Tribal CWA 106 Reporting Requirements

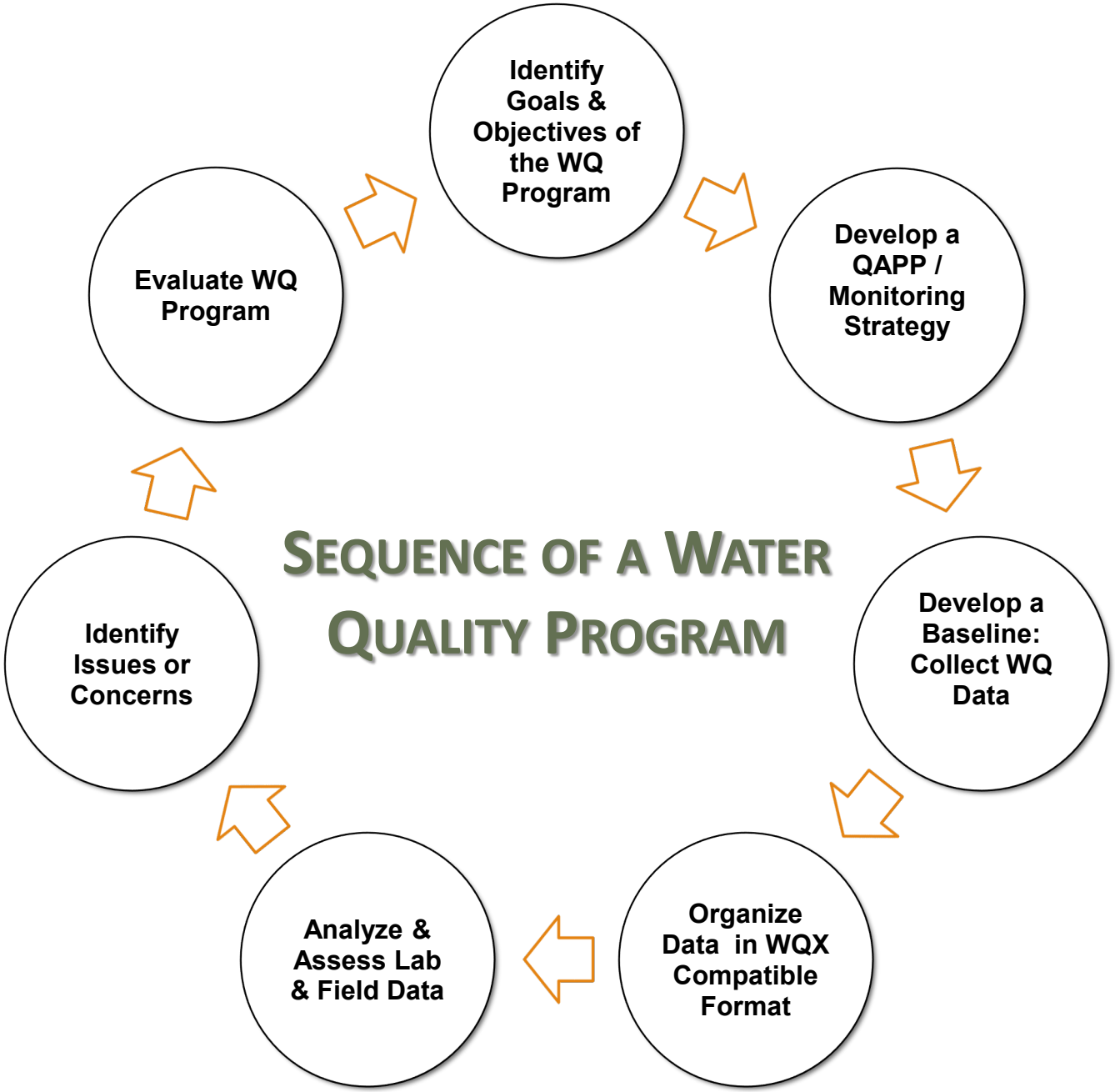
RTOC

SEPTEMBER 2, 2026

Presentation Overview

1. CWA 106 Reporting Requirements
2. Water Quality Monitoring
   - QAPP Requirements and Methods
   - Data Reporting and Retrieval
3. Assessment Reporting and Results
   - Region 9 Template
   - ATTAINS Project
4. Tools and Guidance

Sequence of a Water Quality Program



CWA Section 106 Reporting Requirements

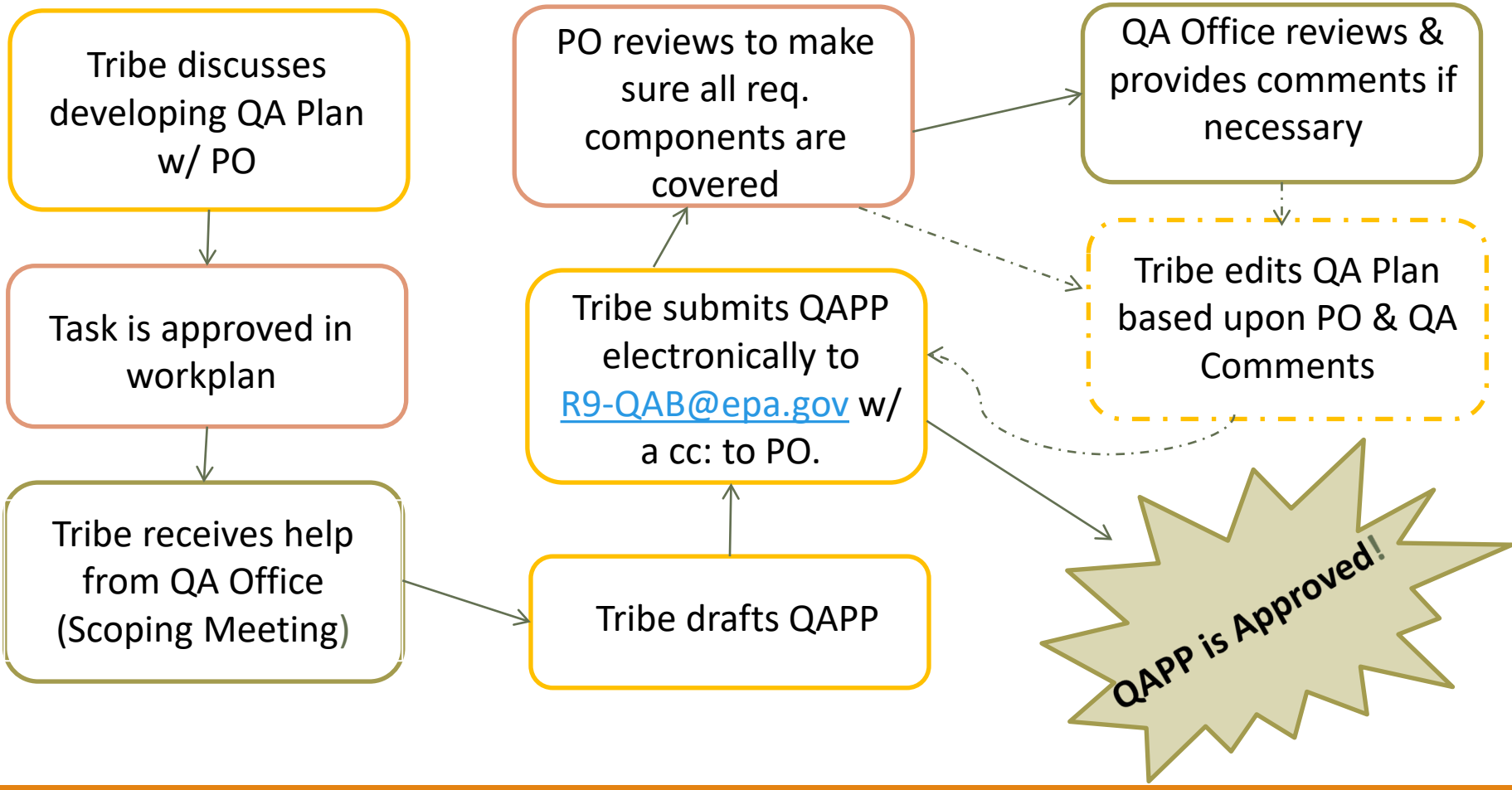
1. Monitoring Strategy/QAPP
2. Water quality data submitted into EPA's Water Quality Exchange (WQX)
3. Water Quality Assessment Report (WQAR)

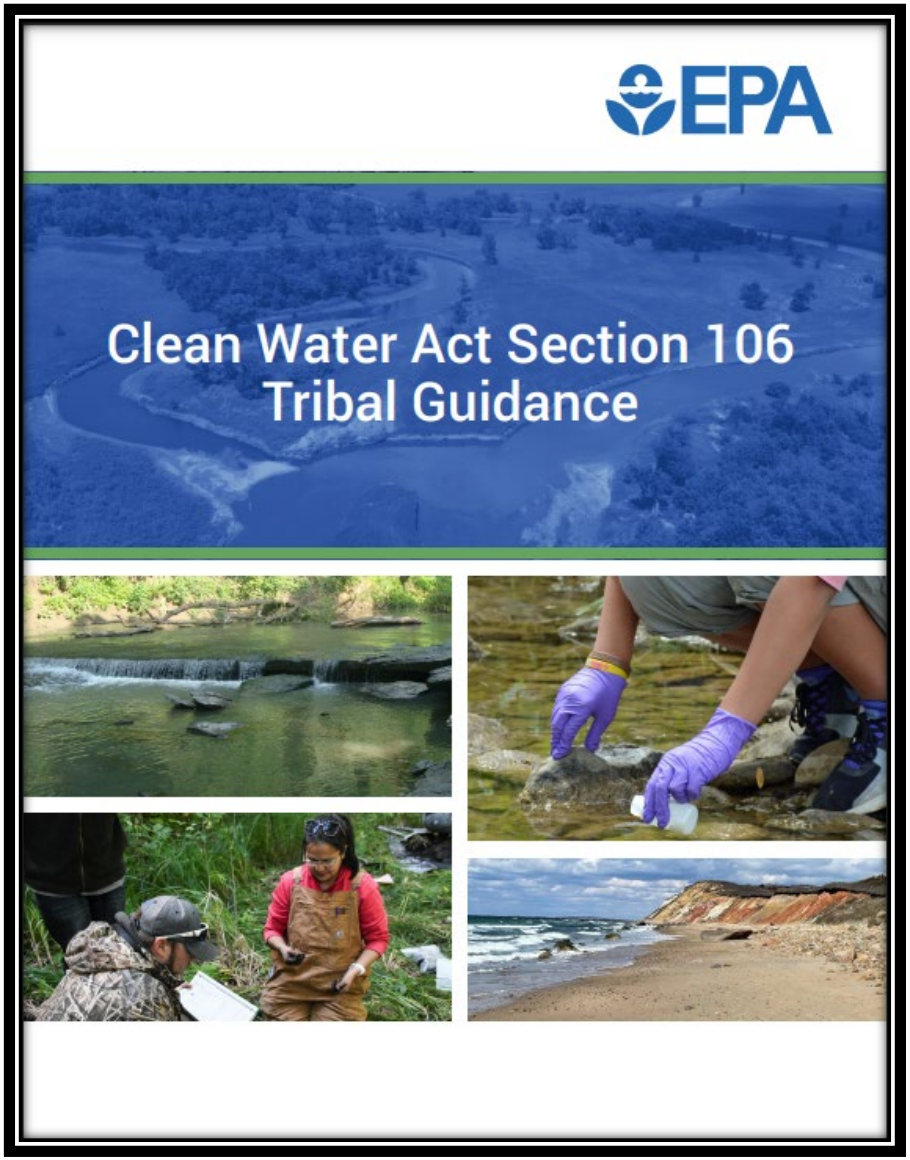
Quality Assurance Project Plan

- All EPA-funded grant projects which include the collection of environmental data **MUST** have an EPA-approved Quality Assurance Project Plan (QAPP) **BEFORE** any monitoring can begin.
- QAPP usually includes monitoring strategy (i.e. rationale for monitoring)
- **Note:** EPA recently updated its QA requirements so updating a previously approved QAPP will involve more edits than usual
  - https://www.epa.gov/system/files/documents/2024-04/quality_assurance_project_plan_standard.pdf
  - https://www.epa.gov/quality/quality-assurance-project-planning-epas-pacific-southwest-region-9

QAPP Approval Process

- Orange: Tribe
- Red: Project Officer
- Green: QA Office





Water Quality Exchange (WQX)

2023 CWA 106 Tribal Guidance:

Water quality data submitted into EPA's Water Quality Exchange (WQX)

- Implementation of grant award term and condition began in FY24-25 grants
- Note: Exceptions allowed with approved wavier from PO

Water Quality Exchange (cont.)

Three Categories of Data

- **Projects** *(Why data were collected)*
  - Brief summary of monitoring plan
- **Monitoring Locations** *(Where data were collected)*
  - Describe where monitoring takes place
- **Results** *(When, How and What were collected)*
  - Measurements of what were monitored

Results Tab

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 Measure	Activity Depth/Height Unit	Sample Collection Method ID	Sample Collection Metho	Sample Collection Equipment Name	Sample Collection Equipment Comment
TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
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	
TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
TEMPLATE_PCHEM	ML-06	ML-06:20170301:1433:SR:WB:		Sample-Routine	Water	3/1/2017	14:33	MST			Grab Sample Method		Water Bottle	
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	
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	
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	
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	
TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
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TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
TEMPLATE_PCHEM	ML-03	ML-03:20170308:1100:SR:WB:		Sample-Routine	Water	3/8/2017	11:00	MST			Grab Sample Method		Water Bottle	
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TEMPLATE_PCHEM	ML-07	ML-07:20170310:0939:SR:WB:		Sample-Routine	Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
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TEMPLATE_PCHEM	ML-07				Water	3/10/2017	9:39	MST			Grab Sample Method		Water Bottle	
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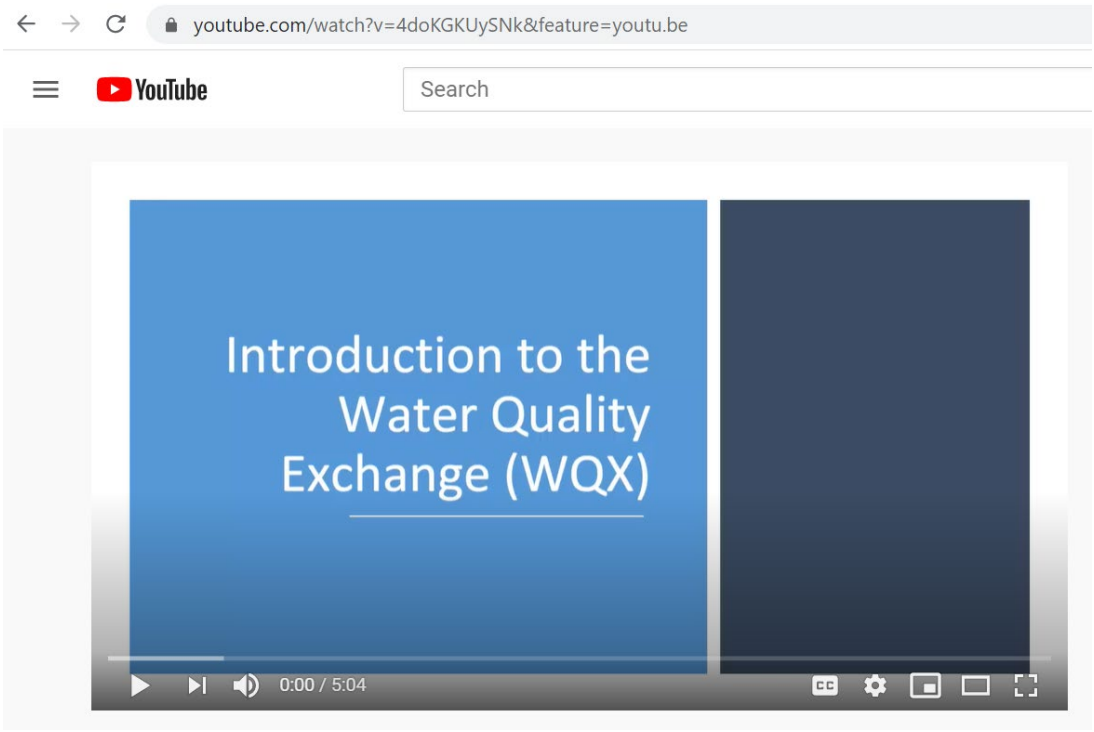
TEMPLATE_PCHEM	ML-09				Water	3/15/2017	16:20	MST	1.3	m	Field Sample Method		Probe/Sensor	Troll-9500
TEMPLATE_PCHEM	ML-09				Water	3/15/2017	16:20	MST	1.3	m	Field Sample Method		Probe/Sensor	Troll-9500

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.



Need help submitting WQX Data?

Available At: https://www.epa.gov/waterdata/learn-more-about-water-quality-data#trainingvideos

or

WQX Helpdesk
wqx@epa.gov

1-800-424-9067

Water Quality Assessment Report

Atlas of Tribal Water Resources	Narrative Description of the Tribal Water Quality Monitoring Program and Assessment Methods	Tables describing which water bodies are meeting designated uses
Tables describing causes and sources of impairment	Narrative Description of the Results of Water Quality Monitoring on your Reservation	Narrative Description of Issues of Tribal Concern

Clean Water Act Section 106 Tribal Water Quality Assessment Report Template (R9 Pilot)

Tribe:	(Type Tribe Name)	Monitoring Period:	(Month Started)	(Number of months monitored)		ONLY FILL OUT COLUMNS 12-15 IF THE "CURRENT WATER QUALITY STATUS" IS MARKED AS "IMPAIRED"	

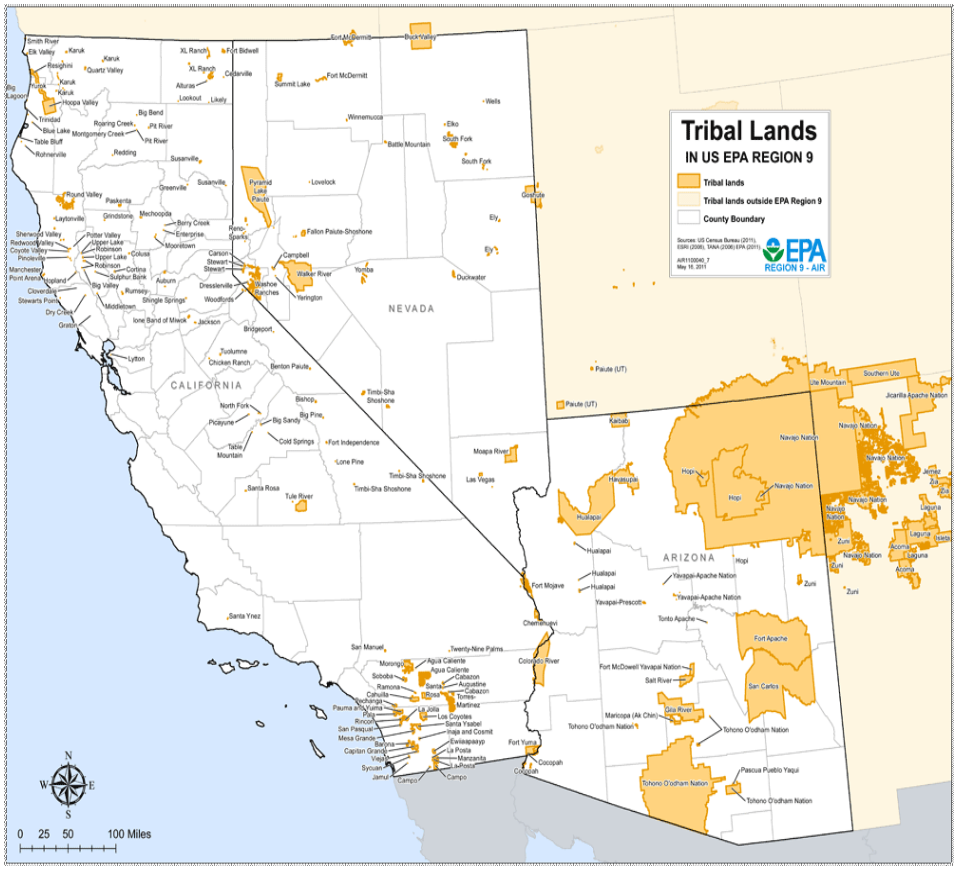
1	2	3	4	5	6	7	8		9		10	11	12		13		14	15	16	1
terbody e/Identifier	Waterbody Type	Monitoring Station Located On Reservation	Monitoring Station ID (WQX)	Distance or Area Monitored or Assessed	Unit of Measure	Frequency of Monitoring	Parameters Monitored		Tribal Goal or Designated Use for this Waterbody		Change in water quality since start of monitoring period	Current Water Quality Status	Impaired Parameters		Impaired Tribal Goals/Designated Uses		Source(s) of impairment	Impairment Status	Watershed restoration project at this monitoring station	Addit Comm
							pH	Yes	Unknown	Choose...			pH	No		Choose...				(Add comme informatic this wat EX. No v monitor, u monitor high flow equipr
							Temperature	Yes	Primary Contac				Temperature	No	Primary Contact	No				
							Dissolved Oxygen	Yes	Secondary Cor				Dissolved Oxygen	No		Choose...	1) Agriculture (Livestock)	Year Round Impairment		
							Turbidity	Yes	Cultural Use				Turbidity	Yes	Cultural Use	Yes				
							Total Phosphorus	No	Drinking Water					Choose...		Choose...				
							Total Nitrogen	No	Fish/Shellfish S					Choose...		Choose...				
							E. coli	Yes	Agricultural Irrig				E. Coli	No	Agricultural Irrigation	Yes				
							Enterococci	No	Aquatic Life an					Choose...		Choose...	2) Leaking Tanks	Intermittent Impairment		
							Macroinvertebrates	No	Livestock Wate					Choose...	Livestock Watering	No				
dell Wash	River/Stream Perennial	Yes	Wendell001	3.2	miles (mi)	Choose...	Basic Habitat	No	Rare And Endai		some degradation	Impaired		Choose...		Choose...			No	
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...	3) Wet Weather Discharges	Seasonal Impairment		
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							pH	Yes	Unknown	Choose...			pH	No		Choose...				(Add comme informati this wate
							Temperature	Yes	Primary Contact	Yes			Temperature	No	Primary Contact	No				
							Dissolved Oxygen	Yes	Secondary Contact	No			Dissolved Oxygen	No		Choose...	1) Agriculture (Livestock)	Year Round Impairment		
							Turbidity	Yes	Cultural Use	Yes			Turbidity	Yes	Cultural Use	Yes				
							Total Phosphorus	Yes	Drinking Water	No			Total Phosphorus	Choose...		Choose...				
							Total Nitrogen	Yes	Fish/Shellfish Safe To Eat	Choose...			Total Nitrogen	Choose...		Choose...				
							E. coli	No	Agricultural Irrigation	Yes				No	Agricultural Irrigation	Yes				
							Enterococci	No	Aquatic Life and Wildlife	Yes				Choose...	Aquatic Life and Wild	Choose...	2) Leaking Tanks	Intermittent Impairment		
							Macroinvertebrates	No	Livestock Watering	Yes				Choose...	Livestock Watering	No				
dell Wash	Wetland	No	Wendell002	4.5	miles (mi)	Bimonthly	Basic Habitat	No	Rare And Endangered Species	Choose...	Some improvement, some degradation	Impaired		Choose...		Choose...			No	
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...	3) Wet Weather Discharges	Seasonal Impairment		
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...				Choose...		Choose...				
							pH	Choose...	Unknown	Choose...				Choose...		Choose...				(Add
							Temperature	Choose...	Primary Contact	Choose...				Choose...		Choose...				comme

Tribal Goal/Use for Waterbody
Choose "Yes" or No" for each goal/use listed, depending on whether or not it applies to this waterbody. You may add up to 5 additional designated uses of your choice. See definitions, Tab 6.

Region 9 WQAR Template

HTTPS://WWW.EPA.GOV/TRIBAL-PACIFIC-SW/R9TRIBAL106#WQAR

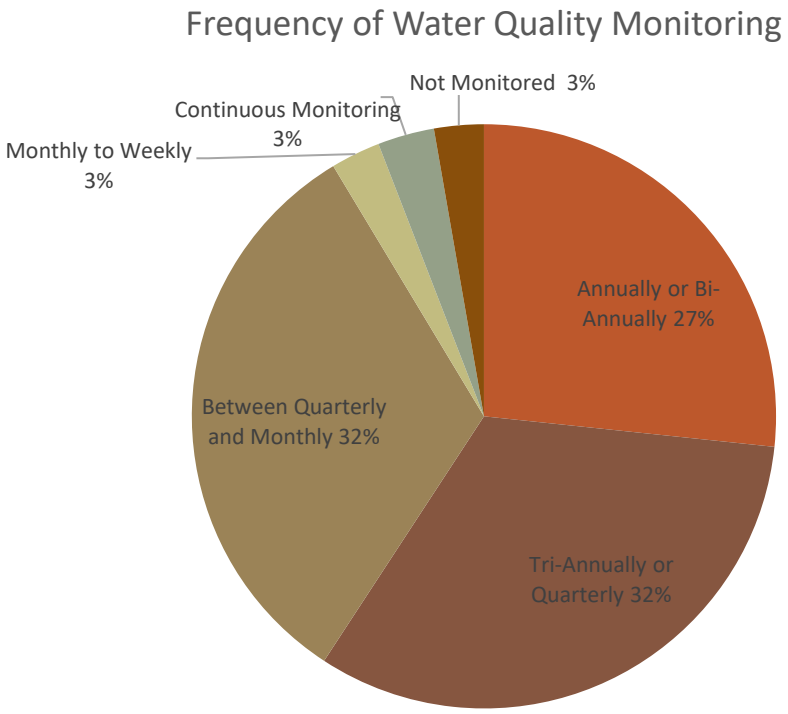
FY24-25 WQAR Results

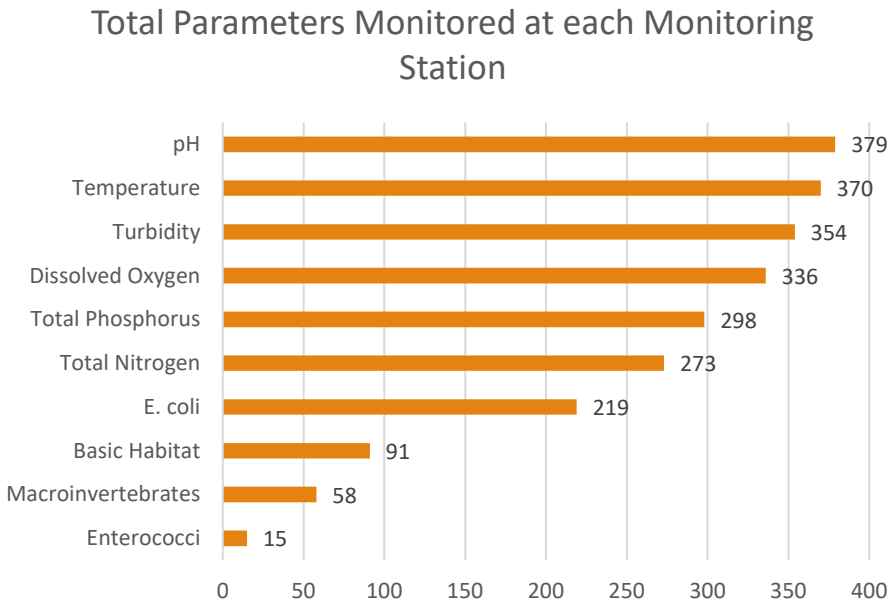


Total # of Tribes submitted WQAR template	Total # of Waterbodies Monitored	Total # of Monitoring Stations
33	224	244

Summary analysis of R9 Tribal data collected under CWA 106 for FY24-25 reporting period. The data includes any Tribe that submitted a WQAR using the excel template tool and does not include any identifiable Tribal information.

FY24-25 WQAR Results

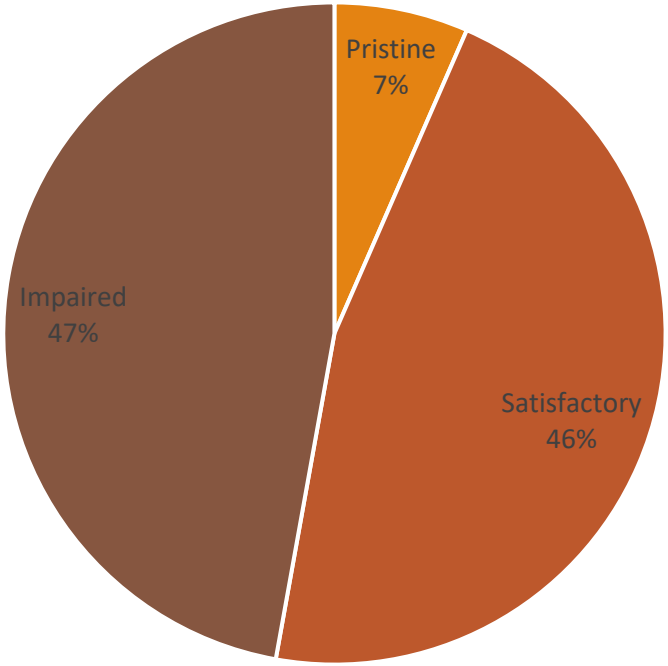




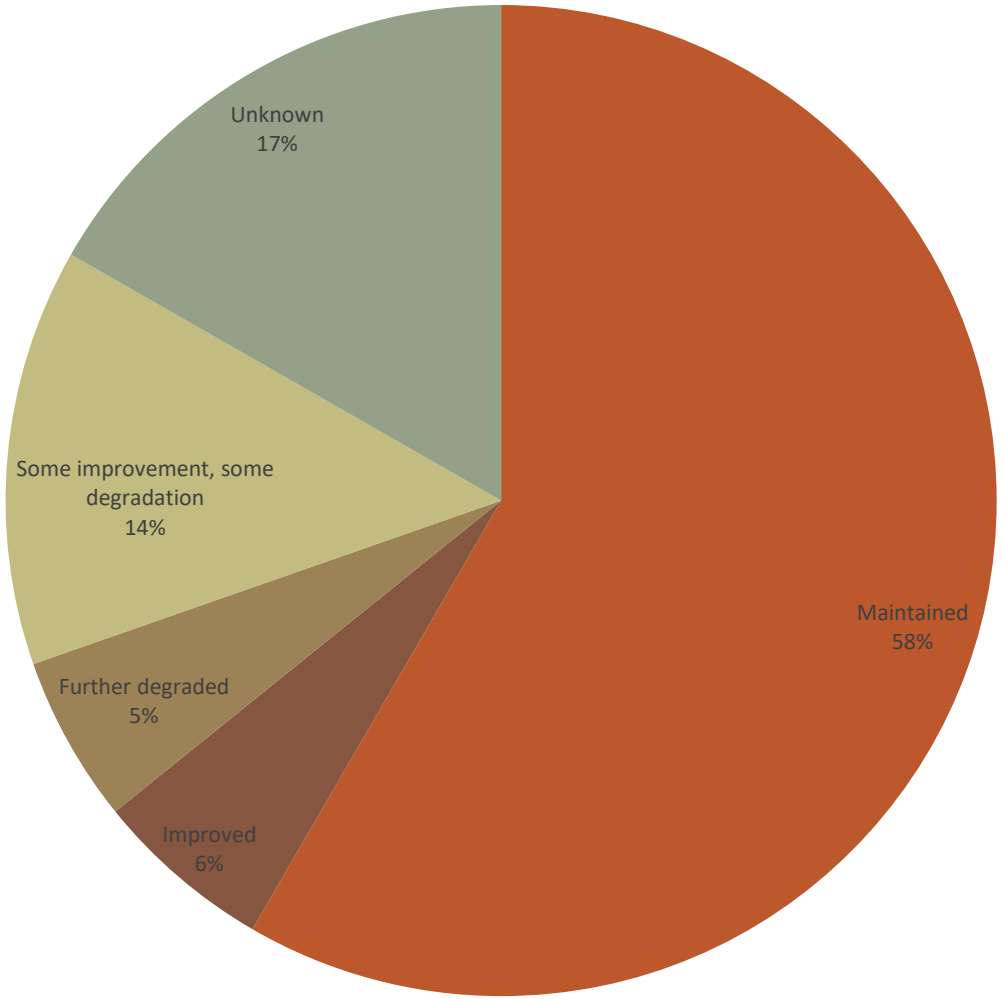
Summary analysis of R9 Tribal data collected under CWA 106 for FY24-25 reporting period. The data includes any Tribe that submitted a WQAR using the excel template tool and does not include any identifiable Tribal information.

FY24-25 WQAR Results

Current Qater Quality



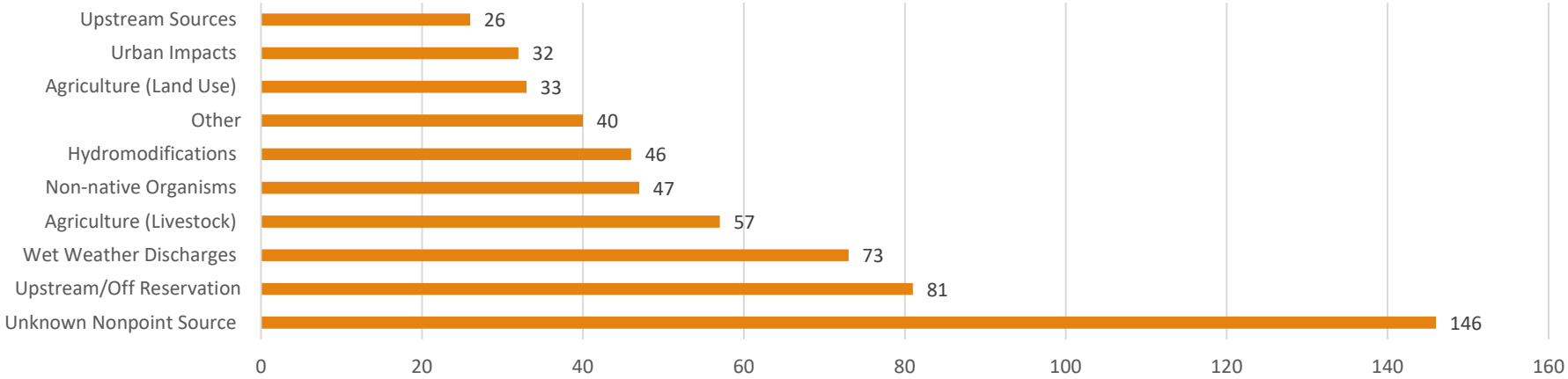
Change in Water Quality



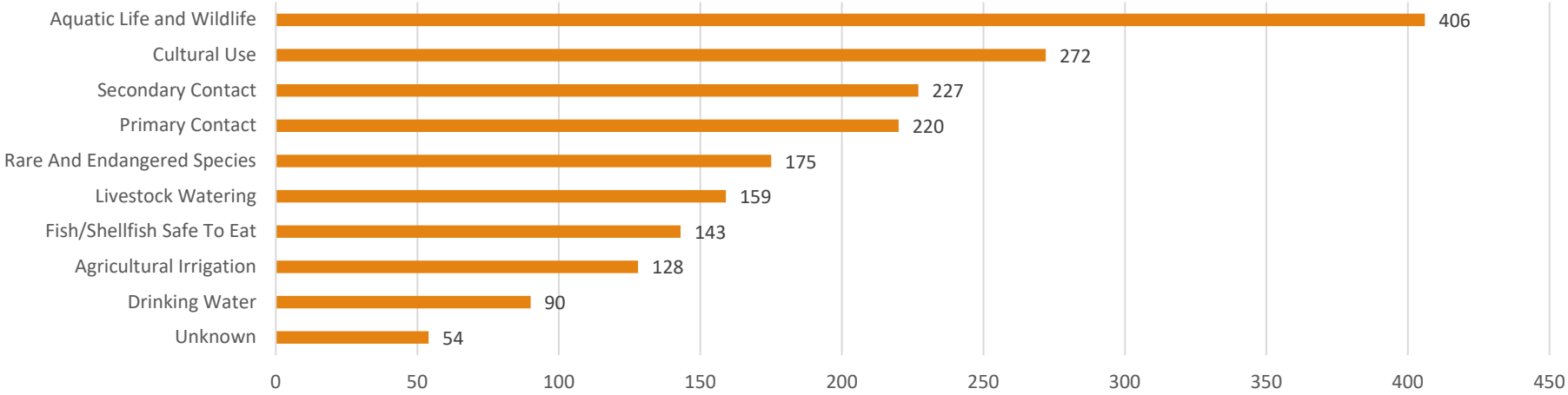
Summary analysis of R9 Tribal data collected under CWA 106 for FY24-25 reporting period. The data includes any Tribe that submitted a WQAR using the excel template tool and does not include any identifiable Tribal information.

FY24-25 WQAR Results

Primary Sources of Impairments

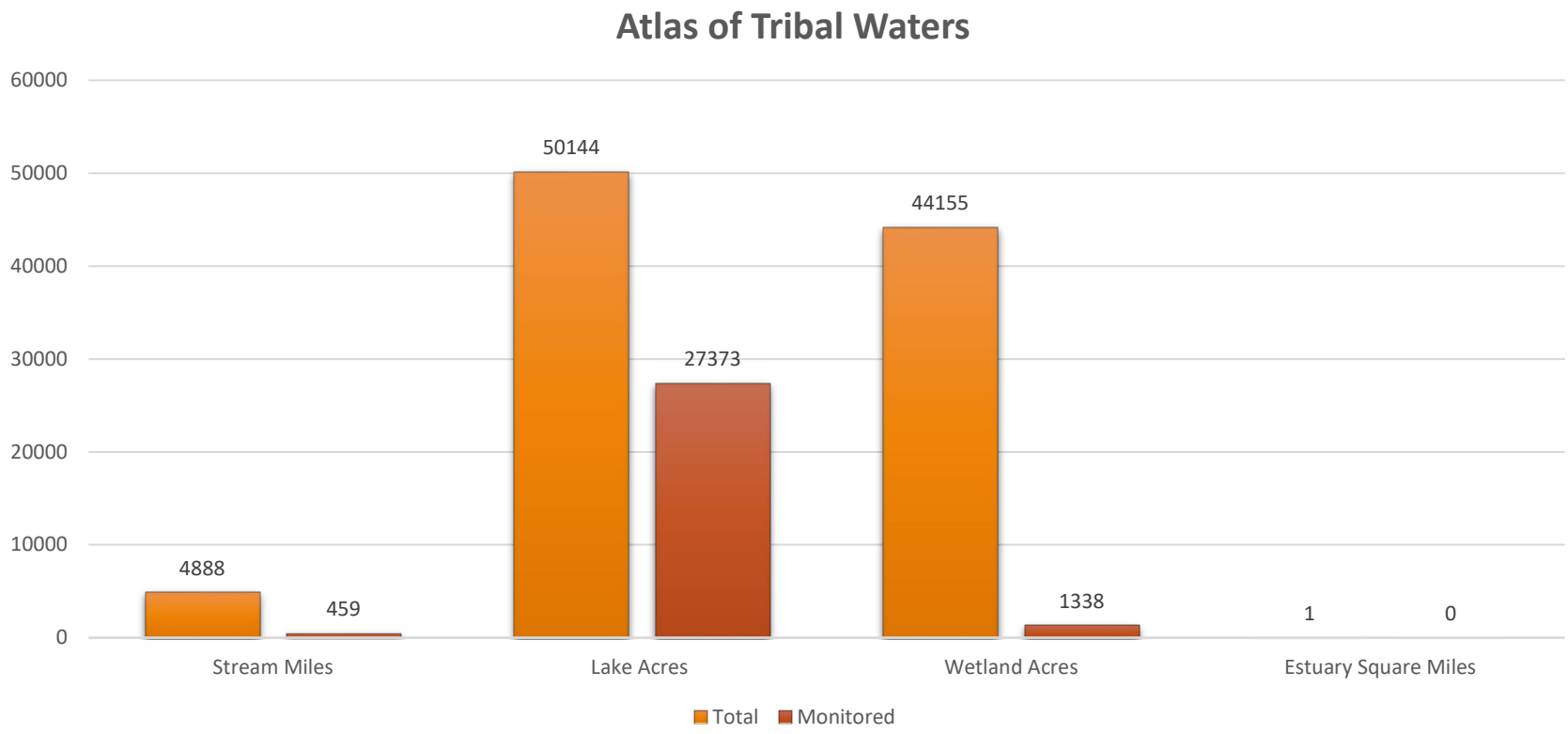


Tribal Goals and Designated Uses Per Each Waterbody



Summary analysis of R9 Tribal data collected under CWA 106 for FY24-25 reporting period. The data includes any Tribe that submitted a WQAR using the excel template tool and does not include any identifiable Tribal information.

Atlas of Tribal Waters



Summary analysis of R9 Tribal data collected under CWA 106 for FY24-25 reporting period. The data includes any Tribe that submitted a WQAR using the excel template tool and does not include any identifiable Tribal information.

What is the ATTAINS pilot?

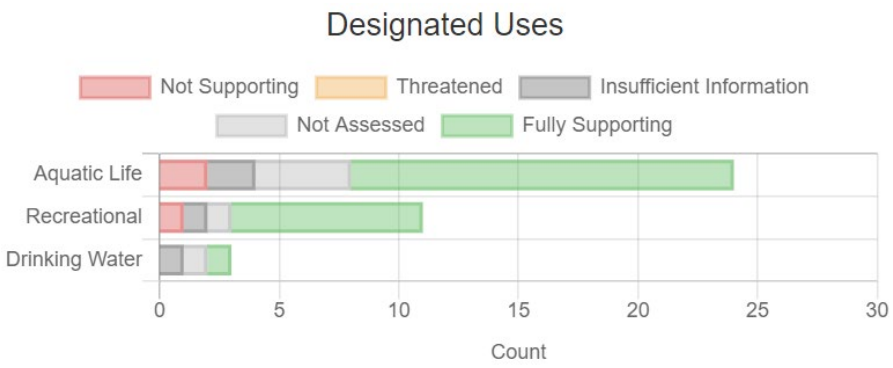
ATTAINS (Assessment TMDL Tracking and ImplementatioN System)

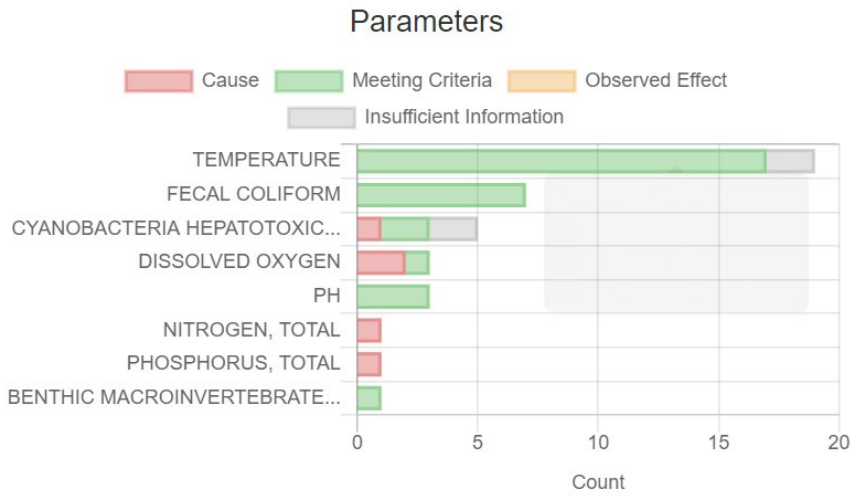
A way to electronically report water quality assessment reports

Tribes must have an assessment methodology (recipe for reproducing their conclusions)

Optional reporting method

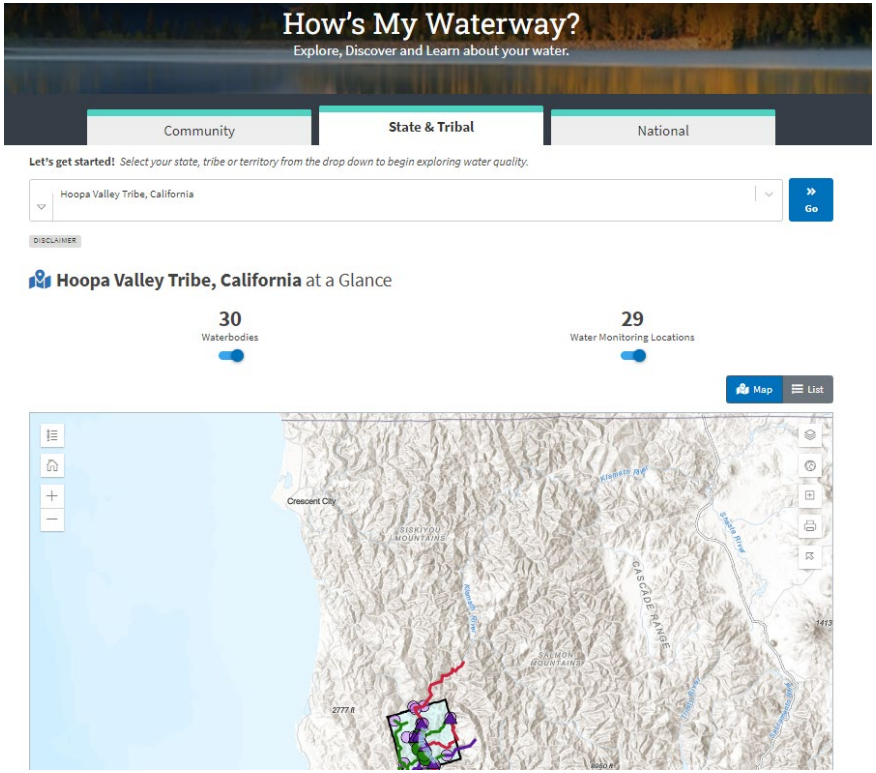
Tribal ATTAINS Project Timeline

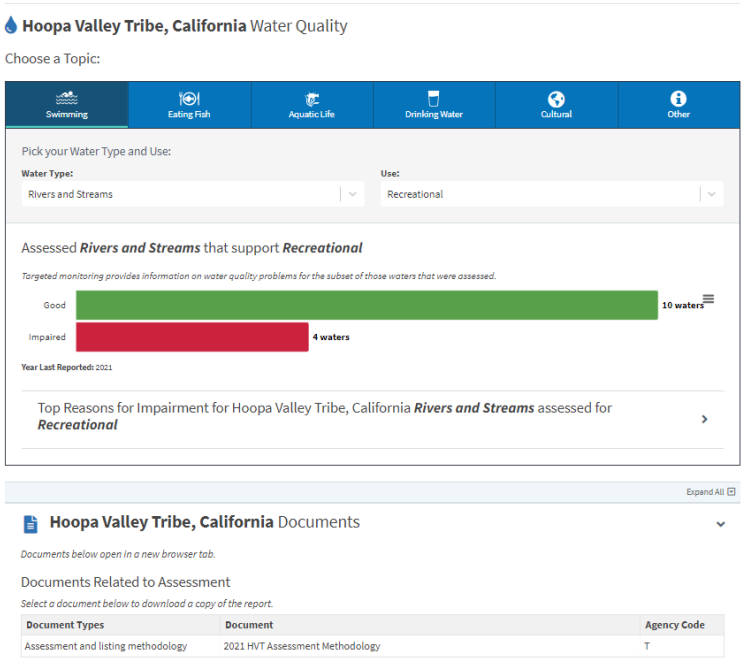




ATTAINS Report Examples

How's My Waterway Tribal Pages





https://mywaterway.epa.gov/

QUIZ TIME!

WHAT ARE THE THREE CWA 106 REPORTING REQUIREMENTS?

Tool for Data Analysis!

Show Search Form | Map All Stations

Organization ID	Organization Name	Station ID	Station Name
EBCI	Eastern Band of Cherokee Indians	EBCI-3200-1	Conley Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-3200-3	Shepherd Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 1	Big Cove 1
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 11	Big Cove 11
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 12	Big Cove 12
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 13	Big Cove 13
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 2	Big Cove 2
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 3	Big Cove 3
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 5	Big Cove 5
EBCI	Eastern Band of Cherokee Indians	EBCI-BC 7	Big Cove 7
EBCI	Eastern Band of Cherokee Indians	EBCI-BC1	Bunches Creek 1
EBCI	Eastern Band of Cherokee Indians	EBCI-BC2	Bunches Creek2
EBCI	Eastern Band of Cherokee Indians	EBCI-BC3	Bunches Creek 3
EBCI	Eastern Band of Cherokee Indians	EBCI-BC_11	Big Cove 11
EBCI	Eastern Band of Cherokee Indians	EBCI-BC_5	Big Cove 5
EBCI	Eastern Band of Cherokee Indians	EBCI-BT 2	Birdtown/Oconaluftee Rive
EBCI	Eastern Band of Cherokee Indians	EBCI-BT1	Birdtown/Oconaluftee Rive
EBCI	Eastern Band of Cherokee Indians	EBCI-BT2	Birdtown/Oconaluftee Rive
EBCI	Eastern Band of Cherokee Indians	EBCI-CC1	Beaver Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC10	Cherokee County/Upper Ha
EBCI	Eastern Band of Cherokee Indians	EBCI-CC2	Webb Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC3	Hyatt Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC4	Rogers Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC5	Vengeance Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC6	Cherokee County/Wilscott
EBCI	Eastern Band of Cherokee Indians	EBCI-CC7	Cherokee County/Bates Cre
EBCI	Eastern Band of Cherokee Indians	EBCI-CC8	Cherokee County/Lower Ha
EBCI	Eastern Band of Cherokee Indians	EBCI-CC9	Cherokee County/Grape Cre
EBCI	Eastern Band of Cherokee Indians	EBCI-CCVR1	KOA Campground Below Ca
EBCI	Eastern Band of Cherokee Indians	EBCI-CCVR2	Konehete Park Above Casir
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_1	Beaver Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_10	U. Hanging Dog
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_2	Webb Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_3	Hyatt Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_4	Rogers Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_5	Vengeance Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_6	Wilscott Rd
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_7	Bates Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_8	L. Hanging Dog
EBCI	Eastern Band of Cherokee Indians	EBCI-CC_9	Grape Creek
EBCI	Eastern Band of Cherokee Indians	EBCI-EBCIH	EBCI Hatchery

INSTRUCTIONS | STATIONS | RESULTS | ANALYSIS | SAVED AN

SEARCH

Step 1: Search for Stations | Step 2: Retrieve Data Set and Analyze | About

Open Previous Saved Search:

Option1: Search by Organization and/or HUC

Organization ID: EBCI

HUC:

Option 2: Search by Distance from a Point

Point Description

Lat: Long:

Distance (in miles):

Option 3: Search by Lat/Long Box

North:

West: East:

South:

Additional Optional Search Criteria

Station Type:

Search by Parameters Sampled

Date Range (MM/DD/YYYY)

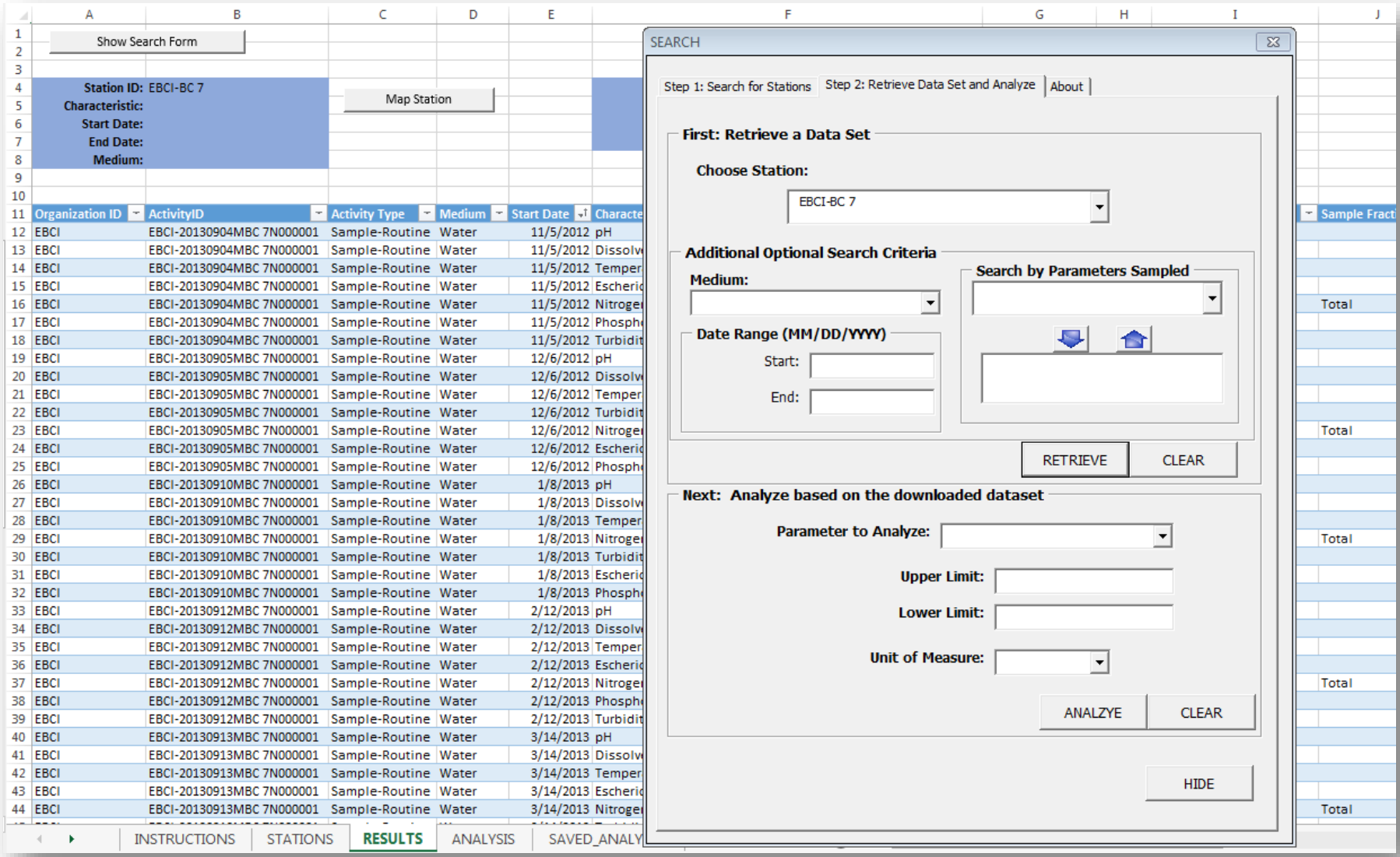
Start:

End:

SAVE SEARCH CRITERA | SEARCH | CLEAR | HIDE

https://www.epa.gov/system/files/other-files/2026-04/tribal-water-quality-data-analysis-tool.xlsm

SP-14b Data Analysis Tool



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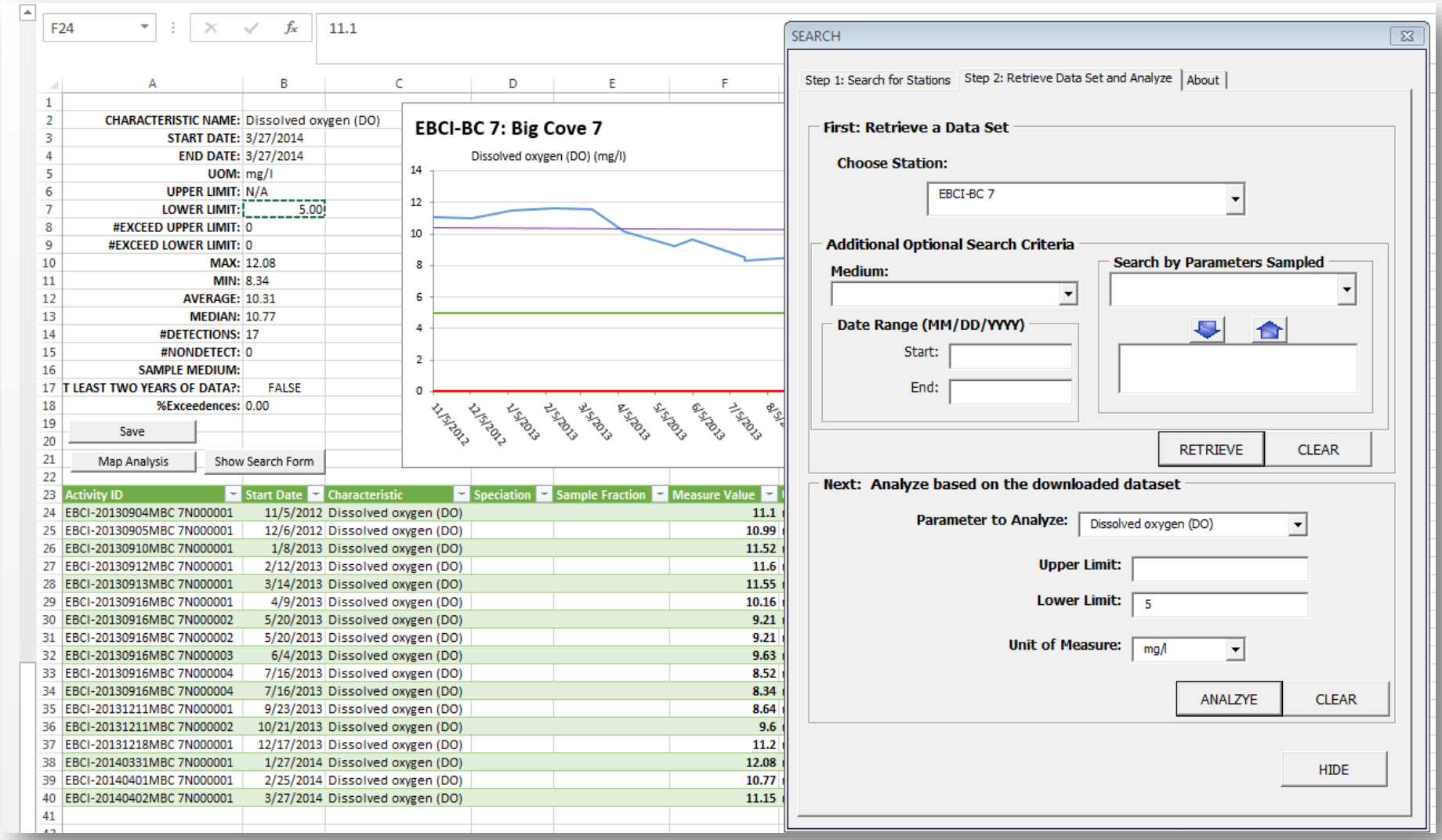
SP-14b Data Analysis Tool



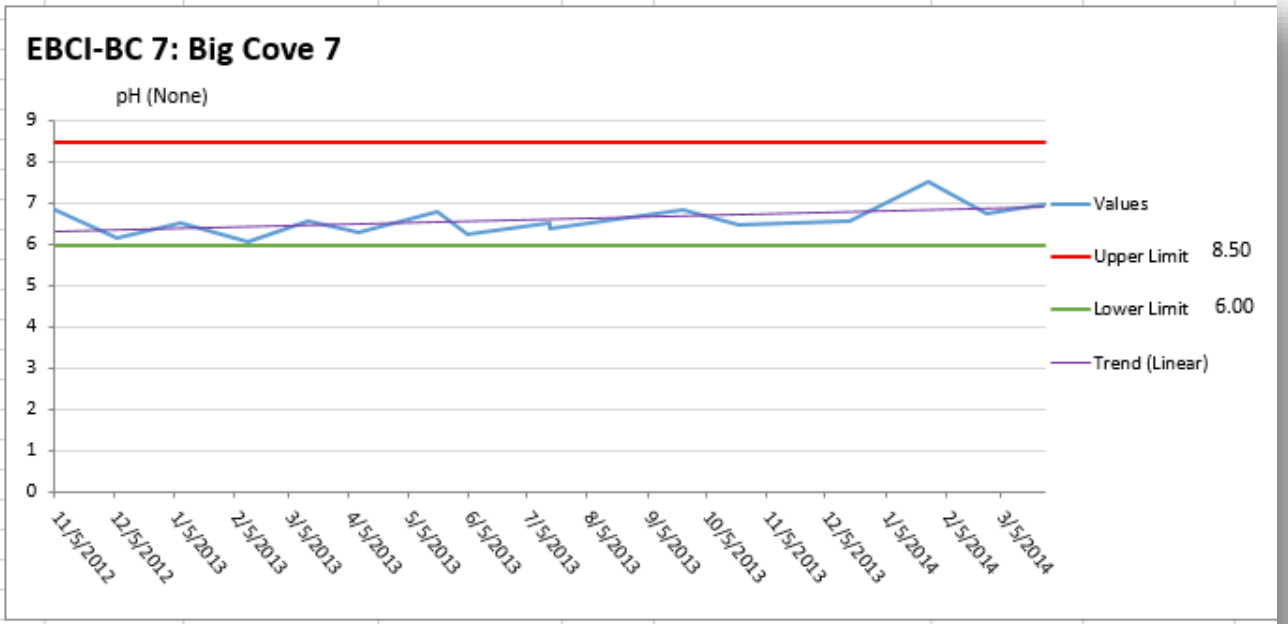
https://www.epa.gov/system/files/other-files/2026-04/tribal-water-quality-data-analysis-tool.xlsm

SP-14b Data Analysis Tool

CHARACTERISTIC NAME:	pH
START DATE:	3/27/2014
END DATE:	3/27/2014
UOM:	None
UPPER LIMIT:	8.50
LOWER LIMIT:	6.00
#EXCEED UPPER LIMIT:	0
#EXCEED LOWER LIMIT:	0
MAX:	7.52
MIN:	6.07
AVERAGE:	6.607647059
MEDIAN:	6.55
#DETECTIONS:	17
#NONDETECT:	0
SAMPLE MEDIUM:	
T LEAST TWO YEARS OF DATA?:	FALSE
%Exceedences:	0.00

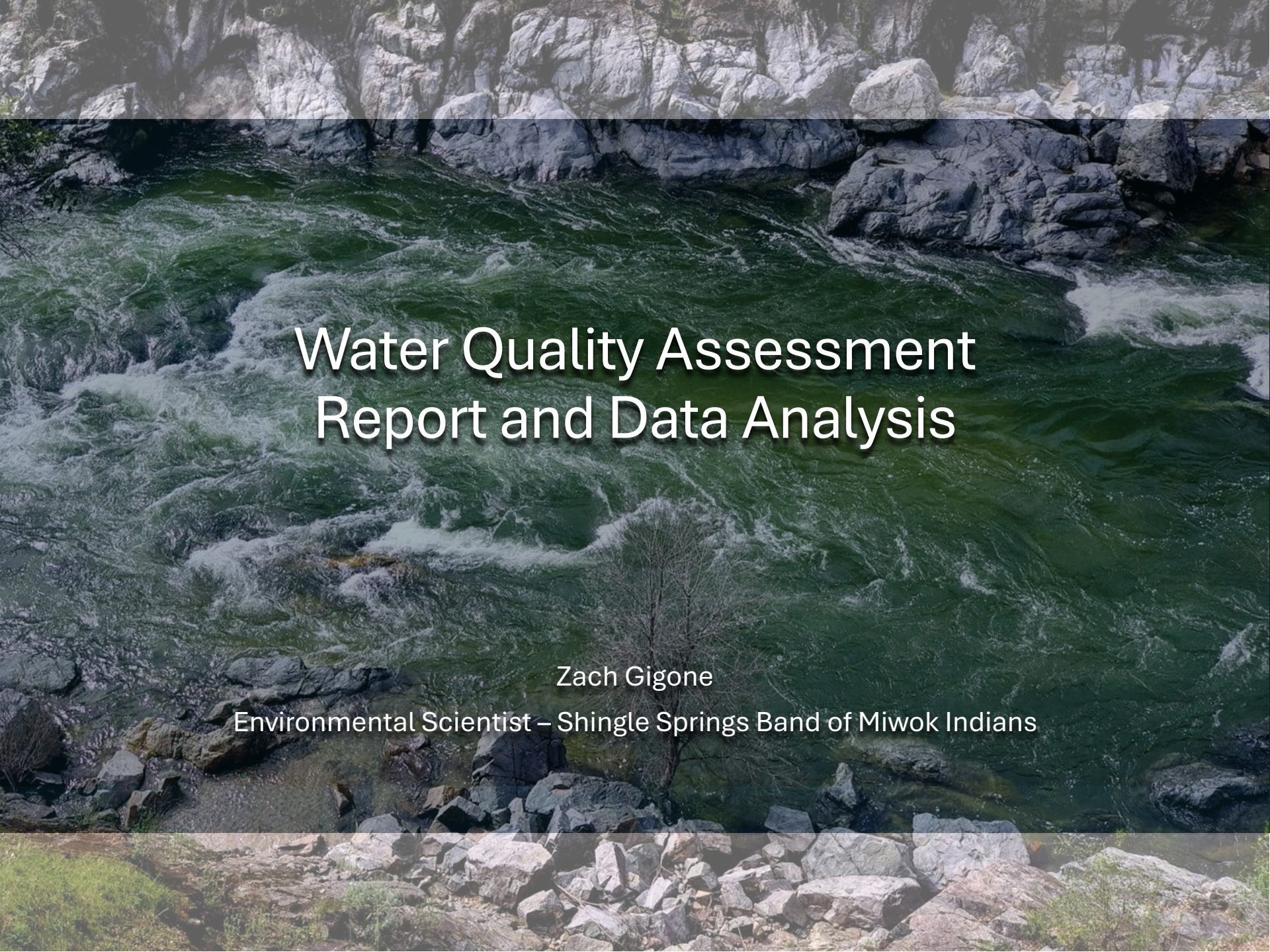
Save

Map Analysis | Show Search Form



Activity ID	Start Date	Characteristic	Speciation	Sample Fraction	Measure Value	Units	Detection Condition Text	Upper Limit	Lower Limit
EBCI-20130904MBC 7N000001	11/5/2012	pH			6.85	None		8.50	6.00
EBCI-20130905MBC 7N000001	12/6/2012	pH			6.18	None		8.50	6.00
EBCI-20130910MBC 7N000001	1/8/2013	pH			6.51	None		8.50	6.00
EBCI-20130912MBC 7N000001	2/12/2013	pH			6.07	None		8.50	6.00
EBCI-20130913MBC 7N000001	3/14/2013	pH			6.56	None		8.50	6.00
EBCI-20130916MBC 7N000001	4/9/2013	pH			6.31	None		8.50	6.00
EBCI-20130916MBC 7N000002	5/20/2013	pH			6.81	None		8.50	6.00
EBCI-20130916MBC 7N000002	5/20/2013	pH			6.81	None		8.50	6.00
EBCI-20130916MBC 7N000003	6/4/2013	pH			6.23	None		8.50	6.00

https://www.epa.gov/system/files/other-files/2026-04/tribal-water-quality-data-analysis-tool.xlsm



Water Quality Assessment Report and Data Analysis

Zach Gigone

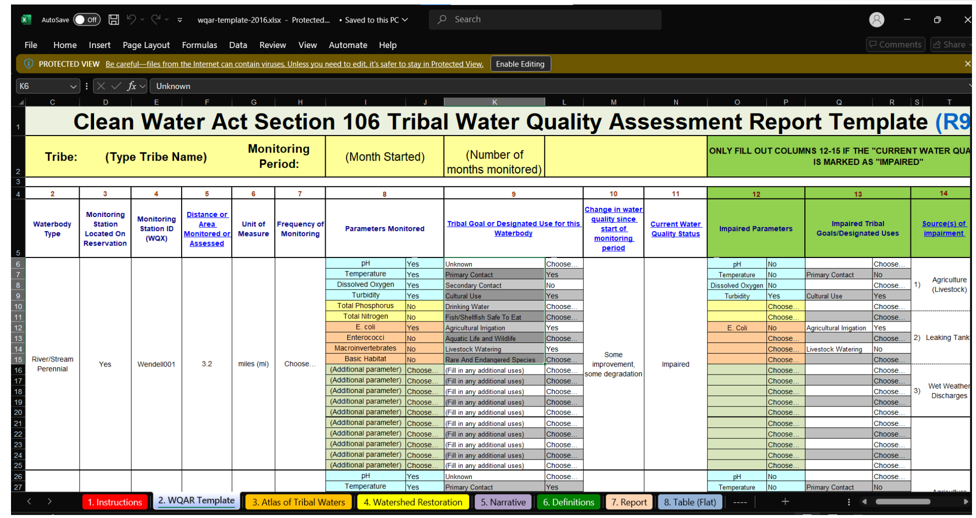
Environmental Scientist – Shingle Springs Band of Miwok Indians

Background

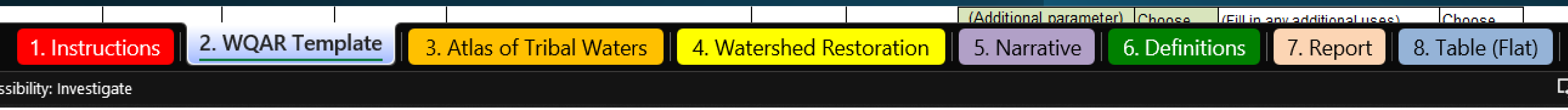
- Water quality testing through CWA106 began in 2012
- Took over the water testing in 2023 and managing the grant this year
- 4 water quality monitoring sites on trust land
- Monitoring takes place during the wet season each year 1-2 times depending on rainfall

Background

- WQAR template used to start out
- Narrative and spreadsheet updated after each season of sampling



Tab #2 - WQAR Template

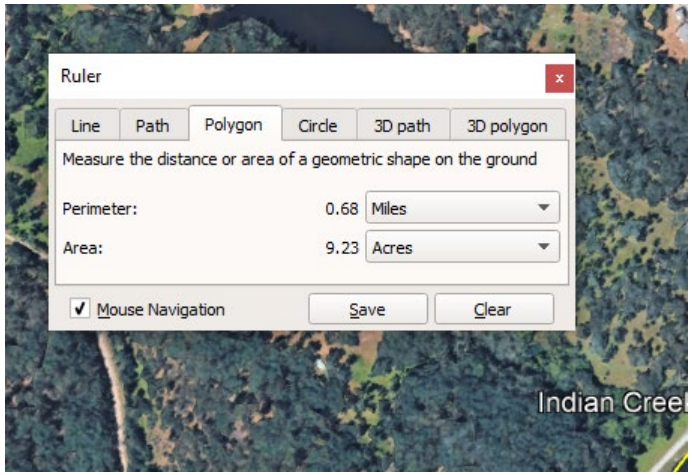


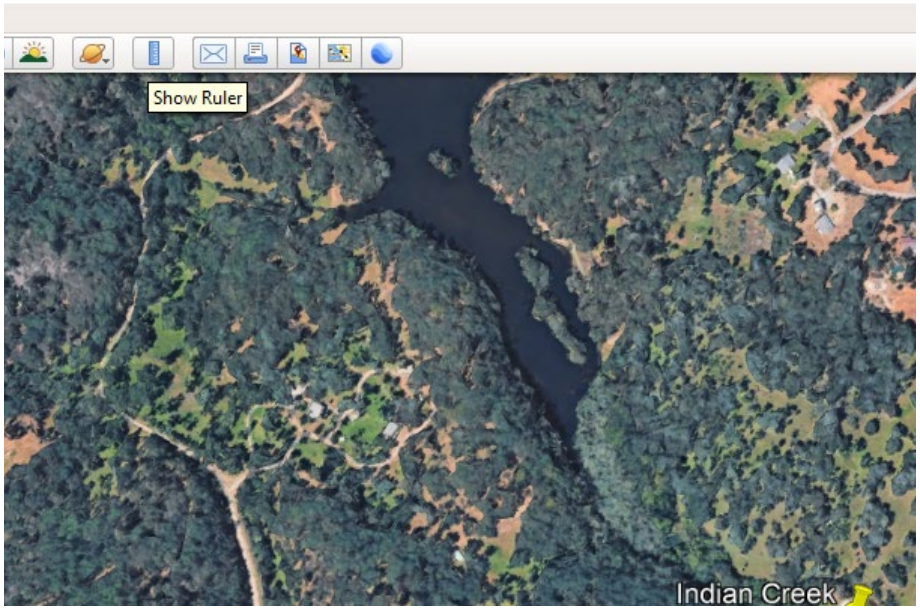
- Fill in designates uses or goals for each body of water, and parameters being monitored.

pH	Choose...	Unknown	Choose...
Temperature	Choose...	Primary Contact	Choose...
Dissolved Oxygen	Choose...	Secondary Contact	Choose...
Turbidity	Choose...	Cultural Use	Choose...
Total Phosphorus	Choose...	Drinking Water	Choose...
Total Nitrogen	Choose...	Fish/Shellfish Safe To Eat	Choose...
E. coli	Choose...	Agricultural Irrigation	Choose...
Enterococci	Choose...	Aquatic Life and Wildlife	Choose...
Macroinvertebrates	Choose...	Livestock Watering	Choose...
Basic Habitat	Choose...	Rare And Endangered Species	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...
(Additional parameter)	Choose...	(Fill in any additional uses)	Choose...

Tab #3 – Atlas of Tribal Waters

1. Instructions | 2. WQAR Template | 3. Atlas of Tribal Waters | 4. Watershed Restoration | 5. Narrative | 6. Definitions | 7. Report | 8. Table (Flat)





Tab #5 – Narrative

1. Instructions | 2. WQAR Template | 3. Atlas of Tribal Waters | 4. Watershed Restoration | **5. Narrative** | 6. Definitions | 7. Report | 8. Table (Flat)

- Beginning sections describe your water quality monitoring program, and can stay the same year to year
- Results section is the main focus

7) Results of water quality monitoring during this Project Period:

a. Discuss the interpretation and summary of your program's findings
   i. Are there potential sources of impairment to the water bodies you are monitoring?
   ii. Are you able to track trends with the water quality data you collected?
   iii. What summary statistics and what kind of graphs are you using to interpret results? *Please attach if available.*
   iv. After interpreting your results, are you going to make any changes to your water quality program?
      1. Change in frequency of monitoring?
      2. Focus on a particular area of concern?

b. Include any water quality issues of tribal concern for future planning of your water quality program
   i. For example: outbreaks of waterborne disease, fish kills, fishing advisories, restrictions on surface drinking water supplies, restrictions on bathing, restrictions on cultural practices, etc.

WQAR Takeaways

- Opportunity to evaluate progress for the year and review goals
- Data can be easier to visualize / summarize in this format compared with WQX

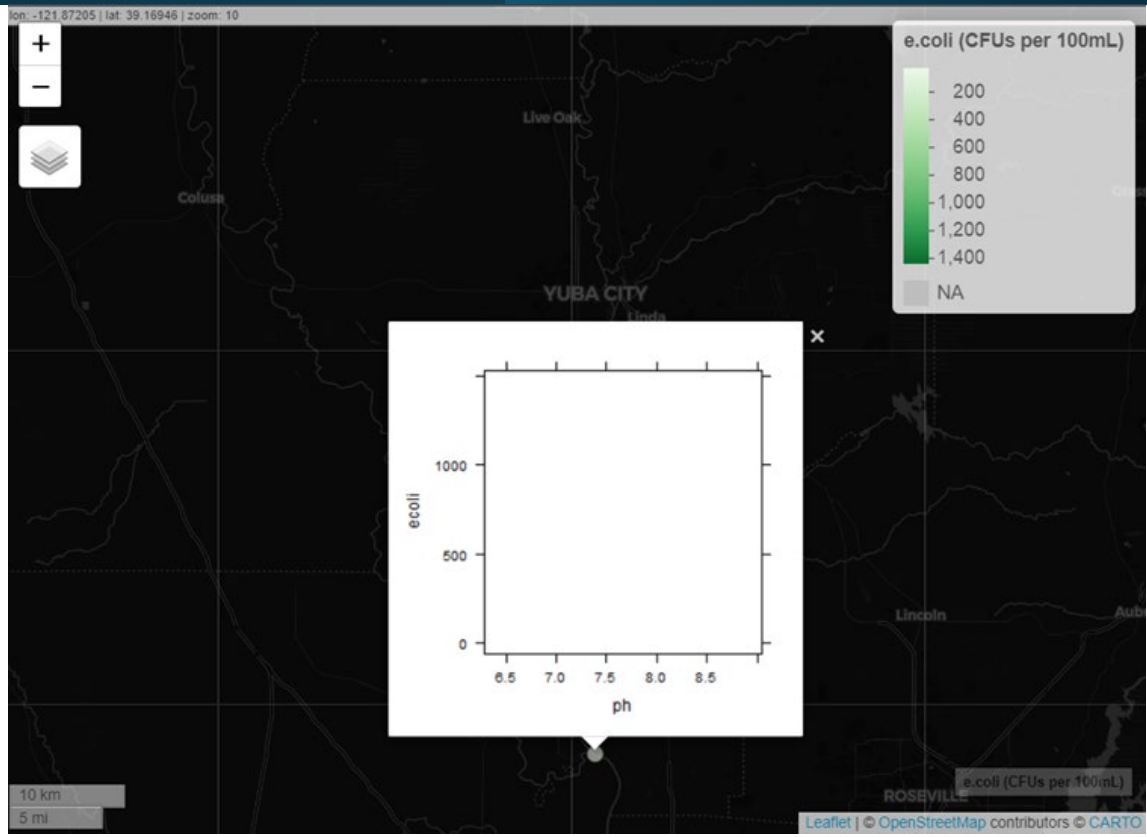
Data analysis

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

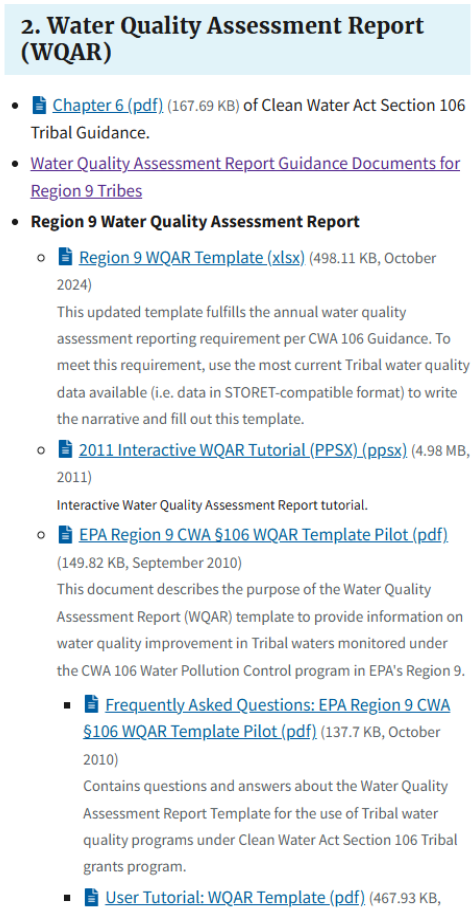
```
library(RColorBrewer)
library(janitor)
setwd("N:/Environmental Drive/Water Testing Program")

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



More WQAR Template Tips

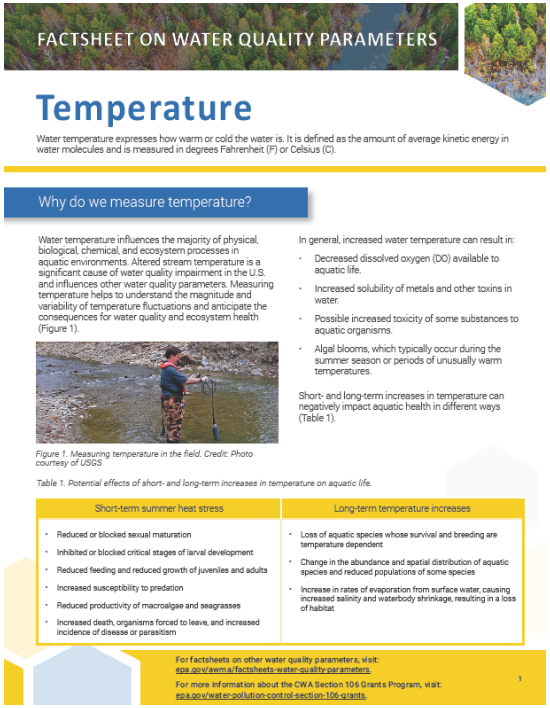


2. Water Quality Assessment Report (WQAR)

- Chapter 6 (pdf) (167.69 KB) of Clean Water Act Section 106 Tribal Guidance.
- Water Quality Assessment Report Guidance Documents for Region 9 Tribes
- **Region 9 Water Quality Assessment Report**
  - Region 9 WQAR Template (xlsx) (498.11 KB, October 2024)
    This updated template fulfills the annual water quality assessment reporting requirement per CWA 106 Guidance. To meet this requirement, use the most current Tribal water quality data available (i.e. data in STORET-compatible format) to write the narrative and fill out this template.
  - 2011 Interactive WQAR Tutorial (PPSX) (ppsx) (4.98 MB, 2011)
    Interactive Water Quality Assessment Report tutorial.
  - EPA Region 9 CWA §106 WQAR Template Pilot (pdf) (149.82 KB, September 2010)
    This document describes the purpose of the Water Quality Assessment Report (WQAR) template to provide information on water quality improvement in Tribal waters monitored under the CWA 106 Water Pollution Control program in EPA's Region 9.
    - Frequently Asked Questions: EPA Region 9 CWA §106 WQAR Template Pilot (pdf) (137.7 KB, October 2010)
      Contains questions and answers about the Water Quality Assessment Report Template for the use of Tribal water quality programs under Clean Water Act Section 106 Tribal grants program.
    - User Tutorial: WQAR Template (pdf) (467.93 KB,

- Check for template update if you have been using an old version.
- Don’t forget to complete the narrative portion of the template.
- Review the definition tab.
- Select from the drop-down menu instead of typing in your own words.
- Enter numerical values only, without units, after converting them to the correct units.

Water Quality Parameter Fact Sheets



FACTSHEET ON WATER QUALITY PARAMETERS

Temperature

Water temperature expresses how warm or cold the water is. It is defined as the amount of average kinetic energy in water molecules and is measured in degrees Fahrenheit (F) or Celsius (C).

Why do we measure temperature?

Water temperature influences the majority of physical, biological, chemical, and ecosystem processes in aquatic environments. Altered stream temperature is a significant cause of water quality impairment in the U.S. and influences other water quality parameters. Measuring temperature helps to understand the magnitude and variability of temperature fluctuations and anticipate the consequences for water quality and ecosystem health (Figure 1).

In general, increased water temperature can result in:

- Decreased dissolved oxygen (DO) available to aquatic life.
- Increased solubility of metals and other toxins in water.
- Possible increased toxicity of some substances to aquatic organisms.
- Algal blooms, which typically occur during the summer season or periods of unusually warm temperatures.

Short- and long-term increases in temperature can negatively impact aquatic health in different ways (Table 1).

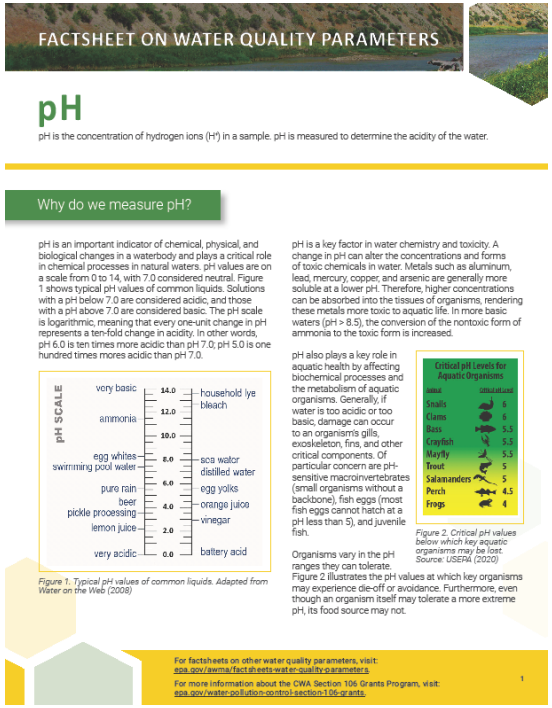
Figure 1. Measuring temperature in the field. Credit: Photo courtesy of USGS

Table 1. Potential effects of short- and long-term increases in temperature on aquatic life.

Short-term summer heat stress	Long-term temperature increases
• Reduced or blocked sexual maturation	• Loss of aquatic species whose survival and breeding are temperature dependent
• Inhibited or blocked critical stages of larval development	• Change in the abundance and spatial distribution of aquatic species and reduced populations of some species
• Reduced feeding and reduced growth of juveniles and adults	• Increase in rates of evaporation from surface water, causing increased salinity and waterbody shrinkage, resulting in a loss of habitat
• Increased susceptibility to predation	
• Reduced productivity of macroalgae and seagrasses	
• Increased death, organisms forced to leave, and increased incidence of disease or parasitism	

For factsheets on other water quality parameters, visit: epa.gov/awma/factsheets-water-quality-parameters.

For more information about the CWA Section 106 Grants Program, visit: epa.gov/water-pollution-control-section-106-grants.



FACTSHEET ON WATER QUALITY PARAMETERS

pH

pH is the concentration of hydrogen ions (H^+) in a sample. pH is measured to determine the acidity of the water.

Why do we measure pH?

pH is an important indicator of chemical, physical, and biological changes in a waterbody and plays a critical role in chemical processes in natural waters. pH values are on a scale from 0 to 14, with 7.0 considered neutral. Figure 1 shows typical pH values of common liquids. Solutions with a pH below 7.0 are considered acidic, and those with a pH above 7.0 are considered basic. The pH scale is logarithmic, meaning that every one-unit change in pH represents a ten-fold change in acidity. In other words, pH 6.0 is ten times more acidic than pH 7.0; pH 5.0 is one hundred times more acidic than pH 7.0.

Figure 1. Typical pH values of common liquids. Adapted from Water on the Web (2008)

pH is a key factor in water chemistry and toxicity. A change in pH can alter the concentrations and forms of toxic chemicals in water. Metals such as aluminum, lead, mercury, copper, and arsenic are generally more soluble at a lower pH. Therefore, higher concentrations can be absorbed into the tissues of organisms, rendering these metals more toxic to aquatic life. In more basic waters (pH > 8.5), the conversion of the nontoxic form of ammonia to the toxic form is increased.

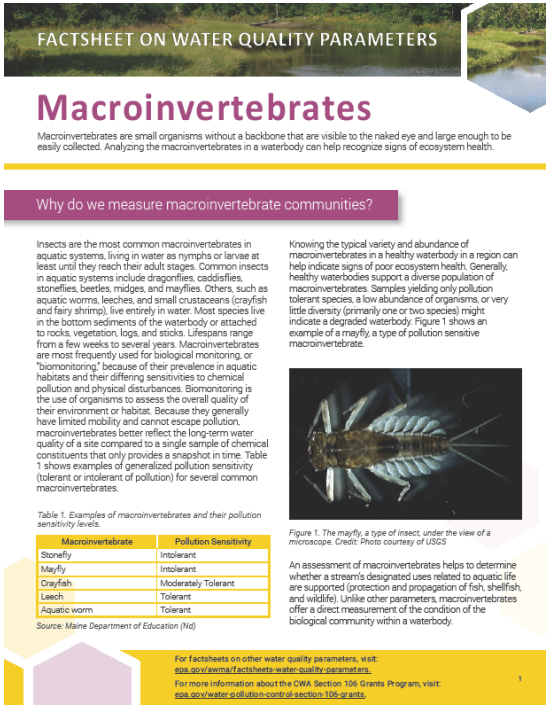
pH also plays a key role in aquatic health by affecting biochemical processes and the metabolism of aquatic organisms. Generally, if water is too acidic or too basic, damage can occur to an organism's gills, exoskeleton, fins, and other critical components. Of particular concern are pH-sensitive macroinvertebrates (small organisms without a backbone), fish eggs (most fish eggs cannot hatch at a pH less than 5), and juvenile fish.

Figure 2. Critical pH values below which key aquatic organisms may be lost. Source: USEPA (2020)

Organisms vary in the pH ranges they can tolerate. Figure 2 illustrates the pH values at which key organisms may experience die-off or avoidance. Furthermore, even though an organism itself may tolerate a more extreme pH, its food source may not.

For factsheets on other water quality parameters, visit: epa.gov/awma/factsheets-water-quality-parameters.

For more information about the CWA Section 106 Grants Program, visit: epa.gov/water-pollution-control-section-106-grants.



FACTSHEET ON WATER QUALITY PARAMETERS

Macroinvertebrates

Macroinvertebrates are small organisms without a backbone that are visible to the naked eye and large enough to be easily collected. Analyzing the macroinvertebrates in a waterbody can help recognize signs of ecosystem health.

Why do we measure macroinvertebrate communities?

Insects are the most common macroinvertebrates in aquatic systems, living in water as nymphs or larvae at least until they reach their adult stages. Common insects in aquatic systems include dragonflies, caddisflies, stoneflies, beetles, midges, and mayflies. Others, such as aquatic worms, leeches, and small crustaceans (crayfish and fairy shrimp), live entirely in water. Most species live in the bottom sediments of the waterbody or attached to rocks, vegetation, logs, and sticks. Lifespans range from a few weeks to several years. Macroinvertebrates are most frequently used for biological monitoring, or "biomonitoring," because of their prevalence in aquatic habitats and their differing sensitivities to chemical pollution and physical disturbances. Biomonitoring is the use of organisms to assess the overall quality of their environment or habitat. Because they generally have limited mobility and cannot escape pollution, macroinvertebrates better reflect the long-term water quality of a site compared to a single sample of chemical constituents that only provides a snapshot in time. Table 1 shows examples of generalized pollution sensitivity (tolerant or intolerant of pollution) for several common macroinvertebrates.

Knowing the typical variety and abundance of macroinvertebrates in a healthy waterbody in a region can help indicate signs of poor ecosystem health. Generally, healthy waterbodies support a diverse population of macroinvertebrates. Samples yielding only pollution tolerant species, a low abundance of organisms, or very little diversity (primarily one or two species) might indicate a degraded waterbody. Figure 1 shows an example of a mayfly, a type of pollution sensitive macroinvertebrate.

Figure 1. The mayfly, a type of insect, under the view of a microscope. Credit: Photo courtesy of USGS

Table 1. Examples of macroinvertebrates and their pollution sensitivity levels.

Macroinvertebrate	Pollution Sensitivity
Stonefly	Intolerant
Mayfly	Intolerant
Crayfish	Moderately Tolerant
Leech	Tolerant
Aquatic worm	Tolerant

Source: Maine Department of Education (Nd)

An assessment of macroinvertebrates helps to determine whether a stream's designated uses related to aquatic life are supported (protection and propagation of fish, shellfish, and wildlife). Unlike other parameters, macroinvertebrates offer a direct measurement of the condition of the biological community within a waterbody.

For factsheets on other water quality parameters, visit: epa.gov/awma/factsheets-water-quality-parameters.

For more information about the CWA Section 106 Grants Program, visit: epa.gov/water-pollution-control-section-106-grants.

Available at: https://www.epa.gov/awma/factsheets-water-quality-parameters

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