



# Data Analysis and Attainment Assessment

## Twenty-Nine Palms Band of Mission Indians: Water Quality Management Program



Jose Mora

Twenty-Nine Palms Band of Mission Indians





# Objectives

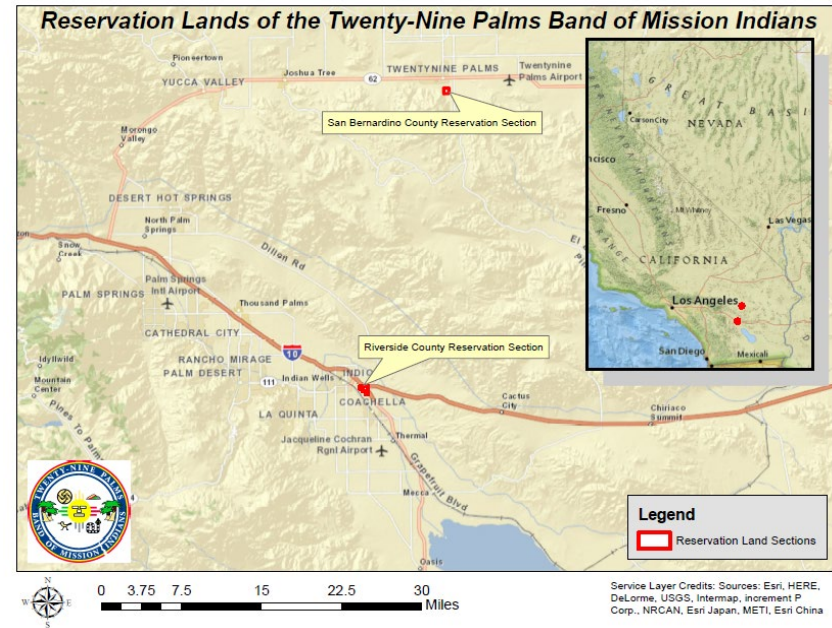
- To demonstrate how the Twenty-Nine Palms Band of Mission Indians manages and implements their Water Quality Management Program
- To illustrate how the Twenty-Nine Palms Band of Mission Indians uses its adopted Tribal Water Quality Standards to determine if water quality objectives are being met
- To show the tools that can be used to monitor surface water quality data





# Background

- The Twenty-Nine Palms Band of Mission Indians (Tribe) is a federally recognized Tribe located in Southern California
- Descendants of the Chemehuevi Tribe





# Background (cont.)

- The southern section of the Reservation is located near the city of Coachella, CA
- This section of the Reservation is located 15 miles upstream (northwest) of the Salton Sea and is central to the Salton Sea Watershed
- The Whitewater River is the primary surface water body on the Twenty-Nine Palms Reservation

Twenty-Nine Palms Indian Reservation - Whitewater River Sampling Sites





## Clean Water Act § 106 Water Quality Management Program

- The Tribe has been implementing their Water Quality Management Program since 1997.
- Since then, the Tribe has partnered with the U.S. EPA to develop a comprehensive water monitoring program which preserves and protects the water resources of the Tribe
- In 2015, the Tribe and the U.S. EPA Water Division formally adopted the Tribal Water Quality Standards
- The 29 Palms Laboratory has continued to build its capacity by becoming certified by the U.S. EPA Region 9 and the California Environmental Laboratory Accreditation Board for the analysis of Enterococcus, total coliform, and E. Coli





# Surface Water

- The Whitewater River is the primary surface water body in the Reservation
- The River is dry most of the year except during heavy rain events
- Wastewater treatment plant discharges treated water upstream of the Reservation creating perennial flow that ultimately discharges into the Salton Sea





# Whitewater River/Coachella Valley Stormwater Channel





# Whitewater River/Coachella Valley Stormwater Channel







# Initial Water Quality Assessment

- In 2015, the Tribal EPA conducted an initial assessment of water quality on surface water resources located on the reservation following their Quality Assurance Project Plan (QAPP).
- Provided preliminary information that would be helpful for the development of the Tribal Water Quality Monitoring Program
- Results would be used to identify analytes to be monitored on a routine basis.





# Initial Water Quality Assessments Results

- Physical properties are relatively stable throughout the year
- Anions did not reach harmful levels
- Bacteria levels show slight spikes after heavy rainfall but return to normal for the next sampling event
- Although the river has elevated bacteria levels, it is not being degraded

Parameter	Results
pH	6.95 - 7.75
Conductivity	727 - 866 uS/cm
TDS	489 - 589 mg/L
Fluoride	0 - 1 mg/L
Chloride	110 - 150 mg/L
Enterococci	10 - 504 MPN/100mL





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## Historical information of the Whitewater River

- The River is part of the state of California's CWA 303 (d) list of impaired waters bodies
- Bacteria levels have been historically elevated
- E. coli and Enterococcus levels regularly exceed Tribal Water Quality Standards
- Bacteria can enter surface water from point and nonpoint sources
- The primary permitted point source is Valley Sanitary District





# Water Quality Monitoring Program

Twenty-Nine Palms Tribal EPA  
List of Parameters of Analysis

- The initial assessment provided results to identify those analytes that would be monitored on a routine basis
- List of parameters is constantly changing
- No two programs are the same since each program has their own specific needs
- Tribes should base their water quality monitoring program on their surface water needs and budget

## Surface Water Monitoring

Parameter	Monitoring Frequency	Laboratory of Analysis
Ammonia, Nitrogen	Quarterly	A & R Laboratory
Nitrate, Nitrogen	Quarterly	A & R Laboratory
Nitrite, Nitrogen	Quarterly	A & R Laboratory
Nitrogen, Total Kjeldahl	Quarterly	A & R Laboratory
Bromide	Quarterly	A & R Laboratory
Chloride	Quarterly	A & R Laboratory
Fluoride	Quarterly	A & R Laboratory
Sulfate	Quarterly	A & R Laboratory
Orthophosphate Phosphorus	Quarterly	A & R Laboratory
Calcium	Quarterly	A & R Laboratory
Barium	Quarterly	A & R Laboratory
Magnesium	Quarterly	A & R Laboratory
Potassium	Quarterly	A & R Laboratory
Sodium	Quarterly	A & R Laboratory
Perchlorate	Quarterly	A & R Laboratory
Chromium VI	Quarterly	A & R Laboratory
Title 22 Metals	Annually	A & R Laboratory
Methylene Blue Active Substances	Annually	A & R Laboratory
Pesticides	Annually	A & R Laboratory
Temperature	Quarterly	29 Palms Laboratory and Field Measurement
pH	Quarterly	29 Palms Laboratory and Field Measurement
Dissolved Oxygen	Quarterly	29 Palms Laboratory and Field Measurement
Conductivity	Quarterly	29 Palms Laboratory and Field Measurement
Turbidity	Quarterly	29 Palms Laboratory and Field Measurement
Total Dissolved Solids	Quarterly	A & R Laboratories
Pharmaceuticals & Personal Care Products	Annually	Weck Laboratories
Per- and Polyfluoroalkyl Substances	Annually	Weck Laboratories





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# Tribal Water Quality Standards

- The Tribe and the U.S. EPA adopted the Tribal Water Quality Standards in 2015
- Standards consist of narrative and numerical objectives
- Provided a baseline that would allow the Tribe to make determinations of exceedances and decide appropriate action levels

Tribal Water Quality Standards

List of Criteria\*

Narrative Criteria

Category	Parameter	Water Quality Objective	Action Limit	Location(s) of Analysis
General	Aesthetic Qualities	Free of nuisance deposits producing objectionable color, odor, taste, or turbidity.	Field observation of undesirable impacts.	Field
	Toxicity	Free of toxic substances in concentrations which are harmful to people, plants, fish and wildlife.	Field observation of death or illness to exposed organisms.	Field
	Suspended Solids	Discharges containing suspended solids shall not increase turbidity.	Observed spike in turbidity above baseline after a discharge.	Field and/or 29 Palms Laboratory
	Total Dissolved Solids	Discharges shall not increase the total dissolved solids of receiving waters unless designated uses are not affected.	Field observation of loss of designated beneficial use.	Field
	Biostimulatory Substances	Water shall not contain biostimulatory substances in concentrations that promote nuisance aquatic growth.	Field observation of increase in nuisance aquatic growth.	Field
	Sediment	Sedimentary discharges shall not adversely affect beneficial uses.	Field observation of loss of designated beneficial use.	Field





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Category	Parameter	Numeric Criteria		Location(s) of Analysis
		Water Quality Objective	Action Limit	
Physical Properties	pH	pH shall range from 6.5-9.0	Field or lab monitoring outside numeric criteria limits	Field and/or 29 Palms Laboratory
	Dissolved Oxygen	5.0 or above	Field monitoring results over 5.0	Field
Microbiology	Enterococci	35 geometric mean	Laboratory Result exceedance	29 Palms Laboratory
	<i>E. coli</i>	126 geometric mean	Laboratory Result exceedance	29 Palms Laboratory
	<i>Bacteroides</i>	15 Million Bacteroides Number	Laboratory Result exceedance	29 Palms Laboratory





# Whitewater River Surface Water Sampling

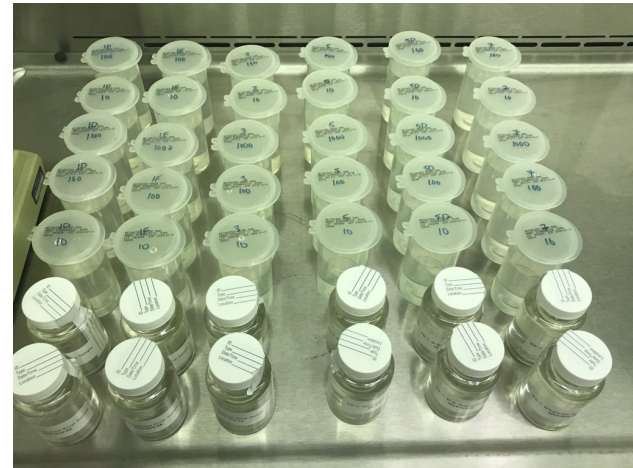
- The Tribe continuous to monitor the Whitewater River by conducting quarterly sampling events
- Parameters are analyzed quarterly or yearly depending on Quality Assurance Project Plan (QAPP)
- Results are compared to the Tribal Water Quality Standards to determine if the objectives have been met





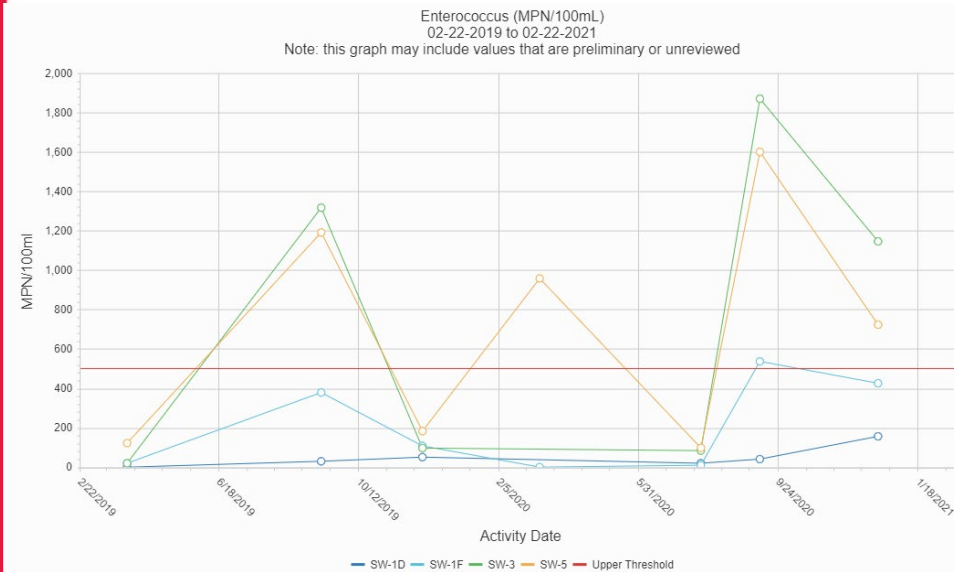
# Whitewater River Surface Water Sampling

- Once the samples have been collected, they are transported to the 29 Palms Laboratory
- Microbiology samples are then diluted and analyzed for total coliform, E. Coli, and enterococci
- Other samples are distributed to the appropriate contracted laboratories for analysis





# Enterococcus Analysis

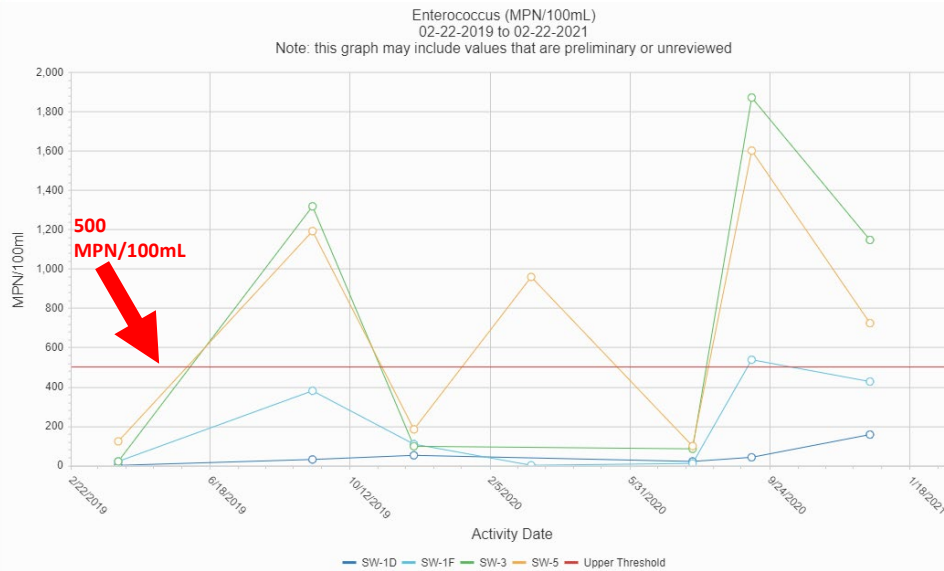


Twenty-Nine Palms Indian Reservation - Whitewater River Sampling Sites





# Enterococcus Analysis



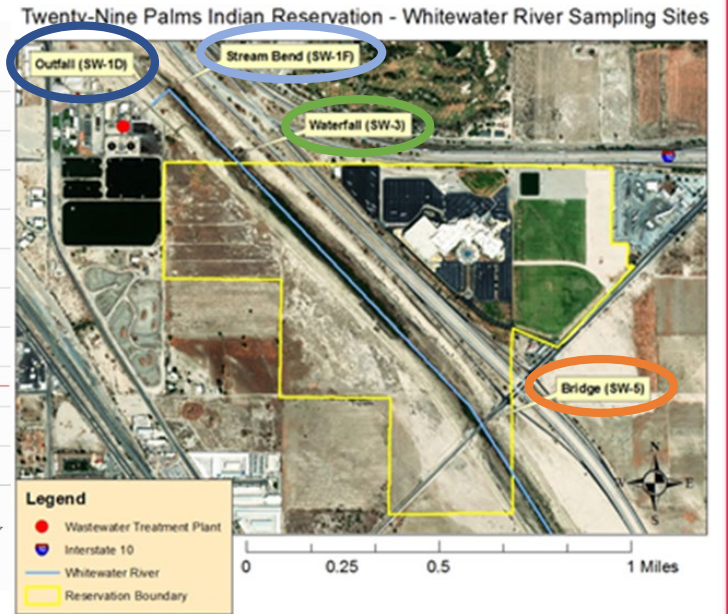
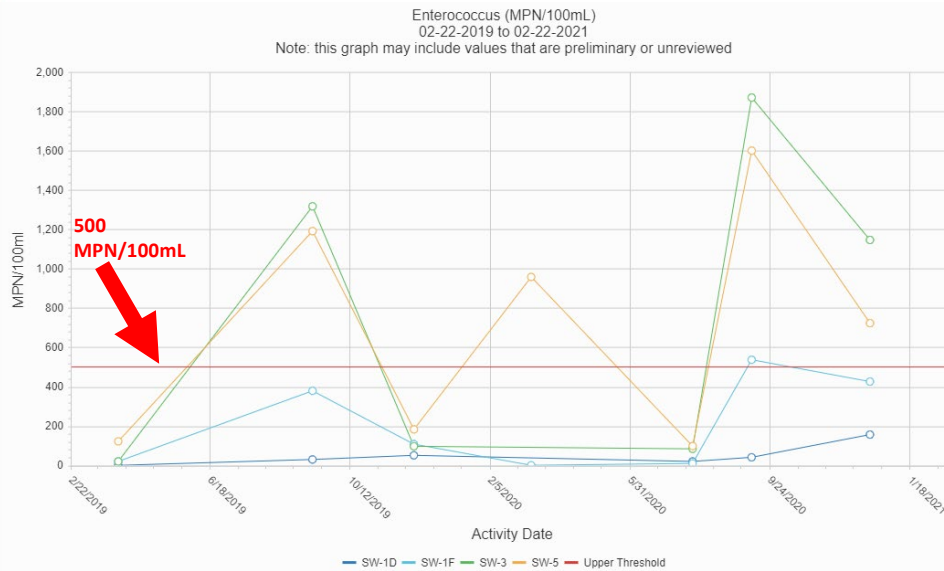
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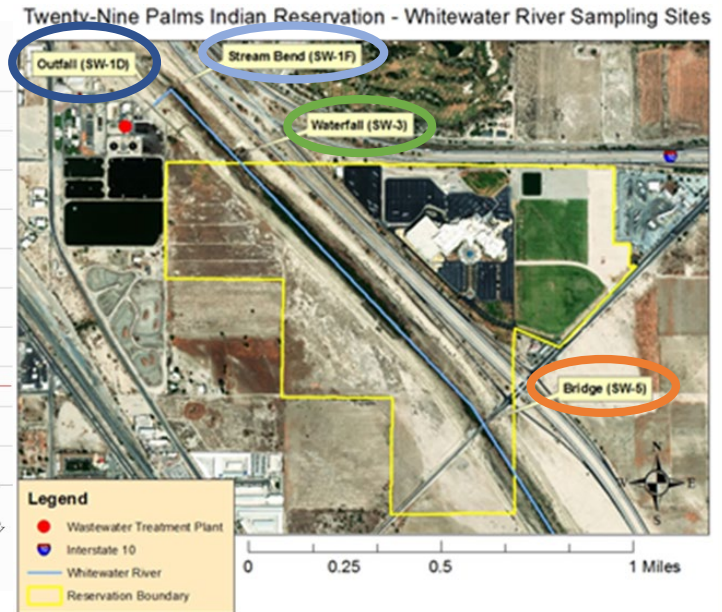
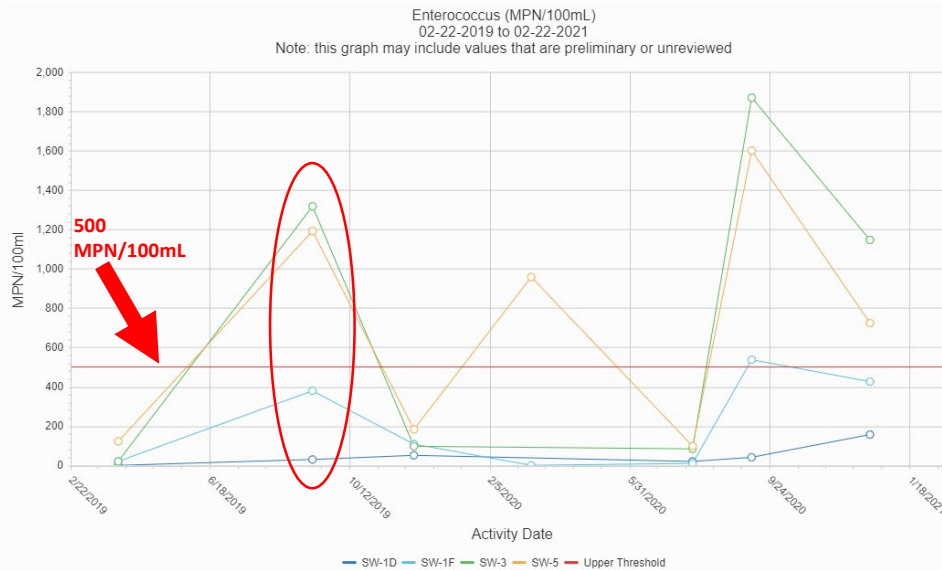


# Enterococcus Analysis





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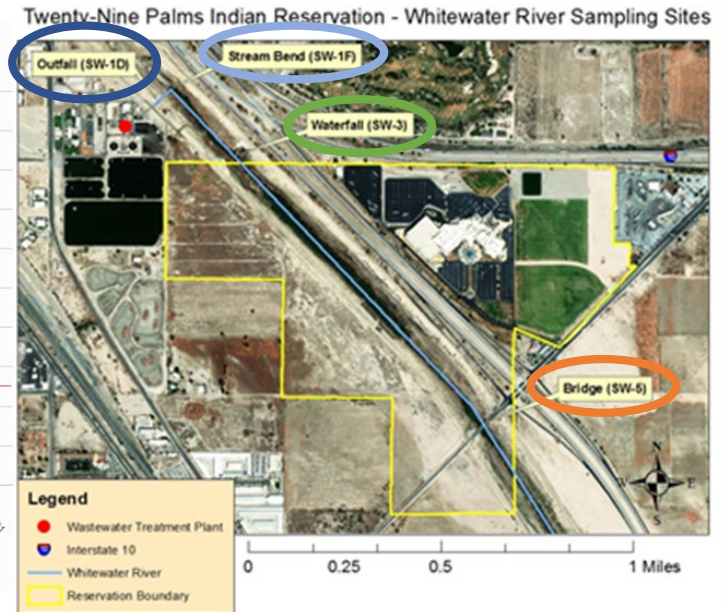
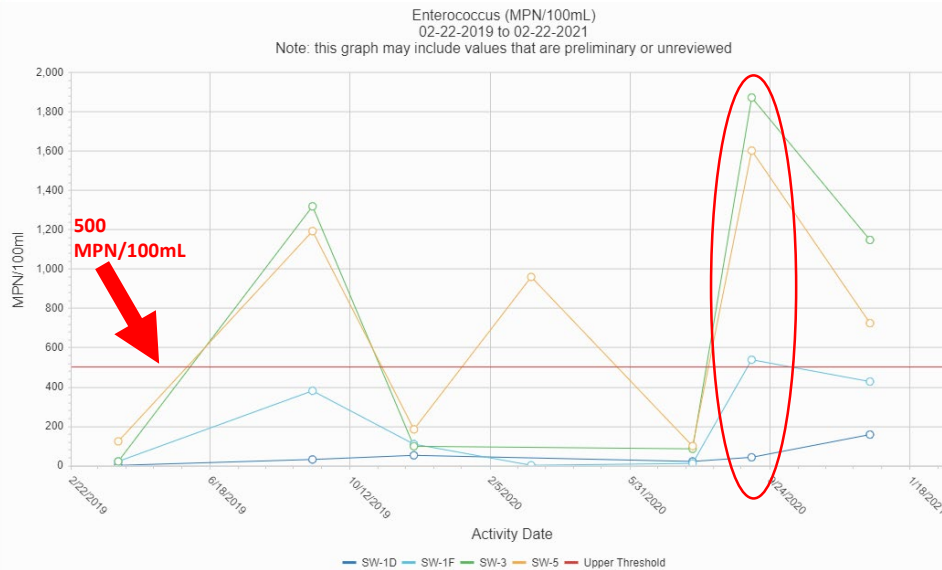


- Enterococcus sampling data illustrates a rise in bacteria in a downstream trend
- Enterococcus samples can range from 10 to 1870 MPN/100mL
- In the last 2 years, 7 samples have exceeded the Tribal Water Quality Standard





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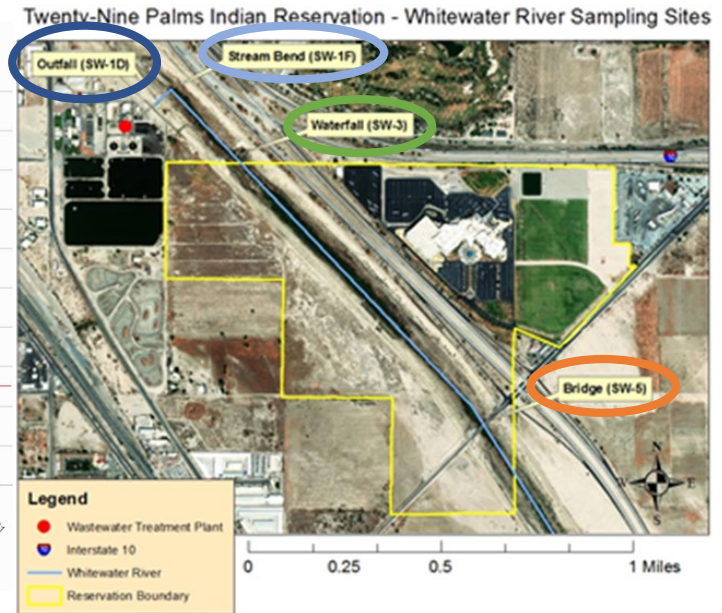
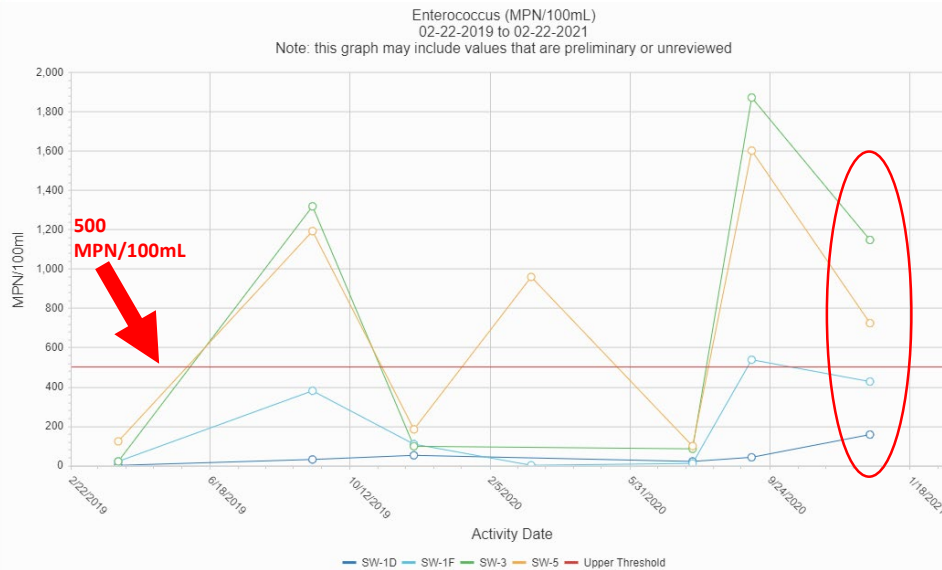


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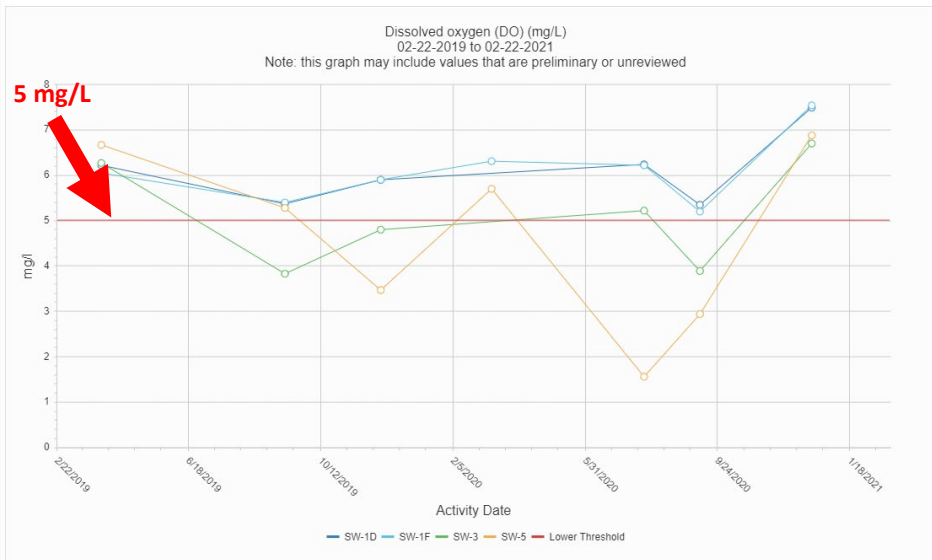


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# Dissolved Oxygen Analysis

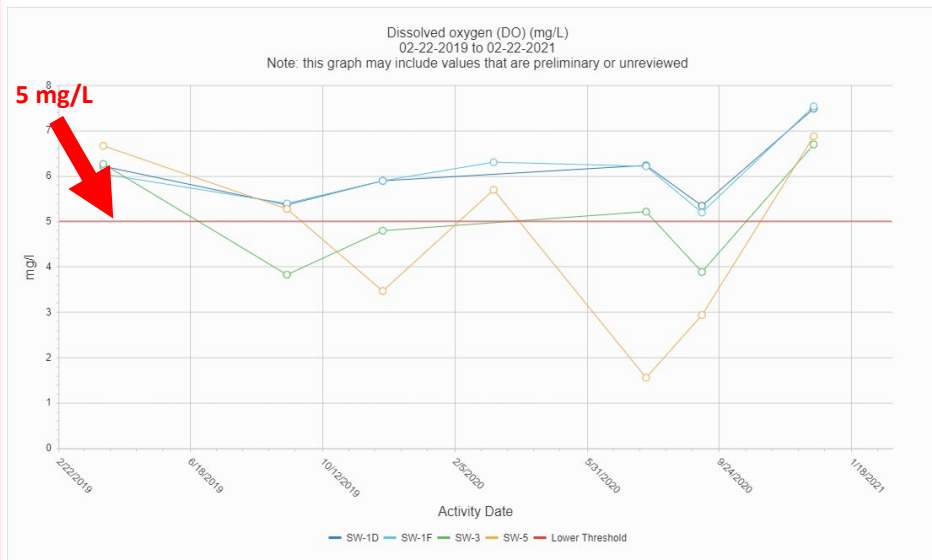


Twenty-Nine Palms Indian Reservation - Whitewater River Sampling Sites





# Dissolved Oxygen Analysis



Twenty-Nine Palms Indian Reservation - Whitewater River Sampling Sites

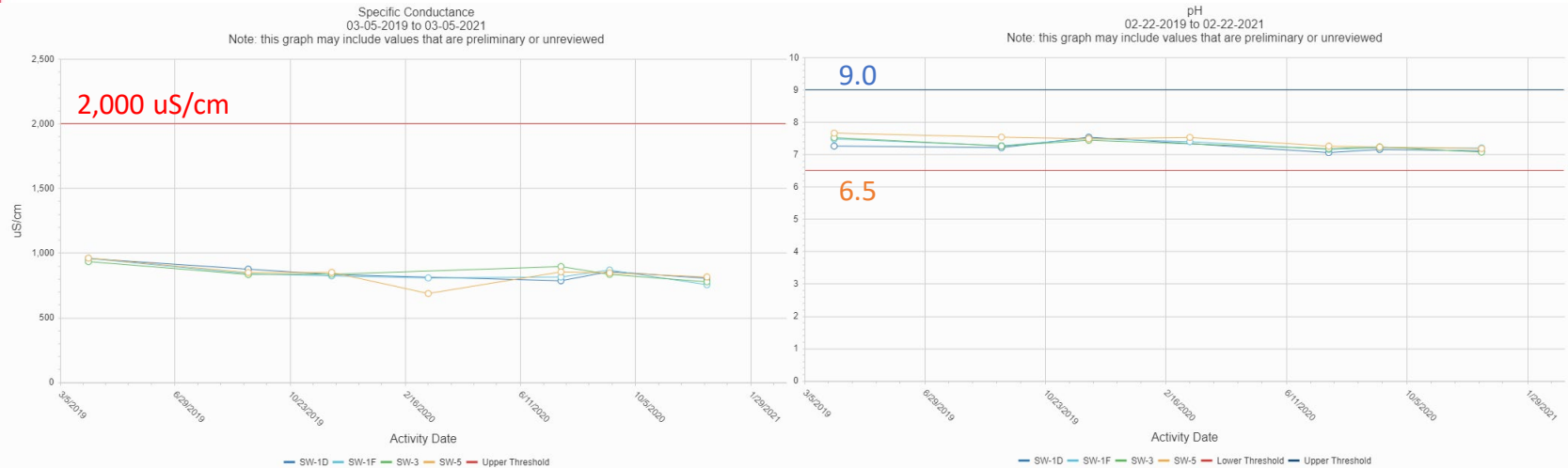


- DO sampling data illustrates a decrease in DO concentration in a downstream trend
- DO concentration can be as low as 1.55 mg/L
- In the last 2 years, 6 samples have exceeded the Tribal Water Quality Standard, especially during the hot summer months





# Physical Parameters Analysis



- Physical parameters have been consistent throughout the years
- Parameters, such as pH and conductivity, have been consistently within the Tribal Water Quality Standards





# Mitigation Strategies

- Mitigation strategies can differ based on the parameter that exceeded the WQS
- If a contaminant is detected, does it exceed federal and Tribal WQS?
  - No, continue to monitor
  - Yes, notify the community, stakeholders, and U.S. EPA
- Can the source of pollution be determined?
  - No, continue to monitor
  - Yes, determine and implement best management plan (BMP) to mitigate the contaminant
- Was the BMP successful?
  - Yes, continue with monitoring program to detect future contamination
  - No, continue with minoring program and developing and effective BMP

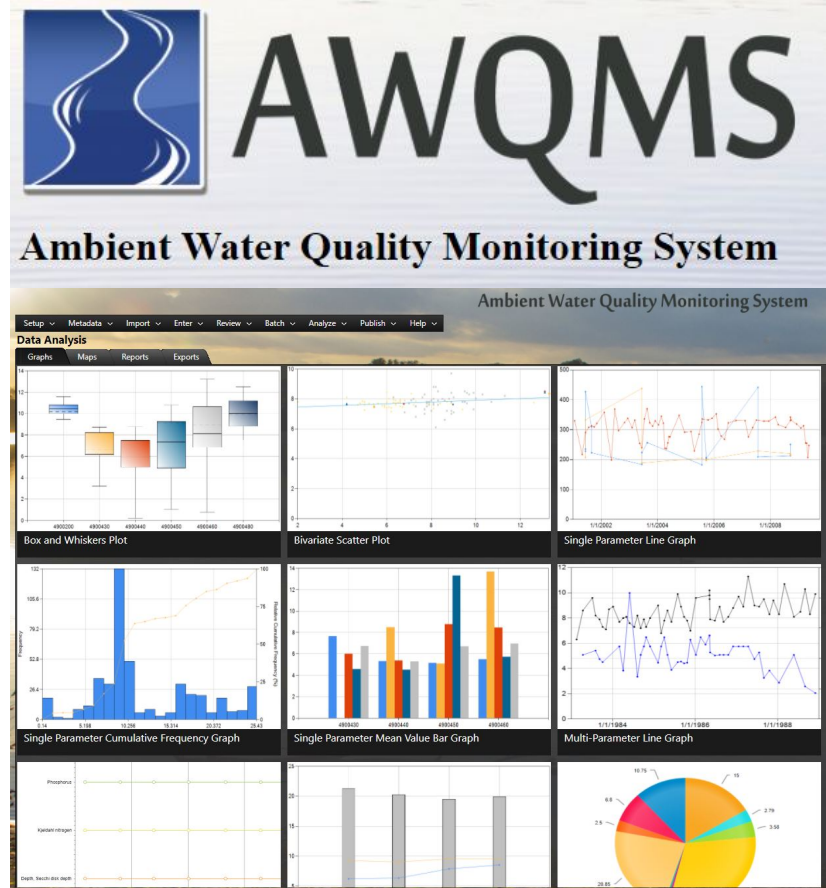






# Water Quality Assessment Tools

- Ambient Water Quality Monitoring System (AWQMS) is a paid web-based water quality data management system
- Provides a variety of tools that include data analysis, data visualization, data interpretation, QA/QC and more
- They work with almost 100 Tribes across the country





# AWQMS Water Quality Tools

- AWQMS allows you to import data as an excel file
- It provides QA/QC controls to verify the data being submitted
- Automatically imports data to WQX once you have reviewed and approved it

Setup ▾ Metadata ▾ **Import ▾** Enter ▾ Review ▾ Batch ▾ Analyze ▾ Publish ▾ Help ▾

### Import an Excel Spreadsheet or Text File into AWQMS

Import Data

Import Configuration and Type of File

Type of Data: Results & Activities  
Import Configuration: Levi Anderson ~ Import 29 Palms Results ~ 2680  
Type of File: Microsoft Excel (xlsx)  
Worksheet(s) to Import: 5th (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	tepa29	

QC Checking is in place for this organization.  
[Review QC Parameters and Thresholds](#)  
[Change Organization Preferences](#)

New or Existing Data:

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

If import file is free of errors and warnings:

Let me review my dataset in the staging area before migrating.  
 Automatically migrate the data into AWQMS.

Batch Processing:

I have a single file to import  
 I have a batch of files to import, which use the same import configuration and generated values (above)

File(s)

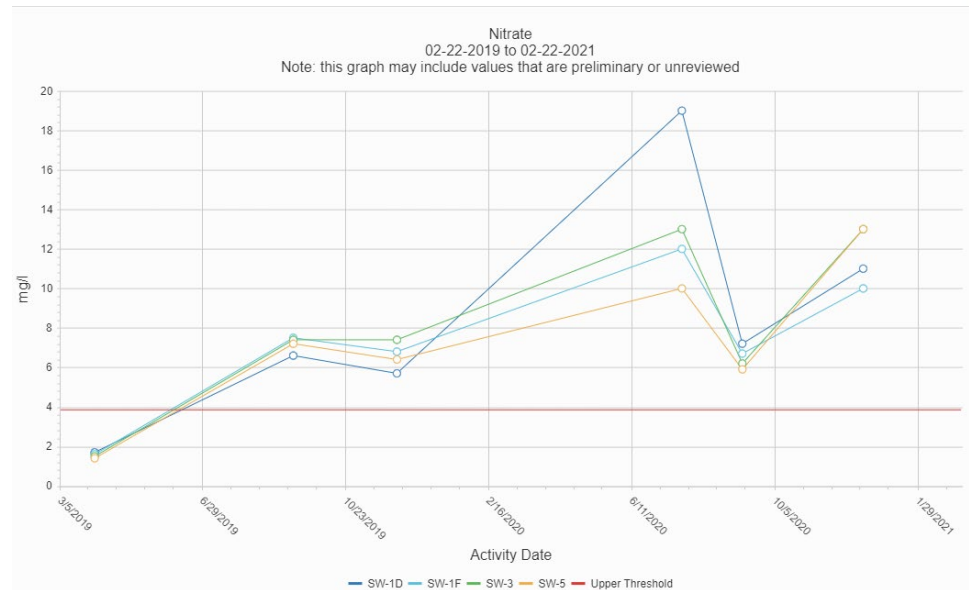
Import File:  No file chosen .xlsx, .xlsxm, .zip  
Attachments File:  No file chosen .zip





# AWQMS Water Quality Tools

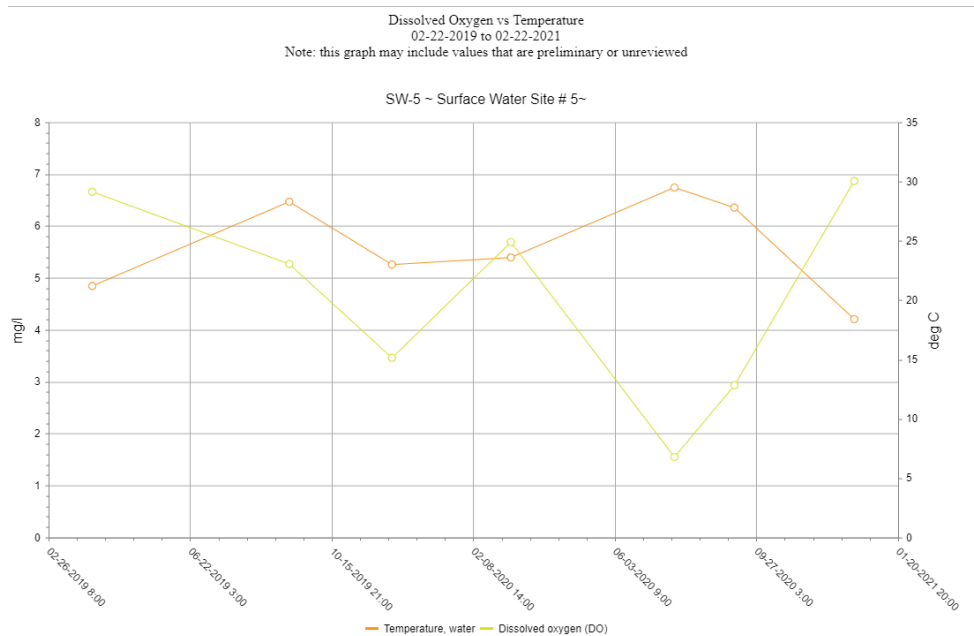
- The program can create multiple data analysis outputs including:
  - **Single parameter line graphs**
  - Multi-parameter line graphs
  - Box and Whiskers Plots
  - Sampling and Exceedance Maps





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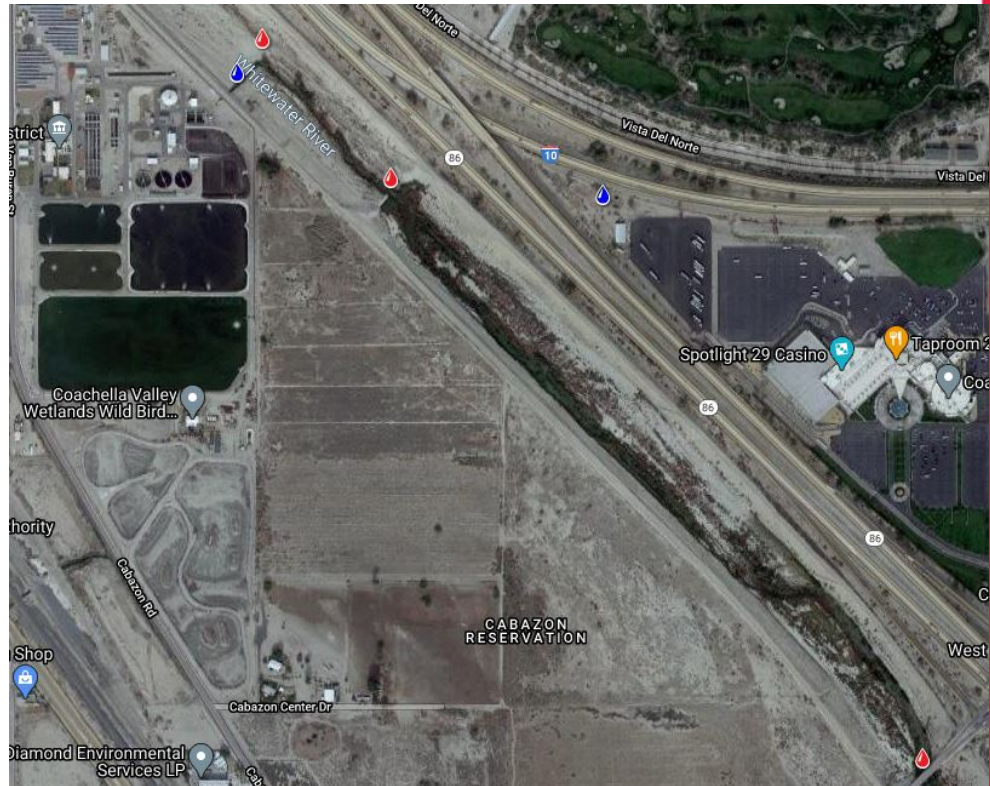




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Enterococcus Exceedance Map (02/22/2019 – 02/22/2021)





# AWQMS Water Quality Tools

- The program generate reports including:
  - Single parameter reports
  - Exceedance reports
  - Statistical analysis report
  - Site specific detailed reports

## Enterococcus Exceedance Report (02/22/2019 – 02/22/2021)

Location: TEPA29 SW-3 ~ Surface Water Site # 3

Date	Parameter	Fraction	Time Basis	Statistical Base	Value	Units	Lower Threshold	Upper Threshold	Diff	%Diff	Exceedance?
4/3/2019	<a href="#">Enterococcus</a>	Total		MPN	20 MPN/100ml			500			No
9/11/2019	<a href="#">Enterococcus</a>	Total		MPN	1317 MPN/100ml			500	817	163%	Yes
12/4/2019	<a href="#">Enterococcus</a>	Total		MPN	97 MPN/100ml			500			No
7/22/2020	<a href="#">Enterococcus</a>	Total		MPN	84 MPN/100ml			500			No
9/9/2020	<a href="#">Enterococcus</a>	Total		MPN	1870 MPN/100ml			500	1370	274%	Yes
12/16/2020	<a href="#">Enterococcus</a>	Total		MPN	1146 MPN/100ml			500	646	129%	Yes

### Summary

Result Count: 6      Mean: 755.666667      Mean Exceedance Value: 1444.333333  
 Exceedance Count: 3      Geometric Mean: 277.8319      Mean Exceedance Diff: 944.333333  
 Percent Exceedances: 50%      Mean Exceedance % Diff: 189%

Location: TEPA29 SW-5 ~ Surface Water Site # 5

Date	Parameter	Fraction	Time Basis	Statistical Base	Value	Units	Lower Threshold	Upper Threshold	Diff	%Diff	Exceedance?
4/3/2019	<a href="#">Enterococcus</a>	Total		MPN	122 MPN/100ml			500			No
9/11/2019	<a href="#">Enterococcus</a>	Total		MPN	1191 MPN/100ml			500	691	138%	Yes
12/4/2019	<a href="#">Enterococcus</a>	Total		MPN	183 MPN/100ml			500			No
3/10/2020	<a href="#">Enterococcus</a>	Total		MPN	958 MPN/100ml			500	458	92%	Yes
7/22/2020	<a href="#">Enterococcus</a>	Total		MPN	98 MPN/100ml			500			No
9/9/2020	<a href="#">Enterococcus</a>	Total		MPN	1600 MPN/100ml			500	1100	220%	Yes
12/16/2020	<a href="#">Enterococcus</a>	Total		MPN	723 MPN/100ml			500	223	45%	Yes

### Summary

Result Count: 7      Mean: 696.428571      Mean Exceedance Value: 1118  
 Exceedance Count: 4      Geometric Mean: 433.7352      Mean Exceedance Diff: 618  
 Percent Exceedances: 57%      Mean Exceedance % Diff: 124%





# Questions?

Contact Information:

Jose Mora, Twenty-Nine Palms Band of Mission Indians

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