



Ambient Water Quality Monitoring Database Input

Standard Operating Procedure

Date:

Document Control #:

## 1. INTRODUCTION

The Ambient Water Quality Management System (AWQMS - pronounced ah-kwums) is the water quality data management system used by the Colorado Data Sharing Network (CDSN). AWQMS is an EPA Water Quality Exchange (WQX) compatible database that allows users to manage various types of environmental data such as surface water, groundwater, and biological data with built in analysis tools.

The purpose of AWQMS is to provide a convenient location for various governmental and non-governmental organizations to store, analyze, and share water quality data with each other and the public. CDOT intends to use AWQMS to store water data from various types of surface waters monitoring projects. These CDOT water quality monitoring project are performed to monitor both surface water and watershed impacts and restoration actions associated with CDOT projects.

This standard operating procedure (SOP) provides an easy to use step by step process to input water quality data into AWQMS for future analysis and public information. It is envisioned that this SOP will be used by both CDOT and their contractors for data management and database input throughout the state of Colorado.

## 2. HOW TO USE THIS DOCUMENT

The purpose of this standard operating procedure is to assist a first time user in uploading data into AWQMS. The document also provides information to help ensure that data from field measurements and water quality laboratory data is complete and in a format that will easily integrate with AWQMS. It is recommended that the user visit the AWQMS web site (<https://awqms.goldsystems.com/Login.aspx>) and read the full SOP document before attempting to upload data to AWQMS.

## 3. LOG IN AND DATA SECURITY ISSUES

The login information necessary to access CDOT's AWQMS account can be obtained by contacting the CDOT Hydrologic Resources and Ecological Design (HRED) Programs Manager at 303-512-4053.

## 4. QUALITY ASSURANCE & QUALITY CONTROL

Quality Assurance (QA) and Quality Control (QC) are critical to ensure a high level of data collected from the field and laboratory and ultimately inputted into the database. It is incumbent upon the CDOT employee or contractor to ensure that the water quality data is compliant to project QC field and laboratory acceptance criteria before data input. In addition, the individual collecting the field data must have been qualified and trained in the skills of water quality sampling, testing and sample management.

## 5. WATER QUALITY PARAMETERS AND STANDARDS

### 5.1. Introduction

Water quality analysis typically requires both performing measurements in the field and sending samples to a third party laboratory where additional analytical measurements are performed. Results from laboratories can be in a variety of formats and may or may not include CDOT required information depending on the laboratory

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that performs the work. This SOP lists required information and recommended formats to ensure that both field and laboratory analysis meets CDOT standards and that data can easily be integrated into the AWQMS database.

## 5.2. Parameters and Practical Quantification Limits

Suggested parameters to be included in any CDOT water quality analysis can be found in the following sources:

- CDOT Wet Weather Monitoring Program
- Permanent Water Quality Pollutants of Concern
- 303d Listing

Any water quality analysis must use methodologies approved in the above sources and corresponding maximum practical quantification limits (PQLs). Higher sensitivity analysis methods with lower PQLs are permitted and acceptable to CDOT.

## 5.3. Required Parameter Metadata

In addition to parameter concentration, certain metadata is required for any water quality result. This additional information allows water quality researchers to understand exactly how a measurement was made and how the results can aid in reviewer interpretation. Required metadata and examples are presented in Table 1.



Table 1 - Required metadata

Metadata Type	Example
Activity Type	Field Msr/Obs, Field Msr/Obs-Habitat Assessment, Field Msr/Obs-Incidental, Field Msr/Obs-Portable Data Logger, Sample-Other, Sample-Routine
Activity Media Name	Air, Biological, Habitat, Other, Sediment, soil, Tissue, Water
Activity Media Subdivision Name	Drinking Water, Finished Water, Groundwater, Industrial Effluent, Industrial Water, Lake Sediment, Mine Tailings Pond, Municipal Sewage Effluent, Rainwater, Septic Effluent, Snowmelt, Stormwater, Surface Water, Surface Water Sediment, Unknown, Water-Vadose-Zone
Activity Start Date	2003/03/14
Activity Start Time	12:45:00 PM
Activity Start Time Zone	MDT, MST
Sample Collection Method ID	Field Meter, Meter or Flume, Grab, Secchi Disk, Staff Gage, Mod Van Dorn, Benthic Scraping
Sample Collection Equipment Name	Water Sample (Other), Water Bottle, Probe/Sensor, Van Dorn Bottle, Miscellaneous (Other)
Parameter Name	pH, Chloride, Hardness, Phosphorus, Specific Conductance, Total suspended solids, Arsenic, Copper, Zinc
Method Speciation*	as As, as CaCO <sub>3</sub> , as Cl, as CO <sub>3</sub> , as H, as HCO <sub>3</sub> , as N, as NH <sub>3</sub> , as NO <sub>2</sub> , as NO <sub>3</sub> , as P, as PO <sub>4</sub> , as Se
Result Unit	ug/L, mg/L, umho/cm, cfs, deg C, NTU, none
Result Qualifier*	A, U, K, J, D
Result Sample Fraction	Total, Dissolved, Total Recoverable, Bed Sediment, Bedload
Result Status ID	Accepted, Final, Preliminary, Rejected, Validated
Result Value Type	Actual, Blank Corrected Calc, Calculated, Control Adjusted, Estimated
Result Analytical Method ID	120.1, 130.1, 200.7, 300.0, 350.1, 351.2, 353.2, 365.4, 1664A, 2540, D-2011
Result Analytical Method Context	USEPA, NIOSH, HACH, LACHAT, APHA, USDOC/NOAA, ASTM, IL/SWSD, SWQC
Result Detection/Quantitation Limit Type	Drinking Water Maximum, Estimated Detection Level, Instrument Detection Level, Interim Reporting Level, Long Term Method Detection Level, Lower Quantitation Limit, Lower Reporting Limit, Method Detection Limit, Practical Quantitation Limit, Sample-specific min detect conc, Upper Quantitation Limit, Upper Reporting Limit, Water Quality Standard or Criteria
Result Detection/Quantitation Limit Measure	0.3, 100
Result Detection/Quantitation Limit Unit	uS/cm, mg/L, cfs, none, deg C, ug/L, NTU, mg/m <sup>2</sup>
Lab Sample Preparation Method ID	HydroLab, EPA 200.7, Default Prep Alk, Filter Thru 0.45, Default Prep Ammonia, Default TDS SM2540-C, Default TSS SM2540 D
Laboratory Name	Field, U.S. EPA Region 8 Laboratory, LEWWTP Lab, TechLaw, Inc. - ESAT Region 8, CU Center for Limnology
Lab Sample ID	Varies

\* May not apply to all results



## 5.4. Water Quality Spreadsheet Templates

As described in Section 6, water quality results are typically inserted into AWQMS using a spreadsheet. To simplify the process of uploading data to AWQMS a template spreadsheet in Microsoft Excel format for CDOT projects is included in the appendix. It is recommended that this template be provided to water quality laboratories before work is begun and that analytical results be stored in the spreadsheet. If the laboratory is unable or unwilling to use the template, it is typically possible to copy data from the provided format to the template before uploading data to AWQMS. Migrating data from another format to the template can also be useful when working with legacy water quality data. It is possible to “teach” AWQMS to understand different spreadsheet formats, however this is typically more challenging than migrating data to the template format and is discouraged. In general, to reduce possible errors and to save time and money it is recommended that water quality laboratories provide results using the template spreadsheet.

## 5.5. GPS Locations

AWQMS requires that GPS coordinates in file uploads of monitoring locations be in decimal degrees format (e.g. 39.692456°, -104.936684° - location of CDOT headquarters). There are a variety of resources available to convert other formats to decimal degrees if necessary. It is recommended that all GPS locations use the same number of significant digits as provided by the GPS receiver and be checked for accuracy in GIS software or Google Earth before uploading to AWQMS.

# 6. AWQMS DATA INPUT PROCESS

## 6.1. Introduction

Uploading data into the AWQMS database is a relatively straight forward process but is sensitive to steps being performed in the proper order and data being in the correct format. If these instructions are read carefully and followed completely, one should encounter few errors if any during the uploading and migration process.

Prior to explaining the upload and migration procedure it is necessary to discuss the overarching structure of data in the AWQMS database. Projects, monitoring locations, and activities provide order and structure to what would otherwise be reams of disparate data. Projects allow related data to be grouped together. Monitoring locations represent the physical place where data was collected. Results are the measurements of physical and chemical data collected at monitoring locations.

The use of a single device used to measure one or more parameters is known as an activity. For example, the measurement of pH with a pH meter is an activity with a single result. The use of a device that measured both pH and specific conductance would be a single activity with two results (pH and specific conductance). Collecting water in a bottle to send off to a laboratory for the analysis of copper, magnesium, manganese, and zinc is a single activity with four results. Correctly organizing results into activities requires an understanding of how analysis was performed in the field. It is important to understand the difference between activities and results in AWQMS. An activity is using a single device (e.g. pH meter, multi-meter, water collection bottle) to measure one or more parameters. A result is the measured concentration or value of a parameter.

Each result in AWQMS is associate with a project, monitoring location, and activity. To simplify this association, projects, monitoring locations, and activities each have an identification (ID) code. This code must be unique or loss of data within AWQMS may occur. Before assigning ID codes and uploading data, the user must check the AWQMS to ensure that the IDs they are using are not already being used. To keep entries in AWQMS consistent, a convention has been established for each type of ID and should be used for all CDOT water quality data. Monitoring location IDs should begin with the abbreviation of the drainage way/water body name followed by the number of the collection site. The monitoring location ID for site number 5 on Hoop Creek is HC-5. As there

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are many drainages in Colorado with duplicate names it is very important to check that monitoring location IDs do not overlap an existing ID in AWQMS. It may take some creativity to correct ID collisions but IDs should be kept as short as possible as they are included in the activity ID. More exact information defining monitoring locations should be included in the monitoring location name as described in Section 6.4.

The project ID should concisely list the name of the project. Please note that this is not necessarily the CDOT project number, though it may be appropriate to include the CDOT project number in the project description. The date range should also be included in the project ID for completed water quality projects or projects with a fixed schedule. For example I-70 Mountain Corridor 2000-2013, or Hoop Creek 1997-2009.

The activity ID is limited to 35 characters and consists of the monitoring location ID, the date in yyyyymmdd format, the time in h:mm:ss format, and an alphabetic activity descriptor; all of which are separated by hyphens. The alphabetic activity descriptors describe the type of measurement and are as follows: G for grab, F for flow (discharge), S for specific conductance, T for temperature, Y for turbidity, and P for pH. G or grab represents the sample collection method that corresponds to a sample of water gathered via a bottle or syringe. The grab collection method is typically used when collecting a sample to send off to a laboratory. Example activity IDs are shown in Table 2. The first example represents a grab (water bottle) sample, taken from monitoring location two on Gore Creek (GC-2), on 9/27/2009, at 2:40 PM in the afternoon. In the third example it should be noted that the time is set to 0:00:00. This is the recommended time for activities with missing start times.

*Table 2 - Example activity identification codes*

Activity ID	Description
GC-2-20000927-14:40:00-G	Monitoring Location: GC-2 Date: 9/27/2009 Time: 2:40:00 PM Sample Collection: Grab
HC-5-19980724-7:00:00-F	Monitoring Location: HC-5 Date: 07/24/1998 Time: 7:00:00 AM Sample Collection: Flow Rate
CC-4-20030314-0:00:00-Y	Monitoring Location: CC-4 Date: 03/14/2003 Time: 0:00:00 Sample Collection: Turbidity

It is critical that project, monitoring location, and activity IDs are unique, otherwise data can be overwritten when new datasets are migrated into the database. The following procedures includes directions detailing how to check existing project, monitoring location, and activity IDs, thereby allowing the user to verify that their proposed IDs are not already in the system. The data entry procedure is outlined in Figure 1.

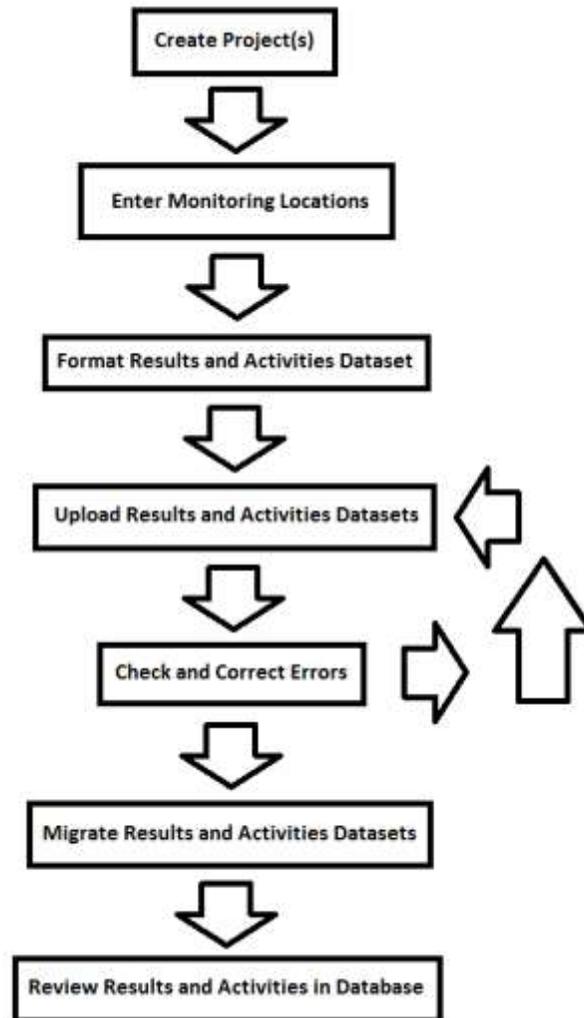


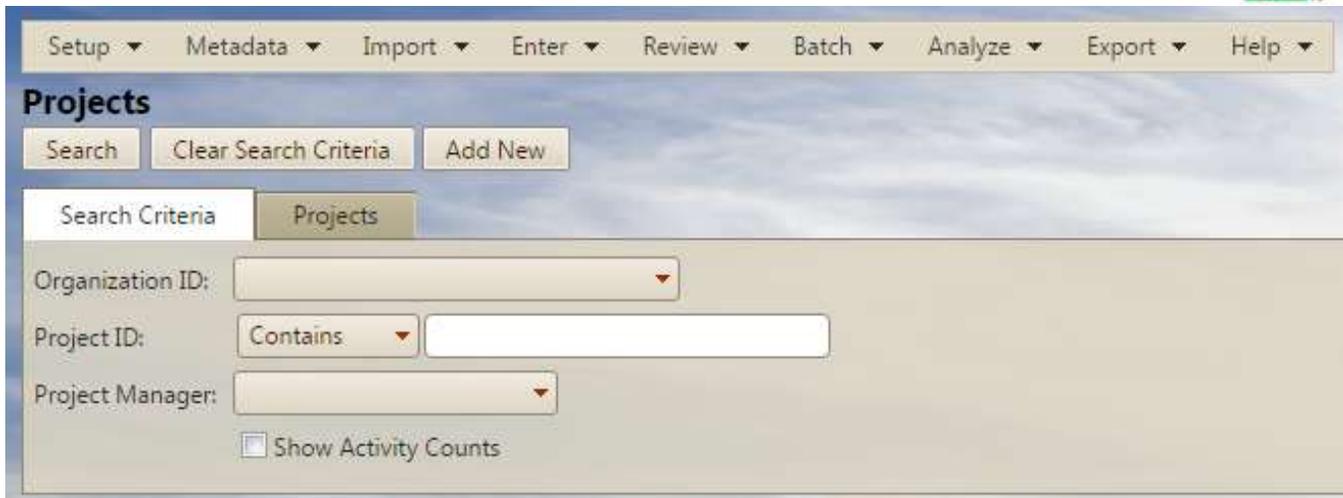
Figure 1: The order of operations for inputting data into AWQMS

## 6.2. AWQMS Demo Account

It is suggested that new users practice with the AWQMS demo account before attempting to upload data to the actual CDOT account. The demo account can be accessed at <http://awqmsdemo.goldsystems.com/Login.aspx>. The username and password for the demo account are both “demo”. Use of the demo account allows the user to practice uploading and modifying data in a “sandbox environment” without the risk of changing or overwriting existing CDOT water quality information.

## 6.3. Step 1 - Projects

- Go to the AWQMS login page
- Enter CDOT’s username and password
- Once on the AWQMS main page find the **Metadata** tab in the top left corner
- From the **Metadata** tab navigate to **Projects**
- On the Projects page click **Add New**: see Figure 2



*Figure 2 - The metadata projects page*

- Select CDOT from the **Organization ID** pull down menu, add a **Project ID, Name, and Description**
  - Project ID codes are discussed in Section 6.1
  - For the description include the project manager or the organization that did the data collection (e.g. “Region 1 - Susie Hagie”, “CEI WQ Joe Banks”, etc.) in addition to any other pertinent information
- Once the Organization ID, Project ID, Name, and Description have been added click **Save**: see Figure 3
  - Add any reports pertinent to the project, under **Attached Files** > click **Add**
- Projects can be reviewed, and project ID’s checked, by going to the **Metadata** tab navigating to **Projects** selecting CDOT from the **Organization ID** and clicking **Search**

## Project Detail

Return Save Cancel Delete

**Project**

Organization ID:\*

Project ID:\*

Name:\*

Description:\*

Project Manager:

Sampling Design Type:

QAPP Approved:

Approval Agency:

Comments:

Private:

Activities: [3178 View](#)

Monitoring Locations:

**Attached Files**

Add

Private	File Name
<input type="checkbox"/>	<a href="#">HoopCreekReport2009.pdf</a>

**Audit Information**

Created: 06-02-2016 12:02:34 PM (by CDOT User Bob McDade)  
 Last Modified: 06-06-2016 11:32:17 AM (by CDOT User Bob McDade)  
 Last Published: 06-02-2016 12:02:34 PM  
 WQX Submit Required: True

Figure 3 - The page for adding a project

- Add more projects as needed then proceed to Step 2

### 6.4. Step 2 - Monitoring Locations

Monitoring locations can be added to the system individually using a dialog or as group by uploading a file. There is some overhead and additional challenge involved in uploading multiple locations at once. Generally it is recommended to upload a file if ten or more locations need to be added to AWQMS. If there are less than ten locations to add to the system it is typically faster and easier to add the locations individually. A monitoring location upload Microsoft Excel template is available in the appendix. Regardless of the method used to add monitoring locations to the system, all locations should have values for the following fields: Monitoring Location ID, Monitoring Location Type, Monitoring Location Name, Latitude, Longitude, Horizontal Reference Datum, and Horizontal Collection Method (monitoring location ID codes are described in Section 6.1).



### Adding Monitoring Locations Individually

- On the AWQMS main page click the **Metadata** tab in the top left corner
- From the **Metadata** tab navigate to **Projects**
- On the Projects page click **Add New**
- Fill out all required fields and click **Save**

### Uploading Multiple Monitoring Locations with a File

- Fill out all required columns in the monitoring location template located in the appendix
- The manual upload page (discussed above) can be checked for acceptable monitoring location types, horizontal reference datums, and horizontal collection methods
- Once the template is completely filled out it should be saved as a comma separated values (csv) file.
  - While AWQMS permits uploading xls and xlsx files it is significantly easier and more reliable to upload a csv
- To upload the completed template click **Import > Monitoring Locations, Assessment Units and Reaches**
  - This will open the dialog shown in Figure 4
- From the **Import Configuration** pull down menu select **CDOT Monitoring Locations Template ~ 2531**
- Select **CSV (Comma delimited)** from the **Type of File** pull down menu
- Under **Generated Values** click on {none}, a menu will pop up, select **CDOT**
- Under **New or Existing Data** keep the default setting **This file contains new data only**
- Keep the default setting for **If import file is free of errors and warnings**
  - It is always a good idea to review your dataset before migrating
- Click **Choose File** next to **Import File:** under the **Import File(s)** heading. Select the csv version of the upload template filled out with the monitoring locations to be uploaded
- Additional files relevant to the monitoring location (site maps, etc.) can be uploaded by clicking **Choose File** next to **Attachments File:** (optional)
- Click the **Import Data** button in the top left of the page
- A new page displaying the progress of the upload will appear



Figure 4 - The page for uploading monitoring locations

- If any errors are found during the upload a red dialog box will appear as shown in Figure 5
  - The error types can be viewed under the **Import Event**
  - Click on **View Log** to be taken to a page that explains the errors
  - Use the explanation of errors in View Log to make corrections to the spreadsheet
- If there are errors delete the dataset by clicking **Delete** in the upper left corner
  - It is strongly recommended that the user correct errors in the template and re-upload rather than attempt to fix errors by clicking **Resolve Online**
- Repeat the upload process again, being sure to upload the updated spreadsheet



Figure 5 - The result of uploading a dataset that contained errors

- Once the spreadsheet uploads successfully without errors a yellow dialog box will appear saying the dataset is ready to be migrated as shown in Figure 6
  - Only valid monitoring locations will be migrated



Figure 6 - The result of uploading a dataset without errors

- Click **Migrate** in the upper left corner
  - Depending on the amount of data, and if results are being updated, this can take 20 minutes or more
  - If a dataset has already been migrated, but the dataset needs to be changed, make the corrections in the spreadsheet, and follow the upload procedure but select **This file may contain new and/or existing data** in the **New or Existing Data** section
- Once the migration is complete a green dialog box will appear stating the migration was completed successfully as shown in Figure 7



Figure 7 - Successful migration of a dataset

## 6.5. Step 3 – Formatting Activities and Results

- Input activities and results into the provided activities and results template located in the appendix
- The following field must be filled out in the template for each result: Project ID (project ID codes are described in Section 6.1), Monitoring Location ID, Activity ID, Activity Start Date, Activity Type, Activity Media Name, Activity Media Subdivision Name, Sample Collection Method ID, Sample Collection Equipment Name, Characteristic Name, Result Value, Result Unit, Result Sample Fraction, Result Value Type, Result Analytical Method ID, Result Analytical Method Context, Analysis Start Date, Analysis Start Time, Result Detection Type, Result Detection Measure, Result Detection Unit, Lab Sample Preparation Method ID, and Laboratory Name
  - Activity start date must be in yyyy/mm/dd format
  - Activity start time must be in h:mm:ss AM/PM format
  - Activity start time zone will typically be MST or MDT
  - If a result is described as Bicarbonate as CaCO<sub>3</sub>, then the **Characteristic Name** is Bicarbonate and the **Method Speciation** is as CaCO<sub>3</sub>
  - Check the units of pH, sometimes this is reported as su, None is an acceptable domain value for pH's **Result Unit**
  - It can be very beneficial to reference the CDSN Minimum Data Elements Upload Template (included in appendix) when formatting the results and activities data as it provides acceptable domain values for parameters and examples of formatting
  - See Step 5 - Trouble Shooting if you are having any issues
- The other parameters are not required, but it is recommended to provide as many as possible
- Some data that is not initially required will become required depending on which fields are filled out
  - For instance **Sample Collection Method ID** is required when **Activity Type** contains the word sample



- Figuring out secondary requirements is an iterative process and may take several cycles of uploading the dataset, reviewing, and correcting errors. Proper preparation of data and selection of allowable values will reduce the number of iterations required.
- Once all data has been added to the template proceed to Step 4

## 6.6. Step 4 - Uploading & Migrating Results and Activities Data

Uploading results is typically the most challenging aspect of adding data to AWQMS. It is typically an iterative process consisting of attempting to upload data, analyzing error messages, modifying data in the template, and re-uploading data.

- Go to the **Import** tab, select **Results & Activities**
- From the **Import Configuration** drop down menu select **CDOT Results & Activities Template ~ 2532**
- The **Type of File** should be **CSV (comma delimited)**
- Under **Generated Values** click on **{none}**, a menu will pop up, select **CDOT**
- Under **New or Existing Data** use the default setting **This file contains new data only**
- Use the default option for **If import file is free of errors and warnings**
  - It is always a good idea to review your dataset before migrating
- Click **Choose File** next to **Import File:** under the **Import File(s)** heading. Select the csv version of the upload template filled out with the results to be uploaded
- Click **Import Data** in the top left of the page
- A new page will appear displaying the progress of the upload
- If any errors are found during the upload a red dialog box will appear
  - Error types are shown in the **Import Event** section
  - Click on **View Log** to open a new page will appear that explains the errors
- If there are errors, make corrections to the spreadsheet based on the import log
  - Warnings about Characteristics not being configured as valid parameters in the Quality Control Threshold table can be ignored
- Delete the unsuccessful upload by clicking **Delete** in the upper left corner
- Repeat the upload process again, being sure to upload the updated spreadsheet
- Once the spreadsheet uploads successfully without errors a yellow dialog box will appear saying the dataset is ready to be migrated
- Click **Migrate** in the upper left corner
  - Depending on the amount of data, and if the dataset is being updated, this can take 20 minutes or more
  - If a dataset has already been migrated but needs to be changed make the corrections in the spreadsheet, and follow the upload procedure but select **This file may contain new and/or existing data** in the **New or Existing Data** section
- Once the Migration is complete a green dialog box will appear stating the migration was completed successfully

### Check that the results and activities have migrated

- Go to the **Review** tab find and click on **Activities**
- Select **CDOT** from Organization ID
- Select a Project ID
- Click **Search** in the upper left corner
- A new page will appear displaying all of the activities associated with the project as shown in Figure 8



- To look for activities associated with another project click **Clear Search Criteria** in the upper left corner, and once again select **Organization ID** and **Project ID** and click **Search**
- When finished log out by clicking **Log Out** in the upper right corner of the page

## 6.7. Step 5 - Trouble Shooting

There are many places during the formatting and uploading of the datasets for things to go wrong. The following is a discussion of common problems and solutions.

If it is not clear what value(s) are appropriate or in the domain for a particular parameter consult the following:

- CDSN Minimum Data Elements Fact Sheet (see Section 9)
- CDSN Minimum Data Elements Upload Template (see Appendix)
  - Some of the parameters have links to other sheets that provide details on acceptable values.
- Metadata pages on the AWQMS website associated with certain topics
- Manual upload pages on the AWQMS website for monitoring locations, projects, results and activities

Sometimes the values in the domain of a parameter are not defined in any of the above locations. However, domain values for certain parameters can be added. For instance if the Result Analytical Method ID and the Result Analytical Method Context are unknown a domain value of unknown can be added. Go to the **Metadata** tab > **Analytical Methods**, from the **Context** drop down menu select **CDOT**. Click **Add New**, in the dialog box for **ID** type Unknown, in the **Name** dialog box type Unknown. After click **Save**, Unknown will now be a Result Analytical Method ID and CDOT will be the Result Analytical Method Context.

Always use the comma separated values format (CSV). The xls and xlsx spreadsheet formats can cause uploading issues even when the spreadsheets are otherwise identical.

If a dataset was uploaded and migrated, and the results are not appearing when reviewed, it is likely that the Result Analytical Method ID and the Result Analytical Method Context were not provided.

Results and activities cannot be uploaded and migrated into the database if the associated monitoring location has not already been uploaded and migrated into the database.

The CDSN project coordinator can also be contacted for further assistance as described in Section 8.

Organization ID	Activity Start	Activity Type	Monitoring Location ID	Fraction	Characteristic	Status	Value	Unit	Detection Condition
CDOT	09-27-2000	Sample-Routine	HB-2	Total	Alkalinity, total		21	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Acidic		< 0.001	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Equivalents		25	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Calcium		9	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Carbonate		+ 5	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Chloride		47	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Sulfate		+ 5	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Magnesium		21	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Manganese		0.033	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Total	Phosphorus		+ 0.01	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Fluoride		0.8	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Sodium		54	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Sulfate		+ 10	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Total	Total suspended solids		+ 5	mg/l	
CDOT	09-27-2000	Sample-Routine	HB-2	Dissolved	Zinc		+ 0.005	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Total	Alkalinity, total		18	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Acidic		< 0.001	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Equivalents		22	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Calcium		28	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Carbonate		+ 5	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Chloride		180	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Hydroxide		+ 5	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Magnesium		6	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Manganese		0.04	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Phosphorus		0.01	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Total	Phosphorus		0.02	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Fluoride		1.5	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Sodium		80	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Sulfate		4	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Total	Total suspended solids		9	mg/l	
CDOT	08-25-2001	Sample-Routine	HB-2	Dissolved	Zinc		0.02	mg/l	
CDOT	08-28-2001	Sample-Routine	HB-2	Total	Alkalinity, total		7	mg/l	

Figure 8 - Reviewing successfully migrated results



## 7. DATA INPUT QUALITY CONTROL

It is recommended that before final quality data is inputted into AWQMS, an independent QC check is performed by checking for correct data entry at a 10% frequency or at a level consistent with the project Quality Assurance Plan. As previously mentioned, the quality of the data from the field and laboratory must be reviewed and deemed acceptable before AQWMS entry.

## 8. PROCESS CONTACTS

DTD Environmental Programs Branch  
Hydrologic Resources and Ecological Design Section  
HRED Programs Manager  
Phone: 303-512-4053

Further technical assistance can be obtained by contacting the Colorado Data Sharing Network coordinator at [cdsn@coloradowaterdata.org](mailto:cdsn@coloradowaterdata.org)

## 9. REFERENCES

Ambient Water Quality Monitoring system, 2016. *AWQMS-Cloud*, Accessed June 2016, from <https://awqms.goldsystems.com/Login.aspx>

Colorado Data Sharing Network, 2016. Accessed June 2016, from <http://www.coloradowaterdata.org/index.html>

Colorado Data Sharing Network, 2016. *CDSN Minimum Data Elements Fact Sheet*, Accessed June 2016, from [http://www.coloradowaterdata.org/cdsnawqms\\_cdsn.html](http://www.coloradowaterdata.org/cdsnawqms_cdsn.html)

## APPENDIX

Open the following templates in Microsoft Excel by right clicking on the icon > **Worksheet Object** > **Open**.

### CDOT Monitoring Locations Template



### CDOT Results and Activities Template



### CDSN Minimum Data Elements Upload Template

