxa Richness	Decrease

Univoltine Richness	Decrease

Table 2: Calculated Metrics Not Currently Supported in GSE-WQ:

Calculation Family	Description	Notes	Algorithm
Hilsenhoff Biotic Index	$HBI = \frac{\sum n_i \times a_i}{N}$; n = number of specimens in taxa i a = tolerance value of taxa i N = total number of specimens in sample	http://cfb.unh.edu/StreamKey/html/biotic_indicators/indices/Hilsenhoff.html	1. For each species multiply the POLLUTION tolerance by the number of that species 2. Sum up all of step 1 3. Divide that sum by the the total organism count (all species)
Beck's Biotic Index	$BI = 2n_I + n_{II}$ where: BI = Beck's Biotic Index n_I = the number of Class I species identified from the samples n_{II} = the number of Class II species identified from the samples	https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_041569.pdf	Class I = Sensitive or Intolerant Class II = Facultative i.e. have ability to live under varying conditions Class III = Tolerant

Table 3: Method for Calculating Metric Values in GSE-WQ

Note: Some items below include the term 'index', GSE-WQ still creates these items as metrics.

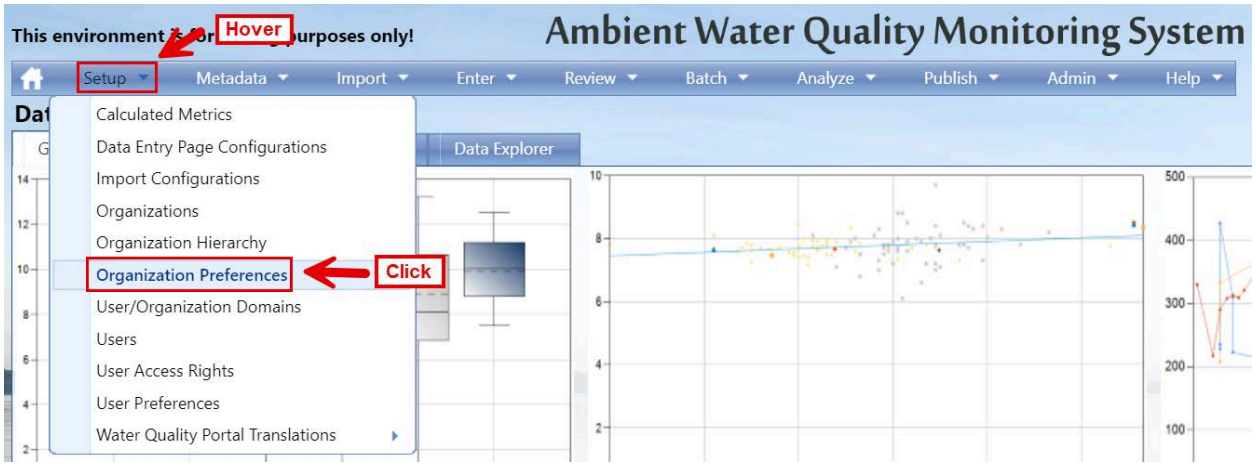
Calculation Family	Description	Notes	Algorithm
Richness by Taxon	# of taxa that belong to or are descendants of the Taxon. Could be multiple Taxa (i.e. "Richness of EPT")	8 total "Richness" calculations.	Simply the number of distinct X in the activity (where "X" is the type of parameter, i.e. Taxon, Tolerance, Habit, etc)
Composition by Taxon	% of total count/mass of taxa that belong to or are descendents of the Taxon. Could be multiple Taxa (i.e. "% of EPT")	9 total "Composition" calculations	n / N (where n is the # or mass of the parameter and N is the total # or mass across all values of the parameter
Richness by Tolerance	# of taxa that exhibit the indicated tolerance. Could be multiple tolerance types.		
Composition by Tolerance	% of total count/mass of taxa that exhibit the		

	indicated tolerance. Could be multiple tolerance types.		
Composition by Taxon Dominance	% of total count/mass of taxa that are "dominant". Dominant = the most abundant taxon. This could be the dominant 1,2,3,4, 5, or 10 taxa so would need an option to specify "The top x dominant taxa".		
Composition by Feeding Group	% of total count/mass of taxa that use the indicated feeding group. Could be multiple Feeding groups		
Richness by Feeding Group	# of taxa that use the indicated feeding group. Could be multiple Feeding groups		
Richness by Habit	# of taxa that belong to the indicated habit. Could be multiple Habits.		
Shannon's Diversity Index	$H = -\Sigma p_i \ln(p_i)$ where p_i is the proportion of the population of the i-th species	Two variants, one for ln() and one for log(base 2) http://www.tiem.utk.edu/~gross/bioed/bealsmodules/shannonDI.html	1. For each species find its proportion of the total population 2. Multiply that by the log of the same proportion 3. Repeat for all species and sum all the values 4. Multiply by -1
Margalef's Diversity Index	$d = (S - 1) / \ln(N)$ where S = richness (# different species) and N = total # of individuals		1. Find the richness (# different species) and subtract 1 2. Divide that by the ln (N) where N = the total # of individuals
Simpson's Diversity Index	$D = 1 - \left(\frac{\Sigma\, n(n-1)}{N(N-1)} \right)$ n = # organisms of a particular species	https://geographyfieldwork.com/SimpsonsDiversityIndex.htm	1. For each species take the count minus 1 and multiply by the count 2. Sum up all those results for all the

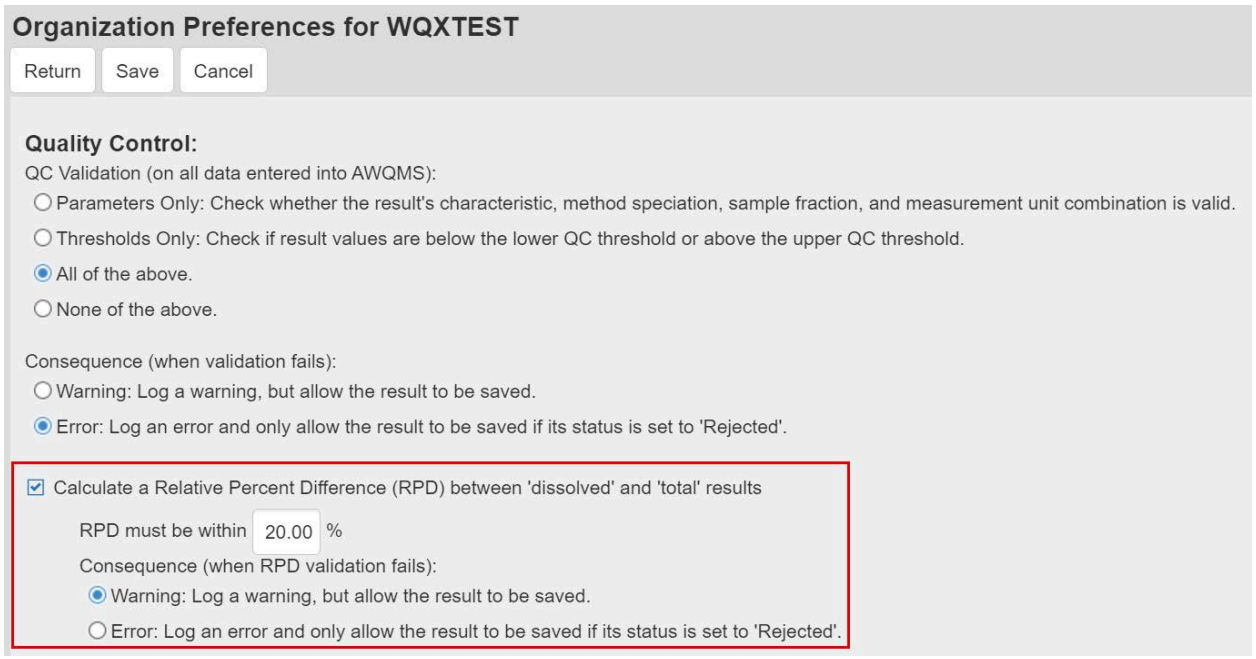
	N = Total # organisms (all species)		spcies 3. Divide that sum by N(N - 1) where N is the total organism count (all species) 4. Subtract that value from 1
Evenness	How close in numbers each species is to others. Can be calculated from Shannon Index. $J = H / H_{max}$ where Hmax = ln(S) where S is the richness (# of species)	http://www.tiem.utk.edu/~gross/bioed/bealsmodules/shannonDI.html	1. Find Shannon Index 2. Divide that by ln(S) where S = richness
Composition by Taxon (Comparison)	% of total count/mass of taxa that belong to or are descendents of the Taxon compared to a secondary Taxon		n / N (where n is the # or mass of the parameter and N is the total # or mass of the secondary parameter
Composition by Feeding Group (Comparison)			

7 Calculate a Relative Percent Difference (RPD) between ‘dissolved’ and ‘ total results

GSE-WQ has the capability to calculate a Relative Percent Difference (RPD) between ‘dissolved’ and ‘total’ results. To do so, navigate to your Organization Preferences - hover over **Setup** and click **Organization Preferences**.



Click your Organization ID and navigate to the Quality Control section.



One can opt-in to calculating a Relative Percent Difference (RPD) between ‘dissolved’ and ‘total’ results. One can choose what percentage (%) the RPD must be within and choose the consequence for when the validation fails.

8 Managing Data in GSE-WQ

A pair of companion pages exist for each of the main types of data in GSE-WQ:

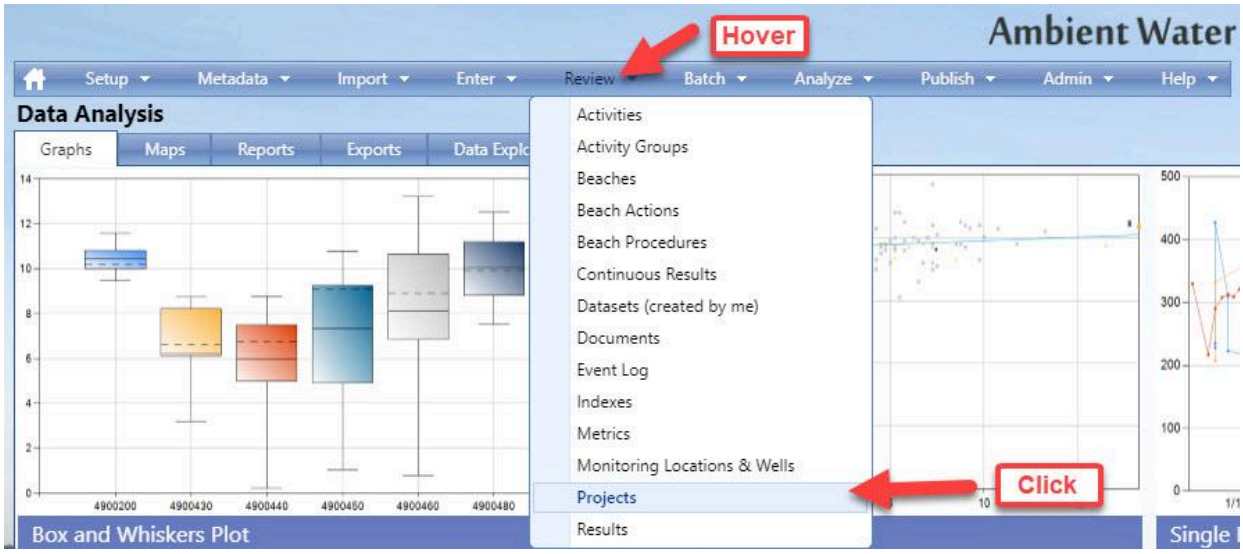
- Search Criteria page where you plug in your desired criteria
- Output page that displays the data based off your search criteria

On the output page, an "Add New" button allows you to create new records. This will populate a Detail Page. Required fields are indicated by an asterisk to the right of the label.

A Detail Page for viewing and editing an existing specific record can be selected on the output list page as well.

8.1 Project List Page

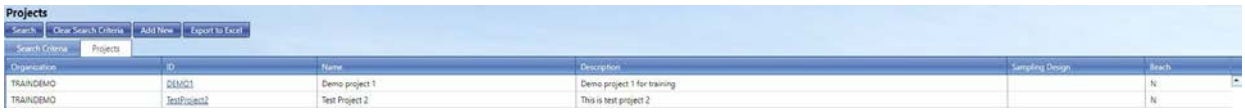
A project defines a particular data collection effort and typically includes a Quality Assurance Project Plan (QAPP). To access the projects list page, hover over **Review** in the Navigation Bar and Click on **Projects**.



You will be taken to the Project Search Criteria page. If you have specified a default Organization in your User Preferences, then the Organization ID drop down list will be pre-populated with that value.

The Project ID search field supports partial matches, so you can type any part of the Project ID you are searching for.

Select the **Search** button to display the results of your query in the output **Projects** tab.



Select a link on the ID column to view the Details Page for the record.

Select the **Add New** button to create a new Project (on the Detail Page).

8.1.1 Project Detail Page

This page is used to view, edit, add or delete a specific project. Binary Objects may also be attached to a project.

- The **Project Manager** drop-down menu, allows you to select a manager based off your list of personnel in GSE-WQ
- The **Private** check box allows you to make your project only viewable by your organization and does not send that project's information to the EPA
- The **Add Attachment** link will allow you to browse to a file on their local machine and upload it to the Project. You must save the project before you can attach files.
- The **Remove Attachment** link will allow you to remove an attachment from the project.

The system will use Flags "behind the scenes" to track when these items are changed. The flags will be used by the system to ensure that the changes will be included in the next Project Export.

As specified above, the Delete button, when selected, will prompt you for confirmation. Due to the fact that deleting a Project has the potential to cascade deletes to many related records across the system, the prompt will also provide a severe warning and you will have to confirm the delete by actually typing something like **YES** in a box and then selecting **OK**. Deleting a project will automatically "cascade" the following deletes:

- Attached Binary Objects
- Activities

Note: Special Logic for Cascading Deletes from Project to Activities: If an Activity is related to more than one Project and only one of the Projects it relates to is deleted, the Activity will

remain in the system and only the relationship between the deleted Project and the Activity will be deleted. In other words, when an Activity relates to only one Project, it will be deleted when that Project is deleted.

The system will automatically keep an audit history of deleted records including the table and record ID of the record being deleted, the user who deleted the record, and the date and time the deletion took place.

8.1.2 Project Detail Rules

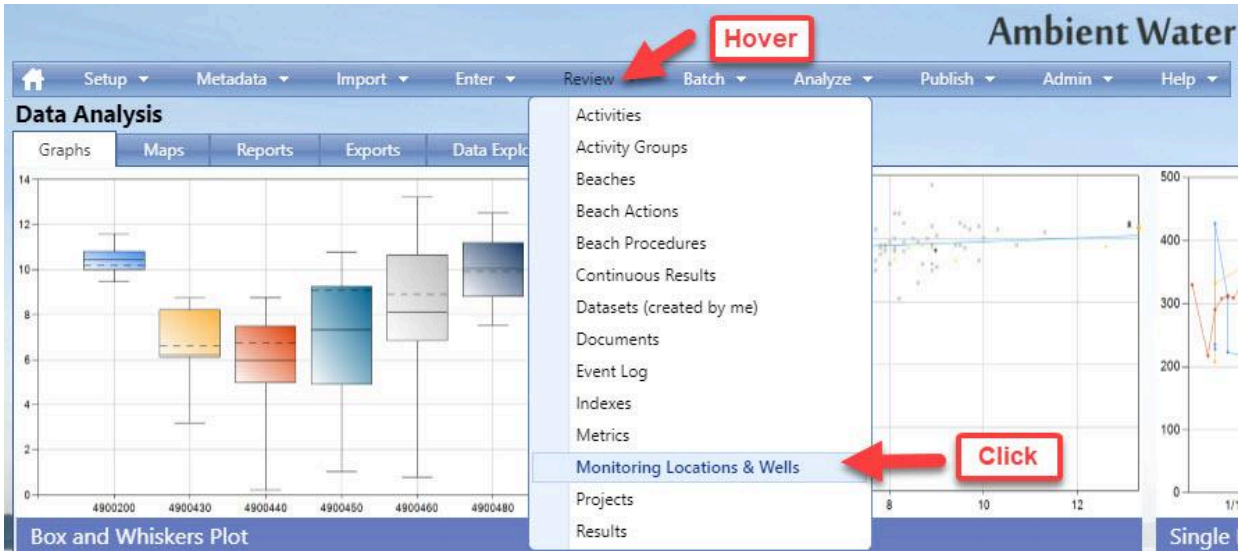
The following elements are required for a Project:

- Organization ID
- Project ID
- Project Name
- Project Description

8.2 Monitoring Location List Page

This page is used to view a list of Monitoring Locations that have been entered or imported into the system and will allow you to navigate to or “drill down” to the details for a specific existing Monitoring Location record or to navigate to a blank form for entering a new record for a Monitoring Location that has not yet been captured in the system.

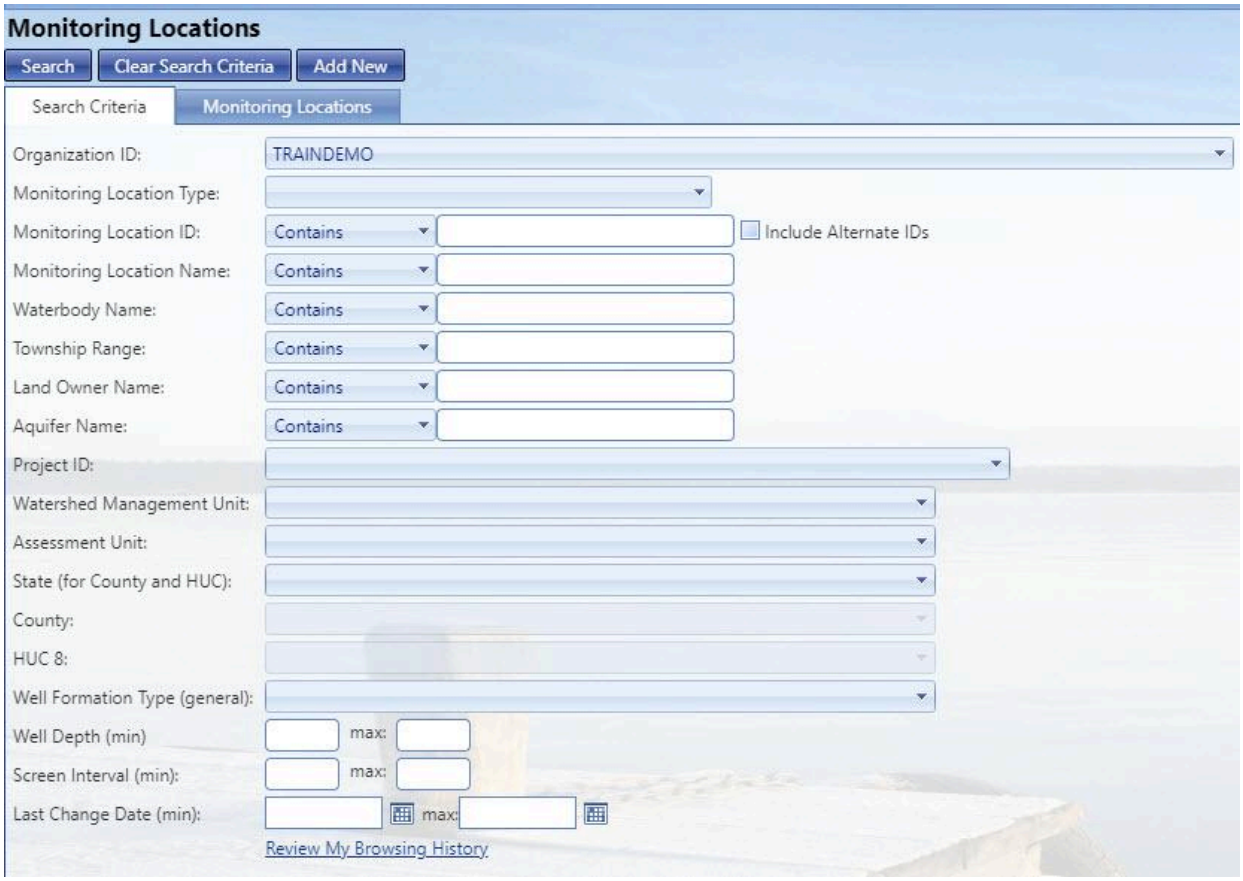
To get to the Monitoring Location list page, hover on **Review** and Click on **Monitoring Locations & Wells**.



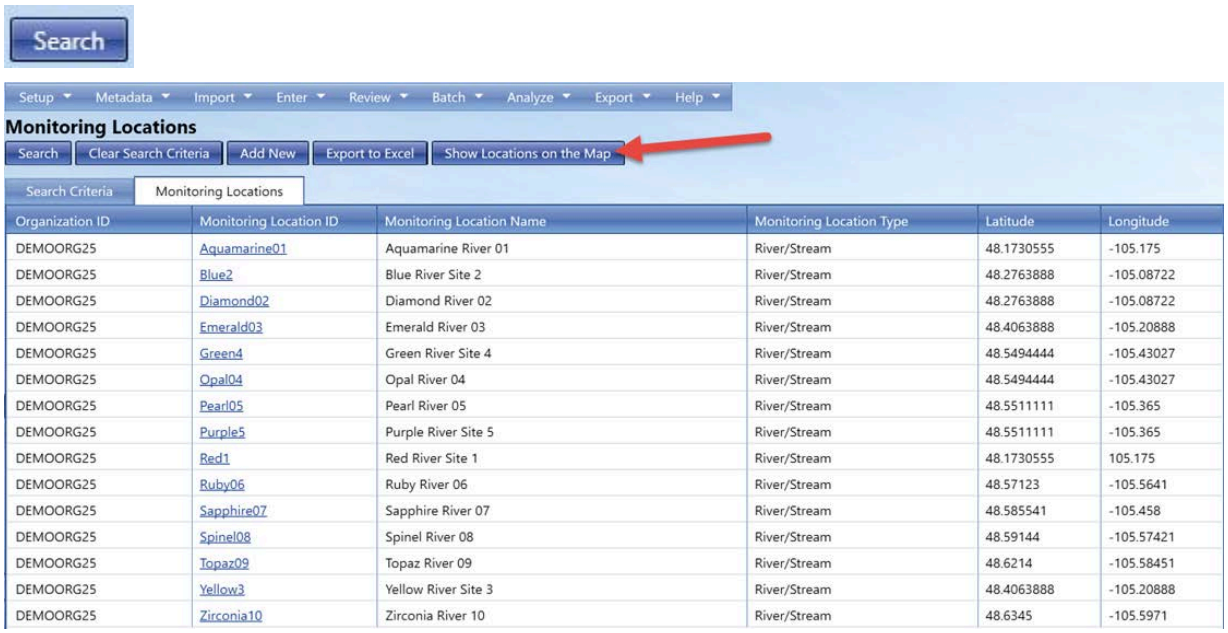
You will be taken to the Monitoring Location Search Criteria page.

You can filter using the different options. To use the HUC8 filter, you must first select the State (for HUC) from the drop-down list provided. The list of HUC8 values will be populated with the

8-digit HUCs for the selected state. Now you may select one or more HUCs from the list.



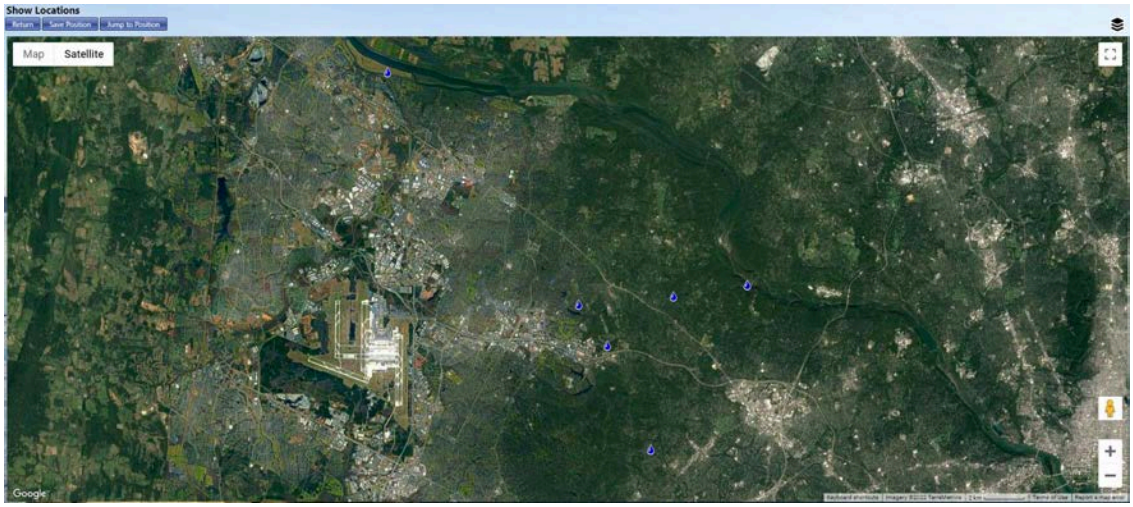
Click the **Search** button to bring you to the list of your Monitoring Locations in GSE-WQ under the output tab.



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

If your Monitoring Locations are listed as public, they can be displayed using Google Maps. Clicking **Show Locations on the map**, a map will display one blue dot for each monitoring location that matches the criteria you have already entered in the criteria fields.

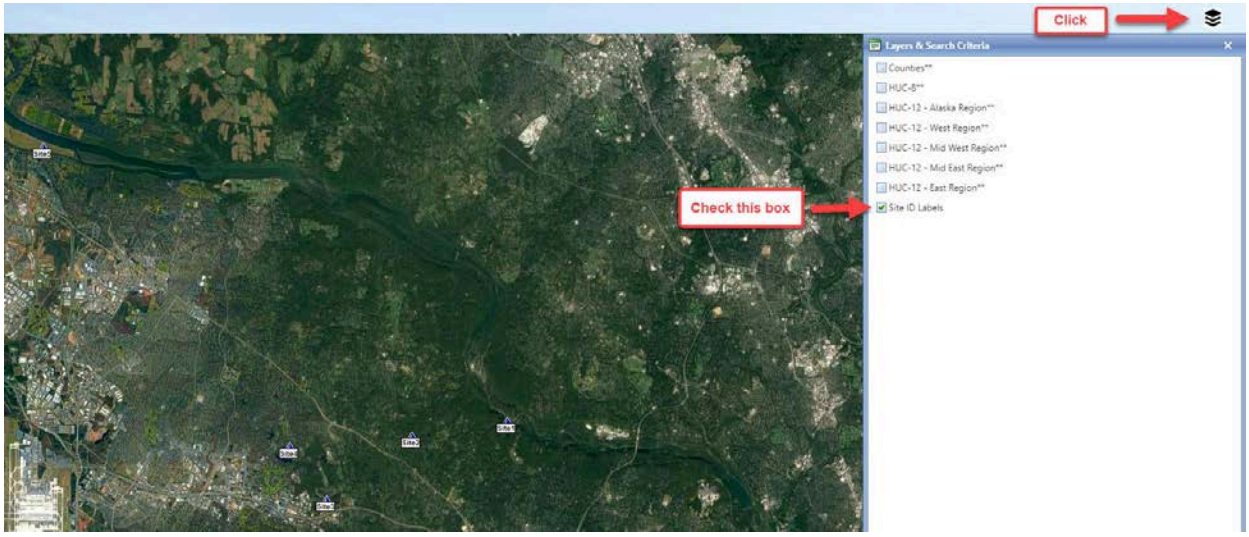
- You can pan and zoom to see finer detail using the typical pan and zoom features provided by web-based mapping tools.



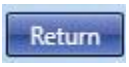
You'll want to zoom in to an appropriate level first in order to be able to clearly distinguish between locations. Sometimes locations are so close together that it is easy to select more than you intended. You can achieve the finest (zoom) detail using the Map (as Opposed to Satellite).

At a certain level of detail, the dots become water droplet icons and you can click on them to view underlying result data from samples taken at the location. Once you have zoomed to an appropriate level of detail, you can hover over the raindrop and view the details of the monitoring location.

To show ID labels on the map, click the layer button (top right corner).

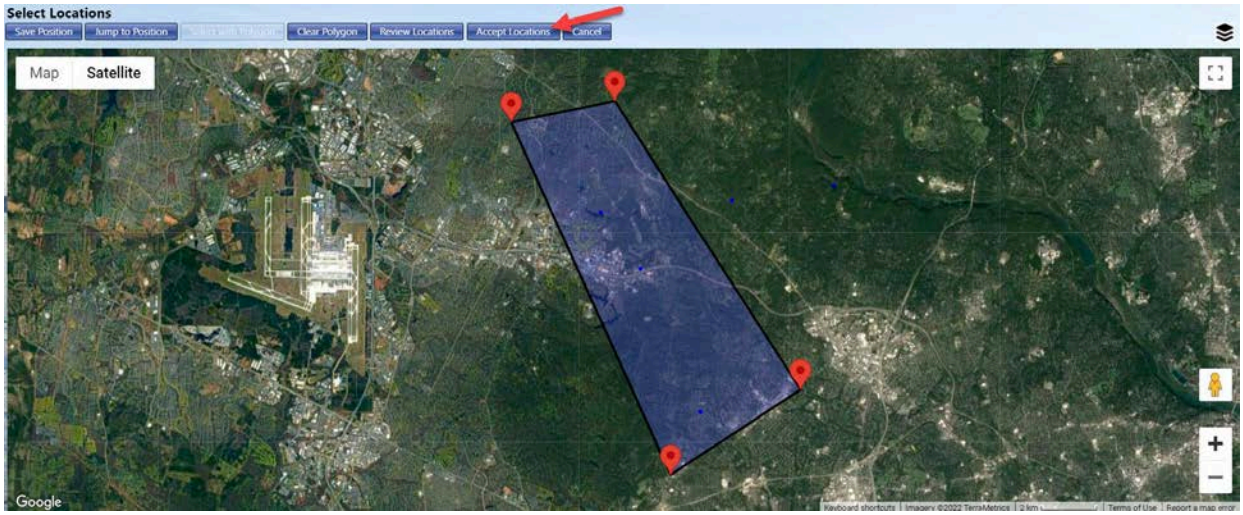


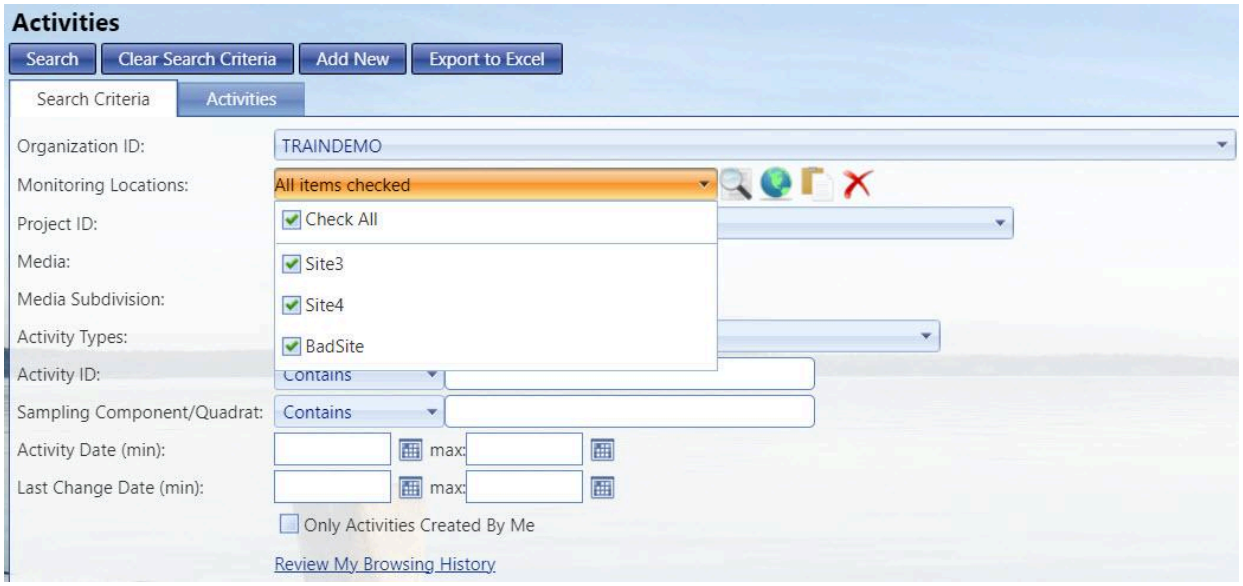
Now select the **Return** button at the top left of the map to return to the Monitoring Locations List page.



When viewing Monitoring Locations on a map in certain sections of GSE-WQ (ex. when reviewing your activities and selecting monitoring locations from the map), you can also select locations by creating a polygon on the map.

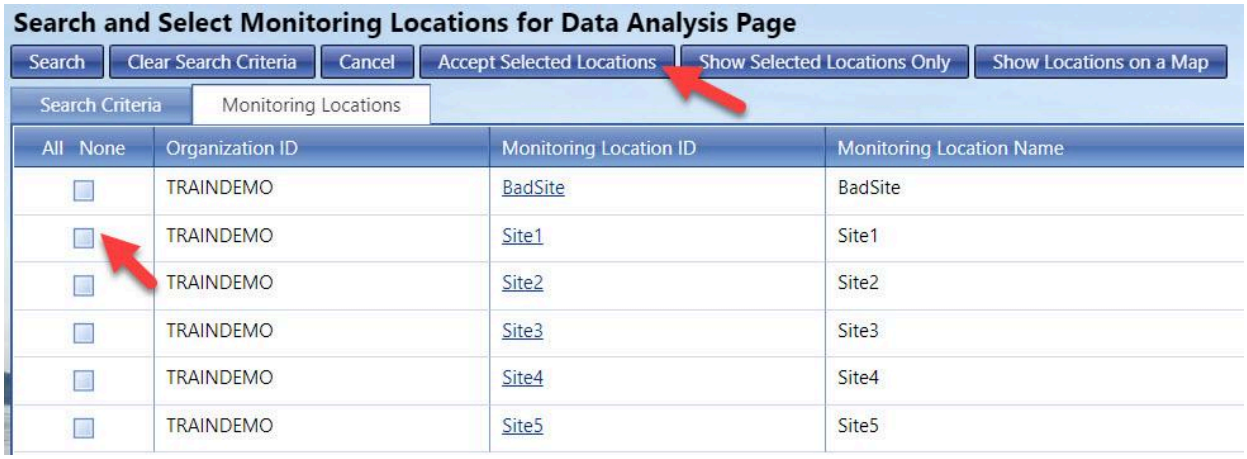
By selecting certain locations with the polygon, you can accept those locations and they will then be available to use as part of your search criteria.





The Clear Search Criteria button allows you to quickly clear out both the search criteria and the list of locations.

Note: The Monitoring Location List page is used any time a page in GSE-WQ has a need for the user to provide a list of monitoring locations. One example of this is in the Data Analysis Criteria page, where you'll have to select monitoring locations. When you select monitoring locations in the Data Analysis Criteria page, the system redirects to the Monitoring Locations List page and allows you to perform searches to find and select the locations you wish to use in the Data Analysis Criteria page. When the Monitoring Locations List page is in this "select locations" mode, there are checkboxes displayed that allow you to indicate which specific locations you wish to include when you return to the Data Analysis Criteria page.



(The Monitoring Locations List page in "Select Locations" mode with checkboxes)

Pages that leverage the functionality of the Monitoring Locations List page include:

- Data Analysis Criteria Page
- Activities Search Criteria Page
- Results Search Criteria Page
- Indexes Search Criteria Page
- Metrics Search Criteria Page

8.2.1 Monitoring Location Detail Page

Selecting a link in the Monitoring Location ID column will take you to the Monitoring Location Details Page for the specific Monitoring Location selected. This page is used to view and/or edit a specific Monitoring Location, add/delete Attached Binary Objects to/from a specific Monitoring Location, capture information about a new Monitoring location, or delete an existing Monitoring Location.

All of the fields related to Monitoring Locations are represented on the Monitoring Location Detail page. Required field are indicated by an Asterisk (*).

The application computes and displays the degrees, minutes, and seconds (DMS) of latitude longitude from the decimal degrees and vice-versa. The Map Latitude/Longitude Service link allows you to view a topographical satellite map of the latitude/longitude coordinates.

The page has a sub-section for maintaining a list of alternate identifiers for the monitoring location.

- You will select the Add link to add a new row for capturing an alternate identifier to the list.
- You will be able to modify the values in the fields for an existing alternate identifier in the list.
- You will be able to select the Remove link to delete the corresponding Alternate Identifiers from the list.

The page also has a sub-section for attaching files.

- The **Add Attachment** link allows you to add a new attachment by browsing to a file on your local machine and uploading it to the Monitoring Location.
- The **Remove Attachment** link allows you to remove an attachment from a monitoring location.

The system will use flags behind the scenes to track when these items are changed. The system will use the flags to ensure that the changes will be included in the next Monitoring Location Export.

As specified above, the **Delete** button, when selected, will prompt you for confirmation. Due to the fact that deleting a Monitoring Location has the potential to cascade deletes to many related records across the system, the prompt will also provide a severe warning and you will have to

confirm the delete by actually typing something like **YES** in a box and then selecting the **OK** button. Deleting a Monitoring Location will automatically "cascade" the following deletes:

- Attached Binary Objects
- Activities

Note: Special Logic for Cascading Deletes from Monitoring Locations to Activities: Activities may or may not relate to a Monitoring Location. Therefore, when an Activity relates to a Monitoring Location it will be deleted when its Monitoring Location is deleted. When it does not relate to a Monitoring Location (such as for certain Quality Control Samples) it will be unaffected by any Monitoring Location deletes.

The system will automatically keep an audit history of deleted records including, at a minimum, the table and record ID of the record being deleted, the user who deleted the record, and the date and time the deletion took place.

8.2.2 Monitoring Location Detail Rules

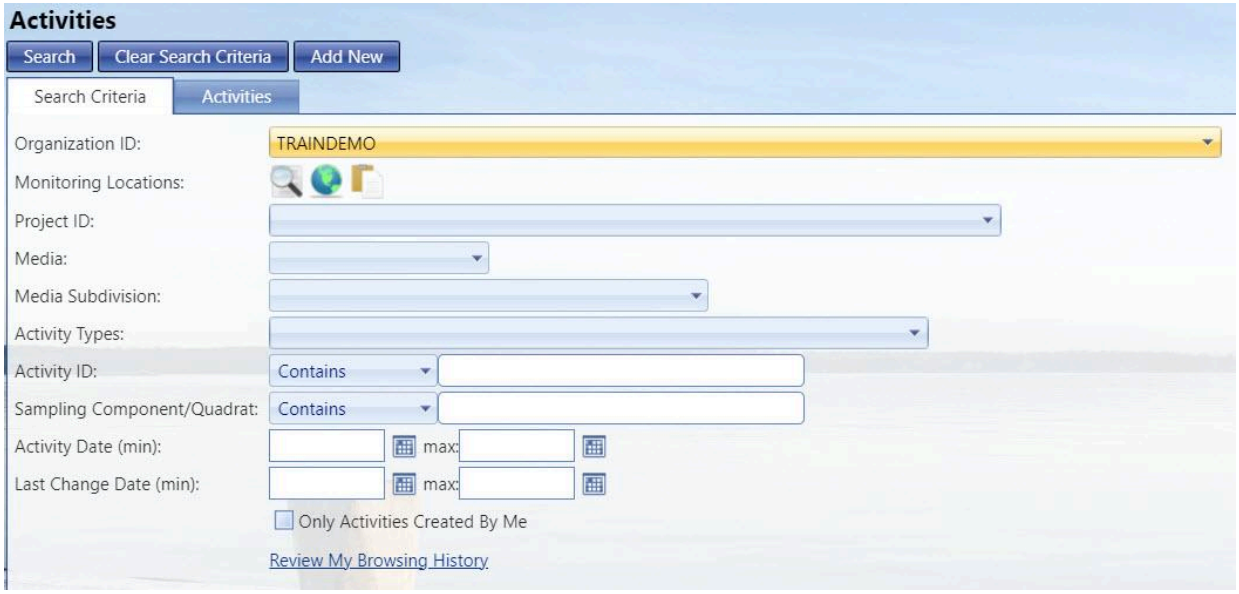
The following rules apply to monitoring locations:

- The following elements are required for a Monitoring Location:
    - Organization ID
    - Monitoring Location ID
    - Monitoring Location Name
    - Monitoring Location Type
    - Latitude
    - Longitude
    - Horizontal Collection Method
    - Horizontal Coordinate System
- When the Horizontal Collection Method is "Interpolation-Map", Source Map Scale must be provided.
- When Vertical Measure is provided, the following also must be provided:
    - Vertical Measure's Measure Unit
    - Vertical Collection Method
    - Vertical Coordinate System
- If a County is provided, then a State must also be provided.
- If an Alternate ID or Context is provided, both must be provided.
- If Horizontal Accuracy or Unit is provided, both must be provided.
- If Vertical Accuracy or Unit is provided, both must be provided.
- If any of the fields in the Well Information section are provided, then Well Type is required.
- If Well Depth or Unit is provided, both must be provided.

8.3 Activities List Page

The Activity page is used to view a list of Activities that have been entered or imported into the system and allows you to navigate or "drill down" to the details for a specific existing Activity

record. You will also be able to navigate to a blank form for entering a new record for an Activity that has not yet been captured in the system.



You can filter the list using different filters and subsequently select the **Search** button.

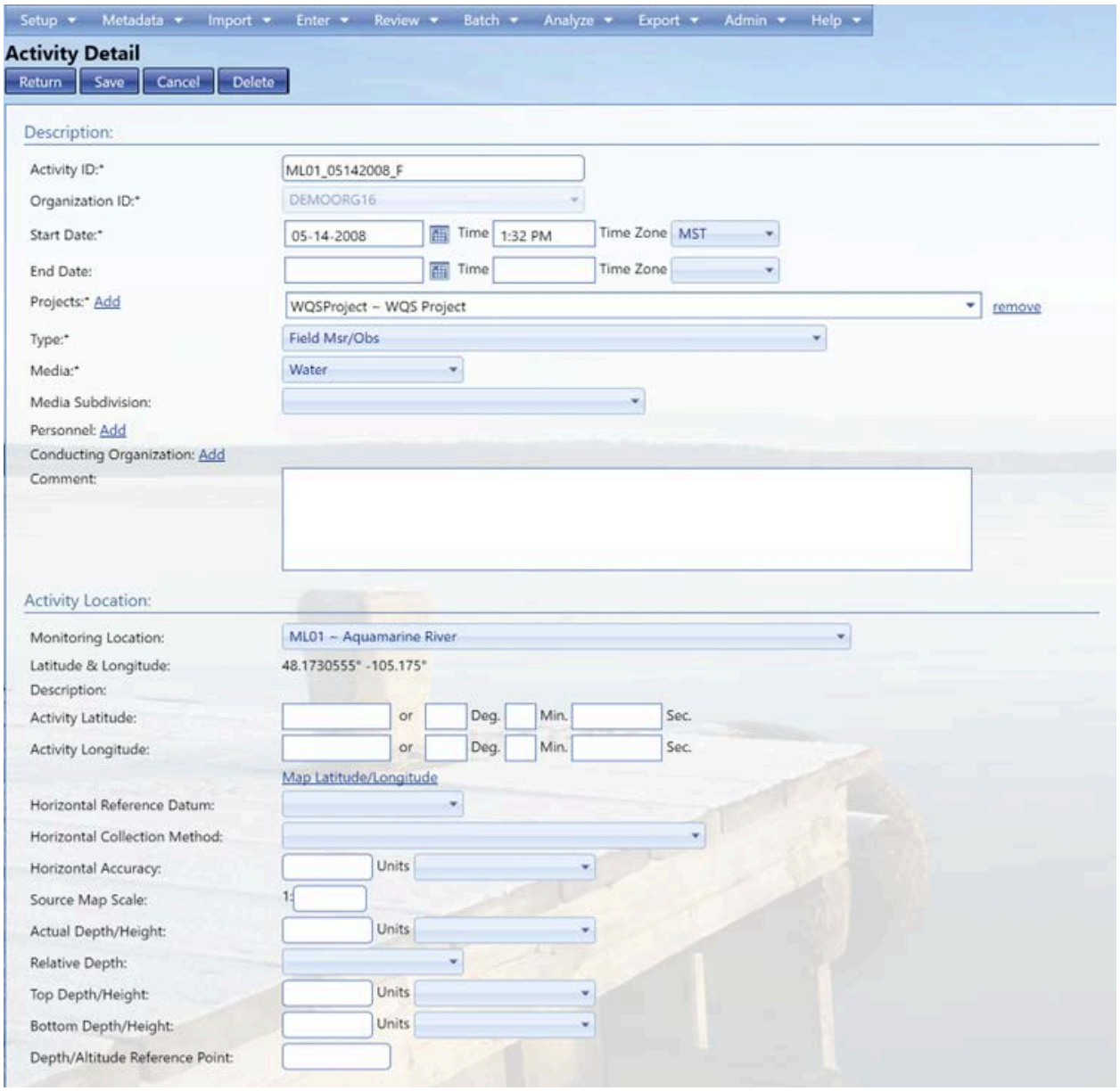
- Select an Organization ID from the drop-down menu
- Enter any other selection criteria to narrow the Activities search

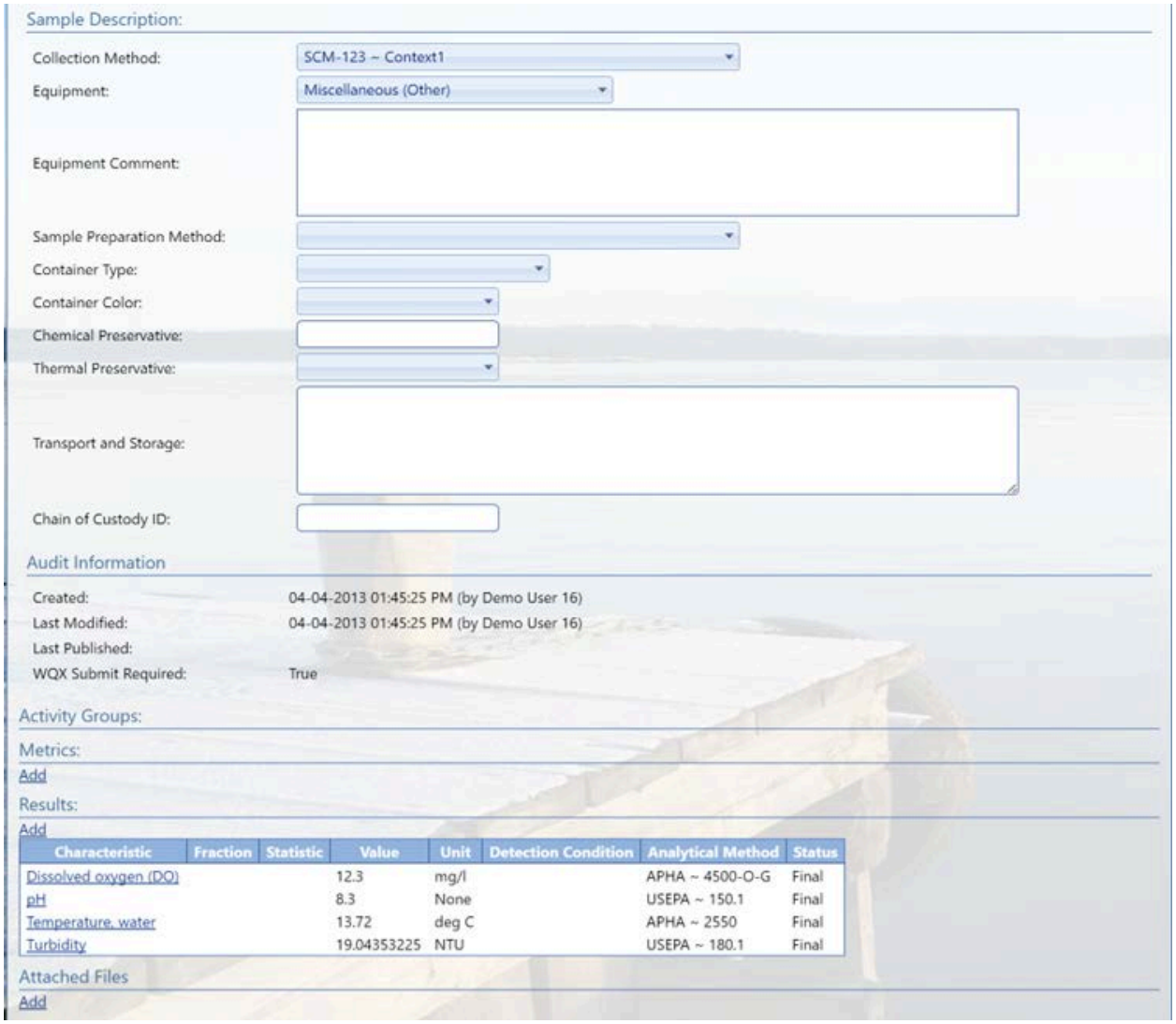
(You can also just do a general search by only selecting the Organization ID and it will take you to a complete list of all your Activities for your organization in GSE-WQ)

The **Add New** button allows you to go to a blank Activity Detail page for data entry. Selecting a link in the Activity ID column will take you to the Activity Detail Page for the specific Activity selected.

8.3.1 Activity Detail Page

This page is used to view and/or edit a specific Activity record, view Activity Groups an Activity is in, add/remove Metrics to/from an Activity, add/remove Results to/from an Activity, attach/detach electronic files to/from an Activity, capture information about a new Activity, or delete an existing Activity.





- Required field are indicated by an Asterik (*)
- The **Add** link after the Projects field label will allow you to add multiple fields for selecting a project. By filling in the field, you will be able to associate the Activity with the selected Project.
- The **Remove** link to the right of each Project field will break the association between the activity and the selected Project.
- The **Add** link to the right of Personnel will reveal a multi-select list box that allows you to choose Personnel to be associated with the Activity.
- When the multi-select Personnel list box is displayed, the Hide Personnel link will also be displayed. You will be able to select the Hide Personnel link in order to hide the multi-select Personnel list box. However, the View-only, comma-separated list of selected personnel that is displayed to the right will continue to be displayed.

Note: The additional Latitude and Longitude fields are provided in order for you to provide more detailed activity coordinates if the location alone does not suffice.

- The **Add** link after the Conducting Organizations field label will allow you to add multiple fields for selecting an Organization. You will associate the Activity with the selected Organization by filling in the field.
- The **Remove** link to the right of each Conducting Organization field will break the association between the activity and the selected Conducting Organization.
- The **Media Subdivision drop-down list** is based on the selection made in the Media Name field.
- The **Map/Latitude/Longitude** link will allow you to view the coordinates on a map using various mapping services available on the WWW.
- The **Add** link to the right of the Metrics label allows you to add a Metric to the Activity using the Activity Metric Detail page.
- The **Add** link to the right of the Results label will allow you to add a Result to the Activity using the Results Detail page.
    - Selecting the Characteristic link will open the Result Detail Page (See below).
- The **Add** link next to the Attachments label will allow you to browse to and attach an electronic file to the Activity.
- If there are any **attachments** for the Activity, each one will be represented by a link that allows you to download and manipulate the attachment if you have the appropriate software on their local workstation.
    - Each attachment, if any, will have a Remove link to the right of the link representing the attachment. When selected, the Remove link will first prompt you for a confirmation of the action and then detach the associated file from the Activity.

As specified above, the Delete button, when selected, will prompt you for confirmation. Due to the fact that deleting an Activity has the potential to cascade deletes to many related records across the system, the prompt will also provide a severe warning and you will have to confirm the delete by actually typing something like **YES** in a box and then selecting **OK**. Deleting a Monitoring Location will automatically “cascade” the following deletes:

- Attached Binary Objects
- Results, Metrics, and/or Indexes.

The system will automatically keep an audit history of deleted records including, at a minimum, the table and record ID of the record being deleted, the user who deleted the record, and the date and time the deletion took place.

8.3.2 Activity Detail Rules

The following rules apply to an activity:

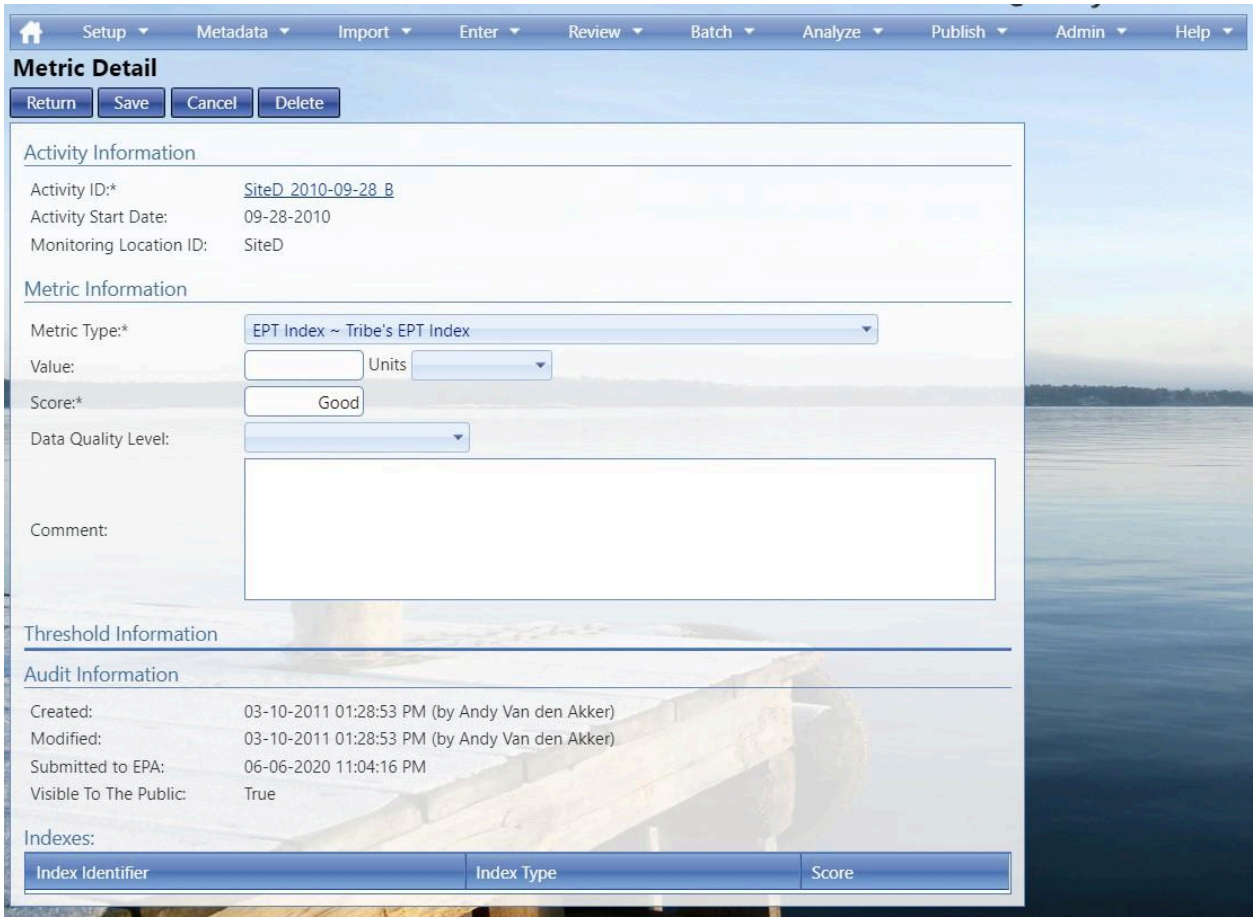
- The following elements are required for an Activity:
    - Organization ID
    - Activity ID
    - Project ID

    - Activity Type
    - Activity Media
    - Activity Start Date
- Activity Depth/Height can be provided in only one of the following two ways (but not both):
    - Specific depth using Actual Depth/Height
    - Depth Range using Top Depth/Height and Bottom Depth/Height
        - This method must be used when the Activity Type is “Sample-Integrated Vertical Profile”.
- The following are conditionally required for an Activity based on the XML schema for WQX:
    - If the Start Time is filled in, the Start Time Zone must be filled in and vice versa.
    - If the End Time is filled in, the End Time Zone must be filled in and vice versa.
    - If the Actual Depth/Height is populated, the corresponding Units of Measurement field must be filled in and vice versa.
    - If the Top Depth/Height is populated, the corresponding Units of Measurement field must be filled in and vice versa.
    - If the Bottom Depth/Height is populated, the corresponding Units of Measurement field must be filled in and vice versa.
    - When Activity Type contains the word 'Sample', Sample Collection Method must be provided.
    - Activity’s Monitoring Location may be required depending on the value provided for Activity Type. See the lookup table for Activity Type for more information.
        - If the Activity Location is populated then the Latitude and Longitude fields must be populated.
        - If the Location Horizontal Accuracy Measure is populated, the corresponding units must be populated and vice versa.
        - If the Activity Location is populated, the Horizontal Collection Method field must be populated.
        - If the Activity Location is populated, the Horizontal Coordinate System must be populated.
    - If Sample Preparation block is provided, then either Chemical Preservative Used or Thermal Preservative Used must be provided.
    - If the Biological Information Collection Duration is populated, the corresponding units field must be populated.
        - If the Biological Information Reach Length is populated, the corresponding units field must be populated.
        - If the Biological Information Reach Width is populated, the corresponding units field must be populated.
    - If any of the fields in the Net Information section are populated, then the following fields must also be populated:
        - Net Information Type
        - Net Surface Area (and units)
        - Net Mesh Size (and units)

- If Net Type is provided then the Sample Collection Equipment must be one that relates to that type of equipment.
- If Net Type = "Net/Horizontal Tow," then Boat Speed is required.
- If the Net Surface Area is populated, the corresponding Units field must also be populated.
- If the Net Mesh Size is populated, the corresponding Units field must also be populated.
- If the Net Boat Speed is populated, the corresponding Units field must also be populated.
- If the Net Current Speed is populated, the corresponding Units field must also be populated.
- If any of the fields in the Sample Description section are populated, the following fields must also be populated:
  - Collection Method
  - Equipment
- If the Preparation Method field, the Container Type, Container Color, Chemical Preservative, Thermal Preservative, or Transport and Storage are populated, the following fields must also be populated:
  - Container Type
  - Container Color
  - Transport and Storage

8.3.3 Metric Detail Page

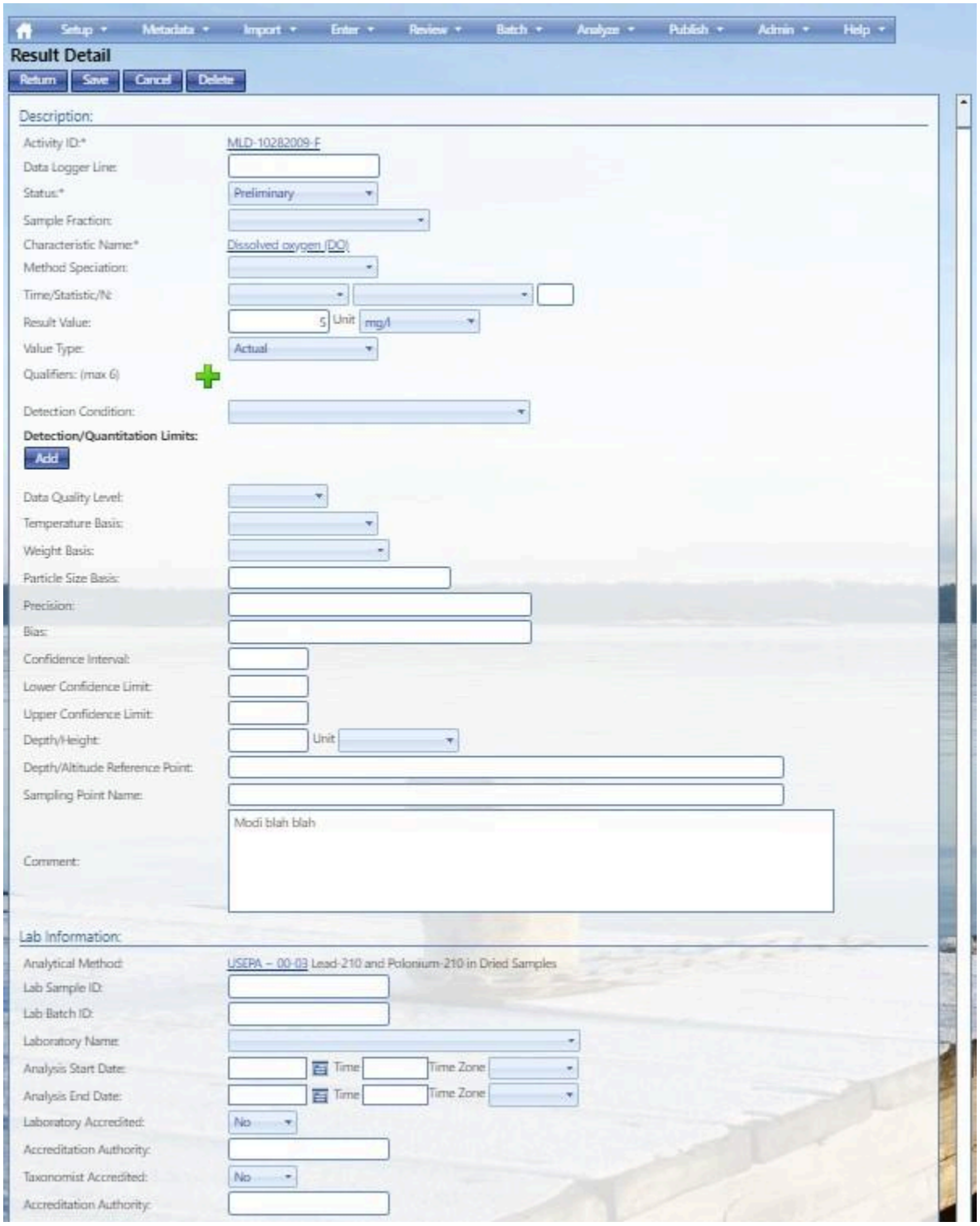
The Metric Detail page will allow you to view, edit, and capture information about a specific Metric for an Activity. You will be able to maintain associations between existing Biological / Habitat Indices and the displayed Activity Metric. This page will also allow you to delete the displayed Activity Metric.



The Indexes sub-section displays a list of Bio/Habitat Indices the Activity Metric is associated with (if any).

If the Value field is populated then the Units code must be populated and vice versa

8.3.4 Result Detail Page



The Result Detail page allows you to view, edit, or delete a result record. You can also attach electronic files to the result record.

The Activity ID will be a link that, when selected, allows you to navigate to the Activity that the displayed result pertains to.

The Characteristic Name will be a link that opens a pop-up list of characteristics (the Characteristic Pick List). If you select a Characteristic from the pop-up list, the system will display the associated name on the Result Detail page.

The page will have a subsection for managing Detection / Quantitation Limits.

- The **Add** link to the right of the Detection / Quantitation Limits field will allow you to add new rows to the list of Detection / Quantitation Limits.
- The **Remove** link to the right of each row in the list of Detection / Quantitation Limits will allow you to remove the corresponding Detection / Quantitation Limit.

The Biological section will not be visible for non-biological results. If it is visible:

- The Taxonomic Name field will be a link, which, when selected, will open a pop-up list of Taxonomic Names (the Taxonomic Name Pick List). If you select one of the Taxonomic Names from the list, the system will display the name in the Result Detail page as the very link that opens the pop-up list.
- The **Add** link next to the Functional Feeding Group label will allow you to add up to 3 fields for capturing functional feeding groups for the Result. Each Functional Feeding Group field will have a Remove link to the right of the field which will allow you to remove the field.
- The Citation field will be a link that, when selected, opens a pop-up form that allows you to search for and select a Citation from the Citation lookup table. If you select a Citation from the list, the system will display the Citation ID and Title; which will become the text for the link that opens the pop up list.
- There will be a sub-section that will allow you to manage Frequency Class Information for the Result.
    - A maximum of three Frequency Classes will be allowed per Result.
    - The Add link will allow you to add a new row of fields for capturing a Result Frequency Class.
    - Each row in the sub-section will have a Remove link that, when selected, removes the corresponding Frequency Class record from the displayed Result.

The Analytical Method field will be a link that, when selected, opens up a pop-up form that allows you to search for and select an Analytical Method (Analytical Method Pick List). If you select one of the Analytical Methods in the list, the system will display the number and name of the Analytical Method as the very link used to open the pop-up list.

If the Laboratory Accreditation Authority field is filled in and you save, the system will automatically ensure that the Laboratory Accredited check box is selected.

If the Taxonomist Accreditation Authority field is filled in and you save, the system will automatically ensure that the Taxonomist Accredited check box is selected.

As specified above, the Delete button, when selected, will prompt you for confirmation. Due to the fact that deleting a Result has the potential to cascade deletes to many related records across the system, the prompt will also provide a severe warning and you will have to confirm the delete by actually typing something like **YES** in a box and then selecting OK. Deleting a Result will automatically "cascade" the following deletes:

- Attached Binary Objects

The system will automatically keep an audit history of deleted records including, at a minimum, the table and record ID of the record being deleted, the user who deleted the record, and the date and time the deletion took place.

8.3.5 Result Detail Rules

The following rules apply to a result:

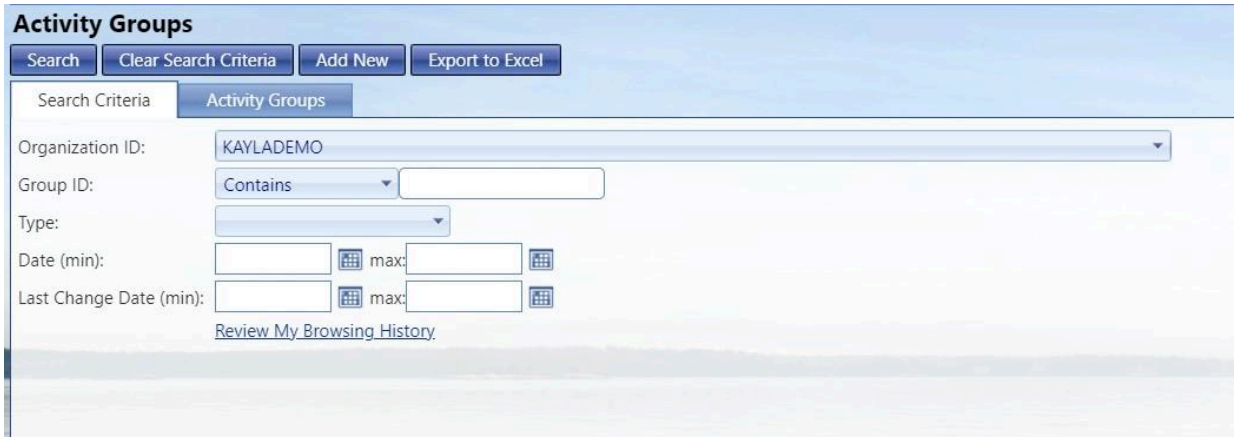
- Result Status is required.
- Characteristic Name is required
- When Detection Condition is 'Not Detected', 'Present Above Quantification Limit' or 'Present and Below Quantification Limit', then Detection Quantitation Limit Type Name and Detection Quantitation Limit must be provided.
- Either Result Value or Detection Condition must be provided, but not both.
- When Detection Quantitation Limit is provided, Detection Quantitation Units must be provided.
- Analytical Method may be required depending on the value provided for Activity Type. See the lookup table for Activity Type for more information.
    - However, Analytical Method is never required if Biological Intent is "Individual", "Population Census", "Frequency Class", or "Group Summary".
- Sample Fraction may be required depending on the value provided for Characteristic Name. See the lookup table for Characteristic Name for more information.
- Analytical Method Context must either match a value from the Analytical Method Context lookup table or it must be the same as the value for the Organization ID provided in the submission file.
- If the Method Context matches a value from the lookup table, then the Method ID must also match a value from the Analytical Method lookup table (for that Context). Furthermore, Method Name, Method Qualifier Type, and Method Description are not required and will be ignored (since only the ID and Context are needed to uniquely identify the Analytical Method).
- If the Method Context matches the Organization ID of the user (indicating the user's own method), then Method ID and Method Name are both required, but do not need to match a value from the lookup table (since they are the users). Additionally, Method Qualifier Type Name and Method Description Text can be provided, but are optional, to further describe the Analytical Method used.

- Result Value may be constrained to a lookup table depending on the value provided for Characteristic Name. See the lookup table for Characteristic Name for more information.
- If a numeric value is provided for Result Value, then Result Value Units and Result Value Type are required.
    - The exception to this is when the Result Value is a Characteristic Pick List Value. These do not have units.
- If Biological Intent is "Group Summary" then Group Summary Count Weight must be provided.
- If Biological Intent Name is "Frequency Class" then Result's Characteristic Name must be "Count".
- If Biological Intent Name is "Population Census" then Result's Characteristic Name must be "Count" or "Total Sample Weight".
- Frequency Class Descriptor Unit may be required depending on the value provided for Frequency Class Descriptor. See the lookup table for Frequency Class Type for more information.
- Frequency Class Information's Lower Class Bound Value and Upper Class Bound Value may be required depending on the value provided for Frequency Class Descriptor. See the lookup table for Frequency Class Type for more information.
- When Activity Type contains the word 'Logger', Data Logger Line must be provided.
- When Activity Media is "Tissue" then Biological Intent Name must also be "Tissue" (and vise-versa).
- When Activity Media (or Biological Intent) is "Tissue", then Sample Tissue Anatomy must be provided.
- When Activity Media is "Biological" then Assemblage Sampled must be provided.
- The following will be conditionally required based on the XML schema for WQX:
    - If Measure Value is populated, Measure Unit must be populated and vice versa.
    - If any of the fields in the Biological section or the Taxonomic Details or the Frequency Class Information sections are populated then the following fields from the same section must be populated:
        - Biological Intent Name
        - Subject Taxonomic Name.
    - If Group Summary Count / Weight Measure Value is populated then the Measure Unit must be filled in and vice versa.
    - When a Frequency Class is added to a result, the Descriptor must be populated.
    - When a file is attached to a result, the system must/will automatically capture the file name and the file type.
    - If the Lab Analysis Start Time is populated, the Start Time Zone must also be populated and vice versa.
    - If the Lab Analysis End Time is populated, the End Time Zone must also be populated and vice versa.
    - If a Detection / Quantitation Limit is added to the Result, the Type Name must be populated.
    - If a Detection / Quantitation Limit is added to the Result and the Limit is populated, the Units must also be populated and vice versa.

- If a Lab Sample Preparation is added to a Result, the Preparation Method is required.
- If a Lab Sample Preparation is added to a Result and the Start Time is populated, the Start Time Zone must be populated and vice versa.
- If a Lab Sample Preparation is added to a Result and the End Time is populated, the End Time Zone must be populated and vice versa.

8.4 Activity Groups List Page

The Activity Group page is used to view a list of Activity Groups that have been entered or imported into the system. This page is used to navigate or “drill down” to the details for a specific existing Activity Group record or to navigate to a blank form for entering a new record for an Activity Group that has not yet been captured in the system.

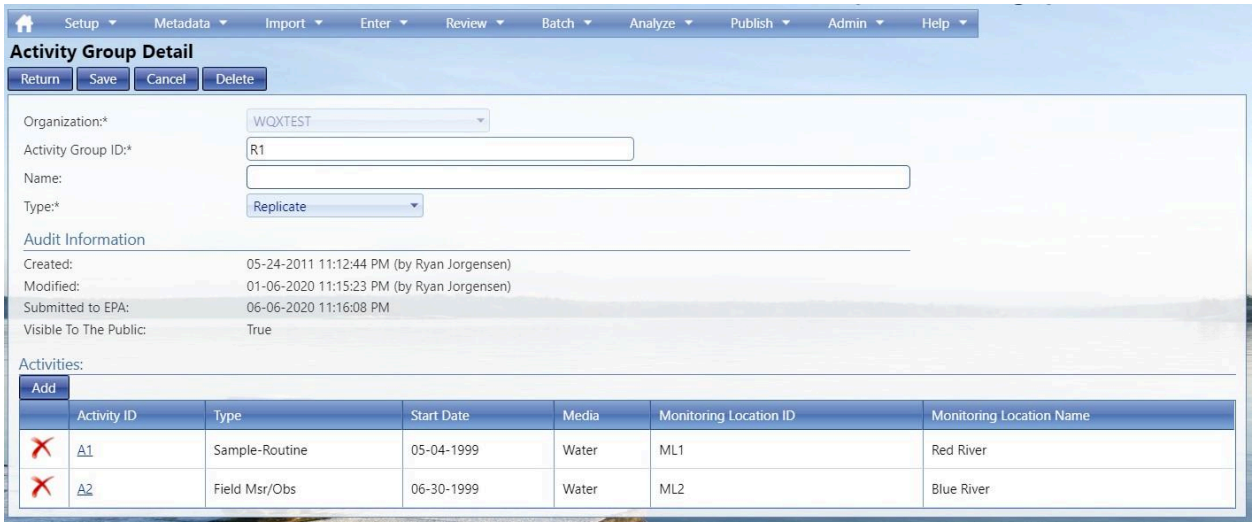


You will be able to filter the list using the Organization ID, Group ID, Activity Type, and / or Date fields at the top of the page and subsequently selecting the Search button.

Selecting the **Add New** button will take you to a blank Activity Group Detail Page so that an activity group can be created.

8.4.1 Activity Groups Detail Page

This page is used to view and/or edit a specific existing Activity Group record, add/remove an Activity to/from an existing Activity Group record, capture information about a new Activity Group, or delete an existing Activity Group.



The page contains a sub-section for maintaining a list of Activities associated with the Activity Group.

- The **Add** link will allow you to associate an existing Activity to the Activity Group.
- Each associated Activity will be represented by a row in the sub-section.
- Each associated Activity ID will be a link that “drills down” to the detail page for the selected Activity.
- Each associated Activity will have a Remove link that, when selected, breaks the association between the Activity Group and the corresponding activity.
- When you select the Remove link, the system will prompt you for confirmation before breaking the activity’s association to the Activity Group.

Deleting an Activity Group WILL NOT cascade deletes to related Activities.

8.4.2 Activity Group Detail Rules

The following elements are required for an Activity Group:

- Organization ID
- Activity Group ID
- Activity Group Type
- 2 or More Activity IDs are required

8.5 Indexes List Page

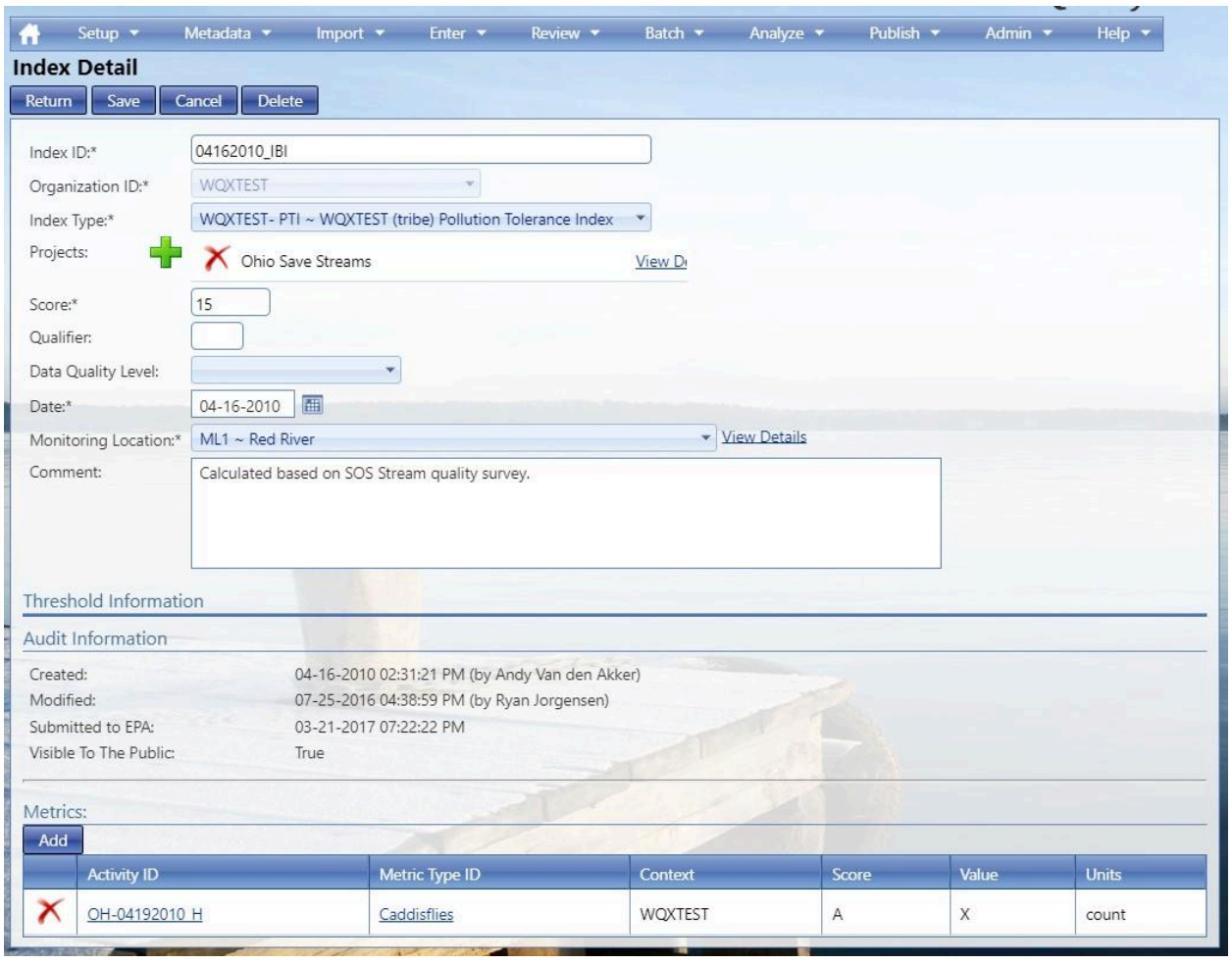
This page is used to view a list of Biological / Habitat Indexes that have been entered or imported into the system. You will be able to use this page to navigate or “drill down” to the details for a specific existing Biological / Habitat Index record or to navigate to a blank form for entering a new record for a Biological / Habitat Index that has not yet been captured in the system.

You will be able to filter the list using the Organization ID, Monitoring Location ID, Index ID, and/or Date fields at the top of the page and subsequently selecting the Search button.

Selecting a link in the Index ID column will take you to the Biological / Habitat Index Details Page for the specific Biological / Habitat Index selected.

8.5.1 Index Detail Page

This page is used to view and/or edit a specific Index. You can also add/delete Metrics from a specific Index, capture information about a new Index, or delete an existing Index.



The system uses flags “behind the scenes” to track when these items are changed. The system will use the flags to ensure that the changes will be included in the next Biological / Habitat Indexes Export.

The page will have a sub-section for maintaining a list of associated Activity Metrics for the Biological / Habitat Index.

- The **Add** link in the Metrics section will allow you to associate a new metric to the Biological Habitat Index record. You will be presented with the Activity Metrics search page where they can search for and select multiple activity metrics to be associated with the Biological / Habitat Index.
- The **Remove** link next to a metric will ask for a confirmation and will delete the metric from the Biological / Habitat Index upon your confirmation. Deleting a Biological/Habitat Index WILL NOT cascade deletes to related Activities.

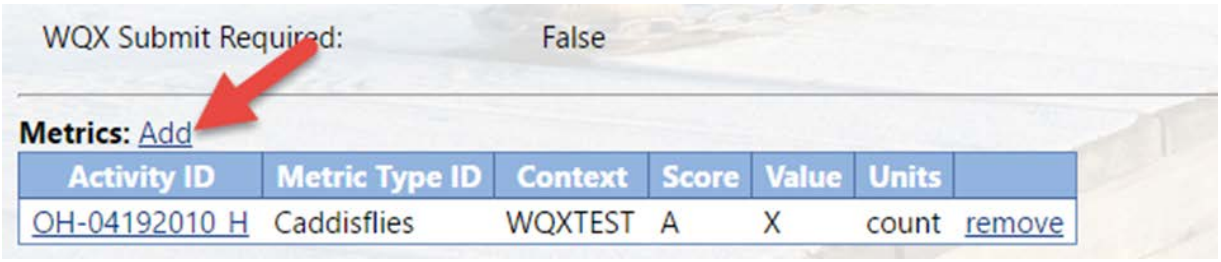
8.5.2 Indexes Detail Rules

The following elements are required for a Biological / Habitat Index:

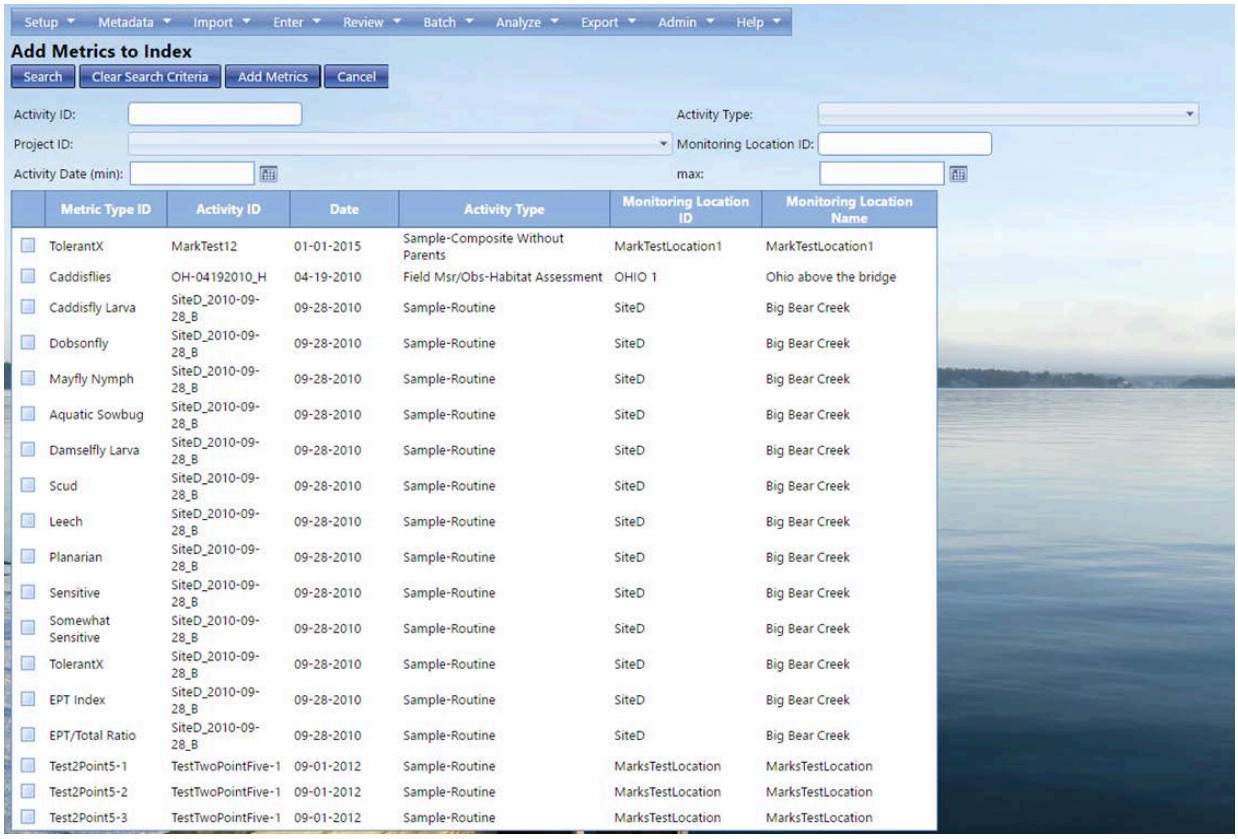
- Index ID
- Index Type ID
- Index Type Context
- Index Type Name
- Index Score Numeric
- Monitoring Location ID

8.5.3 Add Metrics to Index

This page is used to search for and select Activity Metrics. An example usage of this page would be for associating Activity Metrics to a Biological / Habitat Index.



This page does not fit the model for a standard list page or a standard form page. Therefore, only the basic standard features apply. All other functionality is described here.



You will be able to use the Activity ID, Project ID, Activity Type, Monitoring Location ID, and the Date fields and subsequently select the Search button at the top of the page to find relevant Activity Metrics.

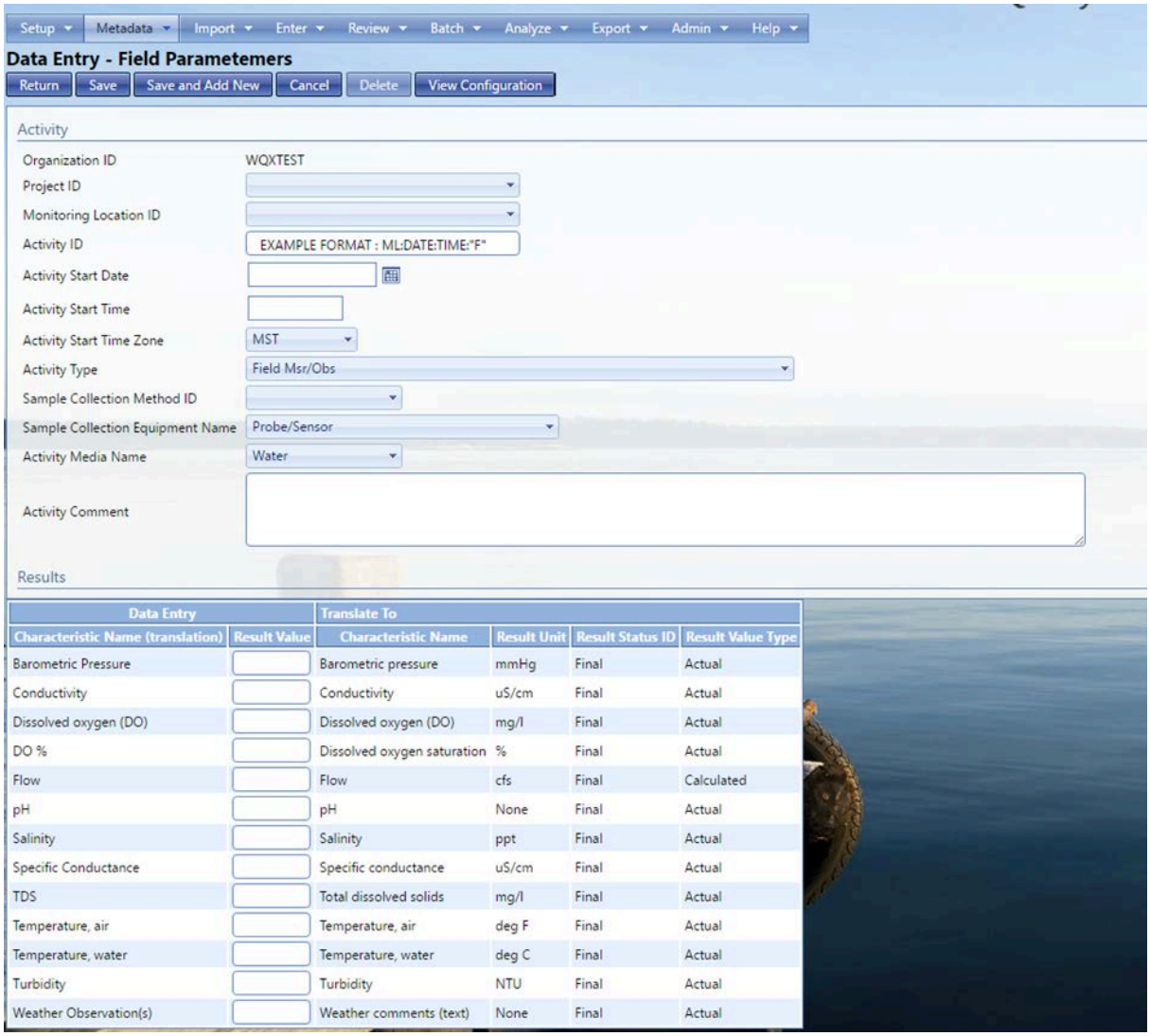
You will be able to select Activity Metrics to be returned using the check boxes to the left of each Activity Metric. The system will track which metrics have been checked on previous pages while you page through the list.

If you select the Add button, the system will return to the previous page and return the metrics to be used by the previous page.

If you select the Cancel button, the system will return to the previous page but will not return the metrics to be used by the previous page.

8.6 Data Entry Page

The Data Entry page is a customizable page designed with many time saving features to simplify the data entry of Activities and Results. The page is driven by an import configuration which defines the fields (and their order on the page), default values, drop-down lists (driven by translations) and contains pre-populated rows of Results (driven by a translation which includes the Characteristic Name). For more information about rapid entry configurations see section 2.



The "**Save and Add New**" button will save data on the page and then clear it, so that you can enter a new set of data (without having to exit the page and return).

9 FCAS

GSE-WQ has multiple features available to assist with managing, analyzing, and submitting your Fish Consumption data. This includes options to input Fish Consumption metadata and options to export your Fish Consumption data. This section will cover the process of entering important metadata into GSE-WQ as well as the process of creating an export.

9.1 Enter Fish Consumption Metadata

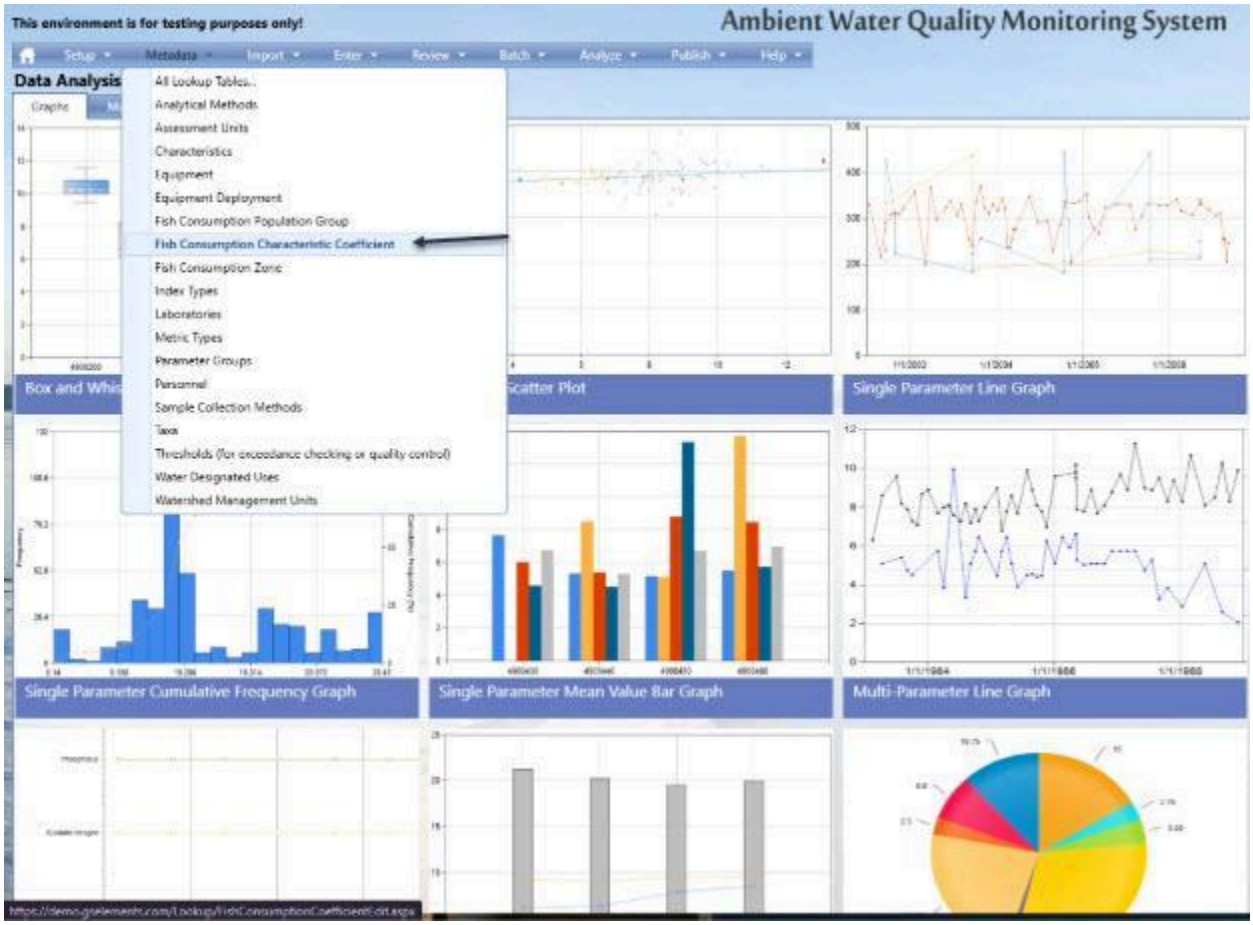
Within the Metadata tab in GSE-WQ, there are three options specific to Fish Consumption data. You can input '**Fish Consumption Characteristic Coefficient**', '**Fish Consumption Population Group**', and '**Fish Consumption Zone**' information. It is recommended that all of these tables have some information, if applicable to you/your organization. For example, having

these tables filled with relevant information means that you can include that important data on any exports you create within GSE-WQ.

9.1.1 Fish Consumption Characteristics Coefficient

With this tool you will be able to enter important Characteristics and set the Reference Dose and Cancer Slope Index for them. Having this information in GSE-WQ allows for easier analysis of your data including better exports, graphs, and reports.

1. To start, click the *Fish Consumption Characteristics Coefficient* option in the **Metadata** page.

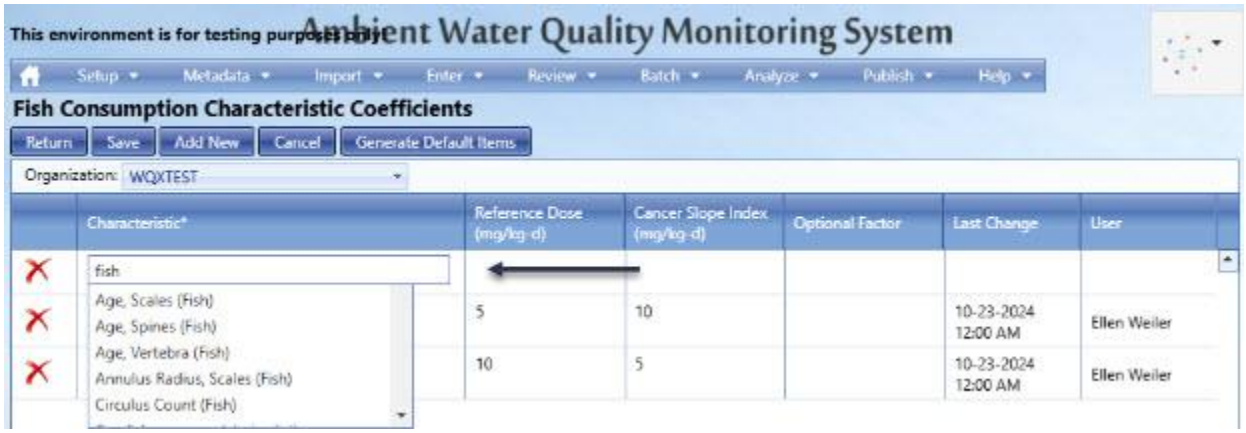


2. From there you will need to input your Organization's ID by selecting the drop-down menu. For this example, WQXTEST was selected as the organization.

3. Once your organization has been selected you can start adding Characteristic Coefficients by clicking the '**Add New**' button. Any previously added Characteristics will also appear in this table.

4. After clicking the '**Add New**' button, a blank row will appear and you can start filling in fields with appropriate information.

   a. Starting with the Characteristic field, when you start to type in your characteristic, a list will appear for you to select from. This list includes the official characteristics that are in compliance with the EPA.

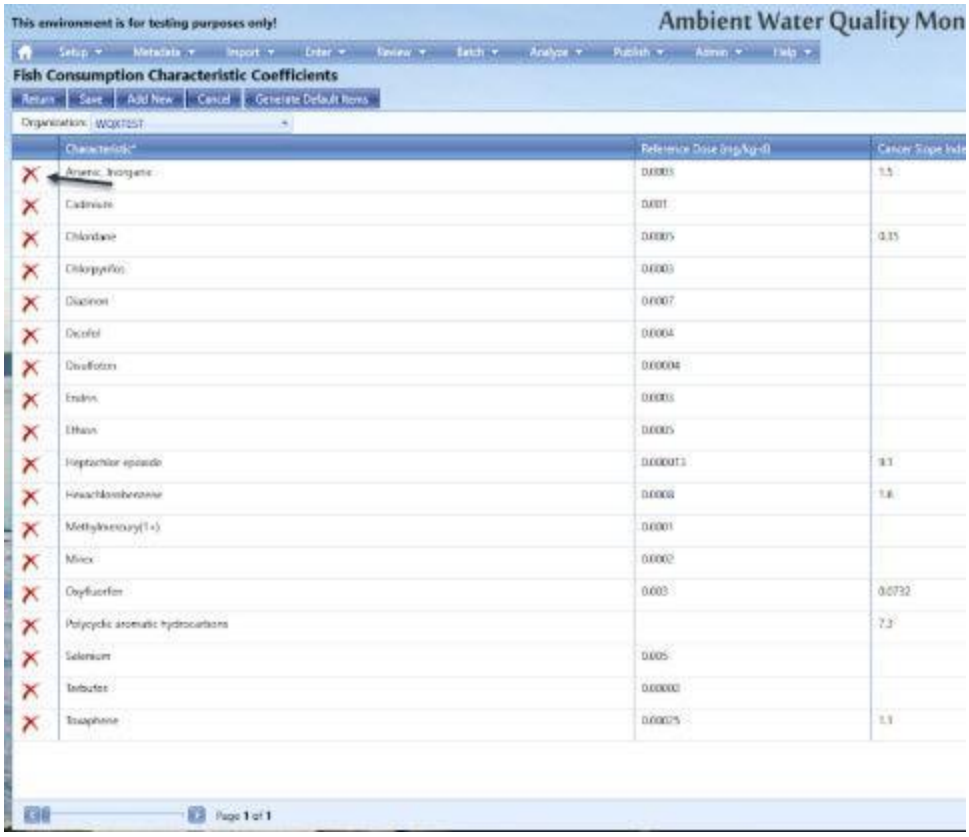


5. After selecting your Characteristic from the drop down list, you can continue to fill in the other fields such as **Reference Dose** and **Cancer Slope Index**. Then click the '**Save**' button to store that information in the GSE-WQ system.

6. There is also an option to '**Generate Default Items**' in the **Fish Consumption Characteristic Coefficients** table. To generate a list of default characteristics and coefficients you can click this button at the top of the page.

a. Then a list of generated values will appear in the table.

7. You have the option to delete any characteristics in the table by clicking the *red 'X' icon* at the far left of the table. Click the *red 'X' icon* next to the characteristic you wish to delete.



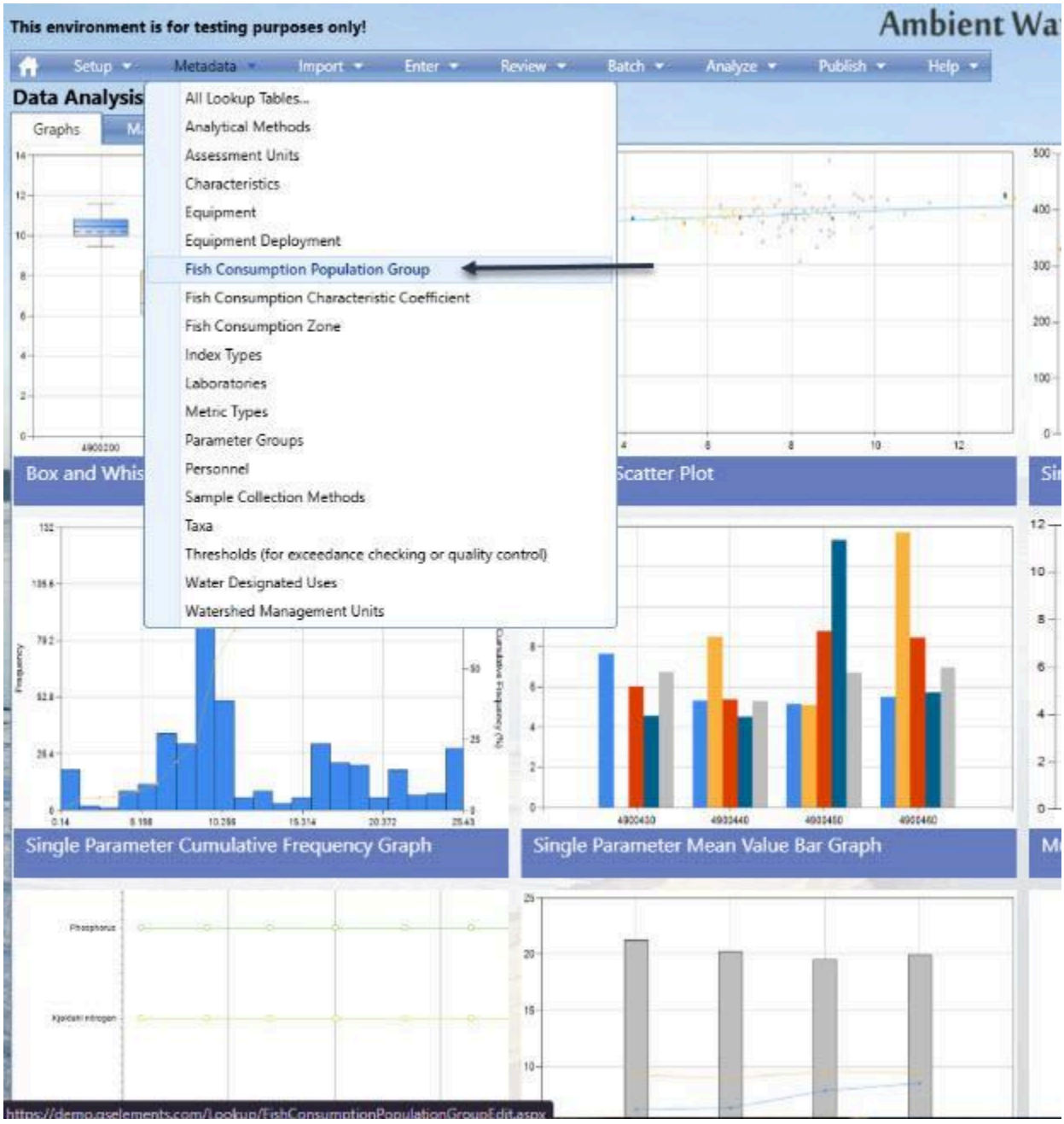
At any point you are able to go back to this table and edit any characteristics, delete them, or add new ones. The system will track the latest changes made to these characteristics and display this information on the far right of the table including which user made the change.

9.1.2 Fish Consumption Population Group

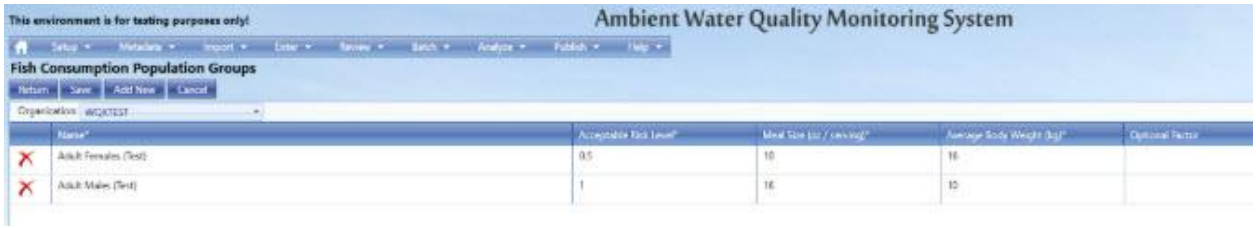
With this tool you will be able to store fish population groups. On this page you can enter information about the acceptable risk level, meal serving size, average body weight, and any

optional factors. This table is always available through the Metadata tab and can be edited at any point.

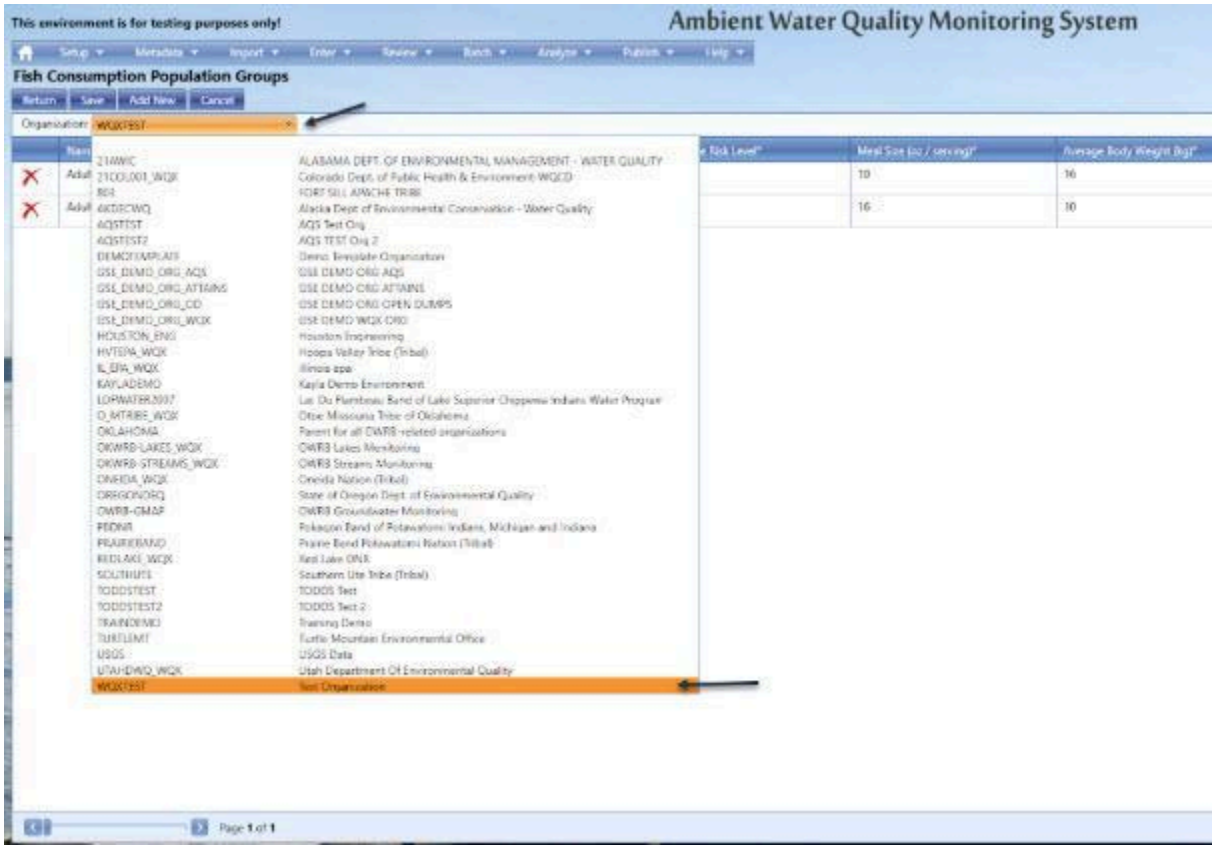
1. To start entering information, navigate to the **Metadata** tab and click the *Fish Consumption Population Group* table.



2. After selecting the table, any previously entered population groups will be displayed.



a. To make sure you are entering your information into the correct organization click the Organization drop-down menu. From the drop-down list select the appropriate organization. For this example, WQXTEST was selected.



3. To enter new information click the '**Add New**' button.

4. After clicking the '**Add New**' button, a blank row will appear in the table. You can then fill in each field with the appropriate information. Any column with an asterisk is **required** to be filled in to save the population group.

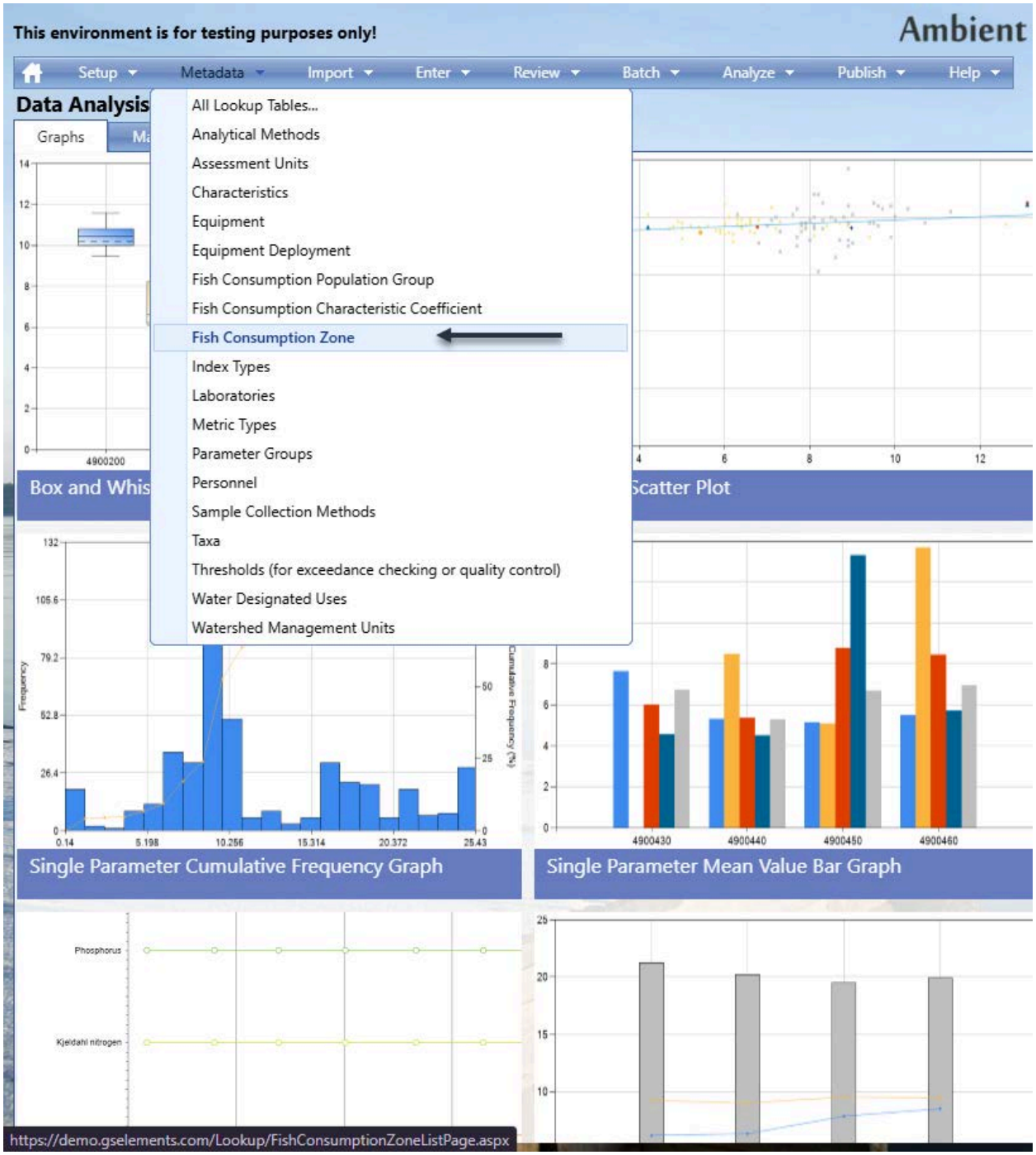
5. To save the new population click the '**Save**' button at the top of the table.

6. Similar to the previous table, to delete a **Fish Consumption Population Group** you can click the *red 'X' icon* next to the group you wish to delete.

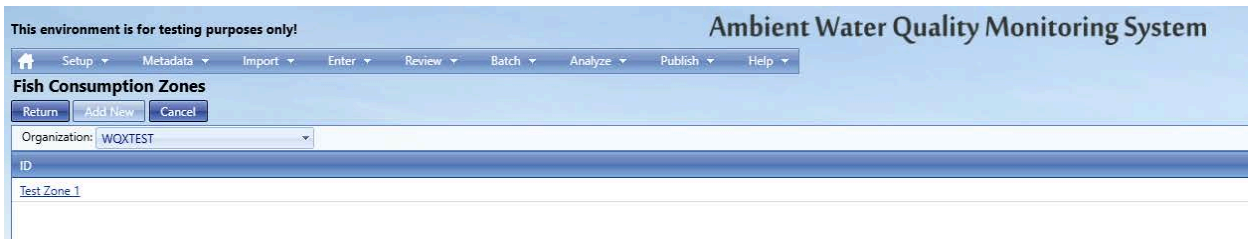
9.1.3 Fish Consumption Zone

With this tool you can store your Fish Consumption Zone information. This includes sorting any monitoring locations in GSE-WQ into the appropriate Fish Consumption Zone(s). It is not required to have monitoring locations to create a Fish Consumption Zone, however it is highly recommended to list any associated locations with the zone.

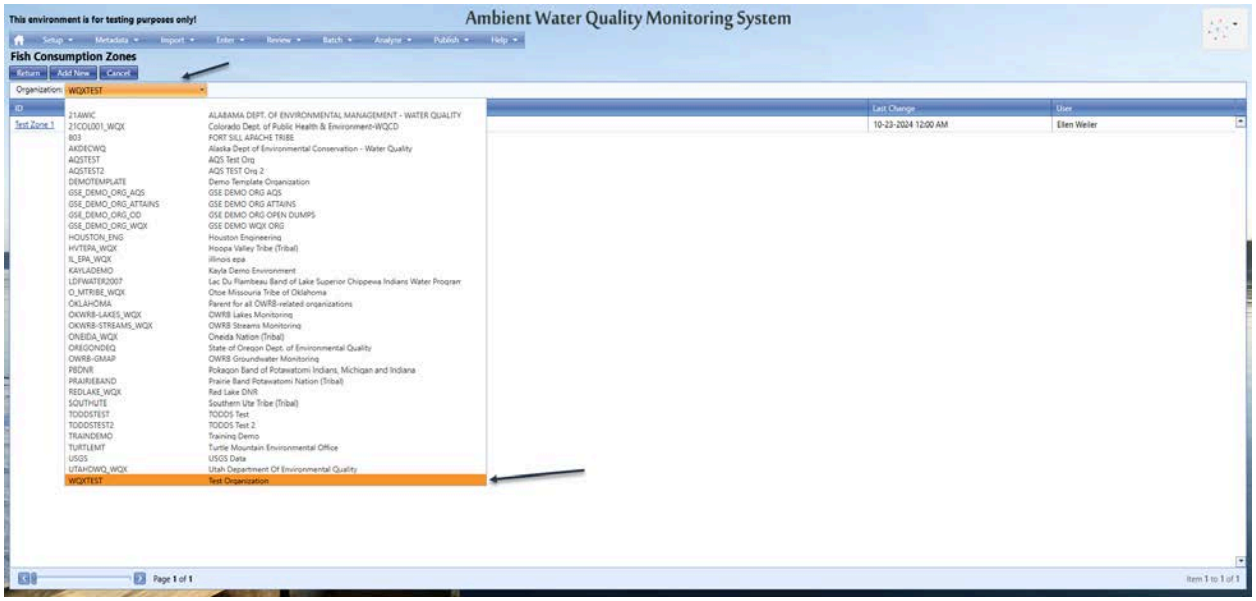
1. To start entering Zone information navigate to the **Metadata** tab and click the *Fish Consumption Zone* table.



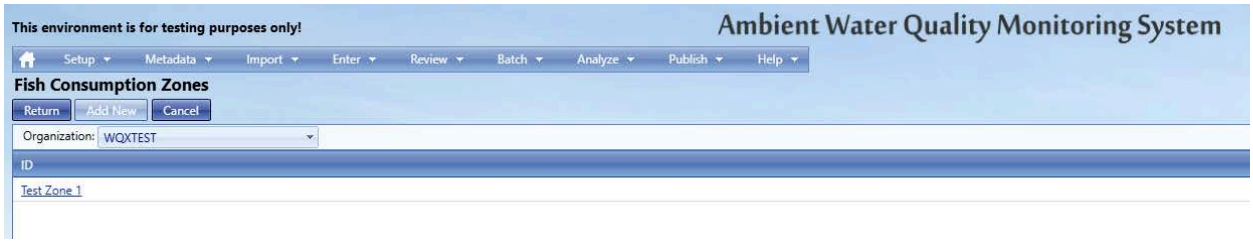
2. Once you have clicked the table, any Zones that have already been entered will be displayed.



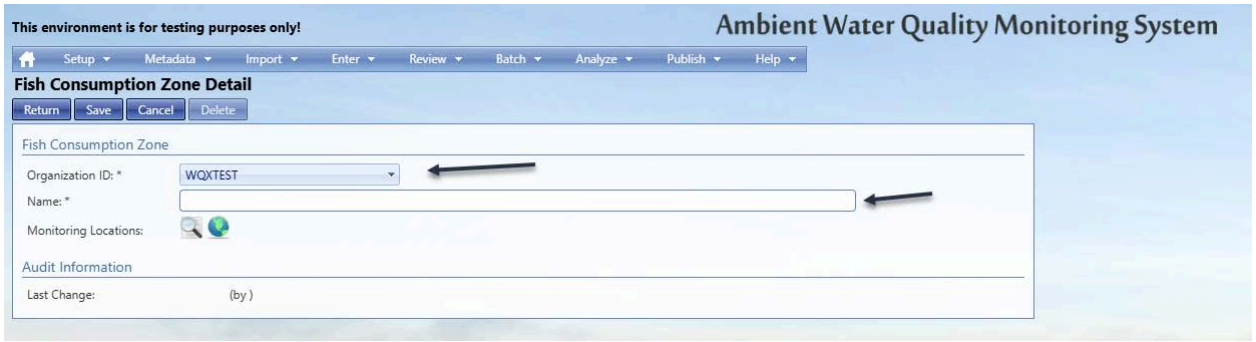
a. To make sure you are seeing the information for your organization click the Organization drop down menu. From the drop down list select your organization.



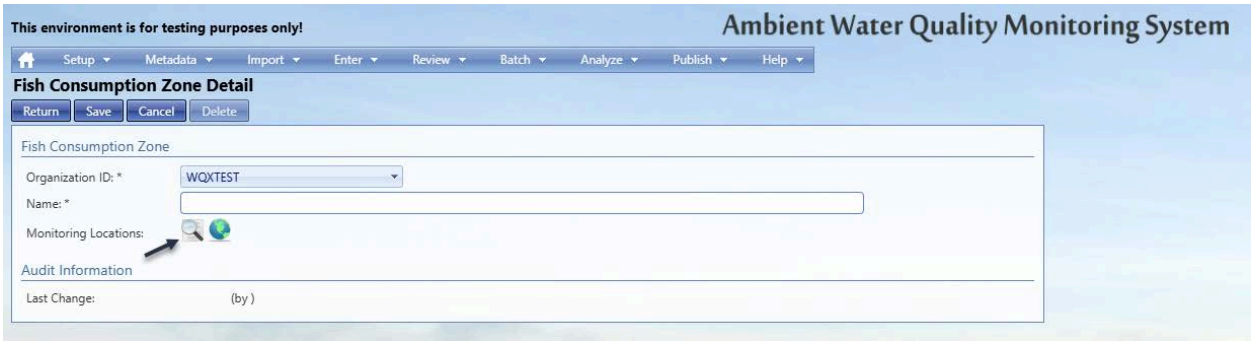
3. To add a new consumption zone click the '**Add New**' button at the top of the table.



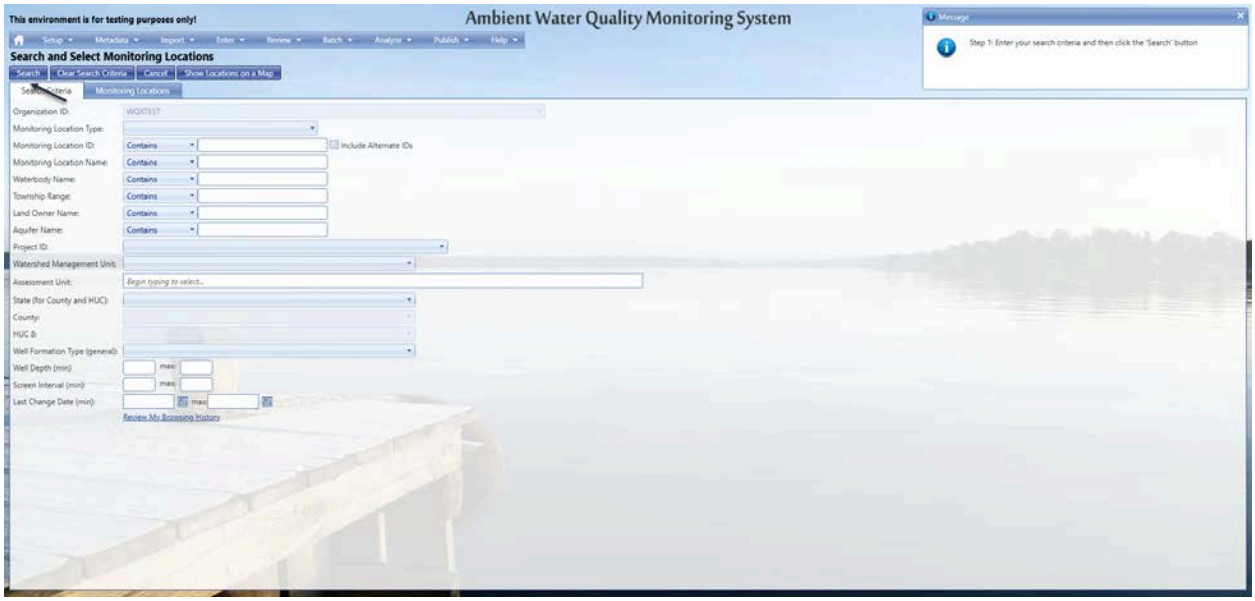
4. A new page will load, on this page you can select the appropriate Organization ID if it isn't already selected. It should automatically populate with the organization you selected previously. You will also be able to name the Consumption Zone and, if applicable, select any monitoring locations that are in the Consumption Zone. It is recommended that you select the monitoring locations associated with the Fish Consumption Zone.



5. Any field of information with an asterisk is a **required** field of information. Monitoring locations are not required, but, if you would like to add them to your Consumption Zone click the *magnifying glass icon*.



6. After clicking the *magnifying glass icon* a new Search page will appear. Click the '**Search**' button at the top of the page.

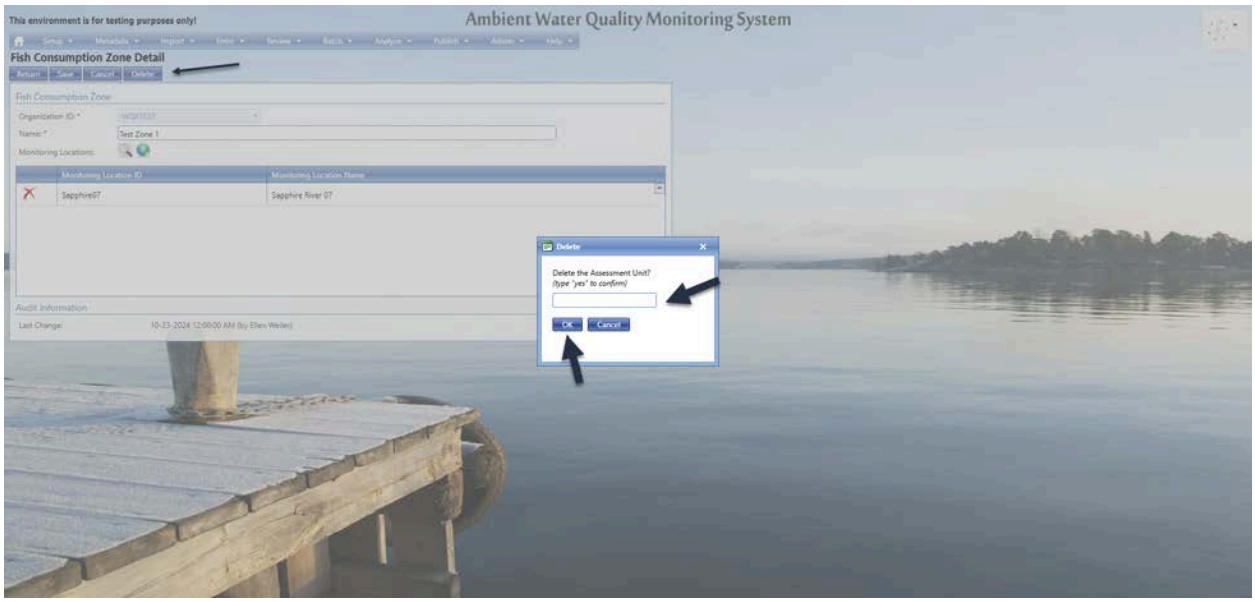


7. After clicking the '**Search**' button a list of Monitoring Locations will appear. From here you can select individual locations by clicking the boxes on the far left. Once you have selected your desired locations, click the '**Accept Select Locations**' at the top of the page.

8. You will now see the selected locations on the Fish Consumption Zone page. To store this Fish Consumption Zone in GSE-WQ click the '**Save**' button at the top of the page.

9. If you need to delete a **Fish Consumption Zone**, click on the Zone you wish to delete. At the top of the page you can click the '**Delete**' button. The system will ask you to confirm your decision by typing '**yes**' before deleting.

   a. After typing '**yes**', click the '**OK**' button in the pop up window and your Fish Consumption Zone will be deleted from the table.



9.2 FCAS Exports

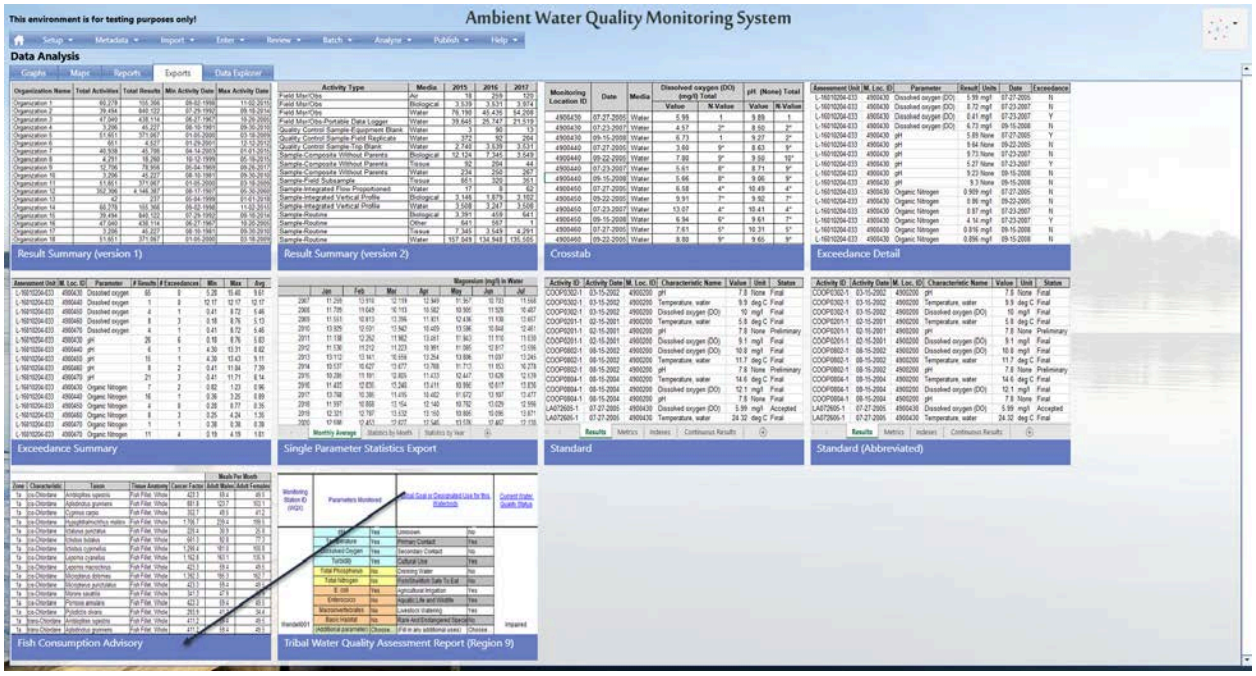
With this tool you will be able to export the FCAS data in the GSE-WQ system and specifically export that data in a reportable format. This example will assume that data pertaining to Fish Consumption is already entered or imported into GSE-WQ. It will also assume that you have entered Fish Consumption Metadata into GSE-WQ for your organization.

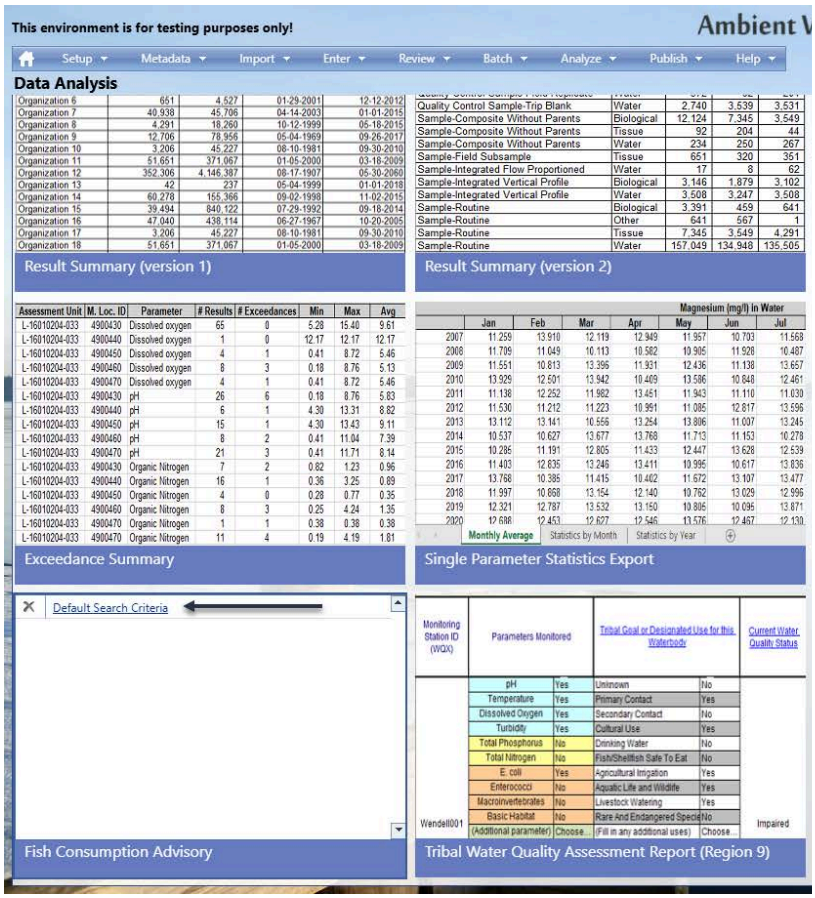
If you haven't imported or entered any data pertaining to Fish Consumption go to 1.5.3 to see instructions on how to import data or 1.5.6 to see instructions on how to enter data.

To see instructions on how to enter data into Fish Consumption Metadata Tables go to 15.1.

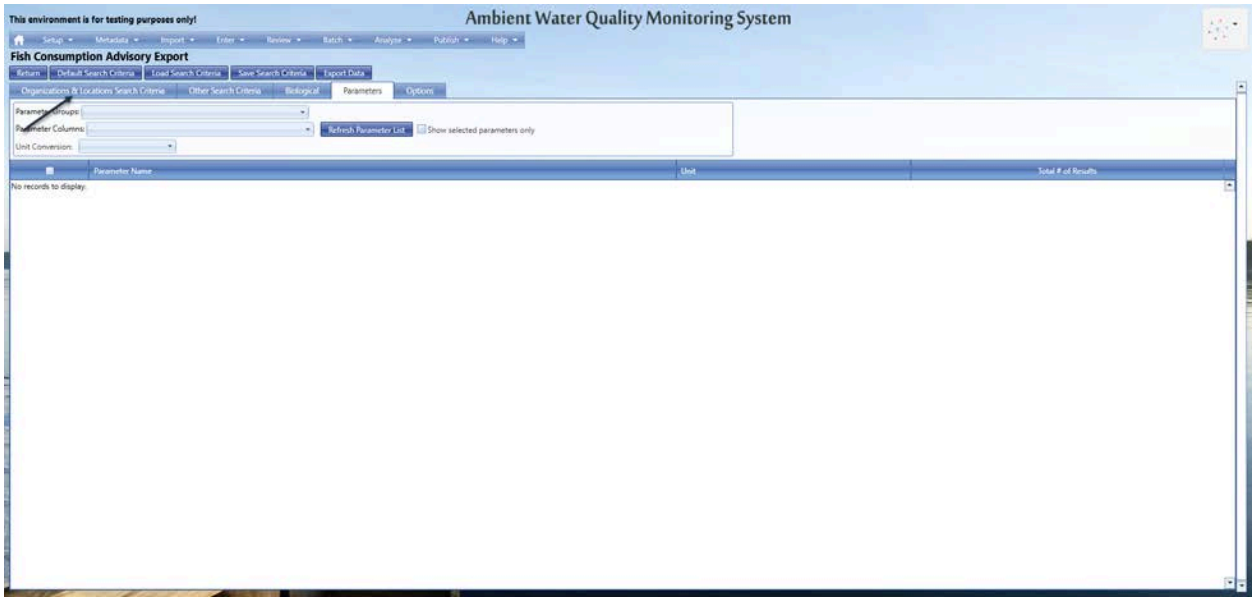
1. To export your FCAS data, navigate to the **Analyze** tab and click the *Exports* option.

2. On the **Exports** page, select the *Fish Consumption Advisory* export option towards the bottom of the page. Hover over the export and click the hyperlink titled ‘Default Search Criteria’.

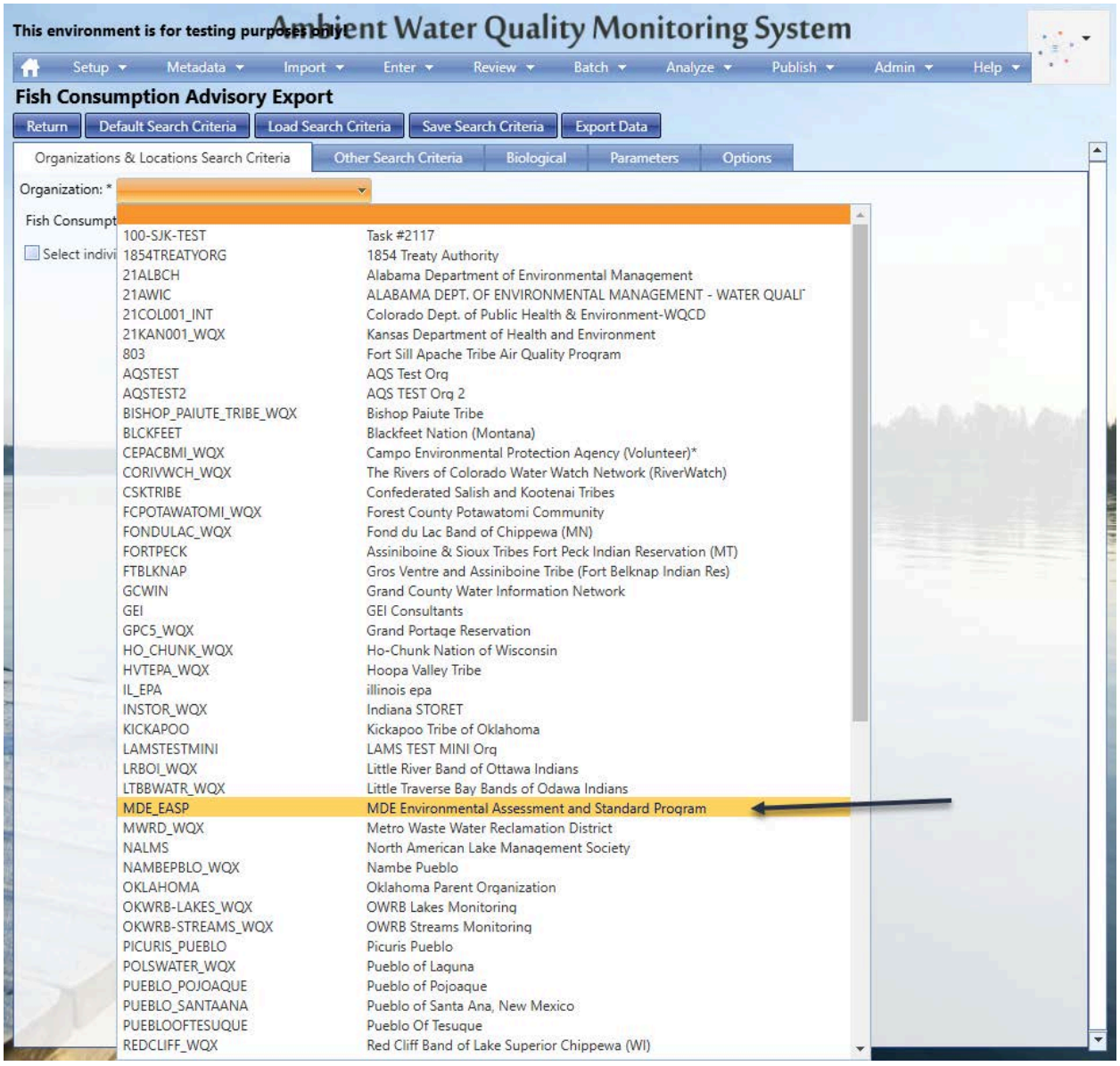




3. After selecting FCA Export, a new page will appear with 5 tabs. Start building your export by clicking the '**Organizations & Locations Search Criteria**' tab.



4. On this tab you will need to start by selecting your organization from the drop-down menu. This field is **required** to export the data.



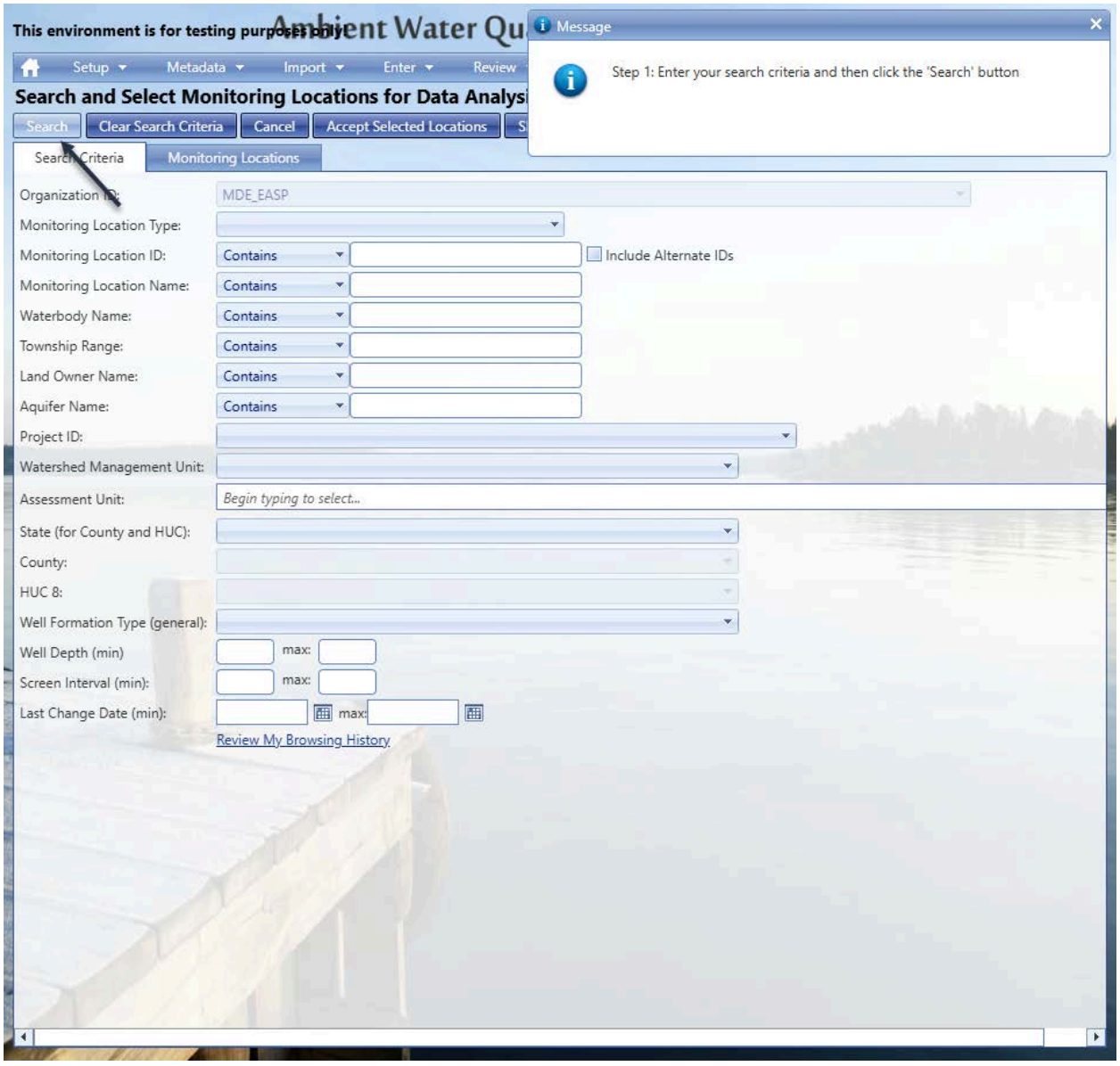
5. From here you can also fill in information such as Fish Consumption Zone and individual monitoring locations. The drop down list for Fish Consumption Zones will show any zones that have been previously entered into the Fish Consumption Zone Metadata

Table. You can enter Fish Consumption Zone information into this table at any time. For further instructions on that process see 15.1.3.

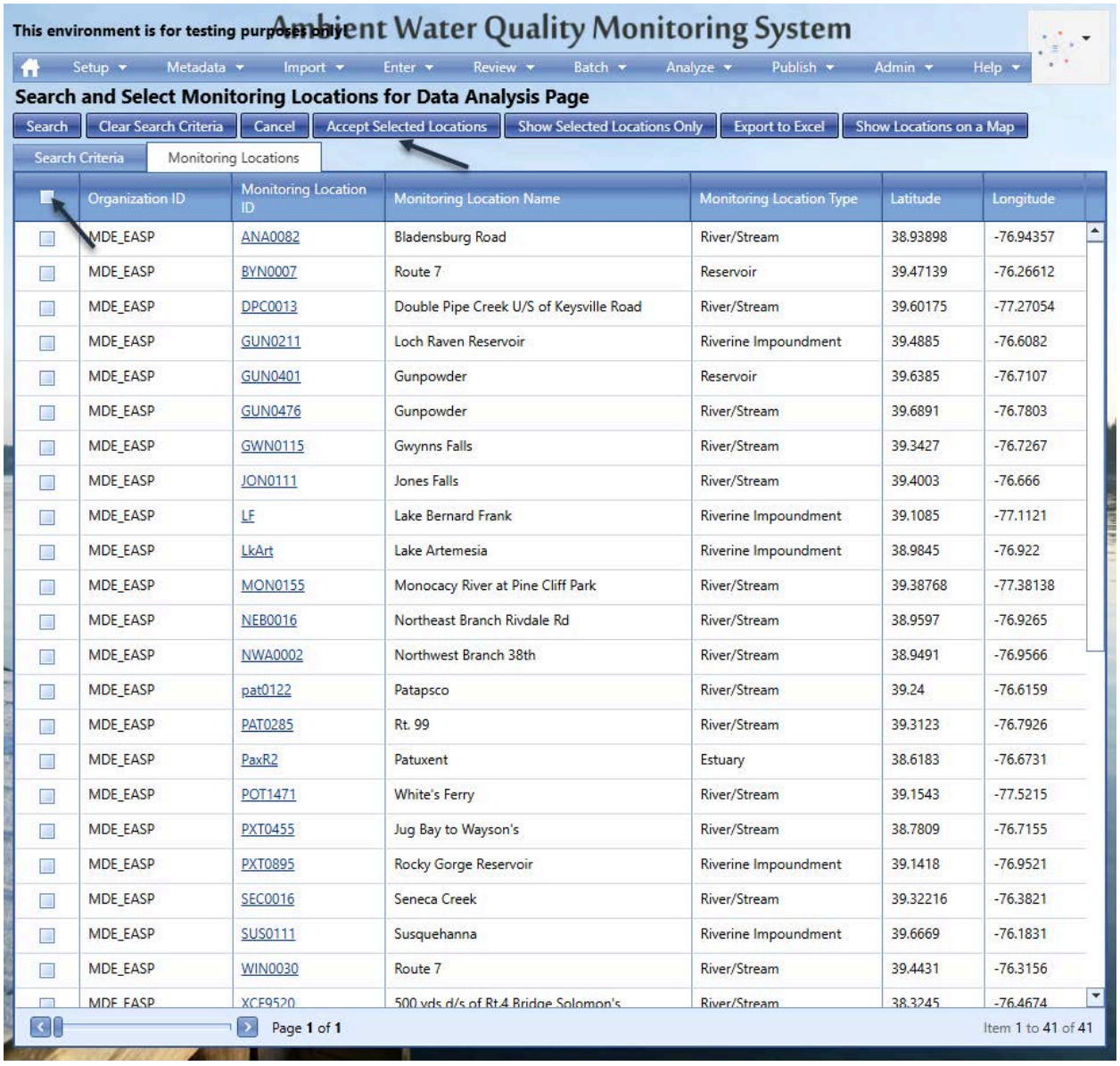
6. You can also choose to select specific monitoring locations you would like to include on your Fish Consumption Advisory Export. If you don't select any individual locations then all locations with Fish Consumption data will be included on the export.
    a. To start selecting individual locations, first check the box next to the field.

7. After clicking that box, a new table will appear. Start by pressing the *magnifying glass icon*.

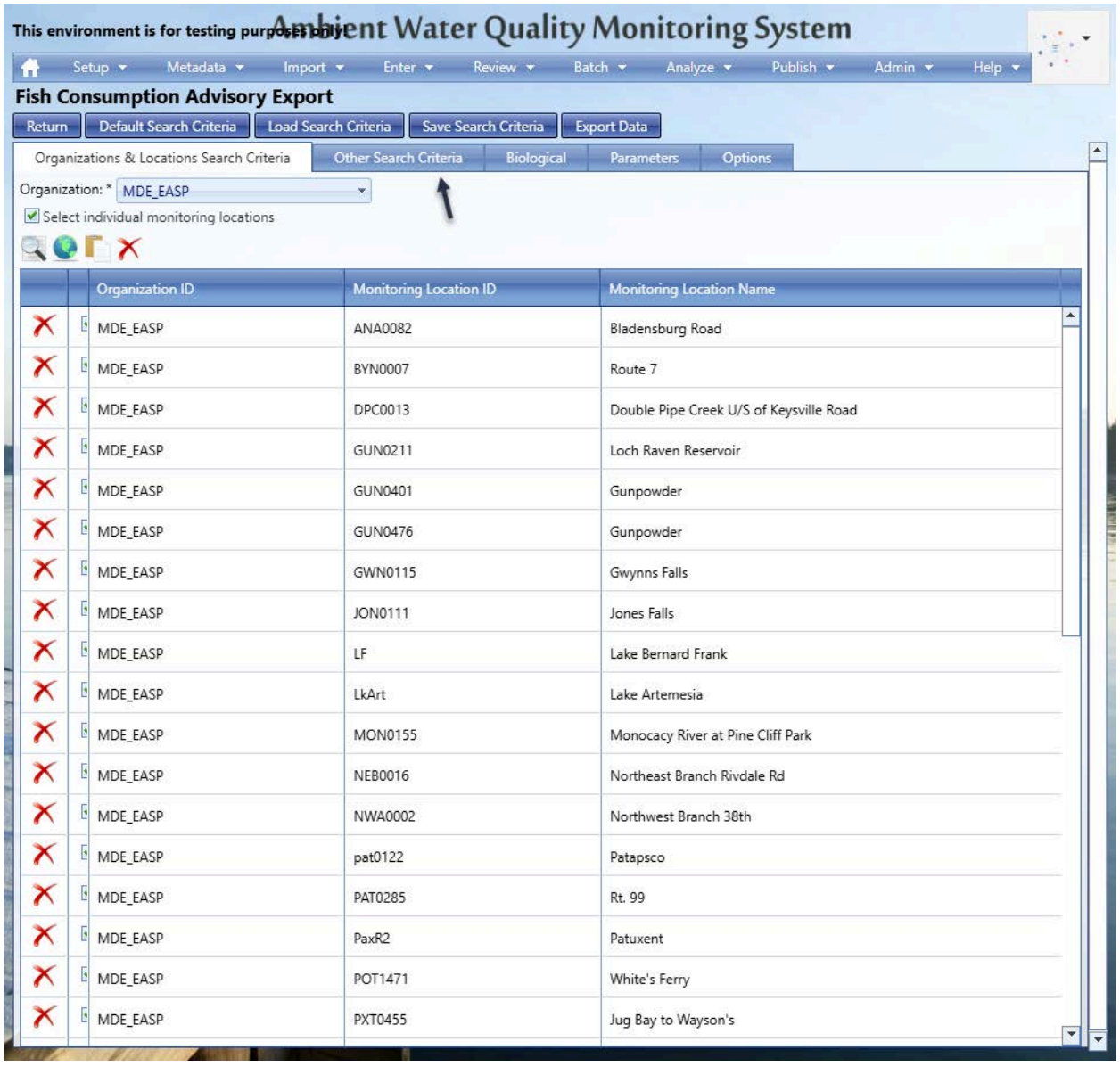
8. This will bring you to a new search page, to see a list of monitoring locations in your organization click the '**Search**' button.



9. On the list of monitoring locations, you can select individual locations by clicking on the boxes found on the far left of the table. Then click the '**Accept Selected Locations**' button at the top of the page. For this example, all locations were selected by clicking the box at the top left of the table.



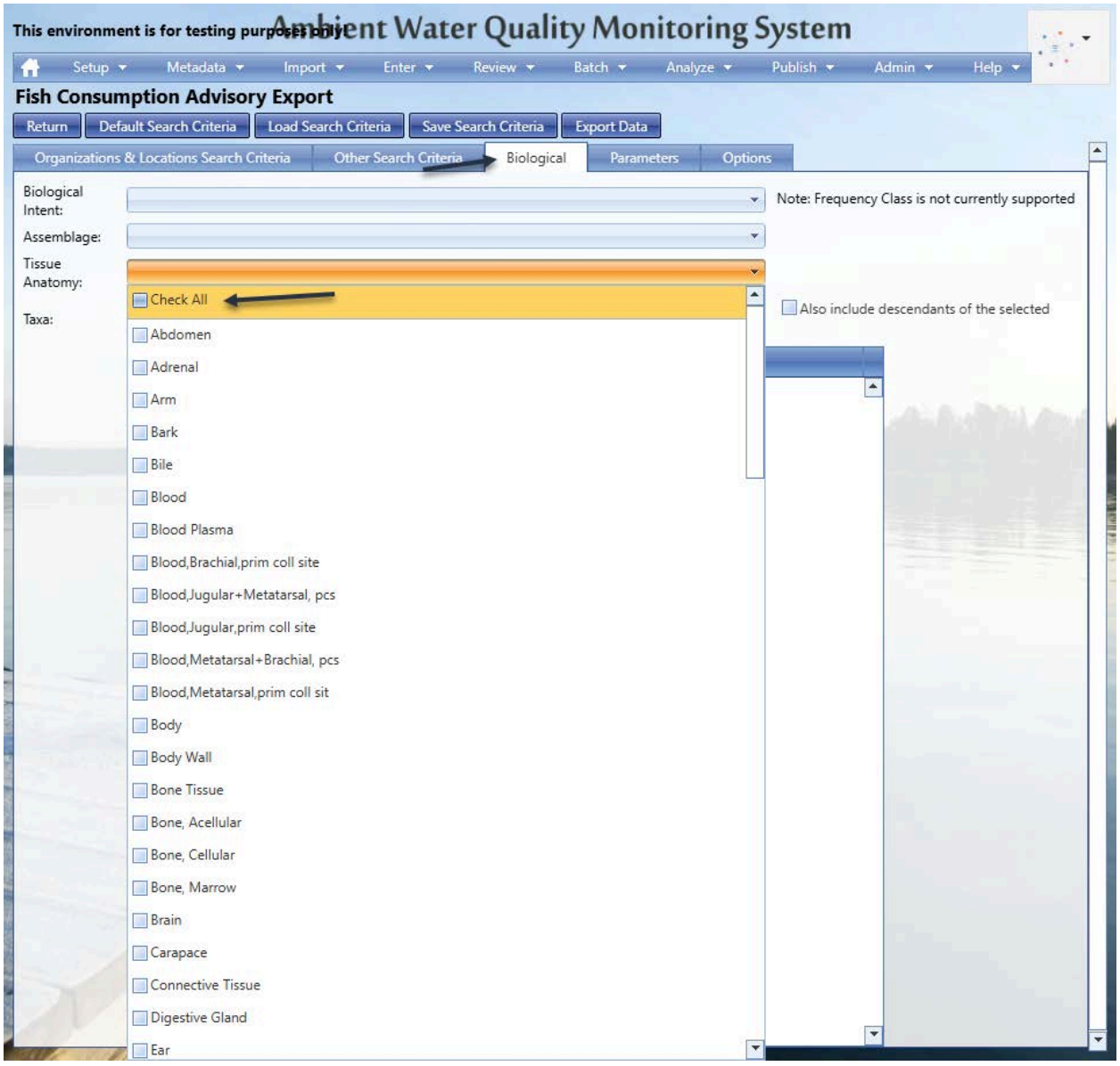
10. Now you should see the table is filled with the locations you selected. After filling in the '**Organizations & Locations Search Criteria**' tab navigate to the '**Other Search Criteria**' tab next to it.



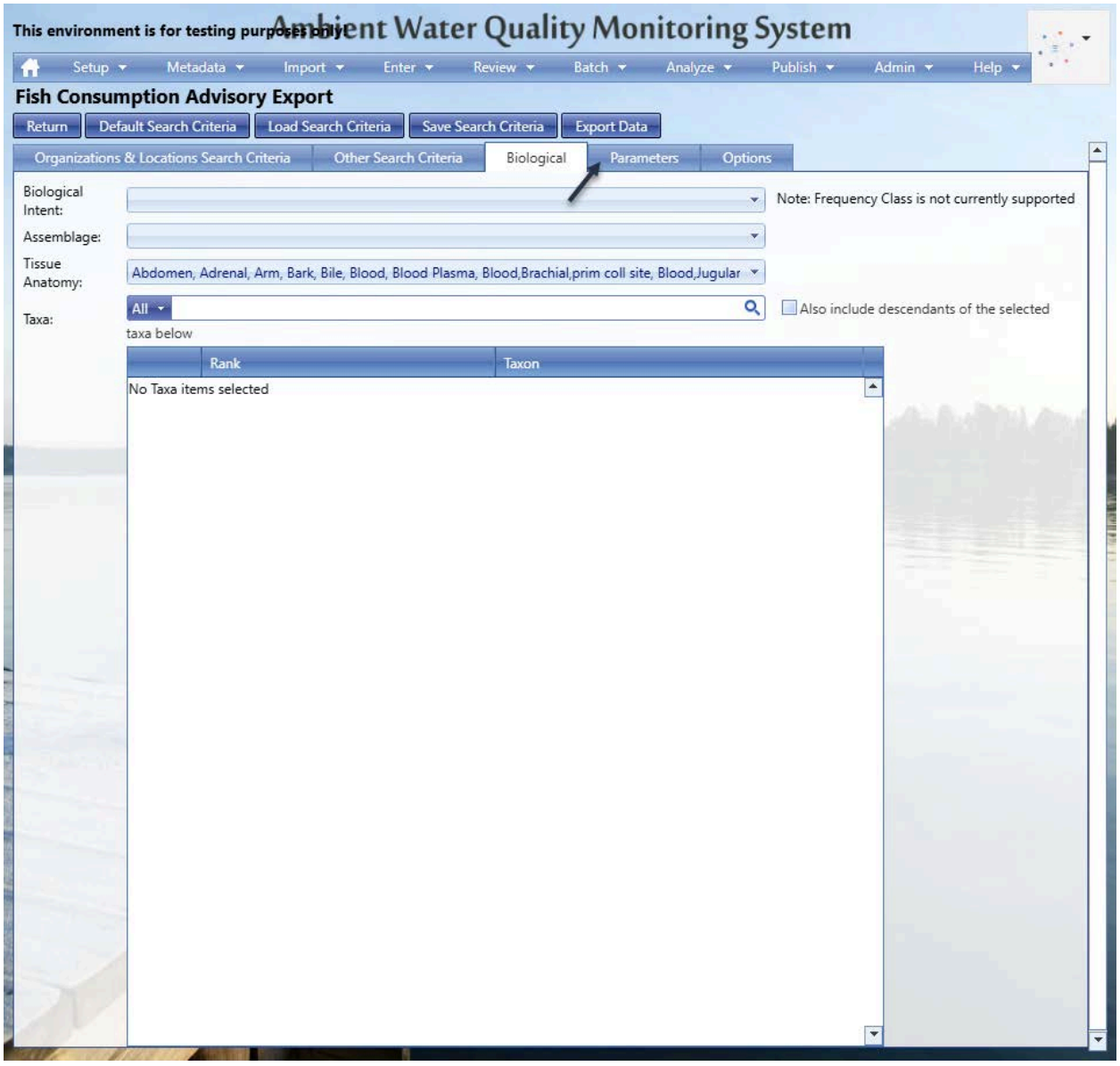
11. On this tab you will narrow down the data you want on the export by Dates and Activity Type. A date range is **required** for this export, you can select an absolute date range and enter the dates you would like. Or you can select a relative date range that goes back by years, month, weeks, or days. For this example, a relative date range of the past 5 years was selected.

a. You are also **<u>required</u>** to select an Activity Type, which you can choose from the drop down menu in that field. For this example, all Activity Types were selected.

12. Then you will navigate to the next tab, the '**Biological'** tab, to enter any biological data that is relevant to your export. It is <u>recommended</u> to at least select an applicable Tissue Anatomy or click '**Check All**' to provide all Tissue Anatomy options. For this example, all Tissue Anatomy options were selected.



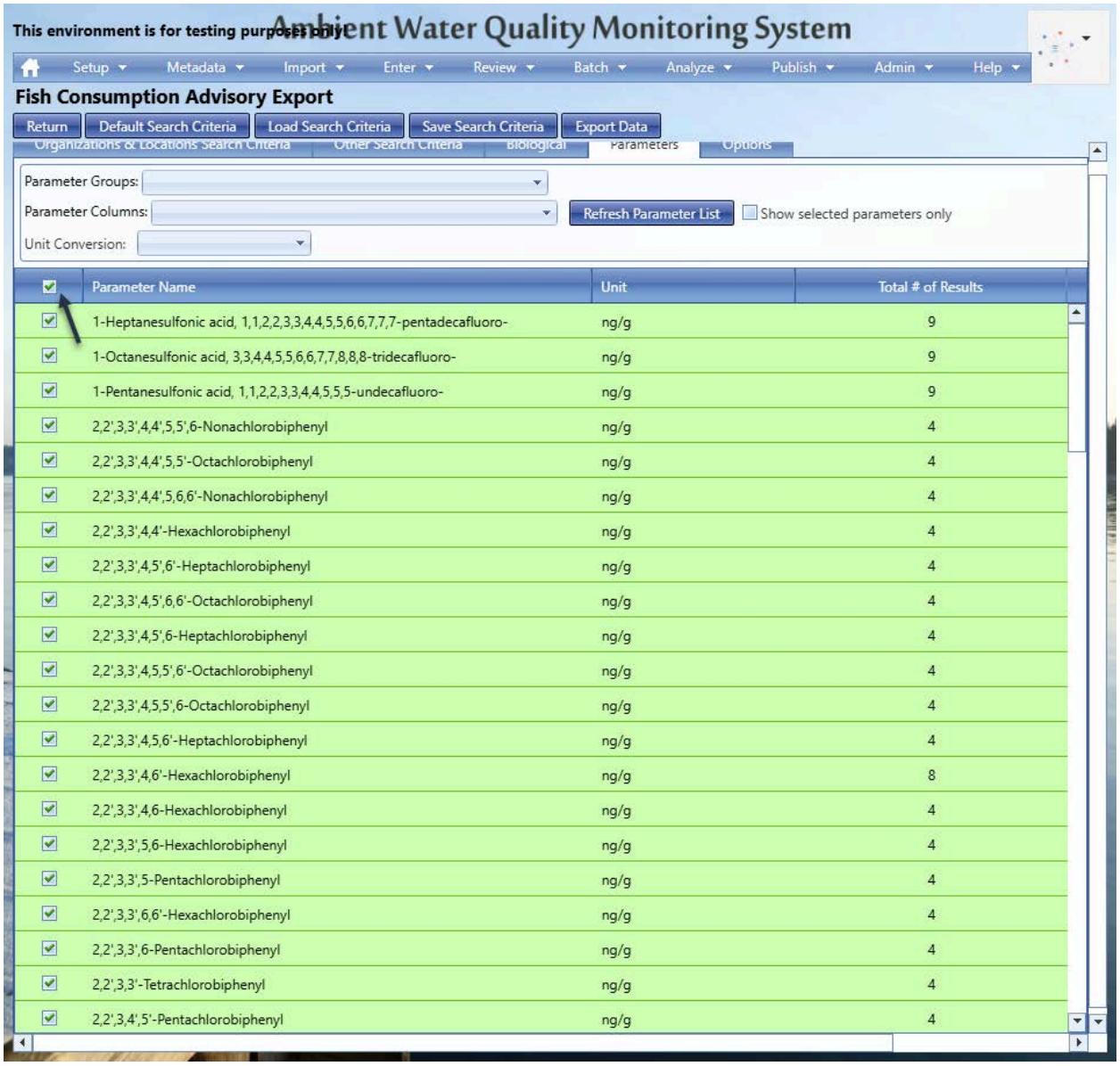
13. You are also able to select the '**Biological Intent**' or '**Assemblage**' you would like. You can use the '**Taxa**' search to filter your results to include only specific taxa. Once you have made your selections for '**Biological Intent**', '**Assemblage**', and '**Taxa**' you can navigate to the Parameters tab.



14. On the Parameters tab, you will first see a blank table near the bottom. To see parameters first click the '**Refresh Parameter List**' button. This will show all the parameters that match the search criteria you just filled in on the previous tabs.

15. After refreshing the list you should see parameters populate the table.
    a. If you **<u>don't</u>** see any parameters after refreshing try changing the search criteria on previous tabs. For example, extend the range of time that you entered on the '**Other Search Criteria**' tab.

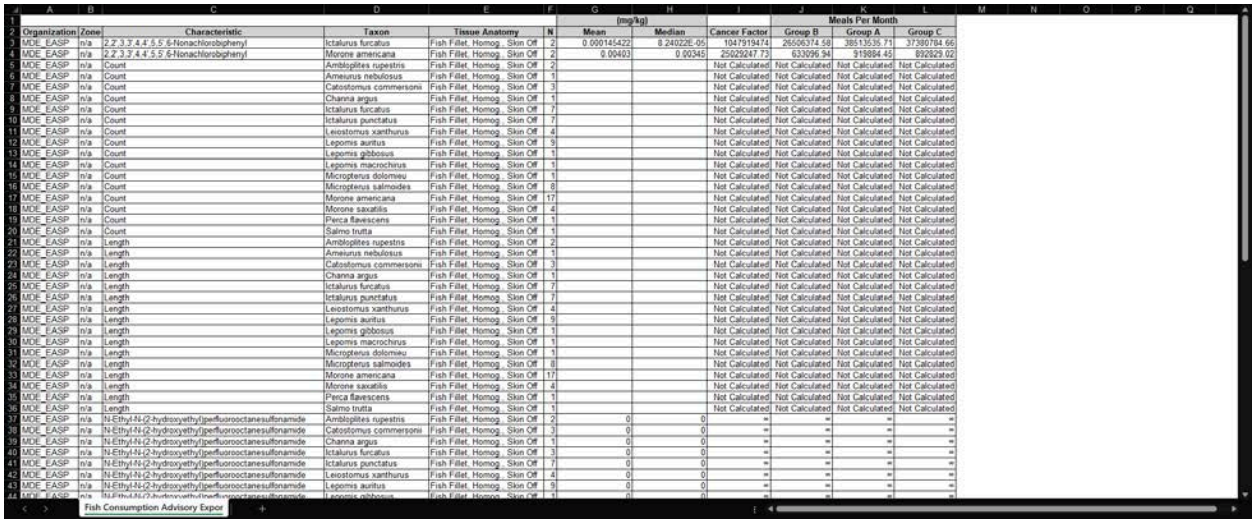
b. To choose what parameters you want on the Export, select the boxes on the far left of the table. If you select the box at the top of the table it will automatically select every parameter.



16. Then navigate to the '**Options**' tab. None of the options on this tab are required, but you can select which population groups you would like to have notated on the export.

17. One this page there is also an option to round digits on your export on the '**Options**' tab.

18. Now you can select the '**Export Data**' button and an excel file will download with your FCA data. See the example below.

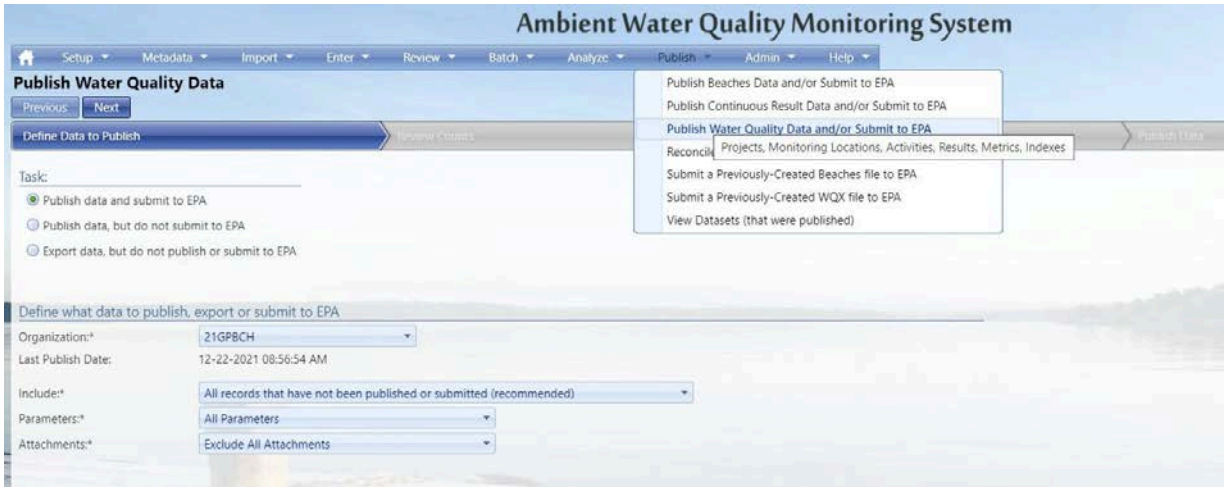


10 Publishing / Submitting Data to WQX

The publish tool publishes and submits your data to the EPA directly from the GSE-WQ application in one step.

GSE-WQ will track the status of the submission at CDX and automatically download relevant documents (for example, Processing Report) so you can follow up on any issues that may have occurred while the file was being processed by the WQX System.

1. Hover on Publish and Click on “Publish Water Quality Data and/or Submit to EPA”.
2. You have three tasks to choose from: **Publish data and submit to EPA, Publish data, but do not submit to EPA, Export data but do not publish or submit to EPA.**
3. The system will automatically generate certain submission features for a new WQX submission file. Be sure your correct organization, what you want included, parameter groups, and attachments are selected.
    a. **Parameter groups** are a way to filter your output to only include results relating to a specific group of characteristics or taxa. These must be set up before use in your Metadata.
    b. **Include** options:
        i. **All records that have not been published or submitted (recommended)**: the most comprehensive list available
        ii. **All records that have changed since a specific date**: by selecting this a new criteria box will appear where you can enter the date range
        iii. **Manually defined subset**: the type of data drop down menu will appear for you to select which data
    c. **Attachment** options:
        i. Exclude All Attachments
        ii. Exclude Private Attachments
        iii. Include All Attachments



Select the **Next** button when you have selected your appropriate conditions.

GSE-WQ will load the record counts screen, where you can review the number of records that will be published based off the criteria you selected above.

If the record counts are correct, click Next. Or click Previous to go back to the previous screen to make the appropriate corrections.

GSE-WQ will then allow you to review the data. You can select the entity you want to review.

If the data looks correct, click Next.

Finally, you'll be brought to the Publish Data page. You will ensure that the task is correct and fill out the Submitter Information and click Finish.

The Submitter Information is used to populate the header that is part of every Exchange Network Submission File. This section is automatically populated from the data from your User Detail Page. Correct any of the header information as necessary. It helps identify who submitted the file and allows you to add any comments that might be helpful (mostly for internal use) in understanding what this dataset includes.

After clicking Finish, the system will display the Dataset Summary page. When datasets are being imported or exported the Dataset Summary Page has a simplified layout. The page provides information regarding the status of a dataset, including the percent complete and a count of any warnings or errors logged so far. An animated image will spin to remind you that an active process is running on the server.

You can navigate away from the page within GSE-WQ if you would like, just do not close the program.

When the task is complete, the Dataset Summary Page will display an additional table with links to files that you can download.

WQX Submission ##### Update.zip - This is your WQX Submission File (zipped up). The numeric portion of the name will be different each time. Even if you submitted this file directly to CDX, you are encouraged to download a copy of this for your own records (so that you have a backup copy of each file sent to EPA).

ValidationResults.xml - This is a report produced by CDX when it compares your submission file against the WQX XML Schema document (which is a document that describes the format that every WQX Submission File must follow). Typically you will not need to view this document because it will just say that the document was valid. If, for some reason, you never receive the next two documents mentioned below, you should view this document to see if it describes a problem with your file. If it does, you should follow up with EPA because this may suggest a bug in the system that needs to be resolved.

Notify.xml - This is a copy of the final response that the WQX System sent to CDX when it was done processing your submission file. Typically you will not need to view this document because it will just state the final status of your submission (which you already have on this page) and remind you to view the Processing Report (next) to view the outcome of your submission. Once again, if, for some reason, you never receive the next document mentioned below, you should

view this document to see if it describes a problem that occurred in the WQX System. If it does, you should follow up with EPA because this may suggest an issue in the WQX System that needs to be resolved.

ProcessingReport.zip – This is a report of everything that was logged in the WQX System while processing your submission file. It's not critical to look at this file if your dataset status is "Completed at CDX" because all of your data loaded successfully and there is nothing more you need to do. It still may be useful to download and save this file for your records because it contains information that could be useful to you or EPA at some future time. If your final dataset status is "Failed at CDX", however, this file is critical for you to look at, because it contains information about errors while processing your submission file in WQX.

A few details to note when downloading documents from the Dataset Summary Page:

- Certain types of documents will often load in your browser window. Typically, this is true for .txt and .xml files.
- Zip files are helpful, especially by unzipping the file locally and then open the XML File found inside (ProcessingReport.xml). If you open the processing report in Internet Explorer it will be converted to a web-based report using a stylesheet created by EPA. This provides a more user-friendly format (see below) but also only provides a summary of the errors. If you want to view each individual error you will need to open the XML document in a text editor.

When the processing at CDX is completed, the dataset will have one of the following statuses:

- Failed at CDX - At least one error was logged while processing the file in the WQX System at CDX.
- Completed at CDX - No errors were found while processing the file in the WQX System at CDX. All of your data successfully loaded.

Keep in mind that the WQX System will only reject records with errors. So every Project, Monitoring Location, Index, Activity and Activity Group that loaded without error will be in the WQX System even if your dataset status is "Failed at CDX".

11 Data Analysis using Graphs, Reports, Maps, and Exports

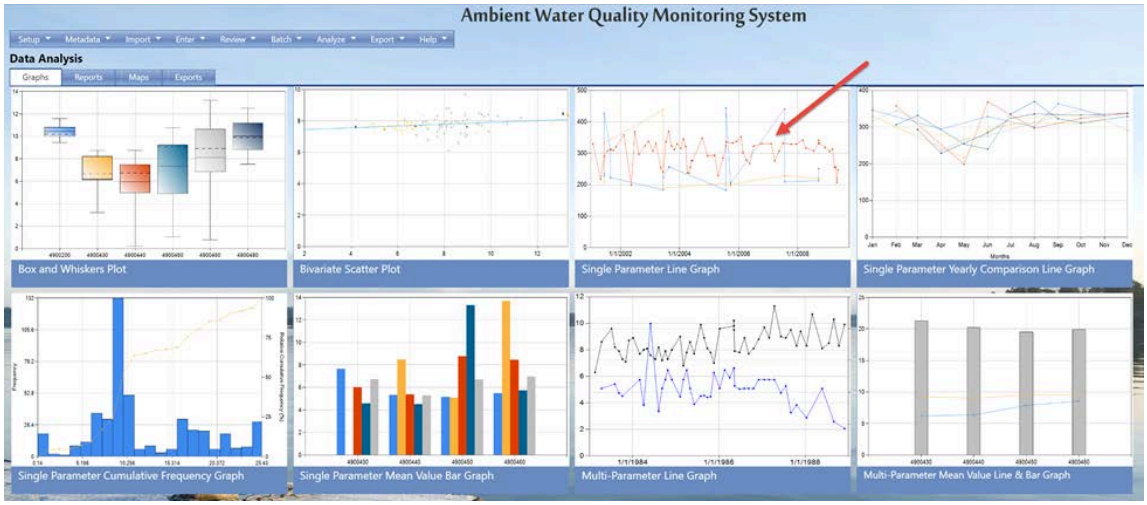
11.1 Common Steps and Features When Generating Graphs, Reports, Maps, and Exports

The general procedures for obtaining a graph, report, or export from the system are the same regardless of the type.

You navigate to a criteria page specific to the desired type of graph, report, map, or export and enter the criteria that define what data will be included. (Certain criteria will only be available when appropriate, depending on the type of graph, report, or export).

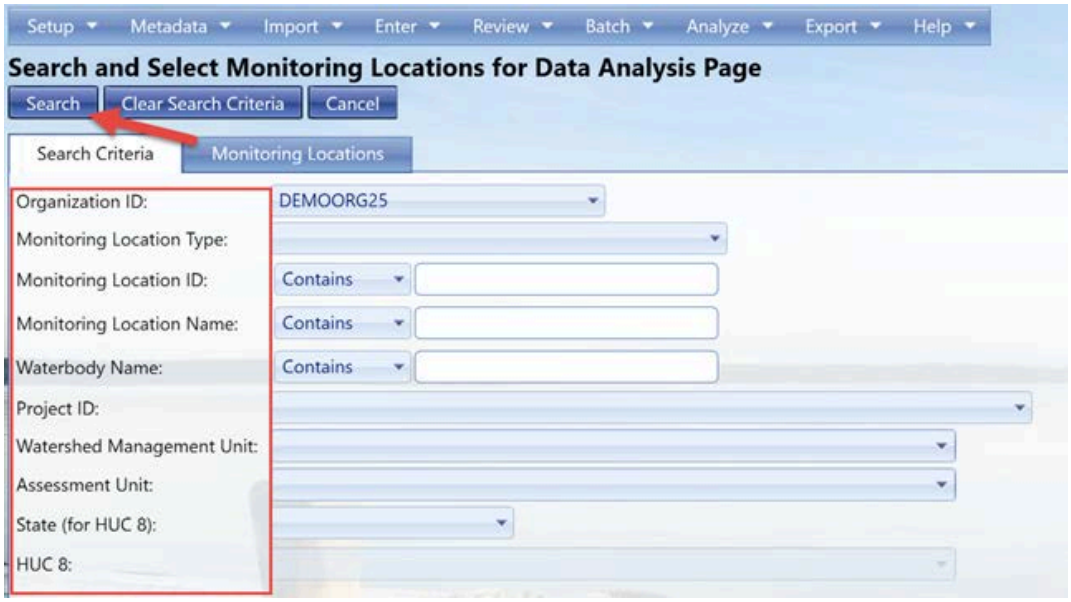
1. Hover over **Analyze** and click on **Graphs, Maps, Reports, Exports, Explorer**.

2. The options for graphs will be displayed. Click Single Parameter Line Graph for example.

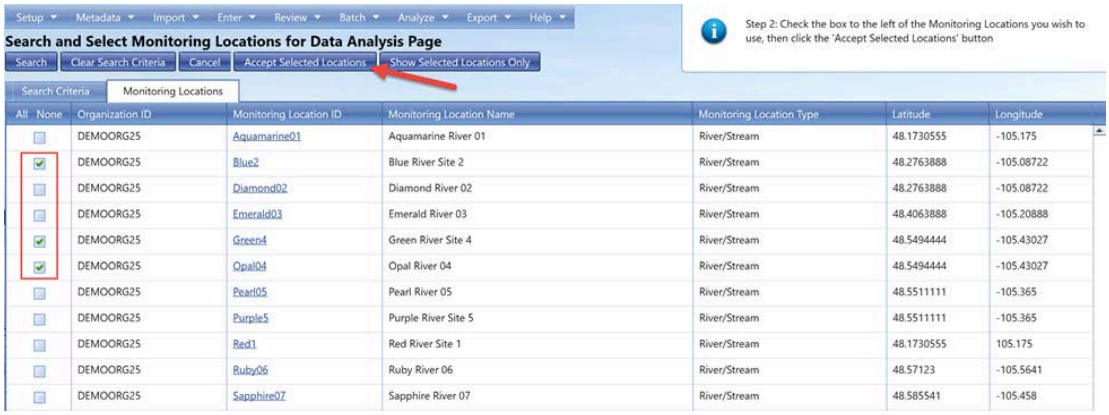


3. The single parameter line graph search criteria page will be displayed. First and foremost, the monitoring locations search criteria tab will be displayed.

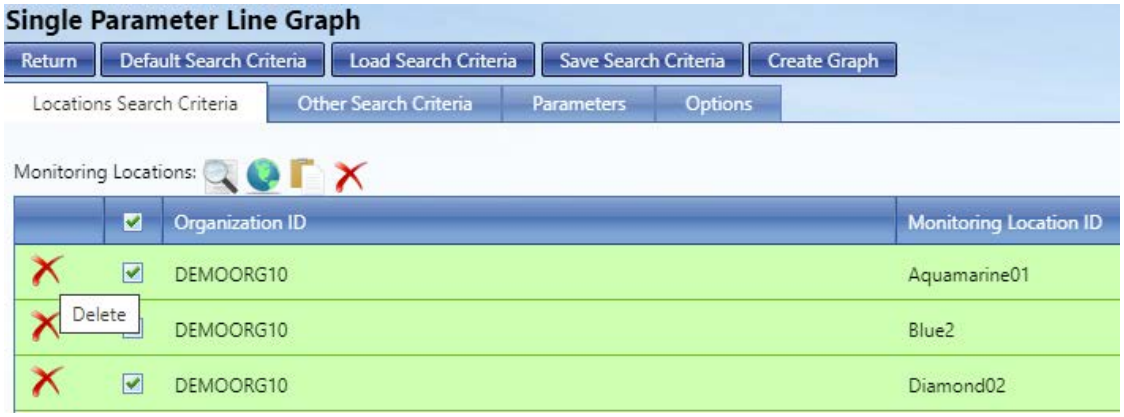
Click on the magnifying glass to go to the search criteria page to filter locations.



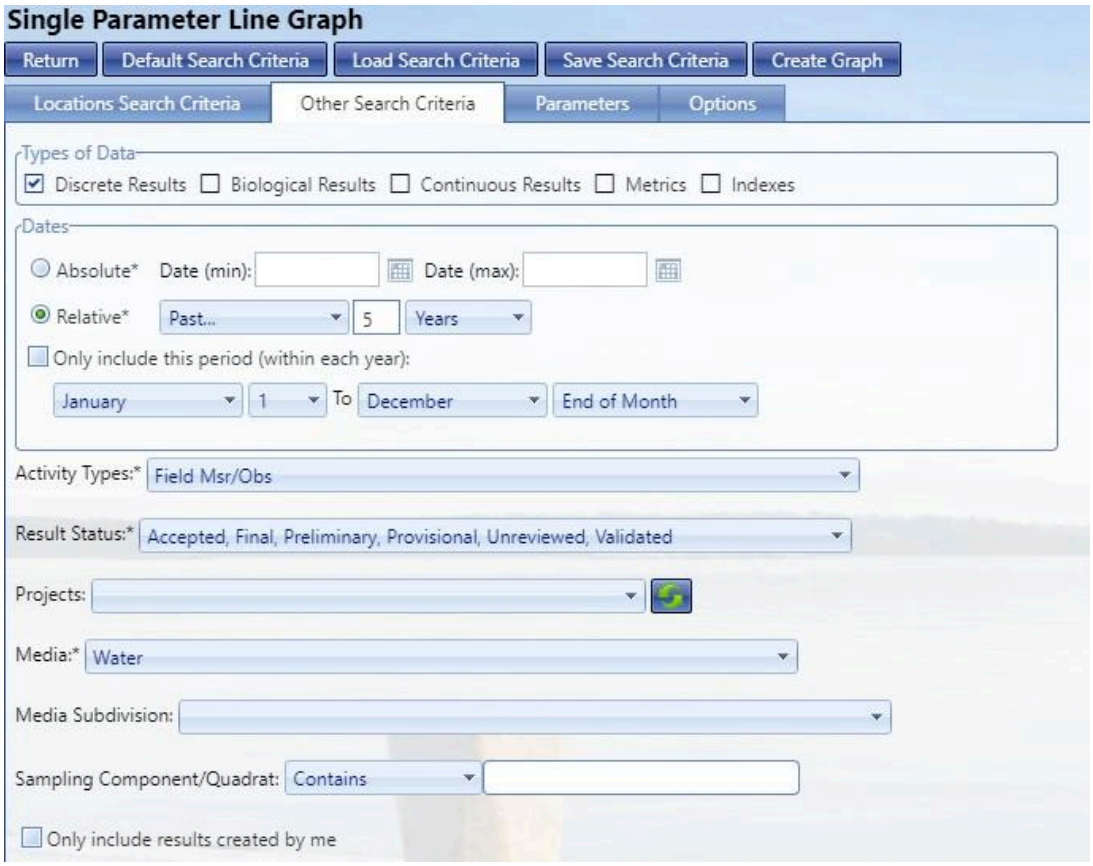
Use the search parameter fields to filter the list of Monitoring Locations. Click Search and the Monitoring Locations list page will populate. Check the box next to the Monitoring Locations that should be added. You can conduct several searches, if necessary. Click the Accept Selected Locations button, when finished, to return to the Data Analysis Criteria page and add your Locations to the criteria.



Unwanted Monitoring Locations may be removed from the list by clicking the X link. Additional Monitoring Locations may be added by clicking the Search Criteria button again.



4. Moving over, click the Other Search Criteria tab. Here you will enter your data range, activity types, result status, project, and media you want to include as a part of your graph.



Types of Data: You can select which type of data you would like to include by checking a box.

Activity Date: You have two options for a date range: absolute and relative. Absolute is best entered in the standard GSE-WQ Date format. However, it is somewhat flexible; allowing both dashes and slashes. The calendar icon next to the field allows you to select the data using a pop-up calendar. **Date (min)** must be before or equal to your **Date (max)** and vice versa.

Activity Type: You can select which activity types you would like to include by checking items in the drop-down menu.

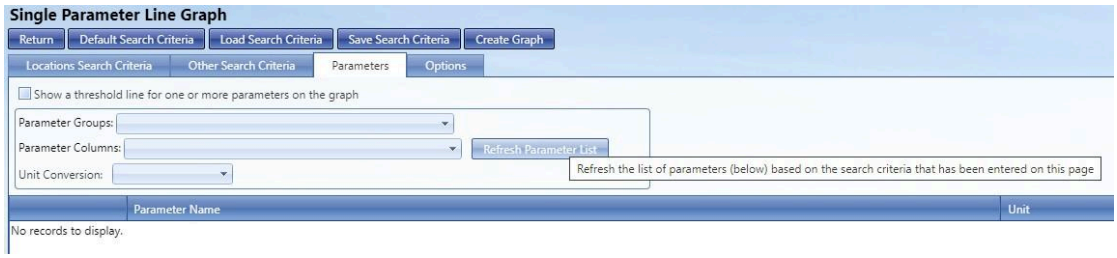
Result Status: Which results should be included. At least one selection is required. *Note for certain analysis tools, the results must be flagged as “Public”. Meaning, the result status must be listed as Accepted or Final*

Projects: You can select to only use results from a certain project(s)

Media: You can only compare results of one media type at one time.

Note, wherever there is an Asterisk in GSE-WQ that field is required.

5. Once you are finished with that tab, move over to the **Parameters** tab. Here you need to click **Refresh Parameter List** so the system can generate your parameters based on the criteria you just entered.

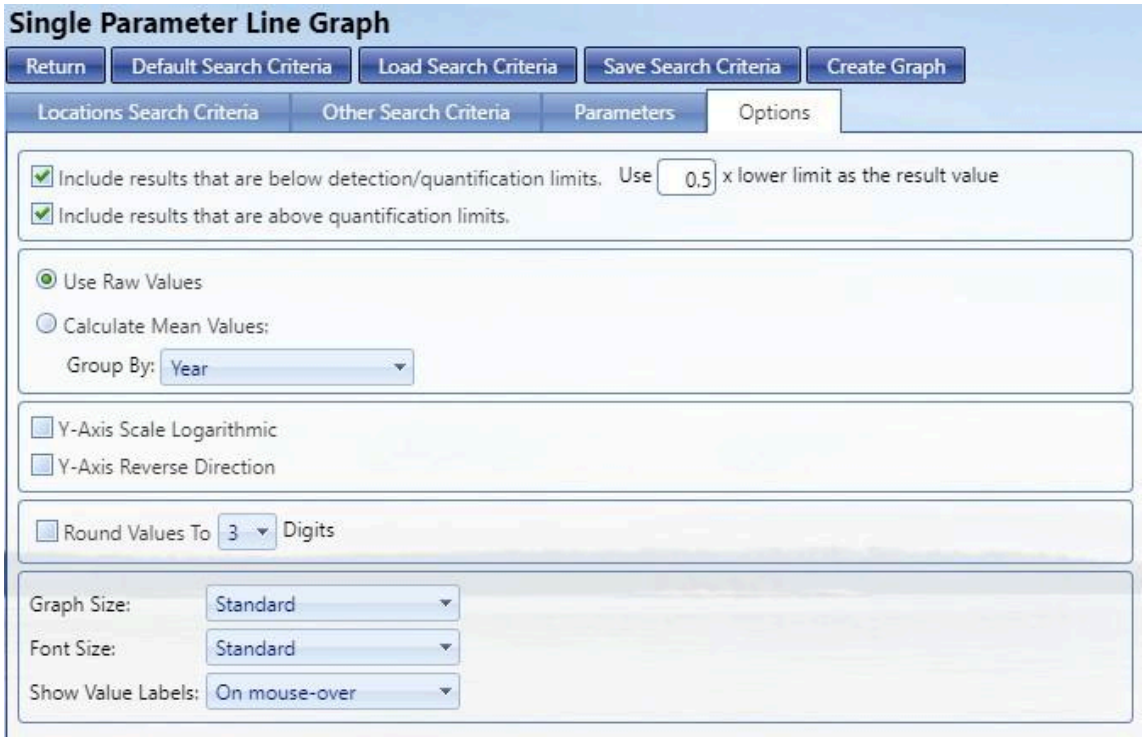


A list of parameters will appear along with the number quantified. Select which parameter you would like to see on your graph

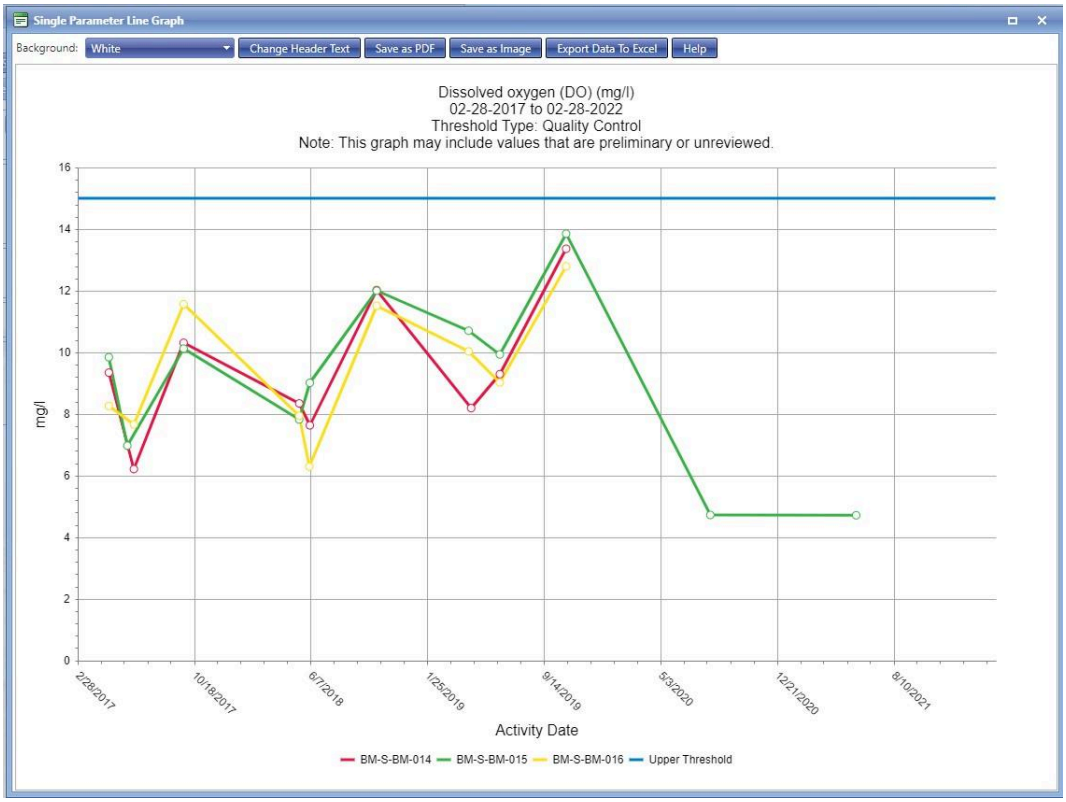
If you would like, you can select your threshold group by first checking the box next to “Show threshold line for one or more parameters on the graphs”. Next, you will select which threshold type: acute, chronic, other, or quality control. Lastly, you will select your threshold group. Select the radio button **Show Thresholds on Graph** to see your thresholds on your graph with the data.

To view certain parameter groups, parameter columns, and/or unit conversion you can select that as well from the drop-down menus.

6. Before creating your graph, go to the final tab, **Options**. Here you can select specific options for your detection limits, what kind of values to use, and graph.



7. Click Create Graph, the system will validate the criteria and option that you have specified.



If the criteria and option values are valid, the system will generate and display the graph or report (or will give you the option to display or save in the case of exports). Otherwise, the system will respond with an error message that indicates what the problem is.

Other import notes common to all reports, graphs, and export criteria pages:

- You can clear all criteria values from the Data Analysis Criteria page by clicking the **Default Search Criteria** button.
- Select the **Return** button to return to the previous page (this would typically be the *Data Analysis* page if you are at a criteria page and would typically be a criteria page if you are looking at a dataset summary page for an export).
- The application has a status setting for results with allowed values of “Accepted,” “Validated,” “Rejected,” “Preliminary,” and “Final.” Each criteria page will have a multi-select list that allows you to select which status or statuses to include. This could potentially be used to filter out “outlier” values if their status is set to something other than the status that is selected for inclusion in the graph, report, or export.
- Depending on how a picklist in the criteria page has been filtered (or if it has not been filtered), there may be many values in a picklist. You can “jump” to the desired value more quickly by selecting the drop-down arrow next to the list and then typing the first character of the choice repeatedly until the one you want shows up.
- All reports and graphs display the search criteria used to “filter” the data. Graphs typically display this centered above the graph. Reports display the search criteria in the upper left of the report header.

- All graphs provide an option for you to specify whether to display datapoint values in pop-up tooltips, as labels on the graph, or not at all. If you opt to display datapoint values as pop-up tooltips, the tooltip containing the value will pop up as you move your mouse over the datapoint in the graph.

11.1.1 Saving your Search Criteria

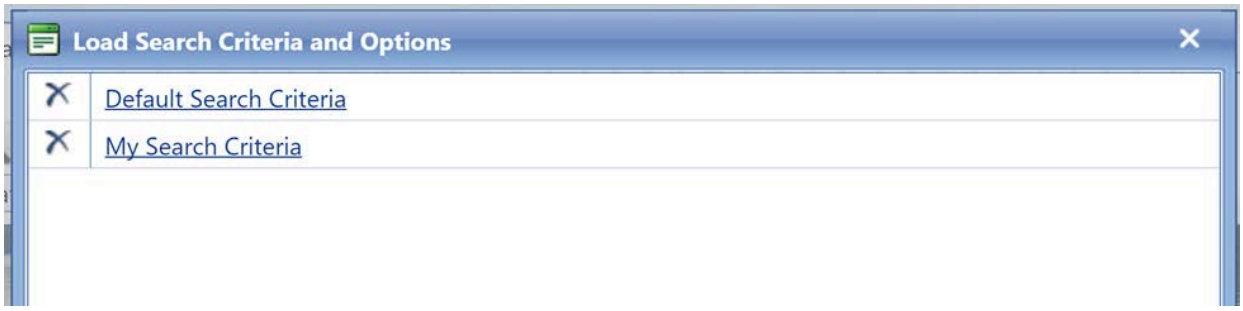
While you are logged into the system, the system will remember the last criteria you entered for a graph and will carry those values to be selected as “Latest Search Criteria” across graph, map, report, or export criteria pages. So when you go to another graph, map, report, or export you will be prompted to select your latest search criteria (if applicable) or your default search criteria.

You can also save a search criterion to use any time in the future. Once you have the search criteria entered how you would like, click Save Search Criteria. *This saves the settings in all 4 of your criteria tabs.*

The pop up will appear where you can select how you would like the search criteria saved and also ask you to name it. You can save your Search Criteria three different ways.

Search Criteria to be used with any graph, map, report, or export:

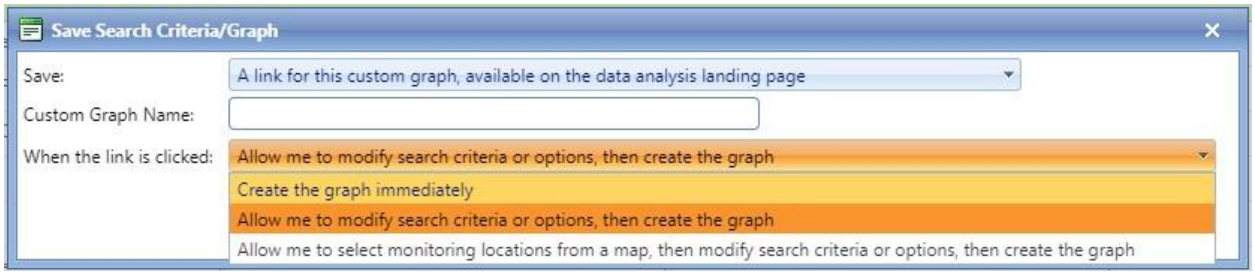
This will allow you to have the default search criteria but you can choose your criteria by clicking “Load Search Criteria”



Changing your Default Search Criteria:

This will make this search criteria into your default.

A link for this custom graph, available on the data analysis landing page:



When the link is clicked, you have the option to create the graph immediately, allow yourself to modify search criteria or options, then create the graph, or allow yourself to select monitoring locations from a map, then modify search criteria or options, then create the graph.

11.2 Overview of Data Analysis Tools Offered in GSE-WQ

11.2.1 Graphs

The below is not a comprehensive list of graphs available in GSE-WQ.

- Single Parameter Line Graph
  - The Single Parameter Line Graph Criteria page allows you to enter search criteria for generating a graph that shows one line per parameter over time. You can choose multiple monitoring locations to compare.
- Single Parameter Mean Value Bar Graph
  - The system provides the capability to generate a bar chart of the mean values (arithmetic average and geometric average) during a given range of time for a single characteristic at one or more locations (with each location listed on the X-axis). This “Single Characteristic Means Bar Chart” is based on result data matching the search criteria that you provide. If a standard value is supplied, the system will graph the standard as a horizontal line.

    - In mathematics and statistics, the arithmetic mean (or simply the mean) of a list of numbers is the sum of all the members of the list divided by the number of items in the list.
    - The geometric mean, in mathematics, is a type of mean or average, which indicates the central tendency or typical value of a set of numbers. It is similar to the arithmetic mean, which is what most people think of with the word "average," except that instead of adding the set of numbers and then dividing the sum by the count of numbers in the set, n, the numbers are multiplied and then the nth root of the resulting product is taken. For instance, the geometric mean of two numbers, say 2 and 8, is just the square root (i.e., the second root) of their product, 16, which is 4. As another example, the geometric mean of 1, ½, and ¼ is the cube root (i.e., the third root) of their product (0.125), which is ½.
- Single Parameter Cumulative Frequency Graph
    - The system provides the capability to generate an ogive curve depicting the frequency of data that is within a class accumulated with the frequencies of the lower classes.
- Multi-Parameter Line Graph
    - The Multi-Parameter Line Graph Criteria page allows you to enter search criteria for generating a graph that shows one line per select characteristic at the specified monitoring location over time.
- Multi-Parameter Mean Value Line & Bar Graph
    - The Multi-Parameter Mean Value Line & Bar Graph Criteria page allows you to enter search criteria for generating a graph that shows one characteristic as a bar and remaining characteristics rendered as lines, all by Monitoring Location sites averaged over time.
- Box and Whiskers Plot
    - The Box and Whiskers Plot displays a Box and Whiskers Plot per location based on result data matching user provided search criteria. A box and whiskers plot is a way of visually summarizing the distribution of a data set at a monitoring location. It shows the 10th percentile and 90th percentile as the “whiskers”. The “box” is defined by the 25th and 75th percentiles. The mean and median are also shown inside the box as a solid and dashed line. If a standard value is supplied, the system will graph the standard as a horizontal line.
- Bi-variate Scatter Plot
    - The bi-variate scatter plot graphically displays correlated measurement values from two characteristics mapped as X and Y coordinates on a plane. This is useful in identifying possible correlations between characteristics (for example, “Does the dissolved oxygen decrease as temperature rises?”).
- Single Parameter Yearly Comparison Line Graph
    - The Single Parameter Yearly Comparison Line Graph page allows you to enter search criteria for generating a graph that shows one characteristic’s mean value at one monitoring location as a yearly comparison.

11.2.2 Maps

- Simple Map
    - The Simple Map is where you can view all the monitoring locations from your organization on a map.
- Interactive Map
    - The Interactive Map is where you can choose specific monitoring locations from your organization and specify further with other search criteria and parameters. Once the map is created, you can interact with it and review available data by creating a table of results, statistics by location report, and a box plot.
- Exceedance Map
    - The Exceedance Map is where you can choose specific monitoring locations from your organization to view on the map. From the map, you can click on an individual location marker to drill into the information on the location.

11.2.3 Reports

- Exceedance Report
    - The Exceedance Report summarizes, per location and per organization, the percentage of sample results per characteristic that exceeded the given standard over a selected period at one or more locations within one or more organizations. The report also shows the individual sample result information upon which the calculation is based and additional statistics per location are provided.
- Statistics by Location Report
    - The Statistics by Location Report shows a table containing statistics for each selection location and parameter. Statistics shown are number of samples, minimum measurement, maximum measurement, median, 90th percentile, exceedance count, exceedance percentage, etc.
- ANOVA
    - The one-way analysis of variance (ANOVA) is a collection of statistical models used to analyze the statistical difference among the means of three or more independent groups.
- Quartiles Report
    - The Quartiles report shows the minimum value, the 25th quartile, the median, the 75th quartile, and the maximum value for a given characteristic at each selected location.
- Site Visit Detail Report
    - The Site Visit Detail Report gives a detailed analysis of a selected group of monitoring locations for your organization. It displays all the characteristics sampled there on each date (between a specified date range) and their details.

11.2.4 Exports

- Results Summary (version 1)
    - The Results Summary export shows a list of organizations in the system. For each organization in the list, the export shows the Minimum Activity Date,

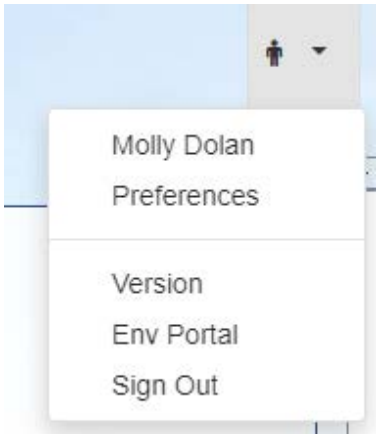
Maximum Activity Date, Total Number of Activities, and the Total Number of Results.

- Result Summary (version 2)
    - The Results Summary export shows a list of organizations in the system. For each organization in the list, the export shows the Total number of results, the number of results in the last 90 days, the year to date, and last WQX Export.
- Crosstab
    - The Crosstab Export generates a “crosstab”-style spreadsheet containing a list of Activities and the corresponding values for any related characteristic results. Each activity is listed once and there is one column per characteristic.
- Standard
    - The Standard Export generates a standard WQX-formatted Excel file containing a list of Activities and the values for any related characteristic results.
- Standard (Abbreviated)
    - The Standard (Abbreviated) Export works exactly as the Standard Export does with the one exception that the abbreviated version exports fewer columns based on a specification provided by the State of Utah Division of Water Quality.
- Exceedance Detail
    - The exceedance detail report is a detailed report of your exceedances based off your saved thresholds or manually entered thresholds for a set of monitoring locations.
- Exceedance Summary
    - Much like the exceedance detail export, this is a report that details your exceedances. The Exceedance Summary however is more abbreviated compared to the detail export.
- Fish Consumption Advisory Export
    - The Fish Consumption Advisory Export shows a detailed report of your Fish Consumption Advisory based on your organization and fish consumption zones. The export shows detailed information including characteristics, taxons, tissue anatomy, cancer factors, etc.

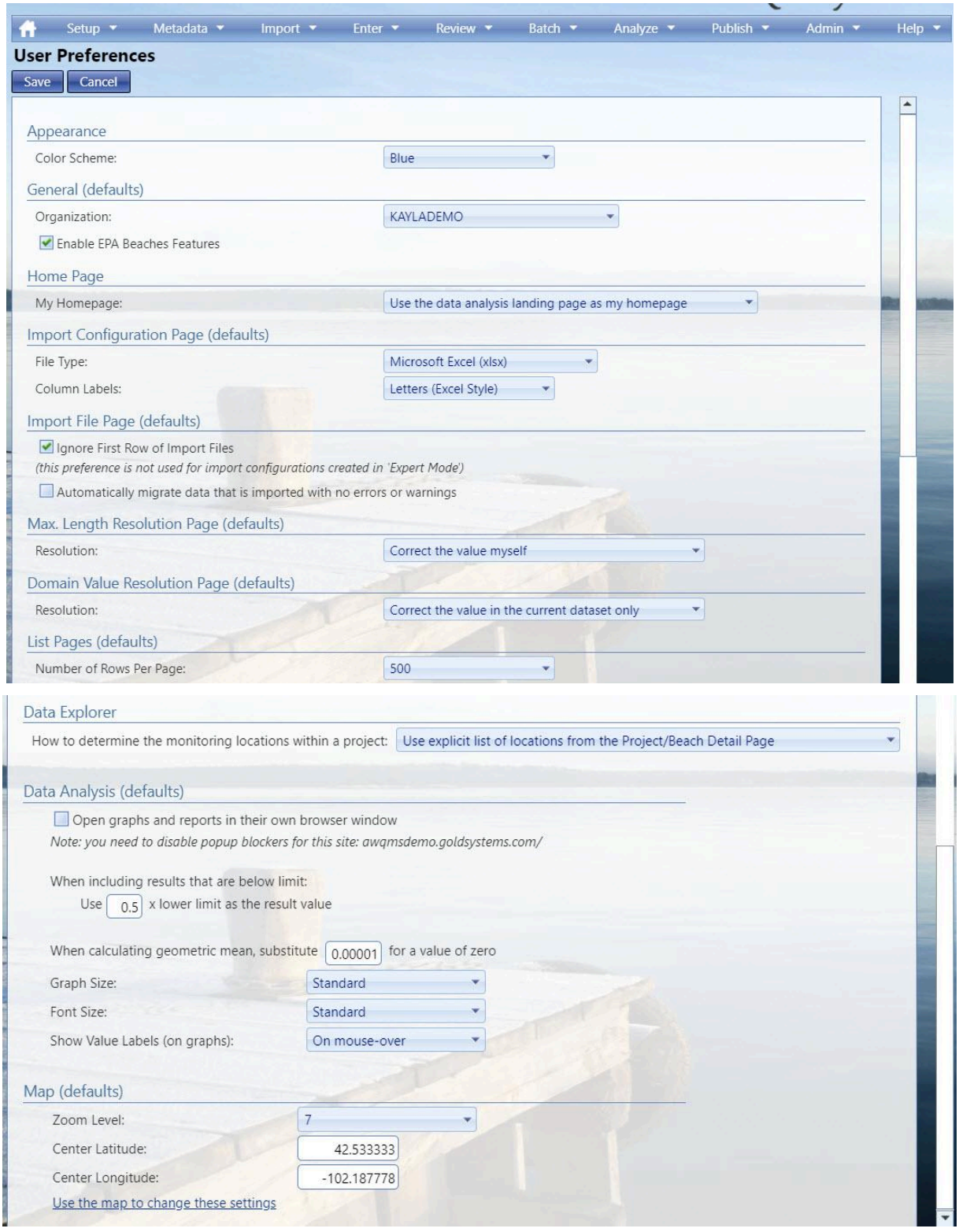
12 Setting your User Preferences

Use the User Preferences Page to customize the way you want the system to behave.

Hover over the User icon in the top right corner and click on the Preferences.



The User Preferences page will be displayed.



The preferences currently available are:

Appearance - You can change the color scheme to be better adapted for the user experience

Organization - Default. For users associated with many organizations in GSE-WQ, this preference allows you to specify which organization should show up in the Organization search filter field in the list pages and the DAT criteria page.

Import Configuration Page - File Type default (can be changed at time of import as well). Column Labels can be also set as letters (excel style) or numbers as your default.

Import File Page - Ignore the first row of import files. This sets the default value for this check box on the Import Configuration Page and can be overridden each time you import a file. You can also select to automatically migrate your data as long as there are no errors or warnings.

Max Length Resolution Page - Resolution. This sets the default value for this field on the Max Length Resolution Page. See the Max Length Resolution Page for more information.

Domain Value Resolution Page - Resolution. This sets the default value for this field on the Domain Value Resolution Page. See the Domain Value Resolution Page for more information.

List Pages - Number of results per page. Allows you to specify the number of results from the result set to display initially and each time you select one of the pagination buttons at the bottom of the list page. Unless the number of results is evenly divisible by this number, the last page will only display the remainder of the result set.

Monitoring Locations sort order. Whether to sort by Monitoring Location Name or by Monitoring Location ID when the user selects the Monitoring Location column header in the list pages.

Data Explorer - Allows you to choose how to determine the monitoring locations within a project: use explicit list of locations from the Project/Beach Detail Page or use implicit test based on the projects and locations on activities in the system.

Data Analysis Criteria Page - These preferences provide default values for search criteria and reporting and graphing options available when running reports, graphs, and exports in the DAT. Use of these preferences mitigates having to reenter the same selections each time the DAT is used. See the sections on DAT reports and graphs for more information regarding the effects of the specific values of these preferences when running reports and graphs.

You can select to open graphs and reports in their own browser window (note, pop ups will have to be disabled for this feature to work).

When including results that are below limit: Use N x lower as the result value and When including results that are above limit: use N x upper limit as the result value.

When calculating geometric mean, substitute N for a value of zero. If this preference contains a value for N, the system will default N to the corresponding field in the DAT criteria page.

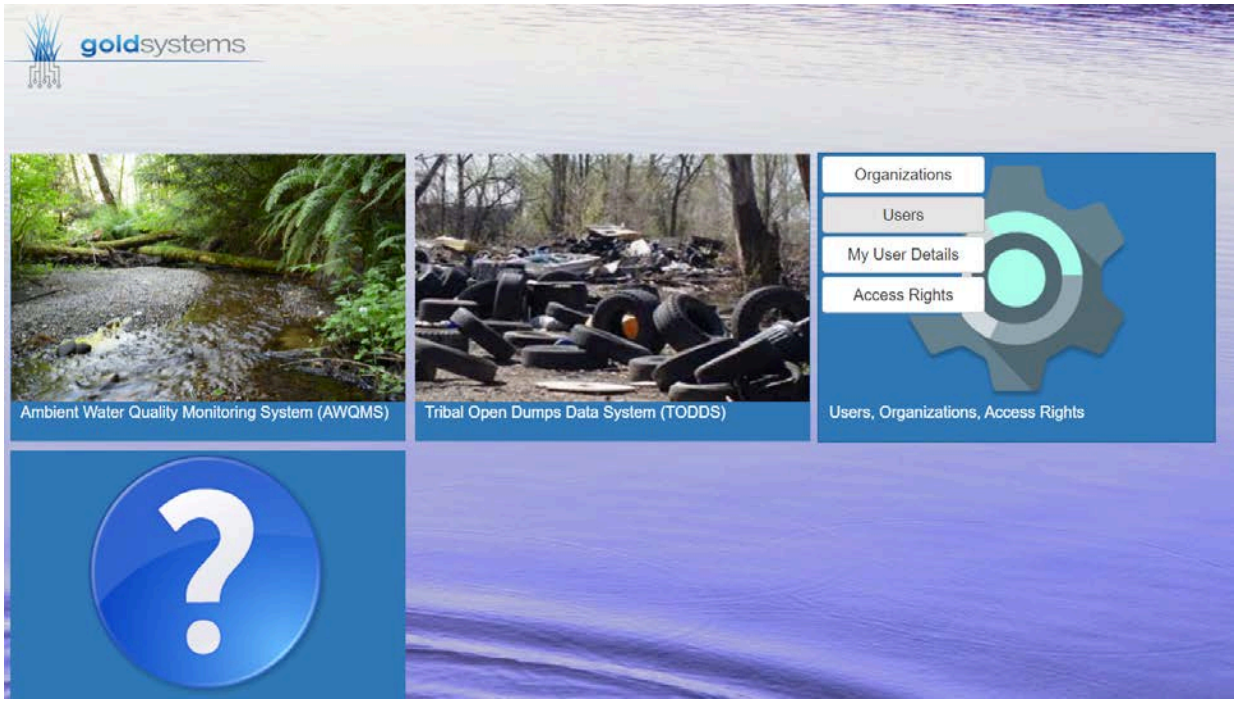
You can also default the graph size, font size, and whether or not to show labels on the graph.

Map - You can use these tools to default the zoom level and also the center latitude and longitude

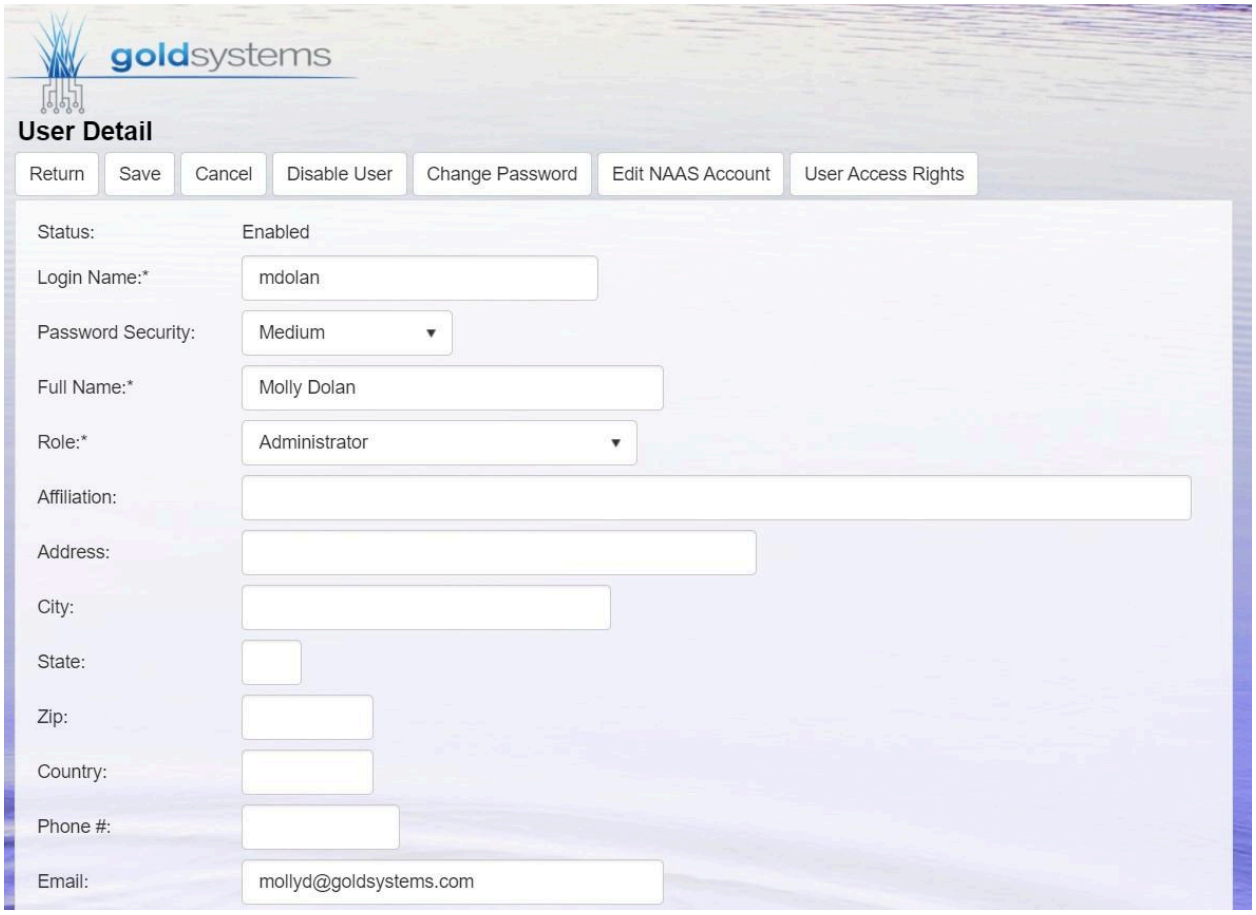
Accessibility - You can enable keyboard navigation and focus indicator on tab strips

13 Changing Your User Details

Hover over the User icon in the top right corner and click on Env Portal. Then, hover over Users, Organizations, Access Rights and click on Users.



You could search for your full name or username and click into your user detail page.



Your rights to manipulate this page are dependent on what kind of Role you currently are in GSE-WQ (this example is in an Administrator). See below for more information on Roles

14 Administration

This section describes features available to administrators, support, and standard users.

14.1 Roles

Each user is assigned a role in GSE-WQ. It's useful to have an understanding of the various roles and their rights as you read through the rest of this section.

Roles determine a user's rights to certain pages or features within the system. Roles are not, for the most part, used to assign rights to data. Rights to data are managed separately. The following roles (and related rights) exist in GSE-WQ:

14.1.1 System Administrator

- Can add, edit, enable, and disable users
- Can add organizations
- Can manage any user's rights on any organization, project, or import configuration

    - An administrator does not have rights to all data in the system by default. Instead an administrator grants himself/herself whatever rights are needed or wanted. It is typical to grant at least read-only rights to all organizations and all import configurations so that he/she can view everything in the system.
- Can add/edit/delete values in all lookup tables except organization-specific lookup values (whose rights are assigned via organization rights, rather than roles)
- Can view event logs for all users including system events
- Can access all pages within the system

14.1.2 Domain Administrator (Users/Organizations)

- Can create users and organizations within their own domain.
- Can assign the following roles to users:
    - Standard User
    - Public User - Custom
        - Limit of one account with this role per domain
    - Domain Administrator (Users/Organizations)
    - Domain Administrator (Users Only)
- Can create new characteristics or taxa and can edit/delete ones they created, but cannot edit ones created by others.
- This role is restricted to users in a state agency (and a municipality or territory)

14.1.3 Domain Administrator (Users Only)

- Can create users within their own domain
- Can assign the following roles to users:
    - Standard User
    - Public User - Custom
        - Limit of one account with this role per domain
    - Domain Administrator (Users Only)

14.1.4 Standard User

- Cannot view the Users List Page
- Can view his/her own user account and edit his/her own contact information, but cannot edit certain fields that are limited to administrators (such as login name, role, or NAAS ID.
- Can access all pages within the system except for the one(s) accessible via the "Admin-only" link in the navigation panel

14.1.5 Public User

This role is intended for user accounts provided to the general public for access to your water quality data. It's important to remember that data access rights are not based on roles. Although not part of the role itself, it is standard practice for an administrator to limit organization rights to "read-only" for users with the "Public User" Role.

- Public users can only access the following pages:
    - List Pages and Detail Pages for Project, Monitoring Locations, Indices, Activities, Results
    - [Output] Datasets List Page and Summary Page
    - Data Analysis Pages

14.1.6 Training User

This role is only available in the demo version of GSE-WQ at Gold Systems. To work correctly, a training user must be assigned only one organization (with Administrator rights on that organization). This role will provide a user with all the same rights as a Standard User, in addition to the following:

- Can click a Reset button on the Home Page which will delete all organization data, datasets and import configurations created by the user, and then restore a standard set of data and import configurations that are used for demonstration/training purposes.

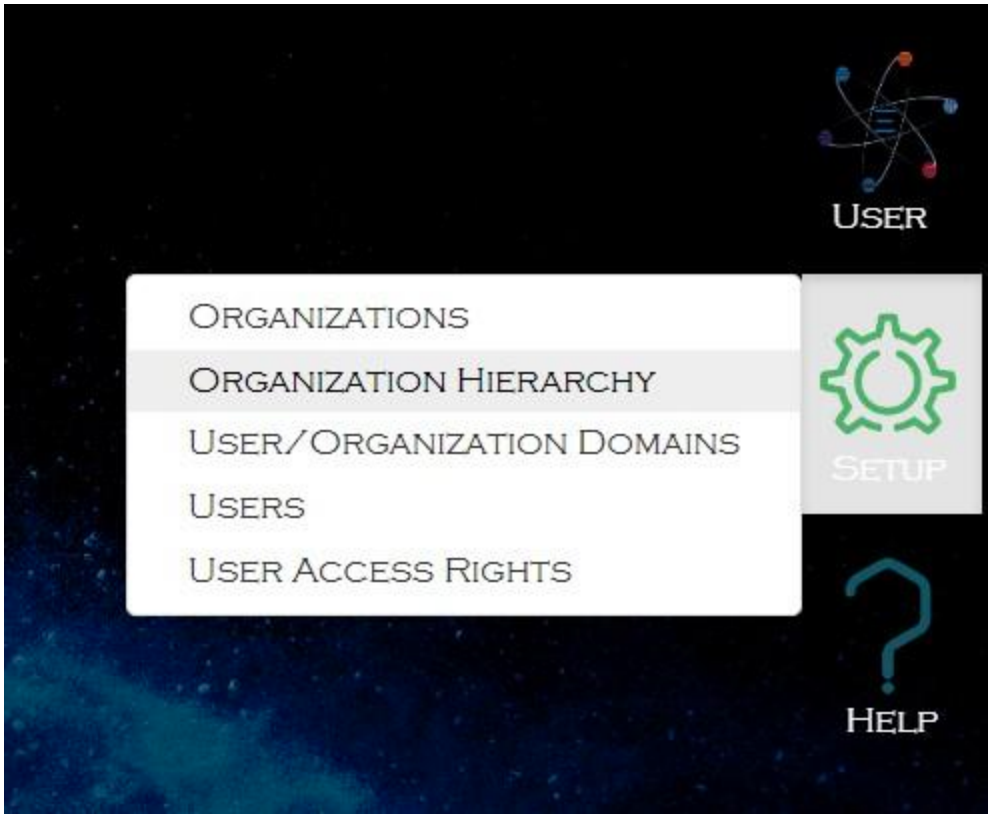
14.2 Organization Hierarchy

In GSE-WQ 9.0, you can create a parent organization and a child organization. A child organization falls under the “umbrella” of a parent organization.

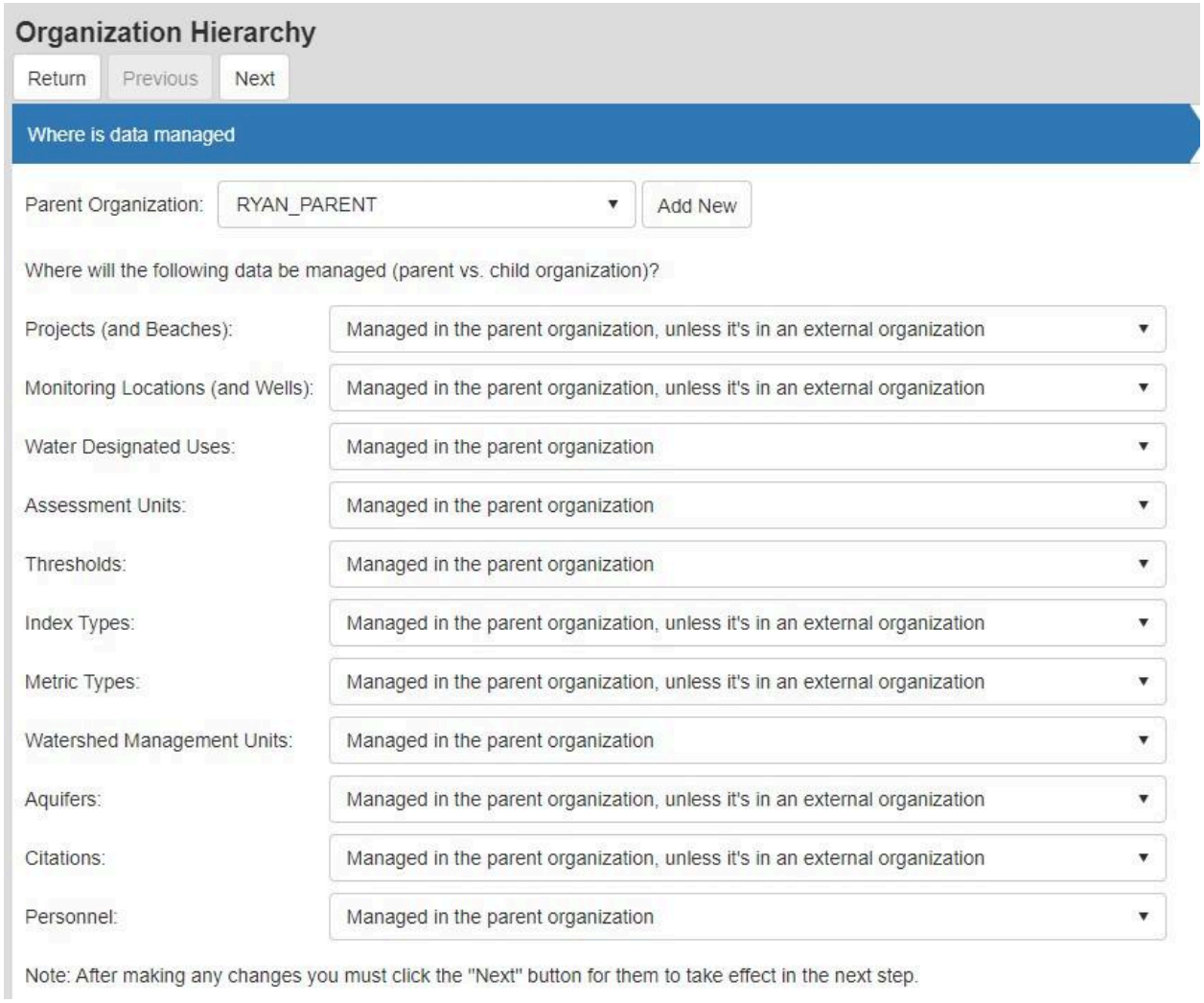
14.2.1 How to Setup Organization Hierarchy

Navigate to the GS Elements page

Hover over the Setup button and click Organization Hierarchy.

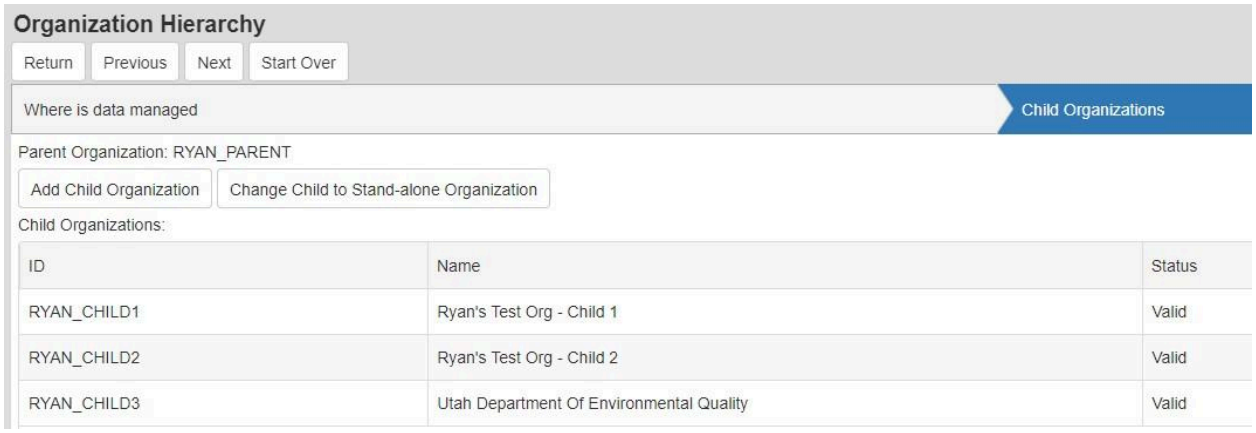


Choose a parent organization and determine where data will be managed (parent vs. child organization).



Click Next.

Add a child organization and/or change a child organization to a stand-alone organization.



Click Next.

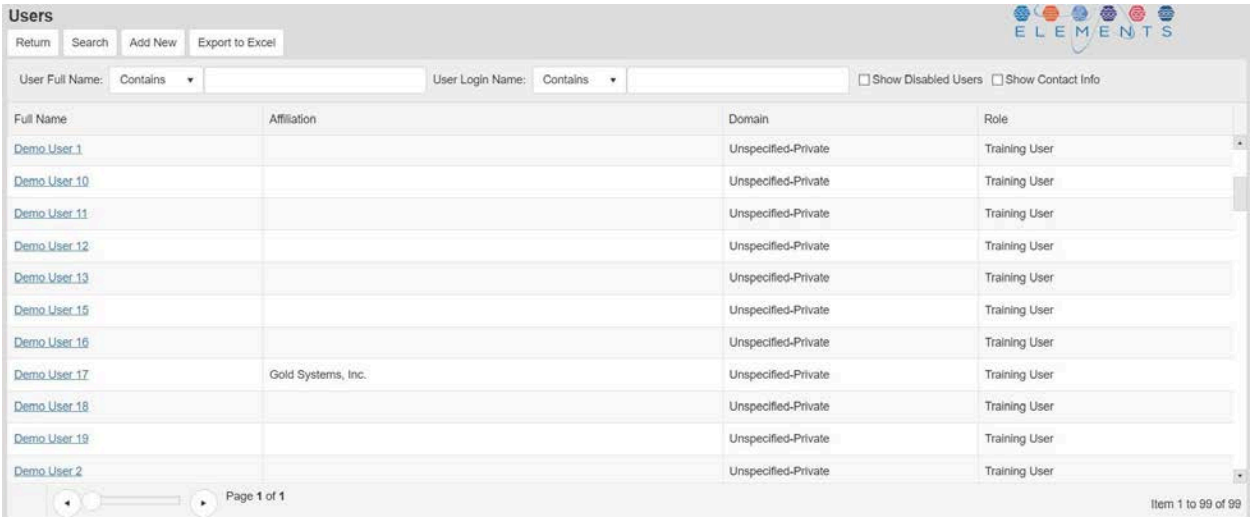
You can review entities and actions.

- Click Finish if you want to save the changes.
- Click Start Over if you wish to start over.
- Click Previous if you wish to return to the previous step.
- Click Return if you wish to return to the GS Elements page.

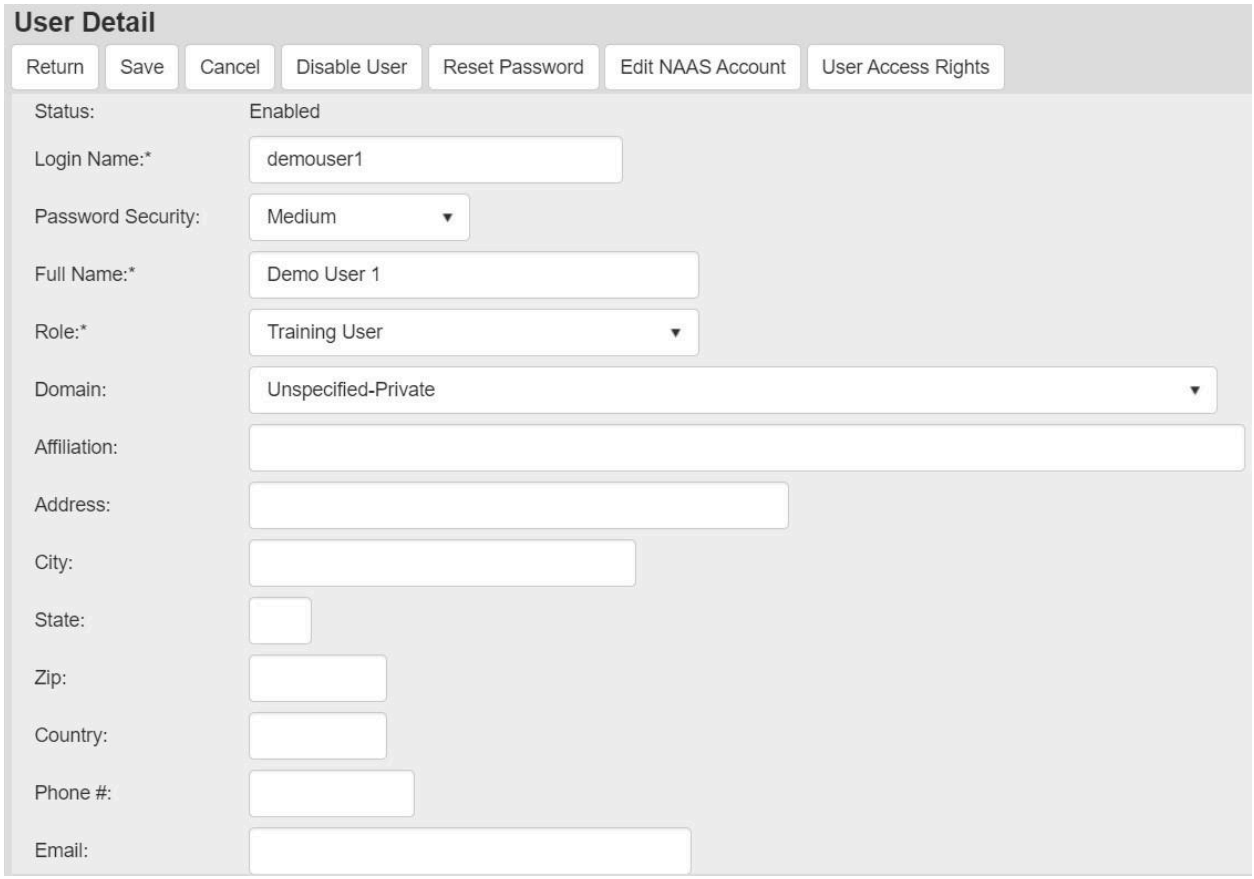
14.3 Managing Users

If you are an administrator, you can hover over Setup and click on Users. This will display the users list page.

From the Users list page, you can view/edit an existing user by clicking the appropriate link in the Full Name column of the list. To add a new user, click the Add New button.



The User Detail Page will be displayed.



Fill in the user information, as appropriate.

Login Name: This is the user's login name.

Role: Places the user into a group with certain rights in the system. See the section above for a full explanation on the roles available.

13.3.1 Disabling a User Account

To prevent a user from accessing the system you can disable their account. Click the **Disable User** button on the User Details page to disable a user.

13.4 Managing User Rights to Organizations, Projects and Import Configurations

A user's rights to organizations, projects, and import configurations are managed on the User Access Rights Page. This page can be accessed from several different pages within the system and has a different layout depending on the page from which it is accessed. An administrator can also change this context-specific layout by changing the value in the [Show] "Rights For" drop-down list at the top of the page.

There are four values in this dropdown list (that control the page layout):

User: The page shows a tabbed form where rights on organizations, project, and import configurations can be assigned to a specific user.

Organization: The page shows users and their rights on a specific organization.

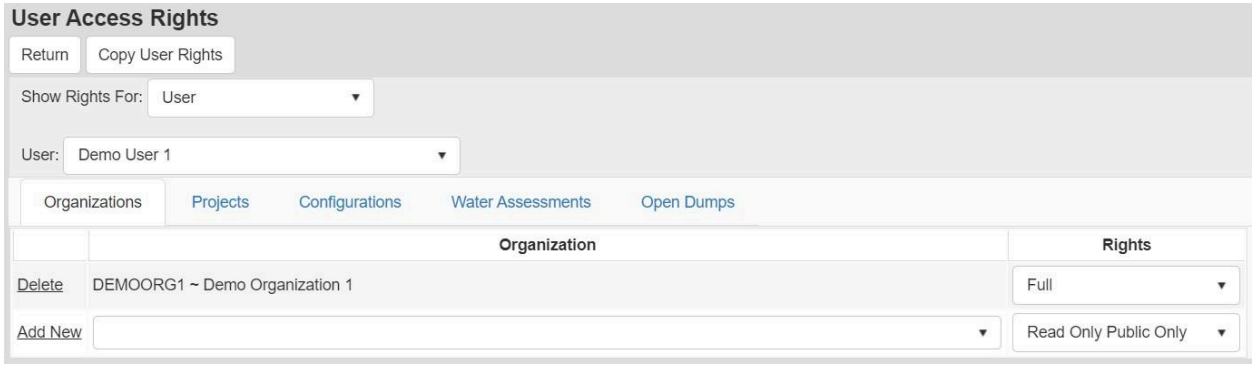
Import Configuration: The page shows users and their rights on a specific import configuration.

Project: The page shows users and their rights on a specific project (within an organization).

14.4.1 Viewing and Changing Rights for a User

When a user accesses the User Rights Page from the User Detail Page or when an administrator changes the “Show Rights For” dropdown list to “User”, then this page will have a layout appropriate for viewing all the rights for a specific user.

The page has six tabs: one for the user’s rights on organizations, one for the rights on projects, one for the rights on import configurations, Water Assessments, Open Dumps, Air Quality.



Note: Standard Users and Support Users have read-only access on this tab.

To assign user’s rights to a new organization:

1. Navigate to the last row of the list labeled “Add New”.
2. In the “Add New” row, choose the organization for which you wish to grant rights.
    - There is also a special value of "*All Organizations" which can be used to grant rights to all organizations. A user's rights on a specific organization will override his/her rights to "All Organizations".
3. Choose the Access Type you wish the user to have:
    - Project Specific – User only has privileges to certain projects for this organization.
    - Read Only (Public Only) - User cannot add, modify or delete any data; but can view only public data for this organization.
    - Read Only – User cannot add, modify, or delete any data; but can view public or private data for this organization.
    - Edit – User can only edit/add new activities and results related to the organization, but can not delete data.

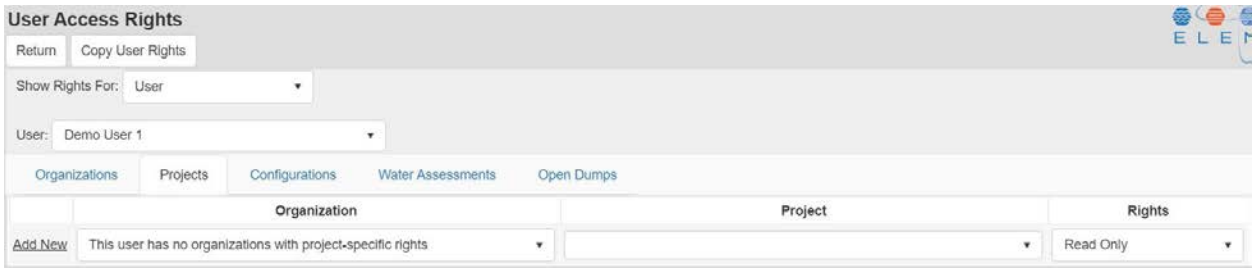
- Edit/Delete - User can add, edit, and delete activities and results related to the organization.
- Full – User can add, edit, and delete projects and monitoring locations as well as project-related information such as activities and results. User can manage the organization's specific list of lookup values in the following tables: Analytical Method, Citation, Index Type, Metric Type, Lab Sample Prep. Method, Sample Collection Method, and Sample Preparation Method.

To remove the user's rights to an organization:

1. Click the Delete link for the appropriate row.

   Click the Save button to save your changes and remain on the page. Click the Return button to save and return to the previous page.

Project (tab)



Note: Standard Users and Support Users have read-only access on this tab.

To assign a user's rights to a new project:

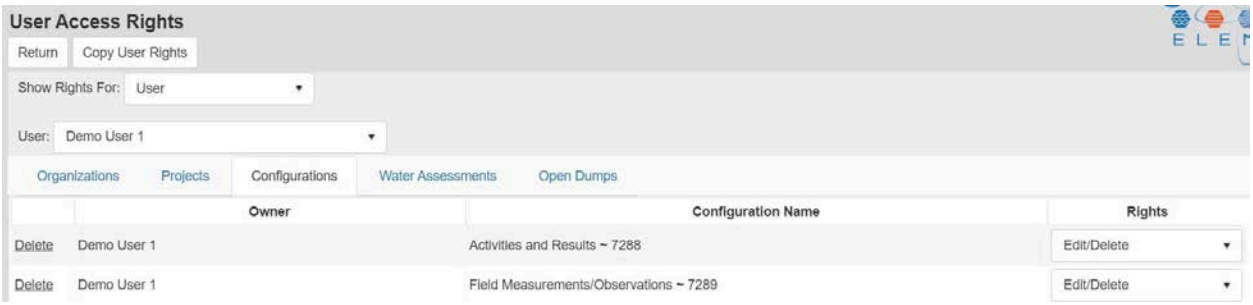
1. Navigate to the last row of the list labeled "Add New".
2. In the "Add New" row, choose the organization to which the project belongs.
3. Choose the project.
4. Choose the Access Type you wish the user to have:
   - Read Only – User can view data for this project but cannot change it.
   - Edit – User can make modifications to data for this project and add new data for the project. User cannot change the project record itself.
   - Edit/Delete – User can make modifications to and delete data for this project and can add new data for the project. User cannot change the project record itself.
   - Full – User can change the project record itself as well as edit/delete data under the project (e.g. activity, result, metric, etc).

To remove a user's rights to a project:

1. Click the Delete link for the appropriate row.

   Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

Configurations (tab)



Note: Standard Users have read-only access on this tab. Support Users have full access.

To assign a user's rights to a new import configuration:

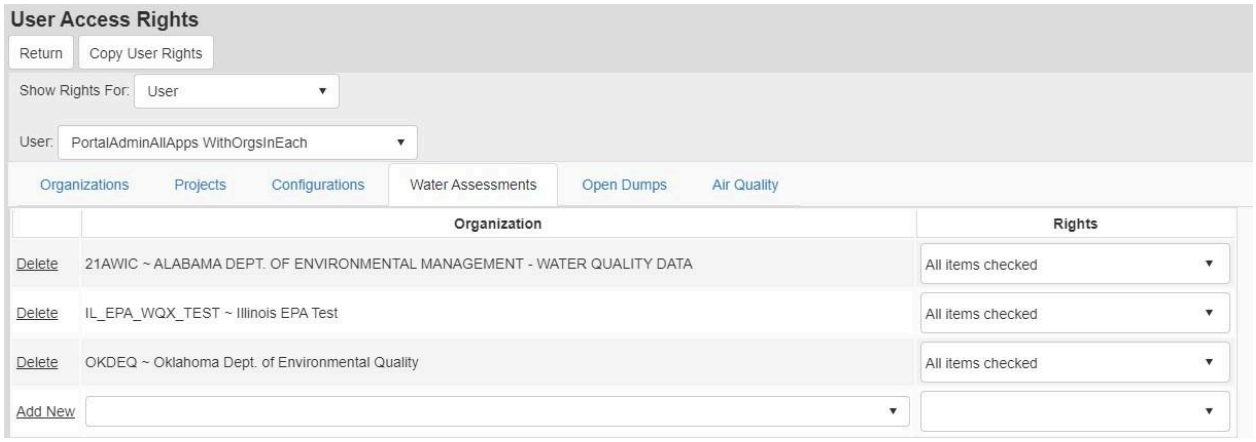
1. Navigate to the last row of the list labeled "Add New".
2. In the "Add New" row, choose the creator of the import configuration you are interested in (this will act as a filter on the Import Configuration list in the next column).
    - If you are assigning rights to all import configurations (see below), then the "Creator" may be left blank.
3. Choose the Import Configuration
    - There is also a special value of "*All Import Configurations" which can be used to grant rights on all import configurations. A user's rights on a specific import configuration will override his/her rights on "All Import Configurations".
4. Choose the Access Type you wish the user to have:
    - Read Only – User can view and use the import configuration.
    - Edit – User can make modifications to (and use) the import configuration.
    - Edit/Delete – User can make modifications to and delete (and use) the import configuration.

To remove a user's rights to an import configuration:

1. Click the Delete link for the appropriate row.

   Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

Water Assessments (tab)



To assign a user's rights to Water Assessments:

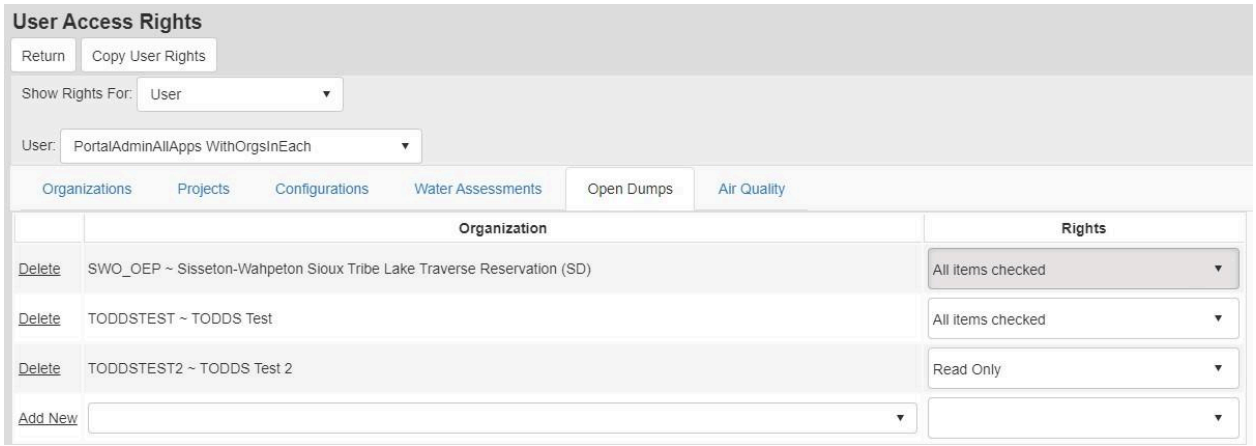
1. Navigate to the last row of the list labeled "Add New".
2. In the "Add New" row, choose the organization for which you wish to grant rights.
5. Choose the Access Type you wish the user to have:
    - Read Only – User cannot add, modify, or delete any data; but can view public or private Water Assessment data for this organization.
    - Assessment Coordinator
    - Assessor
    - Action Manager

To remove a user's rights to Water Assessments:

1. Click the Delete link for the appropriate row.

    Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

Open Dumps (tab)



To assign a user's rights to Open Dumps:

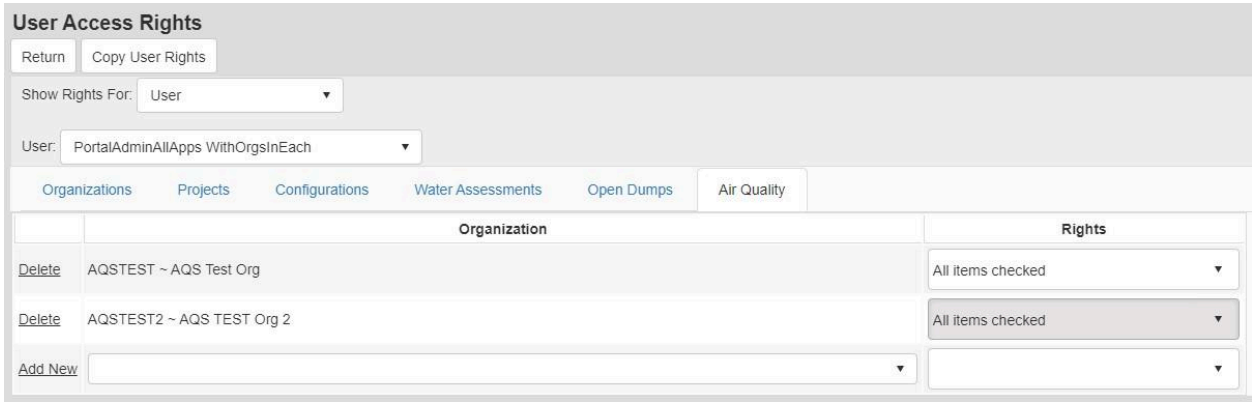
1. Navigate to the last row of the list labeled "Add New".
2. In the "Add New" row, choose the organization for which you wish to grant rights.
3. Choose the Access Type you wish the user to have:
    - Read Only – User cannot add, modify, or delete any data; but can view public or private Open Dumps data for this organization.
    - Tribal Open Dumps Coordinator
    - Tribal Open Dumps Surveyor

To remove a user's rights to Open Dumps:

1. Click the Delete link for the appropriate row.

   Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

Air Quality (tab)



To assign a user's rights to Air Quality:

1. Navigate to the last row of the list labeled "Add New".
2. In the "Add New" row, choose the organization for which you wish to grant rights.
3. Choose the Access Type you wish the user to have:
    - Read Only – User cannot add, modify, or delete any data; but can view public or private Air Quality data for this organization.
    - Air Program Coordinator
    - Air Program Surveyor

To remove a user's rights to Air Quality:

1. Click the Delete link for the appropriate row.

Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

14.4.2 Viewing and Changing Rights on an Organization

When a user accesses the User Rights Page from the Organization Detail Page or when an administrator changes the "Rights For" dropdown list to "Organization", then this page will have the following layout (appropriate for viewing the users and their rights on a specific organization).

Note: Standard Users and Support Users have read-only access in this mode.

To assign users and their rights to an organization:

1. Choose the organization to manage rights for in the organization dropdown list.
2. Navigate to the last row of the list labeled “Add New”.
3. In the “Add New” row, choose the user to grant rights to in the user dropdown list on the “Add New” row.
4. Choose the access type you wish the user to have:
    - Project Specific – User only has privileges to certain projects for this organization.
    - Read Only – User cannot add, modify, or delete any data; but can view data for this organization.
    - Edit – User can add and edit projects and monitoring locations as well as project-related information such as activities and results.
    - Edit/Delete - User can add, edit, and delete projects and monitoring locations as well as project-related information such as activities and results.
    - Full – User can manage the organization’s specific list of lookup values in the following tables: Analytical Method, Citation, Index Type, Metric Type, Lab Sample Prep. Method, Sample Collection Method, and Sample Preparation Method.

To remove rights to an organization:

1. Click the Delete link for the appropriate row.

   Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

14.4.3 Viewing and Changing Rights on an Import Configuration

When a user accesses the User Rights Page from the Import Configuration Detail Page or when an administrator changes the "Rights For" dropdown list to "Import Configuration", then this page will have the following layout (appropriate for viewing the users and their rights on a specific import configuration)

Note: Standard Users have read-only access in this mode. Support Users have full access.

To assign a user rights to an import configuration:

1. Choose the import configuration to manage rights for.
2. Navigate to the last row of the list labeled “Add New”.
3. In the “Add New” row, choose the user.
4. Choose the access type you wish the user to have:
    - Read Only – User can view the import configuration but can’t modify or delete it.
    - Edit – User can view and edit the import configuration but can’t delete it.
    - Edit/Delete – User can view, edit, and delete the import configuration.

To remove rights to an import configuration:

1. Click the Delete link for the appropriate row.

    Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

14.4.4 Viewing and Changing Rights on a Project

When a user accesses the User Rights Page from the Project Detail Page or when an administrator changes the "Rights For" dropdown list to "Project", then this page will have the following layout (appropriate for viewing the users and their rights on a specific project)

Note: Standard Users have read-only access in this mode. Support Users have full access.

To assign a user rights to a project:

1. Choose the project to manage rights for.
2. Navigate to the last row of the list labeled “Add New”.
3. In the “Add New” row, choose the user.
4. Choose the access type you wish the user to have:
    - Read Only – User can view the project but can’t modify or delete it.
    - Edit – User can view and edit the project but can’t delete it.
    - Edit/Delete – User can view, edit, and delete the project.
    - Full - User can view, edit, delete, and publish and submit the project to WQX.

To remove rights to a project:

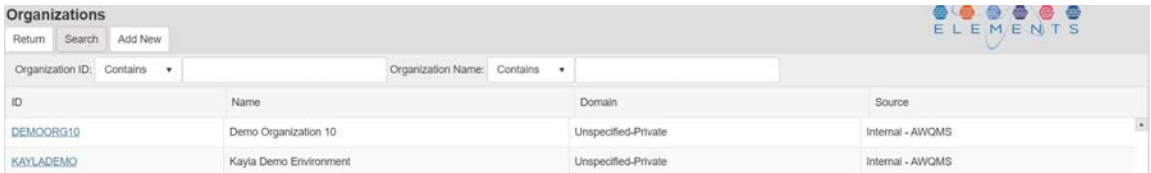
1. Click the Delete link for the appropriate row.

   Click the Save button to save your changes (and remain on the page). Click the Return button to save and return to the previous page.

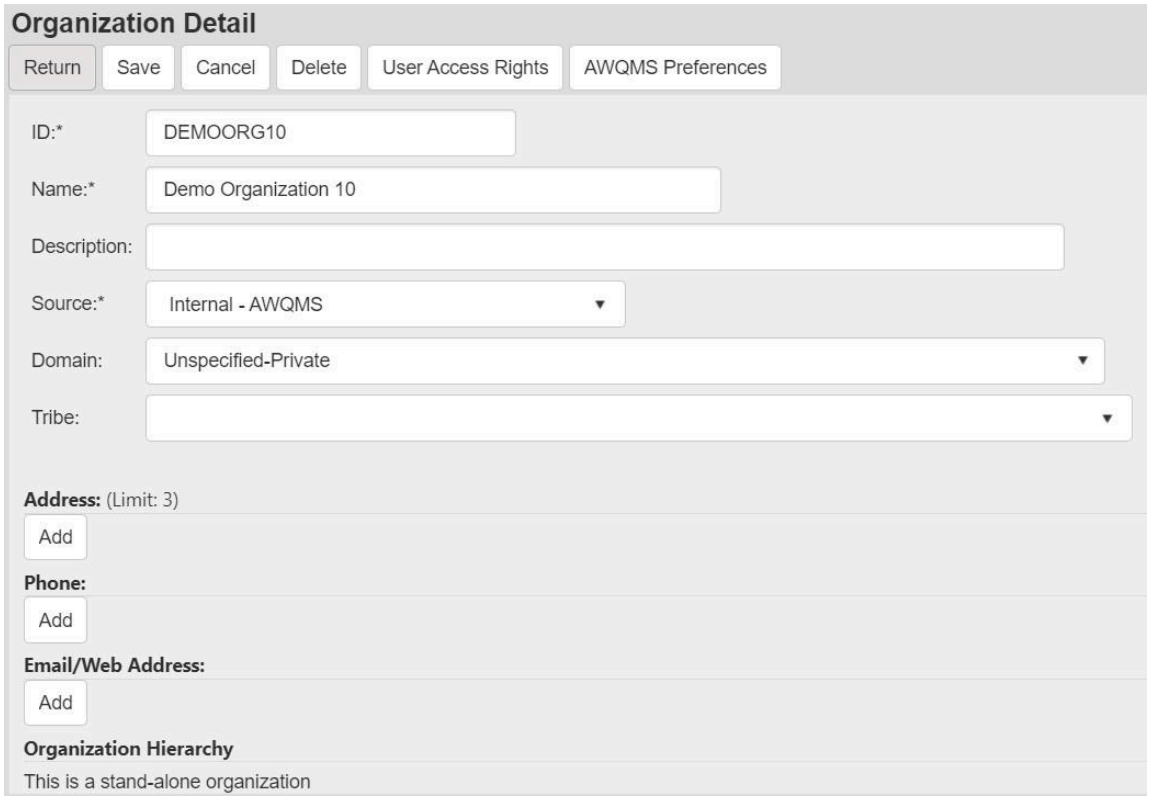
14.5 Managing Organizations

1. If you are an administrator, you can hover over Setup on the GS Elements page and click on Organizations.

2. This will display the Organizations list page.



3. To create a new organization, click the Add New button. Otherwise click the link for a specific organization that you wish to view/edit. The Organization Details page will be displayed.



4. Fill in the Organization information
    - Use the Add link to add up to 3 Organization Addresses
    - Use the Add link to add Organization Phone Numbers
    - Use the Add link to add Organization Email/Web Addresses
    - To remove an address, phone number etc., click the Remove link on the row you wish to remove. Click the Save or Return button to save the changes.
5. Click the Save button or the Return button to save the organization.
6. Click the View User Access Rights to manage the rights for the new organization.
7. Click GSE-WQ Preferences to view and manage the organization's preferences.

14.5.1 Organization Detail Rules

The following rules apply to an organization:

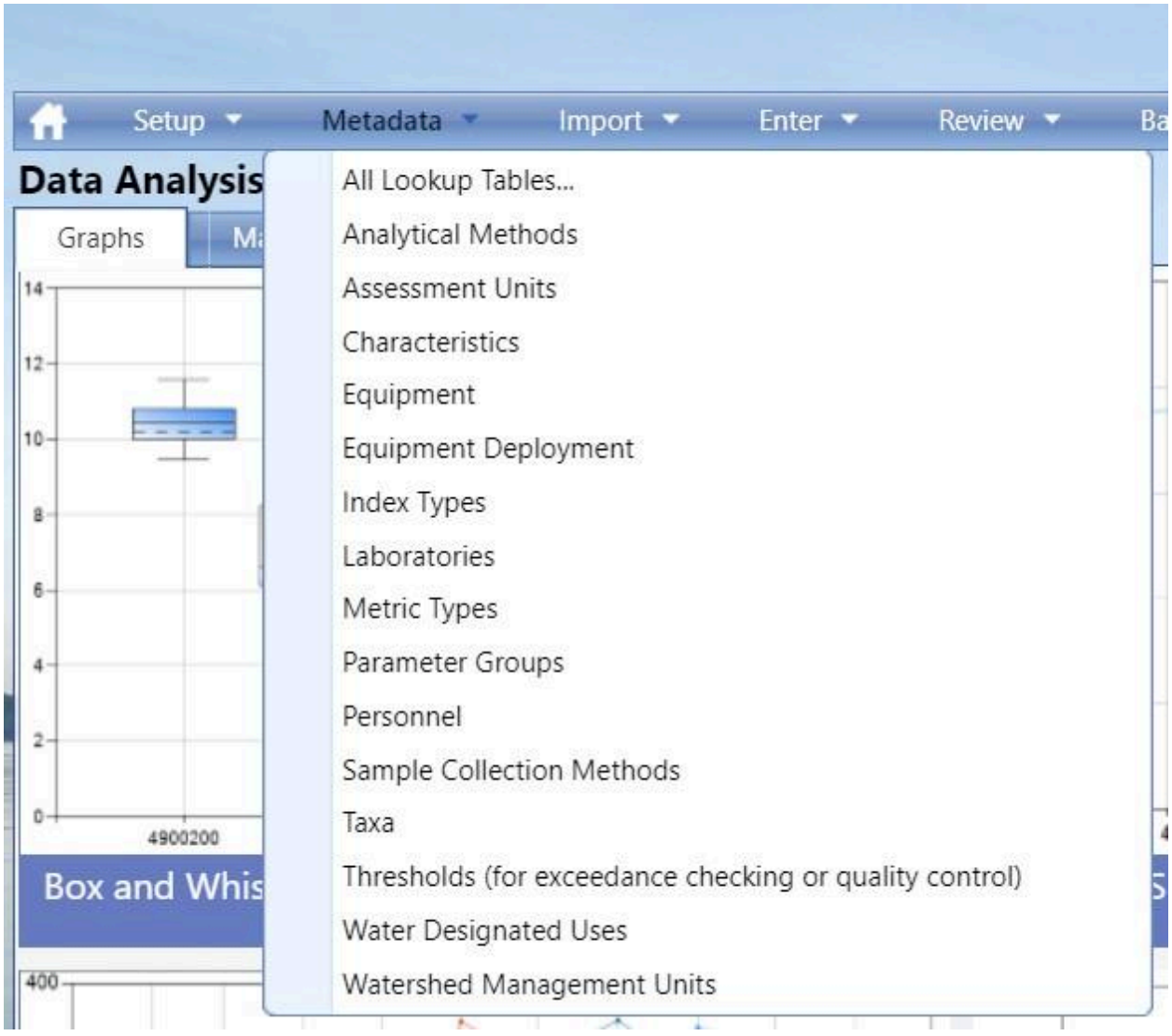
- When Electronic Address or Electronic Address Type is provided, both must be provided.
- When Telephone Number or Telephone Number Type is provided, both must be provided.
- When Address or Address Type is provided, both must be provided.
- The following elements are required for an Organization:
    - Organization ID
    - Organization Name

14.6 Managing Lookup Tables

Lookup tables are a list of allowed values for a given data element. The lists can be used as a reference for the allowable values for an element.

14.6.1 Viewing the Values in a Lookup Table

To access the complete list of Lookup Tables; hover over **Metadata** and click on **Other Lookup Tables**.



Lookup tables fall into one of three main categories:

EPA Managed Tables: Many of the lookup tables in GSE-WQ are copies of lookup tables from EPA's WQX system and need to stay in sync with WQX to maintain full compatibility. Once or twice a year, updates to these tables are typically included with an GSE-WQ application update.

It's generally not recommended to edit these tables manually. However, in a case where the update is needed immediately, a system administrator is allowed to change these tables manually within GSE-WQ, but caution should be used to make sure the spelling is exactly the same as the WQX System.

Internal Tables: Some of the lookup tables in GSE-WQ do not exist in WQX. These tables can be managed locally. Many of these tables have values that are linked to a specific organization. When they are, only an organization administrator is allowed to change them. When they are not, only a system administrator is allowed to change them.

Hybrid Tables: A few tables can contain EPA-managed values and locally managed values. In the case of tables like "Analytical Method" and "Metric Type", EPA has built-in support for local values by providing an organization-specific context that can be used to designate local values. However, a few other tables (for example, "Characteristic", "Taxon", and "Result Measure Qualifier") are actually EPA-managed tables in WQX that have been extended in GSE-WQ to allow local values, which are flagged as "not WQX-compatible." This way, the system knows to not export them when sending data to WQX. Values with an organization-specific context can be modified by an organization administrator. All other values can only be modified by a system administrator.

Lookup Tables

Table	Type	
Horizontal Reference Datum	EPA-Managed Table	Download
HUC-12	Internal Table	Download
HUC-8	Internal Table	Download
Index Type	Internal Table	Download
Lab Sample Preparation Method	Internal Table	Download
Laboratory	Internal Table	Download
Local Aquifer	Hybrid Table	Download
Measurement Unit	EPA-Managed Table	Download
Method Speciation	EPA-Managed Table	Download
Metric Type	Hybrid Table	Download
Monitoring Location Type	EPA-Managed Table	Download
Net Type	EPA-Managed Table	Download
Parameter Group	Internal Table	
Personnel	Internal Table	Download
Phone Type	EPA-Managed Table	Download
Reference Location Type	EPA-Managed Table	Download
Relative Depth	EPA-Managed Table	Download
Result Detection Condition	EPA-Managed Table	Download
Result Qualifier	Hybrid Table	Download
Result Statistical Base	EPA-Managed Table	Download
Result Status	EPA-Managed Table	Download
Result Temperature Basis	EPA-Managed Table	Download
Result Time Basis	EPA-Managed Table	Download
Result Value Type	EPA-Managed Table	Download
Result Weight Basis	EPA-Managed Table	Download

1. Select the link for the table you wish to view (for example, Personnel).
2. Select the Organization for the Personnel
3. Add/Edit/Delete rows as needed.

4. Select the Save or Return button to save your changes.