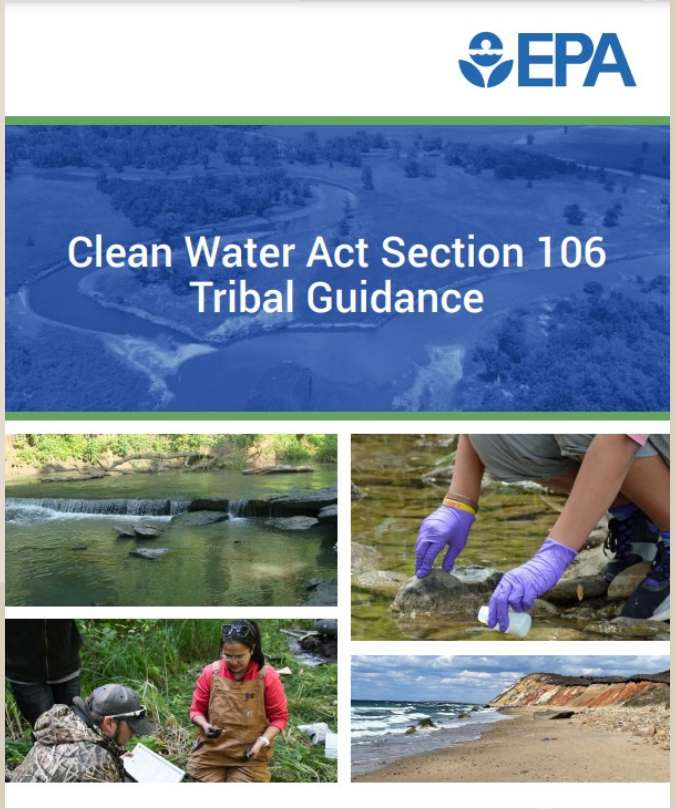
Organizing Water Quality Monitoring Data and submitting to Water Quality Exchange Network (WQX)

Kate Pinkerton, US EPA Region 9
Zach Gigone, Shingle Springs
Tuesday May 20th, 2025
1:30 pm

agenda

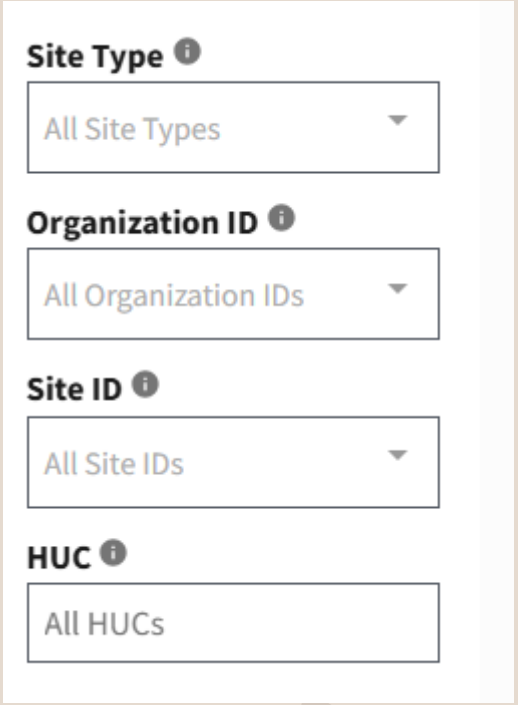
Clean Water Act Section 106 Reporting Requirements

- OLD REQUIREMENT (BEFORE 2023):
  - Submit data in a STORET/WQX Compatible Format (e.g. spreadsheet emailed to project officer)
- NEW REQUIREMENT (AFTER 2023)
  - Submit data directly into WQX (with exceptions if you provide a waiver request to project officer)
  - Implementation began with grant terms and conditions in 2024-2025 grant awards
- APPLIES TO ANY WATER QUALITY DATA COLLECTED USING CWA SECTION 106 FUNDS
  - Both lab and field data!
- ANNUAL REQUIREMENT (DUE 120 DAYS AFTER THE END OF A PROJECT PERIOD- USUALLY JANUARY 31.)



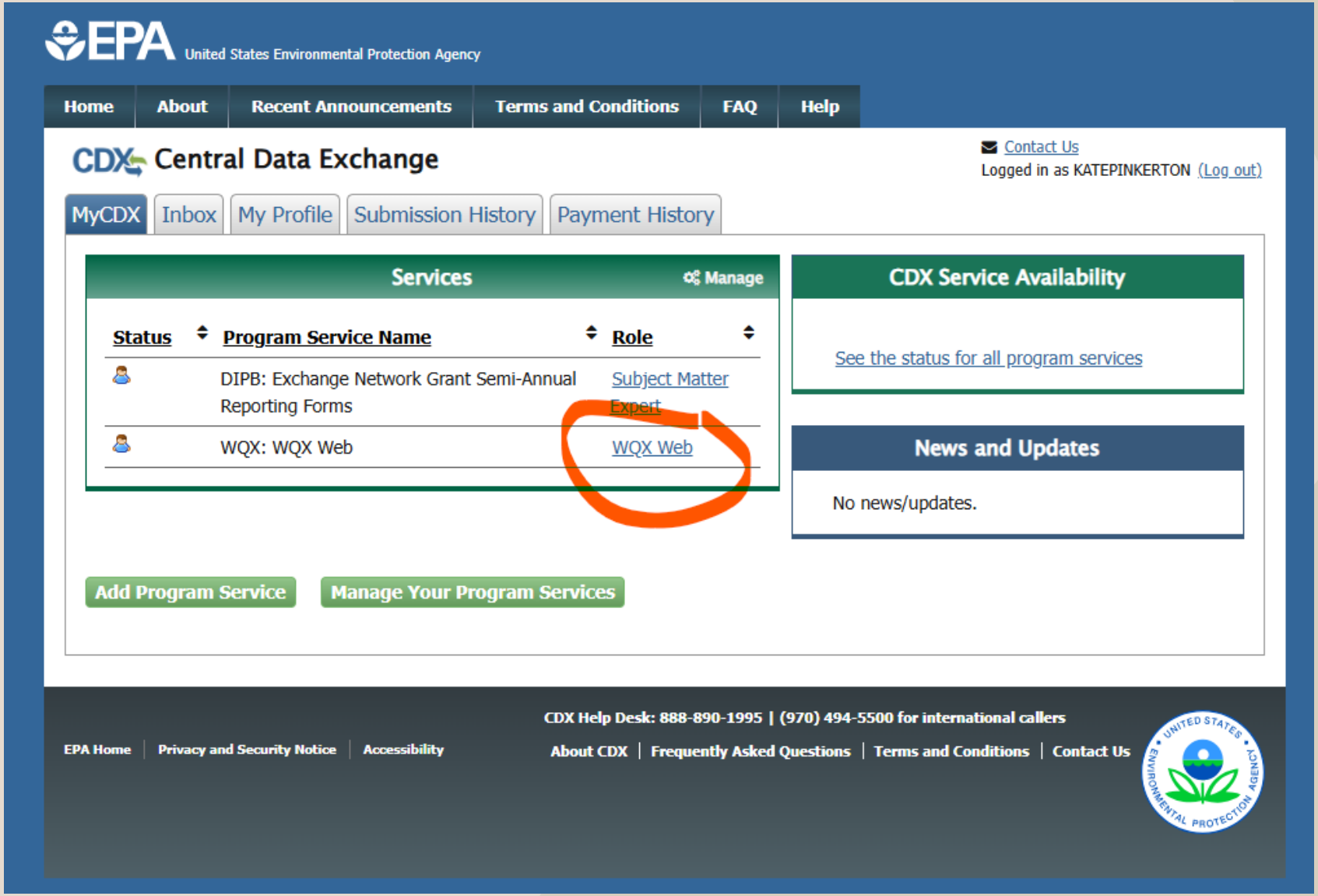
How to get started with WQX

- Confirm if your organization already has data in WQX.
  - Check for previously submitted data in the Water Quality Portal: https://www.waterqualitydata.us/
  - Click "Advanced" and search for your tribe name in the "Organization ID" box.
- Email WQX@epa.gov to create an account associated with that Org ID or to set up a new one.
- These steps are important for consistency and continuity of data collected!



Note CDX now uses Login.gov

WQX is within EPA's Central Data Exchange



WQX Data Requirements

Three categories of data are required:

- **Projects**: At least one project is required. This describes the purpose of the monitoring.
- **Monitoring Locations:** Description of the geographic location of the site where monitoring took place.
- **Results:** Water quality sampling and field observations that take place during a visit to a monitoring station, including descriptions of what was sampled or observed, analytical methods, sample collection procedures and measurements of what was monitored.

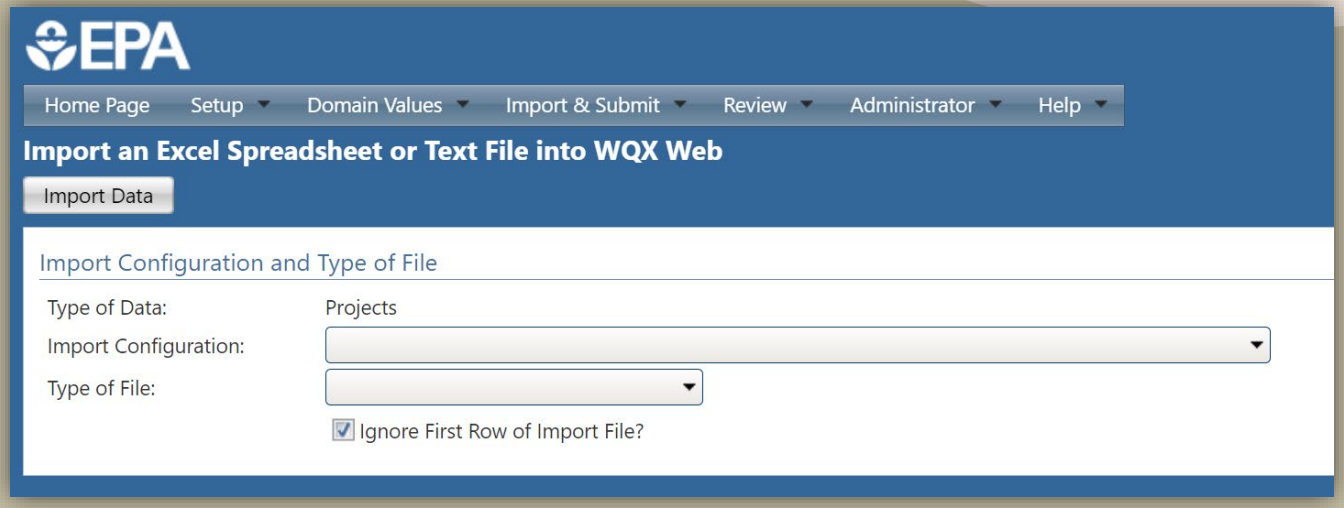
WQX Physical Chemical Template- Projects Tab

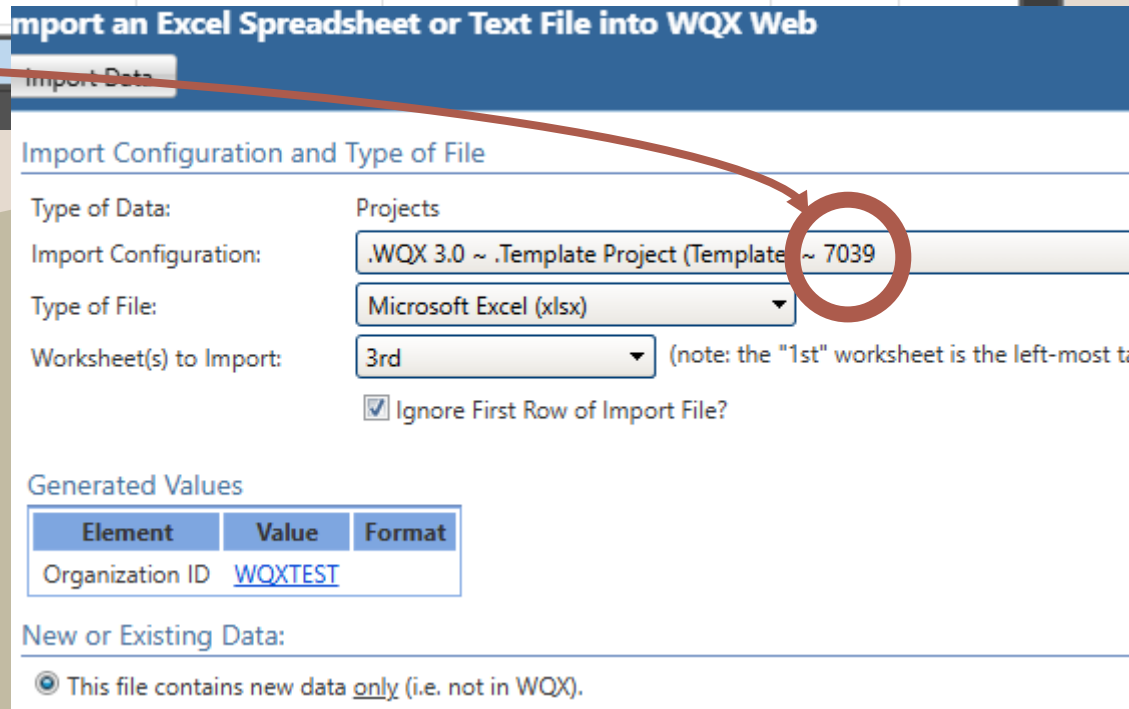
	A	B	C	D	E	F	G	H
1	Project ID	Project Name	Project Description	QAPP Approved Indicator (Yes/No)	Project Attachment File Name	Project Attachment Type		
2	TEMPLATE_PCHEM	Physical-Chemical Template Project	Project for testing of template only	Yes				
3	Tribe_106	Tribe CWA 106 Grant	Samples collected to assess water qu	Yes				
4	Tribe_WQM	Tribe Water Quality Monitoring	Samples collected to assess water quality on the reservation.					
5								
6								
7								

Note: Red Text Fields are Required Metadata!

Instructions | Definitions | Projects - config#7039 | Monitoring Locations - cfg#7040

Ready | Accessibility: Investigate





WQX Physical Chemical Template- Monitoring Location Tab

	A	B	C	D	E	F	G	H	I	J	
1	Monitoring Location ID	Monitoring Location Name	Monitoring Location Type	Tribal Land Indicator (Yes/No)	Tribal Land Name	Monitoring Location Latitude (DD.DDDD)	Monitoring Location Longitude (-DDD.DDDD)	Monitoring Location Source Map Scale	Monitoring Location Horizontal Collection Method	Monitoring Location Horizontal Coordinate Reference System	Stat
2	ML-01	Template ML 1	Spring	No		40.594	-111.72	24000	Interpolation-Map	NAD27	UT
3	ML-02	Template ML 2	River/Stream	No		40.594	-111.72		GPS-Unspecified	NAD83	SC
4	ML-03	Template ML 3	River/Stream	No		40.527	-111.755		GPS-Unspecified	NAD83	WV
5	ML-04	Template ML 4	Spring	No		40.657	-111.77	12000	Interpolation-Map	NAD27	CO
6	ML-05	Template ML 5	River/Stream	No		40.522	-112.149		GPS-Unspecified	NAD83	ID
7	ML-06	Template ML 6	River/Stream	No		40.765	-111.848		GPS-Unspecified	NAD83	UT
8	ML-07	Template ML 7	River/Stream	No		40.771	-111.892		GPS-Unspecified	NAD83	UT
9	ML-08	Template ML 8	River/Stream	No		40.779	-112.099		GPS-Unspecified	NAD83	UT
10	ML-09	Template ML 9	River/Stream	No		40.598	-111.685		GPS-Unspecified	NAD83	UT
11											
12											
13											
14											
15											

Note: Red Text Fields are Required Metadata!
Everything else is optional.

EPA

Home Page | Setup | Domain Values | Import & Submit | Review | Help

Import an Excel Spreadsheet or Text File into WQX Web

Import Data

Import Configuration and Type of File

Type of Data: Monitoring Locations

Import Configuration: .WQX 3.0 ~ .Template Monitoring Location (Template) ~ 7040

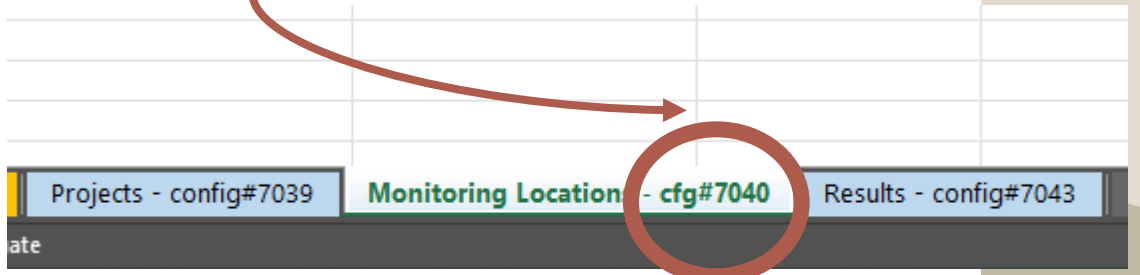
Type of File: Microsoft Excel (xlsx)

Worksheet(s) to Import: 4th (note: the "1st" worksheet is the left-most tab of the Excel Workbook)

☑ Ignore First Row of Import File?

Generated Values

Element	Value	Format
Organization ID	WQXTEST	
Monitoring Location Country Code	US	



New or Existing Data:

- (●) This file contains new data only (i.e. not in WQX).
- ( ) This file contains existing data only (i.e. already in WQX).
- ( ) This file may contain new and/or existing data.

If import file is free of errors:

- (●) Let me review my dataset in the staging area before submitting.
- ( ) Automatically submit the data to WQX.

File(s)

Import File: Choose File | Copy of Physical Chemical Template_KP.xlsx — .xlsx, .xlsm, .zip

Attachments File: Choose File | No file chosen — .zip

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Project ID	Monitoring Location ID	Activity ID (CHILD-subset)	Activity ID User Supplied (PAREN	Activity Type	Activity Media Name	Activity Start Date	Activity Start Time	Activity Start Time Zone	Activity Depth/ Height Measur e	Activity Depth/Height Unit	Sample Collection Method ID	Sampl e Collect ion Metho	Sample Collection Equipment Name	Sample Collection Equipment Comment
2	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
3	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
4	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
5	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
6	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:FM:WB:		Field Msr/Obs	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
7	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
8	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
9	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
10	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:PS:		Field Msr/Obs	Water	3/3/2017	10:01	MST			Field Sample Method		Probe/Sensor	
11	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:PS:		Field Msr/Obs	Water	3/3/2017	10:01	MST			Field Sample Method		Probe/Sensor	
12	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:WB:		Field Msr/Obs	Water	3/3/2017	10:01	MST			Field Sample Method		Water Bottle	
13	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:WB:		Field Msr/Obs	Water	3/3/2017	10:01	MST			Field Sample Method		Water Bottle	
14	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
15	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
16	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
17	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
18	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
19	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
20	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
21	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
22	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
23	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
24	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
25	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
26	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
27	TEMPLATE_PCHEM	ML-07				Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
28	TEMPLATE_PCHEM	ML-07				Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
29	TEMPLATE_PCHEM	ML-07				Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
30	TEMPLATE_PCHEM	ML-09				Water	3/15/2017	16:20	MST	1.3	m	Field Sample Method		Probe/Sensor	Troll-9500
31	TEMPLATE_PCHEM	ML-09				Water	3/15/2017	16:20	MST	1.3	m	Field Sample Method		Probe/Sensor	Troll-9500
32	TEMPLATE_PCHEM	ML-09				Water	3/15/2017	16:20	MST	1.3	m	Field Sample Method		Probe/Sensor	Troll-9500

Confirm Sample Collection Method
Please confirm the SCM you are entering here is also in WQX.

If this cell is highlighted (based on your Activity Type) then it must be populated in order to submit to WQX.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Project ID	Monitoring Location ID	Activity ID (CHILD-subset)	Activity ID User Supplied (PAREN	Activity Type	Activity Media Name	Activity Start Date	Activity Start	Activity Start ne	Activity Depth/ Height Measur e	Activity Depth/Height Unit	Sample Collection Method ID	Sampl e Collect ion Metho	Sample Collection Equipment Name	Sample Collection Equipment Comment
2	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine							Grab Sample Method		Water Bottle	
3	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:									Grab Sample Method		Water Bottle	
4	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:									Grab Sample Method		Water Bottle	
5	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:									Grab Sample Method		Water Bottle	
6	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:FM:WB:									Grab Sample Method		Water Bottle	
7	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:									Grab Sample Method		Water Bottle	
8	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:									Grab Sample Method		Water Bottle	
9	TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:									Grab Sample Method		Water Bottle	
10	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:PS:									Field Sample Method		Probe/Sensor	
11	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:PS:									Field Sample Method		Probe/Sensor	
12	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:WB:									Field Sample Method		Water Bottle	
13	TEMPLATE_PCHEM	ML-01	ML-01:20170303:1001:FM:WB:									Field Sample Method		Water Bottle	
14	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:									Grab Sample Method		Water Bottle	
15	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:									Grab Sample Method		Water Bottle	
16	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:									Grab Sample Method		Water Bottle	
17	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:									Grab Sample Method		Water Bottle	
18	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:					11:00	MST			Grab Sample Method		Water Bottle	
19	TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:			Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
20	TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
21	TEMPLATE_PCHEM														
22	TEMPLATE_PCHEM														
23	TEMPLATE_PCHEM														
24	TEMPLATE_PCHEM														
25	TEMPLATE_PCHEM														
26	TEMPLATE_PCHEM														
27	TEMPLATE_PCHEM														
28	TEMPLATE_PCHEM														
29	TEMPLATE_PCHEM														
30	TEMPLATE_PCHEM														
31	TEMPLATE_PCHEM														
32	TEMPLATE_PCHEM														

Building your activity ID:

Always:

- Location
- Date

Conditional:

- Activity Type (Sample vs Field Measure)
- Project
- Time
- Project
- Method/Equipment
- Depth

B3 =CONCATENATE(B2,":",TEXT(F2,"YYYYMMDD"),":",TEXT(G2,"HHMM"),":",IF(D2="Sample-Routine","SR",IF(D2="Field Msr/Obs","FM","")))

	A	B	C	D	E	F
1	**Activity ID Format**	**Formula (to paste in the 'Results' tab)**				
2						
3	Standard Formula: ("ML:DATE:TIME:ACT TYPE")	:19000100:0000:				
4	Formula for when you have Activity Depth(s):("ML:DATE:TIME:ACT TYPE:DEPTH")	:19000100:0000::				
5						
6		**Copy one of the formulas above and paste it into**	**olumn on the 'Results' tab.**			
7						
8						
9						
10						
11	OrganizationIdentifier(OrganizationIdentifier)	OrganizationFormalName		ActivityId	ActivityTy	ActivityM Activity

Copy this formula and paste it into the 'Activity ID' Column on the 'Results' tab.

Definitions | Projects - config#7039 | Monitoring Locations - cfg#7040 | Results - config#7043 | ALL SiteElements -config#7004 | ALL ResultElements -config#5838 | Activity ID Formula(s)

	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
	Characteristic Name	Characteristic Name User Supplied	Method Speciation	Result Detection Condition	Result Value	Result Unit	Result Measure Qualifier	Result Sample Fraction	Result Status ID	ResultTemperatureBasis	Statistical Base Code	ResultTimeBasis	Result Value Type
	Phosphate-phosphorus		as P	Not Detected				Filtered, lab	Final				Actual
	Kjeldahl nitrogen		as N	Not Detected				Filtered, lab	Final				Actual
	Total Nitrogen/Total Phosphorus Ratio (TN:TP)			Not Detected					Final				Actual
	pH				7.1	None			Final				Actual
	Conductivity				4.3	mg/l			Final				Actual
	Turbidity			Not Detected					Final				Actual
	Fecal Coliform			Not Detected					Final				Actual
	Total Coliform			Not Detected					Final				Actual
0	Temperature, water				11.2	deg C	H		Final				Actual
1	pH				8.02	None	H		Final				Actual
2	Escherichia coli				119	MPN/100ml	H		Final				Actual
3	Turbidity				0.98	NTU	H		Final				Actual
4	Phosphate-phosphorus		as P	Not Detected				Filtered, lab	Final				Actual
5	Fecal Coliform			Not Detected					Final				Actual
6	pH			Detected Not Quantified					Final				Actual
7	Dissolved oxygen (DO)			Not Detected					Final				Actual
8	Turbidity			Not Detected					Final				Actual
9	Total Coliform			Not Detected					Final				Actual
0	Nitrate		as N	Not Detected				Filtered, lab	Final				Actual
1	Phosphate-phosphorus		as P	Not Detected				Filtered, lab	Final				Actual
2	Kjeldahl nitrogen		as N	Not Detected				Filtered, lab	Final				Actual
3	Total Nitrogen/Total Phosphorus Ratio (TN:TP)			Not Detected					Final				Actual
4	pH			Detected Not Quantified					Final				Actual
5	Dissolved oxygen (DO)			Present Above Quantification Limit					Final				Actual
6	Turbidity			Not Detected					Final				Actual
7	Fecal Coliform			Not Detected					Final				Actual
8	Total Coliform			Not Detected					Final				Actual
9	Nitrite		as N	Not Detected				Filtered, lab	Final				Actual
0	Temperature, water				16	deg C			Preliminary		Delta	1 Day	Calculated
1	pH				8.4	None			Preliminary		Daily M	Maximum	Calculated
2	Turbidity				77	NTU			Preliminary		Daily M	Maximum	Calculated

AC	AD	AE	AF	AG	AH	AI
Result Analytical Method ID	Result Analytical Method Context	Analysis Start Date	Result Detection/Quantitation Limit Type	Result Detection/Quantitation Limit Measure	Result Detection/Quantitation Limit Unit	Result Comment
120.1	USEPA	3/2/2017	Upper Quantitation Limit	0.058	mg/l	
120.1	USEPA	3/2/2017	Method Detection Level	1.1	mg/l	
120.1	USEPA	3/2/2017	Method Detection Level	1.1	mg/l	
120.1	USEPA	3/2/2017				
120.1	USEPA	3/2/2017				
120.1	USEPA	3/2/2017	Lower Reporting Limit	12	NTU	
120.1	USEPA	3/2/2017	Upper Quantitation Limit	13	MPN/100ml	
120.1	USEPA	3/2/2017	Upper Quantitation Limit	540	MPN/100ml	
120.1	USEPA					
120.1	USEPA					
120.1	USEPA					
120.1	USEPA	3/9/2017	Upper Quantitation Limit	0.052	mg/l	
120.1	USEPA	3/9/2017	Upper Quantitation Limit	1.8	MPN/100ml	
120.1	USEPA	3/9/2017	Instrument Detection Leve	6.6	None	
120.1	USEPA	3/9/2017	Upper Quantitation Limit	7.8	mg/l	
120.1	USEPA	3/9/2017	Upper Quantitation Limit	11	NTU	
120.1	USEPA	3/9/2017	Upper Quantitation Limit	79	MPN/100ml	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	0.34	mg/l	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	0.48	mg/l	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	1.9	mg/l	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	2.3	mg/l	
120.1	USEPA	3/11/2017	Instrument Detection Leve	6.4	None	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	7.8	mg/l	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	9.4	NTU	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	11	MPN/100ml	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	1600	MPN/100ml	
120.1	USEPA	3/11/2017	Upper Quantitation Limit	0.32	mg/l	
120.1	USEPA					
120.1	USEPA					

Import Completed (with errors)

Step 1 of 3 completed.

The dataset has been imported, but there are errors that need to be resolved (step 2), and then the dataset needs to be submitted to CDX (step 3). If you submit to CDX before resolving all errors, then only the valid records will be included.

A dataset only becomes permanent after it has been submitted to CDX.

Import Event

Start Time: 05-01-2025 02:31:54 PM

End Time: 05-01-2025 02:32:03 PM

File Name: Copy of Physical Chemical Template_KP.xlsx

Event Log: View all validation errors and warnings

Message Type	Total	Resolved	Event Log	Resolution
Required Value Missing	3	0	View Log	Resolve Online
Value or Format Invalid	3	0	View Log	Resolve Online
Domain Value Invalid	12	0	View Log	Resolve Online
Message	7	7	View Log	N/A

Dataset is ready to be submitted to CDX

Step 1 of 2 completed.

The dataset has been imported (step 1). Now the dataset needs to be submitted to CDX (step 2).

A dataset only becomes permanent after it has been submitted to CDX.

Submission to CDX Successful!

The final step in this process has completed and the WQX database has been updated. It may take up to four days for this data to be published and become available from the Water Quality Portal.

EPA

Home Page | Setup | Domain Values | Import & Submit | Review | Help

Dataset Details

Return | Delete | Export & Submit to CDX

Dataset Information:

Type:	Results & Activities
Import Configuration:	.Template Physical/Chemical (Template)
Type of File:	Xlsx
Worksheet(s) to Import:	5
Organization ID:	WQXTEST
Options:	Ignore First Row All New Data Let Me Review My Dataset Before Submitting
Status:	Import Failed

Import Completed (with errors)

Step 1 of 3 completed.

The dataset has been imported, but there are errors that need to be resolved (step 2), and then the dataset needs to be submitted to CDX (step 3). If you submit to CDX before resolving all errors, then only the valid records will be included.

A dataset only becomes permanent after it has been submitted to CDX.

Import Event

Start Time:	05-02-2025 08:13:59 PM
End Time:	05-02-2025 08:14:10 PM
File Name:	Copy of Physical Chemical Template_KP.xlsx
Event Log:	View all validation errors and warnings

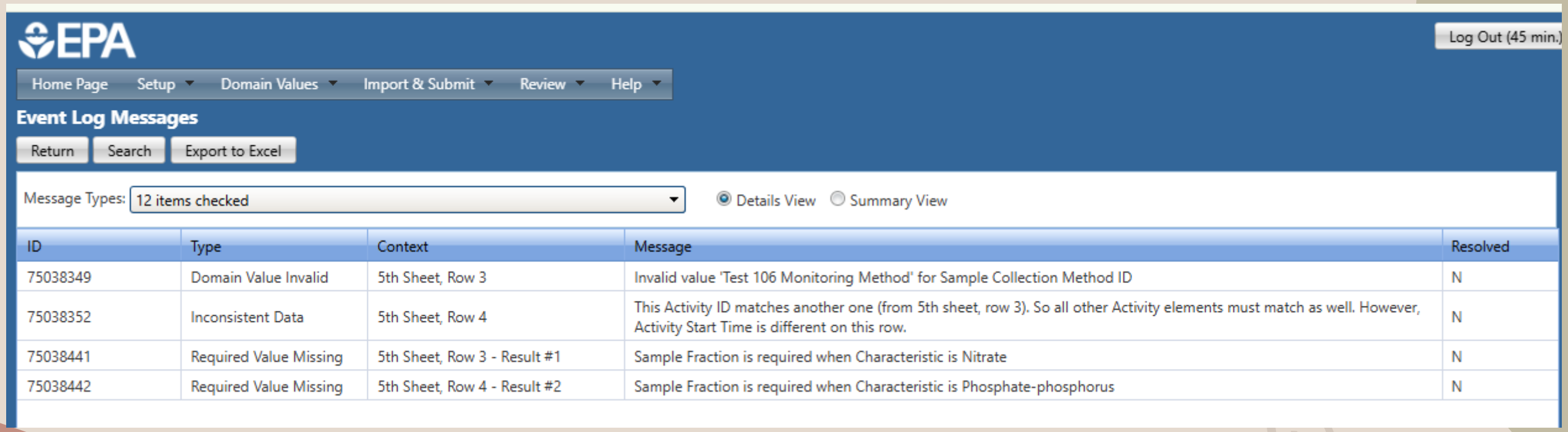
Message Type	Total	Resolved	Event Log	Resolution
Inconsistent Data	1	0	View Log	Resolve in Import File
Required Value Missing	2	0	View Log	Resolve Online
Domain Value Invalid	1	0	View Log	Resolve Online
Message	7	7	View Log	N/A

Imported Records:

Entity	Total	Valid	New	Existing
Activity	2	1	2	0
Result	3	1	3	0

Documents:

Name
Copy of Physical Chemical Template_KP.xlsx
Import Log.xlsx



ID	Type	Context	Message	Resolved
75038349	Domain Value Invalid	5th Sheet, Row 3	Invalid value 'Test 106 Monitoring Method' for Sample Collection Method ID	N
75038352	Inconsistent Data	5th Sheet, Row 4	This Activity ID matches another one (from 5th sheet, row 3). So all other Activity elements must match as well. However, Activity Start Time is different on this row.	N
75038441	Required Value Missing	5th Sheet, Row 3 - Result #1	Sample Fraction is required when Characteristic is Nitrate	N
75038442	Required Value Missing	5th Sheet, Row 4 - Result #2	Sample Fraction is required when Characteristic is Phosphate-phosphorus	N

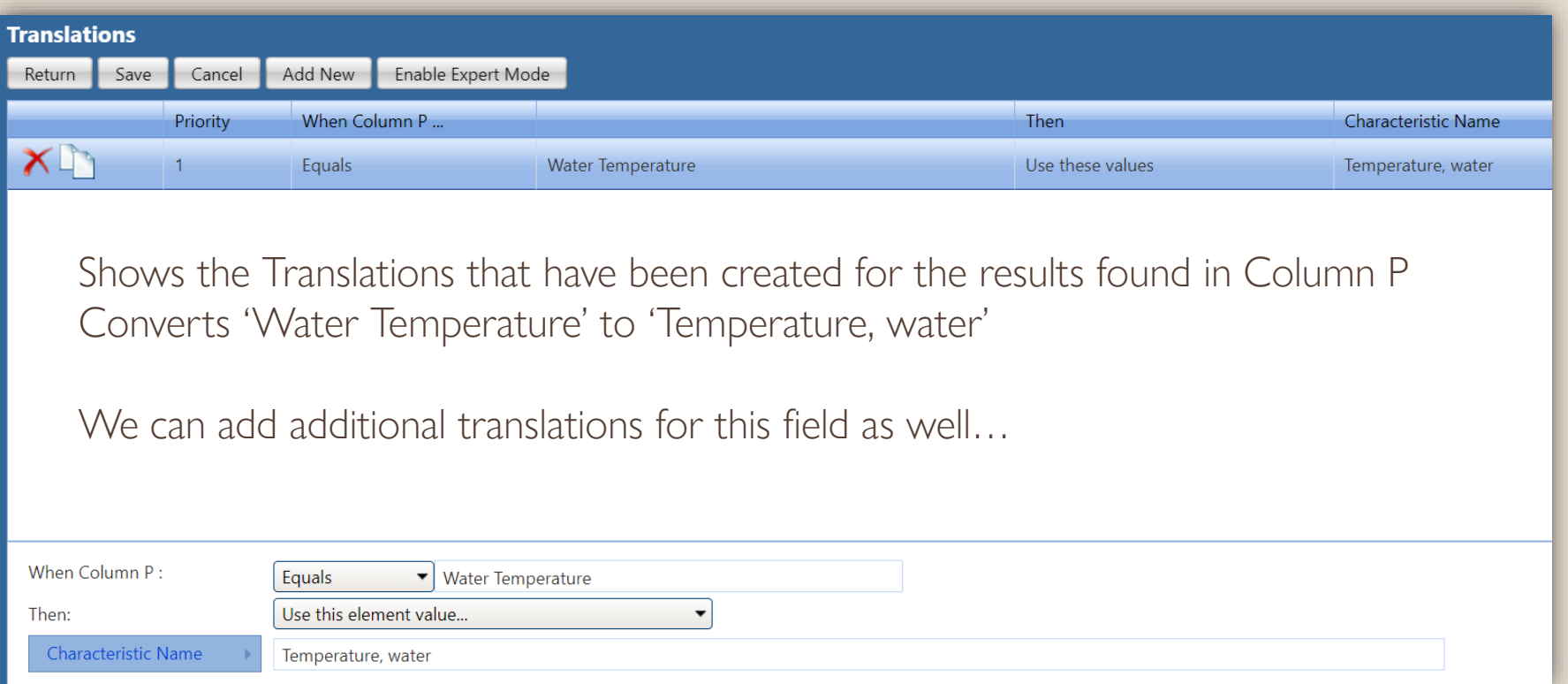
Custom Import Configurations

Translations

- Helps WQX read your data if you use different characteristic/parameter names

Configurations

- Can help WQX interpret wide/tidy data formats into the required "tall format"



Shows the Translations that have been created for the results found in Column P
Converts 'Water Temperature' to 'Temperature, water'

We can add additional translations for this field as well…

Common data formats

Tall

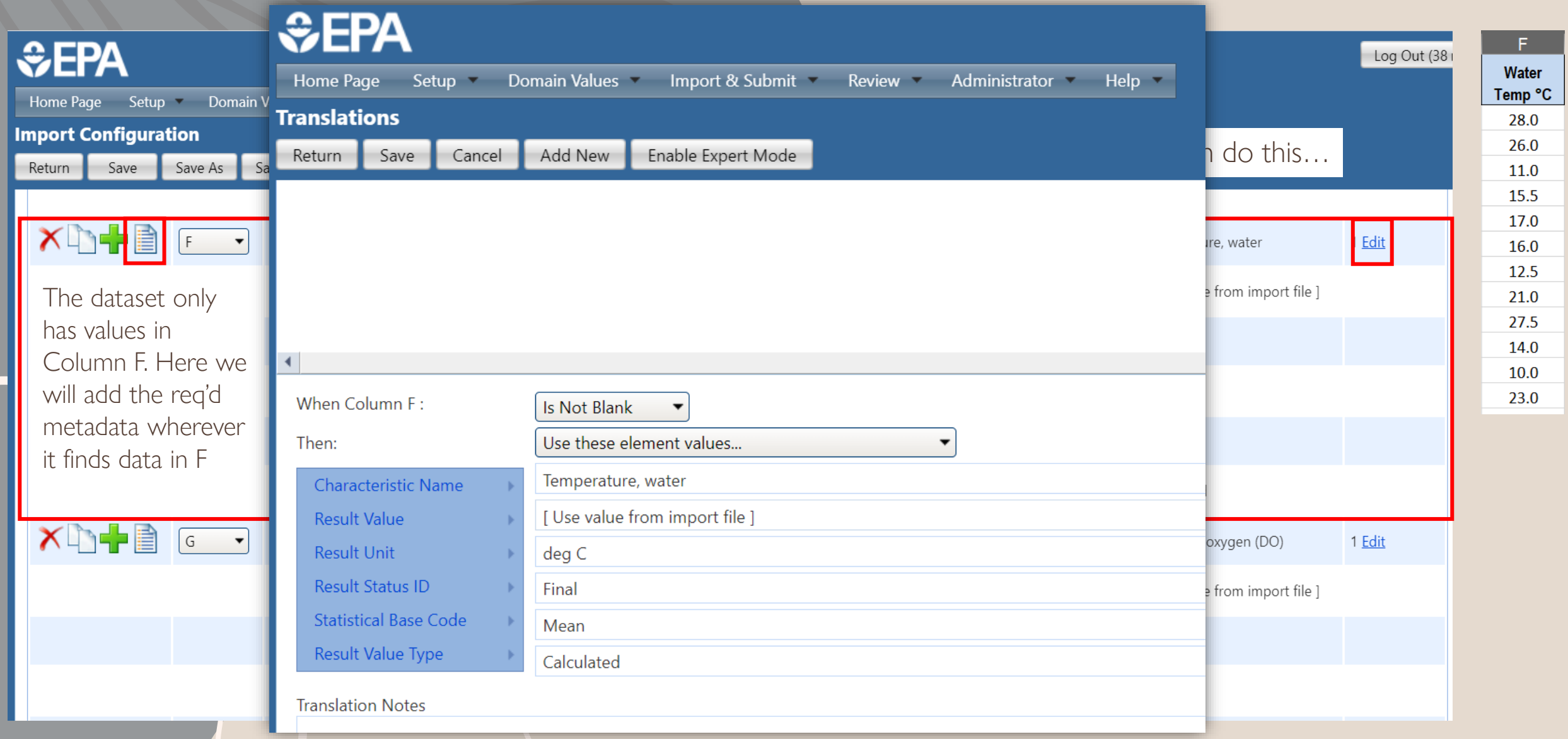
- WQX format
- Detailed metadata
- Unique results for every line

Wide/Tidy/Cross Tab

- Helpful for analysis
- Common probe results
- Missing metadata

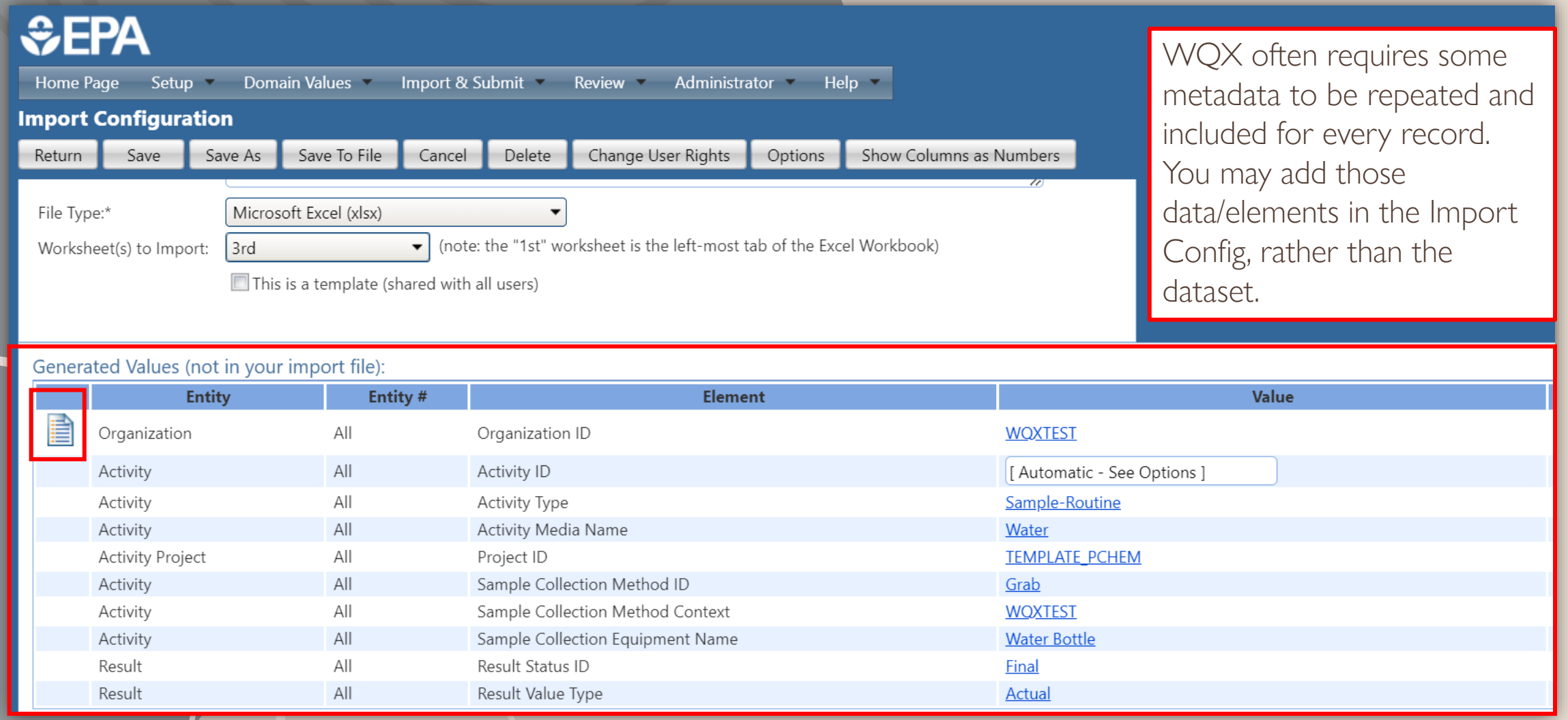
A	B	C	D	E	F	G	H	I	J	K	L
RecNo	AwwSiteID	Sample Date	Sample Time	Air Temp °C	Water Temp °C	pH	Dissolved Oxygen (ppm)	DOSaturation (%)	Total Alkalinity (mg/L)	Total Hardness (mg/L)	Turbidity (JTU)
	1	30-Jul-93	13:30	32.0	28.0	7.3	6.0	76.7	130	130	5
	1	4-Sep-93	13:00	30.0	26.0	7.3	5.6	69.0	165	120	5
	1	31-Oct-93	13:30	5.0	11.0	7.0	8.2	74.3	75	70	50
	1	3-Apr-94	12:00	19.0	15.5	7.3	8.6	86.2	110	100	20
	1	5-Nov-94	12:30	26.5	17.0	7.5	7.2	74.5	150	130	5
	1	10-Dec-94	10:00	18.5	16.0	7.5	7.8	79.0	110	100	15
	1	28-Jan-95	12:00	21.5	12.5	7.5	8.8	82.6	130	110	200
	1	22-Apr-95	11:45	20.0	21.0	7.0	6.1	68.4	75	70	70

A Crosstab Import Configuration



F
Water Temp °C
28.0
26.0
11.0
15.5
17.0
16.0
12.5
21.0
27.5
14.0
10.0
23.0

Adding in Generated Values (not in your dataset)



WQX often requires some metadata to be repeated and included for every record. You may add those data/elements in the Import Config, rather than the dataset.

These are ROUGH guidelines. Monitoring and data management can be very case specific!

Deciding water quality data management

Number of Samples/Parameters/ Characteristics	Number of Monitoring Sites	Frequency of Monitoring	Data Submission Methods	Data Management
<10/site	<5	<3/yr	WQX Web Template	Excel
10-20/site	5-10	3-10/yr	WQX Web Template/Import Configuration	Excel/Access
20+/site	10+	10+/year	Consider a data management service/node	Consider a data management service/node

thank you

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https://www.epa.gov/tribal-pacific-sw/r9tribal106#STORET

WQX@epa.gov is your friend!

Water Quality Data Collection, Analysis, and Organization

Zach Gigone

Environmental Scientist – Shingle Springs Band of Miwok Indians

Background

- Water quality testing through CWA106 began in 2012
- Took over the water testing in 2023 and managing the grant this year
- 4 water quality monitoring sites on trust land
- Monitoring takes place during the wet season each year 1-2 times depending on rainfall

Programs

- Yearly testing of intermittent streams with CWA106 grant
- Biological monitoring
- HABs
- E.Coli
- Non-106 testing

Data Collection

- Measurements in the field
  - Temperature, turbidity, pH
- Lab testing
  - Biological material, chemical tests, heavy metals

Data Format

- Lab data may be received in a variety of formats – PDF, Excel, Etc.
- Request Excel file or preferred format

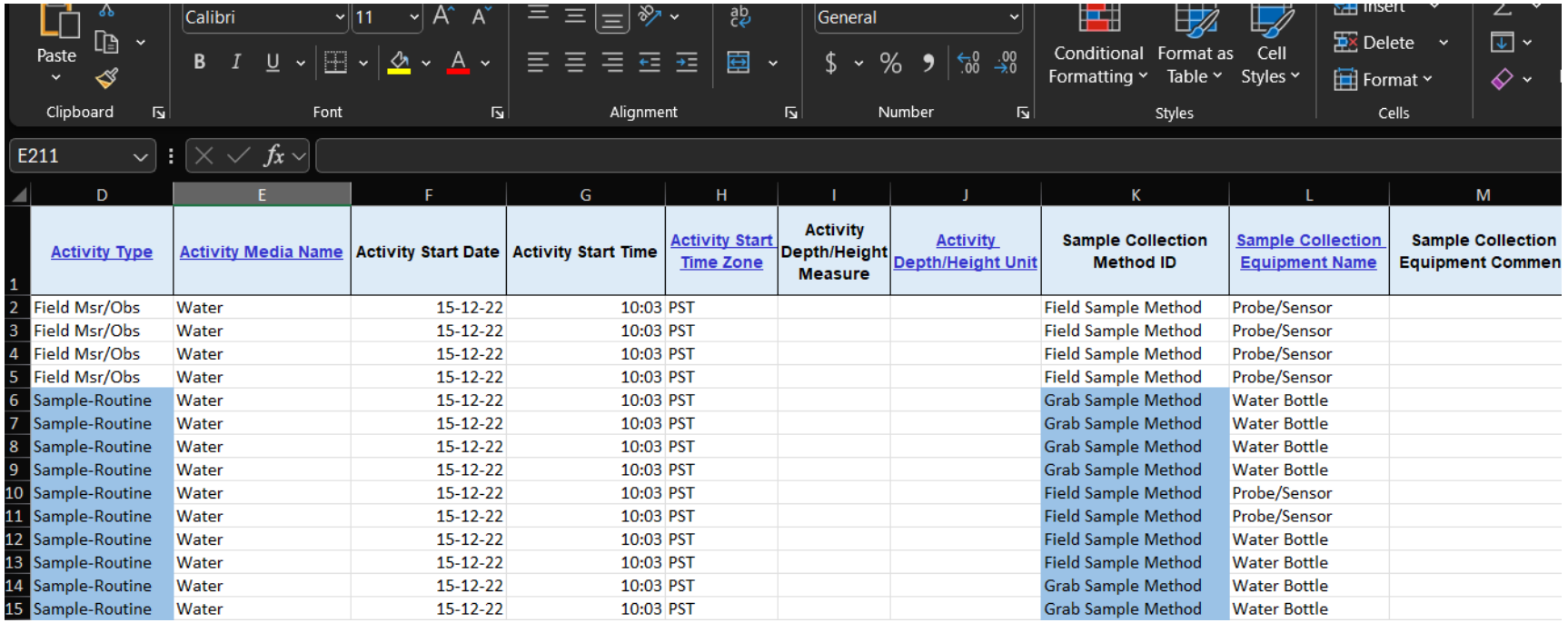
Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2400603 - Solvent Extract										
Blank (2400603-BLK1)				Prepared: 01/23/24 Analyzed: 01/25/24						
Hexane Extractable Material (HEM, Oil & Grease)	ND	5.0	mg/L							
LCS (2400603-BS1)				Prepared: 01/23/24 Analyzed: 01/25/24						
Hexane Extractable Material (HEM, Oil & Grease)	38.8	5.0	mg/L	40.0		97	78-114			
LCS Dup (2400603-BSD1)				Prepared: 01/23/24 Analyzed: 01/25/24						
Hexane Extractable Material (HEM, Oil & Grease)	38.2	5.0	mg/L	40.0		96	78-114	2	18	

WQX Data

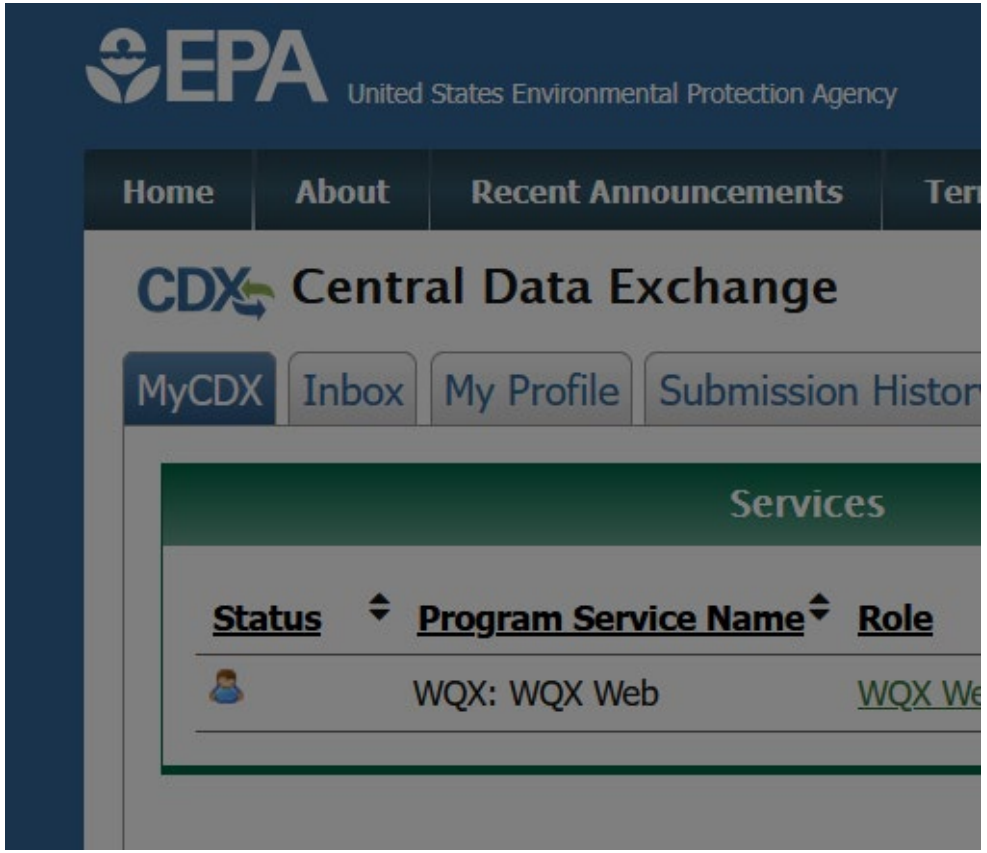
- WQX template used to start out

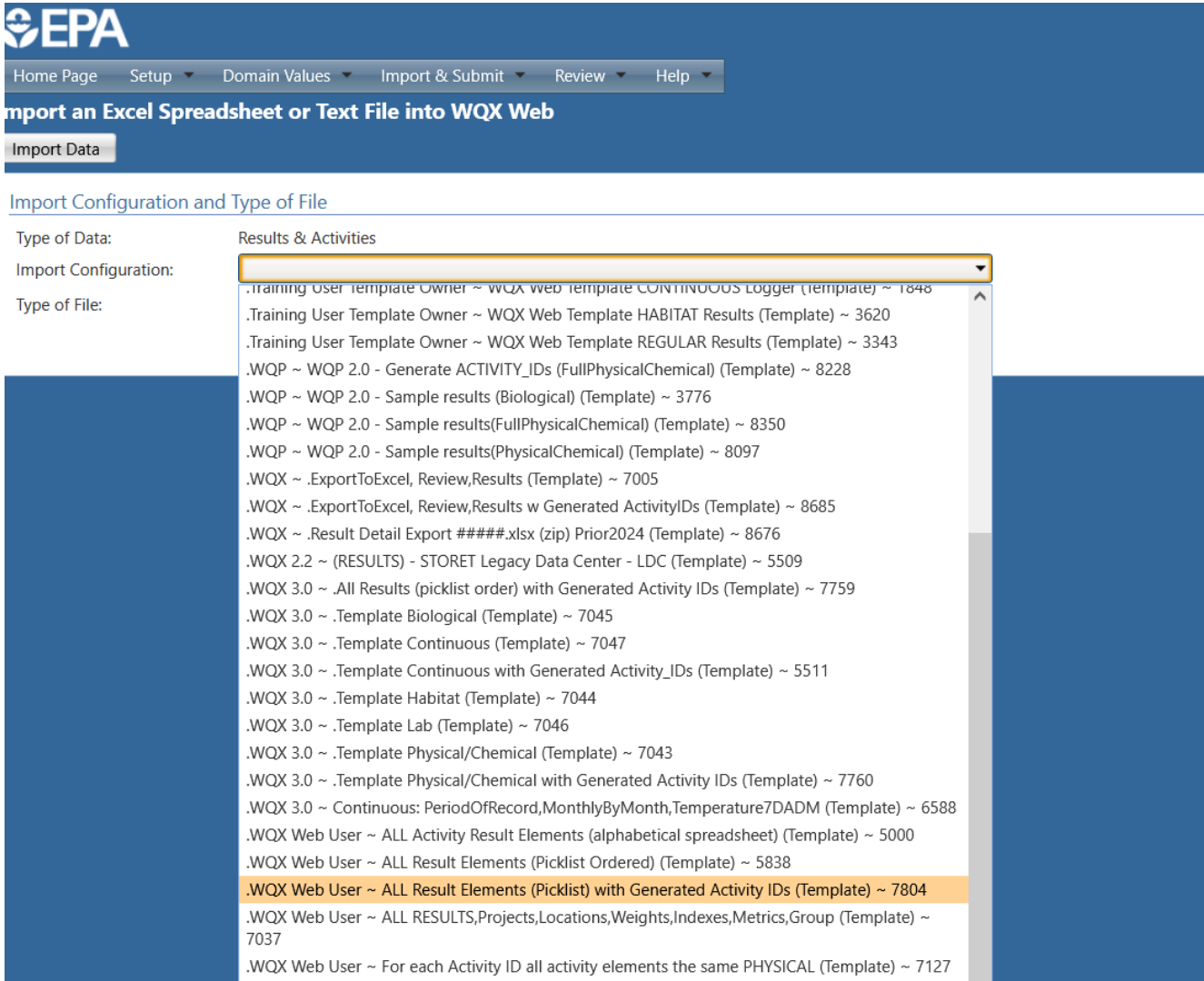
https://www.epa.gov/waterdata/water-quality-exchange-web-template-files



	D	E	F	G	H	I	J	K	L	M
1	Activity Type	Activity Media Name	Activity Start Date	Activity Start Time	Activity Start Time Zone	Activity Depth/Height Measure	Activity Depth/Height Unit	Sample Collection Method ID	Sample Collection Equipment Name	Sample Collection Equipment Commen
2	Field Msr/Obs	Water	15-12-22	10:03	PST			Field Sample Method	Probe/Sensor	
3	Field Msr/Obs	Water	15-12-22	10:03	PST			Field Sample Method	Probe/Sensor	
4	Field Msr/Obs	Water	15-12-22	10:03	PST			Field Sample Method	Probe/Sensor	
5	Field Msr/Obs	Water	15-12-22	10:03	PST			Field Sample Method	Probe/Sensor	
6	Sample-Routine	Water	15-12-22	10:03	PST			Grab Sample Method	Water Bottle	
7	Sample-Routine	Water	15-12-22	10:03	PST			Grab Sample Method	Water Bottle	
8	Sample-Routine	Water	15-12-22	10:03	PST			Grab Sample Method	Water Bottle	
9	Sample-Routine	Water	15-12-22	10:03	PST			Grab Sample Method	Water Bottle	
10	Sample-Routine	Water	15-12-22	10:03	PST			Field Sample Method	Probe/Sensor	
11	Sample-Routine	Water	15-12-22	10:03	PST			Field Sample Method	Probe/Sensor	
12	Sample-Routine	Water	15-12-22	10:03	PST			Field Sample Method	Water Bottle	
13	Sample-Routine	Water	15-12-22	10:03	PST			Field Sample Method	Water Bottle	
14	Sample-Routine	Water	15-12-22	10:03	PST			Grab Sample Method	Water Bottle	
15	Sample-Routine	Water	15-12-22	10:03	PST			Grab Sample Method	Water Bottle	

WQX Data


EPA
United States Environmental Protection Agency
Home
About
Recent Announcements
CDX Central Data Exchange
MyCDX
Inbox
My Profile
Services
Status
Program Service Name
Role
WQX: WQX Web


EPA
Home Page
Setup
Domain Values
Import & Submit
Review
Help
mport an Excel Spreadsheet or Text File into WQX Web
Import Data
Import Configuration and Type of File
Type of Data:
Results & Activities
Import Configuration:
Type of File:
.Training User Template Owner ~ WQX Web Template HABITAT Results (Template) ~ 3620
.Training User Template Owner ~ WQX Web Template REGULAR Results (Template) ~ 3343
.WQP ~ WQP 2.0 - Generate ACTIVITY_IDs (FullPhysicalChemical) (Template) ~ 8228
.WQP ~ WQP 2.0 - Sample results (Biological) (Template) ~ 3776
.WQP ~ WQP 2.0 - Sample results(FullPhysicalChemical) (Template) ~ 8350
.WQP ~ WQP 2.0 - Sample results(PhysicalChemical) (Template) ~ 8097
.WQX ~ .ExportToExcel, Review,Results (Template) ~ 7005
.WQX ~ .ExportToExcel, Review,Results w Generated ActivityIDs (Template) ~ 8685
.WQX ~ .Result Detail Export #####.xlsx (zip) Prior2024 (Template) ~ 8676
.WQX 2.2 ~ (RESULTS) - STORET Legacy Data Center - LDC (Template) ~ 5509
.WQX 3.0 ~ .All Results (picklist order) with Generated Activity IDs (Template) ~ 7759
.WQX 3.0 ~ .Template Biological (Template) ~ 7045
.WQX 3.0 ~ .Template Continuous (Template) ~ 7047
.WQX 3.0 ~ .Template Continuous with Generated Activity_IDs (Template) ~ 5511
.WQX 3.0 ~ .Template Habitat (Template) ~ 7044
.WQX 3.0 ~ .Template Lab (Template) ~ 7046
.WQX 3.0 ~ .Template Physical/Chemical (Template) ~ 7043
.WQX 3.0 ~ .Template Physical/Chemical with Generated Activity IDs (Template) ~ 7760
.WQX 3.0 ~ Continuous: PeriodOfRecord,MonthlyByMonth,Temperature7DADM (Template) ~ 6588
.WQX Web User ~ ALL Activity Result Elements (alphabetical spreadsheet) (Template) ~ 5000
.WQX Web User ~ ALL Result Elements (Picklist Ordered) (Template) ~ 5838
.WQX Web User ~ ALL Result Elements (Picklist) with Generated Activity IDs (Template) ~ 7804
.WQX Web User ~ ALL RESULTS,Projects,Locations,Weights,Indexes,Metrics,Group (Template) ~ 7037
.WQX Web User ~ For each Activity ID all activity elements the same PHYSICAL (Template) ~ 7127

Resolving data errors

Message
This Activity ID matches another one (from 5th sheet, row 7). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 7). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.
This Activity ID matches another one (from 5th sheet, row 14). So all other Activity elements must match as well. However, Sample Collection Equipment Name is different on this row.

ID	Type	Context
75326437	Domain Value Invalid	5th Sheet, Row 2
75326438	Domain Value Invalid	5th Sheet, Row 2
75326439	Domain Value Invalid	5th Sheet, Row 2
75326442	Domain Value Invalid	5th Sheet, Row 2
75326443	Domain Value Invalid	5th Sheet, Row 2
75326444	Domain Value Invalid	5th Sheet, Row 2
75326445	Domain Value Invalid	5th Sheet, Row 2
75326446	Domain Value Invalid	5th Sheet, Row 2
75326447	Domain Value Invalid	5th Sheet, Row 2
75326448	Domain Value Invalid	5th Sheet, Row 2
75326449	Domain Value Invalid	5th Sheet, Row 2
75326450	Domain Value Invalid	5th Sheet, Row 3
75326451	Domain Value Invalid	5th Sheet, Row 3

Data Management

- Yearly / quarterly folders for each grant
- Past grant data is organized in separate folders
- Maintain consistent file / folder names
- Spreadsheet with all yearly data to prep for analysis

characteristic	units	28-03-12	20-03-13	11-03-15	29-01-16	17-02-16	04-03-16	11-03-16	28-02-17	27-03-17	18-04-17	26-02-18	06-04-18	20-02-19	20-03-19	23-01-20	13-12-21	15-12-22
date																		
ph	pH	7.6	7.50	6.84	6.48	7.0	7.34	6.79	6.21	6.12	6.83	8.3	6.67	7.46	7.34	7.12	Not Tested	Not Tested
conductivity	uS/cm	157	491	573	234	259	387	573	542	480	496	618	413	359.8	464	343	Not Tested	Not Tested

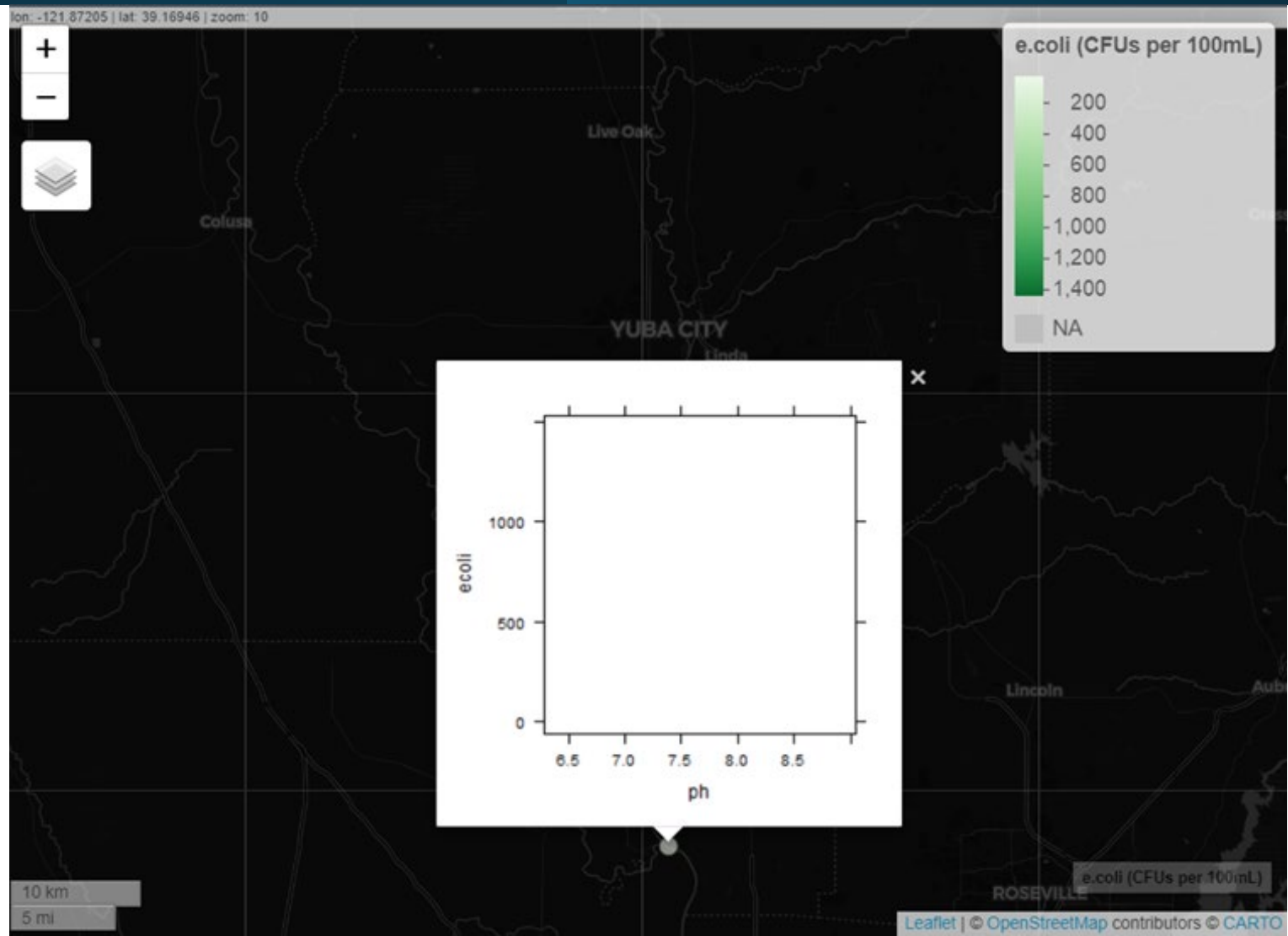
Data analysis

- Data analyzed using the R statistics package
- Script can automate hours of data analysis

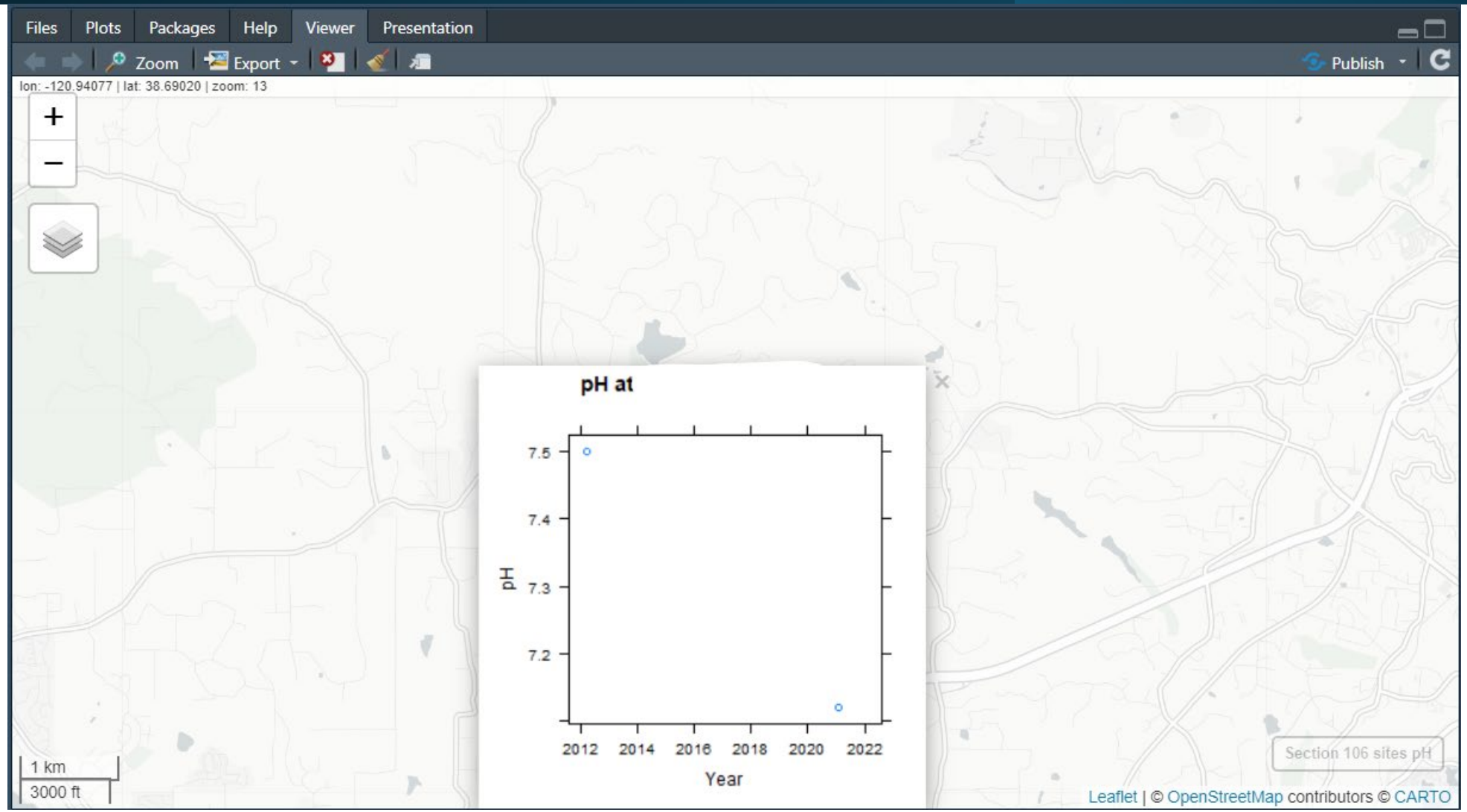
```
library(RColorBrewer)
library(janitor)
setwd("N:/Environmental Drive/Water Testing Program")

locations <- read_excel("Non-106 Data/Water Testing Site Locations.xlsx")

df_list <- lapply(excel_sheets("Non-106 Data/Water Testing Results.xlsx"),
  read_excel("Non-106 Data/Water Testing Results.xlsx",
             col_names = FALSE,
             skip = 10,sheet = x,na="NA") #import spreadsheet
)%>% .[-c(8,9)] %>%  #remove unused pages from spreadsheet
  lapply(., '[',c(1,9)) %>%# remove all columns except date and coliform
  lapply(.,na.omit) %>% #remove empty cells
  lapply(., setNames, nm=c("date","ecoli")) #sets column names

coliform <- df_list %>% reduce(full_join,by='date')
colnames(coliform) <- c("date","stone","verona","tiscornia","marina","watt"
# combines the different sites into 1 df based on data

coordinates(locations) <- ~easting+northing
proj4string(locations) <- CRS("+init=epsg:32610")
```

Data analysis

- Interactive water quality map
- Using the “MapView” package in R
- Allows any of the water quality data to be presented on maps



Data analysis



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