Heber Public Utility District

REPORT TO BOARD OF DIRECTORS

MEETING DATE: September 16, 2021

FROM: Laura Fischer, General Manager

SUBJECT: Approve and Accept the 2020 Watershed Sanitary Survey

ISSUE:
Shall the Board of Directors approve and accept the 2020 Watershed Sanitary Survey?

GENERAL MANAGER'S RECOMMENDATION:
It is recommended that the Board of Directors approve and accept the 2020 Watershed Sanitary Survey.

FISCAL IMPACT:
HPUD's share of the cost was $5,009.53, which was calculated based on all participating agencies paying an equal share of the total cost based on the number of water service connections. This amount was approved in the FY 2020-21 budget and was paid last Fiscal Year upon completion of the Survey.

DISCUSSION:
HPUD's goal in participating in the Joint Watershed Sanitary Survey (WSS) is to meet the State requirements of Title 22 (Social Security), Division 4 (Environmental Health), Chapter 17 (Surface Water Treatment), Article 7 (Sanitary Survey) of California Code of Regulations and the Surface Treatment Rules (SWTR).

This report is an update to the previous 2014 Watershed Sanitary Survey for the Lower Colorado River watershed below Parker Dam and all the contributing drainage areas that drain into the Imperial Irrigation District irrigation canal system that supplies water to surface water treatment plants in Imperial County.

This report provides a description of the watershed, a summary of source water quality monitoring data, a description of activities and sources on contamination, a description of any significant changes that have occurred since the last survey that could affect the quality of the system's ability to meet requirements, and recommendation for corrective actions.

CONCLUSION:
As the HPUD's participation in the Joint Watershed Sanitary Survey was approved in prior year, it is staff's recommendation that the completed Watershed Sanitary Survey be approved and accepted.

Respectfully Submitted,

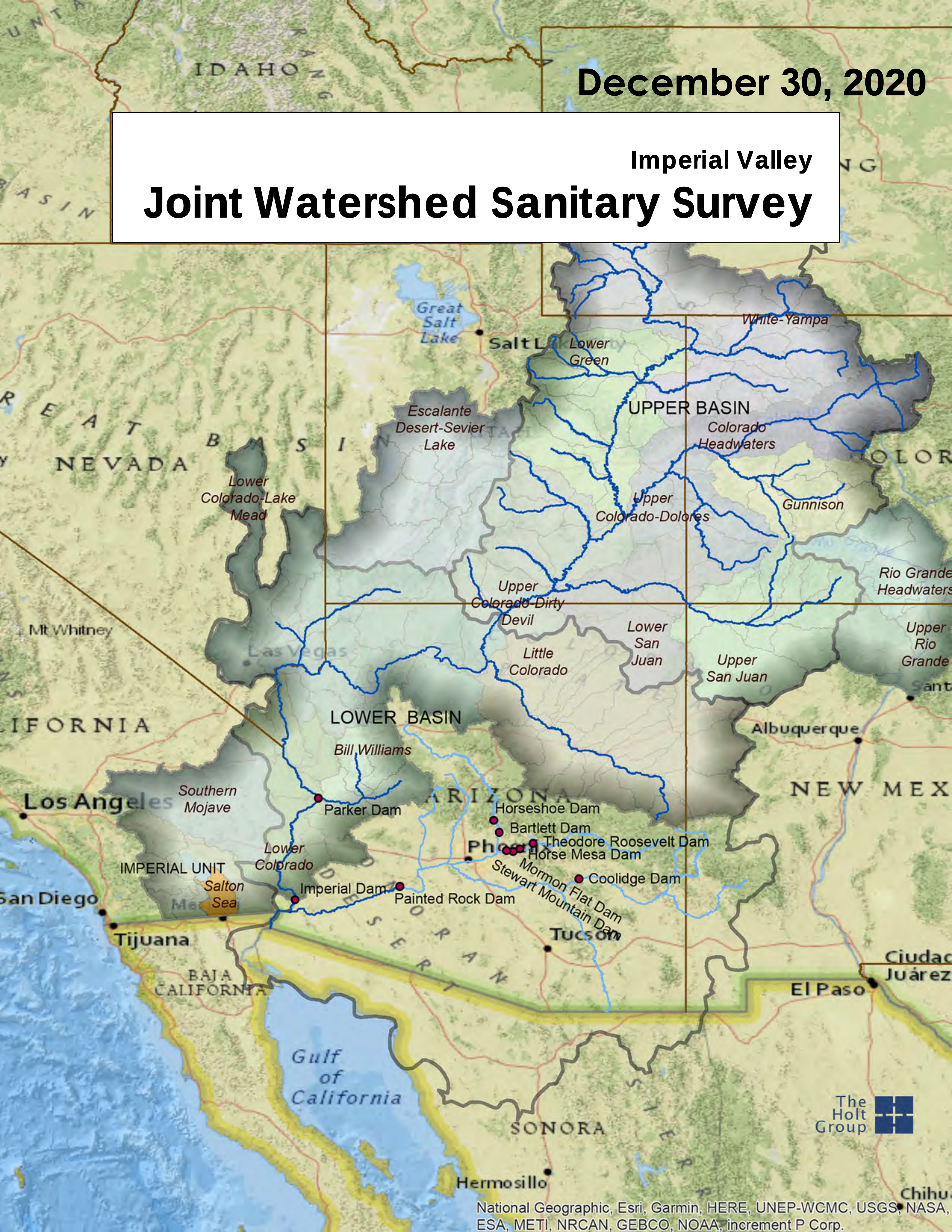
Laura Fischer,
General Manager

Attachment: 2020 Watershed Sanitary Survey

December 30, 2020

Imperial Valley

Joint Watershed Sanitary Survey



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1.1 Introduction

This report is an update to the existing September 2014 Watershed Sanitary Survey (WSS) conducted in 2014 by PSOMAS for the Lower Colorado River watershed below Parker Dam and all the contributing drainage areas that drain into the Imperial Irrigation District (IID) irrigation canal system that supplies water to surface water treatment plants in Imperial County. The three major areas to be addressed are the lower Colorado River (Parker Dam to Imperial Dam), the IID Canal System, and the micro watersheds surrounding the 46 water providers in Imperial County. The information acquired for this report was obtained with the help of the State Water Board, Division of Drinking Water, the IID, local agencies, drinking water providers and various public agencies.

The report is required to fulfill requirements of Title 22 (Social Security), Division 4 (Environmental Health), Chapter 17 (Surface Water Treatment), Article 7 (Sanitary Survey) of California Code of Regulations and the Surface Treatment Rules (SWTR) by updating the Watershed Sanitary Survey every five years.

This report provides a description of the watershed, a summary of source water quality monitoring data, a description of activities and sources of contamination, a description of any significant changes that have occurred since the last survey that could affect the quality of the source water, a description of watershed control and management practices, an evaluation of the system's ability to meet requirements, and recommendations for corrective actions.

This is a joint Watershed Sanitary Survey for the Imperial Valley and is intended to apply to all drinking water providers using IID's canal system as a source of raw water supply. Each participating drinking water provider has been contacted to provide current information regarding their individual water system as it pertains to the requirements of this document as well as comment on recommendations. A list of participating drinking water providers is as follows:

State Regulated Drinking Water Providers

- Brawley, City of
- Calexico, City of
- Calipatria, Golden State Water Company (GSWC)
- CA Dept. of Correction, Centinela
- Department of Homeland Security (DHS) Calexico
- El Centro, City of
- General Services Administration (GSA) Calexico Port of Entry
- Heber Dunes – State Vehicular Recreation Area (SVR)
- Heber Public Utility District
- Holtville, City of
- Imperial, City of
- Naval Air Facility (NAF) El Centro
- Seeley County Water District
- Sonny Bono Salton Sea Wildlife Refuge
- University of California Desert Research and Extension Center (UC DREC)
- Westmorland, City of

County Regulated Drinking Water Providers

- Allied Waste of Imperial Valley
- Bornt & Sons, Inc.
- Brandt Cattle
- CalEnergy (Administration)
- CalEnergy (Eng & Tech)
- CalEnergy (Salton Sea Unit No. III)
- CalEnergy (Vulcan Power Plant)
- Calvary Chapel Church
- Camacho's Restaurant
- Country Life MH & RV Park
- Date Gardens Mobile Home Park
- Earthrise Nutrionals
- Gateway
- Hudson Ranch Power
- IID North End
- Imperial Lakes, Inc.
- Imperial Valley College
- Magnolia Union School
- McCabe Union School
- Meadows Union Elementary School
- Mulberry Union School
- Old Eucalyptus Schoolhouse
- Ormat Nevada, Inc.
- Pine Union School
- Red Hill Marina
- Rio Bend RV Golf Resort & Storm Cross
- Spreckels Sugar
- Sunbeam Lake RV Resort
- Valley Mobile Home Park
- Wiest Lake County Campground

This report consists of eight sections, a summary of this updated WSS report sections is as follows:

Section 1: Executive Summary
Section 2: Recommendations
Section 3: Description of Watershed
Section 4: Drinking Water Providers
Section 5: Potential Sources of Contaminants
Section 6: Water Quality Review and Assessment
Section 7: Watershed Control and Management
Section 8: Conclusions

1.2 Recommendations Overview

The recommendations put forth in this report are an amalgamation of the recommendations from the 2010 WSS update, 2014 WSS updates, and recommendations from The Holt Group, Inc. (THG) with input and approval from the Division of Drinking Water (DDW). Some of THG's suggestions include eliminating outdated recommendations or consolidating similar recommendations.

Following is a list of the seventeen recommendation sent to the 46 drinking water providers:

1. Water treatment systems should contact IID for information on IID’s planned water supply interruptions, cleaning, and vegetation maintenance activities. IID should provide water systems a minimum two-week notice of shutdowns. Water systems should contact IID to update mailing roster in order to receive notices.

2. Each water treatment system should develop a standard operating procedure (SOP) for an annual review and evaluation of scheduled IID activities with the purpose of being aware of events that have the potential to cause negative water quality or source quantity impairments. The SOP should include performing monthly reviews of scheduled IID activities with the goal of identifying scheduling updates for the current and next month calendars that have the potential to cause negative water quality or source quantity impairments. As a precautionary measure, where possible, systems should close their intakes and operate off storage ponds when canals are being maintained. In addition, when maintenance is being performed on ponds, the ponds should be removed from service until the water has had an opportunity to settle.

3. It is recommended that all water systems close the intake gates at the treatment plants when a rain event starts and reopen approximately 24 hours later to prevent taking in the first flush water. CDPH (DDW) commented in 2014 WSS Update that more than 24 hours may be required. Water providers may need canal travel time information. Grab sampling from canal may be needed to determine when to open gate.

4. It is recommended that a website be set up that each water purveyor has access to. In this proposed website the large water systems could enter raw water data daily so that information could be shared with the smaller systems and used to better predict poor water quality events. Public Water Systems (PWS's) will need to set up the website if they believe it will be useful and have the resources.

5. Water systems that have tested finished water above 80ppb should consider all techniques and technologies available in their Capital Improvement Plans (CIP) to reduce the disinfection byproducts (TTHM and HAA5).

6. Small systems (10,000 or fewer people) that do not monitor for temperature should use a minimum temperature of 10° C for CT calculations.

7. Vulnerability assessment helps water systems evaluate potential threats and identify corrective actions that can reduce the risk of serious consequences. The assessment serves as a guide to the water utility by providing a prioritized plan for security upgrades, modifications or operational procedures that pose a threat to the utility’s critical assets. The vulnerability assessment should be updated to reflect the chemicals currently being used on the watershed. The lower Colorado River should be considered vulnerable to the following regulated and unregulated organic chemicals: VOCs, 1,3 dichloropropene,

glyphosate, chloropicrin, chlorothalonil, dimethoate, methyl bromide, atrazine, chloropicrin, and diazinon.

8. Based on chemical application, the system should be considered vulnerable to glyphosate and diuron. The vulnerability assessment and monitoring requirements for the IID Enhanced Joint Monitoring Plan should be updated to reflect the chemicals currently being used on the watershed. The lower Colorado River should be considered vulnerable to the following regulated and unregulated organic chemicals: 1,3 dichloropropene, glyphosate, chloropicrin, chlorothalonil, dimethoate, methyl bromide, atrazine, chloropicrin, and diazinon.

9. Systems should consider taking samples and testing for pesticides and other contaminants separately from the IID Enhanced Joint Monitoring Plan. If sampling results show unusual levels of agricultural chemicals entering the canals because of aerial spraying or other pesticide application methods, then systems should notify Steve Charlton, Water Programs Manager at IID, who in turn notifies the Imperial County Agricultural Commissioner's Office.

10. AII systems should prepare, submit and make available an accurate Consumer Confidence Report (CCR) to the water users and the Imperial County Health Department for review each year. The report should include the system number and PWS must use the DDW assigned Primary Station Code (PSCode) for source water quality data.

11. Monitoring must be done in accordance with the PWS's permit and DDW approved IID Enhanced Joint Monitoring Plan, or, for systems that do not participate in the plan, as directed by DDW or DEH.

12. All the conventional (or equivalent of conventional) plants should collect Total Organic Matter (TOC) raw/treated pair sampling and have a goal to optimize the reduction of TOC to reduce Disinfection by-Products (DBP).

13. All systems should have pre-sedimentation, e.g. raw water ponds to reduce turbidity of raw water and collect data on pre and post pre-sedimentation.

14. All constructed raw water conveyances from IID's canal system to public water system should be of NSF 61 approved materials.

15. Monitoring must be done in accordance with the PWS's permit and DDW approved IID Enhanced Joint Monitoring Plan, or, for systems that do not participate in the plan, as directed by DDW or DEH.

16. DDW and DHS will not permit any new water treatment plants in Imperial Valley without TTHM reduction/removal systems, e.g. aeration or granular activated carbon (GAC).

17. The water systems should, on a monthly or quarterly basis, walk or drive the canal lateral to where it connects to the main canal to become familiar with upstream users and possible sanitary hazards. Water providers have commented on their current canal inspection procedures as noted in table below.

The list of IID recommendations to maintain or improve the water supply source is as follows:

1. IID should continue to provide water systems a two-week notice of shutdowns, including planned water supply interruptions, cleaning, and vegetation maintenance activities, as applicable.

2. Inspect and, if necessary, abandon or modify pump back well EHL DP3 to ensure it does not draw from the All-American Drain.

3. IID should evaluate each seepage pump back system to ensure that all drains from farms and other drains are not connected to seepage systems and are not able to spill into the seepage recovery basins. There are instances where drains do not appear to have adequate separation from seepage ponds. This should be corrected

4. The seepage pond for the Township pump back well appears to be a converted drain. If so, inspect to make sure surface runoff and/or tile drains do not reach the pond. Make corrections, as necessary. Sampling data shows slightly higher specific conductance and salinity in this area, which suggests the possibility of this occurring.

5. Eliminate the 4" pipe carrying lateral water to the seepage pond for the Township pump back well.

6. Water from the individual wells or sumps which are used to pump canal leakage back into the canals should be monitored at least once for Title 22 constituents to verify that the water being pumped back has not been influenced by the ground water quality. Ongoing monitoring could be minimized if monitoring results and an evaluation of the construction and location of the wells indicate that the water being pumped back is not influenced by the ground water. DDW plans to review all of the pump back wells currently installed to verify construction, water quality data collected, appropriate setbacks and agricultural drainage prevention. IID should implement any recommendations by DDW as a result of the review.

7. IID should implement testing of self-rescue equipment to prevent drowning of people and animals.

8. IID should continue to monitor for perchlorate on behalf of all systems.

9. Continue to remind the community of the importance to avoid allowing pesticides/fertilizers from entering the canals, drains, and seepage ponds.

10. Recommendation 19 in the 2014 WSS was that: wherever possible joint materials should be NSF approved.

DDW Comment #12 (p.1-21) in the 2014 WSS Update was: *In addition to joint materials, any new canal coatings, concrete and any other material that comes in contact with raw water upstream of drinking water providers should be NSF Standard 61 certified if certified material is available. In addition, any chemicals, if any, introduced into the canal for algae control and other uses must be NSF Standard 60 approved*.

The 2014 Update had the following: Based on IID responses, the following are some of the materials uses to do repairs: Redi-mix concrete, redwood board, wood grade boards, Portland Plastic Cement, Non-shrink grout, SDR-35 Schedule 40 PVC pipe, Canal seal (Sika-Flex), reinforced concrete pipe. IID does not seal joints with tar anymore.

IID is requested to update the list of materials used in the canals upgradient of the raw water delivery points.

11. If contaminating activities are observed such as spills, aerial spraying of the canals or other pesticide application methods, IID should notify the downstream water systems and the Imperial County Agricultural Commissioner's Office. IID should conduct additional monitoring at the direction of DDW for chemicals entering the canals as a result of aerial spraying or other pesticide application method

12. Review IID Canal Management Practices that relate to protection of the canals from contamination, including but not limited to operations that may impact water quality in the canals (i.e. construction); procedures that address responses to spills and other contamination events with attention to updating written instructions on informing water providers and DDW-San Diego District of any event that may impact the raw water quality.

13. Minimize the potential for backflow or mixing between private irrigation canals treated with fertilizer or other chemicals and water in the IID canals.

14. Provide regular (perhaps monthly) updates to all drinking water providers about upcoming canal maintenance of canals that provide water to drinking water providers. List all drinking water providers that may be impacted by each maintenance activity.

15. IID should evaluate the vulnerability of its water delivery system to accepting backflow of chemicals and fertilizers from farmers' fields into their canals. IID should examine their water delivery points and determine if there is a hydraulic discontinuity between the IID canal and the private irrigation canal to prevent backflow such as a weir box or a drop structure. IID should develop a program to upgrade deficient delivery points with priority to delivery point's upgradient to water provider delivery points.

16. Zanjeros should continue to report contamination events and IID should alert Water Providers and DDW-San Diego District if the event occurred upstream of their delivery point as well as the Imperial County Agricultural Commissioner.

17. The IID Enhanced Joint Monitoring Plan tests should be scheduled during a period when there is significant aerial spraying such as between September and March during the vegetable growing season.

1.3 Watershed Overview

This Watershed Sanitary Survey Update covers a small portion of the Colorado River Watershed. The Colorado River Watershed is comprised of over 246,000 square miles in seven states and serves nearly 30 million people. The Colorado River Watershed begins in the Rocky Mountains of Colorado. The Colorado River Watershed is broken into two smaller watersheds, the Upper and Lower Colorado River Watershed. The Upper and Lower Colorado River Watershed are divided at Lees Ferry. The majority of the Lower Colorado River Watershed is within the Metropolitan Water District (MWD) boundary. MWD covers the Lower Colorado River Watershed from the Lees Ferry to Parker Dam.

This WSS includes the Lower Colorado River Watershed south of the Parker Dam which is not within the Metropolitan Water District boundary. The Imperial Valley Watershed is outlined in detail on page 3-8, Figure 3-4. The Imperial Valley Watershed area is an arid desert with summer temperatures regularly exceeding 100 degrees. With between 10-14 hours of sunshine a day and less than 3-inches of rainfall on average per year, this desert area depends on Colorado River water to grow a variety of agriculture crops and produce. The Imperial Valley Watershed consists of predominantly natural desert and agriculture areas with small urban area pockets dispersed throughout the Watershed.

The Salton Sea, the lowest point in the valley, collects Imperial Valley Watershed drainage. A small portion of the drainage originates in Mexico. The New River and Alamo River originate in Mexico and flow northerly collecting urban and agricultural runoff prior to entering the Salton Sea.

1.4 Summary of Drinking Water Providers

The data for the state regulated drinking water providers was updated based on permits submitted to the State Water Board, Division of Drinking Water and verified by the drinking water providers. Predominantly, the changes that occurred from 2014 to present were in regards to TTHM removal. GSWC Calipatria added aeration to the Niland tank, City of Holtville added UV treatment and 2 additional tanks, UC DREC added an aeration system, and DHS Calexico added a spray aeration system. Heber Public Utility District (HPUD), Seeley County Water District (CWD), and the City of Imperial all had upgrades and modifications to their systems which are included in Section 4.

The bacteriological data table is provided for each of the state regulated drinking water providers with the data from 2014 to 2019 are included in Section 4. The state requirements have changed over time and while the primary focus is on E coli testing, total coliform and turbidity are also included with the bacteriological data. In years in which E. coli testing was not required, the data for fecal coliform was included with the bacteriological data when available.

The data for the County regulated drinking water providers was received from the Imperial County Department of Health Services. System descriptions were updated as required. For the bacteriological data for 2014-2019, the turbidity range, the high total coliform and the high E coli presence is illustrated with the bacteriological data.

1.5 Summary of Potential Sources of Contamination

The potential sources of contamination affecting the Imperial Valley Watershed were evaluated. The potential sources of contamination along the Colorado River from Parker Dam to the Imperial Valley and within the Imperial Valley were evaluated. The primary contamination concern is E. coli, which varies within the Watershed. The variation within the Watershed could be due to several factors, such as proximity to contamination sources within the system, seasonal changes, and various other factors.

Following are potential sources of contamination:

1. Storm Water Runoff and first flush events
2. Spills into the IID Canal System
3. Drowning
4. Failing Septic Systems
5. Wastewater Collection, Treatment, and Discharge
6. Recreation on the River and Associated Bodies of Water
7. Agricultural Activities
8. Other Concerns

1.6 Summary of Water Quality Review and Results

The Environmental Protection Agency (EPA) establishes federal regulations for the control of contaminants in drinking water under the provisions of the Safe Drinking Water Act (SDWA). The California Code of Regulations establishing the drinking water quality requirements and monitoring standards in the State of California. The California Code of Regulations can be no less stringent than the federal regulations. The State Water Resources Control Board – Division of Drinking Water (DDW) has the primary responsibility to enforce drinking water regulations.

DDW related regulations are contained in Titles 22 and 17 of the CCR. If authorized by California law, the State Water Quality Control Board can set maximum contaminant levels (MCLs) based on recommendations from the California Environmental Protection Agency's Office of Environmental Health Hazards Assessment (OEHHA). MCLs are required to be reviewed every five years.

Applicable federal regulations under the SDWA are categorized by the following:

- Chemical Contaminants
  - Inorganics
  - Radionuclides
  - Volatile Organic Chemicals (VOCs) and Synthetic Organic Chemicals (SOCs)
  - Contaminants regulated under Secondary Guidelines

- Surface Water Treatment Rules (SWTR)
  - Filter Backwash Recycling Rule (FBRR)
  - Interim Enhanced Surface Water Treatment (IESWTR)
  - Long Term 1 & 2 Enhanced Surface Water Treatment (LT1ESWTR & LT2ESWTR)

- Other Water System Rules
  - Lead and Copper Rule
  - Disinfection Byproducts Rule
  - Total Coliform Rule
  - Total Coliform (TCR) and Revised Total Coliform Rules (RTCR)

1.7 Summary of Watershed Control and Management

This portion of the report is based on data received from the Imperial Irrigation District (IID) and on the IID website. IID is responsible for the management of the canals and drains in the Imperial Valley Watershed.

IID’s Water Department has ongoing routine maintenance procedures for its canals, laterals, and other components of the delivery and conveyance system. Field staff zanjeros (ditch riders) visually inspect the canals and structures during their daily runs, and record any maintenance needs seen in the field. Zanjeros remove nominal trash, vegetation and debris from channels and structures that interfere with their immediate tasks.

IID has multiple maintenance procedures to restore the canal to its original design capacity. The routine maintenance procedures performed by IID maintenance forces are described in further detail are the following:

1. Disking (Earthen Canals)
2. Chaining (Earthen and Concrete Canals)
3. Cleaning/Excavation (Earthen Canals, Concrete Canals)
4. Concrete Lining Repair/Replacement
5. Rip-Rap Placement (Earthen Canals, Reservoirs)

An important activity for the canals and drains is sediment removal, which is typically done with excavators, and is done as needed depending on the site conditions. If a canal is taken out of service, notice before the outage will be given to water users who are supplied by that canal. IID’s Water Department is also responsible for the maintenance of waterway structures and gates.

IID has a Vegetation Management Unit that is in charge of all aspects of weed prevention and control. IID uses mechanical, chemical, and biological weed control methods.

2.1 State Regulated Drinking Water Provider Recommendations

The recommendations from the 2010 and 2014 WSS updates were reviewed by The Holt Group, Inc. THG, then prepared an excel spreadsheet showing suggested updates to the previous recommendations to reflect current practices, and listed proposed new recommendations designed to improve source water quality. Some of THG's suggestions included eliminating outdated recommendations or consolidating similar recommendations. The excel table also included previous recommendations that were still relevant. THG proposed revisions in including a column explaining the logic behind the changes. DDW reviewed the proposed changes and returned the excel spreadsheet with a column of comments and suggestions. After a second round of modifications and review by DDW, the recommendations were finalized and included in the word fill in form sent to all the state regulated water providers.

The tables in this section present the comments from the responding state water providers.

Recommendation 1 (WSS Update 2010 - #1)

Water treatment systems should contact IID for information on IID's planned water supply interruptions, cleaning, and vegetation maintenance activities. IID should provide water systems a minimum two-week notice of shutdowns. Water systems should contact IID to update mailing roster in order to receive notices.

Table 2-1: Recommendation #1 – Service Coordination and Noticing

Recommendation #1	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP staff is in constant comunication with IID. IID always provide us with notices prior to starting any of the mentioned ativities.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	IID currently delivers notices to El Centro water systems regarding any work affecting our raw water supply. The City of El Centro contact is current and communication between agencies is adequate.
GSWC, Calipatria	Agree with this recommendation
Heber Public Utility District	Agree with recommendations.
Holtville, City of	IID already provides advance notification of any planned canal maintenance or shut-downs.
Imperial, City of	This is currently being done by both US mail and text.
NAF El Centro	For ease of information, please include IID link to cutout schedule. https://www.iid.com/water/agriculture-customers/canal-cutout-schedulehttps://www.iid.com/water/agriculture-customers/canal-cutout-schedule
Seeley CWD	IID mails out, about 1 month in advance, water outage notifications
Westmorland, City of	Already in practice.

Recommendation 2 (WSS Update 2010 - #2)

Each water treatment system should develop a standard operating procedure (SOP) for an annual review and evaluation of scheduled IID activities with the purpose of being aware of events that have the potential to cause negative water quality or source quantity impairments. The SOP should include performing monthly reviews of scheduled IID activities with the goal of identifying scheduling updates for the current and next month calendars that have the potential to cause negative water quality or source quantity impairments. As a precautionary measure, where possible, systems should close their intakes and operate off storage ponds when canals are being maintained. In addition, when maintenance is being performed on ponds, the ponds should be removed from service until the water has had an opportunity to settle.

Table 2-2: Recommendation #2 – Standard Operating Procedures (SOP)

Recommendation #2	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP staff will develop an SOP addresing such situations.The water plant has the capabilities and will implement the recommended precautionary measurements.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro will work on developing one SOP to reflect IID activities on the watershed and include mitigation efforts on possible water impact. The SOP will include all watershed sanitary survey recommendations.
GSWC, Calipatria	GSWC will develop a SOP
Heber Public Utility District	Agree with recommendations with one exception. The exception is to hold monthly reviews of scheduled IID activities. The IID activities are consistent in the sense that there is a water outage from the IID canal for maintenance of such canal on a quarterly basis. As such, the HPUD system has consistent and typical water shut off procedure during a canal outage.
Holtville, City of	Our water system already implements most of these measures.
Imperial, City of	Imperial has two sources of supply so this type of action would not be needed
NAF El Centro	SOP exists at NAFEC. Please verify with IID that cutout schedule is correct place to look. https://www.iid.com/water/agriculture-customers/canal-cutout-schedule
Seeley CWD	Seeley CWD does not currently have a section in its SOP dedicated to the maintenance activities conducted by the IID on their canals. Seeley CWD does receive and react to scheduled water outage notifications sent out by IID.
Westmorland, City of	Already in practice.

Recommendation 3 (WSS Update 2010 - #5)

It is recommended that all water systems close the intake gates at the treatment plants when a rain event starts and reopen approximately 24 hours later to prevent taking in the first flush water. CDPH (DDW) commented in 2014 WSS Update that more than 24 hours may be required. Water providers may need canal travel time information. Grab sampling from canal may be needed to determine when to open gate.

Table 2-3: Recommendation #3 – First Flush Water

Recommendation #3	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP will track rain events and will follow the recommendations mentioned.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro will track rain events and follow the proposed protocol during raining events.
GSWC, Calipatria	GSWC will monitor rain events and close the intake gate for 24 hours.
Heber Public Utility District	HPUD water settles in the sedimentation ponds for approximately 3 to 4 days prior to treatment. However, the recommendation is good practice to deter and eliminate contaminated water from entering the WTP. HPUD conducts pH, turbidity and temperature tests on daily basis.
Holtville, City of	Our water system already implements these measures.
Imperial, City of	This should not be the only operational plan Plant might need to make coagulation changes and stay operational If rain event last over several days plants may not be able to be without supply water that long
NAF El Centro	Agreed. Systems should evaluate their raw storage and fill ponds prior to storm events. Flash flooding near Westmorland has historically resulted in NTUs a high as 250, and SWTP performance issues. If High turbidity water exists, can the system call IID to have that canal volume dumped on a field and better quality water delivered to the system? Is there an IID procedure for this?
Seeley CWD	Seeley CWD can/will adopt this recommendation and make adjustments on the time based on observations made by operations crew.
Westmorland, City of	Already in practice.

Recommendation 4 (WSS Update 2010 #16 modified in 2020)

It is recommended that a website be set up that each water purveyor has access to. In this proposed website the large water systems could enter raw water data daily so that information could be shared with the smaller systems and used to better predict poor water quality events. Public Water Systems (PWS's) will need to set up the website if they believe it will be useful and have the resources.

Table 2-4: Recommendation #4 – Digital Data Sharing

Recommendation #4	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP staff believes that this will be a great tool.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro abides by DDW data submittal recommendations. El Centro water system endorses this idea and is willing to weigh it in the future.
GSWC, Calipatria	It is not applicable. GSWC Calipatria/Niland system is small water system.
Heber Public Utility District	I am not sure if this will be useful. HPUD is considered to be a medium water system. I don't see whom would set up the website, and if the operators can update on a daily basis. A variation in water quality is noticeable by operators on a daily basis
Holtville, City of	Should not be applicable to small water systems like City of Holtville.
Imperial, City of	I see no use in this as plants draw off different main and service canals
NAF El Centro	New IID raw water quality sample data should be mapped, inventoried in WSS, and SDWIS WQ database links to each site should be provided. Contact Steve Charlton IID
Seeley CWD	Seeley CWD lacks the resources to conduct/participate in such an exercise.
Westmorland, City of	This would be very helpful for our water system.

Recommendation 5 (WSS Update 2010 (#17))

Water systems that have tested finished water above 80ppb should consider all techniques and technologies available in their Capital Improvement Plans (CIP) to reduce the disinfection byproducts (TTHM and HAA5). These include but are not limited to:

1. Minimizing treated water age by:
   a) Keeping treated water storage to a minimum
   b) Placing storage tanks in series
   c) Utilizing baffles and mixing equipment within the storage tanks to prevent thermo stratification
2. Optimizing the Contact Time ratio
3. Optimizing filters through coagulant jar testing
4. Reducing residual chlorine to the minimum
5. Placing chlorine injection points strategically
6. Reducing natural organic matter in the raw water
   a) Lining raw water ponds
   b) Aerating and mixing raw water ponds
   c) Raw water filters
7. Use of alternative Disinfectants
   a) Chloramines
   b) Ultraviolet (UV) systems
   c) Ozone
8. TTHM removal systems after formation
9. Granular Activated Carbon Filters
10. Aeration in storage tanks

Table 2-5: Recommendation #5 – TTHM and HAAS

Recommendation #5	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP's finished water is below the 80ppm threshold; however, we are still exploring techniques to enhance the removal of DBPs.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro Water Treatment Plant samples its water for disinfection by-products on a quarterly basis. Our disinfection by-products levels have been low and deemed compliant with DDW MCLs. The City of El Centro abides by DDW data submittal recommendations. El Centro water system endorses this idea and is willing to weigh it in the future.
GSWC, Calipatria	GSWC Calipatria system is in compliance with this recommendation
Heber Public Utility District	There are no DBP exceedance issues with the HPUD System. It is agreed that all techniques and technologies available be utilized to reduce DBPs upon attaining high DBPs results, or concerns of trends to attain high DBPs
Holtville, City of	Our water system is in compliance with this recommendation.

Recommendation #5	
Drinking Water Provider	**Comments**
Imperial, City of	No Comment received from agency
NAF El Centro	NAFEC treats with GAC and is in compliance with DBPR.
Seeley CWD	Seeley CWD is consistently below the MCL for DBP's since the installation of an aeration/blower system was installed. However, 3rd quarter of every year since its installation, we still see a spike in TTHM levels. This is most likely temperature related.
Westmorland, City of	Historically our water system has had problems with TTHM exceedances. Currently we are working with DDW to obtain a grant for storage tanks upgrades and mixer.

Recommendation 6 (WSS Update 2010 #18)

Small systems (10,000 or fewer people) that do not monitor for temperature should use a minimum temperature of 10° C for CT calculations.

Table 2-6: Recommendation #6 – Temperature Monitoring

Recommendation #6	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP staff monitors raw water temperature on a daily basis.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro is a large system and currently monitors for temperature.
GSWC, Calipatria	GSWC - Calipatria system monitors for temperature.
Heber Public Utility District	Not applicable.
Holtville, City of	Our water system monitors for temperature.
Imperial, City of	No comment
NAF El Centro	NAFEC monitors Temperature
Seeley CWD	Seeley CWD does monitor for temperature.
Westmorland, City of	N/A

Recommendation 7 (WSS Update 2010 #19)

Vulnerability assessment helps water systems evaluate potential threats and identify corrective actions that can reduce the risk of serious consequences. The assessment serves as a guide to the water utility by providing a prioritized plan for security upgrades, modifications or operational procedures that pose a threat to the utility's critical assets. The vulnerability assessment should be updated to reflect the chemicals currently being used on the watershed. The lower Colorado River should be considered vulnerable to the following regulated and unregulated organic chemicals: VOCs, 1, 3 dichloropropene, glyphosate, chloropicrin, chlorothalonil, dimethoate, methyl bromide, atrazine, chloropicrin, and diazinon.

Table 2-7: Recommendation #7 – Vulnerability Assessment

Recommendation #7	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP staff will review and update the vulnerability assessment.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro plans to revise and update its vulnerability assessment to include the recommendations of this watershed survey. The system will include chemicals use in the watershed, regulated and unregulated chemicals.
GSWC, Calipatria	GSWC - Calipatria System will review and update the vulnerability assessment accordingly.
Heber Public Utility District	Agreed. The VA was last updated in 2009. It would be a good idea to update the VA.
Holtville, City of	Our water system is in compliance with VA.
Imperial, City of	We should monitor as required
NAF El Centro	No comment
Seeley CWD	In reviewing past Title 22 reports it appears that Seeley CWD source water was sampled/tested by the water supplier for the chemicals listed.
Westmorland, City of	We will need to review/update our vulnerability assessment.

Recommendation 8 (WSS Update 2010 #22)

Based on chemical application, the system should be considered vulnerable to glyphosate and diuron. The vulnerability assessment and monitoring requirements for the IID Enhanced Joint Monitoring Plan performed by IID should be updated to reflect the chemicals currently being used on the watershed. The lower Colorado River should be considered vulnerable to the following regulated and unregulated organic chemicals: 1, 3 dichloropropene, glyphosate, chloropicrin, chlorothalonil, dimethoate, methyl bromide, atrazine, chloropicrin, and diazinon.

Table 2-8: Recommendation #8 – Vulnerability Assessment, Glyphosate & Diuron

Recommendation #8	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP staff will review and update the vulnerability assessment.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro acknowledges the need for testing for these constituents within its watershed. The City will endorse testing and updates on IID Joint Monitoring requirements.
GSWC, Calipatria	GSWC - Calipatria System will review and update the vulnerability assessment accordingly
Heber Public Utility District	This statement says that we should consider the glyphosate, diuron and other chemicals (basic weed killers and refrigerant solvents).These chemicals are analyzed by IID testing of canal water. These chemicals should be considered in an updated VA.
Holtville, City of	Our water system is in compliance with VA.
Imperial, City of	We should monitor as required
NAF El Centro	New IID raw water quality sample data should be mapped, inventoried in WSS, and SDWIS WQ database links to each site should be provided. Contact Steve Charlton IID If any of these constituents have been detcted at any of the sites, then the downstream systems should be tagged. WQ threats are not likely constitent valleywide.
Seeley CWD	Seeley CWD does not sample for these chemicals directly. These chemicals may be sampled/tested for in raw water by the joint monitoring program.
Westmorland, City of	We will need to review/update our vulnerability assessment.

Recommendation 9 (WSS Update 2014 #24)

Systems should consider taking samples and testing for pesticides and other contaminants separately from the IID Enhanced Joint Monitoring Plan. If sampling results show unusual levels of agricultural chemicals entering the canals because of aerial spraying or other pesticide application methods, then systems should notify Steve Charlton, Water Programs Manager at IID, who in turn notifies the Imperial County Agricultural Commissioner's Office.

Table 2-9: Recommendation #9 – Sampling

Recommendation #9	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP will consider this recommendation. Meanwhile, if such contamination is noticed, staff will contact IID to notify and immediately start a corrective action.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro does not sample for pesticides or other contaminants in its raw water. The El Centro system relies on the IID's monitoring sampling.
GSWC, Calipatria	GSWC-Calipatria System relies on the IID's monitoring sampling
Heber Public Utility District	HPUD feels that these chemicals as tested once a year by IID, is an ample testing schedule.
Holtville, City of	Should not be applicable too small water systems like City of Holtville.
Imperial, City of	No comment
NAF El Centro	New IID raw water quality sample data should be mapped, inventoried in WSS, and SDWIS WQ database links to each site should be provided. Contact Steve Charlton IID If SOC data indicates detection, then it should be highlighted in WSS
Seeley CWD	This additional sampling/testing for contaminants separate from the joint monitoring program will prove challenging to the Seeley CWD because of financial concerns.
Westmorland, City of	We will need to take this into consideration.

Recommendation 10 (WSS Update 2014 #30 and 2020)

All systems should prepare, submit and make available an accurate Consumer Confidence Report (CCR) to the water users and the Imperial County Health Department for review each year. The report should include the system number and PWS must use the DDW assigned Primary Station Code (PSCode) for source water quality data.

Table 2-10: Recommendation #10 – Consumer Confidence Report (CCR)

Recommendation #10	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP provides a CCR to all of its consumers as well as a copy to DDW with the information required.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro prepares and submits its consumer confidence report annually and following DDW guidelines. The CCR can be found within the City's website.
GSWC, Calipatria	Already in practice.
Heber Public Utility District	The CCR is issued on an annual basis by HPUD, but does not include the system number and PSCode. The number and code are to be included in the following CCR.
Holtville, City of	Our water system is in compliance with this recommendation.
Imperial, City of	No Comment
NAF El Centro	New IID raw water quality sample data should be mapped, inventoried in WSS, and SDWIS WQ database links to each site should be provided. Contact Steve Charlton IID
Seeley CWD	Seeley CWD does prepare and submit CCR's to the DDW as well as to customers. On the CCR document our PS codes have not been used in reporting source water quality data. That information will be added going forward.
Westmorland, City of	Already in practice.

Recommendation 11 (WSS Update 2020)

Monitoring must be done in accordance with the PWS's permit and DDW approved IID Enhanced Joint Monitoring Plan, or, for systems that do not participate in the plan, as directed by DDW or DEH.

Table 2-11: Recommendation #11 – Monitoring

Recommendation #11	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP is monitoring according to its permit and participates in the IID Joint Monitoring Plan.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro water plant monitors its raw water in accordance with the DDW permit and participates in the Joint monitoring plan.
GSWC, Calipatria	GSWC - Calipatria System is in compliance with this recommendation.
Heber Public Utility District	Agreed.
Holtville, City of	Our water system is in compliance with this recommendation.
Imperial, City of	No Comment
NAF El Centro	New IID raw water quality sample data should be mapped, inventoried in WSS, and SDWIS WQ database links to each site should be provided. Contact Steve Charlton IID
Seeley CWD	To the best of our knowledge Seeley CWD adheres to the PWS permit and DDW in conducting sampling/testing.
Westmorland, City of	No Comment

Recommendation 12 (WSS Update 2020)

All the conventional (or equivalent of conventional) plants should collect Total Organic Matter (TOC) raw/treated pair sampling and have a goal to optimize the reduction of TOC to reduce Disinfection by-Products (DBP).

Table 2-12: Recommendation #12 – Total Organic Matter (TOC)

Recommendation #12	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP is collecting such samples in a monthly basis and is exploring ways to reduce TOC.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro currently collects TOC on a monthly basis and works to optimize coagulants to future reduce TOC levels
GSWC, Calipatria	GSWC - Calipatria System is in compliance with this recommendation.
Heber Public Utility District	HPUD already conduct such testing and have a goal to meet the MCL of DBPs.
Holtville, City of	Our water system is in compliance with this recommendation.
Imperial, City of	No Comment
NAF El Centro	Colorado River Water is non-amenable to enhance coagulation. TOC reduction would be via DBP treatment with GAC (BMP) or in tank spray stripping.
Seeley CWD	Seeley CWD collects raw/treated samples for TOC analysis.
Westmorland, City of	Already in practice.

Recommendation 13 (WSS Update 2020)

All systems should have pre-sedimentation, e.g. raw water ponds to reduce turbidity of raw water and collect data on pre and post pre-sedimentation.

Table 2-13: Recommendation #13 – Pre-Sedimentation

Recommendation #13	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP has two storage ponds that serve as pre-sedimentation basins. Pre and post turbidly data is collected on a daily basis.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro has four raw water ponds that serve as storage and pre-sedimentation reservoirs. Operators collect pre and post sedimentation data on a daily basis.
GSWC, Calipatria	GSWC - Calipatria System is in compliance with this recommendation.
Heber Public Utility District	HPUD has such ponds. HPUD conducts turbidity testing before and after the sedimentation ponds.
Holtville, City of	Our water system is in compliance with this recommendation.
Imperial, City of	No Comment
NAF El Centro	Raw water storage is primarily to IID suggested volume of 7 days, in order to allow Canal repairs. Raw ponds are not permitted treatment and any presedimentation does not require monitoring.
Seeley CWD	Seeley CWD has (2) two ponds that operate in series for the dual purpose of pre-sedimentation and water storage.
Westmorland, City of	Already in practice.

Recommendation 14 (WSS Update 2020)

All constructed raw water conveyances from IID's canal system to public water system should be of NSF 61 approved materials.

Table 2-14: Recommendation #14 – Raw Water Conveyances Materials

Recommendation #14	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP staff will contact IID to inquire this information.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	All conveyances from IID to the city of El Centro are considered to be NSF61 approved materials.
GSWC, Calipatria	All conveyances from IID to the GSWC - Calipatria plant are considered to be NSF61 approved materials.
Heber Public Utility District	HPUD does have NSF 61 approved materials. Unknown if IID gate is NSF 61 approved.
Holtville, City of	Not applicable at this time.
Imperial, City of	No Comment
NAF El Centro	No comment
Seeley CWD	At this exact moment in time Seeley CWD is not aware of the exact specifications of the 18" concrete pipe used as delivery system from the canal to the treatment plant facility.
Westmorland, City of	We will need to contact IID to verify their material is indeed NSF 61 approved.*

* Conveyance pipelines between an IID canal and the respective water system is the water provider's responsibility and not IID's.

Recommendation 15 (WSS Update 2020)

Monitoring must be done in accordance with the PWS's permit and DDW approved IID Enhanced Joint Monitoring Plan, or, for systems that do not participate in the plan, as directed by DDW or DEH.

Table 2-15: Recommendation #15 – Monitoring

Recommendation #15	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP is in compliance with this recommendation.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro conducts all water testing in accordance with the DDW permit, and is a stakeholder within IID enhanced joint monitoring plan.
GSWC, Calipatria	GSWC - Calipatria System is in compliance with this recommendation.
Heber Public Utility District	HPUD conducts monitoring as per the DDW and PWS's permit.
Holtville, City of	Our water system is in compliance with this recommendation.
Imperial, City of	No comment
NAF El Centro	New IID raw water quality sample data should be mapped, inventoried in WSS, and SDWIS WQ database links to each site should be provided. Contact Steve Charlton IID
Seeley CWD	Depending on the details and on who will be conducting samples Seeley CWD sees no issue in sampling according to PWS permit and IID enhanced joint monitoring plan.
Westmorland, City of	No comment

Recommendation 16 (WSS Update 2020)

DDW and DHS will not permit any new water treatment plants in Imperial Valley without TTHM reduction/removal systems, e.g. aeration or granular activated carbon (GAC).

Table 2-16: Recommendation #16 – TTHM Reduction Removal Systems

Recommendation #16	
Drinking Water Provider	**Comments**
Brawley, City of	Although this will increase the initial cost, it will be very beneficial technology that will reduce the problems with DBPs.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro Water Treatment Plant does not foresee any future construction of pumping substations or/and water treatment Plants.
GSWC, Calipatria	No comments
Heber Public Utility District	Duly noted.
Holtville, City of	Our water system is in compliance with this recommendation
Imperial, City of	
NAF El Centro	No comment
Seeley CWD	Not relevant to Seeley CWD, no plans for future treatment plants possibly only additions to the current plant in the distant future.
Westmorland, City of	N/A

Recommendation 17 (WSS Update 2020)

The water systems should, on a monthly or quarterly basis, walk or drive the canal lateral to where it connects to the main canal to become familiar with upstream users and possible sanitary hazards. Water providers have commented on their current canal inspection procedures as noted in table below.

Table 2-17: Recommendation #17 – Inspection Procedures

Recommendation #17	
Drinking Water Provider	**Comments**
Brawley, City of	Brawley WTP will develop a formal schedule for this type of inspections and will create a log to input all findings.
Calexico, City of	No comment received from agency
Centinela State Prison	No comment received from agency
El Centro, City of	The City of El Centro Water Treatment Plant operators drive sections of the laterals South Date 20B and Dahlia 18A on a daily basis. Furthermore, the Water plant Chief makes a complete drive to where the laterals connect to the main canal on a monthly basis. All finding from inspections are logged in a yearly observations log book.
GSWC, Calipatria	Already in practice.
Heber Public Utility District	HPUD has a daily routine to inspect the canal and gate from which water is attained.
Holtville, City of	Our water system is in compliance with this recommendation.
Imperial, City of	No Comment.
NAF El Centro	No comment
Seeley CWD	We will adopt this inspection procedure on a quarterly basis unless water or weather conditions require more frequent inspections. Our current canal inspection procedures is limited to water level and water conditions based around the IID scheduled water outages
Westmorland, City of	Already in practice.

2.2 County Regulated Drinking Water Provider Recommendations

The recommendations from the 2010 and 2014 WSS updates were reviewed by The Holt Group, Inc. THG, then prepared an excel spreadsheet showing suggested updates to the previous recommendations to reflect current practices, and listed proposed new recommendations designed to improve source water quality. Some of THG's suggestions included eliminating outdated recommendations or consolidating similar recommendations. The excel table also included previous recommendations that were still relevant. THG proposed revisions in including a column explaining the logic behind the changes. DDW reviewed the proposed changes and returned the excel spreadsheet with a column of comments and suggestions. After a second round of modifications and review by DDW, the recommendations were finalized and included in the word fill in form sent to all the county regulated water providers.

The tables in this section present the comments from the responding county water providers.

Recommendation 1 (WSS Update 2010 - #1)

Water treatment systems should contact IID for information on IID's planned water supply interruptions, cleaning, and vegetation maintenance activities. IID should provide water systems a minimum two-week notice of shutdowns. Water systems should contact IID to update mailing roster in order to receive notices.

Table 2-18: Recommendation #1 – Service Coordination and Noticing

Recommendation #1	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	IID consistently provide Notices(s) of Canal Out". Notices are distributed to the various company departments via email.
CalEnergy (Eng. & Tech)	IID consistently provide Notices(s) of Canal Out". Notices are distributed to the various company departments via email.
CalEnergy (Salton Sea Unit No. III)	IID consistently provide Notices(s) of Canal Out". Notices are distributed to the various company departments via email.
CalEnergy (Vulcan Power Plant)	IID consistently provide Notices(s) of Canal Out". Notices are distributed to the various company departments via email.
Country Life MH & RV Park	Country Life will implement the recommendation base on site specific and economical resources available.
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	IID already provides advance notification of any planned canal maintenance or shut-downs.

Recommendation 2 (WSS Update 2010 - #2)

Each system should develop a standard operating procedure (SOP) for an annual review and evaluation of scheduled IID activities with the purpose of being aware of events that have the potential to cause negative water quality or source quantity impairments. The SOP should include performing monthly reviews of scheduled IID activities with the goal of identifying scheduling updates for the current and next month calendars that have the potential to cause negative water quality or source quantity impairments. As a precautionary measure, where possible, systems should close their intakes and operate off storage ponds when canals are being maintained. In addition, when maintenance is being performed on ponds, the ponds should be removed from service until the water has had an opportunity to settle.

Table 2-19: Recommendation #2 – Standard Operating Procedures (SOP)

Recommendation #2	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	CalEnergy to evaluate implementation.
CalEnergy (Eng. & Tech)	CalEnergy to evaluate implementation.
CalEnergy (Salton Sea Unit No. III)	CalEnergy to evaluate implementation.
CalEnergy (Vulcan Power Plant)	CalEnergy to evaluate implementation.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Should not be applicable for small water systems like McCabe Union School District.

Recommendation 3 (WSS Update 2010 - #5)

It is recommended that all water systems close the intake gates at the treatment plants when a rain event starts and reopen approximately 24 hours later to prevent taking in the first flush water. CDPH (DDW) commented in 2014 WSS Update that more than 24 hours may be required. Water providers may need canal travel time information. Grab sampling from canal may be needed to determine when to open gate.

Table 2-20: Recommendation #3 – First Flush Water

Recommendation #3	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	CalEnergy will implement during rain events that yield significant run-off. However given the remote locations of some of the canal intake gates, safe access to these gates may not be possible.
CalEnergy (Eng. & Tech)	CalEnergy will implement during rain events that yield significant run-off. However given the remote locations of some of the canal intake gates, safe access to these gates may not be possible.
CalEnergy (Salton Sea Unit No. III)	CalEnergy will implement during rain events that yield significant run-off. However given the remote locations of some of the canal intake gates, safe access to these gates may not be possible.
CalEnergy (Vulcan Power Plant)	CalEnergy will implement during rain events that yield significant run-off. However given the remote locations of some of the canal intake gates, safe access to these gates may not be possible.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Water system operates a slow sand filtration system, and three raw water cisterns, capable of handling rain events. Has not been a problem for the past 25 years.

Recommendation 4 (WSS Update 2010 #16 modified in 2020)

It is recommended that a website be set up that each water purveyor has access to. In this proposed website the large water systems could enter raw water data daily so that information could be shared with the smaller systems and used to better predict poor water quality events. PWS's will need to set up the website if they believe it will be useful and have the resources.

Table 2-21: Recommendation #4 – Digital Data Sharing

Recommendation #4	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	Recommendation has been implemented locally with the emergence of the Enhanced Monitoring Program. Data from larger water systems is available to the public via the SWRCB's Drinking Water watch portal.
CalEnergy (Eng. & Tech)	Recommendation has been implemented locally with the emergence of the Enhanced Monitoring Program. Data from larger water systems is available to the public via the SWRCB's Drinking Water watch portal.
CalEnergy (Salton Sea Unit No. III)	Recommendation has been implemented locally with the emergence of the Enhanced Monitoring Program. Data from larger water systems is available to the public via the SWRCB's Drinking Water watch portal.
CalEnergy (Vulcan Power Plant)	Recommendation has been implemented locally with the emergence of the Enhanced Monitoring Program. Data from larger water systems is available to the public via the SWRCB's Drinking Water watch portal.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	IID may provide a list of entities and/or sources that may impact the source water quality per area; as wells as, techniques being used to minimized the exposure and introduction of pollutants.
Imperial Valley College	IID may provide a list of entities and/or sources that may impact the source water quality per area; as wells as, techniques being used to minimized the exposure and introduction of pollutants.
McCabe Union School	Should not be applicable for small water systems like McCabe Union School District.

Recommendation 5 (WSS Update 2010 (#17))

Water systems that have tested finished water above 80ppb should consider all techniques and technologies available in their Capital Improvement Plans (CIP) to reduce the disinfection byproducts (TTHM and HAA5). These include but are not limited to:

1. Minimizing treated water age by:
   d) Keeping treated water storage to a minimum
   e) Placing storage tanks in series
   f) Utilizing baffles and mixing equipment within the storage tanks to prevent thermo stratification
2. Optimizing the Contact Time ratio
3. Optimizing filters through coagulant jar testing
4. Reducing residual chlorine to the minimum
5. Placing chlorine injection points strategically
6. Reducing natural organic matter in the raw water
   d) Lining raw water ponds
   e) Aerating and mixing raw water ponds
   f) Raw water filters
7. Use of alternative Disinfectants
   d) Chloramines
   e) Ultraviolet (UV) systems
   f) Ozone
8. TTHM removal systems after formation
9. Granular Activated Carbon Filters
10. Aeration in storage tanks

Table 2-22: Recommendation #5 – TTHM and HAAS

Recommendation #5	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied generally agrees with this recommendation, although we do not feel qualified to provide detailed commentary on highly technical recommendations such as this.
CalEnergy (Administrative)	DBP concentrations were below the MCL for the last five years (Annual Monitoring).
CalEnergy (Eng. & Tech)	DBP concentrations were below the MCL for the last five years (Annual Monitoring).
CalEnergy (Salton Sea Unit No. III)	DBP concentrations were below the MCL for the last five years (Annual Monitoring).
CalEnergy (Vulcan Power Plant)	DBP concentrations were below the MCL for the last five years (Annual Monitoring).
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	Earthrise Nutritionals is not currently experiencing DBP's exceedances; however, we support all of the techniques and recommendations to minimize disinfection byproducts.

Recommendation #5	
Drinking Water Provider	**Comments**
Imperial Valley College	Currently Imperial Valley College is not experiencing DPB exceedances.
McCabe Union School	Not applicable to McCabe Union School District at this time.

Recommendation 6 (WSS Update 2010 #18)

Small systems (10,000 or fewer people) that do not monitor for temperature should use a minimum temperature of 10° C for CT calculations.

Table 2-23: Recommendation #6 – Temperature Monitoring

Recommendation #6	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	All water systems are monitored for temperature.
CalEnergy (Eng. & Tech)	All water systems are monitored for temperature.
CalEnergy (Salton Sea Unit No. III)	All water systems are monitored for temperature.
CalEnergy (Vulcan Power Plant)	All water systems are monitored for temperature.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Temperature is monitored.

Recommendation 7 (WSS Update 2010 #19)

Vulnerability assessment helps water systems evaluate potential threats and identify corrective actions that can reduce the risk of serious consequences. The assessment serves as a guide to the water utility by providing a prioritized plan for security upgrades, modifications or operational procedures that pose a threat to the utility's critical assets. The vulnerability assessment should be updated to reflect the chemicals currently being used on the watershed. The lower Colorado River should be considered vulnerable to the following regulated and unregulated organic chemicals: VOCs, 1,3 dichloropropene, glyphosate, chloropicrin, chlorothalonil, dimethoate, methyl bromide, atrazine, chloropicrin, and diazinon.

Table 2-24: Recommendation #7 – Vulnerability Assessment

Recommendation #7	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	
CalEnergy (Administrative)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003.
CalEnergy (Eng. & Tech)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003.
CalEnergy (Salton Sea Unit No. III)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003.
CalEnergy (Vulcan Power Plant)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Should not be applicable for small water systems like McCabe Union School District.

Recommendation 8 (WSS Update 2010 #22)

Based on chemical application, the system should be considered vulnerable to glyphosate and diuron. The vulnerability assessment and monitoring requirements for the IID Enhanced Joint Monitoring Plan should be updated to reflect the chemicals currently being used on the watershed. The lower Colorado River should be considered vulnerable to the following regulated and unregulated organic chemicals: 1,3 dichloropropene, glyphosate, chloropicrin, chlorothalonil, dimethoate, methyl bromide, atrazine, chloropicrin, and diazinon.

Table 2-25: Recommendation #8 – Vulnerability Assessment, Glyphosate & Diuron

Recommendation #8	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003
CalEnergy (Eng. & Tech)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003
CalEnergy (Salton Sea Unit No. III)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003
CalEnergy (Vulcan Power Plant)	Vulnerability assessments have not been updated. Drinking Water Source Assessments and associated Vulnerability Assessments were conducted by the Imperial County Health Department in May 2003
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Should not be applicable for small water systems like McCabe Union School District.

Recommendation 9 (WSS Update 2014 #24)

Systems should consider taking samples and testing for pesticides and other contaminants separately from the IID's Enhanced Joint Monitoring Plan. If sampling results show unusual levels of agricultural chemicals entering the canals because of aerial spraying or other pesticide application methods, then systems should notify Steve Charlton, Water Programs Manager at IID, who in turn notifies the Imperial County Agricultural Commissioner's Office.

Table 2-26: Recommendation #9 – Sampling

Recommendation #9	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	CalEnergy to evaluate implementation. CalEnergy participates in the Enhanced Monitoring Program, therefore the IID collects samples from geographically representative sampling locations. The designated sampling point for the CalEnergy water systems is the Vail Canal, Lateral 4.
CalEnergy (Eng. & Tech)	CalEnergy to evaluate implementation. CalEnergy participates in the Enhanced Monitoring Program, therefore the IID collects samples from geographically representative sampling locations. The designated sampling point for the CalEnergy water systems is the Vail Canal, Lateral 4.
CalEnergy (Salton Sea Unit No. III)	CalEnergy to evaluate implementation. CalEnergy participates in the Enhanced Monitoring Program, therefore the IID collects samples from geographically representative sampling locations. The designated sampling point for the CalEnergy water systems is the Vail Canal, Lateral 4.
CalEnergy (Vulcan Power Plant)	CalEnergy to evaluate implementation. CalEnergy participates in the Enhanced Monitoring Program, therefore the IID collects samples from geographically representative sampling locations. The designated sampling point for the CalEnergy water systems is the Vail Canal, Lateral 4.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	Consider providing all water systems a time schedule of chemical application per area.
Imperial Valley College	Consider providing all water systems a time schedule of chemical application per area.
McCabe Union School	Should not be applicable for small water systems like McCabe Union School District.

Recommendation 10 (WSS Update 2014 #30 and 2020)

AII systems should prepare, submit and make available an accurate Consumer Confidence Report (CCR) to the water users and the Imperial County Health Department for review each year. The report should include the system number and PWS must use the DDW assigned Primary Station Code (PSCode) for source water quality data.

Table 2-27: Recommendation #10 – Consumer Confidence Report (CCR)

Recommendation #10	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	Consumer Confidence Reports are submitted annually to the Imperial County Public Health Department.
CalEnergy (Eng. & Tech)	Consumer Confidence Reports are submitted annually to the Imperial County Public Health Department.
CalEnergy (Salton Sea Unit No. III)	Consumer Confidence Reports are submitted annually to the Imperial County Public Health Department.
CalEnergy (Vulcan Power Plant)	Consumer Confidence Reports are submitted annually to the Imperial County Public Health Department.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	System is in compliance with this recommendation.

Recommendation 11 (WSS Update 2020)

Monitoring must be done in accordance with the PWS's permit and DDW approved IID's Enhanced Joint Monitoring Plan, or, for systems that do not participate in the plan, as directed by DDW or DEH.

Table 2-28: Recommendation #11 – Monitoring

Recommendation #11	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	The CalEnergy water systems participate in the Enhanced Joint Monitoring Program.
CalEnergy (Eng. & Tech)	The CalEnergy water systems participate in the Enhanced Joint Monitoring Program.
CalEnergy (Salton Sea Unit No. III)	The CalEnergy water systems participate in the Enhanced Joint Monitoring Program.
CalEnergy (Vulcan Power Plant)	The CalEnergy water systems participate in the Enhanced Joint Monitoring Program.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments. System is in compliance with this recommendation.
McCabe Union School	System is in compliance with this recommendation.

Recommendation 12 (WSS Update 2020)

All the conventional (or equivalent of conventional) plants should collect Total Organic Matter (TOC) raw/treated pair sampling and have a goal to optimize the reduction of TOC to reduce Disinfection by-Products (DBP).

Table 2-29: Recommendation #12 – Total Organic Matter (TOC)

Recommendation #12	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	CalEnergy does not operate conventional filtration water systems.
CalEnergy (Eng. & Tech)	CalEnergy does not operate conventional filtration water systems.
CalEnergy (Salton Sea Unit No. III)	CalEnergy does not operate conventional filtration water systems.
CalEnergy (Vulcan Power Plant)	CalEnergy does not operate conventional filtration water systems.
Country Life MH & RV Park	No comment received from agency
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Should not be applicable for small water systems like McCabe Union School District.

Recommendation 13 (WSS Update 2020)

All systems should have pre-sedimentation, e.g. raw water ponds to reduce turbidity of raw water and collect data on pre and post pre-sedimentation.

Table 2-30: Recommendation #13 – Pre-Sedimentation

Recommendation #13	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied generally agrees with this recommendation, although we do not feel qualified to provide detailed commentary on highly technical recommendations such as this.
CalEnergy (Administrative)	The water system's fresh water pond is equipped with an aeration system to improve clarity and prevent stagnation.
CalEnergy (Eng. & Tech)	Source water flows into raw water cisterns that contain an in-ground sand filter. Currently pre and post sedimentation data is not being collected.
CalEnergy (Salton Sea Unit No. III)	Raw water is fed from the fresh water pond to an in-ground concrete cistern.
CalEnergy (Vulcan Power Plant)	Source water flows into raw water cisterns that contain an in-ground sand filter. Currently pre and post sedimentation data is not being collected.
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Water system operates a slow sand filtration system, and three raw water cisterns, capable of handling rain events. Has not been a problem for the past 25 years.

Recommendation 14 (WSS Update 2020)

All constructed raw water conveyances from IID's canal system to public water system should be of NSF 61 approved materials.

Table 2-31: Recommendation #14 – Raw Water Conveyance Materials

Recommendation #14	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied generally agrees with this recommendation, although we do not feel qualified to provide detailed commentary on highly technical recommendations such as this.
CalEnergy (Administrative)	Unknown if the IID conveyance/canal systems were constructed using materials meeting the NSF 61 standard.
CalEnergy (Eng. & Tech)	Unknown if the IID conveyance/canal systems were constructed using materials meeting the NSF 61 standard.
CalEnergy (Salton Sea Unit No. III)	Unknown if the IID conveyance/canal systems were constructed using materials meeting the NSF 61 standard.
CalEnergy (Vulcan Power Plant)	Unknown if the IID conveyance/canal systems were constructed using materials meeting the NSF 61 standard.
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Not applicable at this time.

Recommendation 15 (WSS Update 2020)

Monitoring must be done in accordance with the PWS's permit and DDW approved IID's Enhanced Joint Monitoring Plan, or, for systems that do not participate in the plan, as directed by DDW or DEH.

Table 2-32: Recommendation #15 – Monitoring

Recommendation #15	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	Monitoring is performed as directed by LPA and LPA issued permit.
CalEnergy (Eng. & Tech)	Monitoring is performed as directed by LPA and LPA issued permit.
CalEnergy (Salton Sea Unit No. III)	Monitoring is performed as directed by LPA and LPA issued permit.
CalEnergy (Vulcan Power Plant)	Monitoring is performed as directed by LPA and LPA issued permit.
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	System is in compliance with this recommendation.

Recommendation 16 (WSS Update 2020)

DDW and DHS will not permit any new water treatment plants in Imperial Valley without TTHM reduction/removal systems, e.g. aeration or granular activated carbon (GAC).

Table 2-33: Recommendation #16 – TTHM Reduction Removal Systems

Recommendation #16	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	CalEnergy acknowledge recommendation.
CalEnergy (Eng. & Tech)	CalEnergy acknowledge recommendation.
CalEnergy (Salton Sea Unit No. III)	CalEnergy acknowledge recommendation.
CalEnergy (Vulcan Power Plant)	CalEnergy acknowledge recommendation.
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	Not applicable at this time.

Recommendation 17 (WSS Update 2020)

The water systems should, on a monthly or quarterly basis, walk or drive the canal lateral to where it connects to the main canal to become familiar with upstream users and possible sanitary hazards. Water providers should comment on their current canal inspection procedures.

Table 2-34: Recommendation #17 – Inspection Procedures

Recommendation #17	
Drinking Water Provider	**Comments**
Allied Waste of Imperial Valley	Allied concurs with this recommendation.
CalEnergy (Administrative)	CalEnergy to evaluate implementation
CalEnergy (Eng. & Tech)	CalEnergy to evaluate implementation
CalEnergy (Salton Sea Unit No. III)	CalEnergy to evaluate implementation
CalEnergy (Vulcan Power Plant)	CalEnergy to evaluate implementation
Date Gardens Mobile Home Park	Date Gardens will implement the recommendations based upon site specific and economical resources available.
Earthrise Nutrionals	No comments.
Imperial Valley College	No comments.
McCabe Union School	System is in compliance with this recommendation.

2.3 IID Recommendations

The following are the responses of the Imperial Irrigation District to recommendations:

Recommendation 1 (WSS Update 2010 and 2014 - #1)
IID should continue to provide water systems a two-week notice of shutdowns, including planned water supply interruptions, cleaning, and vegetation maintenance activities, as applicable.

IID Response:
With more than 3,000 miles of canals and drains, IID is one of the largest irrigation districts in the nation. With 1,668 miles of canals, the IID Water Department is continually conducting maintenance - both preventative and reactive - of its waterways. IID's standard practice is to provide water users a four week notice of water shutdowns due to scheduled maintenance repairs. Some water systems have two delivery points from different IID canals to help ensure delivery of water.
Annual water outage schedule for maintenance activities is providing on the IID's website. https://www.iid.com/water/agriculture-customers/canal-cutout-schedule.
IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 2 (WSS Update 2014 - #2)
Inspect and, if necessary, abandon or modify pump back well EHL DP3 to ensure it does not draw from the All-American Drain.

IID Response:
IID has implemented operational actions to ensure that the DP3 pump is off during farm irrigation events so that water within the All-American Drain is not drawn into the pump. IID will continue to regularly inspect, and if deemed necessary, take corrective action excluding abandonment.

IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 3 (WSS Update 2014 - #3)
IID should evaluate each seepage pump back system to ensure that all drains from farms and other drains are not connected to seepage systems and are not able to spill into the seepage recovery basins. There are instances where drains do not appear to have adequate separation from seepage ponds. This should be corrected

IID Response:
ID regularly evaluates each seepage pump back system to ensure that all drains from farms and other drains are not connected to seepage systems. In the event that IID finds that there is not adequate separation from seepage ponds IID, will implement operational actions to ensure that the pump is off during farm irrigation events so that water within the drains are not drawn into the pump.

IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 4 (WSS Update 2014 - #4)
The seepage pond for the Township pump back well appears to be a converted drain. If so, inspect to make sure surface runoff and/or tile drains do not reach the pond. Make corrections, as necessary. Sampling data shows slightly higher specific conductance and salinity in this area, which suggests the possibility of this occurring.

IID Response:
This pump system was last inspected on November 17, 2020. IID records show that no surface runoff and/or tile drains reach the Township pump back pond.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 5 (WSS Update 2014 - #5)
Eliminate the 4" pipe carrying lateral water to the seepage pond for the Township pump back well.

IID Response:
IID has inspected and confirmed that the 4" pipe referenced in the recommendation is an operational discharge line from the lateral that carries raw water from the EHL. This operational discharge pipe is required for IID operations and poses no risk to water quality.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 6 (WSS Update 2014 - #5 modified in 2020)
Water from the individual wells or sumps which are used to pump canal leakage back into the canals should be monitored at least once for Title 22 constituents to verify that the water being pumped back has not been influenced by the ground water quality. Ongoing monitoring could be minimized if monitoring results and an evaluation of the construction and location of the wells indicate that the water being pumped back is not influenced by the ground water. DDW plans to review all of the pump back wells currently installed to verify construction, water quality data collected, appropriate setbacks and agricultural drainage prevention. IID should implement any recommendations by DDW as a result of the review.

IID Response:
IID continuously coordinates with DDW to ensure that testing is completed as needed. IID will coordinate with DDW on future inspections and, if warranted, will participate in discussions with DDW, as well as water system operators, as it relates to funding and timing of any agreed upon recommendations as a result of future inspections.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 7 (WSS Update 2010 and- 2014 #7)
IID should implement testing of self-rescue equipment to prevent drowning of people and animals.

IID Response:
The IID has installed self-rescue buoys and ladders on the All-American Canal. These buoys are regularly cleaned and maintained by IID staff, however testing of the equipment is not possible as it would present great risk to staff due to heavy currents. IID has also installed No Trespassing signs to keep people away from canals. In addition, IID has installed English and Spanish signage to discourage swimming in All-American Canal high-speed flows.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 8 (WSS Update 2014 #8)
IID should continue to monitor for perchlorate on behalf of all systems.

IID Response:
IID's ongoing Joint Watershed Monitoring Program includes the monitoring for perchlorate on an annual basis from the four original joint watershed monitoring sites on behalf of all water system operators.

IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 9 (WSS Update 2014 #9)
Continue to remind the community of the importance to avoid allowing pesticides/fertilizers from entering the canals, drains, and seepage ponds.

IID Response:
IID regularly uses its newsletter, Ditchbank, and meetings of the IID Water Conservation Advisory Board and of industry groups like the Farm Bureau to remind the community of the importance of avoiding allowing pesticides/fertilizers from entering the canals, drains and seepage ponds.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 10 (WSS Update 2010 and 2014 #19)
Recommendation 19 in the 2014 WSS was that: wherever possible joint materials should be NSF approved.
DDW Comment #12 (p.1-21) in the 2014 WSS Update was: *In addition to joint materials, any new canal coatings, concrete and any other material that comes in contact with raw water upstream of drinking water providers should be NSF Standard 61 certified if certified material is available. In addition, any chemicals, if any, introduced into the canal for algae control and other uses must be NSF Standard 60 approved*.
The 2014 Update had the following: Based on IID responses, the following are some of the materials uses to do repairs: Redi-mix concrete, redwood board, wood grade boards, Portland Plastic Cement, Non-shrink grout, SDR-35 Schedule 40 PVC pipe, Canal seal (Sika-Flex), reinforced concrete pipe. IID does not seal joints with tar anymore.

IID is requested to update the list of materials used in the canals upgradient of the raw water delivery points.

IID Response:
In addition to the materials listed in the 2014 update, IID also uses Canal Seal (grade board mastic) and ADS polypropylene pipe.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 11 (WSS Update 2014 #10 updated 2020)
If contaminating activities are observed such as spills, aerial spraying of the canals or other pesticide application methods, IID should notify the downstream water systems and the Imperial County Agricultural Commissioner's Office. IID should conduct additional monitoring at the direction of DDW for chemicals entering the canals as a result of aerial spraying or other pesticide application methods.

IID Response:
IID has 1,668 miles of canals in a continuously flowing system and, to the extent that IID is notified of a an unplanned chemical release or other contamination event that has an adverse impact on water quality as it relates to public health IID ensures that the Imperial County Agricultural Commissioner's Office, Imperial County Health Department and the Office of Emergency Services (if needed) is notified using established procedures. Additionally, IID notifies water users downstream of the unplanned chemical release or contamination event.

During maintenance and construction activities, IID ensures that all requirements of the NPDES permit and current construction practices are followed.

IID will update its existing procedure to ensure DDW is notified and will collaborate with DDW on additional monitoring that may be needed.

IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 12 (WSS Update 2020)
Review IID Canal Management Practices that relate to protection of the canals from contamination, including but not limited to operations that may impact water quality in the canals (i.e. construction); procedures that address responses to spills and other contamination events with attention to updating written instructions on informing water providers and DDW-San Diego District of any event that may impact the raw water quality.

IID Response:
IID has 1,668 miles of canals in a continuously flowing system and, to the extent that IID is notified of a an unplanned chemical release or other contamination event that has an adverse impact on water quality as it relates to public health IID ensures that the Imperial County Agricultural Commissioner's Office, Imperial County Health Department and the Office of Emergency Services (if needed) is notified using established procedures. Additionally, IID notifies water users downstream of the unplanned chemical release or contamination event.

During maintenance and construction activities, IID ensures that all requirements of the NPDES permit and current construction practices are followed.

IID will update its existing procedure to ensure DDW is notified and will collaborate with DDW on additional monitoring that may be needed.

IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 13 (WSS Update 2020)
Minimize the potential for backflow or mixing between private irrigation canals treated with fertilizer or other chemicals and water in the IID canals.

IID Response:
From a hydrological perspective, backflow from private irrigation canals to IID canals is not likely to happen. IID has implemented procedures for minimizing the potential for backflow of chemicals and fertilizers from farmers' fields into canals. Additionally, IID has implemented a communication protocol to ensure that customers are aware of the risk of mixing between private irrigational canals treated with fertilizer or other chemicals and water in the IID canals.

As part of the Water Department's capital improvement program, deliveries are replaced as needed. Delivery infrastructure is inspected and evaluated for replacement on a routine basis. When deficiencies are found they are corrected.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 14 (WSS Update 2020)
Provide regular (perhaps monthly) updates to all drinking water providers about upcoming canal maintenance of canals that provide water to drinking water providers. List all drinking water providers that may be impacted by each maintenance activity

IID Response:
With more than 3,000 miles of canals and drains, IID is one of the largest irrigation districts in the nation. With 1,668 miles of canals, the IID Water Department is continually conducting maintenance - both preventative and reactive - of its waterways. IID's standard practice is to provide water users a four week notice of water shutdowns due to scheduled maintenance repairs. Some water systems have two delivery points from different IID canals to help ensure delivery of water.

Annual water outage schedule for maintenance activities is providing on the IID's website. https://www.iid.com/water/agriculture-customers/canal-cutout-schedule.

IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 15 (WSS Update 2020)
IID should evaluate the vulnerability of its water delivery system to accepting backflow of chemicals and fertilizers from farmers' fields into their canals. IID should examine their water delivery points and determine if there is a hydraulic discontinuity between the IID canal and the private irrigation canal to prevent backflow such as a weir box or a drop structure. IID should develop a program to upgrade deficient delivery points with priority to delivery points upgradient to water provider delivery points.

IID Response:
From a hydrological perspective, backflow from private irrigation canals to IID canals is not likely to happen. IID has implemented procedures for minimizing the potential for backflow of chemicals and fertilizers from farmers' fields into canals. Additionally, IID has implemented a communication protocol to ensure that customers are aware of the risk of mixing between private irrigational canals treated with fertilizer or other chemicals and water in the IID canals.

As part of the Water Department's capital improvement program, deliveries are replaced as needed. Delivery infrastructure is inspected and evaluated for replacement on a routine basis. When deficiencies are found they are corrected.

IID has addressed this recommendation and requests that it be removed from future JWSS updates.

Recommendation 16 (WSS Update 2020)
Zanjeros should continue to report contamination events and IID should alert Water Providers and DDW-San Diego District if the event occurred upstream of their delivery point as well as the Imperial County Agricultural Commissioner.

IID Response:
IID has 1,668 miles of canals in a continuously flowing system and, to the extent that IID is notified of a an unplanned chemical release or other contamination event that has an adverse impact on water quality as it relates to public health IID ensures that the Imperial County Agricultural Commissioner's Office, Imperial County Health Department and the Office of Emergency Services (if needed) is notified using established procedures. Additionally, IID notifies water users downstream of the unplanned chemical release or contamination event.

During maintenance and construction activities, IID ensures that all requirements of the NPDS permit and current construction practices are followed.

IID will update its existing procedure to ensure DDW is notified and will collaborate with DDW on additional monitoring that may be needed.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

Recommendation 17 (WSS Update 2020)
The IID Enhanced Joint Monitoring Plan tests should be scheduled during a period when there is significant aerial spraying such as between September and March during the vegetable growing season.

IID Response:
IID will continue to conduct tests based on DDW recommendations for locations and time. Any changes to the test schedule are at the discretion of DDW. IID currently completes testing for 4 original locations in October. Twenty-one (21) additional locations are tested on a rotating quarterly basis where each of these 21 sites is tested each quarter every four years.

IID has addressed this recommendation and requests that it be removed from future JWSS updates

3.1 Introduction

The Colorado River is about 1,450 miles long, with headwaters in Colorado and Wyoming which eventually flows across the international border into Mexico. The Colorado River Watershed encompasses 246,000 square miles including all of Arizona, parts of California, Colorado, New Mexico, Nevada, Utah and Wyoming. The river and its tributaries provide water to the nearly 30 million people, both within and outside of the basin, and irrigate nearly 4 million acres of agricultural lands.[1] The Colorado River Compact of 1922 designated Wyoming, Colorado, Utah, and New Mexico as the Upper Basin and California, Arizona, and Nevada as the Lower Basin. Figure 3-1, from the United States Bureau of Reclamation website, shows the upper and lower basins for the river. The portion of the Colorado River Basin that this report covers is the area south of Parker Dam, further detailed in Section 3.3. The area north of Parker Dam is covered by the Metropolitan Water District's Colorado River Watershed Sanitary Survey 2015 Update.

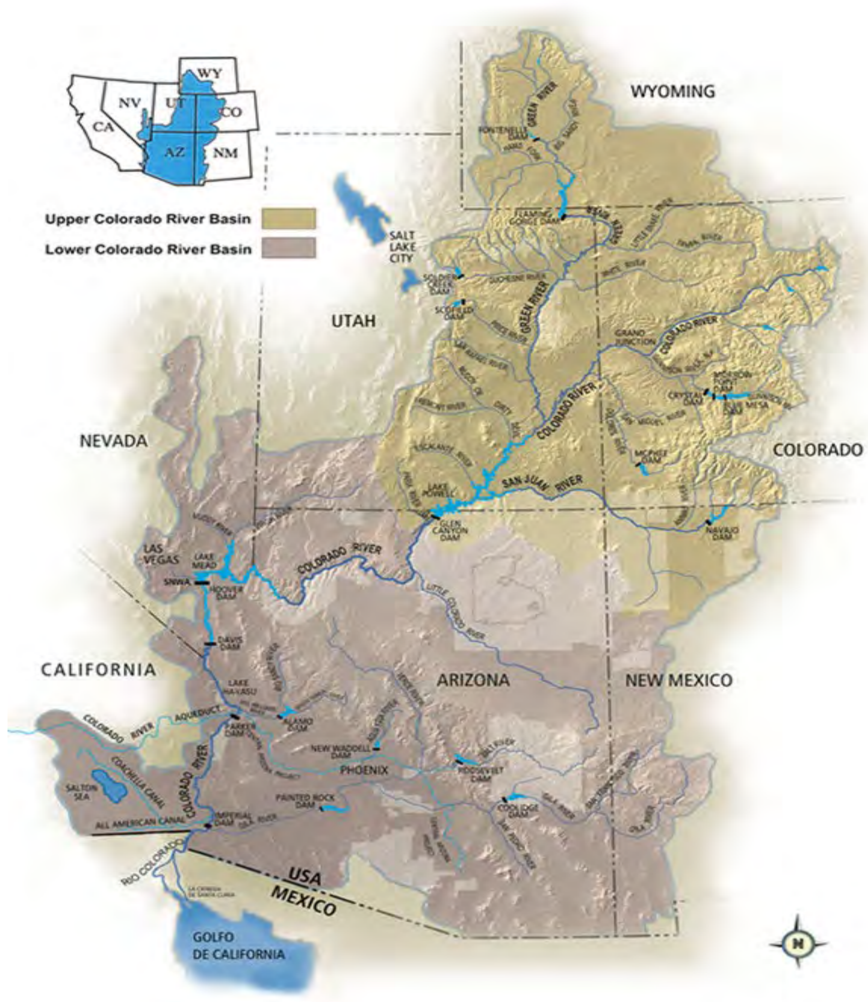

Figure 3-1: Colorado River, Upper and Lower Drainage Basin

[1] Water Census, U. (n.d.). Colorado River Basin Focus Area. Retrieved December 24, 2020, from https://www.usgs.gov/mission-areas/water-resources/science/colorado-river-basin-focus-area-study?qt-science_center_objects=0

3.2 Colorado River Basin

The 1,450 mile[2] long Colorado River begins in the Rocky Mountains in Grand County, Colorado at approximately 10,000 feet[3]. From there, it flows southwest into the Gulf of California in Mexico. The Colorado River flows southwesterly for 640 miles[4] through the Upper Colorado River Basin (Upper Basin) to Lee's Ferry. Lee's Ferry is the divide between the upper and lower portions of the Colorado River Basin. Natural flow is an estimate of flows that would exist without human intervention. The average annual natural flow of the Colorado River at the Lee's Ferry Gaging Station is approximately 15 million acre-feet (MAF)[5]. Natural flow is expected to decrease in the coming years due to climate change and human impact.

The Colorado River basin covers a large range of environments, with temperatures ranging from -61 °F to over 120 °F[6]. The northern portion consists of high basins, valleys, and mountains, experiences short warm summers and long cold winters. The southern sections, semi-arid to desert regions, have long hot summers and mild winters. Rainfall averages 40 to 60 inches in the northern mountain areas and 2.5 inches per year in the southern portion[7].

The Colorado River is the main water source for most of the southwestern United States. It provides municipal and industrial water for more than 30 million people and irrigation water for nearly 5 million acres of farmland[8].

Salinity

Millions of years ago, much of the land within the Colorado River Basin was the bottom of a large inland sea. The sea evaporated leaving deposits of salts, which were formed into the soil and rock formations that make up the Colorado River Basin of today. These salts are carried to the Colorado River by natural erosion or man's activities.

Salinity occurs naturally in waterways due to the weathering and dissolution of minerals in soil and rock. The same process occurs in areas with irrigated agriculture, which produces about double the salinity yield compared to areas without irrigated agriculture. Other factors known to affect salinity loads in streams include geology, land cover, land-use practices and precipitation. The Colorado River is a naturally salty river and salinity has long been recognized as one of the major problems in the river.

In 1973, the Colorado River Basin States organized the Colorado River Basin Salinity Forum and in 1974, while working with Congress, passed the Colorado River Basin Salinity Control Act in response to rapidly increasing salinity levels in the Lower Colorado River. Title 1 of the Act deals with the United States' salinity commitments to Mexico and Title 2 creates the Colorado River Salinity Control Program, focusing on improving water quality of the river to U.S. users above Imperial Dam. The control program has measures

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[2] Colorado River Basin Focus Area Study. U.S. Geological Survey. Retrieved November 30, 2020, from https://www.usgs.gov/mission-areas/water-resources/science/colorado-river-basin-focus-area-study?qt-science_center_objects=0

[3] Colorado River. Water Education Foundation. Retrieved November 30, 2020, from https://www.watereducation.org/aquapedia/colorado-river

[4] United States, U.S Department of the Interior, Bureau of Reclamation. (n.d.). *Reclamation Managing Water in the West - Upper Colorado River Basin Consumptive Uses and Losses Report* (Vol. Revised October 2019).

[5] Colorado River Natural Flow at Lees Ferry, Arizona. (n.d.). Retrieved November 30, 2020, from https://www.doi.gov/water/owdi.cr.drought/treeringdata/index.html

[6] National Research Council. 2007. *Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability*. Washington, DC: The National Academies Press. https://doi.org/10.17226/11857.

[7] Ibid.

[8] Lower Basin of the Colorado River. (2018, November 19). Retrieved December 01, 2020, from https://www.americanrivers.org/river/lower-basin-colorado-river/

in place that remove approximately 1.3 million tons of salt annually and the concentration at Imperial Dam has been reduced by approximately 100 mg/L[9]. Regardless, damages to U.S. users are estimated at $454 million per year and projected to increase to $574 million per year by 2035 if the program does not continue to be aggressively implemented[10].

Silt

The Colorado River has a heavy silt load which has caused issues since the early 1900's. Sedimentation issues have occurred at each dam requiring settling basins or, in the case of the Hoover Dam, another dam to reduce the amount of sediment build up. According to the IID, the Imperial Dam has three desilting basins capable of removing 70,000 tons of sediment a day.

Wastewater Disposal

There are numerous wastewater treatment plants (WTP) that discharge directly to the Colorado River, as well as thousands of septic systems operating within the Colorado River basin which are potentially sources of contamination to the watershed. Septic tanks have the potential to add nitrate, bacteria/pathogens, and EDCs/PPCPs to both adjacent groundwater supplies and to the river itself. River communities such as Lake Havasu City, Arizona, have been updating to wastewater treatment facilities to help resolve water quality concerns due to septic tank contamination.

Agricultural Runoff

Agricultural runoff introduces a variety of pollutants to the watershed, such as fertilizers and pesticides. Irrigated farmland contributes 500,000 acres within IID's water service boundaries. According to State Water Board, agricultural discharge in the Imperial Valley averages about 830,000 acre-feet/year from the New and Alamo River to the Salton Sea. Of this amount, approximately 36 percent is tailwater, 33 percent is seepage, and 30 percent is tilewater. The resulting mix of tailwater, tilewater, and seepage contains pesticides, nutrients, selenium, and silt in amounts that violate water quality standards. Agricultural runoff increases salinity and sediment that drain to the Salton Sea, but this runoff is necessary because it is the Salton Sea's main source of water. The agricultural runoff is part of the drainage system, which is kept separate from the drinking water supply.

Mining

Uranium mining has been going on around the Colorado Plateau since the 1950's. The mining and milling of uranium effects the entire ecosystem including the watershed. At least one uranium mine in the watershed has contaminated an aquifer with concentrations of uranium exceeding the EPA standards for drinking water[11].There are 395 uranium mining claims, both active and abandoned, along the Colorado River with 800 more new claims pending[12]. The Moab Uranium Mine was discovered in the 1950s and for a number of years extracted yellowcake uranium for sale to the U.S. Atomic Energy Commission. When the processing operations ceased in 1984, an estimated 16 million tons of uranium mill tailings and tailings-contaminated soil were left in an unlined pond adjacent to the River[13]. The pond was capped but there was also a pile of

[9] Colorado River Basin Salinity Control Forum. (n.d.). Retrieved December 01, 2020, from https://www.coloradoriversalinity.org/
[10] Ibid.
[11] Grand Canyon Trust. (2017, August 14). Uranium. Retrieved December 02, 2020, from https://www.grandcanyontrust.org/colorado-plateau-uranium.
[12] Save the Colorado. (n.d.). Mineral Resources. Retrieved December 02, 2020, from http://savethecolorado.org/threats/mineral-resources/
[13] Office of Environmental Management. (n.d.). Moab Site Cleanup By the Numbers. Retrieved December 02, 2020, from https://www.energy.gov/em/downloads/moab-site-cleanup-numbers

mine tailings over 90 feet tall believed to be leach pollutants into the river. The site is currently owned by the U.S. Department of Energy and as of May 2020, 10.4 million tons of tailing (65%) have been removed[14]. A well field is located between the tailing pile and the river, which extracts and purifies groundwater before it enters the Colorado River.

In August of 2015, during mine reclamation activities led by the EPA, the rapid uncontrolled release of approximately 3 million gallons of acid mine water from the Gold King Mine occurred north of Silverton, Colorado. The iron-oxyhydroxide, which had absorbed heavy metals from the mine, turned the acidic water a vivid orange color which continued until it reached Lake Powell on August 14th [15]. EPA has since installed a water treatment plant to filter the water still draining from the Gold King Mine.

Figure 3-2: Colorado River, Lower Drainage Basin

[14] Office of Environmental Management. (n.d.). Moab Site Cleanup By the Numbers. Retrieved December 02, 2020, from https://www.energy.gov/em/downloads/moab-site-cleanup-numbers

[15] U.S. Department of the Interior, Bureau of Reclamation. (2015). Technical Evaluation of the Gold King Mine Incident. Retrieved December 02, 2020, from https://www.usbr.gov/docs/goldkingminereport.pdf

Lower Colorado River Watershed

The Lower Colorado River begins at Lees Ferry, Arizona, and covers over 700 miles with a drainage area of 132,300 square miles within the U.S.[16]. The area drains portions of New Mexico, Arizona, Nevada, Utah, and California, with a discharge of approximately 15 million acre-feet per year[17]. The majority of the lower basin is arid, due to the Sonoran and Mojave Deserts and the expanse of the Colorado Plateau with limited forested areas in northern Arizona. Figure 3-2 shown to the left is an image of the lower basin of the Colorado River from the National Geographic Society.

Dams

The increased demand for water along with the defined water apportioned for each region created the need for water storage to compensate and store water for dry seasons or dry years. The most upstream dam is the Glen Canyon Dam located at the Arizona/Utah border. Glen Canyon Dam, built in 1963, formed Lake Powell, and according to the United States Bureau of Reclamation has a storage capacity of 26.2 million acre-feet. The Hoover Dam, located about 35 miles southeast of Las Vegas, was built in 1935 forming Lake Mead. Davis Dam, near Laughlin, Nevada, was built in 1951 creating Lake Mohave. Parker Dam near Lake Havasu City, Arizona, was built in 1938, creating Lake Havasu. Imperial Dam was completed in 1938 and spans the Colorado River northeast of Yuma, Arizona. The dam raises the water surface 25 feet which allows for gravity flow into the All-American Canal. The Imperial Reservoir was created as a result of the Imperial Dam.

California Service Areas

Colorado River Aqueduct takes water from Lake Havasu and supplies much of Southern California, including Los Angeles and San Diego. Palo Verde Irrigation District is supplied by the Colorado River water. The Imperial Dam is the starting point of the All-American Canal. The All-American Canal serves both the Imperial and Coachella Valley. Figure 3-3, from the Metropolitan Water District, is an overview of the California Service Area.

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[16] *Colorado River system consumptive uses and losses report, 1971-1975*. (1977). Salt Lake City: U.S. Dept. of the Interior, Bureau of Reclamation, Upper Colorado Region, Lower Colorado Region.

[17] National Research Council. 2007. *Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability*. Washington, DC: The National Academies Press. https://doi.org/10.17226/11857.

Figure 3-3: California Service Areas

3.3 Imperial Valley

Background

The Imperial Valley is in the southeast corner of California. The Imperial County is restricted by San Diego County to the west, Riverside County to the north, the Colorado River and Arizona boarder to the east, and Mexico to the south. The County stretches over 4,176 square miles[18] with an elevation varying from -266 feet to 2,621 feet[19].

The Imperial Valley is roughly 50 miles long, extending from the southern end of the Salton Sea to the Mexican border. The Imperial Valley is located within a graben, the Salton Trough, which is an active tectonic pull-apart basin. The Salton Trough stretches from the Coachella Valley through the Salton Sea and the Imperial Valley to the Mexicali Valley, ending in the Colorado River Delta in Mexico.

Watershed

The portion of the Lower Colorado River Watershed covered by this report is shown in detail in Figure 3-4, which was created for this report. Figure 3-4 shows the portion of the drainage area in Arizona that contributes water to the Colorado River upstream of the Imperial Dam. A large portion of the drainage from Arizona has been detained by dams. The Coolidge Dam near Globe Arizona captures water from the Gila River and is part of the San Carlos Irrigation Project.

The seven Salt River Project Dams in Arizona capture water from the Tonto, Salt and Verde Rivers that collect runoff from a 13,000 square mile watershed and, through irrigation canals, provide water resources that partially meet the domestic and agricultural demand of a water service area of 375 square miles in the Phoenix Area. Roosevelt Dam and reservoir can store up to 1.7 million acre-feet and was one of the first projects funded by the Reclamation Act of 1902. In 1996 the dam was modified and raised 77 feet to provide flood protection and additional conservation storage. The other six dams on the Salt and Verde River are conservation dams.

Discharges of storm runoff and drains from farms flowing into the Hassayampa, Agua Fria and Salt and Gila rivers west of Phoenix are captured in the Painted Rock Dam and Reservoir near Gila Bend built by the Corps of Engineers for flood control and opened in 1960. "Scientists estimate that approximately 5,000 tons of DDT has been transported from farmland to the Gila west of Phoenix. This winter's heavy rains are expected to transfer more pesticide residue from farms into the river. "It's in the sediment and surface soil, and that drainage goes right down to the Gila River basin," says Will Humble, Chief of Environmental Health for the State Department of Health Services. "It's probably the most contaminated waterway in Arizona."[20] As of August 2009, access to the lake is restricted because it is heavily polluted with pesticides, especially DDT.

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[18] U.S. Census Bureau QuickFacts: Imperial County, California. (n.d.). Retrieved December 15, 2020, from https://www.census.gov/quickfacts/imperialcountycalifornia

[19] Anyplace America. (n.d.). Imperial County Topo Maps and Elevations. Retrieved December 15, 2020, from https://www.anyplaceamerica.com/directory/ca/imperial-county-06025/

[20] Dougherty, J. (2016, April 03). Contaminated Splendor. Retrieved December 21, 2020, from https://www.phoenixnewtimes.com/news/contaminated-splendor-6397498

Figure 3-4: Imperial Valley Watershed

Climate

The Imperial Valley temperatures ranges from 34 degree to 113 degrees. The hot months are June through September when the average daily temperature exceeds 99 degree. Imperial County, on average, has over 122 days a year where the temperature exceeds 100 degrees. During the cold season, mid-November to mild-February the average high is 76 degrees and it rarely goes below freezing. During winter months the Valley averages more than ten hours of sunshine a day, the longest day in the summer is over 14 hours of sunshine. The average annual rainfall is 3.0 inches, very minimal compared to US average at 38 inches per year. [21]

Drainage

The lowest point in the valley is the Salton Sea, which collects most of the drainage from the surrounding areas. The New River and Alamo River flow north from Mexico into the Salton Sea, collecting urban and agricultural runoff along the way.

Regions

The Imperial Valley can be broken into two regions, incorporated and unincorporated communities. The seven (7) incorporated communities of Imperial County include Brawley, Calexico, El Centro, Imperial, Calipatria, Holtville, and Westmorland. The unincorporated eight (8) communities are Palo Verde, Heber, Niland, Ocotillo, Seeley, Winterhaven, Salton City and Bombay Beach throughout our watershed in Imperial County.

Imperial County Land Use Distribution

Imperial County is mostly comprised of agricultural lands with natural desert and urban areas dispersed throughout. Imperial County's website provides the “County's General Plan” which was prepared in 2008 and revised in 2015. Table 3-1 shows the land use breakdown as shown in the Land Use element of the County's 2008 General Plan Update.

[21] Imperial County, California Climate https://www.bestplaces.net/climate/county/california/imperial

TABLE 3-1*: Imperial County Land Use Distribution*

Imperial County Land Use Distribution (Acres)	
Irrigated (Agriculture)	
Imperial Valley	512,163
Bard Valley (Including Reservation)	14,737
Palo Verde Valley	7,428
Total	534,328 (18.2%)
Developed	
Incorporated	9,274
Unincorporated	8,754
Total	18,028 (0.6%)
Salton Sea (At Elevation -230)	211,840 (7.2%)
Desert/Mountains	
Federal	1,459,926
State	37,760
Indian	10,910
Private	669,288
Total	2,177,884 (74.0%)
Imperial County Total	2,942,080 Acres

**All acreages are approximate*

Natural Desert

The majority of the desert is managed by the Bureau of Land Management. The Algodones Sand Dunes are approximately 40 miles long by 5 miles wide, in some places reaching heights of 300 feet above the desert floor[22]. The dunes run alongside the eastern edge of the Imperial Valley agricultural region following a line that correlates to the prevailing northerly and westerly wind directions. The northernmost area is known as Mammoth Wash. South of Mammoth Wash is the North Algodones Dunes Wilderness, established by the 1994 California Desert Protection Act. This area is closed to motorized use and access is by hiking and horseback. The largest and most heavily used area begins at Highway 78 and continues south just past Interstate 8.

Agriculture

The Imperial Valley has long been known for its agricultural production. The combination of climate, soil, and water availability has made the Imperial Valley highly productive. The top commodities produced in the Imperial Valley are cattle, alfalfa, leaf and head lettuce, broccoli, Bermuda grass, carrots, and sugar beets. According to Imperial County's Ag Commissioner Website, in 2019 gross agriculture was valued at $2 billion. Table 3-2 is taken directly from IID's website and lists all crops produced in the valley.

[22] Bureau of Land Management. (n.d.). Imperial Sand Dunes. Retrieved December 14, 2020, from https://www.blm.gov/visit/imperial-sand-dunes

Table 3-2: 2019 Imperial Valley Crops by Rank and Acreage

Rank	Crop Type	Crop Description	Acreage (Acres)	%	Cumulative Acreage	Cumulative %
1	Field	Alfalfa	139,543	31.1	139,543	31.1
2	Field	Bermudagrass (All)	64,312	14.3	203,855	45.5
3	Field	Sudangrass (All)	46,283	10.3	250,138	55.8
4	Garden	Lettuce (All)	27,644	6.2	277,782	62.0
5	Field	Sugarbeets	25,378	5.7	303,160	67.6
6	Field	Kleingrass	20,952	4.7	324,112	72.3
7	Garden	Carrots (All)	14,422	3.2	338,534	75.5
8	Garden	Onions (All)	12,100	2.7	350,634	78.2
9	Permanent	Duck Ponds	9,859	2.2	360,493	80.4
10	Garden	Broccoli (All)	9,640	2.2	370,133	82.6
11	Garden	Corn, Sweet	7,992	1.8	378,125	84.3
12	Field	Wheat	7,899	1.8	386,024	86.1
13	Garden	Vegetables, Mixed	7,155	1.6	393,179	87.7
14	Permanent	Citrus (All)	7,123	1.6	400,302	89.3
15	Garden	Spinach	6,882	1.5	407,184	90.8
16	Garden	Melons, Spring (All)	5,184	1.2	412,368	92.0
17	Field	Corn, Field	4,856	1.1	417,224	93.1
18	Garden	Cauliflower	3,662	0.8	420,886	93.9
19	Field	Oats	3,188	0.7	424,074	94.6
20	Garden	Sunflowers (Seed)	2,554	0.6	426,628	95.2
21	Garden	Potatoes	2,518	0.6	429,146	95.7
22	Field	Ryegrass	1,863	0.4	431,009	96.1
23	Garden	Cabbage	1,807	0.4	432,816	96.5
24	Garden	Rapini	1,661	0.4	434,477	96.9
25	Permanent	Dates	1,473	0.3	435,950	97.2
26	Field	Hemp	1,450	0.3	437,400	97.6
27	Field	Grass, Mixed	1,234	0.3	437,184	97.5
28	Garden	Celery (All)	803	0.2	437,987	97.7
29	Garden	Watermelons	651	0.1	438,638	97.8
30	Permanent	Olives	630	0.1	439,268	98.0
31	Garden	Cilantro	551	0.1	439,819	98.1
32	Garden	Okra	500	0.1	440,319	98.2
33	Field	Fish Farms	485	0.1	440,804	98.3
34	Garden	Melons, Fall (All)	438	0.1	441,242	98.4
35	Garden	Coriander Seed	408	0.1	441,650	98.5
36	Field	Sugarcane	400	0.1	442,050	98.6
37	Garden	Mustard (All)	398	0.1	442,448	98.7
38	Permanent	Palms	391	0.1	442,839	98.8
39	Field	Rapeseed	387	0.1	443,226	98.9
40	Permanent	Pasture, Permanent	345	0.1	443,571	98.9

Rank	Crop Type	Crop Description	Acreage (Acres)	%	Cumulative Acreage	Cumulative %
36	Field	Sugarcane	400	0.1	442,050	98.6
37	Garden	Mustard (All)	398	0.1	442,448	98.7
38	Permanent	Palms	391	0.1	442,839	98.8
39	Field	Rapeseed	387	0.1	443,226	98.9
40	Permanent	Pasture, Permanent	345	0.1	443,571	98.9
41	Garden	Kale	334	0.1	443,905	99.0
42	Garden	Sweet Basil	236	0.1	444,141	99.1
43	Field	Corn, Silage	221	0.0	444,362	99.1
44	Garden	Parsley (All)	217	0.0	444,358	99.1
45	Garden	Flowers	204	0.0	444,562	99.1
46	Garden	Swiss Chard (All)	168	0.0	444,730	99.2
47	Garden	Artichoke (All)	164	0.0	444,894	99.2
48	Permanent	Jujube	153	0.0	445,047	99.3
49	Field	Sesbania	139	0.0	445,186	99.3
50	Field	Cotton	128	0.0	445,312	99.3
51	Permanent	Nursery	126	0.0	445,438	99.3
52	Permanent	Ornamental Trees	126	0.0	445,438	99.3
53	Field	Sorghum Silage	121	0.0	445,559	99.4
54	Field	Red Beets	114	0.0	445,673	99.4
55	Garden	Cabbage, Chinese	102	0.0	445,775	99.4
56	Garden	Rockett	92	0.0	445,867	99.4
57	Field	Spirulina Algae	85	0.0	445,952	99.5
58	Permanent	Mangos	81	0.0	446,033	99.5
59	Garden	Radishes	81	0.0	446,114	99.5
60	Garden	Squash	74	0.0	446,188	99.5
61	Garden	Aloe Vera	72	0.0	446,260	99.5
62	Garden	Herbs, Mixed	70	0.0	446,330	99.5
63	Permanent	Asparagus	39	0.0	446,369	99.6
64	Field	Sorghum Grain	37	0.0	446,406	99.6
65	Garden	Thyme	37	0.0	446,443	99.6
66	Garden	Dill	30	0.0	446,473	99.6
67	Garden	Sesame	25	0.0	446,498	99.6
68	Garden	Eggplant	17	0.0	446,515	99.6
69	Field	Safflower	13	0.0	446,528	99.6
70	Field	Dunaliella	12	0.0	446,540	99.6
71	Field	Barley	10	0.0	446,550	99.6
72	Field	Quinoa	10	0.0	446,560	99.6
73	Permanent	Eucalyptus	7	0.0	446,567	99.6

Rank	Crop Type	Crop Description	Acreage (Acres)	%	Cumulative Acreage	Cumulative %
74	Permanent	Pecans	4	0.0	446,571	99.6
75	Permanent	Fruit, Mixed	2	0.0	446,573	99.6
76	Field	Bamboo	0	0.0	446,573	99.6
77	Garden	Brussels Sprouts	0	0.0	446,573	99.6
78	Garden	Collards	0	0.0	446,573	99.6
79	Garden	Cucumbers	0	0.0	446,573	99.6
80	Garden	Fennel	0	0.0	446,573	99.6
81	Field	Flax	0	0.0	446,573	99.6
82	Garden	Garbanzo Beans	0	0.0	446,573	99.6
83	Garden	Parsnips	0	0.0	446,573	99.6
84	Garden	Peppers, Bell	0	0.0	446,573	99.6
85	Garden	Peppers, Hot	0	0.0	446,573	99.6
86	Field	Triticale Grain	0	0.0	446,573	99.6

Total Acres of Crops: 448,372

Urban

According to the County of Imperial Planning & Development Services Department Land Use Element General Plan, the cities, towns, and communities in Imperial Valley account for a small portion of overall land use. The Land Use Plan includes areas surrounding the seven incorporated cities; Brawley, El Centro, Westmorland, Holtville, Calipatria, Imperial and Calexico. Urban areas also include the unincorporated communities of Niland, Heber, Seeley, Winterhaven and West Shores/Salton City. Per the Planning & Development Department urban areas are defined by a full level of urban services, in particular public water and sewer systems.

Table 3-3 shows the urban area acreage within the incorporated and unincorporated cities in the Imperial Valley.

Table 3-3: Urban Area Acreage

Urban Areas	Acres
Brawley	9,890
Calexico	8,302
Calipatria	4,285
El Centro	14,288
Heber	1,040
Holtville	4,080
Imperial	8,480
Niland	1,290
Seeley	1,520
Westmorland	880
West Shores/Salton City	31,840
Winterhaven	200
TOTAL	**86,095**

*Source: Planning & Development Services Department (County of Imperial, Ca.)
Adopted November 9, 1993 MO #18 (Revised October 6, 2015 MO #18b)

Current and Projected Population

According to the California Department of Finance the total county population as of 2020 is estimated to be around 188,780. The population is projected to remain relatively steady through the coming decades, according to the State of California Department of Finance's Population Projections. Table 3-4 identifies estimated populations and yearly percent changes for the large state regulated water systems within Imperial County.

Table 3-4: Current Population (Imperial County State Systems)

State Systems	System #	Population	Yearly Percent Change
Brawley, City of	1310001	26,273	0.4
Calexico, City of	1310002	40,357	-0.3
Calipatria (GSWC) City of*	1310003	10,731	-4.1
Ca. Dept. of Corrections Centinela	1310801	4,600	-0.4
DHS Calexico	1310019	330	-0.4
El Centro, City of	1310004	46,315	-0.3
GSA Calexico Point of Entry	1310016	300	-0.4
Heber Dunes - SVRA	1310301	28	-0.4
Heber Public Utility District	1310007	6,979	-0.4
Holtville, City of	1310005	6,032	-0.1
Imperial, City of	1310006	19,372	2.8
NAF El Centro	1310700	1,022	-0.4
Seeley CWD	1310013	2,124	-0.4
Sonny Bono Salton Sea Wildlife Refuge	1310302	79	-0.4
UC Desert Field Station	1300571	53	-0.4
Westmorland, City of	1310008	2,444	-0.4

*City of Calipatria/Golden State Water Company serves the City of Calipatria, Calipatria State Prison and Niland.

3.4 Historic Water Rights Agreements, Acts, and Litigations

The following chronology of events and other information in this subsection is taken from IID's website:

1895 -1899 -A series of water appropriates were made by individuals and also by the California Development Company under the existing laws of the State of California, by posting notices at the intended point of diversion and recording them with the County Recorder of San Diego County (Imperial County was not organized until sometime later) Mr. Charles L. Rockwood and his associates organized the California Development Company-hereinafter referred to as the C.D. Company-under the laws of New Jersey, on April 25, 1896.

1901 -California Development Company began diversions from Alamo Canal in Mexico.

1911 -Imperial Irrigation District formed for the purpose of acquiring the rights and properties of the C.D. Company and its two Mexican companies.

1916 -IID acquired 13 mutual water companies; the district was now delivering water to 500,000 acres.

1922 -November, representatives from the upper (Colorado, New Mexico, Utah, and Wyoming) and lower (Arizona, California, and Nevada) basin states signed the **Colorado** River Compact, giving each basin perpetual rights to annual apportionments of 7.5 million acre-feet (MAF) of Colorado River Water.

1928 - The Boulder Canyon Project Act of 1928 authorized construction of a dam in Boulder, or Black, Canyon, construction of the All-American Canal to connect the Imperial and Coachella Valleys with the Colorado River, and divided the lower basin waters among the lower basin states.

1929 -California Limitation Act limits California's annual water consumption to 4.4 MAF.

1931 -California Seven-Party Agreement established how/where the 4.4 MAF of water was to be used.

1932 -December, the Secretary of the Interior, acting on behalf of the United States, executed a contract with IID to deliver Colorado River Water.

1944 –The United States and Mexico signed The Mexican Water Treaty of 1944 which entitles Mexico to 1.5 MAF of Colorado River water each year 1950-1975.

1964-Supreme Court decreed in Arizona v. California, that IID has 'present perfected' rights to 2.6 MAF of water annually.

1979 -Second case, Arizona v. California, reaffirmed IID’s rights to 2.6 MAF of Colorado River water annually.

1988 -Agreement between IID and Metropolitan Water District of Southern California (MWD) for the transfer of up to 105,000 acre-feet per year for a 35-year period, or longer.

1998 -IID and San Diego County Water Authority (SDCWA) entered into a long term conservation and water transfer agreement.

1999 -IID Board of Directors, Coachella Valley Water District (CVWD), and MWD approved the Key Terms for Quantification Settlement among the State of California, Imperial Irrigation District, Coachella Irrigation District, and Metropolitan Water District of Southern California, as the basis for obtaining public input regarding Colorado River use in California-this is referred to as the Quantification Settlement Agreement (QSA).

2001 - 2003, CVWD, and MWD engaged in QSA negotiations with the State of California and the US Bureau of Reclamation. IID published the final environmental impact reports and a habitat conservation plan required for the IID/SDCWA water conservation and transfer program. In December, the State Water Resources Control Board approved the IID/SDCWA transfer.

2003 -October, Colorado River Water Delivery Agreement (Federal Agreement) was signed by the US Secretary of the Interior, the CVWD, IID, MWD and SDCWA also, the QSA and Related Agreements were signed by the US Secretary of the Interior and representatives of various Indian tribes, the US Bureau of Reclamation, CVWD, IID, MWD and SDCWA.

In addition, as discussed in the 2014 WSS Update regarding the QSA, the following is taken from the IID website:

Quantification Settlement Agreement and Related Agreements (2003)

With completion of a large portion of the CAP infrastructure in 1994, creation of the Arizona Water Banking Authority in 1995, and the growth of Las Vegas in the 1990's, California encountered increasing pressure to live within its rights under the Law of the River. After years of negotiating among Colorado River Compact States and affected California water delivery agencies, a Quantification Settlement Agreement and Related Agreements and documents were signed on October 10, 2003, by the Secretary of Interior, IID, Coachella Valley Water District (CVWD), Metropolitan Water District of Southern California (MWD), San Diego County Water Authority (SDCWA), and other affected parties.

"The Quantification Settlement Agreement and Related Agreements (QSA/Transfer Agreements) are a set of interrelated contracts that resolve certain disputes among the United States, the State of California, IID, Metropolitan Water District, Coachella Valley Water District and the San Diego County Water Authority for a period of 35 to 75 years, regarding the reasonable and beneficial use of Colorado River water; the ability to conserve, transfer, and acquire conserved Colorado River water; the quantification and priority of Priorities 3 (a) and 6 (a)[23] within California for the use of Colorado River water; and the obligation to implement and fund environmental impact mitigation.

Conserved water transfer agreements between IID and SDCWA, IID and CVWD and IID and MWD are all part of the QSA and Related Agreements. For IID, these contracts identify conserved water volumes and establish transfer schedules along with price and payment terms. As specified in the agreements, IID will transfer nearly 110,000 AF annually to MWD, 200,000 AF to SDCWA, 103,000 AF to CVWD and MWD combined and 11,500 Acre Feet per Year (AFY) to certain San Luis Rey Indian Tribes. IID will transfer nearly 415,000 AF annually over a 35-year period (or longer).

In addition, IID will transfer to SDCWA 67,700 AFY annually of water conserved from the lining of the AAC in exchange for payment of lining project costs and a grant to IID to certain rights to use the conserved water. In addition to the 105,000 acre feet of water currently being conserved under the 1988 IID/MWD Conservation Program, these more recent agreements define an additional 303,000 AFY to be conserved by IID from on-farm and distribution system conservation projects for transfer to SDCWA, CVWD and MWD.

[23] Priorities 1,2,3(a),6(a), and 7 of current section 5 Contracts for the delivery of Colorado River water in the State of California and Indian and miscellaneous Present Perfected Rights within the State of California and other existing surplus water contracts are not affected by the QSA Agreement

2004 – MWD-PVID sign 35-year deal to pay farmers to fallow and rotate crops, transferring saved water to urban Southern California.

2005 – Lower Basin Multi-Species Conservation Program signed a 50-year agreement to restore 8,100 acres of habitat between Hoover Dam and the U.S. Mexico border.

2006 – Congress passes legislation to waive environmental requirements and orders interior to proceed with the canal lining and construction of Brock Reservoir in Imperial County.

2007 – Seven States Agreement and federal ROD signed; includes Lower Basin shortage guidelines and rules to store conserved water in Lake Mead and agreement to “equalize” storage in Mead and Powell.

2010 – The Seven Colorado River Basin States initiated the Colorado River Basin Supply and Demand Study.

2012 – California Court of Appeals upholds QSA and Supreme Court leaves that decision standing.

2013 – Federal officials establish working groups to implement Colorado River Basin Study.

2016 – Major water suppliers in the Lower Basin begin work on a Drought Contingency Proposal that would ensure Arizona, California and Nevada are enrolled in what they agree is a shortage-sharing platform to avoid the undesirable aspects of Lake Mead falling to 1,025 feet above sea level – the lowest trigger level contemplated in the 2007 Guidelines.

2017 – United States and Mexican governments sign an agreement to the 1944 Water Treaty between the two countries called Minute 323. The Minute 323 extends 2012’s Minute 319 that gave Mexico greater flexibility in managing its Colorado River allotment. The latest agreement provides mechanisms for increased conservation and water storage in Lake Mead to help offset the effects of drought and prevent a shortage from being triggered. Minute 323 dedicates 210,000 acre-feet of water over nine years for environmental restoration work in the Colorado River Delta.

2018 – Bureau of Reclamation releases Tribal Water Study. It describes how tribal water use fits into the overall picture of Colorado River management, how future development of tribal water resources will alter river operations (including others using water to which a tribe may hold legal title) and how future development of tribal water rights will affect Basin operations.

2019 – President Trump signs the Drought Contingency Plan. The DCP commits the seven Colorado River states which include California, Nevada, Arizona, Colorado, New Mexico, Utah and Wyoming to a plan centered on the idea that all water users, not just those with junior water rights, have a stake in keeping the system whole by taking voluntary reductions on their Colorado River deliveries. IID is not a signatory to the DCP.

3.5 IID Facilities

This section is all based information received for IID and the IID website. The figures used in this section were created for this report.

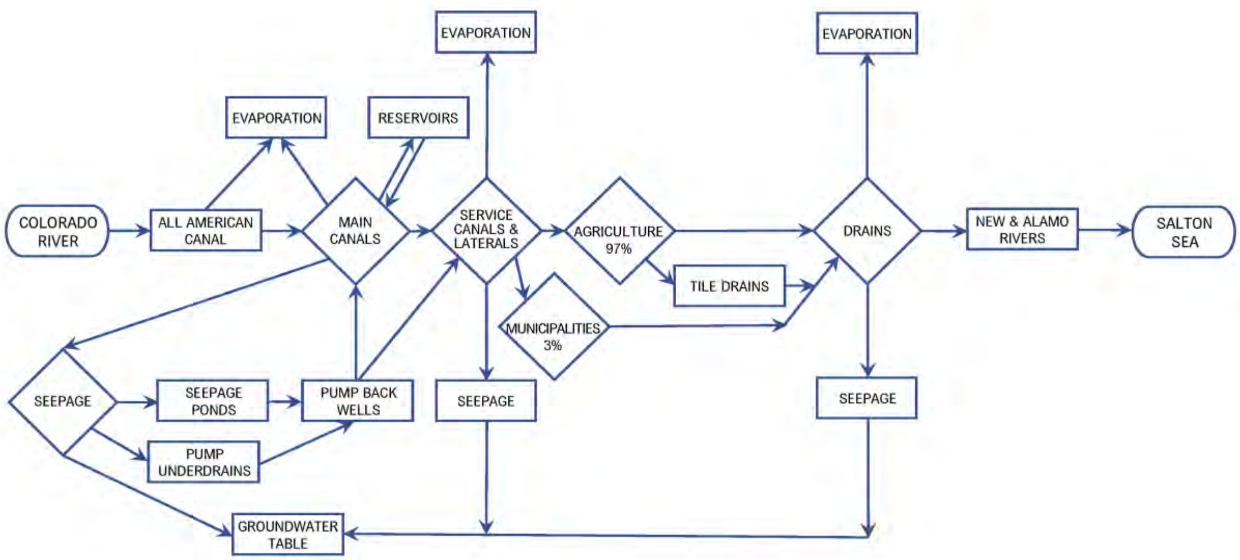


Figure 3-5: Imperial Valley Water Use

Canals: 1,668 miles

1,438 miles of lateral canals

230 miles of main canals

80 mile All-American Canal

Drains: 1,456 miles

Collects surface runoff and subsurface drainage from 32,227 miles of tile drains underlying approximately 475,000 acres of farmland.

The All-American Canal is not an IID owned facility, owned by Bureau of Reclamation, however operated and maintained by IID.

Reservoirs: 11 regulating reservoirs

These reservoirs store surplus water for beneficial use as needed, with a total storage capacity of more than 4,300 acre-feet of water. Table 3-5 gives information about each reservoir and Figure 3-6 shows the locations of the reservoirs.

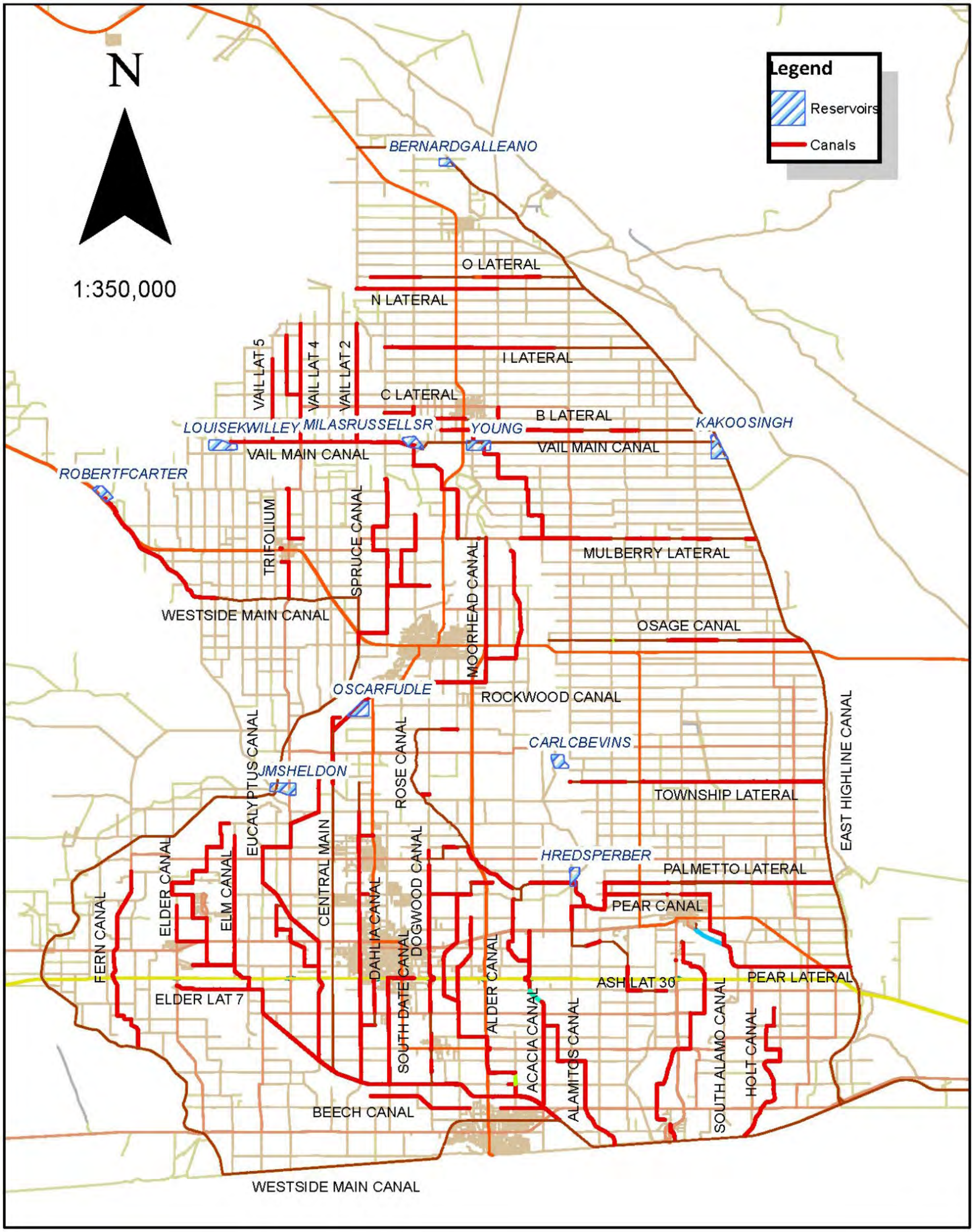


Figure 3-6: IID Reservoirs

The table 3-5 below displays IID Reservoirs obtained from the IID website.

Table 3-5: IID Reservoirs

Reservoir	Area (Ac.)	Capacity (Ac.-Ft)	Maximum Depth (Ft)	Inlet Capacity (cfs)	Outlet Capacity (cfs)	Date of Diversion
Singh	32	323	11	100	100	1/20/1976
Sheldon	50	476	10	100	100	3/29/1977
Fudge	37.5	300	10	100	100	2/26/1982
Sperber	64.6	470	9	100	2 outlets @ 100 cfs each	5/1/1983
Carter	32	350	11.3	150	50 cfs (pump outlet only)	9/19/1988
Galleano	40	425	21	150	75 cfs (pump outlet only)	10/9/1991
Bevins	37.36	253	12.9	165	50 cfs (pump outlet only)	11/12/1992
Young	47	275	9	100	100	2/9/1996
Russell	29	200	8.3	100	50 cfs (pump outlet only)	12/5/1996
Willey	51.2	300	7	190	51 cfs (pump outlet only)	1/22/1998
Off-Line Storage	73.5	1,251	13.6	400	400	1/1/2009

Kakoo Singh: Date of Diversion: 1/20/1976

This is IID's oldest reservoir and regulates water from the East Highline Canal, diverting it to the Vail Supply Canal via gravity flow. Water is pumped back to the East Highline Canal.

JM Sheldon: Date of Diversion: 3/29/1977

This reservoir takes surplus water from the Westside Main Canal located off Forrester Road.

Oscar Fudge: Date of Diversion: 2/26/1982

This reservoir is located on the Central Main Canal near Brawley.

H "Red" Sperber: Date of Diversion: 5/1/1983

The reservoir is located west of Holtville on Meloland Road and water from the Rositas Canal is held and released when needed into the Rose and Rubber canals.

Robert F. Carter: Date of Diversion: 9/19/1988

This was designed to conserve operational discharge from the end of the Westside Main Canal. It's located adjacent to Highway 86, six miles north of Westmorland, the reservoir also features a computerized control system and a specially designed area for recreational fishing. A five-foot dike impounds water within the fish habitat area. The dike is 1,000 feet by 110 feet, with a sandy beach for fishing access.

Bernard Galleano: Date of Diversion: 10/9/1991

The Bernard Galleano Reservoir is located at the terminus of the East Highline Canal just north of Niland. Farmland beyond this point is supplied water via the Niland Lateral Canal Extension. The location of the reservoir, and the fact that it is totally automated and self-controlled, allows the IID to balance water shortfalls and overages in the East Highline Canal, thus providing more uniform water deliveries to all downstream users. The reservoir was designed with an enhanced fisheries habitat and test site for waterfowl habitat development.

Carl C. Bevins: Date of Diversion: 11/12/1992

The Carl C. Bevins Reservoir stores operational discharge from the eight lateral canals in the Plum-Oasis Lateral Interceptor system. Two 25-cfs pumps draw water out of the reservoir for delivery to downstream users. The Bevins Reservoir, located east of Imperial, is part of a project that provides farmers a virtual demand delivery system where they can shut off or receive water whenever they want. The Plum-Oasis Lateral Interceptor Project conserves about 10,600 acre-feet of water annually.

Young: Date of Diversion: 2/9/1996

The 275 acre-foot Young Reservoir was constructed as part of the Mulberry-D Lateral Interceptor Project under the 1989 IID/MWD Water Conservation Program Agreement. The Mulberry-D Lateral Interceptor is approximately 8.25 miles long and catches operational discharge at the ends of 11 lateral canals serving 31,000 acres of farmland. The reservoir is located near Calipatria at the end of the South Interceptor Canal to store water for downstream users. The Mulberry-D Lateral Interceptor Project conserves about 8,700 acre-feet of water annually.

Milas Russell, Sr.: Date of Diversion: 12/5/1996

The 200 acre-foot Russell Reservoir is part of the Mulberry-D Lateral Interceptor Project, a 1989 IID/MWD Water Conservation Program Agreement. The Mulberry-D catches operational discharge at the ends of 11 lateral canals that serve 31,000 acres of farmland near Calipatria. It is approximately 8.25 miles long. This lateral interceptor project conserves about 8,700 acre-feet of water annually. The Russell Reservoir stores water for downstream users and is located on the Vail Canal.

Louise K. Willey: Date of Diversion: 1/22/1998

The 300 acre-foot Willey Reservoir was constructed as part of the Trifolium Lateral Interceptor Project under the 1989 IID/MWD Water Conservation Program Agreement. The Trifolium Lateral Interceptor is approximately 10.9 miles long and catches operational discharge at the ends of 15 lateral canals serving 30,000 acres of farmland. The reservoir is located on the south side of the New River opposite the end of the Vail Canal. This reservoir stores operational discharge from the interceptor and pumps the water through a 45-inch in diameter pipeline 3.5 miles long upstream on the Vail Canal. The water is then discharged into the Vail Canal at the Vail Lateral No. 3 Heading for downstream users. The Trifolium Lateral Interceptor Project conserves about 13,300 acre-feet of water annually.

Off Line Storage: Date of Diversion: 1/1/2009

The Off Line Storage Reservoir was constructed as part of the All-American Canal Lining Project. The lining of the All-American Canal reduced the availability of system storage in the AAC Drop 1 pond. The OLS replaces most of the system storage that was lost by the lining of the All-American Canal above AAC Drop 1. The original All-American Canal channel between AAC Drop 1 and AAC Drop 2 was converted into the OLS reservoir. The OLS is the major control point for regulating flow into the Imperial Valley. Excess AAC water is diverted into the OLS reservoir using inlet gates constructed in the AAC Drop 2 pond. Shortage AAC water is released back to the AAC from the OLS reservoir using outlet gates that discharge below AAC Drop 2.

Pump Back Wells

IID owns and operates 21 pump back wells, ten are located along the East Highline Canal and seven along the All-American Canal. Their purpose is to collect water lost due to seepage and pump it back to the canal. Collection of the seepage is accomplished by a series of underdrain pipes and/or seepage ponds constructed parallel to the canal with inverts well below the canal bottom. Based on information provided by IID, table 3-6 gives information about all IID Pump Back Wells and Figure 3-7 shows the locations of the Pump Back Wells.

Table 3-6: IID Pump Back Wells

Pump #	Pump Size (HP)	Well Depth (Ft)	Year Installed
AAC DP3 Outlet N	40	12	11/1/1951
AAC DP3 Outlet S	60	18	11/1/1951
AAC DP4 Large	30	14	8/1/1951
AAC DP4 Small	10	10	8/1/1951
AAC DP5 Large	25	12	1/1/1997
AAC DP5 Small	15	12	1/1/1997
AAC DP6	5	8	7/27/1960
DP11	5	20	4/18/1963
DP12	5	8	2/3/1965
EHL DP17	10	20	5/15/1967
EHL DP18	10	20	9/16/1968
EHL DP19	10	20	9/9/1968
EHL DP20	15	20	9/26/1968
EHL DP21	10	20	11/12/1968
EHL DP22	10	20	11/4/1968
EHL DP23	10	20	3/30/1970
DP27A	2 @ 5 each	*	*
EHL DP27 North	10	20	12/13/1972
EHL DP27 South	15	20	12/13/1972
EHL Pump A DR	40	18	*
Holtville Pump	*	*	*

*

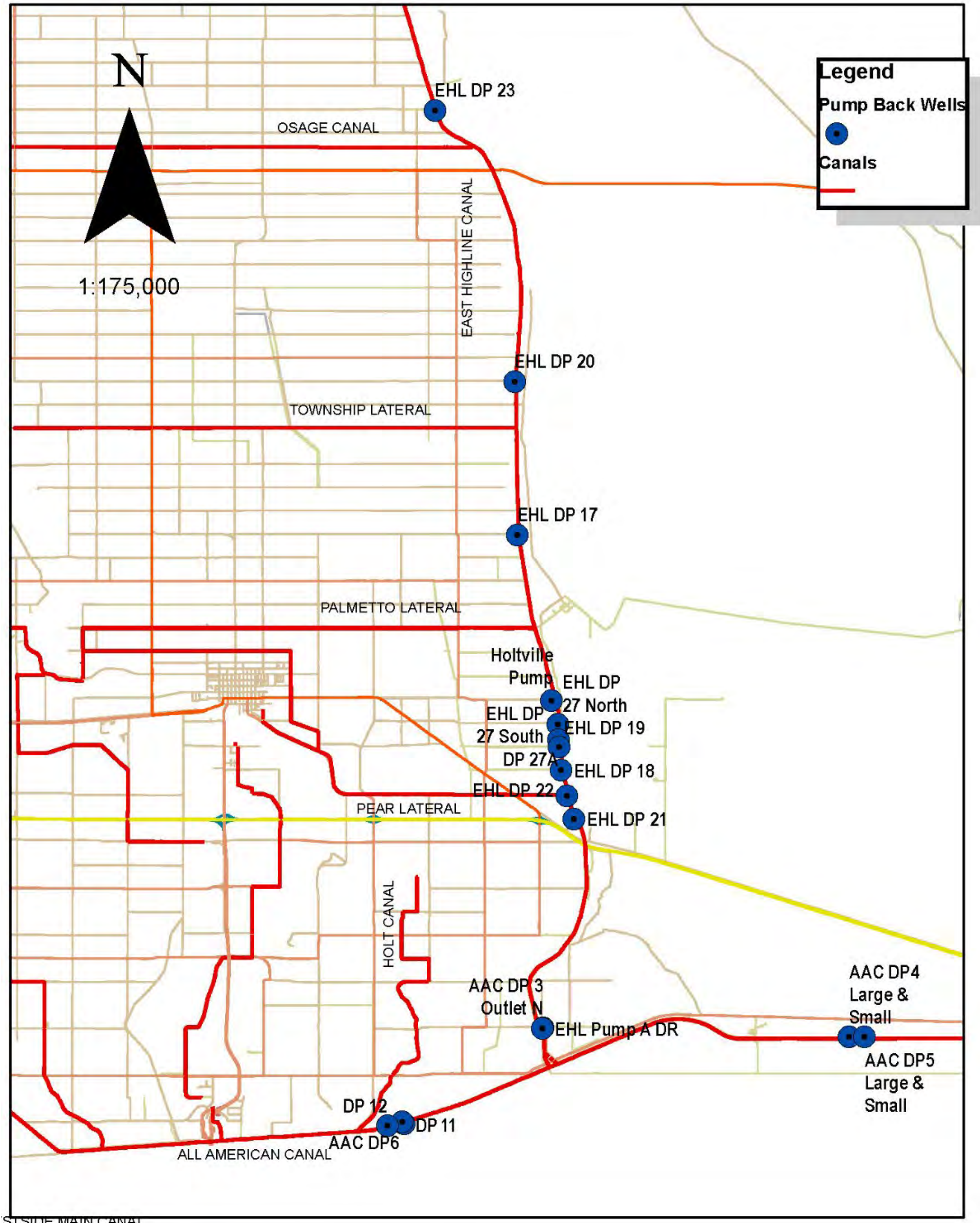


Figure 3-7: IID Pump Back Wells

3.6 IID Service Area

IID's service area includes Brawley, Calexico, El Centro, Imperial, Holtville, Westmorland and Calipatria. The three census-designated places are Niland, Seeley and Heber. Niland, Calipatria and Calipatria State Prison receive treated water from Golden State Water Company and Heber is served by the Heber Public Utility District. The remaining municipal areas operate its own water treatment plant. The IID does not provide potable/treatable water services to any entity. The map below shows the IID Service Area broken down into four (4) units: Imperial (630,327 acres), West Mesa (117,845 acres), East Mesa (218,897 acres) and Pilot Knob (21,696.90 acres). Figure 3-8 is the IID Service Area per IID GIS Public Water Map. This information can be found on IID's website.

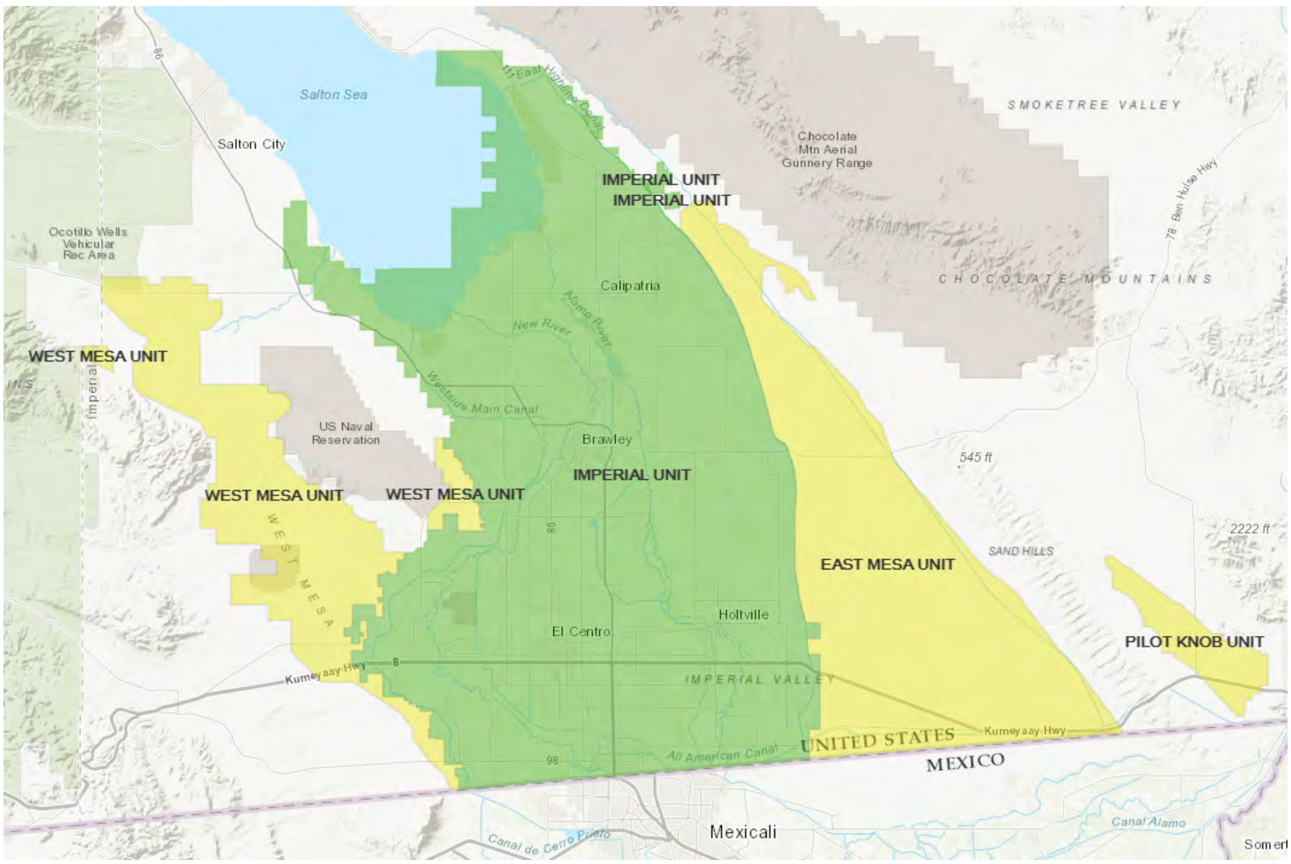


Figure 3-8: IID Service Area Map

3.7 Current and Future IID Projects

The following tables, Tables 3-7 and 3-8, show IID Canal Concrete Lining and Pipeline Projects from 2014 through the present. These projects help minimize losses due to seepage and have allowed the District to eliminate a number of the pump back wells previously along IID canals. The total length of concrete lining from 2014-present is 85,625 feet. Table 3-7 shows IID's Current and Future Concrete Lining Projects.

The highlighted rows indicate the future projects that are in construction and are set to be completed in 2020. This information was provided by IID and is current through October 9th, 2020.

Table 3-7: IID Current and Future Concrete Lining Projects

Project Name	Description	Length (ft)	Completion
Ebony Canal Concrete Lining	Replace Concrete Lining from Chk for G9 to End	2,689	2015
Best Canal Concrete Lining	Install new Concrete Lining from Dogwood Rd. to Bryant Rd.	2,600	2014
Acacia Canal Concrete Lining	Install new Concrete Lining from G45 to Chick Rd.	3,549	2015
Pear City Ditch - Replace Concrete Lining	Replace Concrete Lining from Heading to G30L	6,270	2014
Mesquite Lateral Concrete Lining	Install new Concrete Lining from G3 to G5	2,395	2014
Moorhead Lateral 3 Concrete Lining	Install new Concrete Lining from Heading to Dietrich Rd.	1,400	2015
Osage Lateral Concrete Lining	Install new Concrete Lining from Magnolia School to Casey Rd.	600	2016
Maple Lateral Concrete Lining	Install new Concrete Lining from Heading to Delivery 2	3,576	2016
Elder Lateral 3 Concrete Lining	Replace Concrete Lining from Heading to Brockman Rd.	2,640	2016
Alder Canal Concrete Lining	Install new Concrete Lining from G7 to G8	2,618	2016
Osage Lateral Concrete Lining	Install new Concrete Lining from Delivery 20 to Delivery 21	2,570	2016
Smilax Lateral Concrete Lining	Replace Concrete Lining from Heading to Delivery 65	2,640	2017
Mesquite Lateral Concrete Lining	Install new Concrete Lining from Delivery 5 to Delivery 6	2,636	2017
Eucalyptus Lateral 2 Concrete Lining	Replace Concrete Lining from Delivery 20 to past Delivery 21	2,150	2018
Flax Canal Concrete Lining	Replace Concrete Lining from Delivery 22 to Spill	2,640	2017
Hemlock Canal Concrete Lining	Replace Concrete Lining from Delivery C to Gunterman Rd.	2,943	2018
Maiva Lateral 2 Concrete Lining	Install new Concrete Lining from Delivery 17 to Delivery 19	2,548	2018
Thorn Lateral 1 Concrete Lining	Install new Concrete Lining from Delivery 119 to Delivery 120	1,967	2018

Project Name	Description	Length (ft)	Completion
Mesquite Lateral Concrete Lining	Install new Concrete Lining from Delivery 6 to Delivery 8	2,585	2018
Rose Lateral 9 Concrete Lining	Install new Concrete Lining from Heading to end	1,284	2018
Pampas Lateral Concrete Lining	Install new Concrete Lining from Delivery 23A to Delivery 24	1,205	2019
Hemlock Canal Concrete Lining	Replace Concrete Lining from Gunterman Rd. to Delivery 2	1,134	2019
Mesquite Lateral Concrete Lining	Install new Concrete Lining from Delivery 8 to Delivery 9	2,687	2019
Orange Lateral Concrete Lining	Install new Concrete Lining from Delivery 7 to Delivery 8	2,553	2019
O Lateral Concrete Lining	Install new Concrete Lining from Delivery 16 to UPRR	1,876	2019
Ash Main Concrete Lining	Replace Concrete Lining from McCabe Rd. to Lateral 25 Heading	2,643	2020
Oak Lateral Concrete Lining	Install new Concrete Lining from Delivery 4 to Delivery 5	1,642	2020
Munyon Lateral Concrete Lining	Install new Concrete Lining from Delivery 12 to Delivery 13	2,777	2020
Osage Lateral Concrete Lining	Install new Concrete Lining from Delivery 23 to Pipe Crossing	1,850	2020
Elder Canal Concrete Lining	Replace Concrete Lining from Delivery 108 to Delivery 109	2,780	2020
Nutmeg Lateral Concrete Lining	Install new Concrete Lining from STA 12+00 to Delivery 4	1,652	2020
Mesquite Lateral Concrete Lining	Install new Concrete Lining from Delivery 9 to Delivery 10	2,658	2020
Moss Lateral Concrete Lining	Install new Concrete Lining from Delivery 5 to Delivery 6	2,600	2020
Dogwood Canal Concrete Lining	Install new Concrete Lining from Delivery 1 to Lateral 1 Heading	2,640	2020
Eucalyptus Canal Concrete Lining	Replace Concrete Lining from Delivery 149 to Delivery 150	2,628	2020

Table 3-8 shows IID Pipeline Projects from 2014-present. This information was provided by IID and is current through October 9th, 2020.

Table 3-8: IID Current and Future Pipeline Projects

Project Name	Description	Length (ft)	Completion
Rice 1 Drain	New pipeline for southbound turn lane improvements	830	2015
Oakley Canal Pipeline	New pipeline to create access to Calle De Valenzuela St.	532	2016
Date Drain @ Wake Ave. - Relocate Pipe	Replace existing pipeline to accommodate new City Sewer pipe	90	2016
Dahlia 8 Drain Phase 1 - Neckel Rd. Signalization	New pipeline to allow for signalization of Neckel Rd.	232	2016
Dahlia 8 Drain - Neckel Rd. Signalization	New pipeline to allow for signalization of Neckel Rd.	110	2016
Eucalyptus Lateral 2B Pipeline	New pipeline to replace deteriorated concrete lining	1,900	2016
North Date Canal Pipeline - City of El Centro	New pipeline to provide safety in area	1,430	2016
Dahlia Canal Pipeline Replacement - Circle K	Replace unreinforced pipe with reinforced pipe for development of Circle K		2017
Mount Signal Drain - Imperial Solar Energy Center	New pipeline of Mount Signal Drain	152	2017
North Date Lateral 4 Pipeline	New pipeline from UPRR outlet structure to Cross Road inlet structure	1,634	2018
Pear 9th St. Canal Pipeline (Phase 3) - City of Holtville	New pipeline for City of Holtville	328	2017
Thistle 7 Drain Pipeline	Replace approximately 1/4 mile of pipeline	1,300	2019
Date Drain Pipeline - Caltrans/I8 Interchange	Replace	1,300	2019
Best Canal Pipeline (Phase 1) - City of Brawley	New pipeline for City of Brawley	856	2019
Acacia Lateral 5 Pipeline	New pipeline from Meadows School to Evan Hewes Hwy	720	2020

3.8 Operations of the Water System

One of the provisions called for in the 1988 water conservation agreement between the IID and the Metropolitan Water District of Southern California was the construction of a modern, automated Water Control Center. This centralized facility has greatly improved control of IID's water delivery system.

Operation of IID's main canal system has evolved extensively over the years. Initially, the system was controlled manually by field personnel, who routed water on-site by electric powered gates or manual gate lifts. Beginning in the late 1950s, remote-controlled equipment was installed through telephone lines, which provided better control of large sites along main canals. Water delivery equipment for the All-American Canal and the upstream half of Imperial Valley main canals is now controlled from IID Headquarters.

System Automation

Beginning in the late 1980s, IID began to replace approximately half of the old remote-controlled systems in the field and at the control office with computerized equipment. Telephone communication links to the sites were also replaced with a radio/microwave communication network. This type of radio communication network provides automated operation of field sites along with monitoring and control capabilities directly from the control room. In 1988, IID's first automated site was completed along with the construction of the Carter Reservoir. Since then, the Water Control Center (Water Dispatching) has electronically controlled all main canal water.

Construction

After almost one year of construction, the new $3 million Water Control Center became fully operational in September of 1993. The 10,000 square-foot building constructed at IID Headquarters now houses all the hardware and software used to regulate automated gates for water delivery as well as collect information needed to verify water savings. In addition, the building is equipped with a backup generator that ensures uninterrupted power service to the control system. Prefabricated electrical control equipment, in cargo containers at each control site, is solar powered or equipped with generators.

Other innovative technology was also implemented and includes earthquake disaster recovery features, computer-generated screens displaying control room information, acoustical velocity flow measurement devices and the implementation of unique changeover procedures to allow for continuous 24-hour service at the control center and at canal sites.

The command center provides a controlled environment for water dispatchers, engineers and operation personnel. The center is equipped with a visitor's lobby where guests can observe water control operations through a large window. On display are IID artifacts from the '30s, '40s and '50s that include the very first system automation equipment. The center also houses a large conference room, small kitchen and several administrative offices.

The Water Control Center was recently remodeled in 2019; Integrated Information Management implementation status was executed. The IID had automated 116 of the total 223 lateral headings, upgraded Supervisory Control and Data Acquisition (SCADA) antennae and cellular systems and installed 106 of 120 mobile laptops on zanjero vehicles for efficient operations.

4.1 Introduction

The raw water delivered via IID's delivery system is tested as required by Title 22 California code by each State regulated system and County regulated systems. There are many potential sources of bacterial (Total Coliform, Fecal Coliform, and E.coli) concentrations in the source water. The raw water is tested and recorded before entering any Water Treatment Facilities on a regular basis.

Coliforms are group of bacteria that are found in the environment but can also be found in the intestines and feces of animals and humans. Coliforms are often found in soil, plant matter, and surface water. While most coliform bacteria are not harmful to humans; their presence in drinking water indicates that pathogens could be present. Most pathogens contaminating water supplies come from feces. Testing for coliform bacteria is relatively easy and inexpensive unlike testing for all possible pathogens. For the previously mentioned reasons, coliform testing is used as an indicator for possible contamination.

Total coliform bacteria are commonly found in soil and are typically harmless. If only total coliform bacteria are detected in drinking water, the source is probably from a non-pathogenic environmental origin, meaning fecal contamination is not likely. The presence of environmental contamination shows there may be a way for pathogens to enter the system. It is imperative to find the source of the problem and resolve it to prevent further contamination.

Fecal coliform bacteria are a sub-group of total coliform bacteria. They considered to be present specifically in the intestines and feces warm blooded animals. The presence of fecal coliform in a drinking water sample often indicates recent fecal contamination, signifying a greater risk that pathogens are present than if only total coliform bacteria is detected.

E. coli is a sub-group of the fecal coliform group. Most E. coli bacteria are harmless and are found in great quantities in the intestines of people and warm-blooded animals. Some strains, however, can cause illness (the strain E. coli 0157:H7). The presence of E. coli in a drinking water sample usually indicates recent fecal contamination, representing a greater risk that pathogens are present. E.coli is a main indicator for inactivation requirements. In the proceeding charts, an E.coli value over the threshold of 100 MPN/100 mL are highlighted.

Turbidity is a measure of relative clarity of a liquid and is found by measuring the amount of light that is scattered by material in the water when a light is shown though. Turbidity is caused by total dissolved solids (TDS) or total suspended solids (TSS).

The regulation necessitating testing is the Total Coliform Rule (TCR). The TCR was first implemented in June, 1989 with the purpose of improving public health by reducing fecal pathogens by controlling total coliform bacteria, including fecal coliforms and Escherichia coli (E. coli). By implementing this rule, the risk of illness from disease causing organisms has been reduced. The TCR applies to all public water systems and the Maximum Contaminant Level (MCL) is based on the presence or absence of total coliforms and not the density. The TCR outlines the sampling requirements for water system providers.

4.2 State Regulated Drinking Water Providers

The state regulated drinking water providers in Imperial County with corresponding treatment plants and population are shown in the following table: (Data from CA State Water Board – Electronic Annual Report)

Table 4-1: State Regulated Drinking Water Providers

System	System #	Population Served
Brawley, City of	1310001	26,273
Calexico, City of	1310002	40,357
Calipatria (GSWC) City of	1310003	10,731
Ca. Dept. of Corrections Centinela	1310801	4,600
Department of Homeland Security, Calexico	1310019	330
El Centro, City of	1310004	46,315
GSA Calexico Port of Entry	1310016	300
Heber Dunes - SVRA	1310301	28
Heber Public Utility District	1310007	6,979
Holtville, City of	1310005	6,032
Imperial, City of	1310006	19,372
NAF El Centro	1310700	1,022
Seeley County Water District	1310013	2,124
Sonny Bono Salton Sea Wildlife Refuge	1310302	79
UC Desert Field Station	1300571	53
Westmorland, City of	1310008	2,444

Figure 4-1 is a map showing the raw water intake connection point to the canal system for the state regulated systems.

IID WATER SOURCE FACILITIES

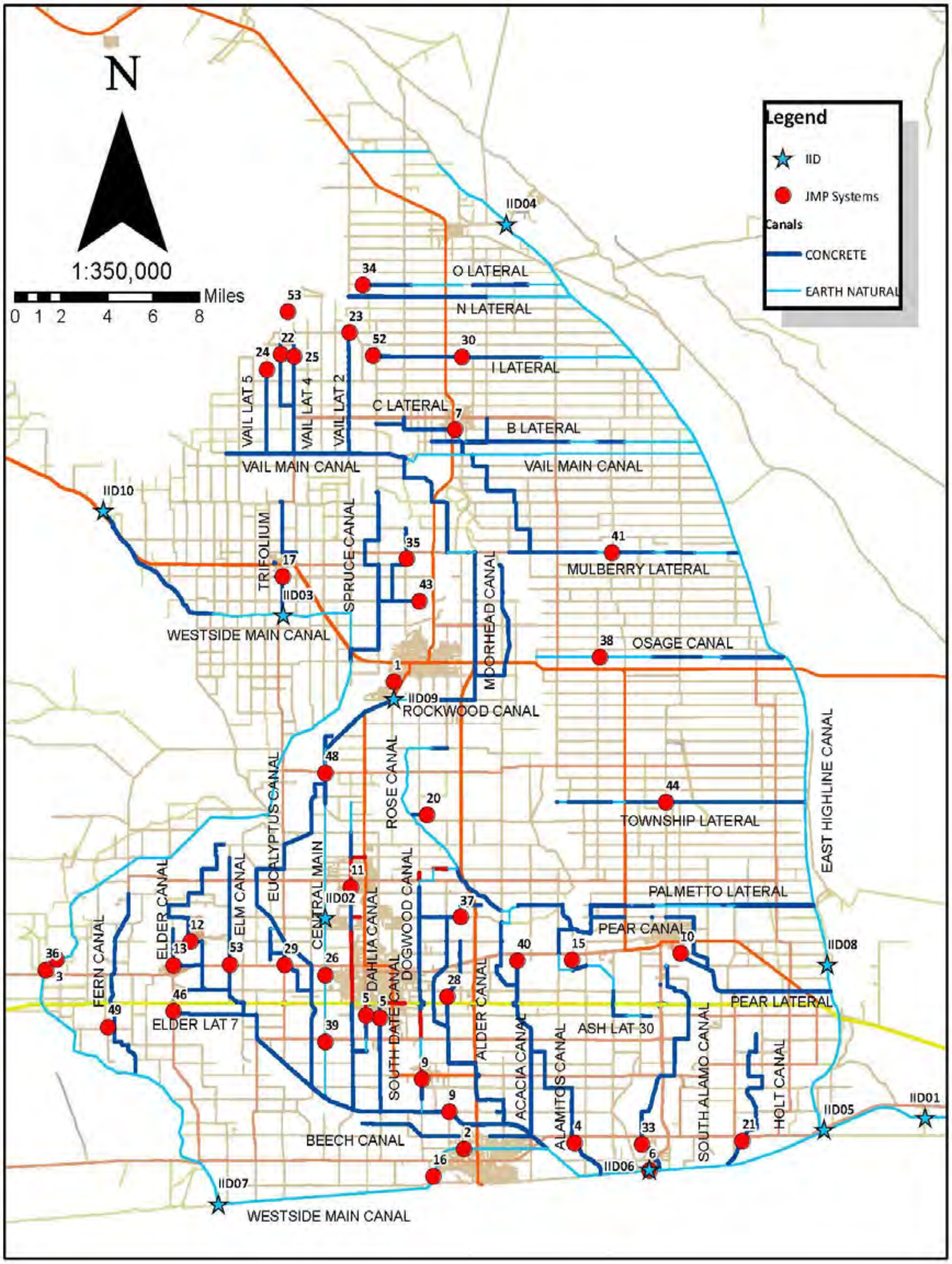


Figure 4-1: State Regulated Drinking Water Provider Intake Map

City of Brawley (1310001)

The City of Brawley owns and operates a system that provides potable water for a population of 26,273 through approximately 5,900 potable water service connections. The water treatment plant facilities consist of two (2) raw water storage reservoirs totaling 40 MG capacity and one 15 MGD water treatment plant (WTP) with a current average daily use of 7.5 MGD.

The City purchases Colorado River water from IID. The Mansfield Canal carries raw water north from the Central Main Canal into the two raw water storage ponds and on to the WTP.

Table 4-2 shows the City of Brawley Bacteriological data from 2014- 2019 which was received from the State Water Board.

Table 4-2: City of Brawley Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016				2017			2018			2019		
	TC	FC	T	TC	FC	T	TC	FC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	140	80	9.4	80	50	6.8	220	27		7.1	240	5	5.7	172	1	4.6	44	2	4.1
Feb.	110	30	12.6	900	110	11.7	110	13	9	11.5	145	7	10.0	89	2	5.3	95	4	4.4
March	280	50	30.2	350	50	16.9	130	17	10	16.6	220	2	16.3	65	1	4.8	207	6	4.6
April	500	80	23.6	900	50	19.7	500	23	11	15.8	205	5	8.8	182	7	8.1	295	8	5.6
May	300	30	30.9	170	70	20.3	300	50	28	18.1	500	17	9.6	364	17	7.4	222	19	6.4
June	900	34	37.5	500	22	30.0	300	30	17	27.1	185	10	8.7	345	24	7.3	625	78	6.0
July	170	12	33.9	500	110	30.9	110	11	21	26.3	65	4	5.5	202	7	6.1	244	15	9.5
Aug.	500	17	22.0	300	26	23.3	300	80	20	24.2	300	6	7.4	450	4	8.1	525	11	9.7
Sep.	125	11	25.3	280	30	18.8	400	55	15	18.7	500	15	8.2	205	3	6.7	287	19	10.0
Oct.	205	10	18.7	80	7	22.1	1050	65	19	16.1	195	12	6.5	292	3	7.1	268	7	9.8
Nov.	400	40	13.5	170	20	12.4	240	8	2	9.8	170	2	6.1	162	7	5.4	710	5	7.5
Dec.	170	40	8.0	240	70	7.0	75	14	4	7.8	30	2	4.6	33	1	4.0	29	2	5.2
Avg.	317	36	22.1	373	51	18.3	311	33	14	16.6	230	7	8.1	213	6	6.2	296	15	6.9
6-yr. Avg.	TC =	290	FC =	40	EC =	11	T =	13.1											

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

As shown in the table above, E.coli numbers tend to be higher in the summer months but never passed the threshold number of 100 MPN/100mL.

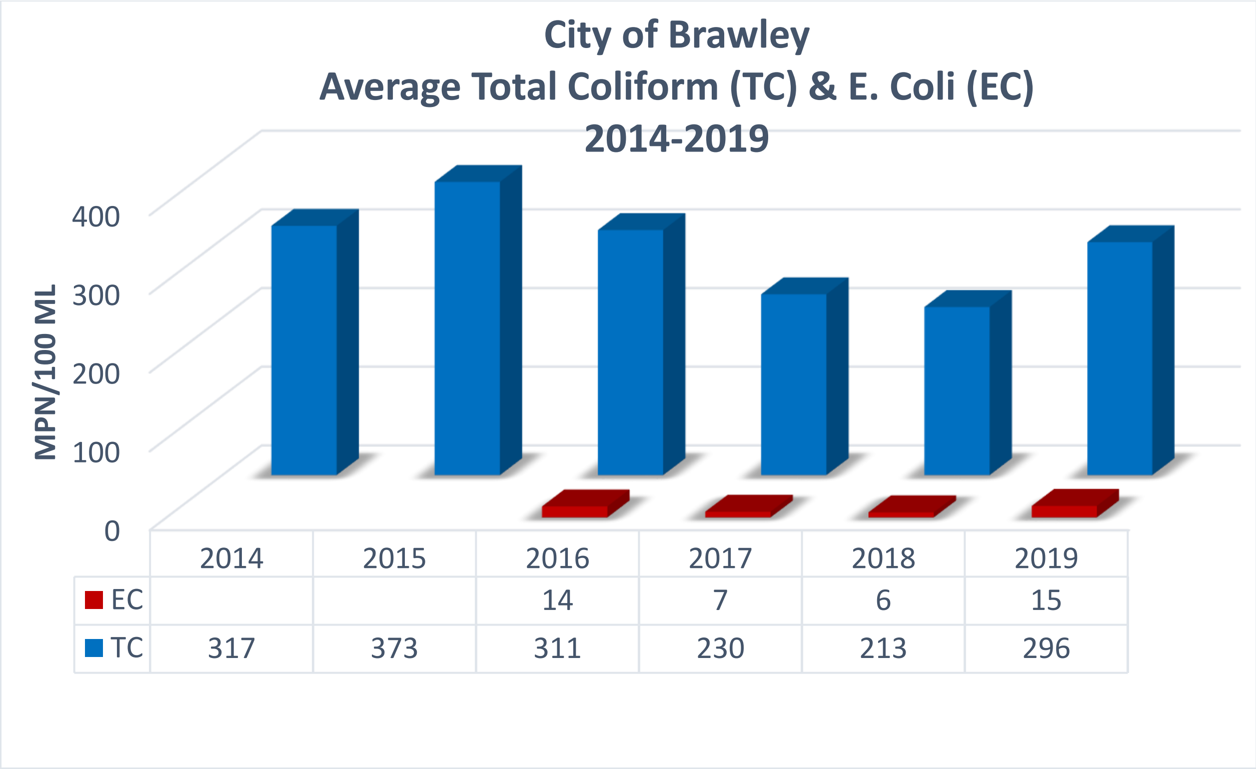


Figure 4-2: City of Brawley Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

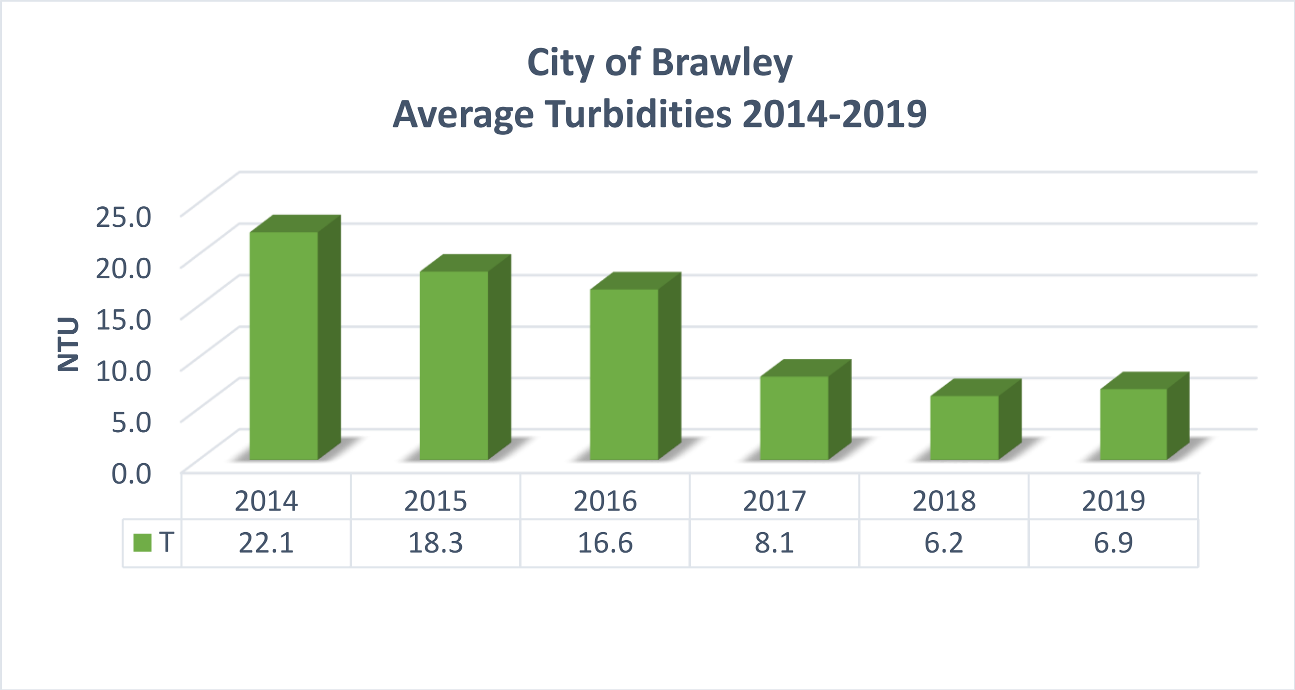


Figure 4-3: City of Brawley Sampling Data, Avg. Turbidity (2014-2019)

City of Calexico (1310002)

The City of Calexico owns and operates a system that provides potable water for a population of 40,357. The water treatment plant (WTP) facilities consist of a 25 MG raw water storage reservoir and a 14 MGD water treatment plant, with a current daily maximum use of 9.0 MGD. Existing storage capacity totals 16 MG from three different tanks. There are currently two 6.0 MG tanks and a 4.0 MG tank.

The City purchases Colorado River water from IID via the All-American Canal, where it is pumped from the canal to the raw water storage reservoir approximately 1 miles north of the WTP. From here, the water is screened and then pumped to the WTP. The raw water storage reservoir can be bypassed by diverting the water directly to the WTP influent pumps or the canal water can flow by gravity directly to the WTP.

Table 4-3 shows City of Calexico bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL.

Table 4-3: City of Calexico Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016			2017			2018			2019		
	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	1600	238	1.1	500	47	0.6	50	9	0.7	240	6	0.5			0.8	110	6	1.5
Feb.	900	83	1.2	50	2	0.7	240	10	1.0	300	2	0.6	50	1	0.9	130	26	1.1
March	170	17	1.8	900	7	0.8	500	2	1.4	130	4	1.0	130	8	1.0	93	44	1.1
April	240	11	2.1	80	<1	1.3	1600	11	1.9	130	2	1.5	240	1	1.3	390	15	1.3
May	50	3	2.2	170	4	1.9	240	<1	1.3	50	<1	1.3	23	<1	1.4	130	1	1.3
June	240	6	1.5	500	2	1.9	500	7	1.7	22	<1	1.5	80	<1	1.4	26	1	1.0
July	170	1	1.4	300	2	1.1	26	2	1.3	23	1	1.1	240	<1	1.4	170	1	1.0
Aug.	80	2	1.1	80	<1	1.0	240	1	1.1	240	17	1.1	30	1	1.0	240	2	1.1
Sep.	17	<1	1.0	14	<1	1.0	14	1	0.9	22	1	1.0	80	3	0.8	170	1	1.3
Oct.	50	1	1.6	22	1	1.2	80	1	0.9	27	<1	0.9	14	<1	0.8	30	0	1.2
Nov.	240	<1	1.6	14	<1	0.9	50	<1	0.8	240	1	1.0	8	<1	1.0	11	0	1.2
Dec.	500	45	1.0	140	4	0.7	130	3	0.6	300	4	0.8	130	2	1.0	30	11	1.0
Avg.	355	41	1.5	231	9	1.1	306	5	1.1	144	4	1.0	93	3	1.1	128	9	1.2
6-yr. Avg.	TC = 209		EC= 10		T= 1.2													

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

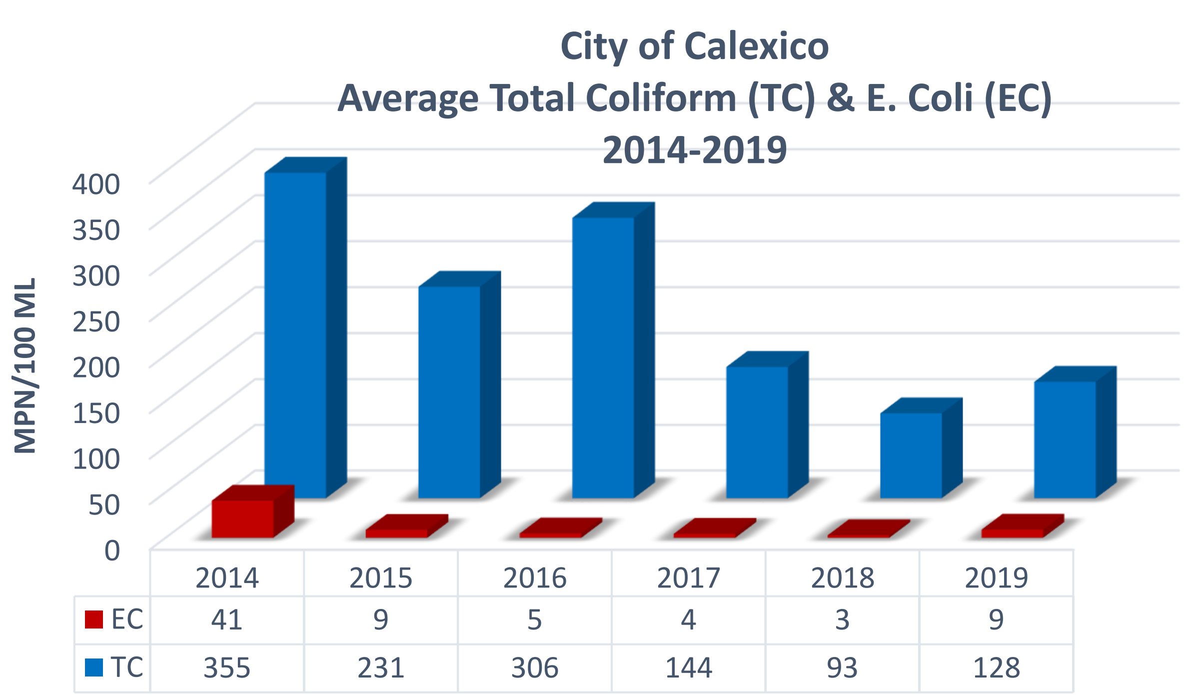


Figure 4-4: City of Calexico Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

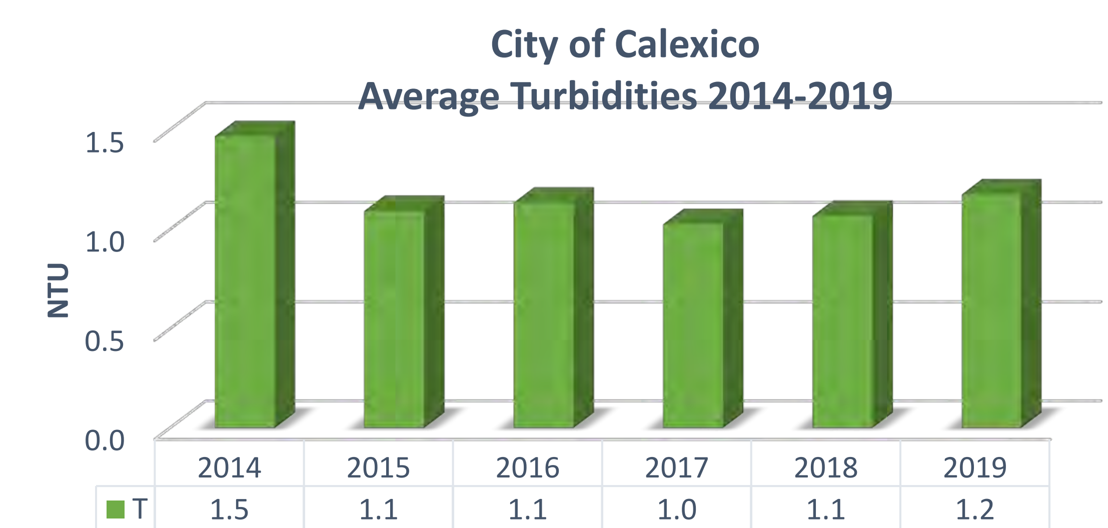


Figure 4-5: City of Calexico Sampling Data, Avg. Turbidity (2014-2019)

City of Calipatria, GSWC (1310003)

Golden State Water Company (GSWC) owns and operates the water treatment plant located in the City of Calipatria providing potable water to an estimated population of 4,425. This plant provides treated water for Calipatria, the community of Niland and the State Prison, which has its own onsite water distribution system. The WTP has a capacity of 6 MGD. In 2015, GSWC add surface aeration treatment at the Niland tanks for Total Trihalomethanes management.

GSWC receives raw water from IID via the East High line Canal to C West lateral to Gate. Raw water flows by gravity through a pipeline to two 4.5 MG raw water storage ponds the water is then pumped through a flash mixer prior to entering US Filter Micro floc treatment units, followed by a polymer coagulant/filter aid. Treated water is pumped to two 1.1 MG storage tanks operated in series. GSWC may choose to divert 1,200 gpm through a set of four 20,000 lb. granular activated carbon (GAC) adsorption filters which were installed to mitigate Total Trihalomethanes (TTHMs).

Table 4-4 shows City of Calipatria bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-4: City of Calipatria Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	285	4	25.7	1576		24.6	364	10	16.9	1095	<10	12.4	211	76	17.6	5492	2	13.5
Feb.	816	5	29.4	1777		37.3	1467	20	23.2	2909	10	14.4	591	8	20.7	3968	228	20.5
March	2400	9	37.0	3654		35.5	1198	10	25.1	3873	71	22.2	145	10	23.0	1725	20	18.0
April	46111	41	36.7	6131		32.2	4352	30	28.9	1956	<10	23.9	24119	10	29.5	1725	20	18.0
May	7701	31	38.2	3654	31	36.2	4884	20	25.6	9000	41	27.2	3873	20	27.4	6015	72	21.8
June	6131	10	43.6	6131	20	43.5	2866	45	33.0	2200	41	30.6	6488	63	27.7	6893	20	27.9
July	10462	84	49.8	4833	21	41.4	3755	30	32.5	7701	30	33.2	1414	12	32.6	689	2	34.6
Aug.	11199	63	59.3	579	2	33.6	6488	20	37.4	11189	<10	32.6	6015	52	39.3	6586	30	32.5
Sep.	24192	30	44.5	887	<1	30.9	11199	<10	30.3	3123	<10	35.4	4838	63	33.4	17329	52	28.3
Oct.	7701	10	40.8	613	5	31.1	2911	14	25.2	6131	31	22.9	24192	52	26.4	11199	52	16.1
Nov.	7148	10	27.3	261	1	20.1	713	13	18.0	2359	10	23.6	6015	52	15.2	9280	10	18.1
Dec.	1956	20	31.0	143	6	16.1	702	8	15.7	3076	31	17.8	4106	20	16.2	4611	10	17.2
Avg.	10508	26	38.6	2520	12	31.9	3408	20	26.0	3948	33	24.7	6834	36	25.8	6293	43	22.2
6-yr. Avg.	TC =	5615	EC =	29	T =	28.2												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

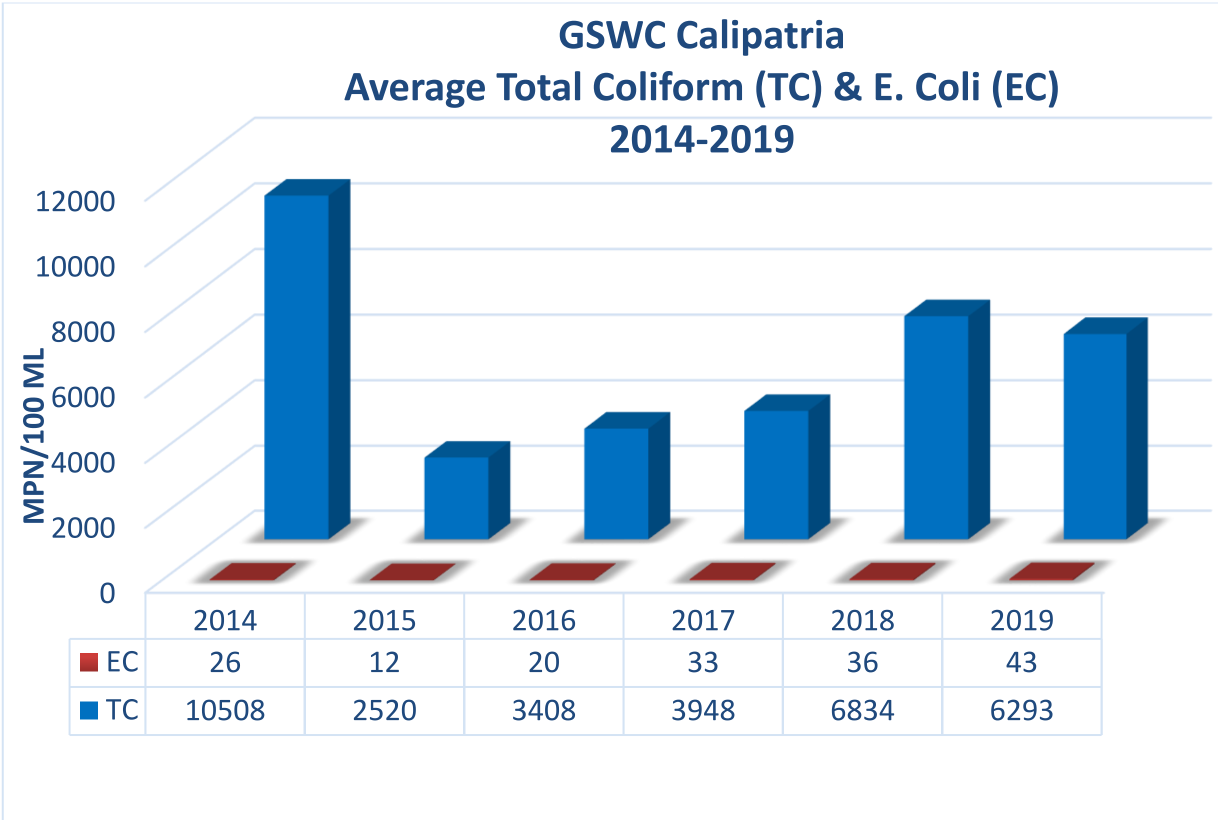


Figure 4-6: City of Calipatria Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

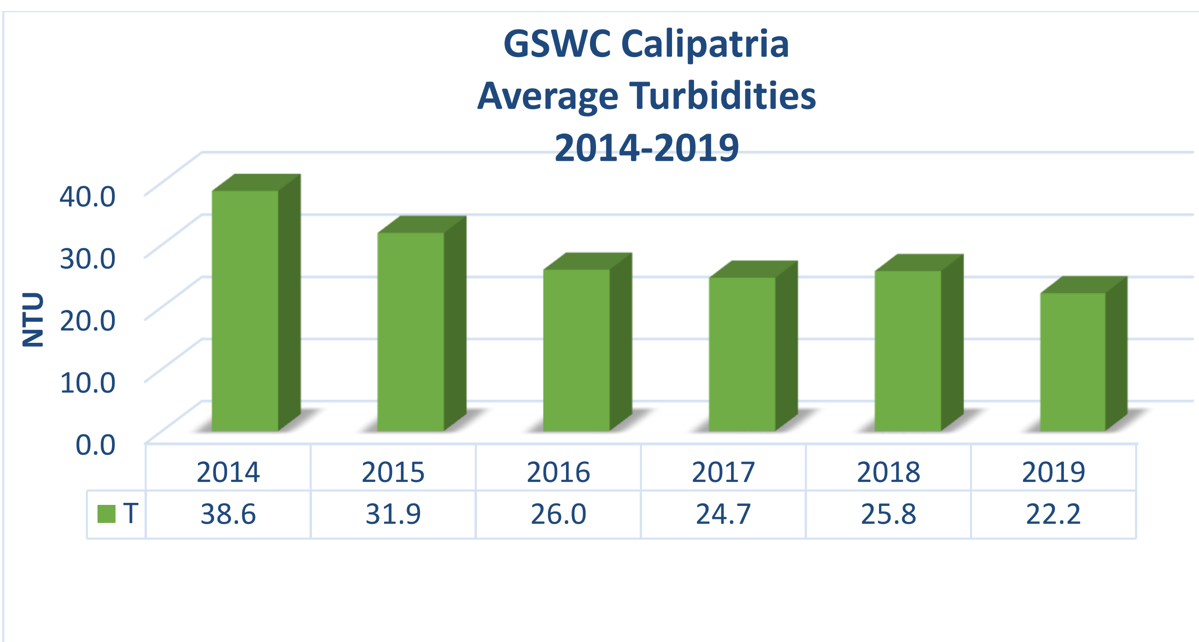


Figure 4-7: City of Calipatria Sampling Data, Avg. Turbidity (2014-2019)

Ca. Dept. of Corrections, Centinela (1310801)

Centinela State Prison owns and operates a water system that supplies potable water to the prison with an estimated population of 4,600.

Centinela State Prison purchases Colorado River water from IID via a lateral from the Westside Main Canal, Gate 18A. A 2 MGD packaged WTP provides treated water. Raw water storage consists of two lined reservoirs of approximately 5 MG each. The settled water is pumped to the package WTP where after the coagulation, flocculation, sedimentation, and filtration, hypochlorite solution provides disinfection. Treated water storage consists of two above ground reservoirs totaling 2.5 MG.

Table 4-5 shows Centinela State Prison bacteriological data from 2014- 2019 which was received from the State Water Board except where noted by footnote 1. The highlighted values indicate when the E.coli is >100 MPN/100mL.

This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-5: Centinela State Prison Raw Water Bacteriological (Monthly Averages)

Month	2014			2015			2016		2017		2018		2019		
	TC	EC	T	TC	EC	T	EC	T	EC	T	EC	T	TC	EC	T
Jan.	300 [1]	70 [1]	11.2	240 [1]	130 [1]	5.4	5 [1]	5.6	4	4.6	<1	3.3		1	4.4
Feb.	220 [1]	130 [1]	11.3	350 [1]	130 [1]	7.2	10 [1]	6.6	2	7.8	1	4.7		10	7.4
March	80 [1]	30 [1]	15.0	2400 [1]	170 [1]	7.3	13 [1]	8.8	12	8.2	1	5.9		2	10.4
April	500 [1]	140 [1]	12.3	500 [1]	33 [1]	9.1	4 [1]	8.8	15	7.7	1	6.7		18	10.5
May	240 [1]	13 [1]	12.9		37 [1]	10.7	22 [1]	8.2	23	8.6	8	10.6		16	10.2
June	300 [1]	13 [1]	12.0		7 [1]	13.4	2	9.7	28	10.3	18	9.1		28	9.2
July	110 [1]	17 [1]	11.1		7 [1]	9.0	15	10.1	15	11.2	5	11.9		4	12.2
Aug.	300 [1]	130 [1]	12.6		18 [1]	9.4	13	10.3	18	10.8	2	6.7	2400	4	12.3
Sep.	280 [1]	50 [1]	10.1		52 [1]	10.6	21	7.5	1	10.4	4	5.7	2400	7	11.1
Oct.	300 [1]	4 [1]	11.1		79 [1]	11.4	19	7.2	2	10	4	4.6	2400	5	10.9
Nov.	80 [1]	11 [1]	10.5		31 [1]	9.1	17	5.2	15	4.6	<1	4.1	920	4	10.4
Dec.			7.5			6.0	8	4.1	7	3.2	7	3.7	610	5	6.6
Avg.	246	51	11.5	873	63	9.1	12	7.7	12	8.1	5	6.4	1746	9	9.6
6-yr. Avg.	TC =	955	EC =	25	T =	8.7									

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

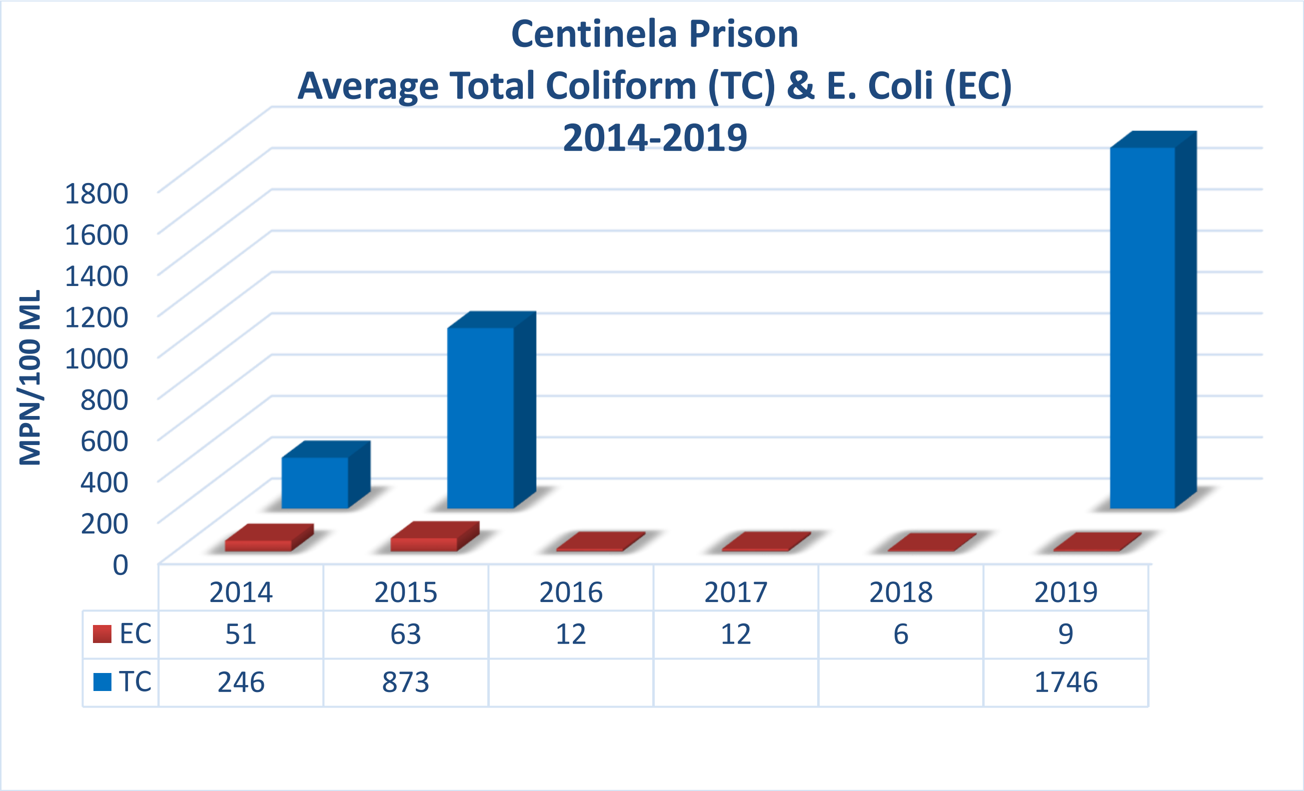


Figure 4-8: Centinela State Prison Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

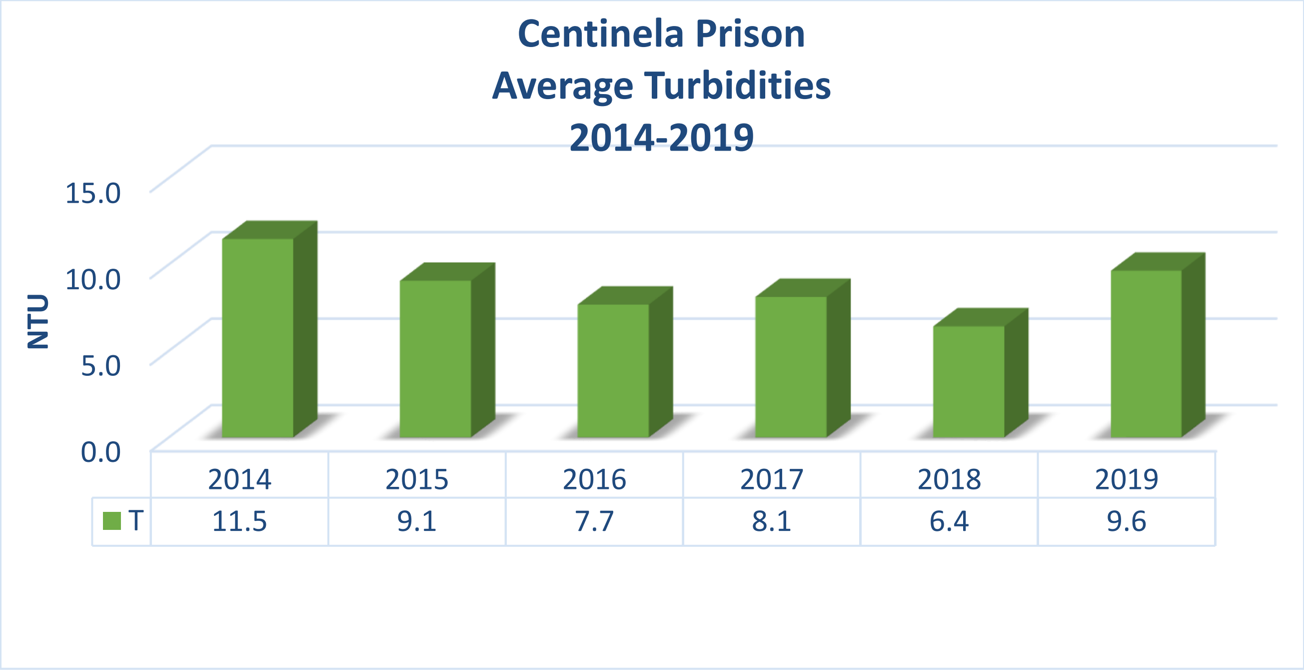


Figure 4-9: Centinela State Prison Sampling Data, Avg. Turbidity (2014-2019)

DHS Calexico (1310019)

DHS Calexico Border Patrol Station is a nontransient noncommunity surface water system that serves approximately 330 people. A single service connection serves one administration building, approximately 250 office and field staff and up to 70 detainees.

The water treatment system consists of a 33,551 gallon raw water storage tank, dual parallel WesTech AltaPac II membrane filtration systems, a Trojan UV Swift Model B03 ultraviolet disinfection units, hypochlorite injection, a 500 gallon chlorine contact tank, an 11,250 gallon potable water storage tank, two 1,000 gallon hydropneumatic potable water storage tanks, and one 62 gallon hydropneumatic utility water storage tank. In 2015, a spray aeration system was added in the storage tank for the removal of Total Trihalomethanes from the finished water.

Table 4-6 shows DHS Calexico Border Patrol Station bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-6: DHS Calexico Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016			2017				2018			2019		
	TC	FC	T	TC	FC	T	TC	FC	T	TC	FC	EC	T	TC	EC	T	TC	EC	T
Jan.	11	2	165	170	13	160	80	4	162	17	2		168	240	4	131	50	3	124
Feb.	23	4	175	900	<14	170	80	14	170	50	2		192	80	<1	119	50	2	145
March	220	13	170	110	<2	170	170	3	170	240	1		107	280	<10	125	900	10	148
April	240	130	165	240	30	170	500	21	170	110	3		125	17	<1	122	870	6	148
May	50	30	170	170	14	180	130	19	165	300	11	1	148	240	2	118	2419	17	138
June	30	4	165	110	17	170	500	130	167	240	80	15	139	240	15	120	500	13	134
July	130	22	170	110	63	170	300	130	159	13	2	2	149	900	12	87	1600	8	134
Aug.	500	50	180	34	11	170	50	26	167	500	50	502	135	170	3	114		7	136
Sep.	300	23	180	300	3	165	300	3	169	130	50	7	130			122	2400	3	130
Oct.	1600	50	185	23	1	175	300	30	158	80	30	12	161	300	16	130	2933	4	60
Nov.	300	11	164	130	2	175	70	20	160	500	80	10	129	80	<1	123		2	17.5
Dec.	240	22	165	50	7	165	110	11	168	300	7		137	80	<1	133		2	43.4
Avg.	304	30	171	196	16	170	216	34	165	207	27	78	143	239	9	120	1302	6	113.2
6-yr. Avg.	TC = 411		FC = 27		EC = 31		T = 147.2												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

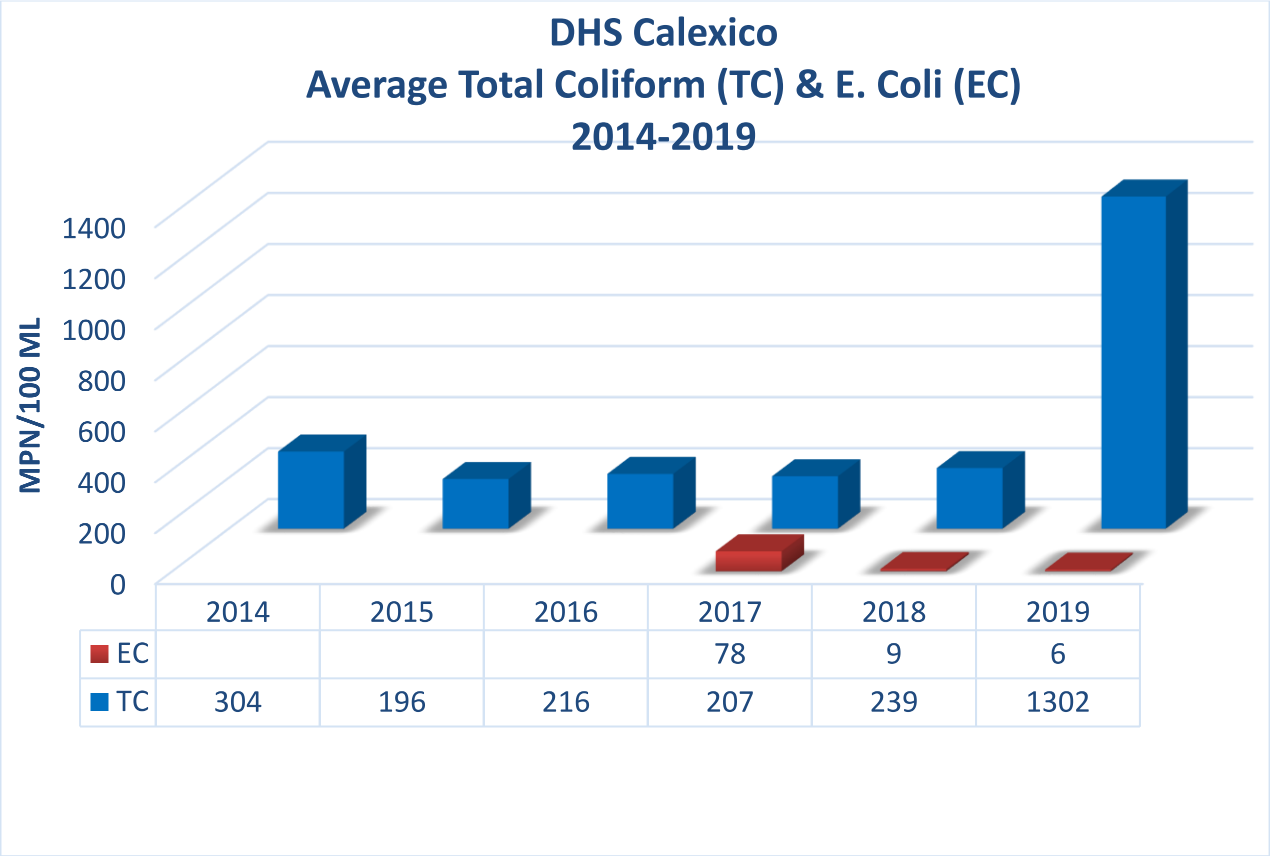


Figure 4-10: DHS Calexico Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

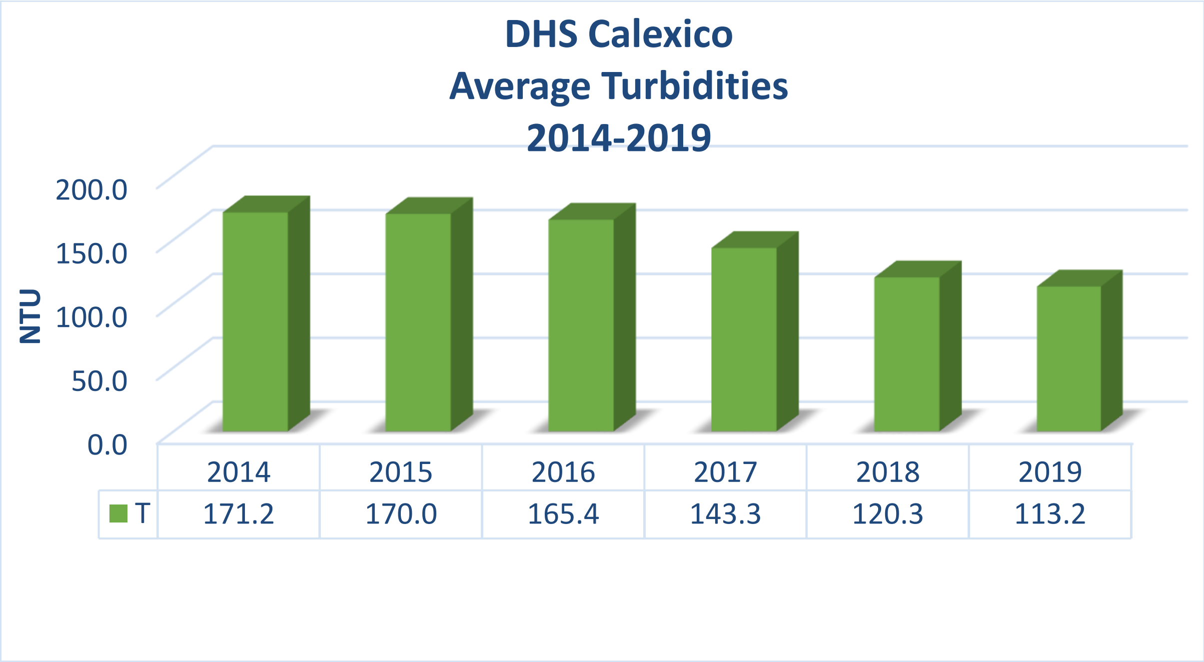


Figure 4-11: DHS Calexico Sampling Data, Avg. Turbidity (2014-2019)

City of El Centro (1310004)

The City of El Centro owns and operates a system that provides potable water for an estimated population of 46,315. The Dannenberg WTP facilities consist of a 50 MG raw water storage reservoir and a 21 MGD water treatment plant (WTP), with a current maximum daily use of 13 MGD. Existing treated water storage capacity totals 15 MG from four different tanks.

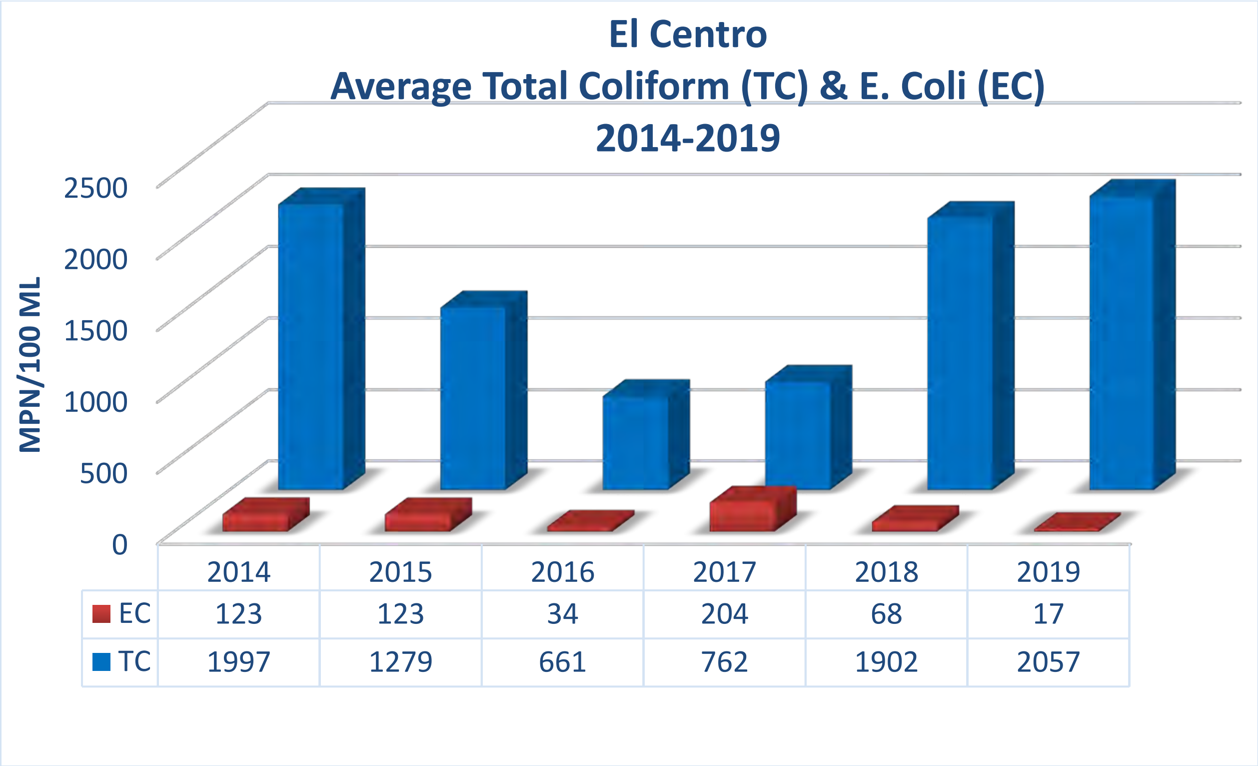
The City purchases Colorado River water from IID via two sources: the South Date Canal-Gate 20B and Dahlia Lateral 1-Gate 18A, each of which flows north from the Central Main Canal. This raw water flows by gravity into a raw water wet well and pump structure where four pumps lift the water to four raw water storage basins. From here, it flows by gravity into a structure comprised of four manually-controlled sluice gates that provide untreated raw water to the two clarifiers.

Table 4-7 shows City of Calexico bacteriological data from 2014- 2019 which was received from the State Water Board except where noted by footnote. The highlighted values indicate when the E.coli is >100 MPN/100mL.

Table 4-7: City of El Centro Raw Water Bacteriological Data (Monthly Averages)

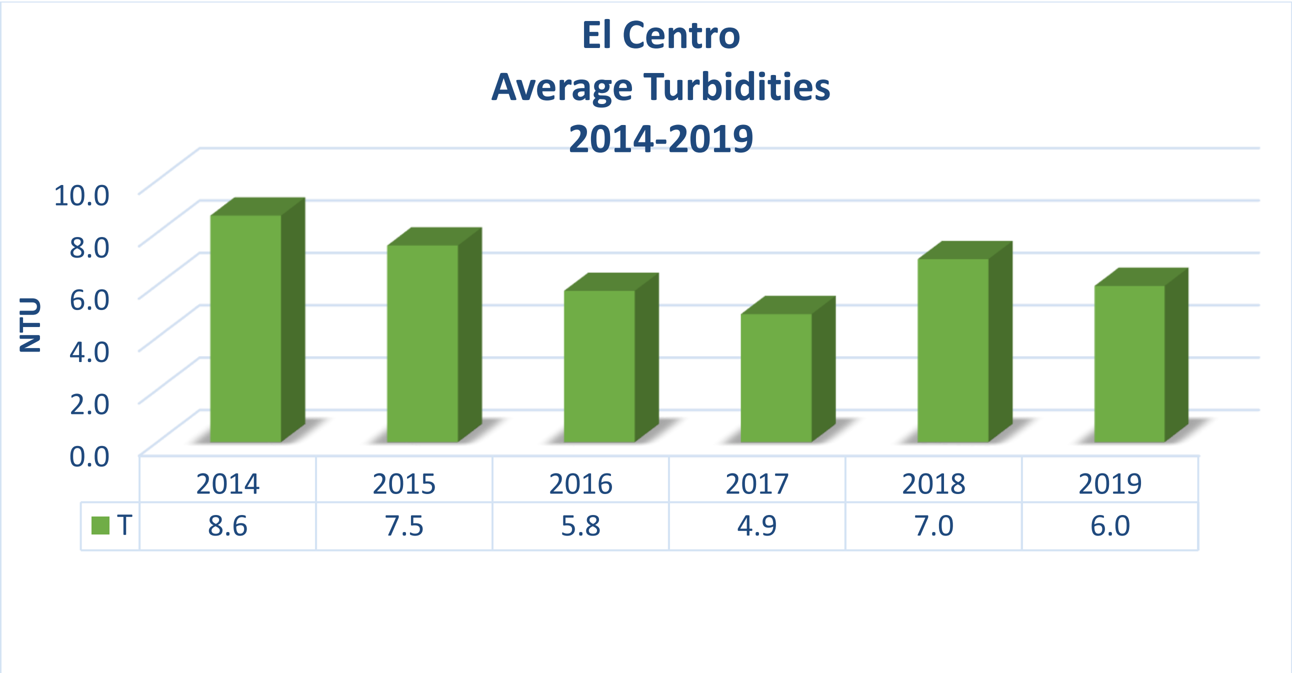
Month	2014			2015			2016			2017			2018			2019		
	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	332	5	3.3	897	698	8.4	379	11	4.7	1346	898	3.5	579	202	3.0	1986	19	2.8
Feb.	997	115	3.9	554	189	10.4	269	82	10.4	1986	894	6.5	780	127	7.5	1700	10	3.9
March	6294	122	7.8	511	154	7.6	390	44	7.6	630	320	7.6	2419	21	5.1	2203	15	6.5
April	4891	64	7.5	1242	23	5.6	364	29	5.6	401	44	5.0	2419	22	9.9	2419	21	9.3
May	1398 [1]	393	12.3	2009	168	6.2	795	31	6.2	338	136	5.0	1643	35	10.5	2419	35	11.8
June	1607 [1]	112	11.3	658 [1]	25	10.2	1405	26	5.0	534	24	7.6	2419	56	9.5	2419	37	6.8
July	1459 [1]	58	11.2	1020	51	11.9	989	29	5.3	350	13	4.3	2419	29	10.6	2419	17	6.6
Aug.	1308 [1]	137	9.8	5450	61	9.8	859	12	4.3	1378	7	4.7	2419	15	9.2	2419	16	4.9
Sep.	2727 [1]	<100	14.4	1200	38	6.6	1318	16	6.6	755	6	4.5	2419	220	7.6	2419	17	5.8
Oct.	1240	136	10.1	1136	23	4.6	541	24	3.2	649	30	3.4	2419	23	5.3	2419	6	4.3
Nov.	604	49	7.3	488	13	5.2	372	21	6.3	290	33	3.8	1811	58	2.4	1046	5	4.6
Dec.	1110	160	4.9	179	27	3.6	250	83	4.2	486	48	2.7	1120	10	3.2	816	5	4.2
Avg.	1997	123	8.6	1279	123	7.5	661	34	5.8	762	204	4.9	1902	68	7.0	2057	17	6.0
6-yr. Avg.	TC =	1237	EC =	81	T =	6.6												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)



	2014	2015	2016	2017	2018	2019
EC	123	123	34	204	68	17
TC	1997	1279	661	762	1902	2057

Figure 4-12: City of El Centro Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)



	2014	2015	2016	2017	2018	2019
T	8.6	7.5	5.8	4.9	7.0	6.0

Figure 4-13: City of El Centro Sampling Data, Avg. Turbidity (2014-2019)

GSA Calexico Point of Entry (1310016)

GSA, Calexico Port of Entry water treatment is a transient non- community system serving offices. Water is delivered to the site via the All American Canal. There is one 7,500 gallon concrete in-ground structure with a gravel pre-filter. Water is delivered via an 18-inch diameter reinforced concrete pipe. A fire suppression system is tied into the existing raw water storage tank. There is also a raw water irrigation distribution system.

A booster supply pump pushes water through the treatment plant and to the storage tank at 60gpm. There are (3) 15hp distribution pumps that pump from the storage tank at a rate of 100gpm. Treatment of the surface water is through a 60 gpm up flow clarification and down flow filter package treatment unit. This is an approved alternative filtration process. The clarifier backwashes once per day. The dual media filter backwashes twice per week.

Table 4-8 shows GSA Calexico bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water

Table 4-8: GSA Calexico Raw Water Bacteriological Data (Monthly Averages)

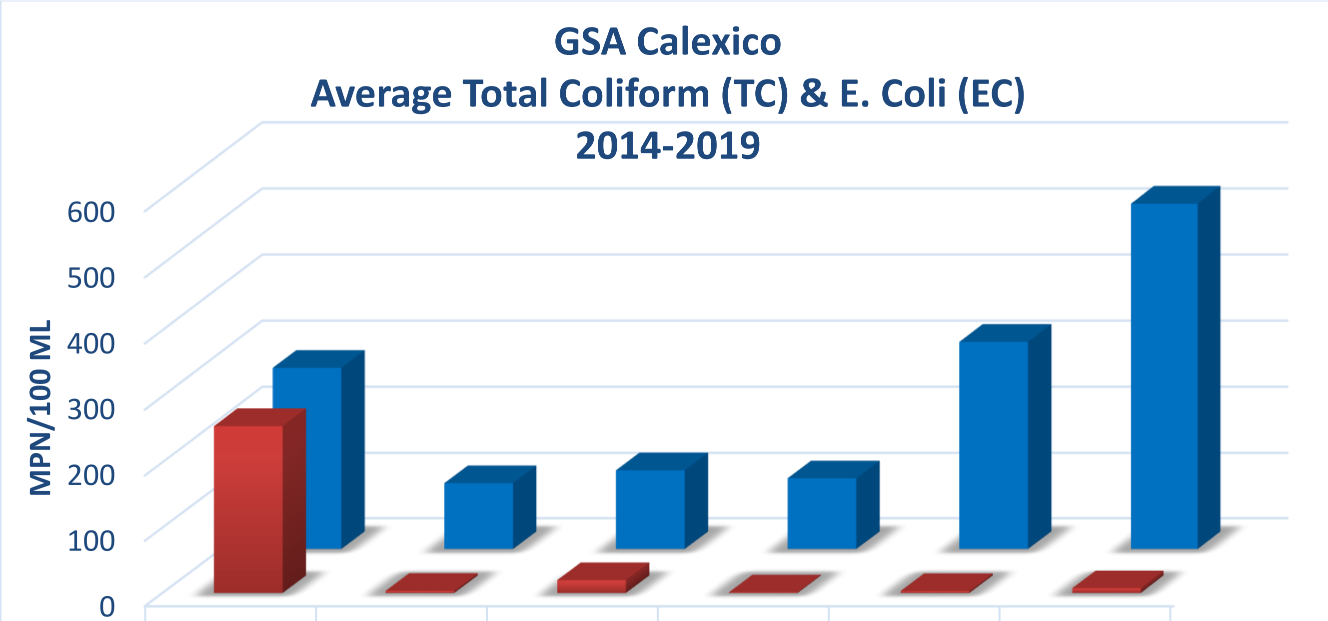
Month	2014			2015			2016			2017			2018			2019		
	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	<2	>1	3.3	240	4	3.0	23		2.6	23		2.3	240	1	1.9	8	<1	1.2
Feb.			3.9	23	2	3.2	2		3.1	4	<1	2.3	80	1	1.9	30	<1	1.2
March	30	23	4.3	50	7	3.2			2.5	<2	<1	2.4	80	1	2.0	2	<1	1.2
April	4	2001	4.1	50	<1	3.9	240	1	2.3	4		2.3	240	3	1.9	2	<1	1.3
May	<2	<1	3.1	23	1	3.2	248		2.1	240	<1	2.6	30	2	1.9	170	14	1.4
June	240	1	3.3	34	<1	3.5	240	1	2.3	130	1	2.4	1600	2	2.0	23	1	1.4
July	80	3	2.9	240	2	3.9	240	111	2.9	23	<1	2.2	80	1	2.0	629	13	1.4
Aug.	23	2	3.1	240		3.4	23	1	2.4	240	<1	2.2	130	3	2.0	50	3	13.1
Sep.	240	5	2.8	240		3.2	240	3	2.4	23	<1	1.8	500	7	2.1	2400	5	3.8
Oct.	1600	2	2.9	23		3.1	23	1	2.5	240	1	1.8	500	7	2.0	2400	6	2.4
Nov.	240	2	3	23		3.0	23		2.4	23	<1	2.0	130	<1	1.8	<2	<1	1.2
Dec.	23	<1	3.4	23		3.0	23		2.4	240	1	1.9	170	<1	1.7	50	<1	1.2
Avg.	276	255	3.34	101	3	3.3	120	20	2.5	108	1	2.2	315	3	1.9	524	7	2.6
6-yr. Avg.	TC =	171	EC =	48	T =	2.6												

TC: Total Coliforms (MPN/100mL)

FC: Fecal Coliforms (MPN/100mL)

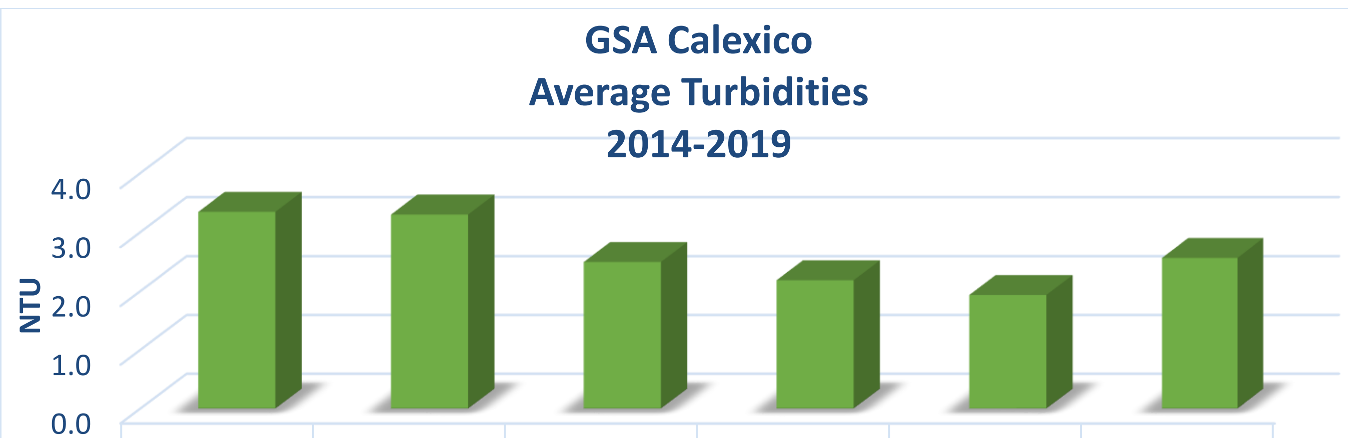
EC: E. coli (MPN/100mL)

T: Turbidity (NTU)



	2014	2015	2016	2017	2018	2019
EC	255	3	20	1	3	7
TC	276	101	120	108	315	524

Figure 4-14: GSA Calexico Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)



	2014	2015	2016	2017	2018	2019
T	3.3	3.3	2.5	2.2	1.9	2.6

Figure 4-15: GSA Calexico Sampling Data, Avg. Turbidity (2014-2019)

Heber Dunes - SVRA (1310301):

The Heber Dunes system is a small non-community water system that supplies water for domestic purposes to a State Park with one residence and a campground with restrooms and showers available. The water system operates 24 hours daily based on system demand.
Heber Dunes is primarily used for off-road recreation. The water system receives water via the All American Canal. The treatment plant is a down flow clarifier (PV-10) with dual media filters with a capacity of 10gpm.

Raw water enters a 4,000 gallon in-ground storage tank with a gravel profiler. The water system maintains one reservoir that provides (2) 5,000 gallons poly tanks storage for a total of 10,000 gallons of storage capacity. Water is fed at the top of the reservoir and is discharged near the bottom of the opposite side of the tank. The system uses UV disinfection and sodium hypochlorite for residual

Table 4-9 shows City of Calexico bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL.

Table 4-9: Heber Dunes - SVRA Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015		2016		2017		2018			2019		
	TC	EC	T	TC	EC	TC	EC	TC	EC	TC	EC	T	TC	EC	T
Jan.	12	<1	0.5	411	3	93	3	28	0	57	0		33	0	2.3
Feb.	45	1		85	<10	291	<1	12	0	319	1		192	0	2.3
March	16	<1		62	<10	84	1	6	<1	171	1		122	3	1.5
April	346	20		261	6.3	24	1	31	1	278	12		240	19	1.5
May	158	10		109	<10	48	0	59	<1	1306	28		1363	41	1.0
June	132	<10		496	<10	345	8	82	6	698	16	2.7	1516	19	1.9
July	137	<1		31	<10	53	1	5700	1	1347	17	1.2	1534	5	0.9
Aug.	291	<1	0.9	487	<10	120	<1	228	9	2419	11	2.5	1352	7	0.9
Sep.	30	<10	0.9	52	10	579	<1	461	3	2419	0	2.1	1355	1	1.8
Oct.	231	1		122	<10	47	<1	613	1	1262	4	2.7	1355	2.6	1.5
Nov.	63	<10		122	<10	28	<1	86	1	1618	2	1.9	295	0	2.0
Dec.	58	<1		243	10	172	0	96	<1	229	2	2.0	103	1	2.3
Avg.	127	8	0.8	207	7	157	2	617	2	1010	8	2.2	788	8	1.7
6-yr. Avg.	TC =	484	EC =	6	T =	1.53									

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU

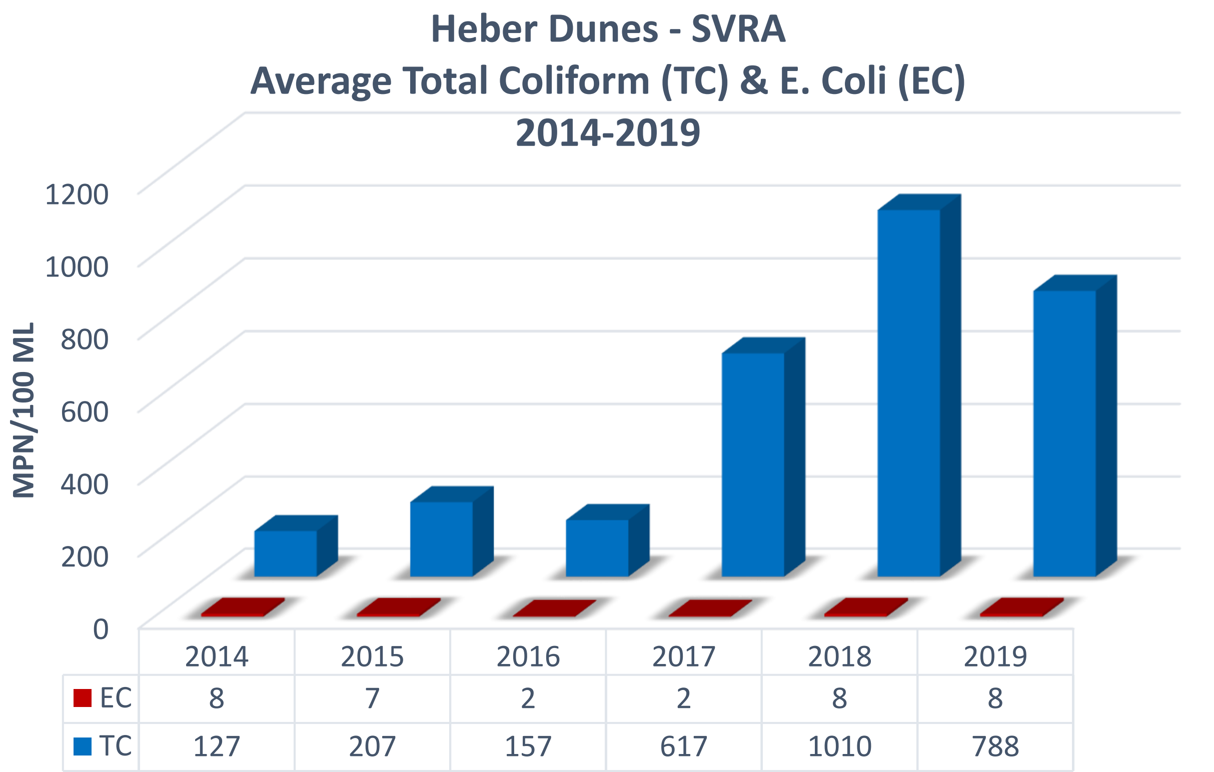


Figure 4-16: Heber Dunes Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

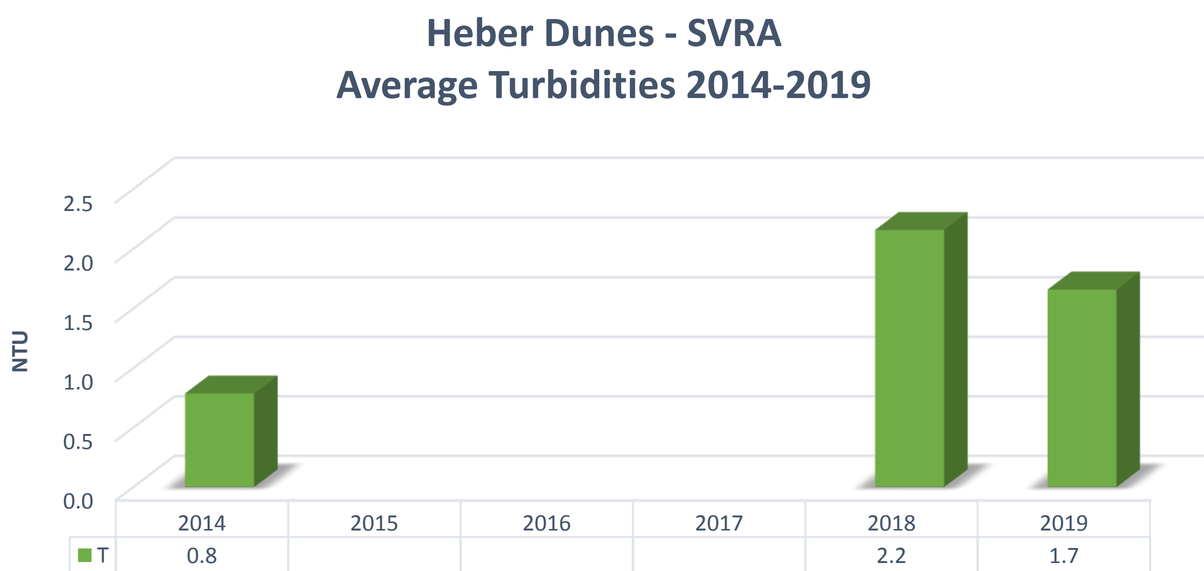


Figure 4-17: Heber Dunes Sampling Data, Avg. Turbidity (2014-2019)

Heber Public Utility District (1310007)

Heber Public Utility District (HPUD) owns and operates a small community water system that supplies potable water to an estimated population of 6,979 through approximately 1,600 service connections. HPUD purchases Colorado River water from IID via the Dogwood Canal, Gate 37 A, which flows northerly from the Central Main Canal, Gate H-1.

The water is pumped from three lined raw water basins, totaling 5.8 MG capacity, to a third basin, where ferric and polymer re added and mixed. Water flows from there to two Microfloc water treatment units, exits the plant, and is chlorinated then and pumped to three clearwells with a total storage of 5.45 MG. In 2017, HPUD upgraded the WTP. The following items were installed: Raw Water Conditioning Facility, upgrades to the Raw Water Pump Station, expansion of the coagulation system, new 2.0 MGD clarification/ filtration unit, rehabilitation and expansion of the existing sodium hypochlorite disinfection system, baffling in the 0.75 MG reservoir, upgrades to the Backwash Basin, new Recycled Backwash Pump Station, expansion of the Finished Water Transfer Pump Station, new High Service Pump Station, and In-Tank Spray Stripping TTHM removal system to the 3.0 MG Reservoir.

Table 4-10 shows Heber Public Utility District bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-10: Heber Public Utility District Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016			2017			2018			2019		
	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	93	23	0.7		5	1.5		2	2.7		2	1.2	228	2	2.7	197	4	2.42
Feb.	410	148	1.1		20	2.2		4	2.7		2	3.0	290	2	3.6	238	1	3.12
March	1046	65	1.5		<10	2.6		2	3.2		6	3.2	248	5	6.2	186	8	5.81
April			2.2		31	3.6		6	3.1		13	2.4	866	12	7.0	687	6	6.28
May	233	10	2.0		41	6.4		0	1.7		50	2.8	1414	48	6.6	2419	47	6.74
June	1333	41	2.1		310	6.1		55	3.3		9	2.8	1011	55	6.2	2400	<1	6.11
July	4611	269	2.7		100	2.4		73	2.9		7	1.9	1553	38	5.8	2400	55	5.9
Aug.	3255	31	2.8		100	2.4		116	2.6		37	1.9	2400	8	6.4	2400	2	5.25
Sep.	4106	31	2.3		100	3.2		24	3.4		5	1.2	2400	57	5.9	2400	22	5.22
Oct.	3255	41	2.5		100	3.6		18	2.7	2419	4	1.2	2400	9	4.1	2400	29	4.69
Nov.	2481	10	3.0		20	3.0		15	2.0	2419	4	1.1	1733	15	2.2	1414	5	4.51
Dec.	404	10	2.5		<10	3.0		2	1.8		7	2.5	326	2	2.4	687	3	3.72
Avg.	1930	62	2.1		83	3.3		26	2.7	2419	12	2.1	1239	21	4.9	1486	17	5.0
6-yr. Avg.	TC =	1768	EC =	32	T =	2.9												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

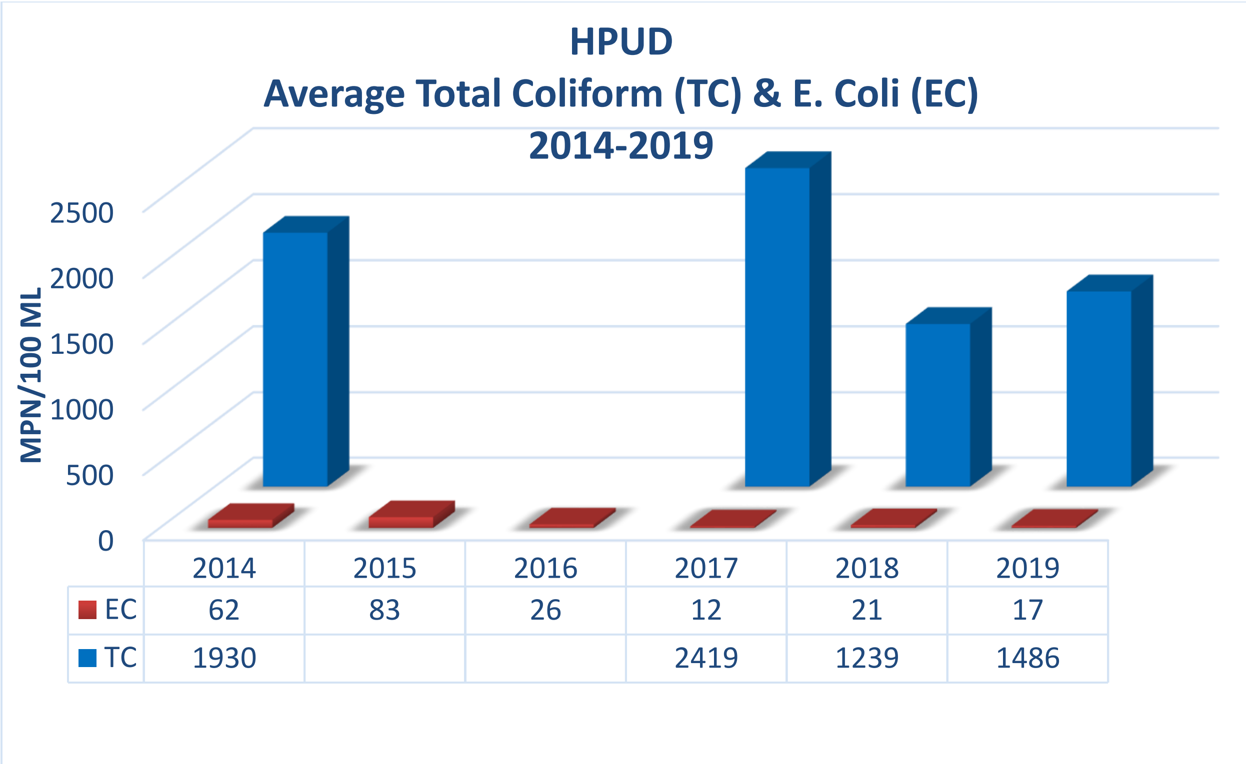


Figure 4-18: Heber PUD Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

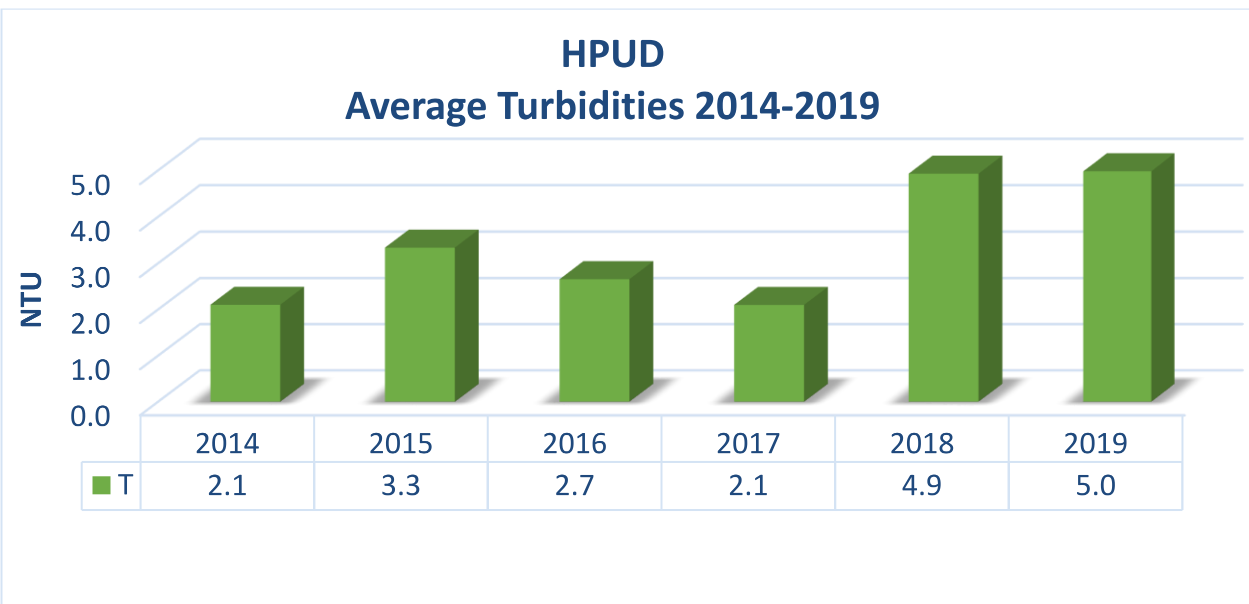


Figure 4-19: Heber PUD Sampling Data, Avg. Turbidity (2014-2019)

City of Holtville (1310005)

The City of Holtville owns and operates a system that provides potable water for an estimated population of 6,032. The WTP facilities consist of 11.2 mg of raw water storage and a 3 MGD water treatment plant (WTP) with a current maximum daily use of 2 MGD during summer months. Average daily use is approximately 1.2 MGD. Treated water is stored in a 1.5 MG tank. In 2015 replacement 1.5 MG and 2.4 MG tanks were add, as well as a new UV disinfection system and an aluminum sulfate and cationic polymer treatment.

The City purchases Colorado River water from IID via the Pear Lateral, Gate 30L. The Pear Lateral flows north from the Pear Canal which flows westerly from a connection at the East High line Canal. This raw water flows by gravity into three raw water storage ponds where two raw water pumps lift the water to the treatment plant.

Table 4-11 shows City of Holtville bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-11: City of Holtville Raw Water Bacteriological Data (Monthly Averages)

Month	2014				2015			2016			2017			2018			2019		
	TC	FC	EC	T	TC	EC	T	TC	FC	T	TC	FC	T	TC	EC	T	TC	EC	T
Jan.	816	6		2.8	1043	169	4.0	70	16	3.1	2400	<1	3.5	1223	2	2.5	1733	56	5.3
Feb.	161	3		3.4	8664	<10	5.6	2419	1	3.5	2400	8	2.4	2419	5	2.2	666	12	1.7
March	309	10		8.0		10	6.7	2400	5		1733	4	7.2	2419	3	3.0	102	5	2.5
April	1989	20		6.5	4106	<10	7.8	2400	5	5.8	2419	7	4.6	1986	65	2.7	201	4	2.9
May	7270	10		6.7	12033	<10	7.4	2400	5	4.5	2419	5	5.7	1234	13	3.0	227	12	4.1
June	6488	20		15.2	1981	<10	8.2	2400	10	4.2	2419	26	4.1	1221	23	5.8	115	18	2.3
July	1860	10		22.1	512	31	6.4	2400	26	5.8	13		3.5	217	1	3.5	1440	15	3.6
Aug.	19693	<10		16.3	5475	20	3.8	2400	<33	7.0	2419	58	3.2	1269	7	2.0	1907	10	2.1
Sep.	24192		10	14.1	12033	<10	4.3	2400	<1	4.6	2419	15	3.6	276	<1	2.9	2419	7	3.0
Oct.	41060		<100	5.6	9804	20	3.2	2400	2	2.3	2419	4	2.8	368	14	2.9	2419	5	2.3
Nov.	52		34	8.6	3448	30	3.1	2400	16	2.4	2419	11	3.6	215	8	1.5	2205	5	1.6
Dec.	24		1	8.7	1236	<10	2.5	1986	6	2.2	1986	45	2.0	590	13	1.7	2419	4	1.3
Avg.	8660	11	15	9.8	5485	47	5.3	2173	9	4.1	2122	18	3.9	1120	14	2.8	1321	13	2.7
6-yr. Avg.	TC =	3480	FC =	13	EC =	22	T =	4.8											

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

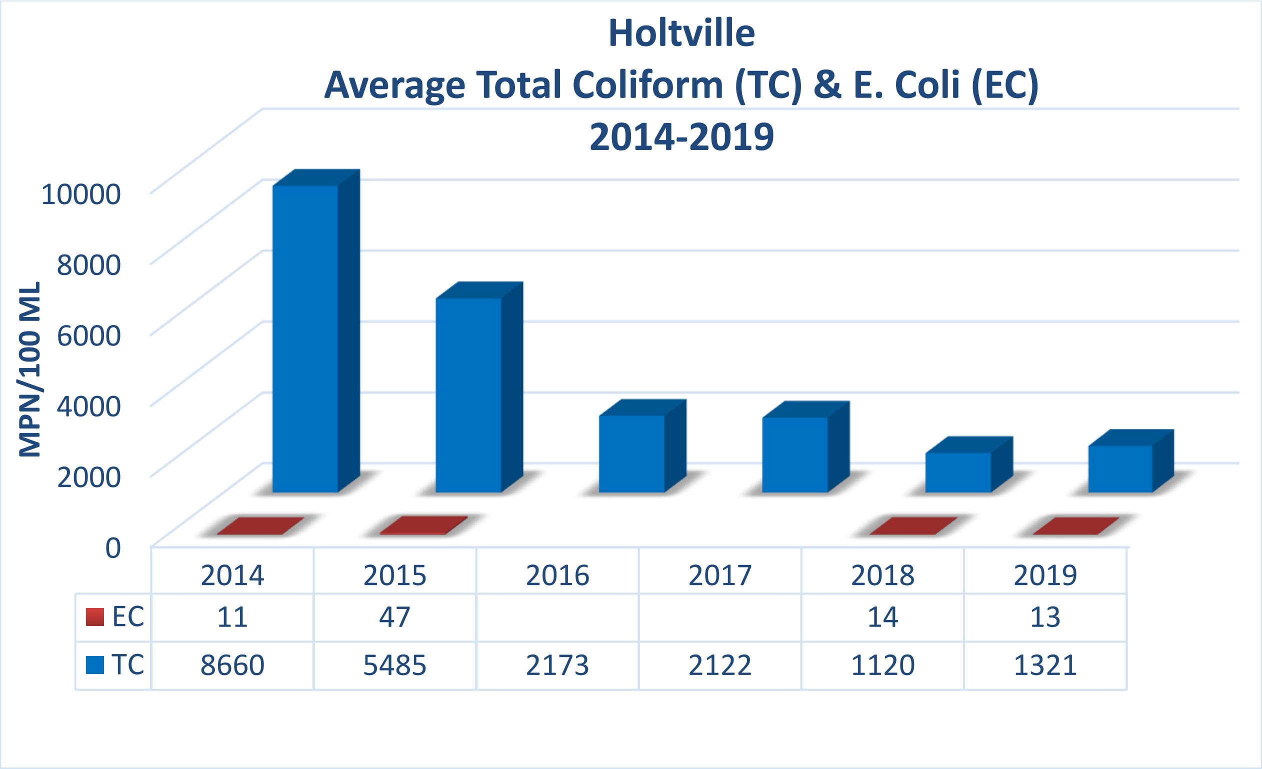


Figure 4-20: City of Holtville Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

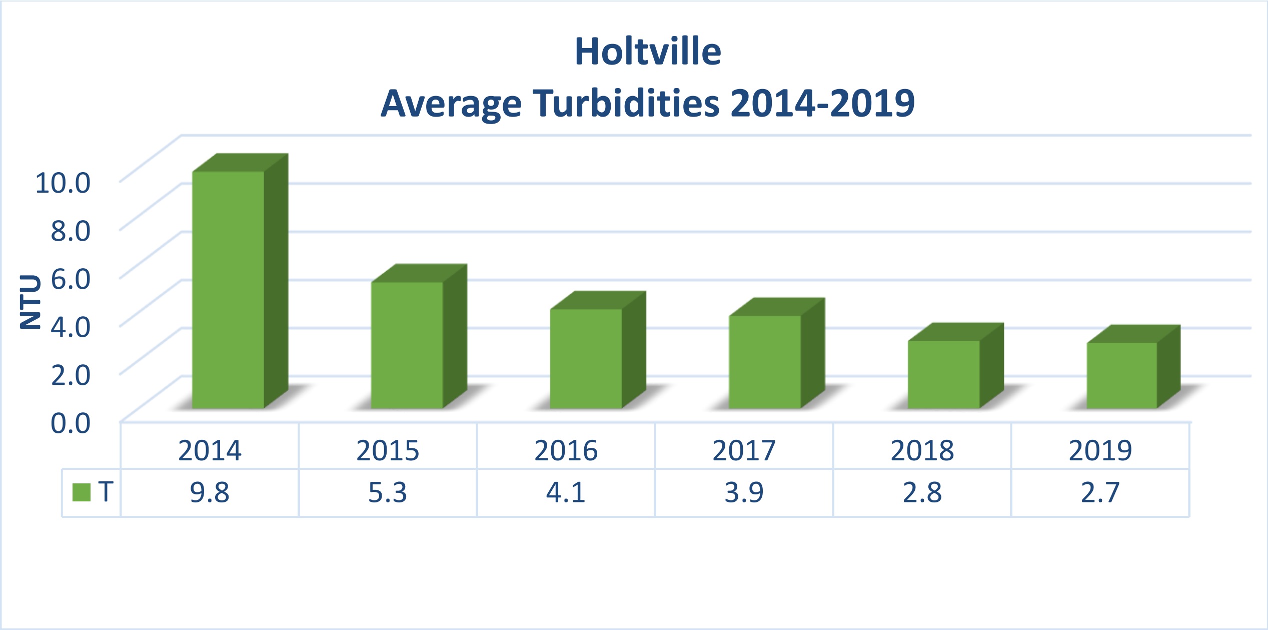


Figure 4-21: City of Holtville Sampling Data, Avg. Turbidity (2014-2019)

City of Imperial (1310006)

The City of Imperial owns and operates a system that supplies water to an estimated population of 19,372. Imperial purchases Colorado River water from IID via the Dahlia Canal, Gate 52 Water flows by gravity to three, concrete-lined raw water ponds totaling 3 MG capacity. Only the upper 4.5 feet of water from the ponds can be used due to limits provided by an intake structure. The WTP has a capacity of 7 MGD with an average daily flow of 3 MGD and max daily peak of 3.6 MGD during summer. There is a 2 MG tank that provides onsite treated water storage. In 2018, the City made upgrades to the WTP to comply with the total Trihalomethanes (TTHM) maximum contaminant level (MLC). Granular activated carbon treatment was added between the gravity filters and the finished water storage tank. Additionally, liquid sodium bisulfate and chlorination systems were also added.

Table 4-12 shows the City of Imperial bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL.

Table 4-12: City of Imperial Raw Water Bacteriological Data (Monthly Averages)

Month	2014				2015				2016			2017			2018			2019		
	TC	FC	EC	T	TC	FC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	97	3			105	33		1.7	186	2	2.4	77	8	2.1	240	1	2.8	95	47	4.4
Feb.	111	4		2.8	200	58		7.2	208	1	4.6	251	3	5.0	145	2	4.4	335	3	4.0
March	167	36		12.0	160	59		16.5	305	7	4.9	185	7	9.7	240	10	7.5	225	8	6.9
April	187	77		9.2	200	84		13.2	521	10	4.9	173	17	9.4	240	2	13.2	240	48	13.0
May	240	80		21.0	240	186		10.6	240	14	8.5	240	25	13.7	350	22	15.6	390	52	18.4
June	218	68		10.3	776	212		23.8	240	17	10.4	240	7	10.9	400	26	12.5	280	36	7.9
July	140	58		17.5	372	236		12.1	230	15	6.4	645	34	11.3	1600	11	8.5	240	12	9.1
Aug.	223	118		9.1	202	180		11.6	512	9	7.9	240	4	8.4	500	9	9.6	570	34	14.1
Sep.	660	227		10.7	240	213		7.3	168	4	7.5	580	2	8.5	265	12	7.7	180	16	4.3
Oct.	613	127		5.4	240	200		6.1	198	10	4.3	372	3	6.4	220	21	5.6	260	20	4.3
Nov.	186	53		6.8	372	68		3.4	186	3	2.9	255	6	3.2	110	5	3.6	160	6	4.1
Dec.	240	27		4.2	315	41	1.5	2.4	37	1	3.0	240	1	2.8	950	5	4.2	80	7	2.8
Avg.	257	73		9.9	285	131	1.5	9.7	253	8	5.6	292	10	7.6	438	10	7.9	255	24	7.8
6-yr. Avg.	TC = 297		FC = 68		EC = 9		T = 8.1													

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

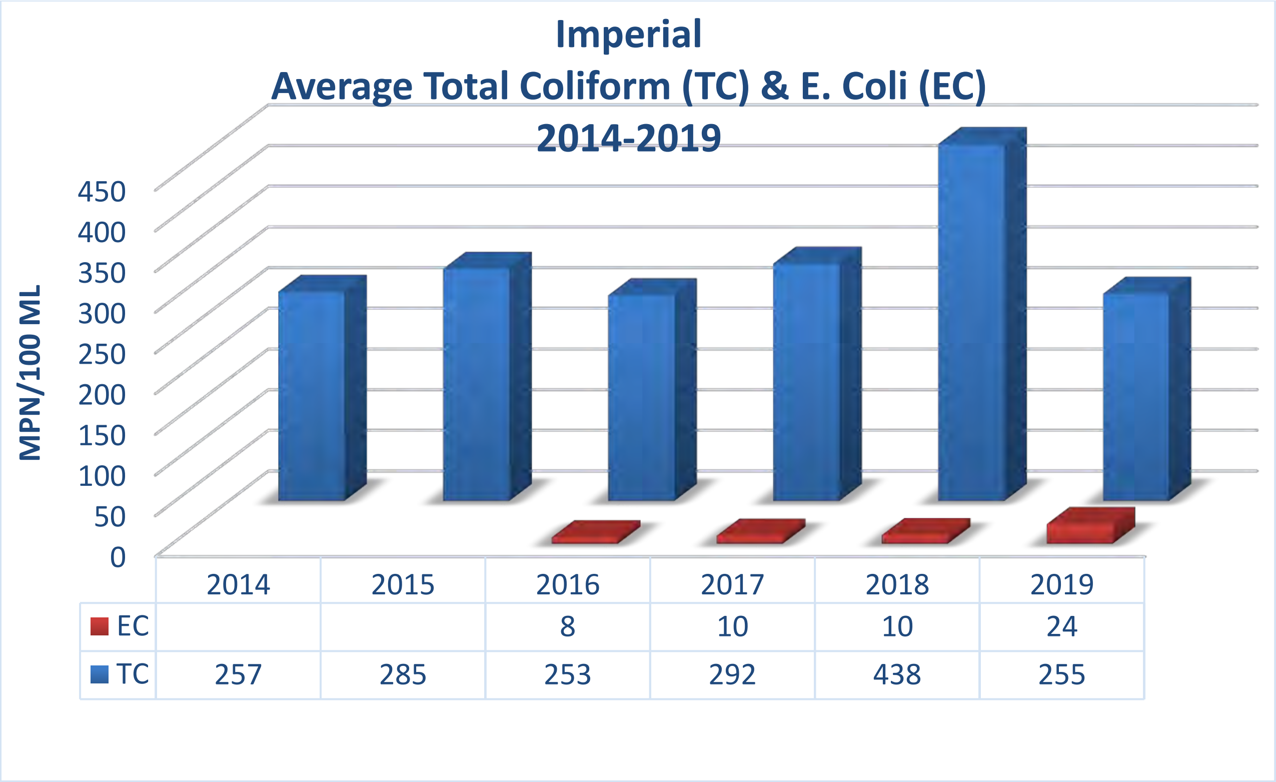


Figure 4-22: City of Imperial Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

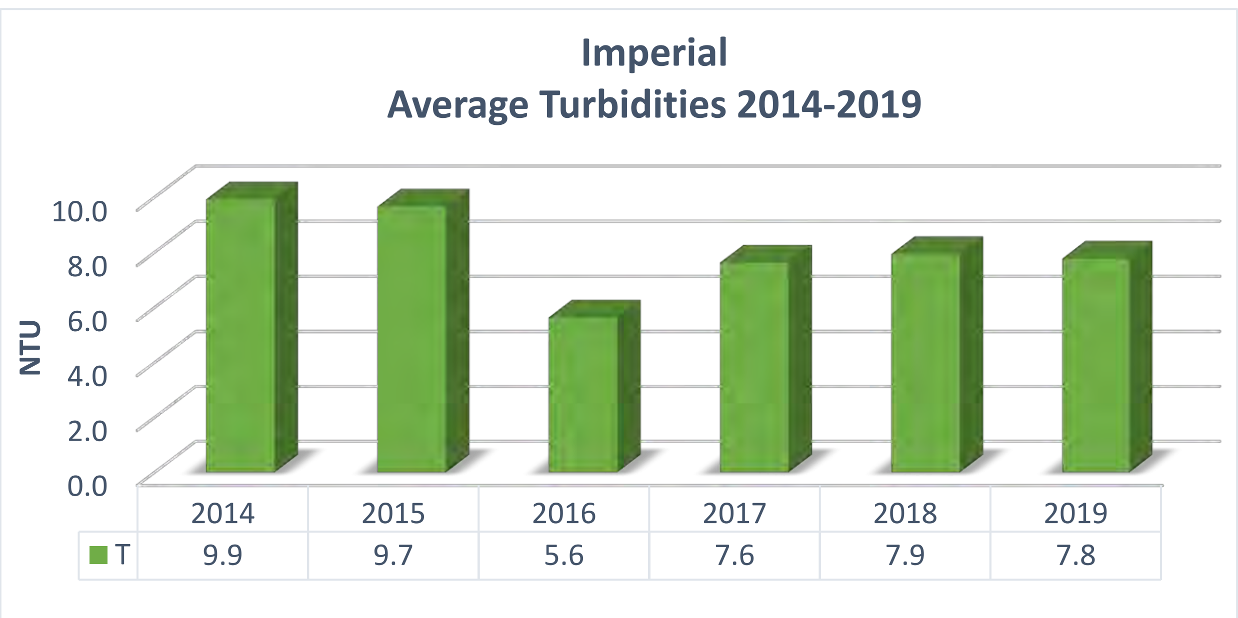


Figure 4-23: City of Imperial Sampling Data, Avg. Turbidity (2014-2019)

NAF El Centro (1310700)

NAF El Centro owns and operates a water system that supplies potable water to base operations with an estimated population of 1,022. NAF El Centro purchases Colorado River water from IID via the Elder Canal# 104B, which flows northerly from the Central Main Canal. The facility has a capacity of 2 MGD with a maximum daily demand of 1.2 MGD and average daily demand of 0.4 MGD. WTP facilities consist of six (6) raw water basins totaling 6.6 MG capacity.

From here, raw water is pumped to two (2) packaged treatment plants in parallel. The plants treat the water via coagulation, flocculation, sedimentation, filtration through GAC filters, and disinfection with sodium hypochlorite. Treated water is discharged to a below ground, 5,000 gallon clearwell, then pumped to one of three above ground storage tanks totaling 2.7 MG capacity.

Table 4-13 shows NAF El Centro bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL.

Table 4-13: El Centro Naval Air Facility Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016			2017			2018			2019		
	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	146	25	1.8	143	13	2.1	550	10	3.0	800	22	4.5	300	3	2.2	90	5	1.6
Feb.	770	168	3.4	950	96	4.1	1375	38	4.2	400	9	3.4	170	<10	3.2	60	2	4.2
March	167	12	5.0	1060	80	4.6	788	10	5.0	1100	20	4.8	300	10	5.8	146	2	4.3
April	542	27	7.2	1628	83	6.4	2135	19	4.6	783	12	4.5	400	10	5.8	417	29	4.8
May	450	39	7.7	925	31	7.4	866	23	5.4	1140	41	8.5	300	20	7.9	1150	30	7.2
June	420	11	8.8	2120	34	11.8	1100	320	5.2	975	28	8.4	500	20	5.9	710	17	6.4
July	528	5	8.2	1208	13	9.6	278	76	3.8	540	33	8.0	553	33	8.0	1044	14	9.6
Aug.	875	13	6.8	1075	11	6.6	1150	23	4.9	470	34	7.6	1512	20	2.7	558	5	7.3
Sep.	1320	81	6.8	1880	14	5.3	725	70	5.0	975	12	6.6	396	6	5.4	378	3	4.8
Oct.	400	11	3.1	925	22	3.6	700	26	2.7	1200	12	4.9	246	10	2.8	664	10	4.4
Nov.	358	5	2.7	468	10	2.3	524	15	2.1	1425	15	2.8	98	8	1.0	710	7	3.0
Dec.	284	8	3.6	618	67	2.6	450	13	2.9	343	10	2.2	200	10	1.2	270	2	2.3
Avg.	522	34	5.4	1083	40	5.5	887	54	4.1	846	21	5.5	415	14	4.3	516	10	5.0
6-yr. Avg.	TC =	711	EC =	29	T =	5.0												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

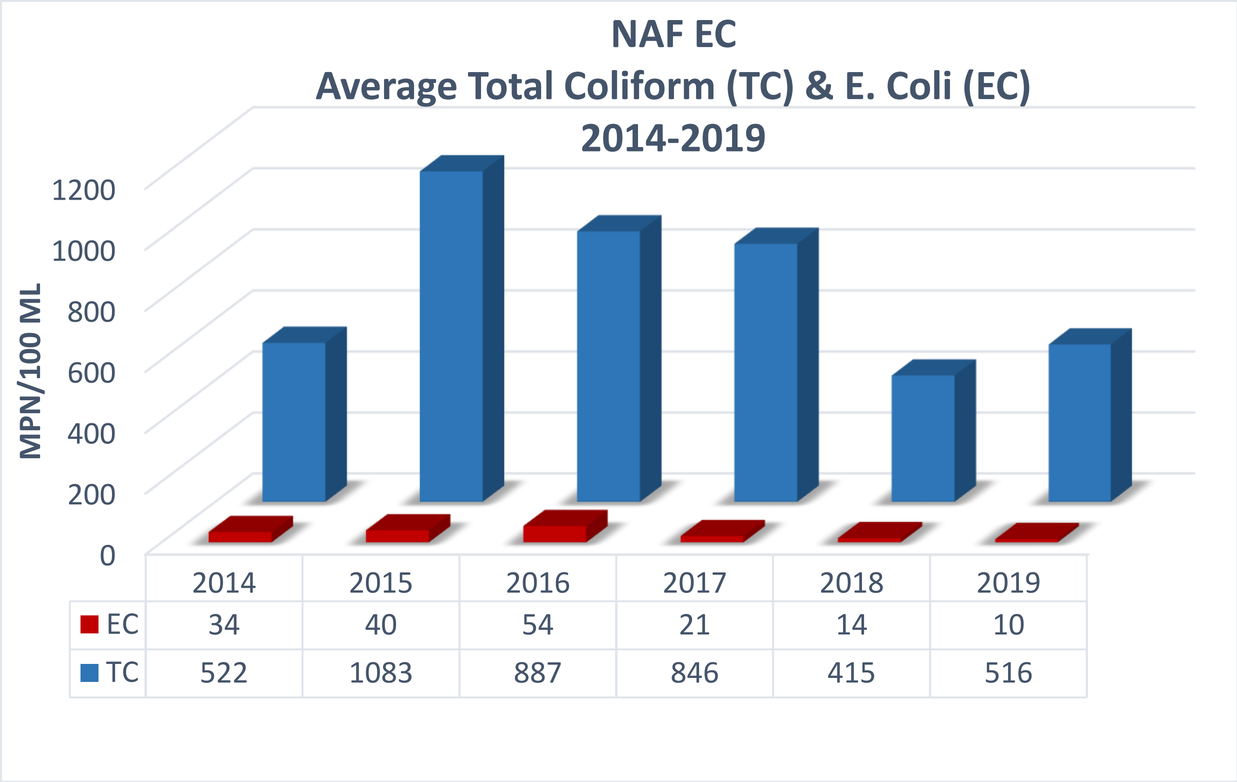


Figure 4-24: NAF El Centro Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

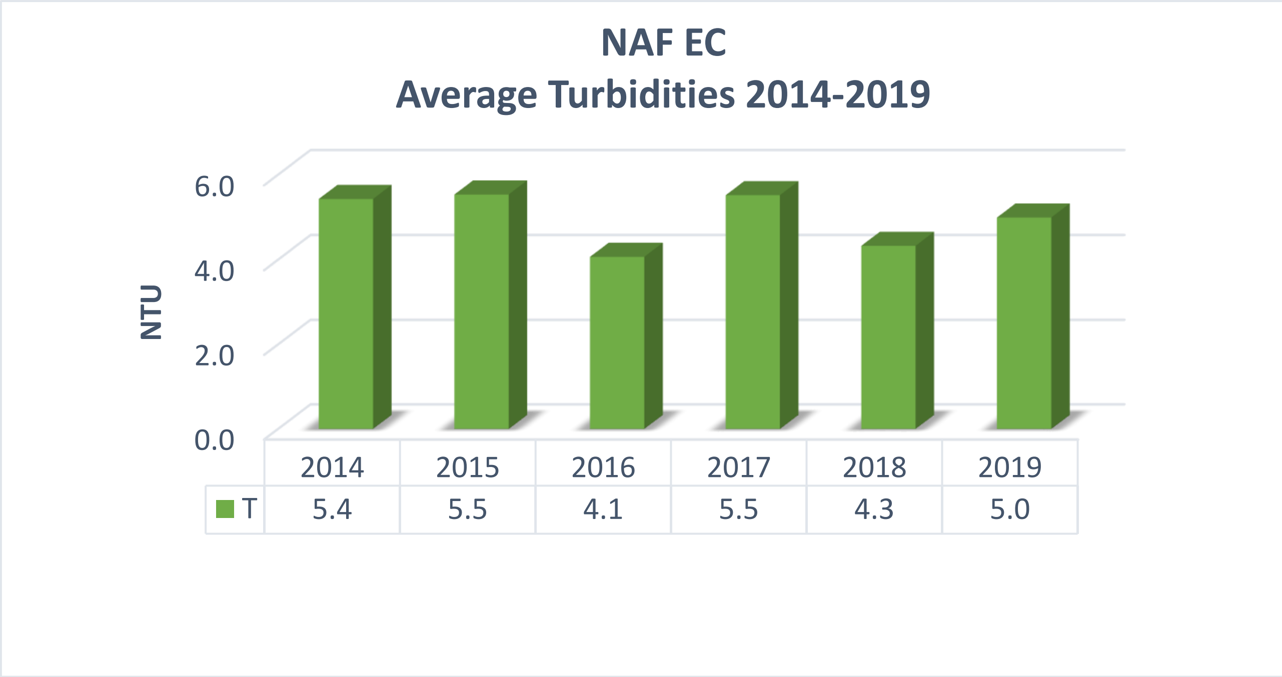


Figure 4-25: NAF El Centro Sampling Data, Avg. Turbidity (2014-2019)

Seeley County Water District (1310003)

Seeley County Water District (SCWD) owns and operates a system that supplies potable water to an estimated population of 2,000 through 549 service connections. SCWD purchases Colorado River water from 110 from Lateral 13 via Gate 940 of the Elder Canal, which carries water northwest from the Central Main Canal. Raw water at the 0.8 MGD WTP with peak summer demands reaching 0.4 MGD. Filtered water is chlorinated just prior to discharge into two 0.5 MG storage tanks in series. In 2018, SCWD made upgrades to the WTP to comply with the total Trihalomethanes (TTHM) maximum contaminant level (MLC). Pressure spray aeration assemblies and blowers were added to the WTP.

Table 4-14 shows Seeley County Water District bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL.

Table 4-14: Seeley County Water District Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016				2017			2018			2019		
	TC	FC	T	TC	FC	T	TC	FC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	130	1	2.0	13	8	1.0	17	<6		1.6	270	32	9.4	23	1	5.4	23	4	1.0
Feb.	175	61	1.1	240	1	1.1	0	0		3.4	240	5	9.7	240	<1	5.2	240	0	1.2
March	16	70	0.8	240	16	1.7	80	2		7.7	240	<1	7.7	70	5	2.4	110	7	1.3
April	300	111	0.7	30	6	1.4	240	13		5.5	5	<1	10.3	30	3	8.7	80	23	1.4
May	900	56	0.8	13	0	1.8	240	<1		5.1	23	1	10.1	16	3	2.7	50	15	1.1
June	23	2	0.9	300	3	2.2	240	11		4.8	240	19	12.9	80	10	1.6	50	11	2.7
July	500	27	0.9	4	0	3.9	300	3		6.2	240	9	5.7	130	1	2.4	30	3	1.7
Aug.	900	41	1.2	240	<1	2.1	240	1		8.3	240	0	9.8	50	17	0.8	140	104	1.3
Sep.	500	2	1.4	23	<1	6.8	1600	535	1	9.9	240	3	8.5	80	19	1.0	220	8	0.7
Oct.	700	2	1.0	2240	2	2.5	240	80	<1	13.6	500	8	10.3	110	2	1.4	110	27	1.7
Nov.	17	2	1.2	8	0	2.4	132	52	3	12.4	1600	1	9	30	2	1.2	30	6	0.6
Dec.	110	35	1.2	17	1	2.4	52	13	1	12	240	<1	9	4	1	1.6	17	8	0.4
Avg.	356	34	1.1	281	4	2.4	282	71	1.7	7.5	340	9	9.4	72	6	2.9	92	18	1.3
6-yr. Avg.	TC = 237		FC = 27		EC = 9		T = 4.1												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

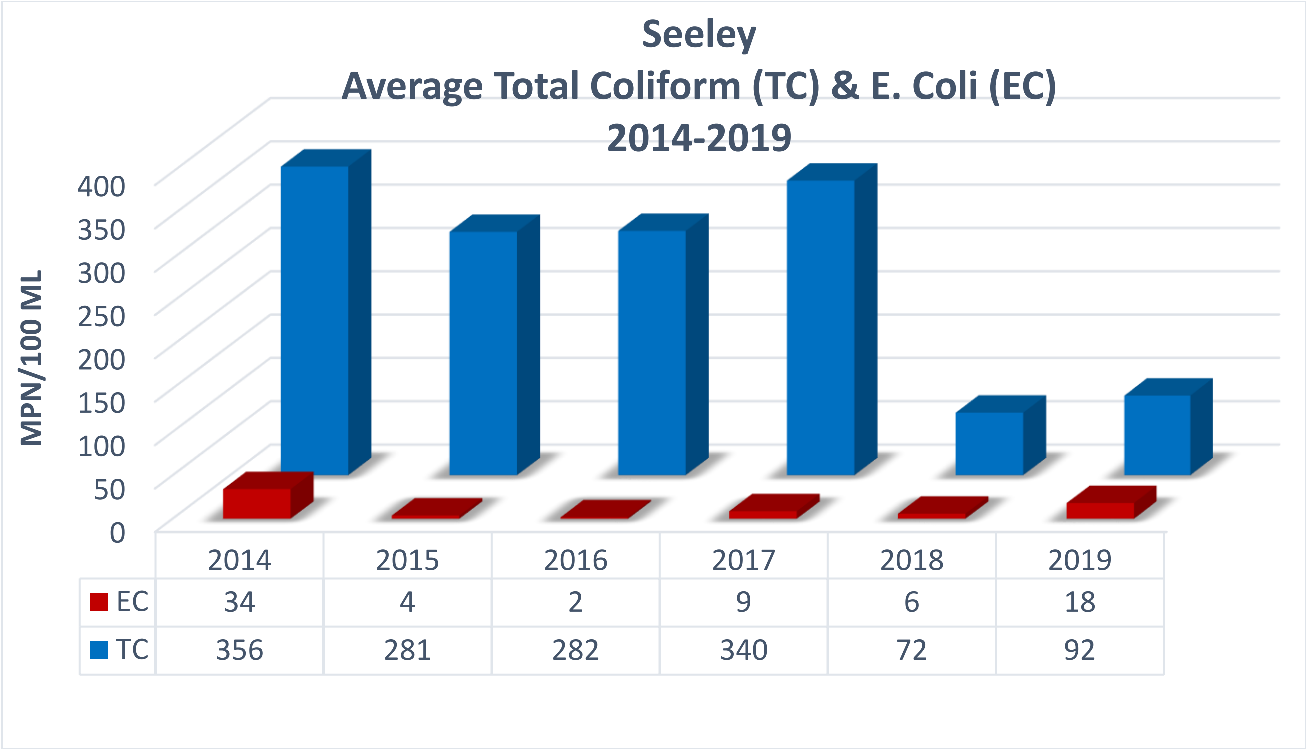


Figure 4-26: Seeley County Water District Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

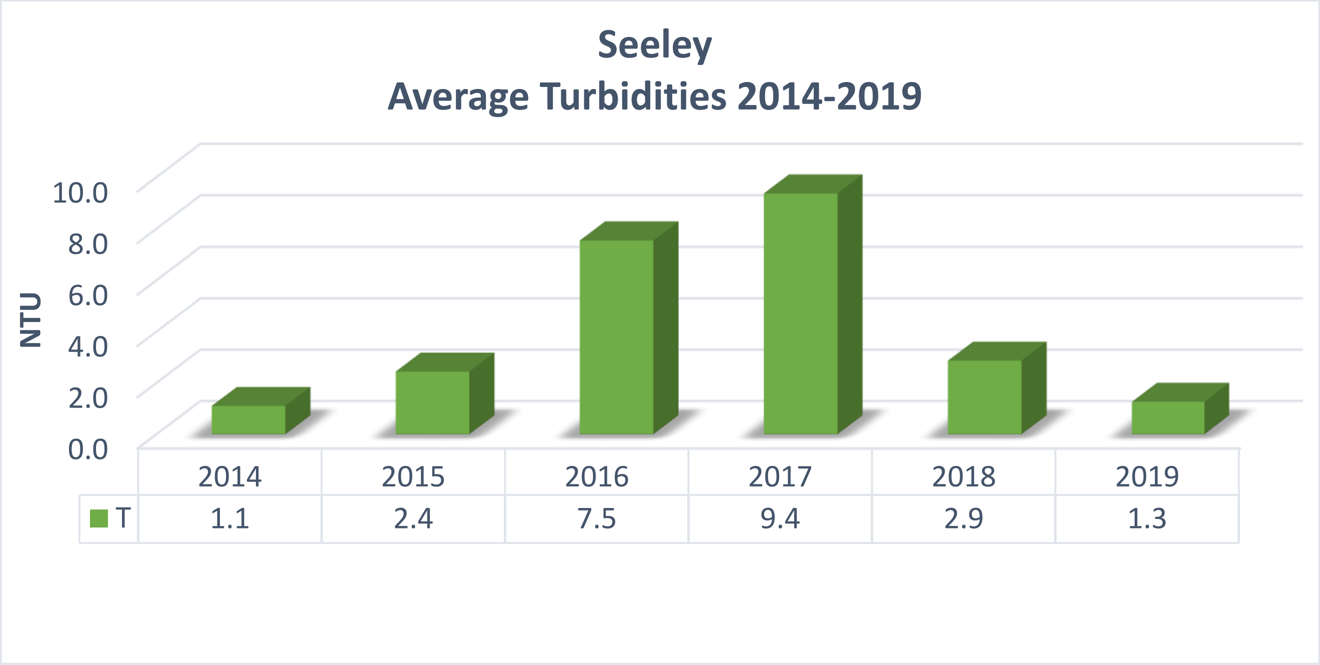


Figure 4-27: Seeley County Water District Sampling Data, Avg. Turbidity (2014-2019)

Sonny Bono Salton Sea Wildlife Refuge (1310302)

The Sonny Bono Salton Sea National Wildlife Refuge (Refuge) obtains raw water from IID provided through Vail Gate 421 at the northernmost end of Vail Canal. The current water system serves the general office, public restrooms, two bunkhouses, a private residence, a maintenance shop, and a bird triage facility within the Refuge. There are eight service connections and ten permanent staff and the system serves a daily transient population of up to 80 people.

The water system has the storage capacity of roughly 4,400 gallons of treated and 3,000 gallons of covered raw water storage. The system can meet the maximum daily demand of 2,600 gallons per day, with the surface water treatment capacity being 9.4 gpm.

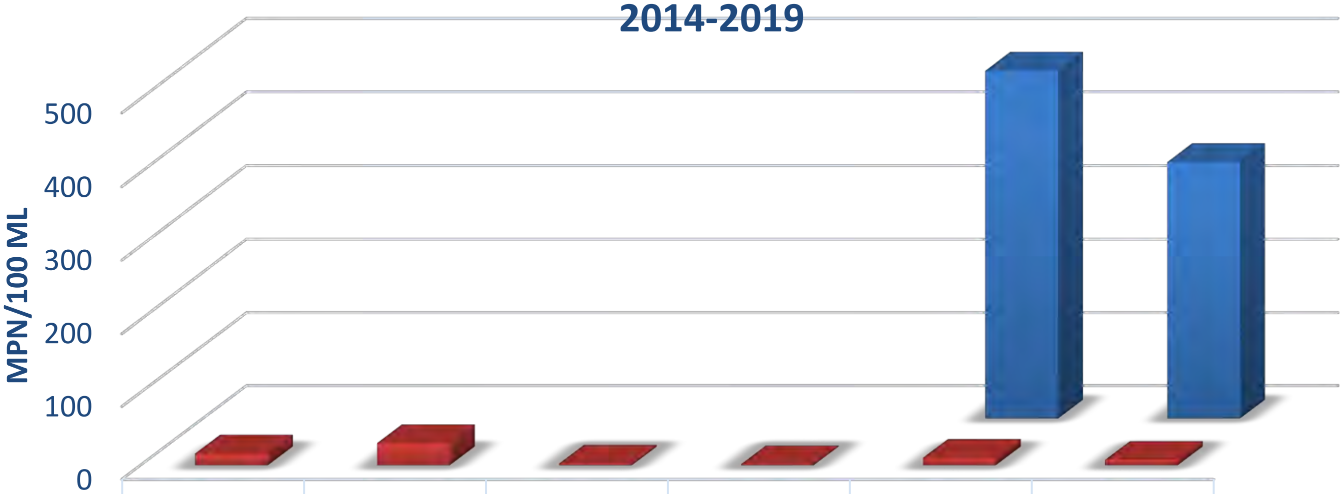
Table 4-15 shows the Sonny Bono Salton Sea National Wildlife Refuge bacteriological data from

2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-15: Sonny Bono Salton Sea Wildlife Refuge Raw Water Bacteriological Data (Monthly Averages)

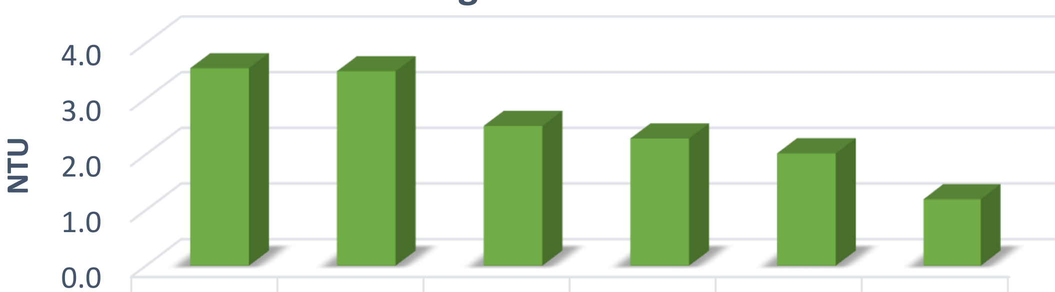
Month	2014		2015		2016		2017		2018			2019		
	EC	T	EC	T	EC	T	EC	T	TC	EC	T	TC	EC	T
Jan.	23	4.1	23	3.8	0	2.9	0	2.6	240	1	2.1	13	0	1.2
Feb.			0	3.7	0	2.7	2	2.4	240	2	1.8	240	6	1.4
March	23	3.7	300	4.0	12	2.8	2	2.5	130	0	1.9	23	17	1.1
April	0	3.8	2	3.5	4	2.3	0	2.4	240	0	2.1	900	21	1.1
May	23	4.0	5	3.4	0	2.1	1	2.5	240	0	2.0	300	1	1.1
June	0	3.5	0	3.6	0	2.2	1	2.6	300	5	2.0	170	5	1.1
July	23	3.2	0	2.7	3	2.3	0	1.9	500	13	1.9	140	3	1.2
Aug.	8	3.1		3.9	3	2.5	0	2.3	1600	87	2.0	500	15	1.2
Sep.	>1600	3.6	0	3.9	0	2.6	4	2.1	1600	3	2.3	900	4	1.3
Oct.	30	3.3	3	2.9	0	2.6	1	2.0	500	6	2.1	500	10	1.2
Nov.	30	3.5	0	3.3	0	2.6	0	2.0	23	2	2.2	500	2	1.2
Dec.	0	3.2	0	3.2	2	2.5	3	2.1	70	2	1.8	8	1	1.2
Avg.	16	3.5	30	3.5	2	2.5	1	2.3	474	10	2.0	350	7	1.2
6-yr. Avg.	TC =	412	EC =	11	T =	2.1								

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)



	2014	2015	2016	2017	2018	2019
EC	16	30	2	1	10	7
TC					474	350

Figure 4-28: Sonny Bono Refuge Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)



	2014	2015	2016	2017	2018	2019
T	3.5	3.5	2.5	2.3	2.0	1.2

Figure 4-29: Sonny Bono Refuge Sampling Data, Avg. Turbidity (2014-2019)

UC Desert Field Station (1310571)

The UC Desert Field Station (UC-DREC) serves a population of 70 via 18 service connections. UC-DREC purchases Colorado River water from 11D via the Lateral 30 of the Ash Canal, Gate 205 of the All-American Canal. From the gate, the raw water flows into a series of underground storage facilities. From the raw water storage facilities, water is withdrawn by the raw pump station and is pumped to the water treatment plant.

The surface water treatment plant consists of micron strainer, membrane filtration and a 30,000-gallon chlorine contact tank. After the surface water treatment plant, UC-DREC staff manually fill the new aeration tank, which provides water to the distribution system.

Table 4-16 shows UC-DREC bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-16: UC Desert Field Station Raw Water Bacteriological Data (Monthly Averages)

Month	2014			2015			2016			2017			2018			2019		
	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.	66		0.7	2489	4352	0.8	1732	26	1.2	2400	36	1.6	846	33	1.0	1046	4	1.5
Feb.	2755		0.6	6867	189	0.9	2400	11	1.0	2400	44	1.4	1595	10	1.0	2400	12	1.4
March	2143		0.6	6131	75	1.0	5794	31	0.9	2400	74	0.9	2400	46	0.8	2400	6	1.4
April	8164		0.7	2419	512	1	2400	73	0.8	2400	5	0.8	2400	61	0.8	2400	116	0.9
May	10462		0.8	1553	171	1.0		124	1.0	2400	101	0.9	2400	1243	1.3	2400	115	1.1
June	24159		0.8	2098	200	0.7	2400	41	1.5	2400	215	0.9	1986	113	1.1	2400	613	1.2
July	29090		0.7	2098	200	0.7	2400	52	0.8	2400	115	0.7	2400	207	0.9	2400	49	1.0
Aug.	23590		0.7	3130	520	0.6	2400	220	0.7	2400	171	0.5	2400	236	0.9	2400	122	0.7
Sep.	23820		0.6	4352	100	0.7	2400	53	0.8	2400	239	1.3	2400	94	1.0	2400	74	0.8
Oct.	14136		0.7	1259	200	0.8	2400	72	0.8	2400	101	1.1	2400	61	1.3	2400	93	1.1
Nov.	8164		0.8	1789	<100	1.1	2400	84	0.9	2400	28	1.0	2400	262	1.3	2400	36	1.1
Dec.	5475	2602	0.8	2400	134	1.0	2400	52	1.3	968	6	1.3	2400	34	1.5	2400	105	1.0
Avg.	12669	2602	0.7	3047	605	0.8	2648	70	1.0	2281	95	1.0	2169	200	1.1	2287	112	1.1
6-yr. Avg.	TC =	4183	EC =	614	T =	1.0												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)

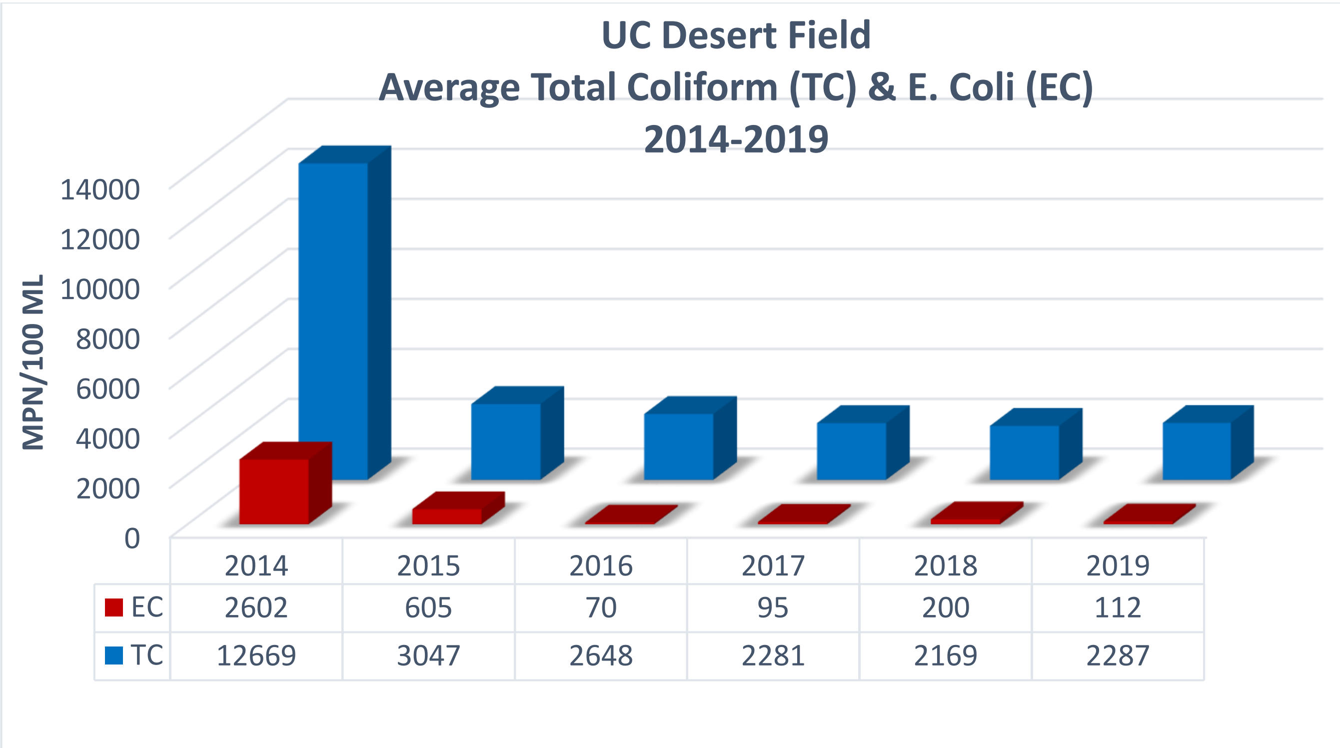


Figure 4-30: UC Desert Field Station Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)

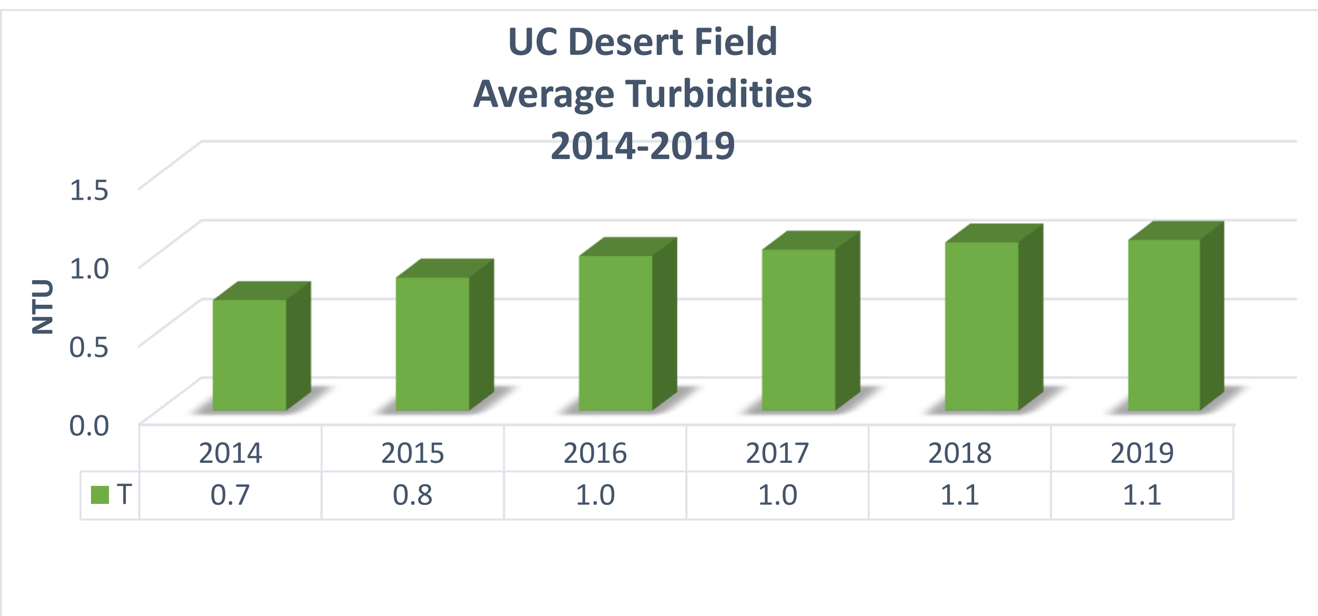


Figure 4-31: UC Desert Field Station Sampling Data, Avg. Turbidity (2014-2019)

City of Westmorland (1310008)

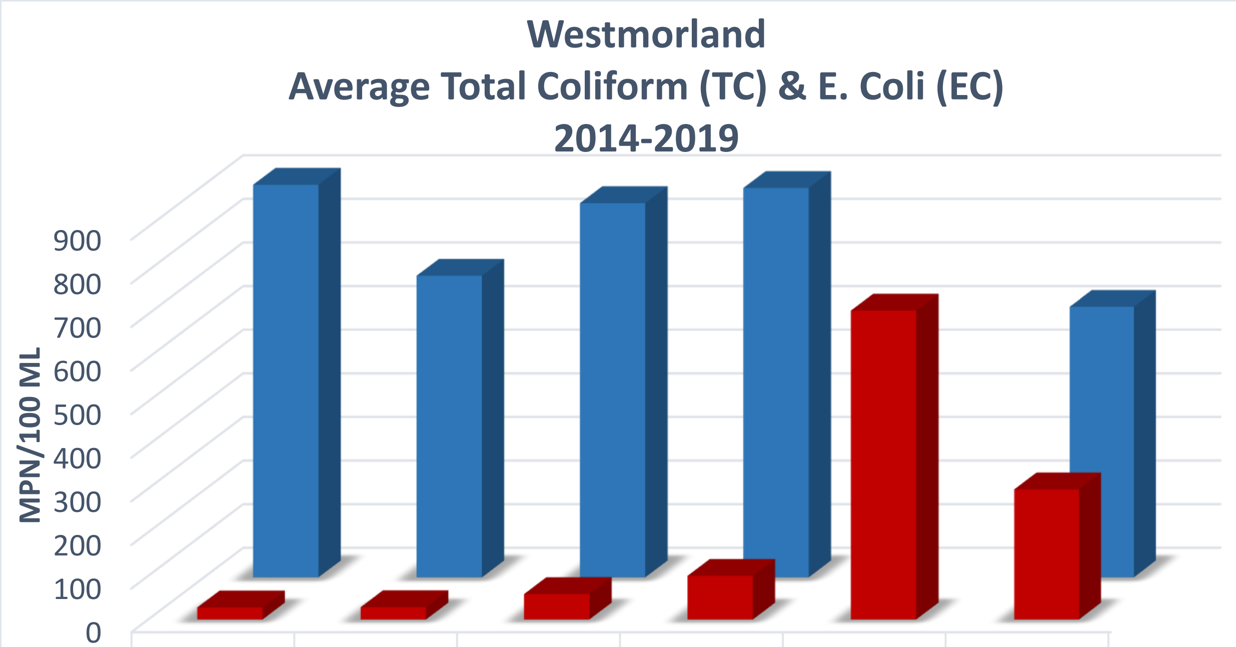
The City of Westmorland owns and operates a system that supplies potable water to an estimated population of 2,444. The WTP has a capacity of 3.0 MGD and consists of three (3) raw water basins totaling 3 MG capacity. From the raw water basins, water is pumped to the WTP where alum and polymers are added for coagulation. From here, it flows through up-flow clarifiers and to filtration. Treated water storage consists of two tanks totaling over 1.1 MG of storage. The City of Westmorland purchases Colorado River water from IID via the Trifolium lateral, Gate 89 which flows northerly from the Westside Main Canal.

Table 4-17 shows City of Westmorland bacteriological data from 2014- 2019 which was received from the State Water Board. The highlighted values indicate when the E.coli is >100 MPN/100mL. This water provider used a most probably number (MPN) index for their testing. For data reporting purposes, we have changed >1600 to 1600 and >2400 to 2400 units/100 mL. We recommend in the future, they carry out a Membrane Filtration (MF) test which would allow dilutions that could provide results more representative of the actual total coliform in their raw water.

Table 4-17: City of Westmorland Raw Water Bacteriological Data (Monthly Averages)

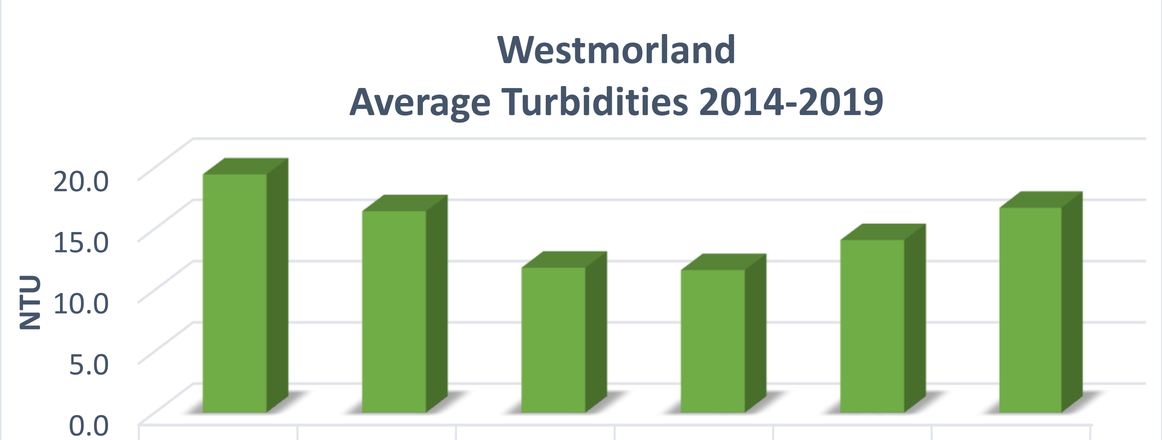
Month	2014			2015			2016			2017			2018			2019		
	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T	TC	EC	T
Jan.				80	4	8.0	8	1	7.6	220	ND	8.7		30	10.7		2	11.4
Feb.	1600		19.5	50	4	10.8	500	9	15.4	1600	13	12.2		50	11.5		17	10.2
March			17	1600	33	18.2	1600	36	20.4	1600	30	14.1		1600	13.8		17	14.6
April	1600	54	18.8	300	29	20.8	900	22	13.5	1600	ND	10.0		39	19.3		49	26.5
May		13	16.4	1600	70	20.1	220	50	11.5	500	11	8.4		920	14.4		<1.8	19.4
June		15	12.8		71	23.0		110	13	1600	140	5.2		950	14.3		540	17.4
July		115	28.5		10	23.6	1600	300	11.9	1600	>1600	13.7		560	17.4		130	18.8
Aug.		7	30.1	1600	7	18.5	1600	50	9.5	1600	80	23.9		975	22.9		540	20.1
Sep.		14	26.7	500	4	16.9	1600	50	15.4	900	500	18.7		95	18.6	1600	350	24.9
Oct.		5	21.6	1600	2	18.2	1600	50	9.6	1600	80	11.1		80	13.3	130	27	21.0
Nov.	900	10	13.3	900	101	10.4	500	13	8.2	500	23	7.4		1600	7.1		1600	7.1
Dec.	1600	14	9	500	2	8.6	50	8	5.8	220	23	6.1		1600	5.5	130	9	9.0
Avg.	1425	27	19.4	873	28	16.4	925	58	11.8	1128	100	11.6		708	14.1	620	298	16.7
6-yr. Avg.	TC =	994	EC =	203	T =	15.0												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E. coli (MPN/100mL)
T: Turbidity (NTU)



	2014	2015	2016	2017	2018	2019
EC	27	28	58	100	708	298
TC	900	691	858	893		620

Figure 4-32: City of Westmorland Sampling Data, Avg. Total Coliforms/E.coli (2014-2019)



	2014	2015	2016	2017	2018	2019
T	19.4	16.4	11.8	11.6	14.1	16.7

Figure 4-33: City of Westmorland Sampling Data, Avg. Turbidity (2014-2019)

4.3 County Regulated Drinking Water Providers

Based on the data from the Division of Drinking Water website, Table 4-18 shows the county regulated drinking water providers in Imperial County, with corresponding water system number and classification.

Table 4-18: County Regulated Drinking Water Providers

System	System #	System Classification
Allied Waste of Imperial Valley	1300668	NTNC
Bornt & Sons, Inc.	1300653	NTNC
Brandt Cattle	1300685	NTNC
CalEnergy (Administration)	1300635	NTNC
CalEnergy (Eng & Tech)	1300642	NTNC
CalEnergy (Salton Sea Unit No. III)	1300637	NTNC
CalEnergy (Vulcan Power Plant)	1300638	NTNC
Calvary Chapel Church	1300661	NTNC
Camacho's Restaurant	1300682	NC
Country Life MH & RV Park	1300550	C
Date Gardens Mobile Home Park	1300575	C
Earthrise Nutrionals	1300676	NTNC
Gateway	1300018	C
Hudson Ranch Power	1300679	NTNC
IID North End	1300652	NTNC
Imperial Lakes, Inc.	1300628	C
Imperial Valley College	1300549	NTNC
Magnolia Union School	1300553	NTNC
McCabe Union School	1300579	NTNC
Meadows Union Elementary School	1300554	NTNC
Mulberry Union School	1300556	NTNC
Old Eucalyptus Schoolhouse	1300655	TNC
Ormat Nevada, Inc.	1300680	NTNC
Pine Union School	1300560	NTNC
Red Hill Marina	1300561	NC
Rio Bend RV Golf Resort & Storm Cross	1300620	C
Spreckels Sugar	1300644	NTNC
Sunbeam Lake RV Resort	1300626	C
Valley Mobile Home Park	1300572	C
Wiest Lake County Campground	1300614	NC

The descriptions for each county regulated water provider are shown in Table 4-19.

Table 4-19: County Regulated System Descriptions

System	Canal/Gate Source	Capacity	Filtration Type	Chemicals Used
Allied Waste of Imperial Valley	East Highline Canal, via Rose Canal Lateral 7	25 gpm (approx. 50 people served)	PV-24 Alternative Filtration Technology	Sodium hypochlorite + NSF alum/polymer blend as a coagulant
Bornt & Sons, Inc.	Holt Canal	20 gpm (approx. 30 people served)	PV-20 Alternative Filtration Technology with Sodium Hypochlorite Disinfection	Sodium hypochlorite + NSF alum/polymer blend as a coagulant
Brandt Cattle	East Highline Canal, via I Lateral	5 gpm (approx. 50 people served)	Approved Alternative Memcor SM1 Auto Membrane Ultrafiltration	Sodium hypochlorite + NSF alum/polymer blend as a coagulant
CalEnergy (Administration)	East Highline Canal, via Vail Canal	10 gpm (approx. 45 employees served)	Multistage Gould's Reverse Osmosis (RO) System + GE Desal DK-5 Osmotic Membranes	Activated Carbon Canister Virgin Liquid Phase Type CS-DW + Sodium Hypochlorite
CalEnergy (Eng & Tech)	East Highline Canal, via Vail Lateral 2	(approx. 26 employees served)	Multistage Gould's Reverse Osmosis (RO) System + GE Desal DK-5 Osmotic Membranes	Activated Carbon Canister Virgin Liquid Phase Type CS-DW + Sodium Hypochlorite
CalEnergy (Salton Sea Unit No. III)	East Highline Canal, via Vail Lateral 4	(approx. 37 employees served)	Multistage Gould's Reverse Osmosis (RO) System + GE Desal DK-5 Osmotic Membranes	Activated Carbon Canister Virgin Liquid Phase Type CS-DW + Sodium Hypochlorite
CalEnergy (Vulcan Power Plant)	East Highline Canal, via Vail Lateral 4	(approx. 87 employees served)	Multistage Gould's Reverse Osmosis (RO) System + GE Desal DK-5 Osmotic Membranes	Activated Carbon Canister Virgin Liquid Phase Type CS-DW + Sodium Hypochlorite
Calvary Chapel Church	Central Main Canal	10 gpm (approx. 342 people)	PV-10 Alternative Filtration Technology with Sodium Hypochlorite Disinfection	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Camacho's Restaurant	Eucalyptus Canal	10 gpm	PV-10 Alternative Filtration Technology with Sodium Hypochlorite Disinfection	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant

System	Canal/Gate Source	Capacity	Filtration Type	Chemicals Used
Country Life MH & RV Park	Central Main Canal, via Alder Canal Lateral 7	150 gpm (approx. 430 people served)	PV-150 with Accu-Tab Calcium Hypochlorite System	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Date Gardens Mobile Home Park	Central Main Canal, via Eucalyptus Canal	75 gpm	PV-75 Alternative Filtration Technology with Sodium Hypochlorite	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Earthrise Nutrionals	East Highline Canal via I Lateral	50 gpm (approx. 50 people served)	PV-50 Alternative Filtration and dual media filter	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Gateway	All-American Canal via Alamo Canal	255 gpm	PV-105 and PV-150 Alternative Filtration and dual media filters	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Hudson Ranch Power	East Highline Canal via O Lateral	10 gpm (Approx. 37 employees served)	PV-10 Alternative Filtration Technology with Sodium Hypochlorite Disinfection	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
IID North End	Spruce Lateral 4 Gate 93	5 gpm (Approx. 30 people served)	Dual media polishing filter with NexSand/ silica	sodium hypochlorite; aluminum sulfate and Amerfloc polymer blended (coagulant)
Imperial Lakes, Inc.	Westside Main Canal	20 gpm (approx, 40 residents served)	Conventional Filtration	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Imperial Valley College	Central Main Canal via Dogwood Canal	100 gpm (approx. 8,981 people served)	Up flow clarifier and down flow filter and Sodium Hypochlorite Disinfectant	NSF Sodium Hypochlorite
Magnolia Union School	East Highline Canal via Osage Canal	50 gpm (approx. 142 people served	Approved Alternative up flow contact clarifiers and dual media polishing filters	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
McCabe Union School	Central Main Canal via Eucalyptus Canal	50 gpm (approx. 1,509 people served)	Pre-filters, Up flow clarifiers and multi-media sand filter	Liquid Chlorine

System	Canal/Gate Source	Capacity	Filtration Type	Chemicals Used
Meadows Union Elementary School	Central Main Canal via Acacia Canal	30 (approx. 575 people served)	Approved DK-5 treatment plant	Sodium Hypochlorite
Old Eucalyptus Schoolhouse	Central Main Canal via Eucalyptus Canal	5 gpm (approx. 25 people served)	PV-5 Alternative Filtration	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Ormat Nevada, Inc.	Spruce Lateral	10 gpm	PV-10 Approved Alternative up flow contact clarifiers and dual media polishing filters	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Pine Union School	East Highline Canal via Township Canal	10 gpm (approx. 217 people served)	PV-10 Approved Alternative Filtration with Sodium Hypochlorite Disinfectant	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Red Hill Marina	East Highline Canal via N Lateral	24 gpm	PV-24 Alternative Filtration Technology	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Rio Bend RV Golf Resort & Storm Cross	Central Main Canal via Elder Canal	150 gpm	Approved Alternative up flow contact clarifiers and dual media polishing filters	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Spreckels Sugar	Central Main Canal	75 gpm (approx. 105 employees served)	Alternative Filtration Technology dual media filters	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Sunbeam Lake RV Resort	Seeley County Water District (SCWD)	(Approx. 322 RV Spaces 50-75 year-round residents)		Sodium Hypochlorite
Valley Mobile Home Park	All-American Canal	10 gpm	PV-10 Alternative Filtration Technology with Sodium Hypochlorite Disinfection	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant
Wiest Lake County Campground	Central Main Canal	10 gpm (approx. 30 people served)	PV-10 Alternative Filtration Technology	NSF Sodium Hypochlorite + NSF alum/polymer blend as a coagulant

The following summarizes the coliform and turbidity sampling data that was provided by the Imperial County Public Health Department, Division of Environmental Health:

Allied Waste of Imperial Valley (1300668): Raw water samples are taken regularly for total coliform, E. coli, and turbidity. Based on the sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.0 to 6.3 NTU. In December 2019, the highest total coliform presence recorded at 1,600 MPN/100ml. In May 2018, an E. coli presence high was recorded at 72 MPN /100ml.

Bornt & Sons, Inc. (1300653): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0 to 1.5 NTU. In February 2019, a total coliform presence high was recorded at 1,600 MPN /100ml. In January 2014, an E. coli presence high was recorded at 19 MPN /100ml.

Brandt Cattle (1300685): Based on the raw water sampling data provided between 2017 and 2019, turbidity levels have ranged from 0.3 to 5.0 NTU. In February 2018, a total coliform presence high was recorded at 1,600 MPN /100ml. In January 2019, an E. coli presence high was recorded at 159 MPN /100ml. (Missing 2014, 2015 & 2016 data)

CalEnergy Administration Water System (1300635): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.3 to 36.2 NTU. In June 2018, a total coliform presence high was recorded at 1,600 MPN /100ml. In April 2019, an E. coli presence high was recorded at 64 MPN/100ml.

CalEnergy Central Services Water System (1300642): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.2 to 45.3 NTU. In April 2017, a total coliform presence high was recorded at 1,600 MPN/100ml. In May 2019, an E. coli presence high was recorded at 80 MPN/100ml.

CalEnergy Vulcan (Region 2) Water System (1300638): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.2 to 58.5 NTU. In April 2019, a total coliform presence high was recorded at 1,600 MPN/100ml. In September 2019, an E.coli presence high was recorded at 201 MPN/100ml.

CalEnergy Region 1 (Unit 3) Water System (1300637): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.7 to 109.0 NTU. In February 2014, a total coliform presence high was recorded at 1,600 MPN/100ml and an E. coli presence high was recorded at 303 MPN/100ml.

Calvary Chapel Church (1300661): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.02 to 6.3 NTU. In July 2016, a total coliform presence high was recorded at 1,600 MPN/100ml. In June 2019, an E. coli presence high was recorded at 76 MPN/100ml.

Camacho's (1300682): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.8 to 6.3 NTU. In March 2015, a total coliform presence high was recorded at 1,600 MPN/100ml. In September 2019, an E. coli presence high was recorded at 39 MPN/100ml.

Country Life MH & RV Park (1300550): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.7 to 12.0 NTU. In September 2016, a total coliform presence high was recorded at 2,419 MPN/100ml and an E. coli presence high was recorded at 1,300 MPN/100ml.

Date Gardens Mobile Home Park (1300575): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.2 to 12.3 NTU. In September 2014, a total coliform presence high was recorded at 1,600 MPN/100ml. In August 2017, an E. coli presence high was recorded at 53 MPN/100ml.

Earthrise Nutritionals (1300676): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.4 to 102.3 NTU. In April 2018, a total coliform presence high was recorded at 2,419 MPN/100ml. In November 2019, an E. coli presence high was recorded at 2,419 MPN/100ml.

Fish and Game Wister Unit (1300544): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.2 to 51.4 NTU. In September 2016, a total coliform presence high was recorded at 2,419 MPN/100ml and an E. coli presence high was recorded at 2,419 MPN/100ml.

Gateway (1300018): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.1 to 30.0 NTU. In August 2016, a total coliform presence high was recorded at 2,419 MPN/100ml. In March 2014, an E. coli presence high was recorded at 36 MPN/100ml.

Hudson Ranch Power (1300679): Based on the raw water sampling data provided between 2018 and 2019, turbidity levels ranged from 1.0 to 3.6 NTU. In October 2018, a total coliform presence high was recorded at 500 MPN/100ml. In April 2019, an E. coli presence high was recorded at 185 MPN/100ml. (Missing 2014, 2015, 2016 & 2017 Data)

IID North End Facility (1300652): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels ranged from 0.02 to 6.5 NTU. In September 2014, a total coliform presence high was recorded at 1,600 MPN/100ml. In September 2017, an E. coli presence high was recorded at 38 MPN/100ml.

Imperial Lakes, Inc. (1300628): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels ranged from 1.0 to 6.4 NTU. In January 2016, a totalcoliform presence high was recorded at 3,240 MPN/100ml. In June 2019, an E. coli presence high was recorded at 17 MPN/100ml.

Imperial Valley College (1300549): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels ranged from 0.2 to 90.8 NTU. In March 2016, a total coliform presence high was recorded at 2,755 MPN/100ml. In June 2018, an E. coli presence high was recorded at 2,419 MPN/100ml.

Magnolia Union School (1300553): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels ranged from 1.0 to 6.2 NTU. In September 2019, a total coliform presence high was recorded at 1,600 MPN/100ml and an E. coli presence high was recorded at 107 MPN/100ml.

McCabe School (1300579): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels ranged from 1.7 to 46.5 NTU. In July August 2014, a total coliform presence high was recorded at 11,199 MPN/100ml. In August 2019, an E. coli presence high was recorded at 365 MPN/100ml.

Meadows Union Elementary School (1300554): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels ranged from 0.08 to 1.3 NTU. In April 2016, a total coliform presence high was recorded at 1,600 MPN/100ml and an E. coli presence high was recorded at 101 MPN/100ml.

Mulberry Union Elementary School (1300556): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels ranged from 0.08 to 20.5 NTU. In August 2018, a total coliform presence high was recorded at 1,600 MPN/100ml and an E. coli presence high was recorded at 190 MPN/100ml.

Old Eucalyptus (1300655): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 0.8 to 6.3 NTU. In October 2018, a total coliform presence high was recorded at 300 MPN/100ml. In May 2014, an E. coli presence high was recorded at 15 MPN/100ml.

Ormat Nevada, Inc. (1300680): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.0 to 6.8 NTU. In December 2018, a total coliform presence high was recorded at >=1,600 MPN/100ml. In August 2012, a fecal coliform presence high was recorded at 240 MPN/100ml. In April 2016, an E. coli presence high was recorded at 14 MPN/100ml.

Pine Union School (1300560): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.0 to 6.3 NTU. In September 2014, a total coliform presence high was recorded at 1,600 MPN/100ml. In December 2019, an E. coli presence high was recorded at 37 MPN/100ml.

Red Hill Marina (1300561): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.2 to 10.0 NTU. In July 2017, a total coliform presence high was recorded at 1,600 MPN/100ml. In October 2019, an E. coli presence high was recorded at 24 MPN/100ml.

Rio Bend RV Golf Resort & **Storm Cross (1300620):** Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.0 to 6.3 NTU. In November 2010, a total coliform presence high was recorded at 3,240 MPN/100ml. In May 2019, an E. coli presence high was recorded at 30 MPN/100ml.

Spreckels Sugar (1300644): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.0 to 6.7 NTU. In November 2014, a total coliform presence high was recorded at 1,600 MPN/100ml. In May 2015, an E. coli presence high was recorded at 19 MPN/100ml.

Sunbeam Lake RV Resort (1300626): (No Sample Data Provided)

Valley Mobile Home Park (1300572): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.5 to 2.7 NTU. In August 2016 a total coliform presence high was recorded at 2,419.2 MPN/100ml. In April 2016, an E. coli presence high was recorded at 37 MPN/100ml.

Westside School (1300578): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.0 to 6.2 NTU. In June 2019, a total coliform presence high was recorded at 300 MPN/100ml. In January 2018, an E. coli presence high was recorded at 15 MPN/100ml.

Wiest Lake County Campground (1300614): Based on the raw water sampling data provided between 2014 and 2019, turbidity levels have ranged from 1.0 to 6.7 NTU. In September 2014, a total coliform presence high was recorded at 1,600 MPN/100ml. In October 2019, an E. coli presence high was recorded at 153 MPN/100ml.

4.4 Significant Changes and Trends

The Holt Group Inc. (THG) has reviewed the bacterial quality of the raw water in section 4 and noted systems that have higher than average bacterial contamination in their raw water supplies. All the systems treat IID water but report wide variations in their source water bacterial water quality. For example, Heber takes its water from the Central Main Canal a short distance from the branch from the All American Canal and Calexico takes its water from the All American Canal. The distance between the two points of delivery is less than a mile but the Calexico average E.coli from 2014 to 2019 is 3 CFU/100 mL and the Heber average is 55 CFU/100 mL. Both drinking water providers are taking water from the main delivery canals.

IID has an extensive program to concrete line the delivery canals. Below is a table THG received from IID showing the extent of its canal system and the length lined.

Table 4-20: IID Distribution System (miles), 2019

System Used	Earthen	Concrete Lined	Piped	Total Length
All-American Canal	56.720	23.000	0.071[1]	**79.790**
Main Canals	128.218	22.072	0.000	**150.290**
Lateral Canals	319.702	1,091.238	26.870	**1,437.810**
Canals Total Miles	**504.6440**	**1,136.31310**	**26.941**	**1,667.890**

[1] The New River Siphon is a 374 foot piped portion of the AAC.

Source: Concrete Lining Projects completed 2015-2018 from IID Water Department Report and 2019 MWA's

About 78% of the lateral canals are either concrete lined or piped or about 15% of the main canals are lined. Table 4-21 shows the Water Provider location numbers per Figure 4-34 showing the canals which supply the water providers. The canal material shown (concrete lined, piped or earthen) is based on a GIS database provided to THG by IID.

Table 4-21: Water Provider Location Numbers

WSN	Figure Number	Water System Name	Facility Name
1310001	1	Brawley, City of	Mansfield - Gate 26
1310002	2	Calexico, City of	AAP - Gate 2
1310801	3	Centinela State Prison	WSM - Gate 17B
1310019	4	DHS Calexico	IID - Alamitos Canal
1310004	5	El Centro, City of	(Primary) South Date - Gate 20B
1310004	5	El Centro, City of	Dahlia - Gate 18A
1310016	6	GSA Calexico Port of Entry	AAC - Gate 23
1310003	7	GSWC - Calipatria	C-West Lateral - Gate 38
1310007	9	Heber Public Utility District	Dogwood - Gate 37A
1310007	9	Heber Public Utility District	Central Main Canal
1310005	10	Holtville, City of	Pear - Gate 30L
1310006	11	Imperial, City of	Dahlia - Gate 52
1310700	12	NAF El Centro	Elder Canal - Gate 104B
1310013	13	Seeley CWD	Elder - Gate 94D
1300561	15	UC Desert Research & Extension Center	Ash Lat 30 - Gate 205
1300572	16	Valley Mobile Home Park	IID - All American Canal
1310008	17	Westmorland, City of	Trifolium Lat 5 - Gate 89
1300668	20	Allied Waste of Imperial Valley	Rose Canal
1300653	21	Bornt & Sons Inc.	Holt Canal - Pipe 1
1300635	22	CalEnergy (Eng. & Tech)	Vail Lat 4A - Gate 461A
1300642	23	CalEnergy (Eng. & Tech)	Vail Lat 2 - Gate 222
1300637	24	CalEnergy (Salton Sea Unit No III)	Vail Lat 5 - Gate 513A
1300638	25	CalEnergy (Vulcan Power Plant)	Vail At 4 - Gate 416A
1300661	26	Calvary Chapel Church	Central Main Canal
1300550	28	Country Life MH & RV Park	Alder - Pipe 32
1300575	29	Date Garden Mobile Home Park	Eucalyptus - Pipe 90
1300676	30	Earthrise Nutrionals, LLC	I Lateral Canal I - Gate 001A
1300018	33	Gateway	South Alamo Canal Gate14
1300679	34	Hudson Ranch Power I LLC	O Lateral - Gate 32
1300652	35	IID North End Consolidation	Spruce Lat 4 - Gate 93
1300628	36	Imperial Lakes, Inc.	WSM - Gate 17A
1300549	37	Imperial Valley College	Dogwood Lat 6 - Gate 67
1300553	38	Magnolia Union School	Osage - Gate 23A
1300579	39	McCabe Union School	Central Main – 3PO14
1300554	40	Meadows Union Elementary School	Acacia - Gate 61
1300556	41	Mulberry Union School	Mulberry Canal - Gate 11A
1300680	43	Ormat Nevada North Brawley	Spruce Canal

WSN	Figure Number	Water System Name	Facility Name
1300560	44	Pine Union School	Township - Gate 21A
1300620	46	Rio Bend RV Golf Resort & Storm Crossing	Elder Lat 7 - Gate 68
1300644	48	Spreckels Sugar Company	CM - Gate 19
1300578	49	Westside School	Fern - Gate 16A
1300685	52	Brandt Cattle Company	I-Lateral
1300669	53	La Valle Sabbia Inc.	Elm Canal
1310014	IID02	Imperial Irrigation District 002	Central Main Above Newside Check
1310014	IID03	Imperial Irrigation District 003	Westside Main Above No. 8 Check
1310014	IID04	Imperial Irrigation District 004	East High Line Above Z Pond
1310014	IID01	Imperial Irrigation District 001	All American Canal Drop 1
1310014	IID05	Imperial Irrigation District 005	All American Canal Above EHL Check
1310014	IID06	Imperial Irrigation District 006	All American Canal Above CM Check
1310014	IID07	Imperial Irrigation District 007	All American Canal Above WSM Hdg
1310014	IID08	Imperial Irrigation District 008	East High Line Above Check 11
1310014	IID09	Imperial Irrigation District 009	Central Main Above Rockwood Hdg
1310014	IID10	Imperial Irrigation District 010	Westside Main Above Carter Resv.
1300544	1001	Fish & Game Wister Unit*	Canal - Niland Lateral
1300561	1002	Red Hill Marina*	L & EHL - Gate 36
1300614	1003	Wiest Lake*	Moorhead - Gate 210
1300626	1004	Sunbeam Lake RV Resort*	Receives Water From Seeley Water Plant
1300655	1005	Old Eucalyptus Schoolhouse*	Eucalyptus - Pipe 20
1300677	1006	Willie's Truck Parking*	Beech Canal
1300682	1007	Camacho's Restaurant*	Eucalyptus Canal
1310301	1008	Heber Dunes - SVRA*	South Alamo - Pipe 7A
1310302	1009	Sonny Bono Salton Sea Wildlife Refuge*	Vail Lat 4 - Gate 421
1310800	1010	Calipatria State Prison*	SCWC-Calipatria - Trtd

*Not shown on figure

Figure 4-34 below illustrates the drinking water provider locations and delivery canal map.

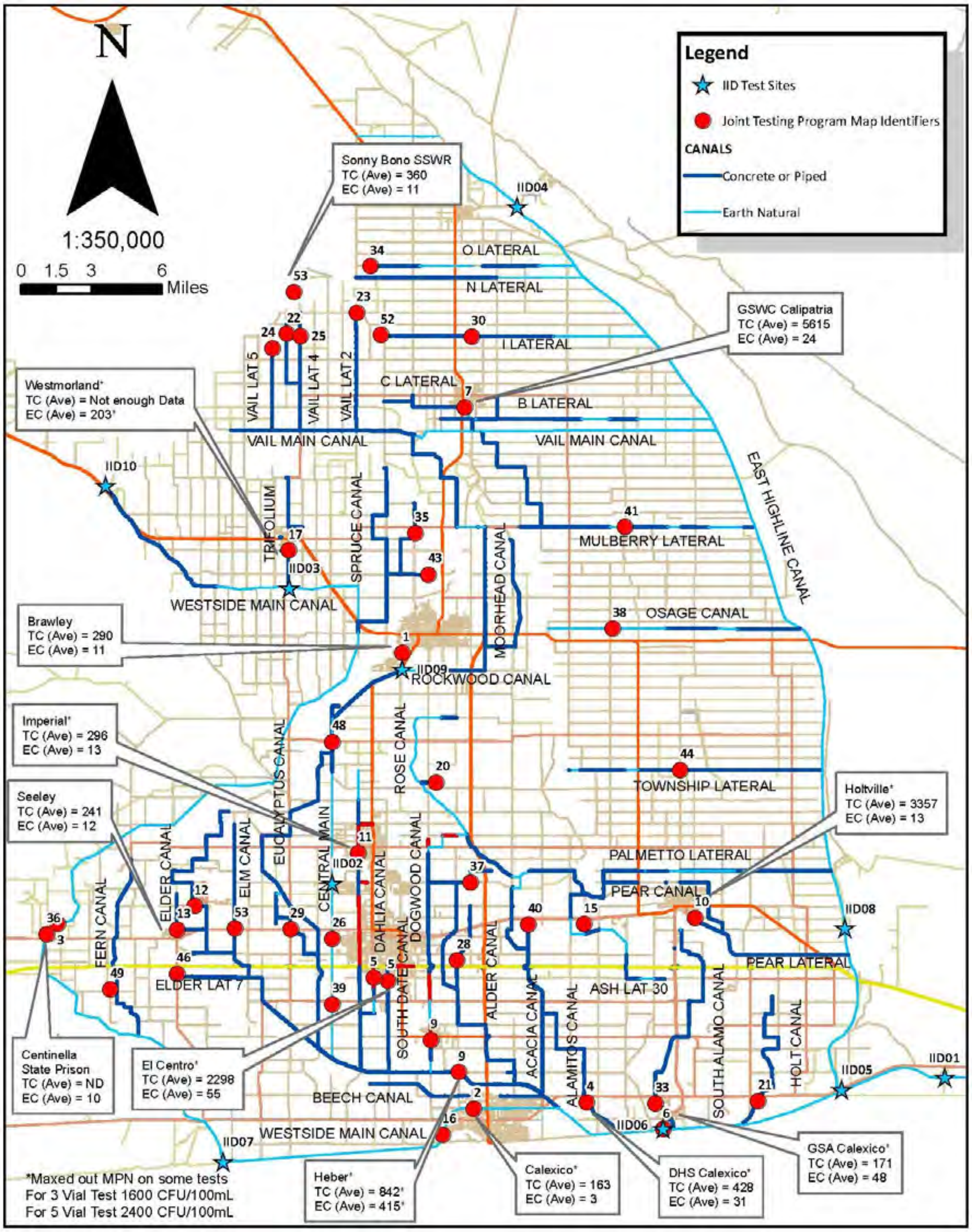


Figure 4-34: Water Provider Location and Delivery Canal Map

IID tests its canal system for microbiological contamination monthly. Table 4-22 shows the testing sites

Table 4-22: Bacterial Testing Sites

Canal	Location
All American Canal	At Drop 1
	Above Eastern Highline Canal Check
	Above Central Main Canal Check
	Above Westside Main Canal Heading
Eastern Highline Canal	Above Check 11
	At Z Pond
Central Main Canal	Above Newside Check
	Above Rockwood Heading
Westside Main Canal	Above No. 8 Check
	Above Carter Reservoir

Using test results provided by IID and DDW, THG was able to compare bacterial canal water quality to water providers' raw water quality The IID Central Main at Rockwood Heading is less than a mile away from the Brawley delivery point at Gate 26 of the Mansfield Canal which takes water from the Central Main Canal. A comparison of test results for three summer months in 2018 is shown in the following table.

Table 4-23: Bacterial Testing Comparison

Comparison of Bacterial Testing					
Brawley Mansfield Canal-Gate 26			IID Central Main above Rockwood Heading		
Month	Total Coliform CFU/100mL	E.coli CFU/100mL	Date	Total Coliform CFU/100mL	E.coli CFU/100mL
June 2018	345	24	June 6. 2018	280	40
July 2018	202	7	July 3, 2018	500	70
August 2018	450	4	August 8, 2018	300	6
September 2018	205	3	September 4, 2018	220	38

Another example is the GSA Calexico water provider and an IID All American Canal test site only 2,000 feet away. The comparison is shown in the following table.

Table 4-24: Bacterial Testing Comparison

Comparison of Bacterial Testing					
GSA Calexico All American Canal-Gate 23			IID All American Canal above Central Main Check		
Month	Total Coliform CFU/100mL	E.coli CFU/100mL	Date	Total Coliform CFU/100mL	E.coli CFU/100mL
June 2018	>1600	2	June 6. 2018	500	62
July 2018	80	1	July 3, 2018	300	23
August 2018	130	3	August 8, 2018	23	1
September 2018	500	7	September 4, 2018	130	8

The apparent differences between the IID and water providers bacteriological test results are not easily explained. They could be related to different testing days or to the water provider sampling conditions (location, sampling method, etc.). Weather conditions such as wind or rain could affect test results from sampling taken on different days.

Total coliforms are widely distributed in nature and not always associated with fecal contamination from the gastrointestinal tract of warm blooded animals. E.coli is commonly found in the feces of warm-blooded animals and, although usually harmless, E.coli can cause illness such as meningitis, septicemia, urinary tract, and intestinal infections. E.coli 0157:H7 is a recently discovered strain that may be fatal in small children and elderly people.[1] E.coli is used by DDW and water providers to determine disinfection requirements to protect drinking water from Giardia and Cryptosporidium contamination. Reduction of E.coli in the raw water could result in dramatic savings to water providers by reducing their chemical costs and treatment plant investments.

Do concrete canal linings reduce E.coli contamination in irrigation canals? Some birds such as pigeons or ducks carry E.coli and can transmit E.coli via their fecal deposits. Other birds can peck at cattle feces and pass E.coli into water they land on. The FDA blamed contaminated canal water for a large outbreak of E.coli O157:H7 contamination of lettuce in Yuma in 2018[2]. The Yuma Irrigation District has about 8 miles of concrete lined canals and 26 miles of underground pipelines with over 99% of farmer owned ditches are concrete lined.[3]

Concrete canal lining may improve water quality by limiting pollution caused by bacteria in the soil interface between water and the canal surface. There is some evidence in the literature that E.coli can survive in a soil based environment, but the relationship is not all clear.[4] Figure 4-34 shows canals supplying water providers and their lining. Most of the canals supplying water to the water providers are concrete lined (except for the main canals) and little of the lining was added to these canals from 2014 to 2019. A review of the recent canal lining projects shows IID places a priority on the raw water delivery canals. Lining of the main canals would require detailed planning and coordination between IID and the water providers. Consideration should be given to carrying out a feasibility study of lining the main canals during reduced demand winter months by optimizing the available storage within the IID and water provider’s facilities.

[1] https://www.usgs.gov/special-topic/water-science-school/science/bacteria-and-e-coli-water?qt-science_center_objects=0#qt-science_center_objects

[2] https://www.nbcnews.com/health/health-news/dirty-canal-water-may-have-tainted-romaine-lettuce-e-coli-n887606

[3] yumairrigation.com/#:~:text=The%20Yuma%20Irrigation%20District%20has,from%2060%20to%2030%20inches..

[4] van Elsas, J.M., Semenov, A.V., Costa R. and Trevors, J.T.,”Survival of Escherichia coli in the environment: fundamental and public health aspects”, The ISME.J, 2011 Feb; 5(2) 173-183.

Potential Sources of Contamination

5.1 Introduction

The 2020 Watershed Sanitary Survey Update classifies the potential point and non-point contaminant sources contributing to the watershed from upstream and downstream of the Imperial Dam following the Colorado River, a portion of the All American Canal, and within the Imperial Valley. Point sources release pollutants from discrete conveyances, such as discharge pipes and sewage treatment plants that release treated water. Non-point sources are a combination of pollutants from a large area generally associated with runoff, unabsorbed water from rain and irrigation. Water quality parameters of concern, including the total coliform, fecal coliform, and E.coli bacterial presence is provided as a basis for understanding the risks or impacts of contamination. The fluctuations in concentration may be due to a few variables such as vicinity to potential sources of contamination, varieties in temperature, changes in system and improvements. This section will focus on the potential sources of contamination and examine any new potential sources of impurities due to changes within the framework or in development.

The potential sources of contamination identified are summarized in the following categories:

1. Storm Water Runoff and First Flush Events
2. Spills into the IID Canal System
3. Drowning
4. Failing Septic Systems
5. Wastewater Collection, Treatment, and Discharge
6. Recreation on the River and Associated Bodies of Water
7. Agricultural Activities
8. Other Concerns

Every source contaminant will include key contaminants relating to the source, the occurrence of the source in the watershed, and a description of findings that will address the existence of key contaminants in the source waters.

5.2 Stormwater Runoff and First Flush Events

The Imperial Valley is classified as a semi-arid desert with the lowest point being approximately 275 feet below sea level and the highest point being 4,284 feet above sea level with warm dry summers and mild winters. Imperial County, California gets 3 inches of rain, on average, per year, however the US average is 38 inches per year which is minimal compared to other parts of the US.[1]

Storm water runoff and first flush events are potential source contaminants. Storm water runoff is generated when precipitation from rain flows over land or impenetrable surfaces such as paved streets, parking lots and building rooftops. First flush events is the first portion of each rainstorm, typically within the first hour of rainfall, high concentrations of runoff accumulate trash, chemicals, oils and dirt sediment that drains into our system and affects our water quality. Best Management Practices (BMPs) can be implemented to filter out pollutants or prevent it at the origin of source. These practices are dedicated to be an effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollutants generated by non-point sources to a level compatible with water quality goals.[2]

Non-storm water runoff is another source of contamination within our watershed due to agricultural, commercial, industrial, and residential land uses which potentially flushes contaminants into drainage systems. By effectively using BMP's, you have a high chance of preventing and controlling the contaminated runoff. Detected pollutants in our system commonly are total suspended solids, pesticides, metals, hydrocarbons, nutrients, oil and grease, and coliform bacteria. Construction sites are also a concern due to the fact stormwater can wash over the loose soil with various materials accumulating sediment, debris and chemicals transporting them to nearby storm sewer system or into a canal. The United States Environmental Protection Agency (EPA) works with construction site operators to ensure they have the proper stormwater controls in place so that construction can proceed in a way that protects your community's clean water and surrounding environment.[3] Protecting these resources is vital to our water quality; communities can implement BMP's to control stormwater pollution at its source. According to the EPA website these are the following practices:

- Public Education and Outreach
- Erosion and Sediment Control Measures
- Land Use Controls and or Incentives
- Zoning Ordinances
- Low Impact Development (LID) and green infrastructure

Information regarding these practices can be found on the EPA website. Majority of the storm and non-storm related runoff is gathered by the IID drainage canal system which eventually discharges into the Salton Sea. The water supply canal system operates independently of the drainage system, however, sections of the drainage water can unintentionally flow into the water supply channels, in particular during the first flush events. The drains used for seepage interception along the East Highline Canal and other seepage interception systems connected to the water supply channels are other possible runoff issues. A source of contamination may theoretically be any drainage system related to the seepage interception system.

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[1] Imperial County, California Climate https://www.bestplaces.net/climate/county/california/imperial
[2] North Carolina Forest Service https://ncforestservice.gov/water_quality/what_are_bmps.htm
[3] EPA Stormwater Discharges from Construction Activities https://www.epa.gov/npdes/stormwater-discharges-construction-activities

5.3 Spills into the IID Canal System

Records indicate that spills into IID canals happen as a result of car crashes and leakages creating a potential source of contamination. According to IID website, IID Hazmat Unit responds to all hazardous material spills. Hazmat Unit personnel shall notify appropriate local agencies if spill is of a Reportable Quantity (RQ), document this notification, and coordinate defensive actions to prevent it from affecting IID water supply. First responders are trained to respond to suspected hazardous materials released to protect people, environment or property. The responders collect scene information from employees and clean up the incident according to state and county regulations. This standard operating procedure (SOP) is detailed in IID's SOP 93-006.

Based on information provided by the Sheriff Coroner's office, a total of 16 vehicle drownings have been found in all canals and drains since 2014. Unfortunately there is not a specific field on the traffic collision report that filters crashes involving IID Canals or drains so no public agency was able to provide that information. When IID Water Control receives notice of a vehicle in the canal, they will alert all IID personnel to clear the area, notify the IID Risk Management, Security and Claims Investigator, and Operations Personnel on call. The Drainage Department in the Northend, Southend, Western, Holtville, and Southwest Divisions will be notified during regular work hours. Lastly, Water Control will notify the Power Dispatcher when it is safe for employees to return to the area. If the vehicle is leaking fluids, Hazmat is called to clean up the spill. This procedure is detailed in IID's SOP 97-003.

The State Water Resources Control Board (SWRCB) adopted Statewide General Waste Discharge Requirements (WDRs) for Sanitary Sewer Systems, Water Quality Order No. 2006-0003 (Sanitary Sewer Systems WDR) on May 2, 2006. The Sanitary Sewer Systems WDR requires public agencies that own or operate sanitary sewer systems to develop and implement sewer system management plans and report all SSOs to the State Water Board's online SSO database.[4] The incident maps for sanitary sewer overflows can be found on the website of the CA State Water Resources Control Board. These accidents are only applicable to the IID drainage system and should not be applicable to IID canal water. Any spill into a drainage channel that may be near canal waters, however, or that is partly linked to a ditch of the seepage interception system has the potential to be a source of contamination.

"A sanitary sewer overflow (SSO) is any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs often contain high levels of pathogenic organisms, toxic pollutants, nutrients, oil and grease that may threaten public health, adversely affect aquatic life, and impair the recreational use of surface waters." [5]

Spills that occur within IID service area are reported to IID and the Regional Board. The Regional Board has a database cataloging all incidents reported in the state of California. EPA's National Response Center is federal point of contact for discharges into the environment and all incidences can be found at their website[6]. The Arizona Department of Environmental Quality (ADEQ) oversees the incidents that may occur on the Arizona side. Likewise, the State Regional Board oversee the incidents on the California side.

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[4] Sanitary Sewer Overflow Reduction Program https://www.waterboards.ca.gov/water_issues/programs/sso/
[5] ibid
[6] National Response Center. (2017, June 21). Retrieved December 17, 2020, from https://www.epa.gov/emergency-response/national-response-center

5.4 Drowning Deaths

Drowning deaths involving human and animal remains are potential sources of contamination by releasing coliforms and other pollutants into the water. The IID covers over 1,450 miles of drains, 1,400 miles of laterals, 230 miles of main canals, and 80 miles of the All American Canal. According to Animal Control and County Sheriff's Coroner records since 2014, there have been approximately 79 human bodies and 52 dead animals found in the canals or drains, resulting in an average of roughly 16 human and 10 animal deaths per year. The cause of most of these deaths appears to be unknown.

The typical response procedures when a body is found in a canal or drain is for the reporting party to notify someone from IID's Water Dispatch. They in turn notify the on-call investigator from the IID Claims and Investigations Unit to respond and inspect the circumstances. If a law enforcement agency is the reporting party, IID will remain on site. However, if the discovery is made by an IID employee or a private party, then the IID dispatcher contacts the proper law enforcement agency to respond before notifying the on-call investigator. The County Sheriff's Department Coroner's office is responsible for removal of a body from the canal or drain.

5.5 Failing Septic Tanks

Failing septic tank systems can be a hazard to the safety of groundwater and a possible source of contamination. The Land Ordinance of the Imperial County addresses in detail the specifications which can be found on their website for all septic systems within the County. It is the responsibility of the land owner to obtain a sanitation permit through the County's Public Health Department, in accordance with Land Ordinance. At this time, the County has not reported, as to whether or not there are known failing septic systems within the County. It mentions common failures occur in the poorest percolating soils around El Centro, Calexico, and Brawley. These incidents are discovered when a contractor or owner contacts the Regional Water Quality Control Board (RWQCB) for a repair permit.

Farmers and IID have initiated canal seepage recovery projects as part of IID's water conservation measures as a way to enhance water quality and conserve water. A possible source of contamination is any septic system situated near the back wells of the IID canal pump. The RWQCB watershed report for the Lower Colorado River should be referred to for further information regarding septic systems along this reach, upstream of Imperial Dam.

In general, failing septic systems, such as Desert Hot Springs, Lucerne Valley, and Coachella Valley, named by the RWQCB, has negatively impacted groundwater quality. Although these failing septic systems are outside the Lower Colorado River aquifer, they increase awareness that failing septic systems could be a threat to groundwater quality.

The Palo Verde Lagoon area has been and continues to be a potential source of concern. Palo Verde is a town all on septic; it is located several miles upstream of Imperial Dam, and lies within the Colorado River floodplain and river aquifer. Several years ago, Palo Verde County Water District (PVCWD) obtained funding from BECC/NADBank for the completion of a Preliminary Engineering Report and any necessary environmental documentation. However, upon the completion of these reports was discovered that a portion of the proposed project site/parcel consists of a wetland identified by the U.S. Fish & Wildlife Services. In order to consider this project, PVCWD must demonstrate that the project will not affect/disturb the wetland. PVCWD was recently awarded a planning grant from USDA – Rural Development for the completion of a wetland delineation in order to determine if the originally identified site is suitable for the project. Regardless of keeping or needing to find an alternative location, PVCWD will be required to update the current PER and environmental documentation as both documents are close to five years old. PVCWD has started work on the wetland delineation in order to move the project forward.

Figures 5-1 and 5-2 are taken from the USGS report entitled, "Update of the Accounting Surface along the Lower Colorado River", revised 2009. They show the areas of river aquifers along the Lower Colorado River reaches from Imperial Dam upstream to Parker, near Lake Havasu, which includes the Palo Verde Lagoon area.

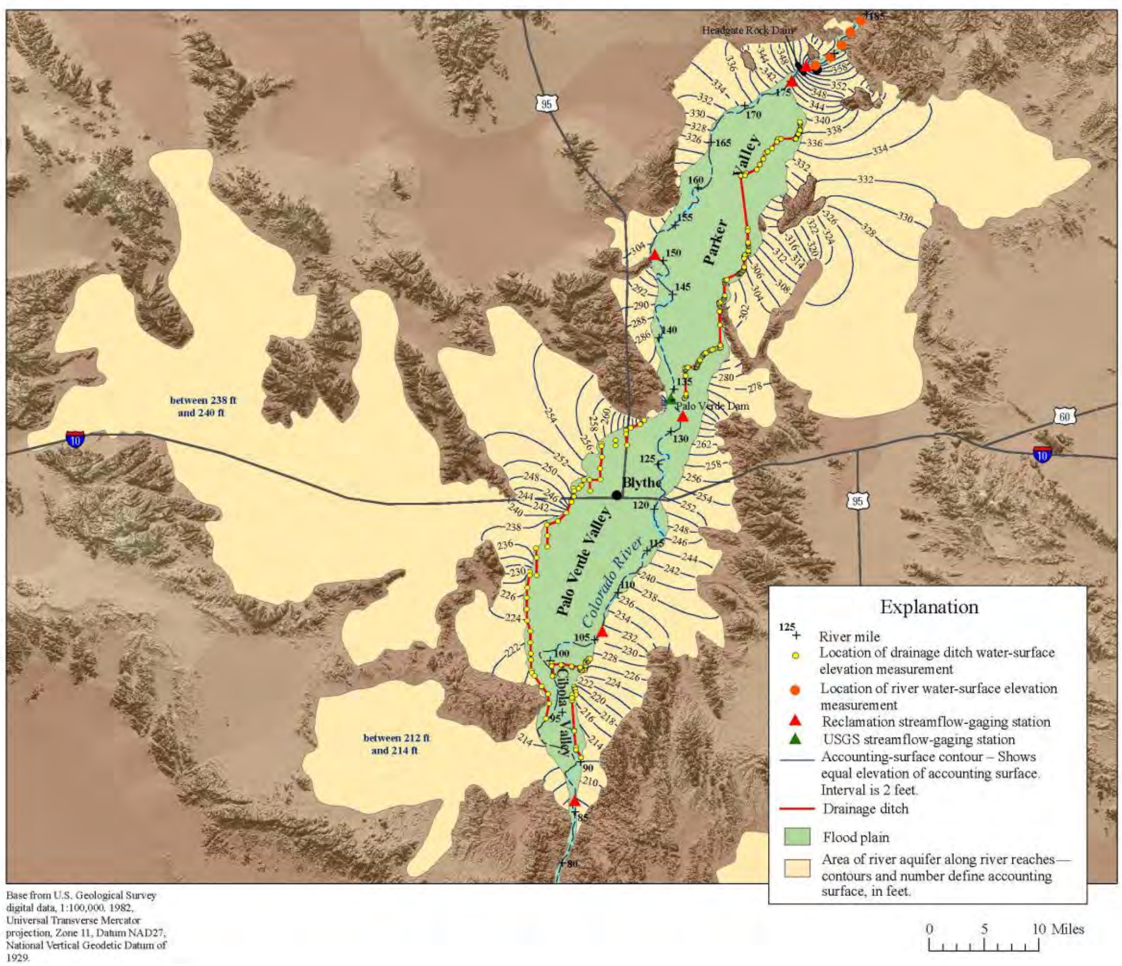


Figure 5-1: Colorado River Aquifer (Parker to Palo Verde)

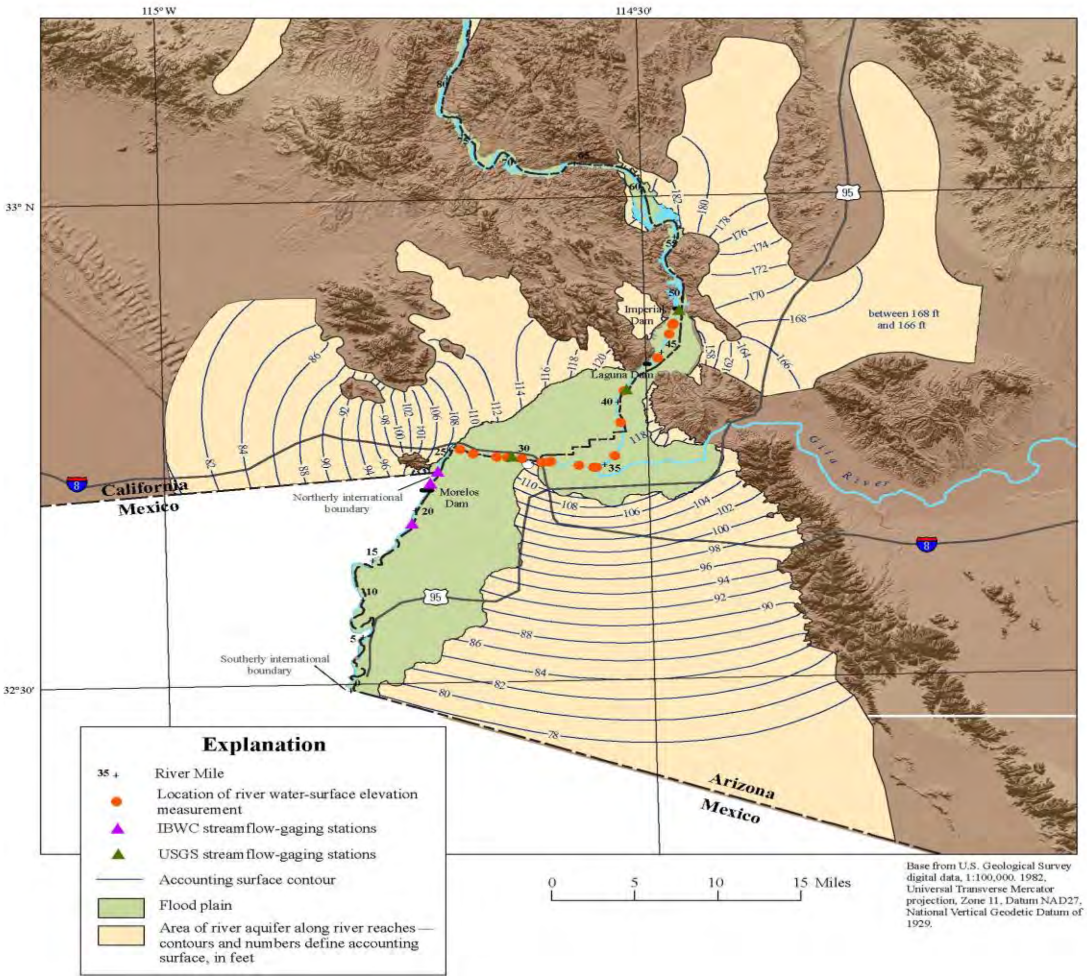


Figure 5-2: Colorado River Aquifer (Palo Verde to Imperial Dam)

5.6 Wastewater Collection, Treatment, and Discharge

Wastewater, known as sewage, is water contaminated by human waste, produced by residencies, businesses and industries. Generally it is composed of 99.9% water with the remaining 0.1% dissolved and suspended material. Wastewater is characterized by its flow rate or volume, physical state, chemical components, and the bacteriological species it contains. Wastewater is typically treated on site or at a private Wastewater Treatment Plant (WWTP) and disposed of at a municipal wastewater treatment plant into a collection system (sanitary sewage system). WWTP that discharge treated wastewater into the Colorado River are potential sources of contamination. Wastewater generators must obtain a National Pollutant Discharge Elimination System (NPDES) permit to discharge their wastewater and stormwater. Some are exempt from federal requirements but California law may still apply under the waste discharge requirements (WDRs).

Maintaining wastewater collection infrastructure systems like pump lift stations, force mains, and sewer lines is an integral component of the proper management of a treatment system and critical to preventing illegal wastewater releases. Effective preventive maintenance programs have been shown to significantly reduce the frequency and volume of untreated sewage discharges, help communities plan for the future and save money on emergency response.[7] Facilities close to the rivers, unlined canal waters and groundwater produce an elevated risk of accidental spills of raw sewage through leaks in sewer lines or overflows caused by power outages at lift stations. Raw sewage can lead to contamination of surface waters with pathogens and coliforms. The cities of Parker, Arizona and Ehrenberg, Arizona, in particular, have WWTPs discharging their treated wastewater into the Lower Colorado River.

The New River is a severely polluted waterway that flows north across United States-Mexico Border through the city of Calexico carrying urban runoff, raw sewage, industrial and domestic and agricultural wastes from the Mexicali Valley into the United States. The river travels about 60 miles through Imperial County discharging its entire flow into the Salton Sea. About 2/3 of its flow consists of wastewater in the form of agriculture run off from Imperial County potentially affecting the water quality.

The release of untreated wastewater can affect water quality which contains variety of contaminants, including: sediment and turbidity; nutrients, particularly nitrogen and phosphorus; toxic compounds, including metals, pesticides and other chemicals; biochemical oxygen-causing organic matter; and gross pollutants, including plastic and paper products. Pathogens including bacteria, viruses, protozoa, helminths, molds and fungi can be borne by waste water. Certain constituents such as pathogens, nutrients, oxygen demanding substances, etc., are typically treated at the WWTPs with varying removal efficiencies.

Pharmaceuticals, personal care products, and endocrine disruptors are emerging concerns due to the harsh chemicals being discharged. For more information regarding the ongoing Endocrine Disruptor Screening Program (EDSP), and the EDSP Comprehensive Management Plan 2014 Update, see the EPA's website. [8]

[7] Wastewater Collection System Toolbox https://www3.epa.gov/region1/sso/toolbox.html April 10,2017
[8] Endocrine Disruptor Screening Program (EDSP) Comprehensive Management Plans. (2015, September 29). Retrieved December 23, 2020, from https://www.epa.gov/endocrine-disruption/endocrine-disruptor-screening-program-edsp-comprehensive-management-plans

Table 5-1 information was obtained from the State Water Resources Control Board (SWRCB), showing the WWTPs by agencies that have active NPDES permits in the State of California Region 7. According to SWRCB, the highlighted agencies indicate an expiration date. The data retrieved for this section is the latest available data as of December 28, 2020.

Table 5-1: NPDES Wastewater Permits in CA Region 7

Agency	Facility Name	County	Order #	NPDES #	Expiration Date	Design Flow (MGD)
Ca Dept. of Corrections Imperial	Ca Dept. of Corrections Centinela WWTP	Imperial	R7-2019-0003	CA7000001	4/30/2024	0.96
City of Brawley	City of Brawley WWTP	Imperial	R7-2015-0004	CA0104523	6/30/2020	5.9
City of Calexico	City of Calexico WWTP	Imperial	R7-2019-0004	CA7000009	5/31/2024	4.3
City of Calipatria	City of Calipatria WWTP	Imperial	R7-2020-0010	CA0105015	11/30/2025	1.73
City of El Centro	City of El Centro WWTP	Imperial	R7-2019-0002	CA0104426	3/31/2024	8
City of Holtville	City of Holtville WWTP	Imperial	R7-2016-0005	CA0104361	6/30/2021	0.85
City of Imperial	City of Imperial WWTP	Imperial	R7-2015-0030	CA0104400	9/30/2020	2.4
City of Westmorland	City of Westmorland WWTP	Imperial	R7-2017-0017	CA0105007	9/30/2022	0.5
Coachella SD	Coachella SD WWTP	Riverside	R7-2020-0008	CA0104493	6/30/2025	4.5
Coachella Valley WD	Coachella Valley WD WWTP	Riverside	R7-2017-0006	CA0104973	5/31/2022	9.9
Date Gardens Asset Partners LP	Date Gardens MHP WWTP	Imperial	R7-2018-0009	CA0104841	9/30/2023	0.014
Heber PUD	Heber PUD WWTP	Imperial	R7-2016-0006	CA0104370	6/30/2021	1.2
NAF El Centro	NAF El Centro WWTP	Imperial	R7-2016-0004	CA0104906	6/30/2021	0.3
Niland SD	Niland SD WWTP	Imperial	R7-2019-0005	CA0104451	5/31/2024	0.5
Ralph Beatty	Country Life MHPRV Assets Partners LP WWTP	Imperial	R7-2018-0010	CA0104264	5/31/2023	0.15
Seeley County WD	Seeley CWD WWTP	Imperial	R7-2017-0016	CA0105023	9/30/2022	0.25
Valley Sanitary District	Valley SD WWTP	Riverside	R7-2020-0007	CA0104477	5/31/2025	13.5

Table 5-2 data, obtained by the SWRCB, shows the facilities by agencies that have Waste Discharge Requirements (WDR) in the state of California Region 7.

Table 5-2: WDR's for Wastewater Treatment Facilities in CA Region 7

Agency	Facility Name	County	Order #	WDID #	Expiration Date	Design Flow (MGD)
City of Blythe	Blythe Regional WW Reclamation Facilities	Riverside	R7-2016-0013	7B330102012	6/30/2026	2.4
Coachella Valley WD	Bombay Beach STP	Imperial	R7-2013-0024	7A330105021	3/21/2028	0.15
Imperial Community College District (CCD)	Imperial CCD WWTP	Imperial	R7-2013-0018	7A130135001	3/21/2028	0.1
McCabe USD	McCabe Municipal WWTP	Imperial	R7-2015-0050	7A130136001	11/19/2030	Null
Imperial County Department Community & Economic Development	Poe Colonia (Cady Subdivision)	Imperial	R7-2005-0005	7A131006001		0.03
Salton Community Services District	SCSD Desert Shores WWTP	Imperial	R7-2014-0007	7A130110031	9/18/2024	0.2
Salton Community Services District	SCSD Thomas R. Cannell WWTP	Imperial	R7-2018-0013	7A130117001	11/8/2033	0.25

5.7 Recreation on the Colorado River and Associated Bodies of Water

Recreational activities within a watershed can contribute to the degradation of water quality. Both bodily and non-bodily contact with the water along the Colorado River is a potential source of contamination. Contamination associated with the recreation includes loss of vegetation, erosion, trash, pathogens contributing from humans and animals, spillage/leakage and production of combustion byproducts.

The California State Parks Division of Boating and Waterways shows all the trails and facilities along the Colorado River from Parker Dam to Imperial Dam. Figures 5-3 to 5-21 show recreational facilities along the Colorado River from Davis Dam to Imperial Dam.

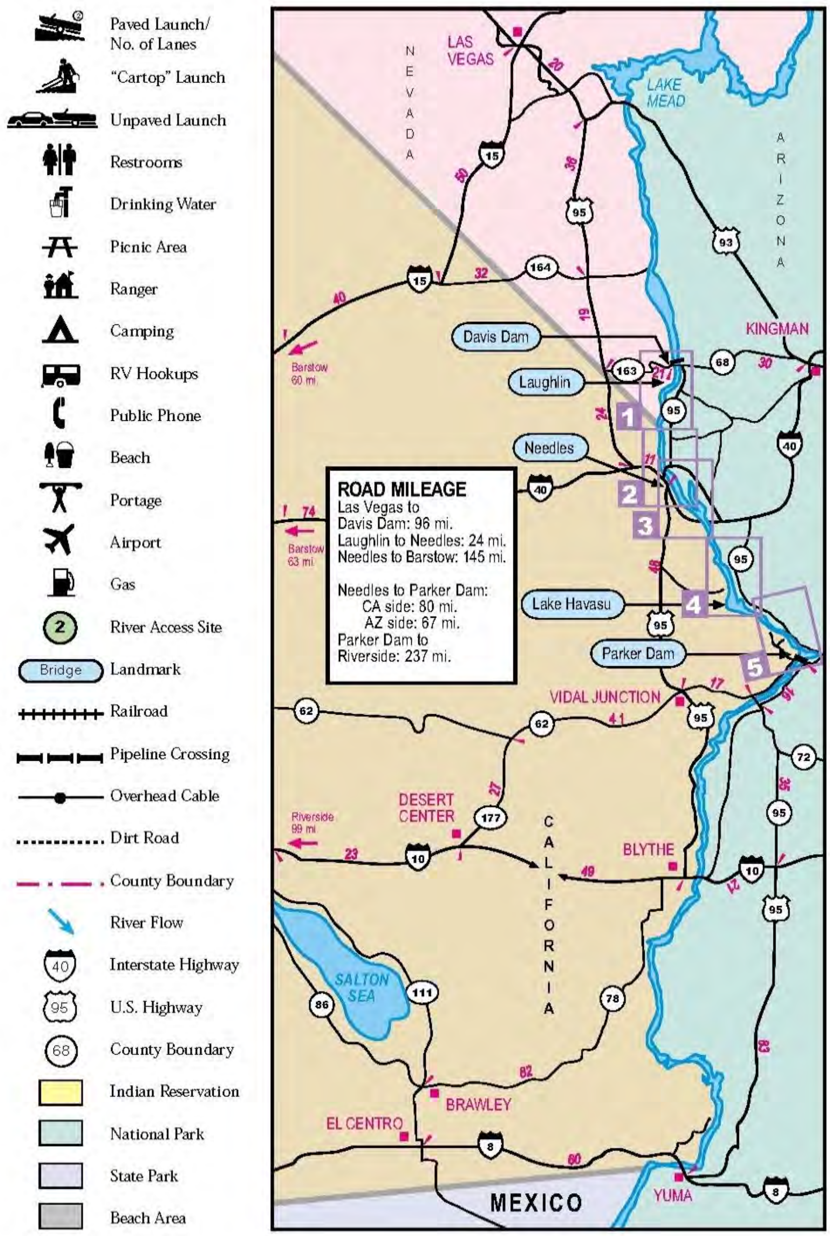


Figure 5-3: Recreational Map, Davis Dam to Parker Dam

1

SPORTSMAN PARK

Clark Co. Parks and Recreation

ALSO: Group Camp Sites

Hwy. 163 and Casino Dr.

(702) 298-3414

2

DAVIS CAMP

Mohave Co. Parks Department

ALSO: Showers, Group Camp Sites, Dump Station, Playground

Hwy. 95, north of Laughlin Bridge

(928) 754-7250

3

FISHERMANS ACCESS AREA

State of Nevada Department of Wildlife

ALSO: Fish Cleaning Station

Casino Dr., north side of the Riverside Casino in Laughlin

(702) 486-5127

4

BULLHEAD COMMUNITY PARK

Bullhead City Parks and Recreation

ALSO: Playground

Hwy. 95, south of 1st St.

(928) 763-0158

5

RIVER BEND, SUNSHINE MARINA

ALSO: Boat Slips, Restaurant

Exit Hwy. 95 at Marina Dr. Located at Whitewater and Rio Grande

(928) 758-6322

NOTE: See Riviera Map, below, for enlarged view of area.

6

BULLHEAD CITY WATERCRAFT LAUNCHING FACILITY

SECTION 30 RECREATION AREA

Bullhead City Parks and Recreation

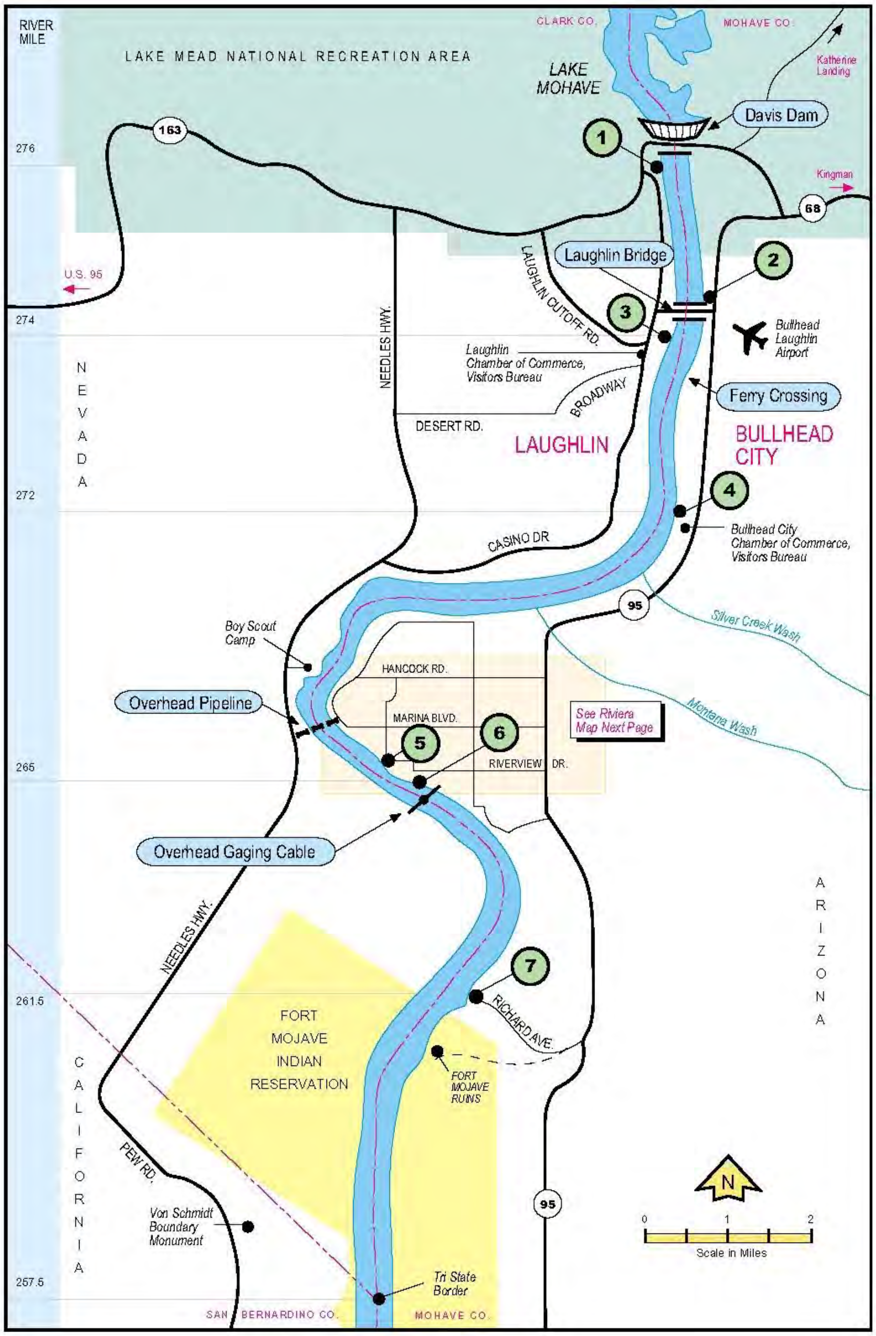
Exit Hwy. 95 @ Riverview Dr., left on Balboa

(928) 763-1110

NOTE: Bullhead City Police Dept. and First Aid Station are at launching facility.

Adjacent public use site (northern boundary) has beach/picnic area, gravel parking, and restroom.

NOTE: See Riviera Map, below, for enlarged view of area.



7

SECTION 10 RECREATION AREA

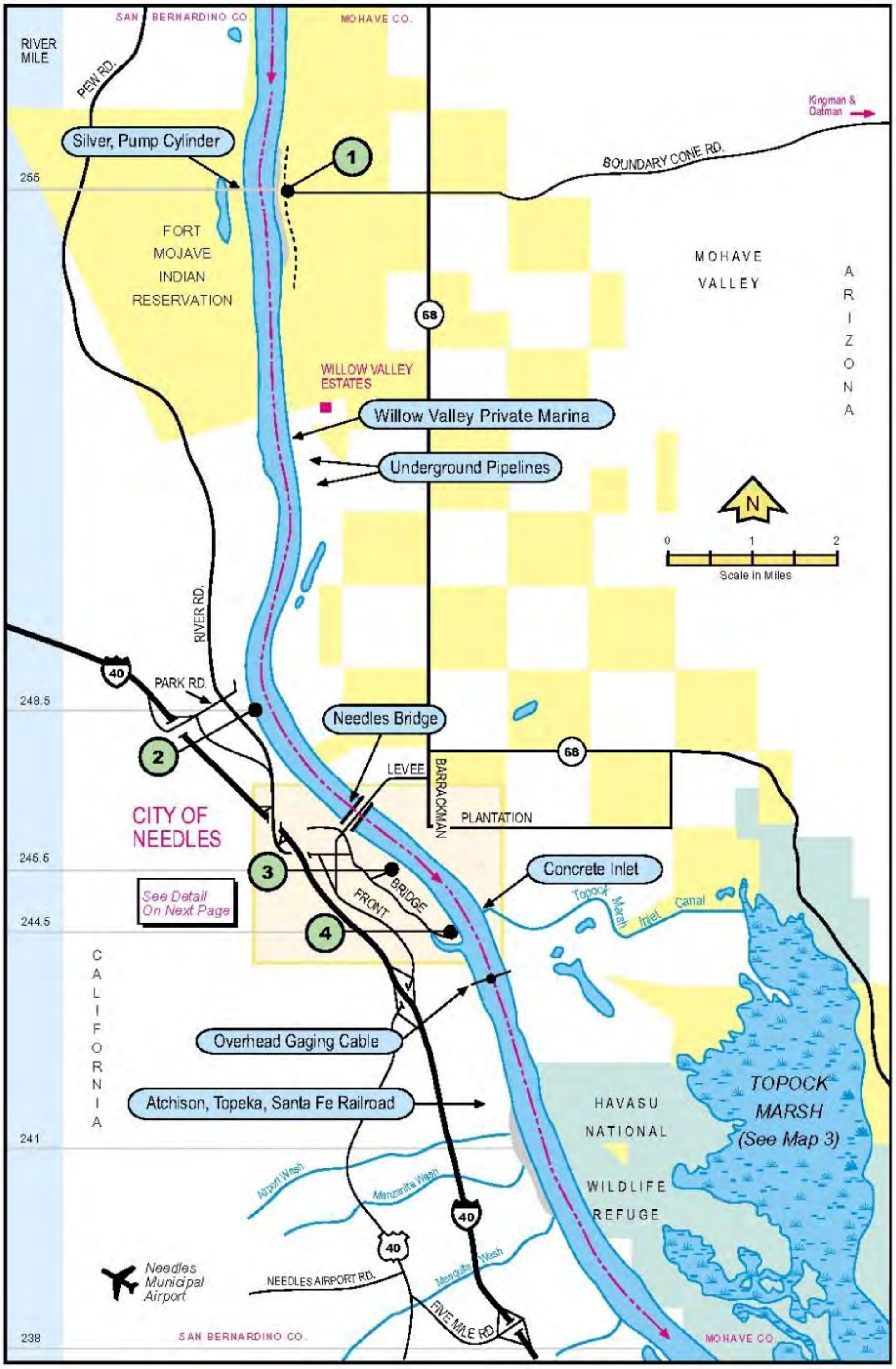
Bullhead City Parks and Recreation

NOTE: Parking area is approx. 200 yds. from water.

Exit Hwy. 95 at Ricardo Ave.

(928) 763-0158

Figure 5-4: Recreational Map, Davis Dam to Parker Dam, Section 1



1 BOUNDARY CONE ROAD

Fort Mojave Indian Reservation

4WD Recommended for Launching
Camping by Tribal Permit Only

Exit Hwy. 95 at Boundary Cone Rd.

(928) 346-1521 (Ft. Mojave Police)

NOTE: The Boundary Cone river access consists of a series of sandy beaches along the shoreline. Because there is a steep slope from the dike road to the beaches, 4WD vehicles are recommended when trailer launching.

2 RAINBO BEACH MARINA

ALSO: Showers, Restaurant, Pool, Laundromat

River Rd., 1 mi. north of Needles

(760) 326-3101

3 NEEDLES MARINA PARK

ALSO: Boat slips, Showers, Group Campsite, Mini-Market, RV Supplies, Snack Bar, Laundromat, Pool, Jacuzzi

Exit I-40 at River Rd., right at Bridge Rd., left on Marina Dr.

(760) 326-2197

4 JACK SMITH MEMORIAL PARK

City of Needles Parks and Recreation

ALSO: Playground

Exit I-40 at River Rd. Right at Bridge Rd. to end of road.

(760) 326-2841

NOTE: Entrance channel from river is partially hidden behind a rock berm. Beach area south of the park is Bureau of Land Management property.

Figure 5-5: Recreational Map, Davis Dam to Parker Dam, Section 2

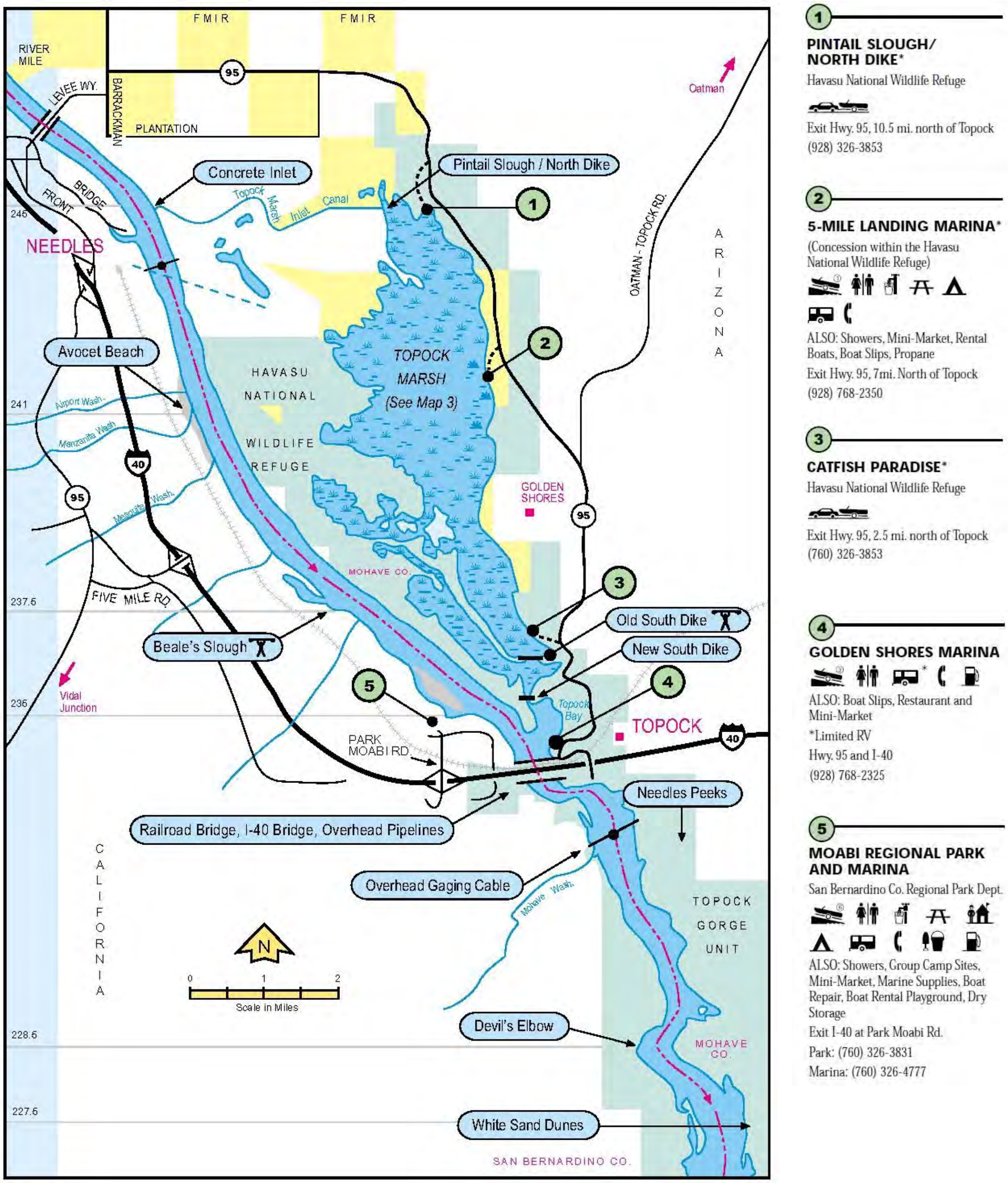


Figure 5-6: Recreational Map, Davis Dam to Parker Dam, Section 3

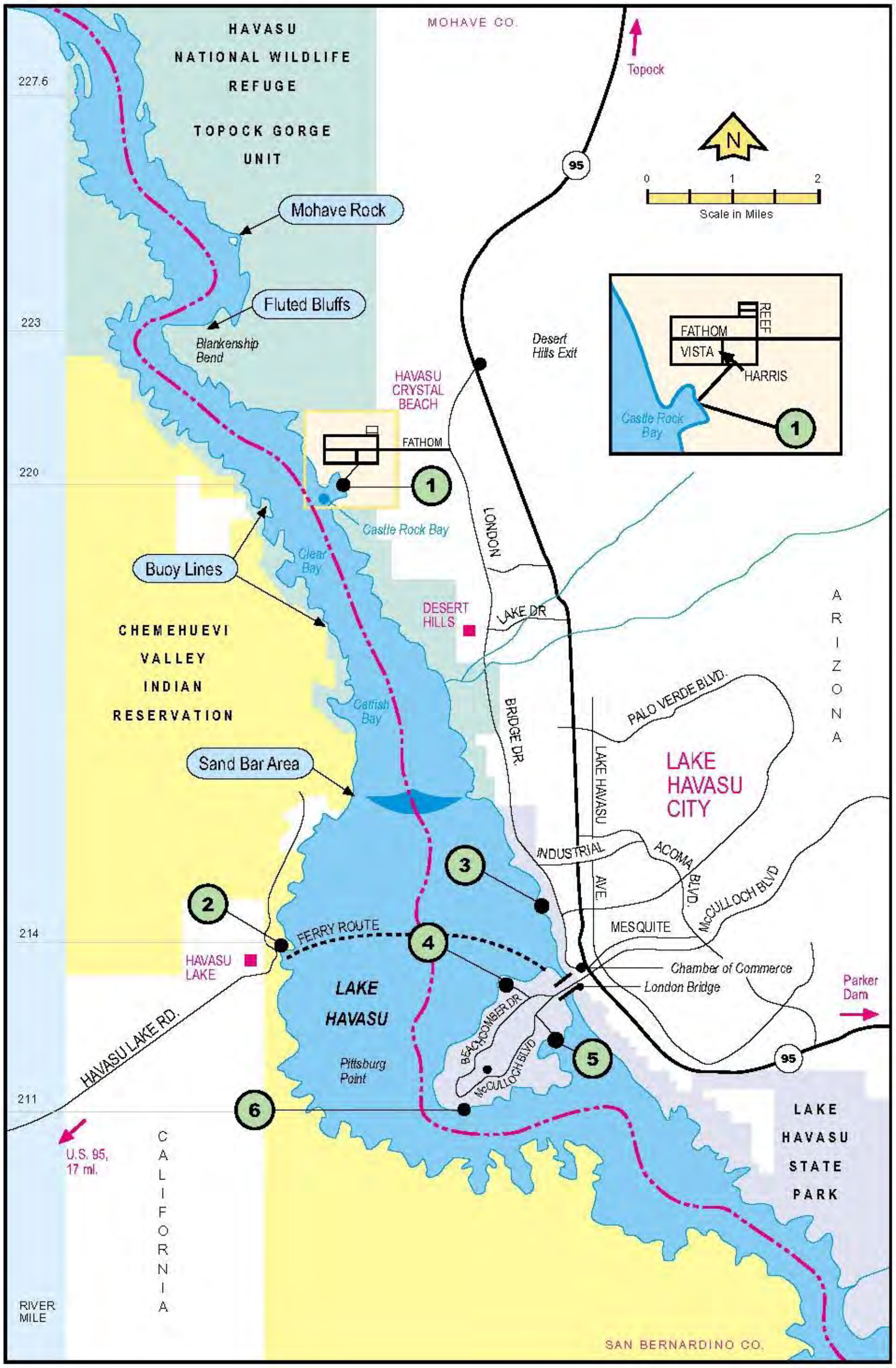


Figure 5-7: Recreational Map, Davis Dam to Parker Dam, Section 4

1

CASTLE ROCK BAY

Havasu National Wildlife Refuge

Take Desert Hills exit off Hwy. 95

(760) 326-3853

NOTE: Trails on both sides of Castle Rock lead to the parking area which is approximately 200 yds. from water

2

HAVASU LANDING RESORT

Chemehuevi Indian Reservation

ALSO: Showers, Group Campsites, Boat Slips, Restaurant, Mini-Market, Marine Supplies, Dry Storage, Boat Repair, Dump Station, Propane

Exit Hwy. 95 at Havasu Lake Rd.

(760) 858-4593

NOTE: From the water, the marina entrance can be found under the white water tower.

3

WINDSOR BEACH

Lake Havasu State Park

ALSO: Showers, Group Campsites, Dump Station

2 mi. north of London Bridge on London Bridge Dr.

(928) 855-2784

4

CRAZY HORSE CAMPGROUNDS

ALSO: Showers, Group Campsites, Boat Slips, Mini-Market, Dry Storage, Dump Station, PWC Rentals

North side of Pittsburg Point off Beachcomber Dr.

(928) 855-4033

5

LAKE HAVASU MARINA

ALSO: Boat Slips, Rental Boats, Mini-Market, Marine Supplies, Boat Repair, Boat Slips, Dry Storage, Fish Cleaning Station

South side of Pittsburg Point off McCulloch Blvd.

(928) 855-2159

6

SITE 6 – PUBLIC LAUNCH

Lake Havasu City Parks and Recreation

Southwest tip of Pittsburg Point off McCulloch Blvd.

(928) 453-8686 (Lake Havasu Area Chamber of Commerce)

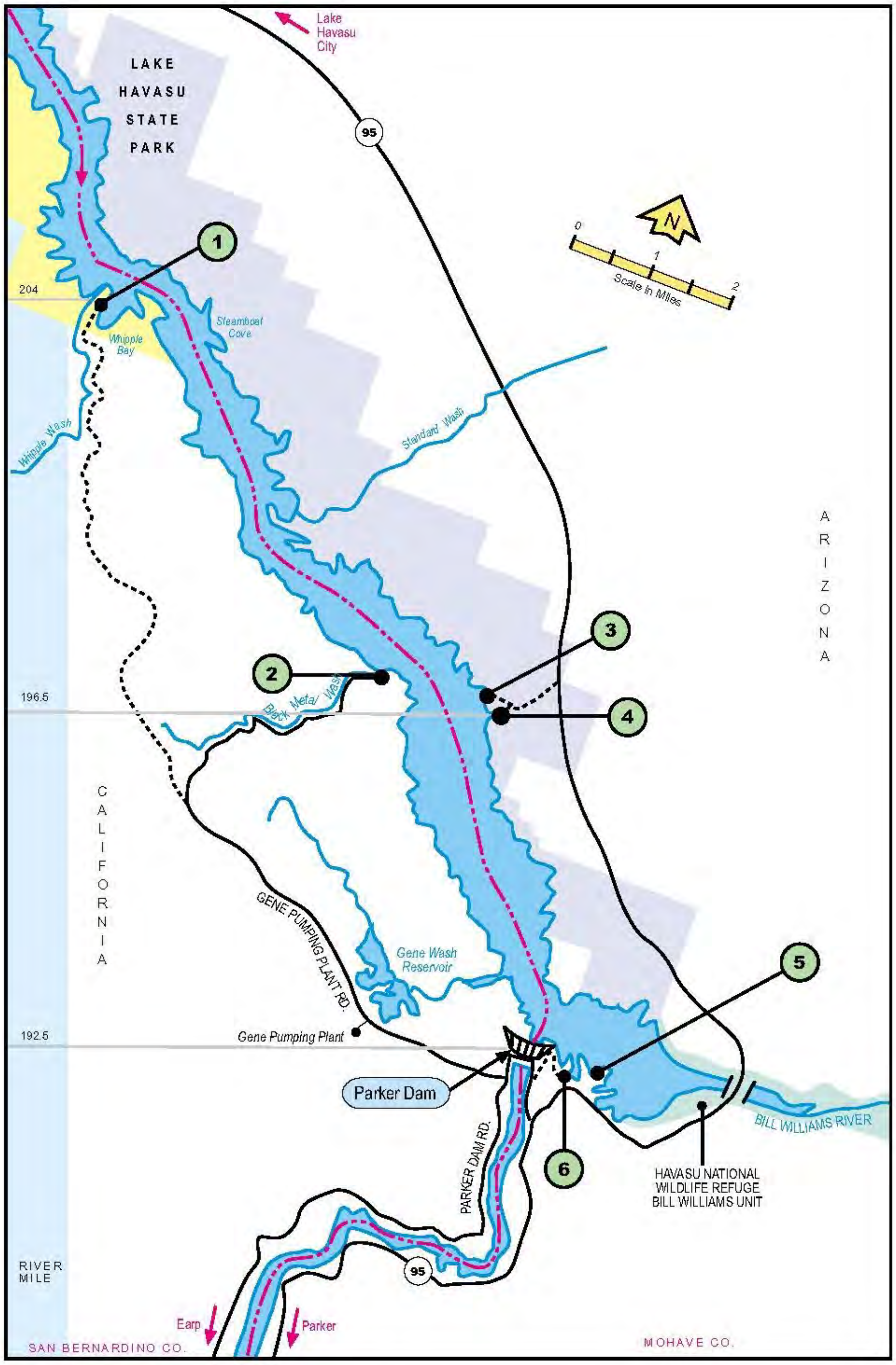


Figure 5-8: Recreational Map, Davis Dam to Parker Dam, Section 5

1

HAVASU PALMS, INC.

ALSO: Boat Slips, Showers, Laundromat, Mini-Market, Restaurant.

Exit Parker Dam Rd. ¼ mi. south of dam at Gene Pumping Plant/Black Meadow Landing sign. Go 10 mi. then turn left at Havasu Palms sign. Winding, gravel road to resort is 8 additional miles.

(760) 858-1193

2

BLACK MEADOW LANDING

ALSO: Showers, Group Campsites, Mini-Market, Marine Supplies, Restaurant, Hiking Trail, Bike Trail, Motel, Cabins, Golf Course

Exit Parker Dam Rd. ¼ mi. south of dam at Gene Pumping Plant Rd./Black Meadow Landing sign. Go 13 mi. north.

(760) 663-4901

3

SAND POINT MARINA

(Concession with Lake Havasu State Park)

ALSO: Showers, Boat Slips, Rental Boats, Boat Repair, Dump Station, Snack Bar, Mini-Market, Marine Supplies, Laundromat, Propane

Launch for Guests Only

15 mi. south of Lake Havasu City (7 mi. north of Parker Dam) off of Hwy. 95

(928) 855-0549

4

CATTAIL COVE

Lake Havasu State Park

ALSO: Showers, Group Campsites, Dump Station, Hiking Trail

15 mi. south of Lake Havasu City (7 mi. north of Parker Dam) off Hwy. 95

(928) 855-1223

5

HAVASU SPRINGS RESORT

ALSO: Showers, Rental Boats, Boat Slips, Mini-Market, Marine Supplies, Restaurant, Laundromat, Dry Storage, Propane, Motels, Tennis, Golf, Swimming Pool

1 mi. north of Parker Dam on Arizona Hwy. 95

(928) 667-3361

6

TAKE OFF POINT

U.S. Bureau of Land Management

L Hwy. 95 at Parker Dam

(928) 505-1200

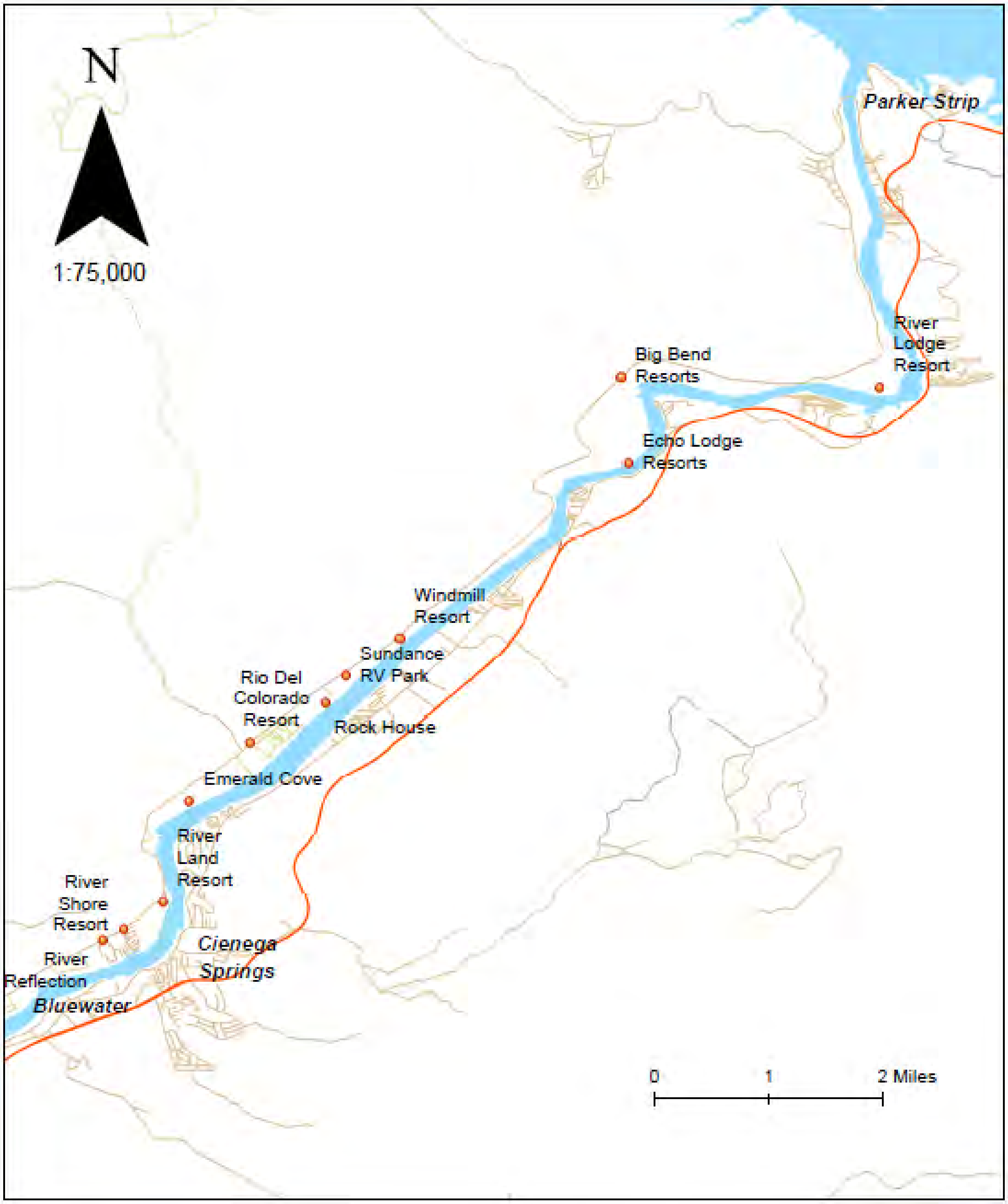


Figure 5-9: Recreational Map,
Parker Dam to Blythe

Figure 5-10: Recreational Map,
Blythe to Imperial Dam

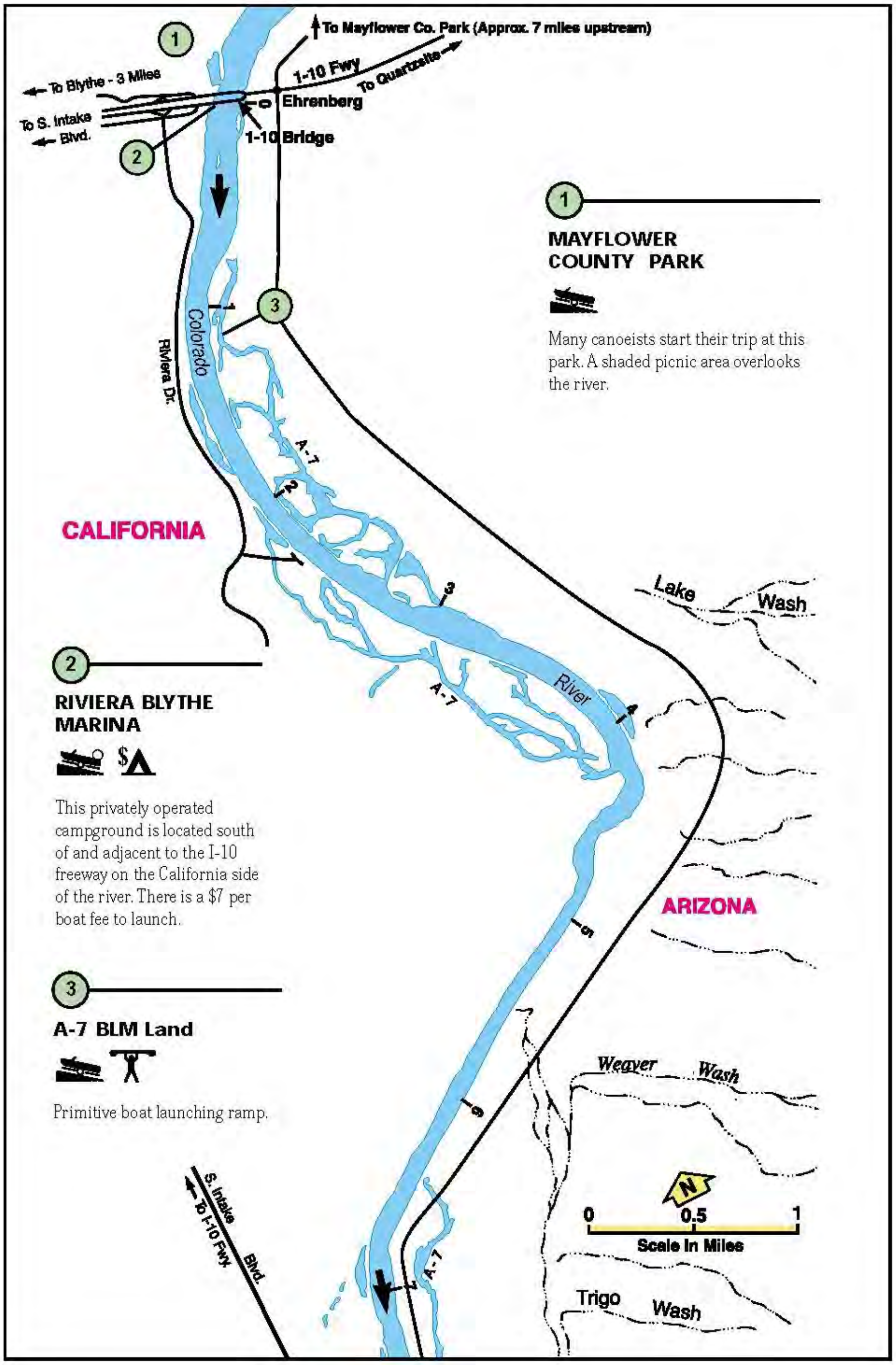


Figure 5-11: Recreational Map, Blythe to Imperial Dam, Section 1

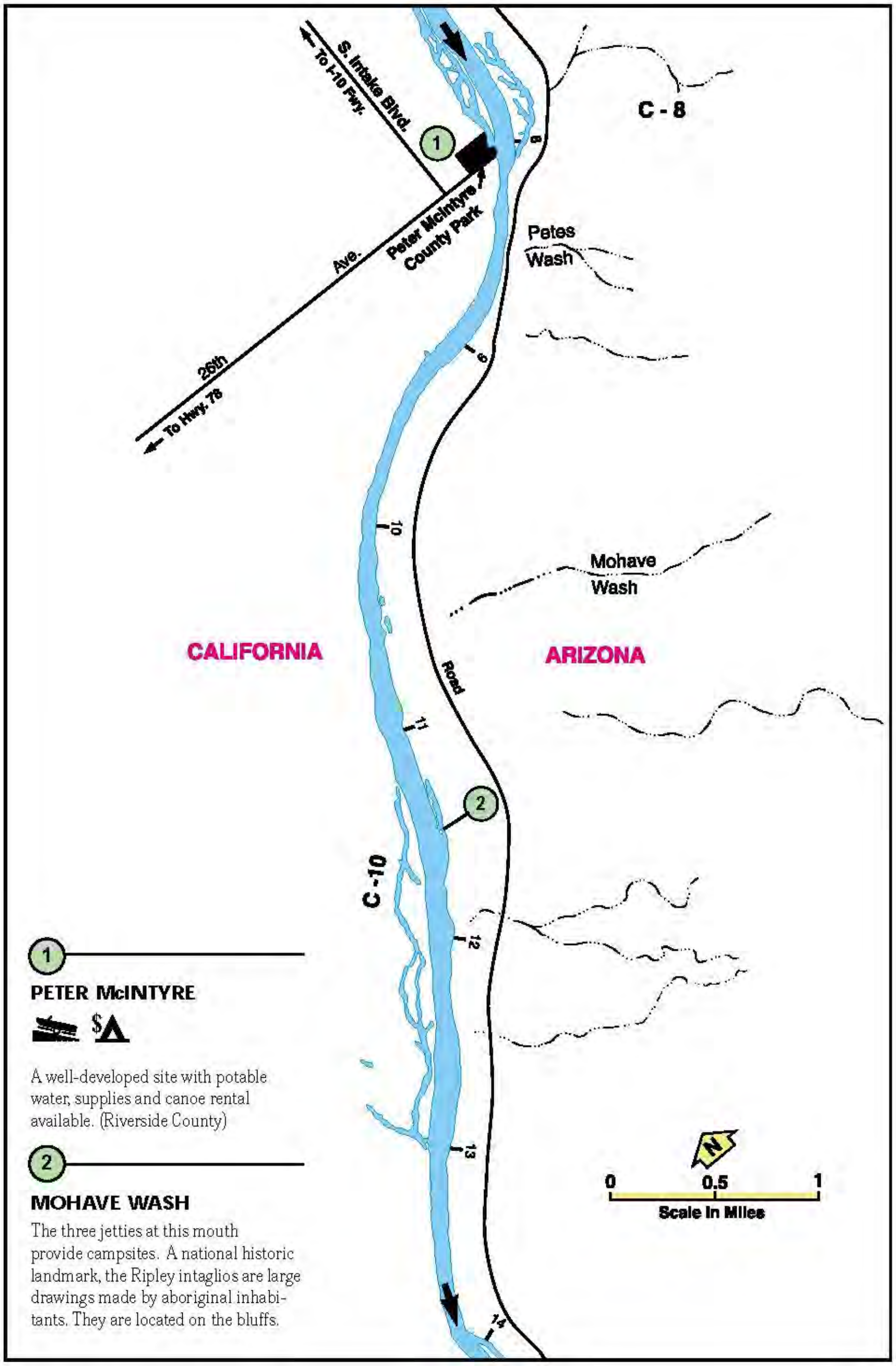


Figure 5-12: Recreational Map, Blythe to Imperial Dam, Section 2

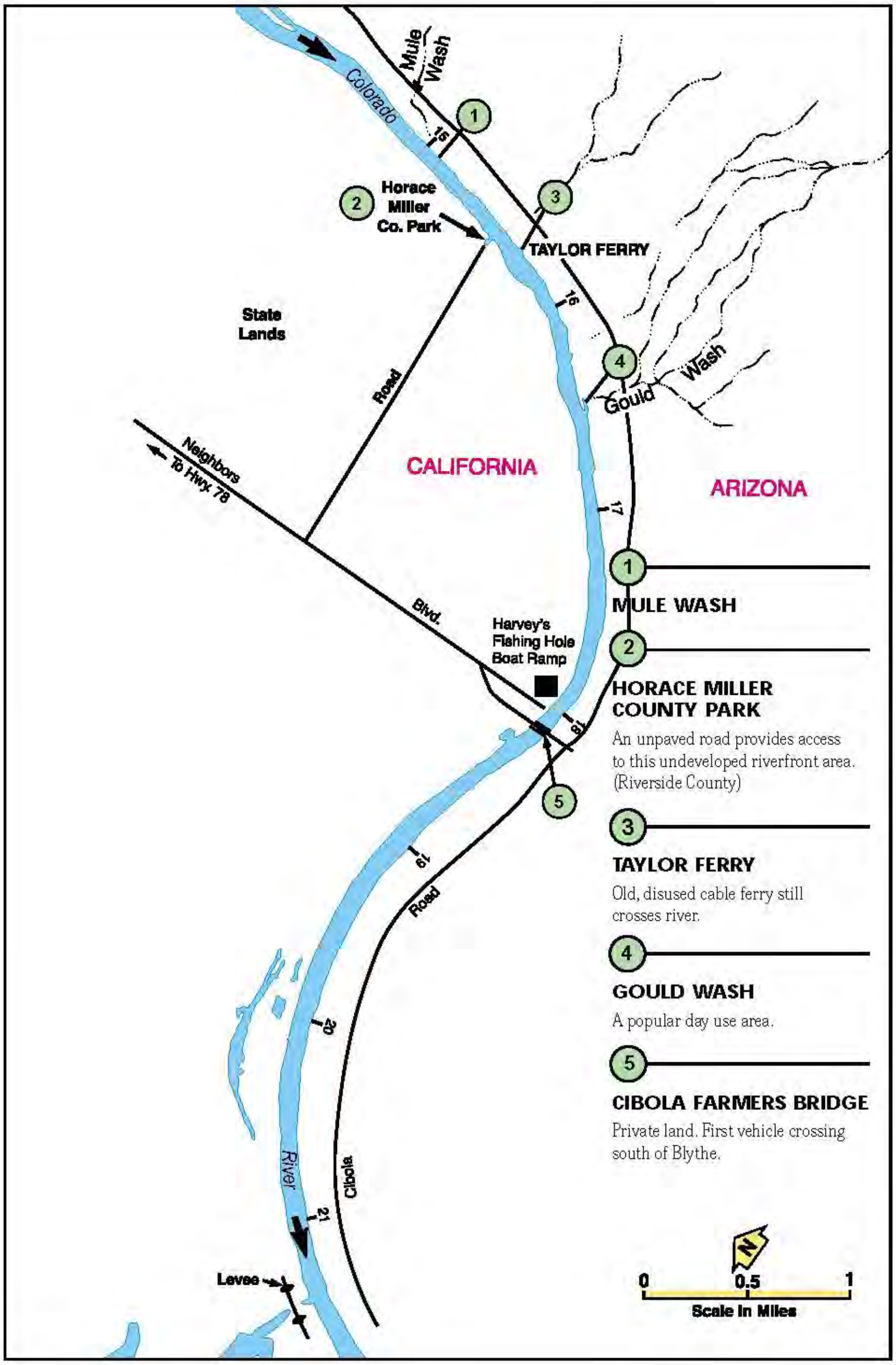


**Figure 5-13: Recreational Map,
Blythe to Imperial Dam, Section 3**

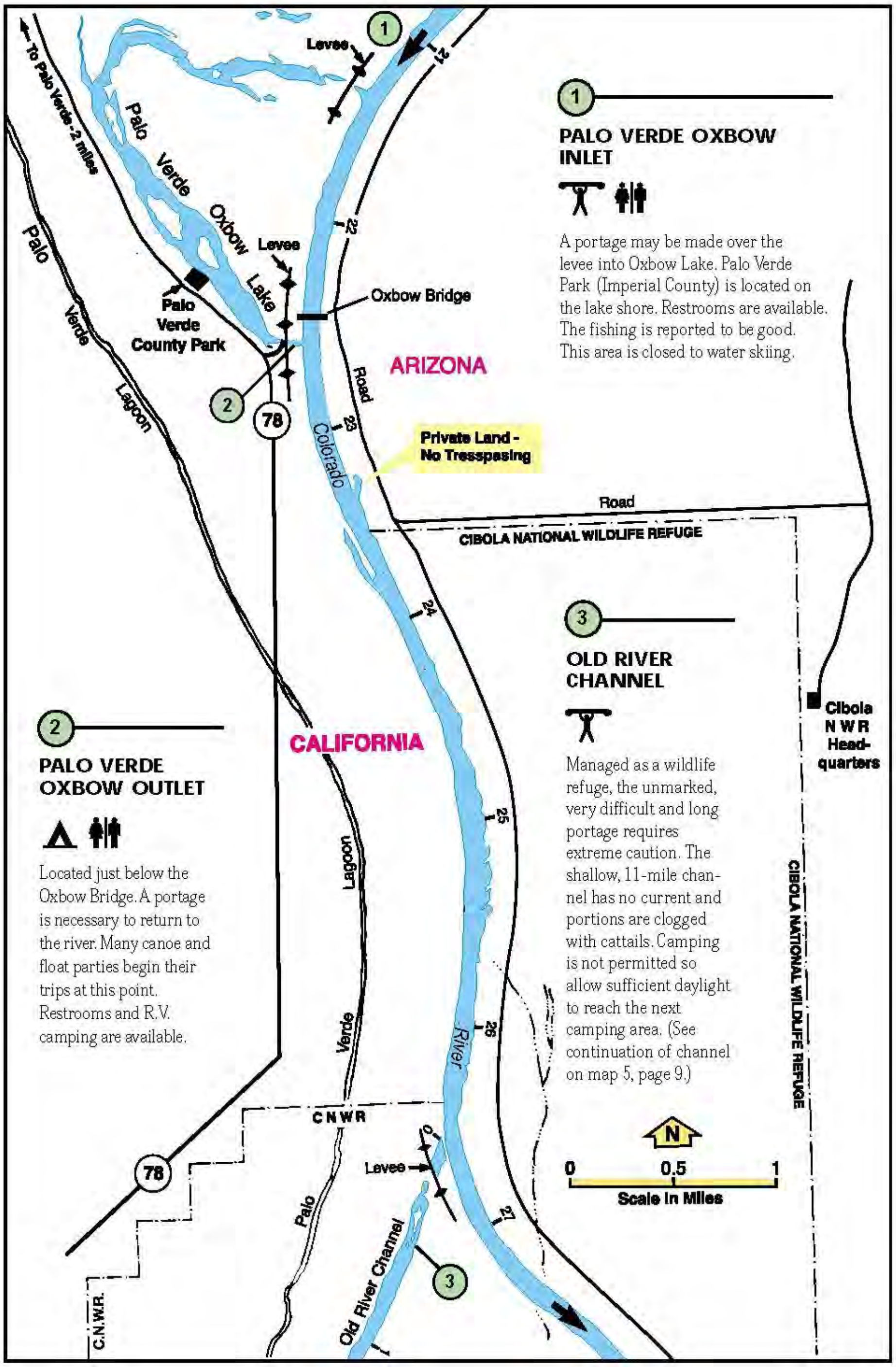


Figure 5-14: Recreational Map,
Blythe to Imperial Dam, Section 4

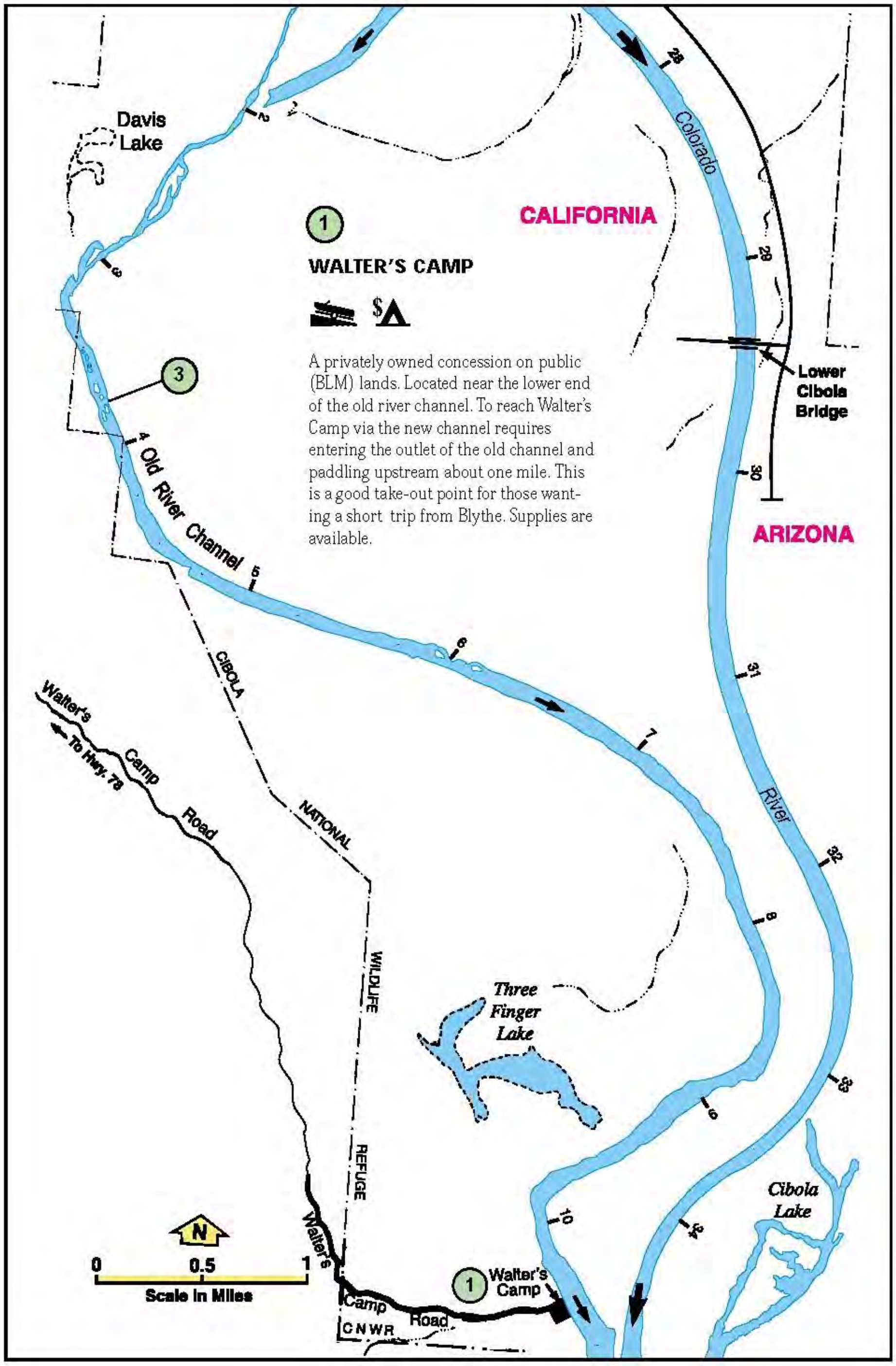


Figure 5-15: Recreational Map, Blythe to Imperial Dam, Section 5

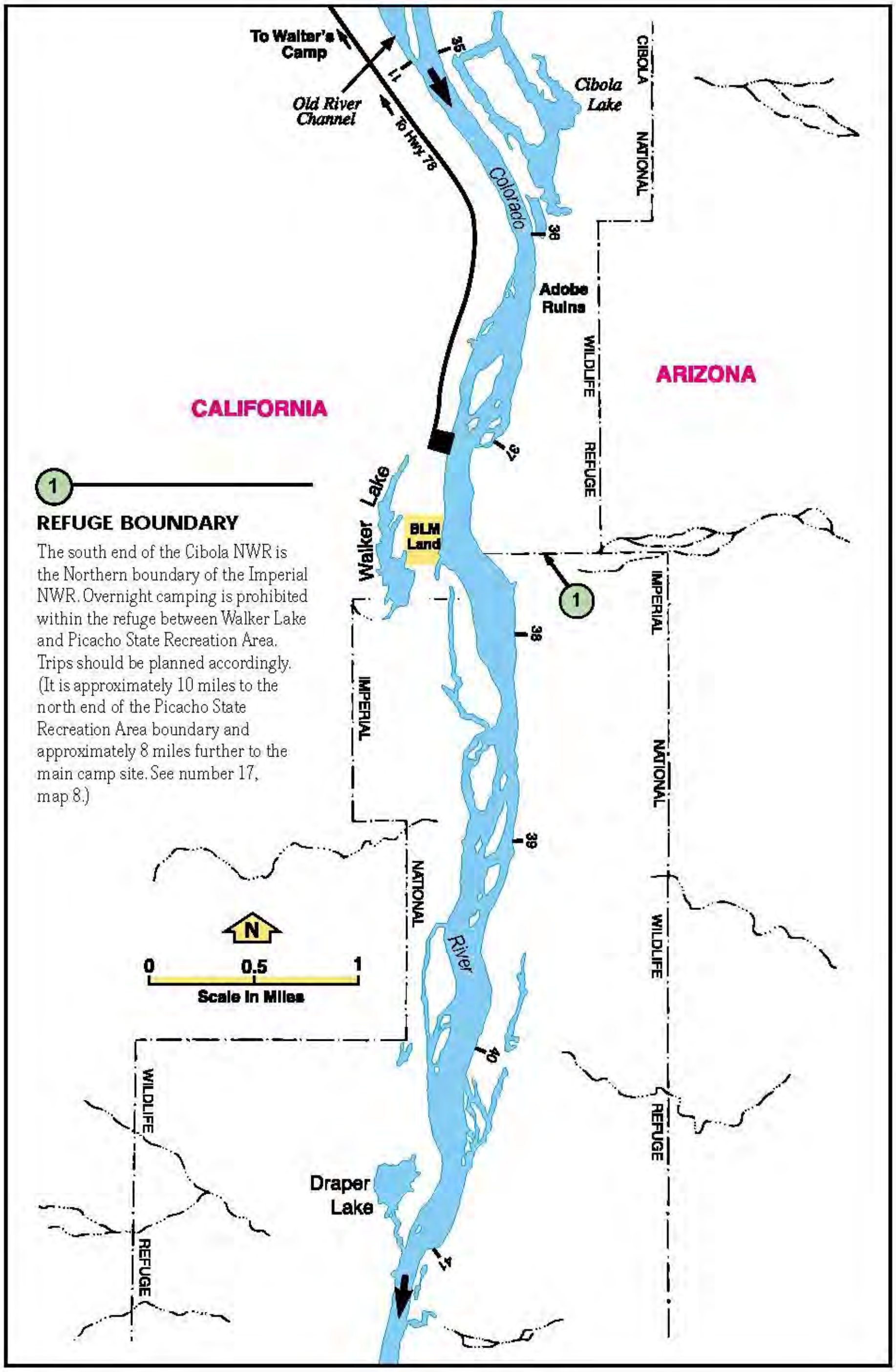


Figure 5-16: Recreational Map, Blythe to Imperial Dam, Section 6

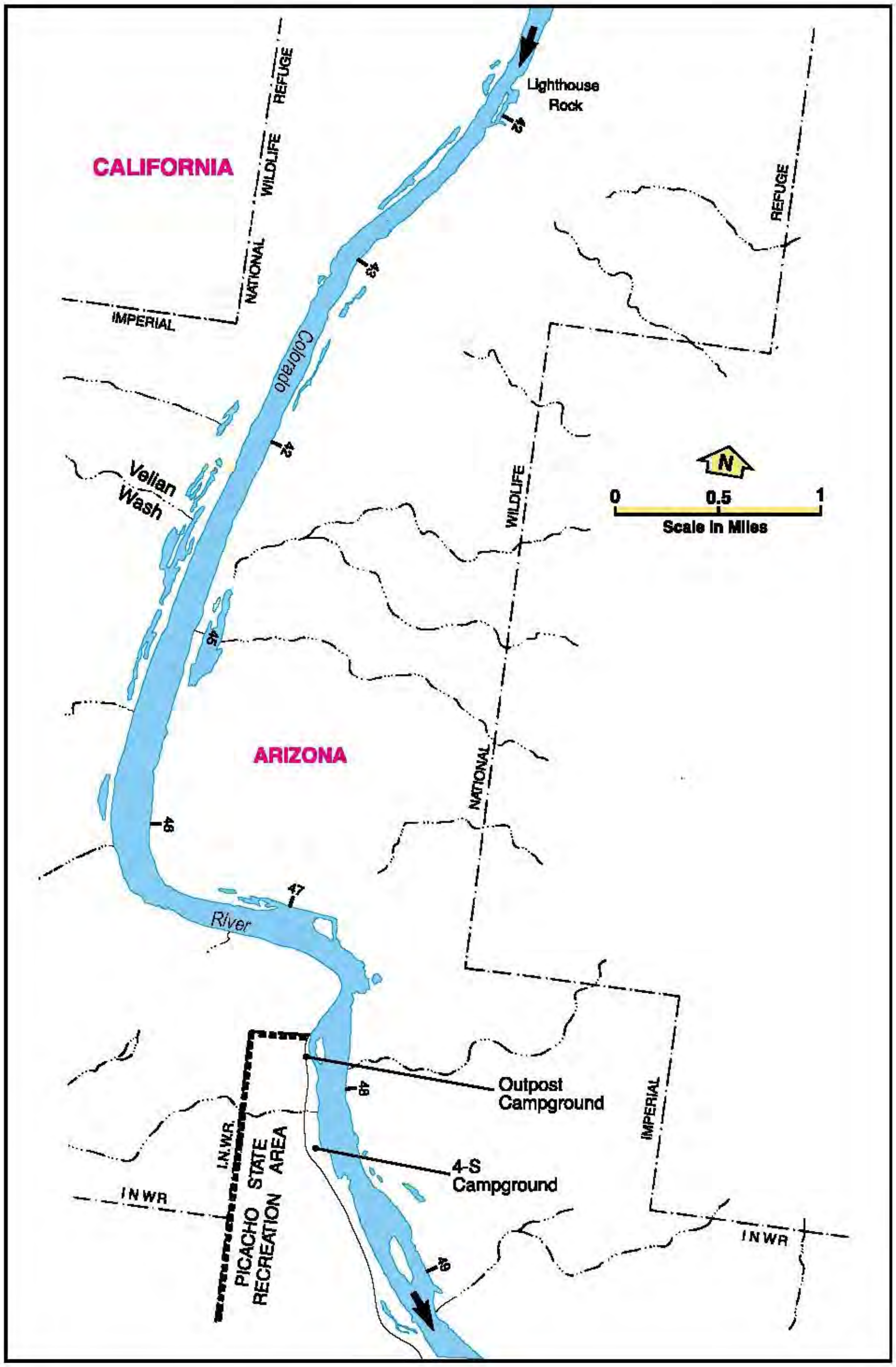


Figure 5-17: Recreational Map, Blythe to Imperial Dam, Section 7

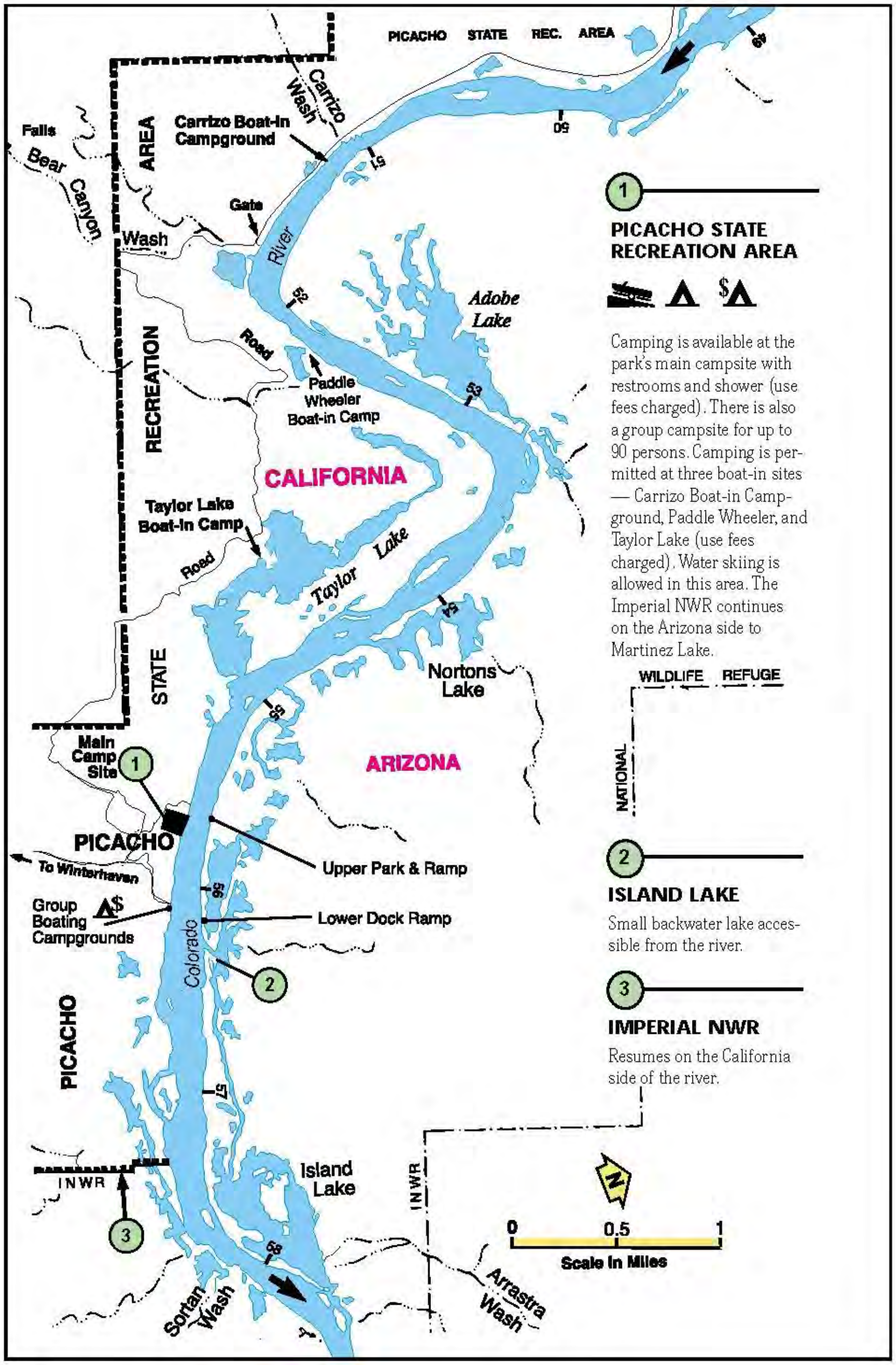


Figure 5-18: Recreational Map, Blythe to Imperial Dam, Section 8

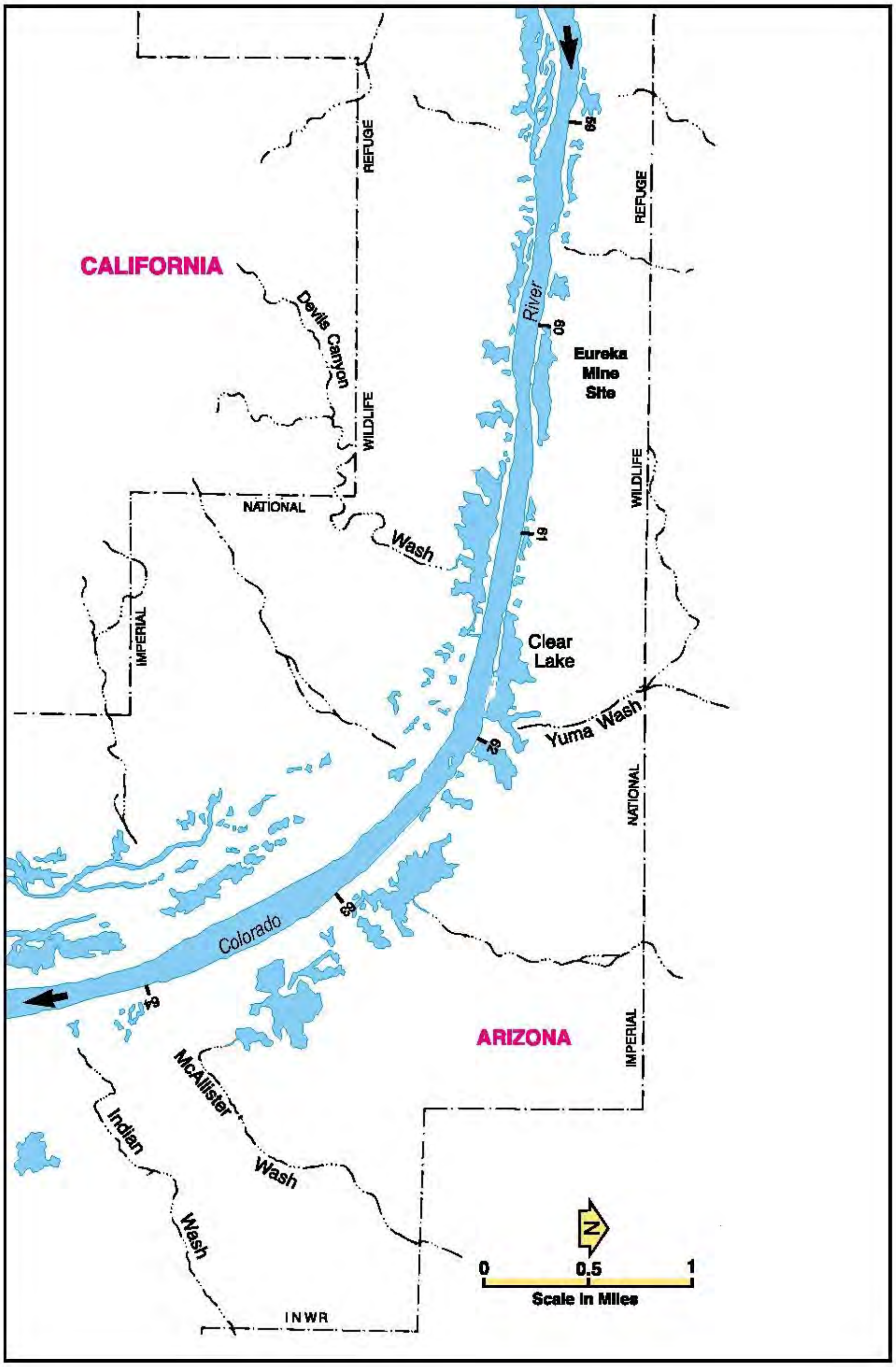


Figure 5-19: Recreational Map,
Blythe to Imperial Dam, Section 9

Figure 5-20: Recreational Map, Blythe to Imperial Dam, Section 10

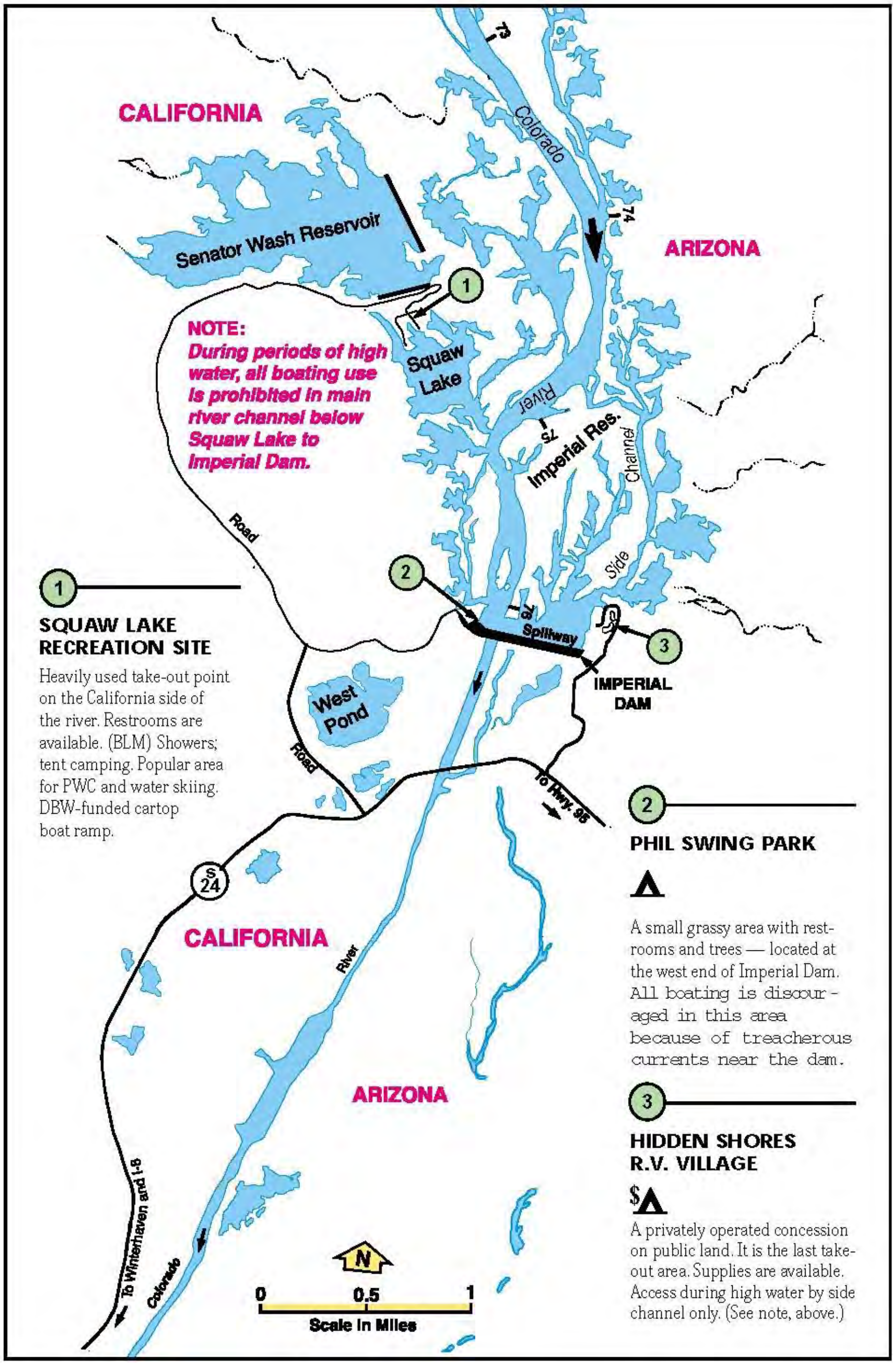


Figure 5-21: Recreational Map, Blythe to Imperial Dam, Section 11

5.8 Agricultural Activities

Agriculture activities are contributing factors affecting the water quality in the Lower Colorado River Watershed. Herbicides/pesticides, fertilizer application, and feedlots are all potential sources of contamination. The term pesticide applies to herbicides, fungicides, and other substances used to control pests. Pesticides are described by the EPA as any substance or mixture of substances which are used as a plant regulator, defoliant or desiccant and/or are used to prevent, kill, repel or mitigate any pest.

According to California Department of Pesticide Regulation (CDPR) it states "restricted materials are pesticides deemed to have a higher potential to cause harm to public health, farm workers, domestic animals, honeybees, the environment, wildlife, or other crops compared to other pesticides. With certain exceptions, restricted materials may be purchased and used only by or under the supervision of a certified commercial or private applicator under a permit issued by the County Agricultural Commissioner (CAC)."[9]

These applications could act as a point source of contamination if performed improperly and/or portions of the application are inadvertently sprayed or other airborne particles from the feedlots fall out into the canal waters. If water from a canal is used for mixing with pesticides, then there is a high risk for contamination due to the potential of pesticide equipment directly contacting the waters and the potential for back flow of pesticides into the water source (see the chemigation portion later in this section for further information). In addition, herbicide/pesticide and fertilizer transportation can occur via leaching or surface runoff, potentially contaminating groundwater or distant surface water sources, particularly during certain conditions such as intense storm events and shortly after application.

Based on the information provided by CDPR, tables 5-3 and 5-4 show a summary of pesticide usage per pound per crop type in 2019 for Imperial County and Riverside County. The California Restricted Materials List for Imperial County and Riverside County can be found at the Department of Pesticide Regulations Database.

Table 5-3: Pesticides used in Imperial County on CA Restricted Materials List

Chemical Commodity	County	Pounds Applied	Crop Type
Aluminum Phosphide	Imperial	44	Rights of Way
"	"	54	Fumigation, Other
"	"	48	Beehives
"	"	1	Alfalfa (Forage – Fodder) Alfalfa Hay)
Atrazine	Imperial	49	Sorghum (Forage-Fodder) Sorgo, Etc.)
"	"	152	Bermuda grass (Forage – Fodder)
"	"	2,052	Corn (Forage-Fodder)
"	"	11,753	Corn (Human consumption)

[9] Restricted Materials Use Requirements https://www.cdpr.ca.gov/docs/enforce/permitting.htm

Chemical Commodity	County	Pounds Applied	Crop Type
"	"	313	Sugarcane (Sugar Crop)
"	"	50,081	Sudan grass (Forage – Fodder)
Atrazine, other related	Imperial	5	Alfalfa (Forage – Fodder) Alfalfa Hay)
"	"	3	Bermuda grass (Forage – Fodder)
"	"	39	Corn (Forage-Fodder)
"	"	228	Corn (Human consumption)
"	"	0.9	Sorghum (Forage-Fodder) Sorgo, Etc.)
"	"	70	Sorghum/Milo
"	"	100	Sudan grass (Forage – Fodder)
"	"	6	Sugarcane (Sugar Crop)
Brodifacoum	Imperial	0.001	Structural Pest Control
Bromadiolone	Imperial	0.0009	N-Outdoor Plants in containers
"	"	0.006	Rights of Way
"	"	0.058	Structural Pest Control
Carbaryl	Imperial	189	Grasses Grown for Seed
"	"	42	N-Outdr (Grown Cut Flowers or Greens)
"	"	18,816	Sugar beet General
Chloropicrin	Imperial	4,254	Melons
Dicamba	Imperial	0.05	Landscape
2,4-D Dimethylamine Salt	Imperial	33,325	Bermuda grass (Forage – Fodder)
"	"	10,904	Forage – Fodder Grasses
"	"	1,781	Grasses Grown for Seed
"	"	1	Landscape
"	"	68	N-Outdr (Grown Cut Flowers or Greens)

Chemical Commodity	County	Pounds Applied	Crop Type
"	"	1,105	Oats
"	"	124	Pastures
"	"	41	Right of Way
"	"	636	Ryegrass Perennial (Forage-Fodder)
"	"	399	Sudan grass (Forage – Fodder)
"	"	348	Uncultivated Agricultural Areas
"	"	1,890	Wheat
4-(2,4-DB) Dimethylamine Salt	Imperial	41,707	Alfalfa (Forage – Fodder) Alfalfa Hay)
1,3-Dichloropropene	Imperial	490,239	Carrots
"	"	13,198	Lettuce, Leaf
Diuron	Imperial	85	Cotton
"	"	540	Rights of Way
Difethialone	Imperial	0.0003	Rights of way
"	"	0.03	Structural Pest Control
EndoSulfan	"	4	Lettuce, Leaf
Metam-Sodium	Imperial	4,797	Aquatic Site (Industrial Use)
Methomyl	Imperial	2,735	Alfalfa (Forage – Fodder) Alfalfa Hay)
"	"	523	Bermuda grass (Forage – Fodder)
"	"	43	Broccoli
"	"	194	Cabbage
"	"	342	Carrot
"	"	144	Cauliflower
"	"	30	Corn (Forage-Fodder)
"	"	19,525	Corn (Human consumption)
"	"	0.25	Endive (Escarole)
"	"	23	Fennel
"	"	1,917	Lettuce, Head
"	"	2,626	Lettuce, Leaf
"	"	743	Onion, Dry
"	"	771	Spinach
"	"	5,578	Sugar beet

Chemical Commodity	County	Pounds Applied	Crop Type
Paraquat Dichloride	Imperial	569	Alfalfa (Forage – Fodder) Alfalfa Hay)
"	"	548	Melons
"	"	72	Olive
"	"	75	Sugar beet
"	"	148	Sunflower
"	"	38	Watermelons
"	"	892	Uncultivated Agricultural Areas
Parathion-Methyl	Imperial	6	Mustard Curled (Mizuna)
Parathion-methyl, Other Realted	Imperial	0.3	Mustard Curled (Mizuna)
Phorate	Imperial	221	Corn (Forage-Fodder)
"	"	1,656	Cotton
Sodium Tetrathiocarbonate	Imperial	4,797	Aquatic Site (Industrial Use)
Strychnine	Imperial	0.02	Rights of Way
Sulfuryl Fluoride	Imperial	55	Structural Pest Control
Zinc Phosphide	Imperial	0.01	Structural Pest Control

While the IID does provide water to small portions of Riverside County, the service is at the tail end of the water system and therefore any pesticides used in Riverside County are negligible.

Table 5-4: Pesticides used in Riverside County on CA Restricted Materials List

Chemical Commodity	County	Pounds Applied	Crop Type
Acrolein	Riverside	1,169	Rights of Way
Aluminum Phosphide	Riverside	209	Alfalfa (Forage-Fodder) Alfalfa Hay)
"	"	0.9	Avocado
"	"	17	Beehives
"	"	38	Commodity Fumigation
"	"	42	Date
"	"	5	Grapefruit
"	"	69	Grapes
"	"	4	Grapes, Wine
"	"	531	Landscape
"	"	1	Orange
"	"	0.68	Pastures
"	"	2	Storage Areas & Processing Equipment
"	"	0.2	Structural Pest Control
4-Aminopyridine	Riverside	0.38	Structural Pest Control
"	"	0.005	Landscape
Atrazine	Riverside	22	Corn (Forage-Foddder)
"	"	10	Ornamental Turf
"	"	5	Uncultivated Agricultural Areas
Atrazine, other related	Riverside	1	Corn (Forage-Fodder)
"	"	4	Ornamental Turf
"	"	0.09	Uncultivated Agricultural Areas
Brodifacoum	Riverside	0.004	Buildings and Structures (Non-Ag Outdoor)
"	"	0.2	Structural Pest Control
Bromadiolone	Riverside	2	Structural Pest Control

Chemical Commodity	County	Pounds Applied	Crop Type
Bromadiolone	Riverside	0.001	Avocado
"	"	0.003	Buildings and Structures (Non-Ag Outdoor)
"	"	0.00005	Citrus Fruits
"	"	0.001	Grapefruit
"	"	0.2	Landscape
"	"	0.03	Lemon
"	"	0.006	Orange
"	"	0.005	Public Health Pest Control
"	"	0.009	Regulatory Pest Control
"	"	0.00007	Rights of Way
"	"	2	Structural Pest Control
"	"	0.001	Tangelo
"	"	0.02	Vertebrate Pest Control
Carbaryl	Riverside	2,232	Grapefruit
"	"	4	Citrus Fruits
"	"	2,232	Lemon
"	"	107	Landscape
"	"	35	N-Grnhs (Grown Cut Flowers or Greens)
"	"	58	N-Outdr Container/Fld Grown Plants
"	"	16	Tangerine
"	"	0.003	Structural Pest Control
Chloropicrin	Riverside	1,879	Watermelons
"	"	3	Structural Pest Control
Chlorpyrifos	Riverside	0.16	Date
"	"	47	Grapes
"	"	50	Landscape
"	"	173	Lemon
"	"	1	N-Outdr Container/Fld Grown Plants
"	"	8	Orange

Chemical Commodity	County	Pounds Applied	Crop Type
Chlorpyrifos	Riverside	9	Orchards (Fruit/Nut)
"	"	3	Ornamental Turf
"	"	198	Rights of Way
"	"	2	Structural Pest Control
"	"	11	Tangerine
Dazomet	Riverside	256	Rights of Way
Dicamba	Riverside	123	Landscape
"	"	5	N-Grnhs (Grown Cut Flowers or Greens)
"	"	0.003	Structural Pest Control
"	"	2	Rights of Way
"	"	8	Ornamental Turf
"	"	11	Turf, Golf Course
Dicamba, Dimethylamine Salt	Riverside	37	Landscape
2,4-D, Dimethylamine Salt	Riverside	77	Forage Fodder Grasses (Hay)
"	"	170	Bermuda grass (Forage-Fodder)
"	"	267	Landscape
"	"	887	Oats
"	"	946	Ryegrass
"	"	16	Rights of Way
"	"	8	Structural Pest Control
"	"	6	N-Grnhs (Grown Cut Flowers or Greens)
"	"	207	Ornamental Turf
"	"	1,349	Wheat
4-(2,4-DB), Dimethylamine Salt	Riverside	2,608	Alfalfa
2,4-DP-P, Dimethylamine Salt	Riverside	2	Landscape
1,3-Dichloropropene (1,3-D)	Riverside	34,947	Lemon
"	"	9,066	Peppers
"	"	3,431	Watermelons
Difethialone	Riverside	0.0001	Landscape
"	"	0.83	Structural Pest Control
Magnesium Phosphide	Riverside	7	Fumigation, other
"	"	0.7	Commodity Fumigation

Chemical Commodity	County	Pounds Applied	Crop Type
Metam-Sodium	Riverside	6,687	Brussel Sprouts
"	"	8,255	Artichoke
"	"	33,528	Corn (Human consumption)
"	"	4,318	Eggplant
"	"	61,912	Grape
"	"	7,359	Lettuce, Leaf
"	"	453,525	Pepper, Fruiting
"	"	1,333	Pimento
"	"	13,700	Squash
"	"	2,328	Strawberry
"	"	45,787	Watermelon
Methomyl	Riverside	155	Onion
Methyl Bromide	Riverside	16,948	Ornamental Turf
Oxydemeton-Methyl	Riverside	0.87	Landscape
Paraquat Dichloride	Riverside	146	Alfalfa
"	"	31	Bermuda grass
"	"	12	Bean, Succulent
"	"	296	Peppers (Bell, Chili, Etc.)
"	"	6,846	Grape
"	"	295	Lemon
"	"	1,065	Uncultivated Agricultural Areas
“	“	18	Squash
Phorate	Riverside	7,546	Cotton
Phosphine	Riverside	66	Commodity Fumigation
“	“	3	Date
“	“	7	Fumigation, Other
Metam-potassium	Riverside	22,318	Peppers (Bell, Chili, Etc.)
“	“	2,901	Uncultivated Agricultural Areas
Sodium Cyanide	Riverside	2,618	Commodity Fumigation
Strychnine	Riverside	0.56	Avocado
“	“	0.035	Citrus Fruits
“	“	0.06	Date
“	“	0.09	Fig
“	“	1	Grapefruit
“	“	0.6	Grapes, Wine
“	“	27	Landscape
“	“	0.46	Lemon
“	“	0.005	Nuts Crops, Nut Trees
“	“	0.09	Olive
“	“	0.53	Orange

Chemical Commodity	County	Pounds Applied	Crop Type
Strychnine	Riverside	0.22	Regulatory Pest Control
"	"	0.47	Structural Pest Control
"	"	0.04	Tangelo
"	"	0.04	Tangerine
"	"	0.005	Vertebrate Pest Control
Sulfuryl Fluoride	Riverside	3,314	Commodity Fumigation
"	"	1,480	Date
"	"	90	Fumigation, Other
"	"	69,090	Structural Pest Control
Zinc Phosphide	Riverside	0.9	Alfalfa
"	"	25	Landscape
"	"	1	Rights of Way
"	"	0.66	Structural Pest Control
"	"	0.35	Vertebrate Pest Control

Based on data from the CA Department of Pesticide Regulations Database from 2014-2019, only Bentazon, Diquat Dibromide, Glyphosate 2,4-D, Oxamyl and Pentachlorophenol were found.

Table 5-5 shows 2014-2019 summaries of the query results for the unrestricted pesticides of interest, in pounds per crop type.

Table 5-5: Unrestricted Pesticides of Interest in Imperial County

Chemical Commodity	County	Pounds Applied	Crop Type
Bentazon	Imperial	130	Beans, Peas
Diquat Dibromide	Imperial	5	Rights of Way
"	Imperial	25,680	Alfalfa (Forage-Fodder) (Alfalfa Hay)
"	Imperial	233	Lemon
"	Imperial	2,089	Potato (White, Irish, Red, Russet)
"	Imperial	130	Rape (All or Unspec)
Glyphosate 2,4-D	Imperial	964	Rights of Way
"	Imperial	1,346	Alfalfa (Forage-Fodder) (Alfalfa Hay)
"	Imperial	133	Barley
"	Imperial	113,080	Bermudagrass (Forage - Fodder)
"	Imperial	43,446	Forage (Fodder Grasses)
"	Imperial	1,984	Grasses Grown for Seed
"	Imperial	67	N-Outdr Grown Cut Flowers or Greens
"	Imperial	4,632	Oats
"	Imperial	753	Pastures (All or Unspec)
"	Imperial	4,575	Ryegrass Perennial (Forage - Fodder)
"	Imperial	1,585	Sudan grass (Forage - Fodder) (Sorghum Sudanese)
"	Imperial	5,486	Uncultivated Agriculture Areas (All or Unspec)
"	Imperial	23,794	Wheat
Oxamyl	Imperial	1,345	Onion (Dry, Spanish, White, Yellow, Red, Etc.)
"	Imperial	1,297	Potato (White, Irish, Red, Russet)
Pentachlorophenol	Imperial	0.009	Lettuce, Leaf (All or Unspec)

Chemigation

Chemigation is a pesticide application procedure in which chemicals are injected into irrigation water. This method of application requires special backflow prevention devices to keep pesticides from contaminating source waters. If proper safety measures are not taken, irrigation water can be contaminated when water containing pesticides is allowed to backflow into the canal supplying the water. If the canals supplies drinking water, the pesticide residues will contaminate the drinking water. If the canal provides only irrigation water, pesticide residues can be transported in canals as it flows to drinking water providers. Chemicals must be labeled in order to show that chemigation is a permissible method of application before a pesticide can be chemigated. In addition, the label must provide guidance on application methods and on preventing the backflow of pesticide residues from the irrigation system to the source of irrigation water.

In 1987, the United States Environmental Protection Agency (EPA) issued Pesticide Registration (PR) Notice 87-1 clarifying label requirements when chemigation is an accepted method of application. This notice required registrants to revise the labeling of pesticide products registered under the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) and intended for application through irrigation systems to include "additional use directions and other statements." According to FIFRA, it is unlawful for any person to use any registered pesticide in a manner inconsistent with its labeling. Pesticides not labeled for chemigation applications must contain language indicating that the product cannot be applied through an irrigation system. Thus, it is illegal to apply pesticides by chemigation if "additional use directions and other statements" specific for chemigation are not contained on the label. When using chemigation as a method of application, the user must conform to the requirements for backflow prevention stated on the label, except as provided in U.S. EPA's memorandum listing approved alternatives.

Chemigation is specified as a method of application for nearly 30 percent of the approximately 410 active ingredients contained in registered products in California and on over 300 separate pesticide products. It is defined in the California Food and Agricultural Code Section 13142 and part of the Pesticide Contamination Prevention Act, which is designed to prevent further contamination of water quality used for drinking water supplies from the agricultural use of pesticides.

The increased use of pressurized irrigation systems, such as macro-sprinkler, micro-sprinkler, and drip systems, facilitated the injection of chemicals from a fixed point of application. The backflow prevention devices listed on the pesticide labels and their approved alternatives are part of an integrated system that also assures proper metering and application of pesticides

According to Imperial County Agriculture Department between January 1, 2014 and July 14, 2020 they performed 45 inspections on pesticide use by chemigation which resulted in 6 inspections found non-compliances (violations) of a law or regulation. Of those violations, all but one was non-compliances of employee safety rules. Said violations were not of rules related to surface water; of due care in applying a pesticide in a proper, safe, and efficient manner related to the protection of the environment; or of proper stewardship to avoid harm to the environment.

Where chemicals, including anhydrous ammonia, are applied by flood, basin, furrow or border chemigation, it should be applied downstream of a hydraulic continuity such as a drop structure or a weir to prevent backflow of treated irrigation water[10]. The following sketch illustrates the concept.

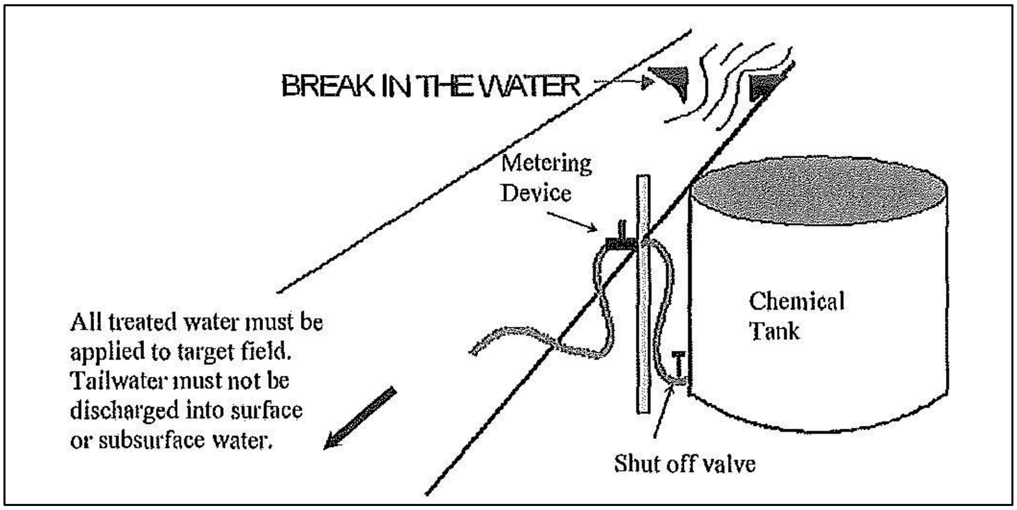


Figure 5-22: Illustration of Hydraulic Break Protection from Chemigation Backflow (Utah Chemigation Training Manual)

The hydraulic break can be installed on the private irrigation canal serving a farm by installing a weir upstream of the chemical dosing. It can also be installed in the IID delivery structure by installing a weir box between the IID supply canal and the private canal. To illustrate this concept a figure from the USBR Design of Small Canal Structures book is shown below:

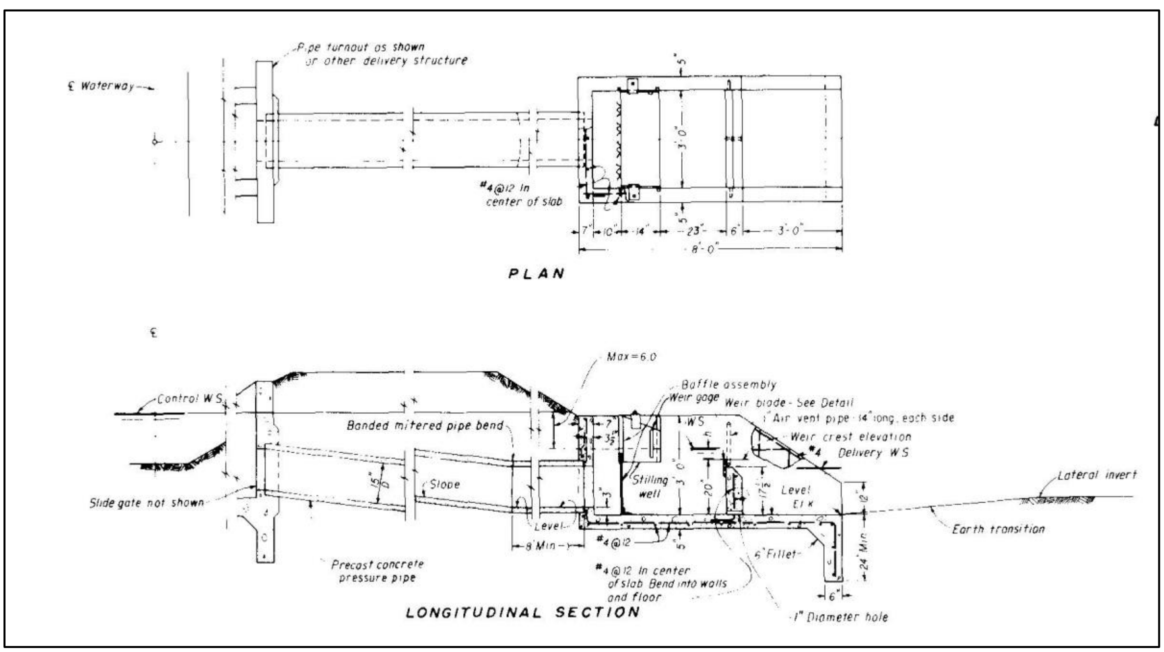


Figure 5-23: Weir Box Irrigation Delivery Structure (USBR - Design of Small Canal Structures)

[10] Jim Childs, Idaho Department of Agriculture, Idaho Chemigation Training Manual, ISDA Pub CH-002008-R2, 2010

A drawing of the outlet structure with a slide gate valve was created for this report as an option for use on IID delivery canal and is shown below:

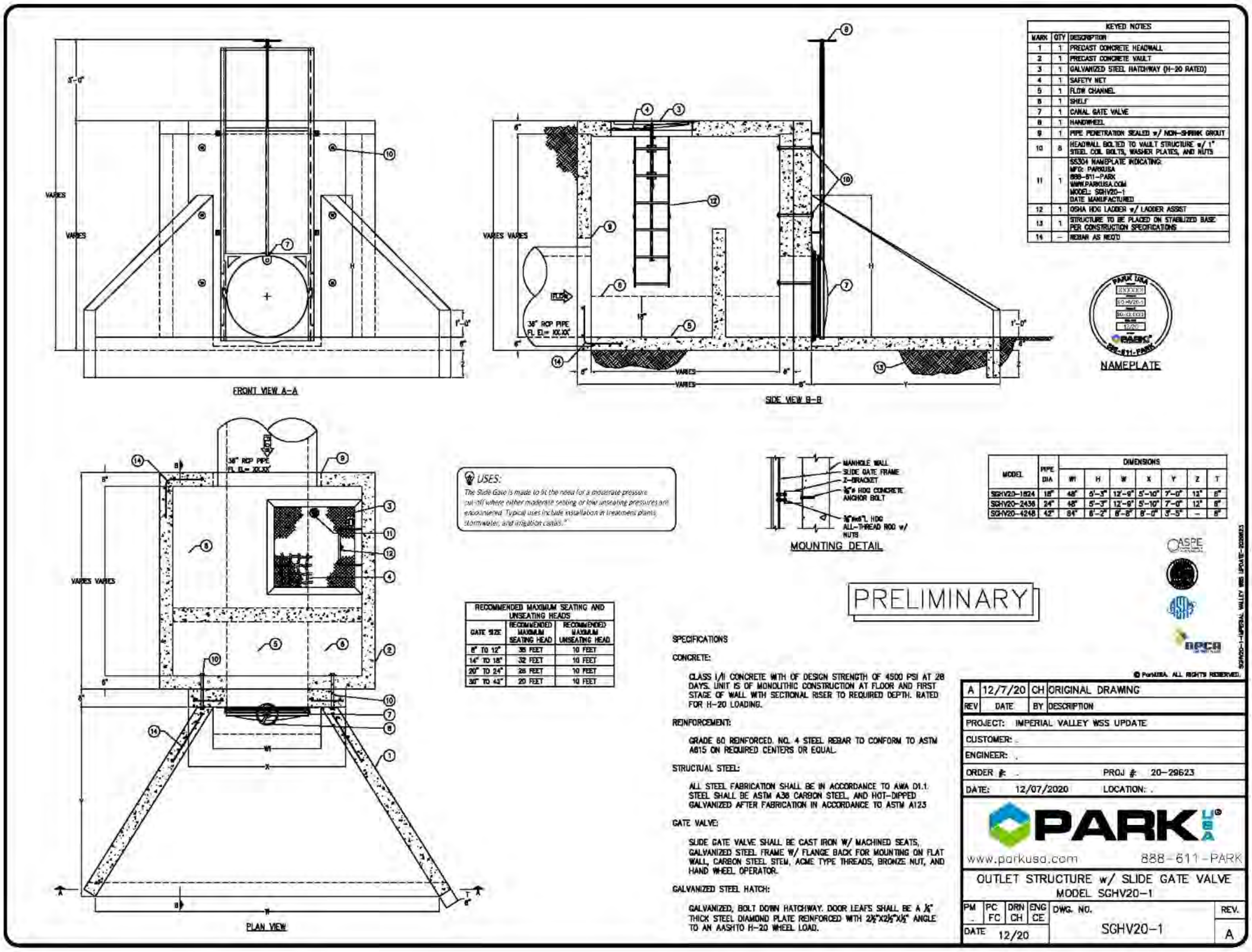


Figure 5-24: Weir Box Irrigation Delivery Structure Drawing for WSS

A picture is shown below that shows a precast delivery gate which shows a simpler concept:

Photo 5-1: Weir Box precast delivery gate

Weir boxes can also be used for pipelines. An example of a weir box installed on a Salt River Project underground pipeline that delivers water to a private irrigation canal is shown in the picture below.

Photo 5-2: Weir Box on Underground Irrigation Line delivering Water to a Private Canal

Table 5-6 information was obtained by the Regional Board's database, showing the animal feeding facilities by Agency/Owner in the state of California Region 7. The expiration dates reflect the latest available data currently on the website.

Table 5-6: Animal Feeding Facilities in California Region 7

Agency/Owner	Facility Name	County	Order #	NPDES #	Expiration Date	Facility City + Zip
Brandenberg, Bill	Brandenberg Feedyard	Imperial	R7-2013-0800	CAG017001	9/29/2019	Calexico, CA 92231
Brandt Company Inc.	Brandt Company Inc.	Imperial	R7-2013-0800	CAG017001	9/29/2019	Calipatria, CA 92233
Cattlemen's Feed & Milling	Meloland Cattle Co.	Imperial	R7-2013-0800	CAG017001	9/29/2019	El Centro, CA 92243
El Toro Export LLC	El Toro Land & Cattle Co, Inc.	Imperial	R7-2013-0800	CAG017001	9/29/2019	Heber, CA 92249
El Toro Export LLC	La Brucherie (McCabe) Feedyard	Imperial	R7-2013-0800	CAG017001	9/29/2019	El Centro, CA 92243
Foster Feed Yard Inc.	Foster Feed Yard	Imperial	R7-2013-0800	CAG017001	9/29/2014	Brawley, CA 92227
Foster Feed Yard Inc.	Foster Feed Yard - Keystone	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Hein Hettinga Dairy	Hettinga Green Road	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Hein Hettinga Dairy	Hettinga Holtville Cattle Feeders	Imperial	R7-2013-0800	CAG017001	9/29/2019	Holtville, CA 92250
Hein Hettinga Dairy	Hettinga Brawley Heifer Ranch	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Jimmy Nuckles	JN Livestock	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
John Grizzle & Debbie Davis	Cameiro Heifer Ranch	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227

Agency/Owner	Facility Name	County	Order #	NPDES #	Expiration Date	Facility City + Zip
Kuhn Farms Inc.	KF Dairy	Imperial	R7-2013-0800	CAG017001	9/29/2019	El Centro, CA 92243
Mesquite Cattle Feeders Inc.	Mesquite Feedyard	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Moiola Brothers Cattle Feeders	Del Charro	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Moiola Brothers Cattle Feeders	Moiola Bros Cattle	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Moolane Ranches	Grizzle Feedlot	Imperial	R7-2013-0800	CAG017001	9/29/2019	Holtville, CA 92250
Phillips Cattle Company	Jackson Feedlot	Imperial	R7-2013-0800	CAG017001	9/29/2019	El Centro, CA 92243
Phillips Cattle Company	Phillips Cattle Co.	Imperial	R7-2013-0800	CAG017001	9/29/2019	El Centro, CA 92243
Ruegger & Ruegger Inc.	Ruegger & Ruegger Feedlot	Imperial	R7-2013-0800	CAG017001	9/29/2019	Westmorland CA 92281
Schaffner, Rudy	Schaffner Dairy	Imperial	R7-2013-0800	CAG017001	9/29/2019	Holtville, CA 92250
Superior Cattle Feeders LLC	SCF - Fairline Yard	Imperial	R7-2013-0800	CAG017001	9/29/2019	Calipatria, CA 92233
Superior Cattle Feeders LLC	SCF - Hannon Yard	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Superior Cattle Feeders LLC	SCF - Kershaw Yard	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Superior Cattle Feeders LLC	SCF - Main Yard	Imperial	R7-2013-0800	CAG017001	9/29/2019	Calipatria, CA 92233
Superior Cattle Feeders LLC	SCF - Beef Eaters Yard	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Superior Cattle Feeders LLC	SCF - Butter Spur West	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
Triple S Farms	Reata Cattle Feeders	Imperial	R7-2013-0800	CAG017001	9/29/2019	Brawley, CA 92227
UC Desert Research & Extension Center	UC Desert Research & Extension Center	Imperial	R7-2013-0800	CAG017001	9/29/2019	El Centro, CA 92243
Van Leeuwan, Richard	Bullfrog Farms	Imperial	R7-2013-0800	CAG017001	9/29/2019	Seeley, CA 92273

5.9 Other Concerns

Leaking Underground Storage Tanks (LUST) – A typical leaking underground storage tank (LUST) scenario involves the release of a fuel product from an underground storage tank (UST) that can contaminate surrounding soil, groundwater, or surface waters, or affect indoor air spaces. [11] These LUST sites in Imperial County are identified on the RWQCB's geo tracker website which most are closed incidents. There is concern when these sites are close to seepage interception and unlined canals.

Table 5-7 shows the LUST clean-up sites in Imperial County, according to the RWQCB, that have not been closed to date, and are open to site assessment, groundwater and soil monitoring and/or site remediation.

Table 5-7: Open LUST Sites in Imperial County per CA RWQCB

Facility Name	Facility Address	City	Zip	Status
2106 Winterhaven Dr.	2106 Winterhaven Dr.	Winterhaven	92283	Open - Inactive
7-Eleven Store #23409	904 Imperial Ave.	Calexico	92231	Open - Remediation
Antunez Autobody	238 East Main St.	El Centro	92243	Open - Remediation
Calipatria Queen Market 7788	101 East Main St.	Calipatria	92233	Open - Site Assessment
Chevron Station #9-2693	400 Imperial Ave.	Calexico	92231	Open - Verification Monitoring
Chevron Station #9-4671	173 West Main St.	Brawley	92227	Open - Eligible for Closure
Former CA Fun Mart (Five Brothers Fuel Stop)	105 West Cole Blvd.	Calexico	92231	Open - Site Assessment
Former EZ Serve #100827	899 East Main St.	Brawley	92227	Open - Remediation
Former EZ Serve #100828	940 Imperial Ave.	Calexico	92231	Open - Assessment & Interim Remedial Action
Former EZ Serve Station	805 North Imperial Ave.	El Centro	92243	Open - Remediation
Former Thrifty Oil #426	444 Imperial Ave.	Calexico	92231	Open - Remediation

[11] Leaking Underground Storage Tanks Corrective Action Resources https://www.epa.gov/ust/leaking-underground-storage-tanks-corrective-action-resources

Facility Name	Facility Address	City	Zip	Status
Former Unocal/Fillco	324 South Imperial Ave.	Calexico	92231	Open - Inactive
Mann Company	1313 Main St.	Brawley	92227	Open - Site Assessment
McDonald's USA LLC Site ID No. 40796	105 West Main St.	Brawley	92227	Open - Inactive
Private Residence	Private Residence	Brawley	92227	Open - Remediation
RD Brown	307 & 321 North Imperial Ave.	Imperial	92251	Open - Remediation
Shah Lot	401 West Main St.	El Centro	92243	Open - Site Assessment
Sidewinder Chevron	611 Sidewinder Rd.	Winterhaven	92283	Open - Site Assessment
Soco No. 60	1690 South 4th St.	El Centro	92243	Open - Remediation
Soco No. 63	800 Imperial Ave.	Calexico	92231	Open - Remediation
Unocal Service Station #3201	324 Imperial Ave.	Calexico	92231	Open - Assessment & Interim Remedial Action
USA Gasoline Station #247	201 West Main St.	Brawley	92227	Open - Remediation
USA Gasoline Station #270	824 Imperial Ave.	Calexico	92231	Open - Remediation
USA Gasoline Station #291	104 West Main St.	Brawley	92227	Open - Remediation
USA Gasoline Station #292	1497 West Adams Ave.	El Centro	92243	Open - Remediation
USA Gasoline Station #294	525 East 5th St.	Holtville	92250	Open - Remediation
USA Gasoline Station #295	1036 Imperial Ave.	Calexico	92231	Open - Remediation
USA Supersave/Salvador Huerta	2115 Winterhaven Dr.	Winterhaven	92283	Open - Site Assessment

Table 5-8 shows the LUST clean-up sites in Riverside County, according to the RWQCB, that have not been closed to date, and are open to site assessment, groundwater and soil monitoring and/or site remediation.

Table 5-8: Open LUST sites in Riverside County per CA RWQCB

Facility Name	Facility Address	City	Zip	Status
AAA Air Conditioning	1134 West Hobsonway	Blythe	92225	Open - Inactive
Bank of America (Vacant Lot)	249 East Hobsonway	Blythe	92225	Open - Remediation
Blocker Transportation	910 14th Ave. W	Blythe	92225	Open - Inactive
Callan Oil	107 West Hobsonway	Blythe	92225	Open - Remediation
Circle K #1407	945 East Hobsonway	Blythe	92225	Open - Remediation
EZ Serve #100808	200 East Hobsonway	Blythe	92225	Open - Remediation
First Interstate Bank	149 East Hobsonway	Blythe	92225	Open - Remediation
Former Flying Inn Motel	9232 East Hobsonway	Blythe	92225	Open - Inactive
Former One Stop Fuel, Inc.	13207 Mesa Dr.	Blythe	92225	Open - Inactive
Jerry Allen Insurance	101 East Hobsonway	Blythe	92225	Open - Remediation
Joy Iverson Hartwick Trust	120 East Hobsonway	Blythe	92225	Open - Remediation
Miller Property	9680 East Hobsonway	Blythe	92225	Open - Inactive
Provident Federal Savings	201 East Hobsonway	Blythe	92225	Open - Remediation
RVSD Co Garage Blythe	271 North Spring St.	Blythe	92225	Open - Verification Monitoring
USA Self Service/Douglas STA	1147 West Hobsonway	Blythe	92225	Open - Inactive

Table 5-9 shows the LUST clean-up sites in Arizona, according to ADEQ's website, that which has not been closed to date.

Table 5-9: Open LUST sites in Arizona per ADEQ

Facility Name	Facility Address	City	Zip	Status
Buckskin Market	5476 North Highway 95	Parker	85344	Confirmed - Open
Circle k #742	8661 Riverside Dr.	Parker	85344	Confirmed - Open
Lil Mike's Service Center	3345 Riverside Dr.	Parker	85344	Confirmed - Open
Plantation Mini-Mart	Parker, AZ	Parker	85344	Confirmed - Open
River Island Market	5225 North Highway 95	Parker	85344	Confirmed - Open

Landfills and land disposal sites are a concern, in particular if they have contaminated soil and/or groundwater, are close to groundwater, and close surface water bodies. This Region oversees landfills in Imperial County which are mainly Class III Waste Management Facilities (WMF's). However, there is Class I and Class II WMF's in this Region as well. The majority of the Class III landfills in our Region are unlined and do not have leachate collection and removal systems. The Regional Board's responsibilities include permitting, monitoring and enforcement of waste discharge requirements mandated by State Regulations (Title 27) and Federal Regulations (Subtitle D), for the disposal of land waste. The goal of the Landfill Section is to protect the ground and surface water quality via these regulations.[12]

The regulations can be found on State Water Board website.

Table 5-10 shows the clean-up sites in Imperial County, according to the RWQCB, that have not been closed to date, and are open to site assessment, groundwater and soil monitoring, and/or site remediation.

[12] Land Disposal Program https://www.waterboards.ca.gov/coloradoriver/water_issues/programs/chapter_15/

Table 5-10: Open Land Disposal Sites in Imperial County per CA RWQCB

Facility Name	Facility Address	City	Zip	Status
Allied (Republic) Imperial Landfill	104 East Robinson Road	Imperial	92251	Open - Operating
Black Rock 1, 2 & 3 Geothermal Power Project Brine Ponds	7030 Gentry Road	Calipatria	92233	Open - Proposed
Black Rock 1, 2 & 3 Geothermal Power Project Wellfield Mud Sumps	7030 Gentry Road	Calipatria	92233	Open - Proposed
Brawley CLS III WMF	North Western Ave. at New River	Brawley	92227	Closed with Monitoring
Cal Energy R1, Salton Sea Power Plants Units 1-5	6922 Crummer Road	Calipatria	92233	Open - Verification Monitoring
Cal Energy R2, Vulcan & Del Ranch (Hoch) Power Plants SIS	7001 Gentry Road	Calipatria	92233	Open
Calexico CLS III WMF	Hwy 98 at New River	Calexico	92231	Open - Operating
Central Brave Ag Serv 88-079	4378 Hwy 86 O'Connell Airport	Brawley	92227	Open
Chemgold Inc. Imperial Project	Pichacho Park	Winterhaven	92283	Open
Clean Harbors 94-005	5295 South Garvey Road	Westmorland	92281	Open
Desert Valley Monofill	3301 West Hwy 86	Brawley	92227	Open
Earthrise Nutrionals Evaporation Pond 8 Class II Surface Inpounment	113 Hoober Road	Calipatria	92233	Open - Proposed
Farm Air Service 88-056	Municipal Airport	Calipatria	92233	Open
Gem 2 & 3	3300 East Evan Hewes Hwy	Holtville	92250	Open
Geo-Brine Holding Basin (H)	P.O. Box 748	Holtville	92250	Open
Geo-Geo Power Plant Basin 91-003	P.O. Box 748	Holtville	92250	Open

Facility Name	Facility Address	City	Zip	Status
H-2 Geothermal Complex	855 Dogwood Road	Heber	92249	Open
Heber South Heber Geothermal Exploration Area	947 Dogwood Road	Heber	92249	Open - Verification Monitoring
Heber 1 Emergency Basins	895 Pitzer Road	Heber	92249	Open
Holtville CLS III WMF	Whitlock Road N. of Norrish Rd.	Holtville	92250	Closed with Monitoring Transfer Station
Hot Spa Imperial County Landfill	10466 Spa Road	Niland	92257	Open - Operating
Imperial County CLS III WMF	Worthington Rd E. of New River	Imperial	92251	Open - Operating
Imperial Wells Power LLC	321 Waterman Avenue	El Centro	92243	Open - Site Assessment
JJ Elemore Geothermal Plant	786 West Sinclair Road	Calipatria	92233	Open
JM Leathers Geothermal	342 West Sinclair Road	Calipatria	92233	Open
JM Leathers Power Plant 91-053	342 West Sinclair Road	Calipatria	92233	Open
John L. Featherstone (Hudson Ranch i) Geothermal Power Plant	409 McDonald Road	Calipatria	92233	Open - Site Assessment
Magazine Road Landfill 02-168	Naval Air Facility	El Centro	92243	Open
Mesquite Regional Landfill (LACSD)	6502 East Hwy 78	Brawley	92227	Open - Operating
National Beef CA LP	57 Shank Road	Brawley	92227	Open - Verification Monitoring
Niland III WMF	Off Cuff Road	Niland	92257	Open - Operating
North Brawley/Orni 18 Geothermal Project	6225 Neil Road Suite 300	Reno	89511	Open - Verification Monitoring

Facility Name	Facility Address	City	Zip	Status
Ocotillo WMF	Shell Canyon Road	Ocotillo	92259	Closed with Monitoring, Transfer Station
Palo Verde	Stallard Road	Palo Verde	92266	Closed with Monitoring, Transfer Station
Picacho Gold Recovery Project	3475 Picacho Road	Picacho Mining District	92283	Open
Picacho SWDS	Pichacho Road	Winterhaven	92283	Open - Closed with Monitoring
PLT E Mesa Units 5 & 6 (H)	P.O. Box 86	Holtville	92250	Open
Ram Power Geothermal Exploration	3000 Shank Road	Brawley	92227	Open - Operating
Salton City Solid Waste Site	Dump Road off Hwy 86	Salton City	92274	Open - Operating
Salton Sea I & II 03-127	6920 Lack Road	Calipatria	92233	Open - Inactive
Salton Sea III 03-128	6922 Krummer Road	Calipatria	92233	Open - Inactive
Salton Sea units I & II 94-082	6920 Lack Road	Calipatria	92233	Open - Inactive
Salton Sea Units III 94-084	6922 Krummer Road	Calipatria	92233	Open - Inactive
Salton Sea Unit VI	7030 Gentry Road	Calipatria	92233	Open - Inactive
Second Imperial GEO 93-025	855 Dogwood Road	Heber	92249	Open
Truckhaven Geothermal Exploratory Project	South of Salton City	Salton City	92274	Open
Unocal-Residue Proc 89-005	950 West Lindsay Road	Calipatria	92233	Open
US Gypsum/Plaster City Class III	3810 West Evan Hewes Hwy	Imperial	92251	Open - Closed with Monitoring

Facility Name	Facility Address	City	Zip	Status
Vulcan/Bn Geothermal	7001 Gentry Road	Calipatria	92233	Open
Western Mesquite Mines Heap Pads & Event Ponds	6502 East Hwy 78	Brawley	92227	Open - Operating
Western Mesquite Inert Waste Pile	6502 East Hwy 78	Brawley	92227	Open - Inactive

The Palo Verde Landfill is not mentioned in the chart due to that it's in Riverside County. The landfill can potentially be a source of contamination within our watershed and is currently closed with monitoring and operating as a landfill.

Based on 2014 update no known landfills are active with 1,000 feet of the Colorado River in California or Arizona. However, the Blythe Sanitary Landfill per RWQCB seemingly is the closest one that could be of concern.

Toxicity in the Colorado River –Toxicity was introduced as a pollutant from unknown sources to the 303d list affecting the Colorado River and associated lakes and reservoirs. It is divided into two segments: the California-Nevada boundary to Lake Havasu and Lake Havasu Dam to Imperial Dam.

Perchlorate Manufacturing in Nevada – Based on information from Nevada Division of Environmental Protection (NDEP), perchlorate was detected in the Lower Colorado River in 1997 and is commonly used as an ingredient in solid rocket propellant, fireworks, flares, matches and munitions which can affect water quality downstream to our watershed. On June 26, 2019, the Environmental Protection Agency (EPA) published a proposed rule regarding the regulation of perchlorate in public drinking water systems, and on June 18, 2020, the EPA made a final determination to not issue a national regulation for perchlorate.[13] Not identified in testing, but testing should have continued. It is unknown at this time whether this has anything to do with the toxicity in the Colorado River.

Mines - The Moab Uranium Mine was discovered in the 1950's and for a number of years extracted yellowcake uranium for sale to the U.S. Atomic Energy Commission. When the processing operations ceased in 1984, approximately 16 million tons of contaminated tailings were produced. While most of the Uranium had been removed from the soil, it still contained radium and other radioactive material. The Uranium Mill Tailings Remedial Action project (UMTRA) was created to deal with these tailings. The project has removed around 62% of the tailings, taking them from the banks of the Colorado River and depositing them via train to a permanent disposal area near Grand Junction, Colorado. In October of 2019, 93,000 tons of tailings were cleaned up from the site, and over 10,000,000 tons have been removed so far.[14] The site is currently owned by the U.S. Department of Energy.

[13] Nevada Department of Environmental Protection https://ndep.nv.gov/environmental-cleanup/black-mountain-industrial-bmi-complex/perchlorate
[14] The Radioactive History of Moab https://moabgeartrader.com/2019/11/30/uranium-mining-history-the-moab-area/

Invasive Species - Aquatic invasive species (AIS) are aquatic organisms that invade native ecosystems and may cause harm to commercial, agricultural, or recreational activities and most importantly harm our health. Some known invasive species in the lower Colorado River system include tamarisk, cheat grass, Russian olive, quagga mussels, spiny naiad, Eurasian water milfoil, and New Zealand mud snails. The spread of invasive mussels are a problem along the entire lower Colorado River system infesting reservoirs and water intakes. They have the ability to plug pipes, intake structures, cooling lines, causing significant environmental and economic damage. Additional research and control measures on invasive species in the water system are critical to assist with monitoring and managing the effects of water quality.

Natural Disasters -Droughts, floods, and earthquakes are potential sources of contamination. Droughts and floods can affect water supply and water quality. Earthquakes have been known to damage and/or limit life line support to water and wastewater conveyance systems that could lead to system contamination.

The Baja Earthquake that struck April 4, 2010, Easter Sunday, significantly damaged areas within the County, including portions of the All-American Canal, and the WTP and WWTP for the cities of El Centro and Calexico, as a result of liquefaction and lateral ground spreading.

On October 22, 2019 the Imperial County Board of Supervisors declared a local state of emergency at the Salton Sea. Starting January 1, 2018 water previously being discharged into the Salton Sea were diverted to urban areas under the terms of state and federal agreement. While the change was over a decade in the making, no preparations were made to minimize the air pollution created by the decreased water volume. Proposition 68 was passed in November of 2020, which currently has designated over $19M to the Salton Sea Authority.

6.1 Introduction

This section serves to summarize the current surface water treatment regulations and identify upcoming regulations as applicable. Raw water monitoring results that include testing for: coliforms, E. coli, and turbidity, are shown in Chapter 4 for each water provider.

In general, the Environmental Protection Agency (EPA) establishes federal regulations for the control of contaminants in drinking water and under the provisions of the Safe Drinking Water Act (SDWA); the State Water Resources Control Board – Division of Drinking Water (DDW) has the primary responsibility to enforce drinking water regulations. The California Code of Regulations, establishing the drinking water quality requirements and monitoring standards, can be no less stringent than the federal regulations.

DDW related regulations are in Titles 22 and 17 of the CCR If authorized by California law, the State Water Quality Control Board can set maximum contaminant levels (MCLs) based on recommendations from the California Environmental Protection Agency's Office of Environmental Health Hazards Assessment (OEHHA). MCLs are required to be reviewed every five years.

California Code of Regulations can be found at the State Water Resources Control Board website.

Applicable federal regulations under the SDWA are categorized by the following:

- Chemical Contaminants
    - Inorganics
    - Radionuclides
    - Volatile Organic Chemicals (VOCs) and Synthetic Organic Chemicals (SOCs)
    - Contaminants regulated under Secondary Guidelines

- Surface Water Treatment Rules (SWTR)
    - Filter Backwash Recycling Rule (FBRR)
    - Interim Enhanced Surface Water Treatment (IESWTR)
    - Long Term 1 & 2 Enhanced Surface Water Treatment (LT1ESWTR & LT2ESWTR)

- Other Water System Rules
    - Lead and Copper Rule
    - Disinfection Byproducts Rule
    - Total Coliform Rule
    - Total Coliform (TCR) and Revised Total Coliform Rules (RTCR)

More details regarding these federal regulations can be found at the EPA's website.

The California State regulations have included additional MCLs or lower MCLs for several constituents including eight (8) inorganic chemicals (i.e., Perchlorate, and Aluminum), two (2) general mineral/general physical, nineteen (19) regulated volatile organic chemicals, and ten (10) regulated synthetic organic chemicals. This section will provide a table comparing Federal MCLs (Maximum Contaminant Levels) to State of California limits.

There are three potential future regulations currently under review by EPA: Lead and Copper Rule Long Term Revisions, Per- and Poly- Fluoroalkyl Substances (PFAS), and Perchlorate. These potential changes will be discussed in the sections that discuss the current rule.

6.2 Current Water Treatment Regulations

Regulations

The Chemical Contaminants Rule is to reduce and regulate contaminants in phases collectively called the Phase II/V Rules or the Chemical Contaminant Rules. These rules regulate over 65 contaminants in three contaminant groups and phases II/V can be found on EPA's website.

- Inorganic Contaminants (IOCs) (including arsenic and nitrate),
- Volatile Organic Contaminants (VOCs),
- Synthetic Organic Contaminants (SOCs), and
- Radionuclides.

The rules apply to all public water systems (PWS). PWS type, size, and water source type determine which contaminants require monitoring for that system.

Over a five year period, EPA gathered and analyzed occurrence and health effects data. Through the Phase II/V Rules, EPA established:

- Maximum Contaminant Level Goals (MCLGs),
- Maximum Contaminant Levels (MCLs),
- Monitoring requirements, and
- Best available technologies for removal for 65 chemical contaminants.

The Chemical Contaminants Rules provide public health protection through the reduction of chronic, or long-term, risks from:

- Cancer,
- Organ damage,
- Circulatory system disorders,
- Nervous system disorders, and
- Reproductive system disorders.

There is an acute health risk from elevated nitrate and nitrite. The regulations reduce the risk of Methemoglobinemia or "blue baby syndrome." Blue Baby Syndrome is caused from ingestion of high levels of nitrate or nitrite.

Perchlorate Regulation

In 2007, The State of California set a maximum contaminant level (MCL) for perchlorate at 6 ug/L with a detection limit for the purposes of reporting (DLR) of 4 ug/L. In 2015, The Office of Environmental Health Hazard (OEHHA) revised the PHG (Public Health Guidance[1]) level for perchlorate from 6 ug/L to 1 ug/L. This revision led to the review of the perchlorate MCL. In 2020, the DLR was changed to 1 ug/L to collect information that may be useful for future rule making.

Lead and Copper Rule (LCR)

In 1991, EPA published a regulation to reduce lead and copper in drinking water to protect health and reduce exposure to lead in drinking water. This regulation is known as the Lead and Copper Rule (also referred to as the LCR). Major revisions to the rule are in the process of being adopted. Comments on the proposed revisions closed February 12, 2020 and the revised rule has been submitted to the President's Office of Management and Budget for final review. The new LCR applies to all community systems and all NTNCWS. The rule's approach focuses on six key areas:

1. Identifying the areas most impacted
2. Strengthening drinking water treatment requirements
3. Replacing lead service lines
4. Increasing sampling reliability
5. Improving risk communication
6. Protecting children in schools and child care facilities

The major elements of the proposed rule are as follows:

<u>Lead Service Line Plan and Replacement</u>

Prior to World War II, lead pipe was used in service connections including goosenecks that connected rigid pipe. Also, until 1986 copper piping system installers could use lead containing solder to install fittings. All systems subject to the proposed revised LCR are, if required by triggers in the rule, to replace all LSL and goosenecks through planning, procedures and improved customer education and coordination. After notification to affected households, the water systems are required to provide and maintain pitcher type filters. All systems must develop and maintain a publicly accessible inventory of LSLs and service lines of unknown materials.

The State of California required the reporting of LSLs or fittings in SB 427 in by July 1, 2018. DDW published the reporting status in a data base and GIS based map starting 12/7/2018. The major water systems in Imperial Valley reported no known LSLs or service lines of unknown materials, but many of Imperial Valley communities were founded early in the 20th century when lead materials were used, so some historical installations that used lead materials may be revealed in the future which will require notification and replacement.

[1] Public Health Guidance (PHG) is the concentration of a drinking water contaminant that does not pose a significant risk to human health if ingested in drinking water

Corrosion Control Treatment

The proposed EPA rule requires evaluation of corrosion control when LCR testing exceeds either the lead or copper trigger levels of 10 ug/L or action level of 15 ug/L.

Find-and-Fix Process

Whenever lead observations from a tap sample are greater than 15 ug/L, the proposed rule modification requires that water system initiate a "find and fix" process, conduct follow-up samples and identify and address the elevated lead at the sample site.

Public Education

The proposed rule expands outreach to customers and includes required changes to the consumer confidence reports (CCRs) and public notification requirements.

Sampling Requirements including School and Childcare Facilities

The proposed rule requires water systems to sample for lead at five taps in each school and two taps in each licensed childcare facility in its service area at least once every five years. California has already required testing for lead in schools. Residents in homes where sampling showed lead concentrations above the action level will need to be informed within 24 hours which could be challenging. Pitcher filters will need to be supplied in the required times. Numerous new reporting requirements are expected.

Small-System Flexibility

For small systems, the proposed rule provides alternative technologies for meeting the EPA requirements including (1) corrosion control optimized to remove lead, (2) remove all LSLs in 15 years, or (3) install and maintain point-of-use devices in all homes in system's service area.[2]

Additional details are expected to be available from EPA if the rule is approved for implementation by OMB.

[2] Stephen Estes-Smargiassi and others, Understanding Proposed Revisions to the Lead and Copper Rule, J. AWWA, March 2020, pp. 7-15.

PFAS – Per- and Polyfluoralky Substances

PFASs are chemicals used in firefighting foam, Teflon, shampoo, paint and many other common products. There are more than 4,000 substances that fit in this category. EPA reports that 600 are still in use. PFASs degrade slowly in the environment and are sometimes described as “forever chemicals”.[3]

PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate) were identified in EPAs health advisories in 2008. In February 2020, DDW announced reduced response levels (RLs) levels of 10 ppt (parts per trillion) for PFOA and 40 ppt for PFOS that are based on updated health recommendations from the California Environmental Protect Agency’s Office of Environmental Health Hazard Assessment (OEHHA). Under California law, if the PFOA or PFOS concentration exceeds their RL, the system is required to take the water source out of service, provide treatment, or notify their customers.

Congress has taken some limited action in 2020 that requires water systems to monitor for PFAS. Other legislation or EPA actions regarding PFAS may be adopted in the future. Firefighting foam containing PFAS will be banned as of Oct. 1, 2024.[4]

Radionuclides Rule

The Environmental Protection Agency (EPA) regulates radionuclides in drinking water to protect public health. Radionuclides in water at amounts greater than the drinking water standards may cause health problems. In 2000, EPA revised the radionuclides regulation, which had been in effect since 1977. The revisions set new monitoring provisions for community water systems (CWS). This ensured that all customers of CWSs receive water meeting the maximum contaminant levels (MCL) for radionuclides in drinking water The Radionuclides Rule is aimed at reducing the exposure to radionuclides in drinking water to reduce the risk of cancer. This rule applies to all community water systems. It retains the existing MCLs for combined radium-226 and radium-228, gross alpha particle radioactivity, and beta particle and photon activity, and it regulates uranium. EPA issued a standard new MCL for uranium of 30 ug/L as required by the Safe Drinking Water Act (SDWA) Amendments of 1986. Monitoring requirements can be found in the quick reference guide.

Surface Water Treatment Rules (SWTR)

The Surface Water Treatment Rules (SWTR's) purposes are to reduce illnesses caused by pathogens in drinking water. Microbial contaminants particularly viruses including Legionella, Giardia lamblia and Cryptosporidium are found in water and treated by using conventional or direct filtration, slow sand, Diatomaceous Earth, or alternative filtration. The removal process of filtration is credited based on the technology provided and the plant effluent turbidity. The (SWTR) applies to all public water systems (PWSs) using surface water sources or ground water sources under the direct influence of surface water, which requires most water systems to filter and disinfect water from surface water sources. It includes treatment technique requirements for filtered and unfiltered systems to protect against adverse health effects of exposure to pathogens and establishes minimum removal/inactivation of viruses.

The effluent turbidity standard for direct and conventional treatment is 0.5 NTU, 95% of the time. The turbidity level in the combined effluent must never exceed 5.0 NTU and must not exceed 1.0 NTU when more than two samples are taken consecutively (every four hours).

[3] David LaFrance, PFAS 101, J. AWWA, July 2019, p. 10.

[4] Tommy Holmes and Nate Norris, Legislating PFAS, J. AWWA, February 2020

Filter Backwash Recycling Rule (FBRR)

The Filter Backwash Recycling Rule (FBRR) addresses a statutory requirement of the 1996 Safe Drinking Water Act (SDWA) Amendments to promulgate a regulation which “governs” the recycling of filter backwash water within the treatment process of public water systems (PWSs). The FBRR's purpose is to enhance recycle practices for improved contaminant control, particularly microbial contaminants. This requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

Interim Enhanced Surface Water Treatment Rule (IESWTR)

The Interim Enhanced Surface Water Treatment Rule (IESWTR) builds on the requirements of the (SWTR) and establishes turbidity performance standards, for conventional and direct filtration combined filter effluent, of< 0.3 NTU in at least 95 percent of measurements taken each month, and a maximum level of 1 NTU. Also, the Cryptosporidium maximum contaminant level goal (MCLG) regulation is zero, and 99 percent (2.0-log) physical removal for systems that filter. Additional requirements under this rule apply to public systems that use surface water or ground water under the direct influence of surface water and serve 10,000 or more people. Accordingly, this includes the cities of Brawley, Calexico, El Centro, and Imperial. It should be noted that the City of Imperial was not included under this rule in the previous WSS.

Long Term 1 Enhanced Surface Water Treatment Rule (LT1 ESWTR)

The Long Term 1 Enhanced Surface Water Treatment Rule (LT1 ESWTR's) purpose is to control microbial contaminants, particularly Cryptosporidium, and to prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR). This rule builds upon the requirements of the 1989 SWTR, and is a smaller system counterpart of the IESWTR, covering water systems that serve fewer than 10,000 people. The LT1 ESWTR establishes turbidity performance standards, for conventional and direct filtration combined filter effluent, of< 0.3 NTU in at least 95 percent of measurements taken each month, and a maximum level of 1 NTU. Also, the Cryptosporidium maximum contaminant level goal (MCLG) regulation is zero, and 99 percent (2.0-log) physical removal for systems that filter.

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR's) purpose is to control microbial contaminants by focusing on systems with elevated Cryptosporidium risk, and to prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2

Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR). Under this rule systems are required to monitor their source water, calculate an average cryptosporidium concentration, and use those results to determine if the source is vulnerable to contamination and if additional treatment is required. Schedule 3 is applicable to the cities of Brawley, Calexico, El Centro, and Imperial, as they have populations within the 10,000 to 49 999 range.

Filtered and unfiltered systems must conduct 24 months of source water monitoring for Cryptosporidium. Filtered systems must also record source water E. coli and turbidity levels. Filtered systems are classified into one of four (4) bins based on results of their source water monitoring.

Unfiltered systems will calculate a mean Cryptosporidium level to determine treatment requirements. Systems may also use previously collected data or 'grandfathered data'.

Filtered systems providing at least 5.5-log of treatment for Cryptosporidium and unfiltered systems providing at least 3.0-log of treatment for Cryptosporidium and those systems that intend to install this level of treatment are not required to conduct source water monitoring.

Stage 1 and 2 Disinfectants and Disinfection Byproducts Rules

The purpose of the Disinfectants and Disinfection Byproducts Rules (DBPR) is to reduce exposure to disinfection byproducts, as some disinfectants and disinfection byproducts have been shown to cause cancer, suggested bladder cancer, and reproductive effects. This applies to all water systems that add a disinfectant other than ultraviolet (UV) light or deliver disinfected water, and transient non-community water systems that add chlorine dioxide. Stage 2 DBPR builds upon Stage 1 DBPR by focusing on monitoring for and reducing concentrations of two classes of disinfection byproducts (DBP) in drinking water, TTHM and HAA5. Stage 2 DBPR requires some systems to complete a system evaluation to characterize their system's DBP levels and identify monitoring locations for compliance.

Total Coliform Rule (TCR)

The Total Coliform Rule (TCR) monitors a group of related bacteria that are with few exceptions not harmful to humans. A variety of bacteria, parasites and viruses known as pathogens can potentially cause health problems if humans ingest them. Total coliforms are used to determine the adequacy of water treatment and the integrity of the distribution system. The Total Coliform Rule's purpose is to protect health by ensuring the integrity of the drinking water distribution system by reducing fecal pathogens to minimal levels through control of total coliform bacteria, including fecal coliforms and E. coli. The TCR applies to all public water systems. This rule establishes a MCL based on the levels of total coliforms, modifies monitoring requirements, including testing for fecal coliforms or E. coli, requires use of a sample siting plan, and requires sanitary surveys for systems collecting fewer than five samples per month.

Monthly sampling requirements are based on system type and population served. The results of routine and repeat samples are used to calculate compliance. The table on the TCR quick reference guide shows the minimum sampling frequency and outlines the routine and repeat sampling requirements.

A monthly violation is triggered if a system collecting fewer than 40 samples per month has greater than one (1) routine/repeat sample per month which total coliform positive, or if a system collecting at least 40 samples per month has greater than 5.0 percent of the routine/repeat samples in a month total coliform positive.

An acute MCL violation is triggered if any public system has any fecal coliform or E. coli positive repeat sample or has a fecal coliform or E. coli routine sample followed by a total coliform positive .repeat sample.

California does not accept fecal monitoring, E. coli must be used for testing.

Revised Total Coliform Rule (RTCR)

On February 13, 2013, EPA published the Revised Total Coliform Rule (RTCR), revisions to the 1989 TCR to provide greater public health protection under the RTCR requirements. The RTCR requires public water systems that are vulnerable to microbial contamination to identify and fix problems. It establishes criteria for systems to qualify for and stay on reduced monitoring, which could reduce water system burden and provide incentives for better system operation.

The revisions include the new Coliform Treatment Technique (TT) requirement replacing the Total Coliform MCL, and a new E.coli MCL regulatory limit. The RTCR applies to all public water systems, and its purpose is to reduce potential pathways of entry for fecal contamination into water systems. This rule will identify and fix problems, and it requires systems to perform assessments to identify sanitary defects and take action to make necessary corrections. Public water systems and primacy agencies must comply with the revised requirements by April 1, 2016. Until then, systems must continue complying with the 1989 TCR.

Chromium VI Regulation

On April 15, 2014, the regulations package for the proposed MCL for hexavalent chromium (chromium-VI) was submitted to the Office of Administrative Law for review and was accepted in May 2014. The new CA MCL of 10 ppb for hexavalent chromium became effective on July 1, 2014.

On May 31, 2017, the Superior Court of Sacramento County issued a judgment invalidating the hexavalent chromium maximum contaminant level (MCL) for drinking water. The court ordered the State Water Resources Control Board (SWRCB) to take the necessary actions to delete the hexavalent chromium MCL from the California Code of Regulations and to file with the court by August 15. The court's primary reason for finding the MCL invalid is that the California Department of Public Health (which was responsible for the drinking water program before it was transferred to the State Water Board) failed to comply with one of the requirements in the Safe Drinking Water Act for adopting an MCL. In particular, the department "failed to properly consider the economic feasibility of complying with the MCL. The court did not make any finding about whether the MCL adequately protected public health, nor did it reach a conclusion about whether the MCL was too low or too high. The court merely found that the department did not adequately document why the MCL was economically feasible. The court also ordered the State Water Board to adopt a new MCL for hexavalent chromium.

The change became effective with the Office of Administrative Law filing the change with the Secretary of State on September 11, 2017. Thus, as of September 11, 2017, the maximum contaminant level for hexavalent chromium is no longer in effect.

Table 6-1: CA MCL and Federal MCL by Constituent

Constituent	CA MCL	Federal MCL
Inorganic Chemicals		
Aluminum	1000 ug/L (secondary 200 ug/L)	(secondary 50 ug/L - 200 ug/L)
Antimony	6 ug/L	6 ug/L
Arsenic	10 ug/L	10 ug/L
Asbestos	7 MFL	7 MFL
Barium	1000 ug/L	2000 ug/L
Beryllium	4 ug/L	4 ug/L
Cadmium	5 ug/L	5 ug/L
Chromium Total	50 ug/L	100 ug/L
Copper	AL: 1,300 ug/L (secondary 1,000 ug/L)	AL: 1,300 ug/L
Cyanide	150 ug/L	200 ug/L
Fluoride	2000 ug/L	4000 ug/L (secondary 2000 ug/L)
Iron	(secondary 300 ug/L)	(secondary 300 ug/L)
Lead	AL: 15 ug/L	AL: 15 ug/L
Manganese	(secondary 50 ug/L)	(secondary 50 ug/L)
Mercury	2 ug/L	2 ug/L
Nickel	100 ug/L	No MCL
Nitrate (as Nitrogen)	10 mg/L	10 mg/L
Nitrate + Nitrite	10 mg/L	10 mg/L
Nitrite (as Nitrogen)	1 mg/L	1 mg/L
Perchlorate	6 ug/L	No MCL
Selenium	50 ug/L	50 ug/L
Silver	(secondary 100 ug/L)	(secondary 100 ug/L)
Thallium	2 ug/L	2 ug/L
Zinc	(secondary 5000 ug/L)	(secondary 5000 ug/L)
General Mineral/General Physical		
Aggressiveness Index	Non-corrosive	Non-corrosive
Chloride	(secondary -varies: 250 mg/L - 600 mg/L)	(secondary 250 mg/L)
Color	(secondary 15 units)	(secondary 15 units)
Foaming Agents (MBAS)	(secondary 0.5 mg/L)	(secondary 0.5 mg/L)
Odor	(secondary 3 units)	(secondary 3 units)
pH, laboratory	No MCL (covered under "non-corrosive")	(secondary 6.5-8.5)
Specific Conductance	(secondary - varies: (900-2200 microMho)	No MCL
Sulfate	(secondary -varies: 250 mg/L – 600 mg/L)	(secondary 250 mg/L)
Total Dissolved Solids (TDS)	(secondary -varies: 500 mg/L - 1500 mg/L)	(secondary 500 mg/L)
Turbidity, laboratory	(secondary 5 NTU)	No secondary MCL

Constituent	CA MCL	Federal MCL
Radiological		
Gross Alpha	15 pCi/L	15 pCi/L
Radium 226 Radium 228	5 pCi/L (combined)	5 pCi/L (combined)
Uranium	20 pCi/L	30 ug/L as mass (equivalent to CA MCL)
Gross Beta	4 millirem/year annual dose equivalent to the total body or any internal organ	4 millirem/yr
Stronium-90	8 pCi/L (=4 millirem/yr close to bone marrow)	8 pCi/L (=4 millirem/yr close to bone marrow)
Tritium	20,000 pCi/L (=4 millirem/yr close to bone marrow)	20,000 pCi/L (=4 millirem/yr close to bone marrow)
Regulated Volatile Organic Chemicals (Table 64444-A)		
Benzene	1 ug/L	5 ug/L
Carbon Tetrachloride	0.5 ug/L	5 ug/L
1,2-Dichlorobenzene	600 ug/L	600 ug/L
1,4-Dichlorobenzene	5 ug/L	75 ug/L
1,1-Dichloroethane	5 ug/L	No MCL
1,2-Dichloroethane	0.5 ug/L	5 ug/L
1,1-Dichloroethylene	6 ug/L	7 ug/L
cis-1,2-Dichloroethylene	6 ug/L	70 ug/L
trans-1,2-Dichloroethylene	10 ug/L	100 ug/L
Dichloromethane	5 ug/L	5 ug/L
1,2-Dichloropropane	5 ug/L	5 ug/L
1,3-Dichloropropene	0.5 ug/L	No MCL
Ethylbenzene	300 ug/L	700 ug/L
Methyl-tert-butyl ether (MTBE)	13 ug/L (secondary 5 ug/L)	No MCL
Monochlorobenzene (Chlorobenzene)	70 ug/L	100 ug/L
Styrene	100 ug/L	100 ug/L
1,1,2,2-Tetrachloroethane	1 ug/L	No MCL
Tetrachloroethylene	5 ug/L	5 ug/L
Toluene	150 ug/L	1000 ug/L
1,2,4-Trichlorobenzene	5 ug/L	70 ug/L
1,1,1-Trichloroethane	200 ug/L	200 ug/L
1,1,2-Trichloroethane	5 ug/L	5 ug/L
Trichloroethylene	5 ug/L	5 ug/L
Trichlorofluoromethane	150 ug/L	No MCL
1,1,2-Trichloro-1,2,2-Trifluoroethane	1,200 ug/L	No MCL
Vinyl Chloride	0.5 ug/L	2 ug/L
Xylenes	1,750 ug/L	10,000 ug/L

Constituent	CA MCL	Federal MCL
Regulated Synthetic Organics Chemicals (Table 64444-A)		
Alachlor	2 ug/L	2 ug/L
Atrazine	1 ug/L	3 ug/L
Bentazon	18 ug/L	No MCL
Benzo(a)pyrene	0.2 ug/L	0.2 ug/L
Carbofuran	18 ug/L	40 ug/L
Chlordane	0.1 ug/L	2 ug/L
Dalapon	200 ug/L	200 ug/L
Dibromochloropropane	0.2 ug/L	0.2 ug/L
Di(2-ethylhexyl)adipate	400 ug/L	400 ug/L
Di(2-ethylhexyl)phthalate	4 ug/L	6 ug/L
2,4-D	70 ug/L	70 ug/L
Dinoseb	7 ug/L	7 ug/L
Diquat	20 ug/L	20 ug/L
Endothall	100 ug/L	100 ug/L
Endrin	2 ug/L	2 ug/L
Ethylene Dibromide (EDB)	0.005 ug/L	0.005 ug/L
Glyphosate	700 ug/L	700 ug/L
Heptachlor	0.01 ug/L	0.4 ug/L
Heptachlor Epoxide	0.01 ug/L	0.2 ug/L
Hexachlorobenzene	1 ug/L	1 ug/L
Hexachlorocyclopentadiene	50 ug/L	50 ug/L
Lindane	0.2 ug/L	0.2 ug/L
Methoxychlor	30 ug/L	40 ug/L
Molinate	20 ug/L	No MCL
Oxamyl	50 ug/L	200 ug/L
Pentachlorophenol (PCP)	1 ug/L	1 ug/L
Picloram	500 ug/L	500 ug/L
Polychlorinated Biphenyls (PCBs)	0.5 ug/L	0.5 ug/L
Simazine	4 ug/L	4 ug/L
Thiobencarb	70 ug/L (secondary 1 ug/L)	No MCL
Toxaphene	3 ug/L	3 ug/L
1,2,3-Trichloropropane	5×10^{-6}	No MCL
2,3,7,8-TCDD (Dioxin)	3×10^{-8}	3×10^{-8}
2,4,5-TP (Silvex)	50 ug/L	50 ug/L

6.3 Raw Water Monitoring

IID annually coordinates with a state certified laboratory for the collection and analysis of Title 22 (of the California Code of Regulations) source water samples under the Joint Monitoring Program and collects bacteria samples at 10 sites to support the growers with their food quality program. The data is forwarded to all of the participants in association with the Title 22 Joint Watershed Monitoring Program and is posted for public view on the IID website..

Since 1993 IID has been carrying out Title 22 Water Quality Monitoring at four locations in its canal system: the All-American Canal and three main supply canals (East Highline, Central Main, and Westside Main). In 2018, the sampling program was expanded to 25 sites as part of the Joint Monitoring Program, as shown in Table 6-12 and Figure 6-12. IID currently has 10 bacteria sampling sites as shown on Figure 6-1, and monthly coliform sampling results is provided in subsequent tables of this section. The IID bacteria sampling at these 10 sites are not part of the Joint Monitoring Program, the data is used by growers as part of their food safety programs. All sampling data is reported to the Division of Drinking Water and posted on IID's website for public viewing.

The following lists the 10 testing locations for bacteria water quality monitoring. The Drop 4 sampling point in the All-American Canal is upstream of all IID main canals and represents the water quality before water enters the IID canal system. Each of the main IID canals has multiple sampling points to understand the varying bacteria levels.

All American Canal (AAC)

- @ Drop 4
- Above East Highline Canal
- Above Central Main Canal
- Above Westside Main Canal

East Highline Canal (EHL)

- Above Check 11
- @ Z Pond

Central Main Canal (CM)

- Above Newside Check
- Above Rockwood Heading

Westside Main Canal (WSM)

- Above No. 8 Check
- Above Carter Reservoir

As part of this study, sampling data is provided from 2014-2019. The results for each of the 10 sites are detailed in the tables below.

Figure 6-1 shows IID sampling sites and the data shown in this section was provided by IID.

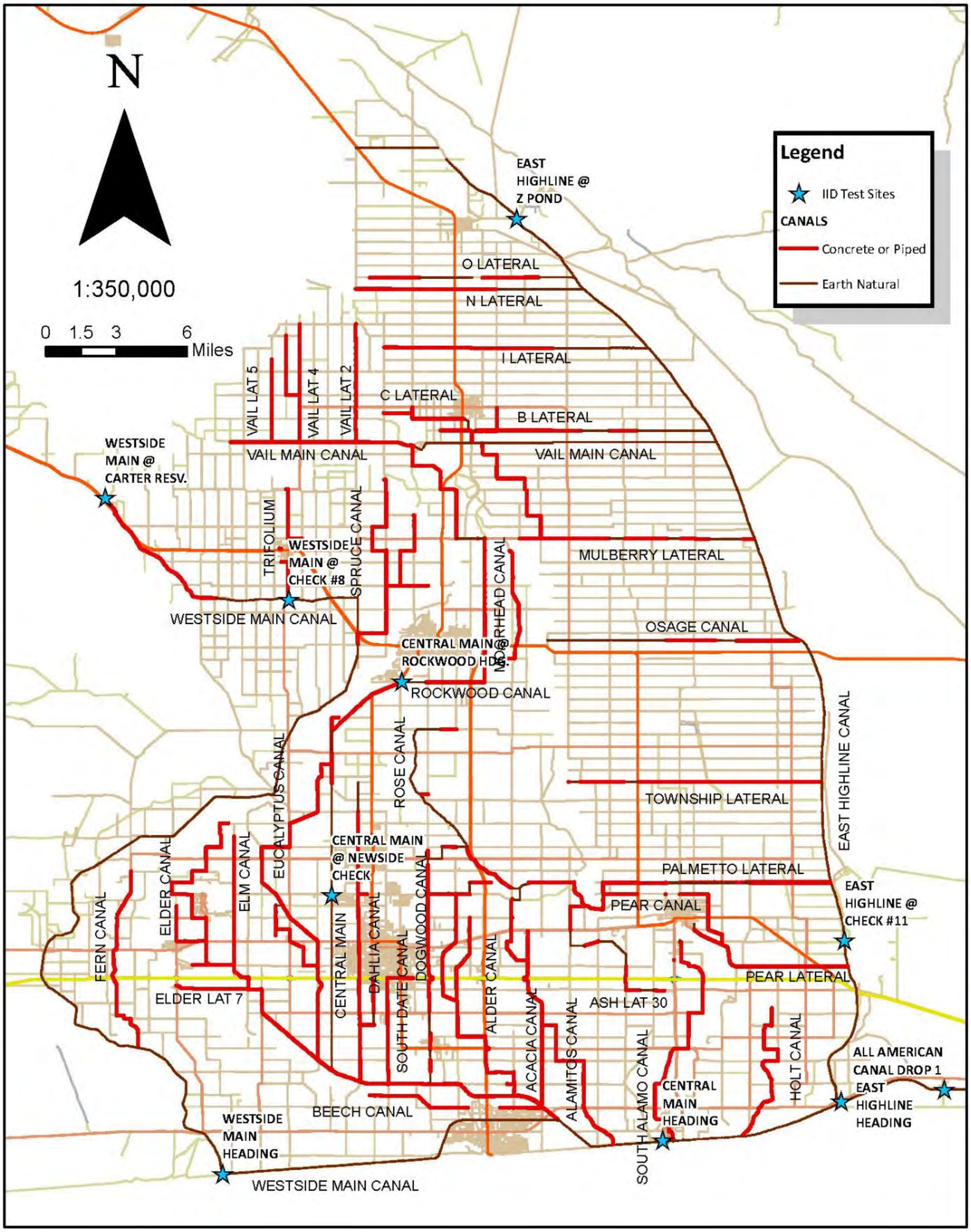


Figure 6-1: IID Sampling Sites

Table 6-2 shows AAC at Drop 4 monthly coliform sampling data.

Table 6-2: AAC Drop 4 Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	30	8	2	23	4	1	30	<2	<1	280	70	23	130	13	1	50	14	5
Feb.	23	<2	<1	130	2	<1	23	4	1	130	17	4	33	8	2	130	11	2
March	30	11	4	17	8	1	500	50	4	30	8	<1	30	4	<1	300	14	1
April	80	8	2	240	8	<1	220	11	2	240	4	<1	50	8	3	50	2	<1
May	23	23	4	240	8	1	130	17	3	80	8	1	130	13	5	130	80	4
June	80	23	<1	240	8	1	80	11	5	50	7	1	170	14	4	90	7	4
July	240	80	4	N/A	N/A	N/A	300	50	50	240	13	2	33	13	7	90	14	3
Aug.	240	22	<1	80	30	4	300	50	16	300	30	12	110	7	4	120	30	2
Sep.	>=1600	>=1600	<1	900	500	53	50	7	2	900	23	<1	500	30	3	130	50	6
Oct.	240	30	<1	80	7	<1	240	30	10	240	22	5	900	170	27	900	110	2
Nov.	240	50	6	170	11	2	300	4	<1	300	80	21	170	14	6	1600	110	4
Dec.	130	8	<1	30	4	2	140	2	<1	80	8	2	170	8	1	170	11	2
Avg.	123	26	4	195	54	8	193	21	10	239	24	8	202	25	6	313	38	3
6-yr. Avg.	TC =	211	FC =	31	EC =	6												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

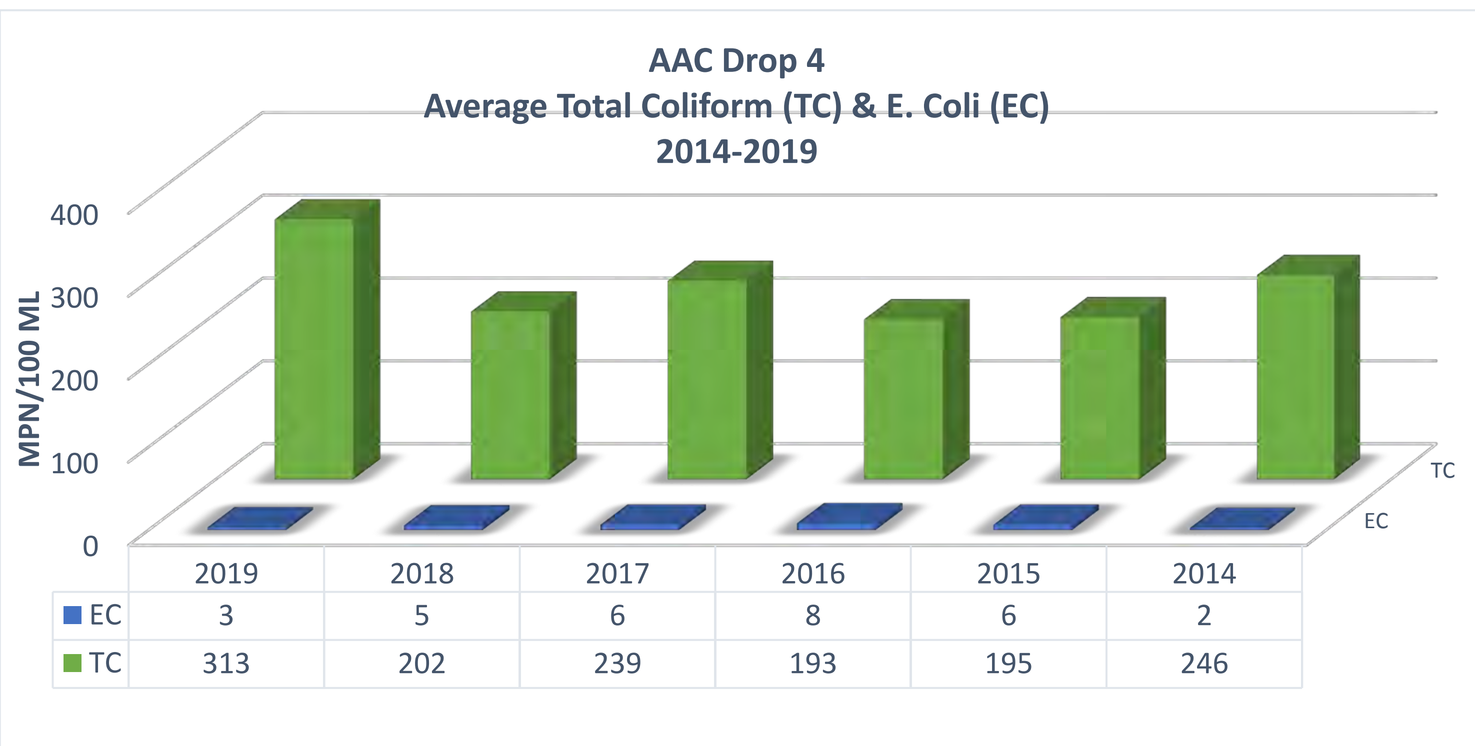


Figure 6-2: AAC Drop 4 Coliform Sampling Data (2014-2019)

Table 6-3 shows AAC at EHL Check monthly coliform sampling data

Table 6-3: AAC at EHL Check Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	23	4	2	130	9	2	50	8	4	80	13	3	50	13	4	130	30	5
Feb.	23	4	1	80	30	9	30	7	5	30	4	1	240	13	3	50	11	6
March	23	8	4	30	8	1	130	8	1	130	9	<1	130	4	1	30	17	1
April	30	8	2	50	30	<1	240	7	3	80	2	<1	300	22	13	110	70	9
May	50	23	6	240	14	1	900	14	2	300	4	<1	240	11	2	240	240	6
June	240	4	<1	240	23	<1	140	8	3	170	2	<1	240	22	10	130	4	2
July	110	50	6	N/A	N/A	N/A	300	13	8	110	4	<1	300	22	16	130	30	6
Aug.	500	30	16	220	9	2	300	7	2	170	26	6	110	23	11	120	30	2
Sep.	240	50	4	220	21	3	240	17	5	1600	27	3	130	23	1	300	34	6
Oct.	130	80	<1	240	30	5	500	23	7	80	4	<1	300	30	18	900	30	12
Nov.	300	50	3	240	8	6	220	9	2	170	13	5	300	50	6	>1600	130	4
Dec.	240	23	10	23	4	<1	130	4	<1	350	22	9	130	14	4	300	17	14
Avg.	159	28	5	156	17	4	265	10	4	273	11	5	206	21	7	222	54	6
6-yr. Avg.	TC =	213	FC =	23	EC =	5												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

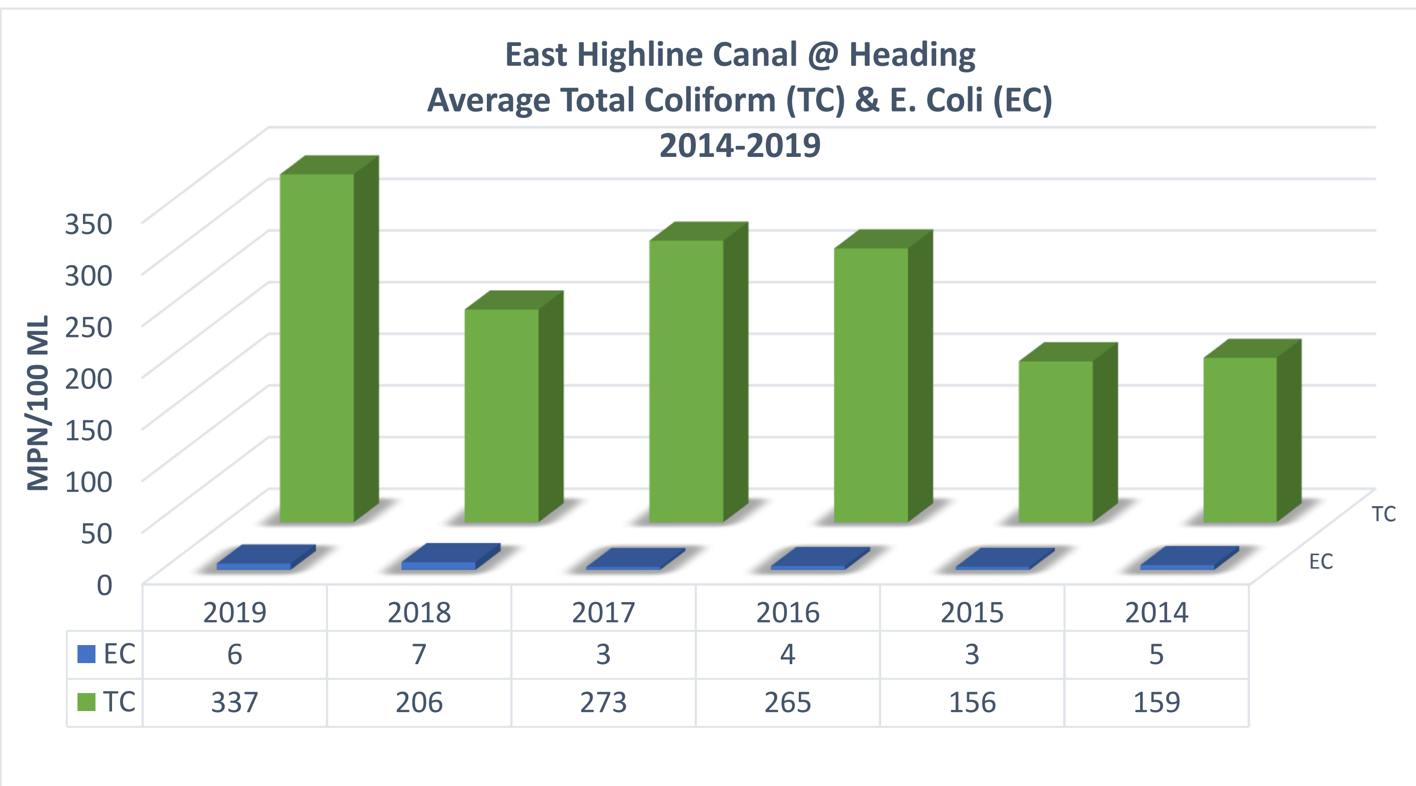


Figure 6-3: AAC at EHL Check Coliform Sampling Data (2014-2019)

Table 6-4 shows AAC at CM Check monthly coliform sampling data.

Table 6-4: AAC at CM Check Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	80	9	1	130	50	11	22	4	2	300	50	17	140	23	6	130	30	8
Feb.	30	11	2	23	23	6	300	80	10	130	14	3	70	8	2	30	23	2
March	30	17	7	50	8	2	170	23	15	130	8	<1	30	8	2	30	2	<1
April	240	30	10	23	23	4	80	23	1	80	8	1	240	8	3	50	17	10
May	80	30	9	23	23	4	300	80	64	23	4	<1	240	50	32	50	50	7
June	130	23	1	23	23	2	300	11	2	30	8	2	500	110	62	240	22	9
July	240	50	7	N/A	N/A	N/A	500	30	30	140	30	11	300	30	23	240	30	8
Aug.	240	27	1	240	50	2	500	13	6	300	70	20	23	4	1	240	80	9
Sep.	240	240	5	900	70	15	900	8	1	280	23	4	130	17	8	240	23	11
Oct.	1600	30	2	500	70	42	280	23	5	23	8	1	500	130	86	300	30	4
Nov.	240	30	3	170	13	5	170	30	10	300	30	3	170	50	28	130	30	16
Dec.	240	50	11	80	11	6	300	4	<1	110	30	18	110	17	4	110	50	15
Avg.	283	46	5	197	33	9	319	27	13	154	24	8	204	38	21	149	32	9
6-yr. Avg.	TC = 217		FC = 33		EC = 11													

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

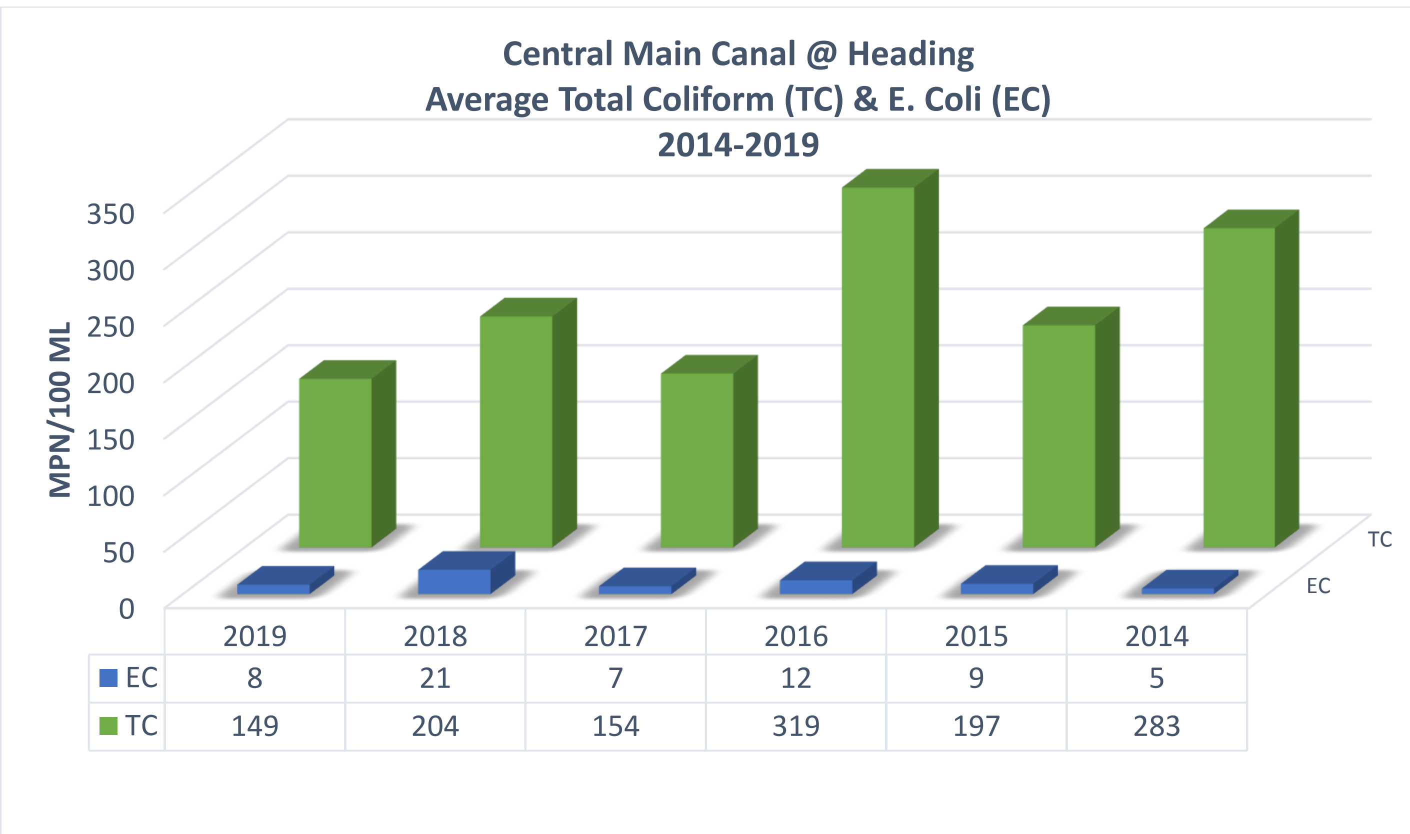


Figure 6-4: AAC at CM Check Coliform Sampling Data (2014-2019)

Table 6-5 shows AAC at WSM Heading Check monthly coliform sampling data.

Table 6-5: AAC at WSM Heading Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	30	7	1	50	1	2	23	6	2	240	30	12	130	50	23	70	17	5
Feb.	50	13	4	30	23	2	30	13	4	240	80	15	240	23	17	30	8	3
March	30	13	9	30	30	4	170	50	31	240	22	5	50	50	6	80	9	2
April	300	23	13	240	30	6	140	50	31	300	30	5	80	50	20	300	27	6
May	240	50	37	240	130	8	900	80	31	300	9	1	500	30	19	>=1600	1600	27
June	23	23	1	240	130	5	900	80	26	220	30	13	300	130	69	280	80	54
July	300	50	7	N/A	N/A	N/A	500	240	130	500	30	9	500	70	46	300	23	13
Aug.	240	130	2	500	80	2	900	50	15	1600	220	66	500	23	8	300	50	12
Sep.	>=1600	50	<1	240	80	15	300	130	18	900	80	18	140	26	12	500	110	9
Oct.	>=1600	50	2	1600	110	88	900	17	10	500	50	12	900	50	16	900	23	6
Nov.	240	240	10	500	70	51	900	23	6	500	110	88	300	70	44	500	30	12
Dec.	240	50	4	170	7	3	130	17	5	280	70	27	900	50	20	240	13	3
Avg.	169	58	8	349	63	17	483	63	26	485	63	23	378	52	25	318	166	13
6-yr. Avg.	TC =	364	FC =	78	EC =	19												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

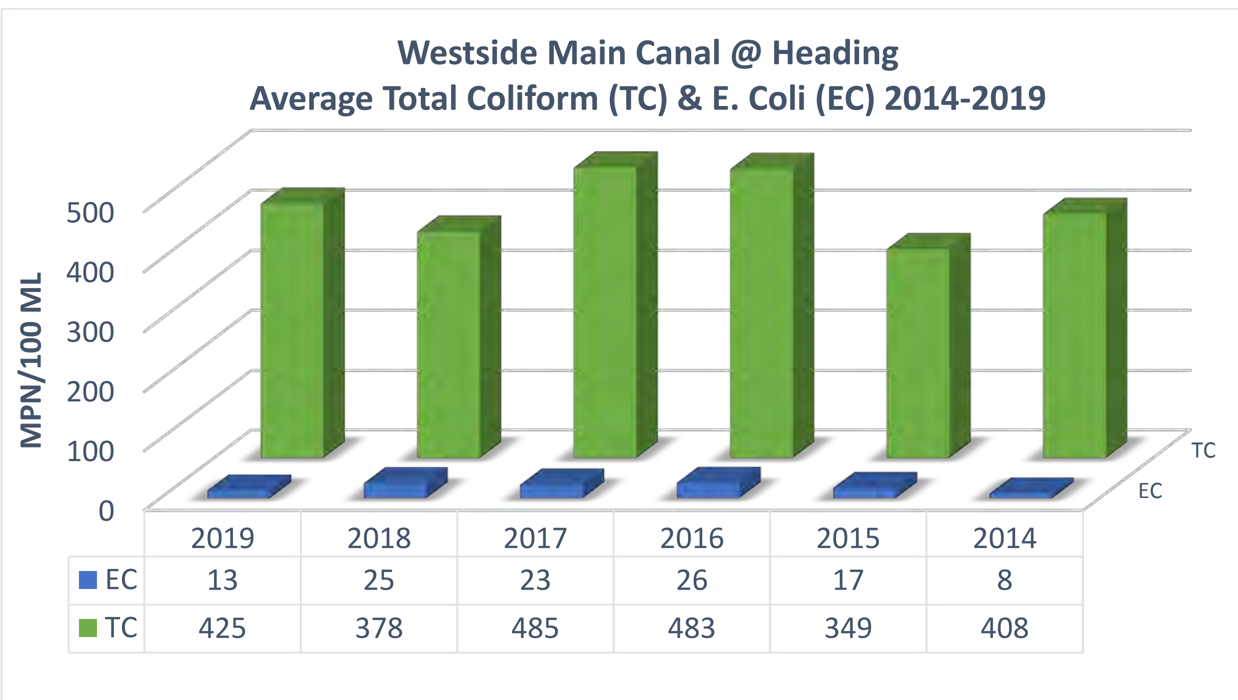


Figure 6-5: AAC at WSM Heading Coliform Sampling Data (2014-2019)

Table 6-6 shows EHL at Check 11 Check monthly coliform sampling data.

Table 6-6: EHL at Check 11 Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	240	30	7	240	50	15	240	23	16	170	50	15	300	27	12	80	22	11
Feb.	50	17	2	130	30	8	170	7	2	80	8	2	140	17	6	30	13	3
March	50	7	5	130	50	8	130	13	6	170	50	10	240	240	3	30	11	3
April	30	23	7	240	30	7	130	17	7	300	23	2	900	300	233	110	17	8
May	300	240	24	240	30	1	220	23	14	240	17	4	500	50	29	300	300	12
June	130	13	1	80	50	1	110	20	14	130	17	4	300	50	10	500	240	10
July	240	50	12	N/A	N/A	N/A	1600	70	50	500	17	4	300	13	10	110	50	5
Aug.	>=1600	900	30	900	17	5	240	30	2	900	130	40	300	30	14	130	50	13
Sep.	240	50	<1	300	23	3	240	240	118	500	14	1	300	23	7	500	30	7
Oct.	900	70	<1	500	30	16	130	8	1	900	14	2	300	50	24	1600	50	9
Nov.	240	50	1	500	22	5	300	30	5	>1600	900	649	500	80	13	>1600	>1600	1203
Dec.	240	80	8	220	13	12	240	13	2	240	30	13	80	13	2	>1600	80	1
Avg.	242	128	10	316	31	7	313	41	20	375	106	62	347	74	30	339	78	107
6-yr. Avg.	TC =	322	FC =	76	EC =	39												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

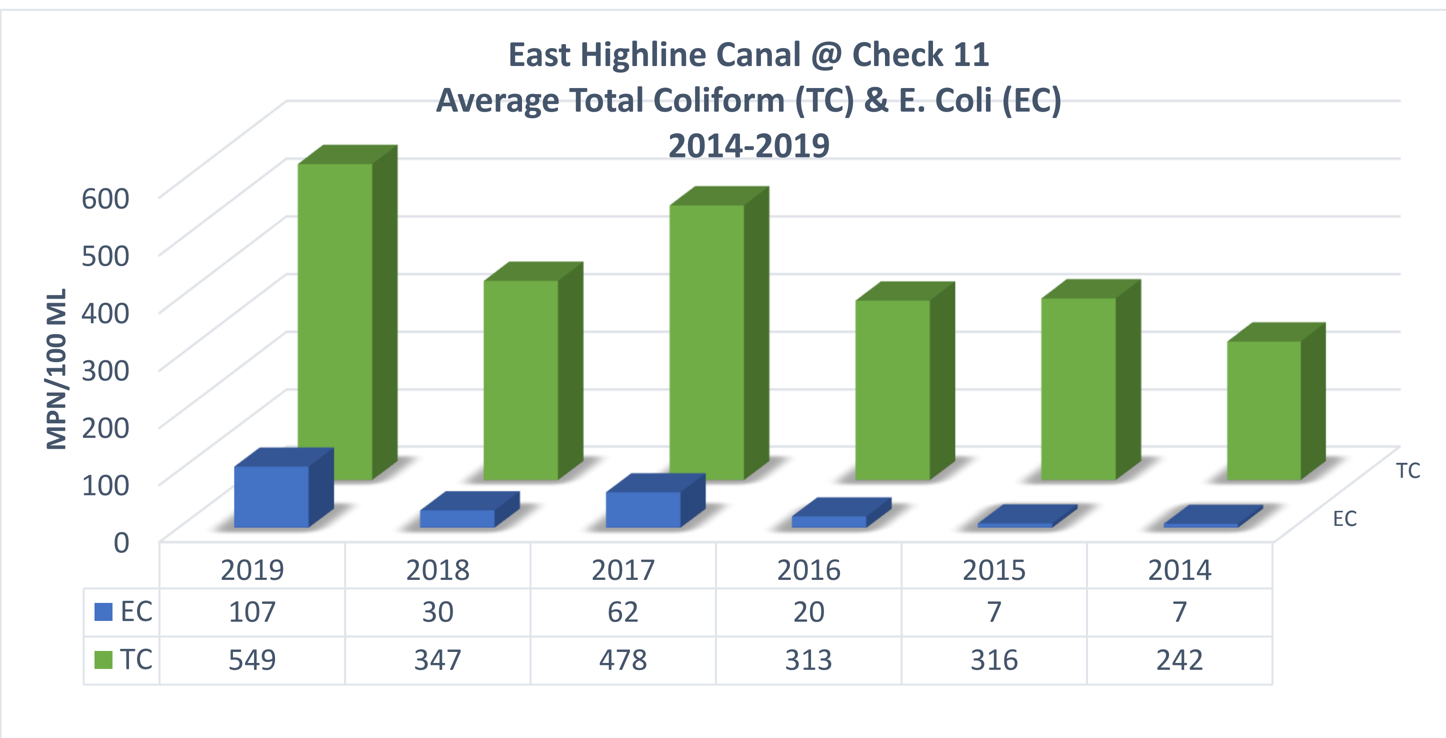


Figure 6-6: EHL at Check 11 Coliform Sampling Data (2014-2019)

Table 6-7 shows EHL at Z Pond Check monthly coliform sampling data.

Table 6-7: EHL at Z Pond Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	50	11	1	23	23	2	>=1600	50	18	80	11	2	300	10	10	110	22	4
Feb.	50	4	<1	240	23	<1	280	27	5	500	23	4	130	50	24	300	240	15
March	80	14	11	N/A	N/A	N/A	170	30	20	500	30	12	80	17	10	500	80	26
April	240	30	4	240	8	1	220	80	48	500	30	9	300	80	48	240	50	16
May	240	80	10	240	50	5	300	50	23	900	130	26	240	22	16	500	130	72
June	80	30	4	50	23	3	DS	DS	16	500	170	31	500	80	37	1600	500	162
July	240	13	4	N/A	N/A	N/A	900	80	80	900	30	9	>=1600	140	20	900	80	41
Aug.	>=1600	900	30	500	34	6	240	50	12	900	220	44	500	240	58	>=1600	240	56
Sep.	240	130	3	300	30	17	240	240	68	500	70	14	500	80	44	300	240	11
Oct.	900	140	6	1600	500	365	300	30	6	900	90	28	500	170	19	>1600	>1600	68
Nov.	240	240	3	1600	240	18	900	22	10	220	23	13	500	30	11	300	240	46
Dec.	130	11	1	50	17	3	300	4	<1	900	33	23	500	50	21	>1600	1600	19
Avg.	226	134	7	484	95	47	385	60	28	608	72	18	368	81	27	528	311	45
6-yr. Avg.	TC =	433	FC =	125	EC =	28												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

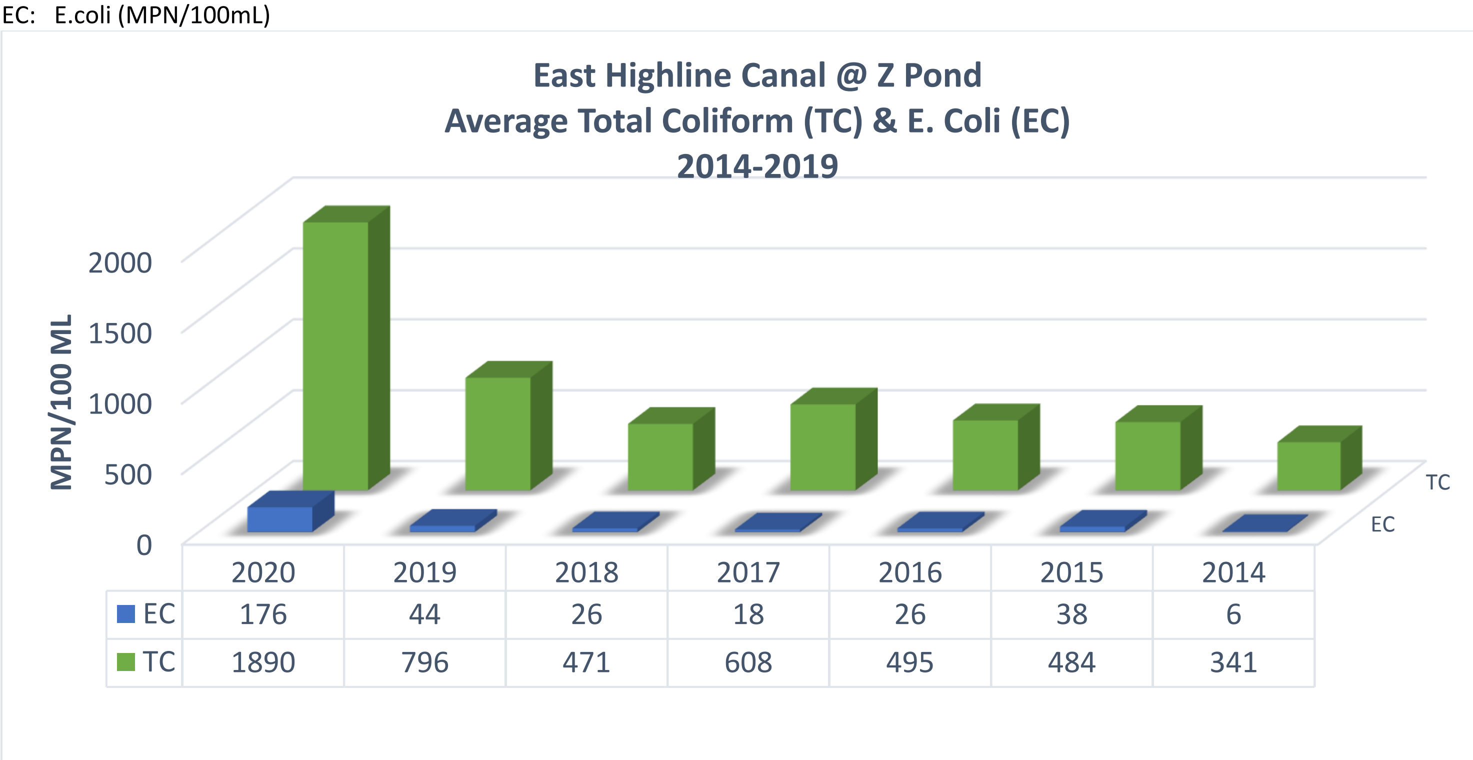


Figure 6-7: EHL at Z Pond Coliform Sampling Data (2014-2019)

Table 6-8 shows CM at Newside Check monthly coliform sampling data.

Table 6-8: CM at Newside Check Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	50	8	2	80	8	2	80	4	<1	500	34	9	300	11	1	110	22	7
Feb.	80	23	4	240	23	7	80	11	7	240	11	1	50	8	3	170	30	1
March	170	30	14	240	50	4	300	17	16	300	11	1	130	8	2	130	22	2
April	500	50	26	240	30	7	300	22	12	900	13	<1	300	50	22	500	240	17
May	500	300	37	>=1600	900	25	1600	500	68	1600	240	39	300	80	53	300	300	52
June	50	23	1	23	23	7	>1600	170	44	500	80	22	240	50	40	500	140	64
July	240	23	2	N/A	N/A	N/A	900	170	170	130	30	6	300	80	33	300	130	41
Aug.	240	50	5	1600	50	26	500	110	10	1600	240	74	500	80	7	900	130	1
Sep.	>=1600	500	1	500	70	35	500	80	29	1600	50	13	500	50	9	900	130	13
Oct.	>=1600	33	<1	1600	110	30	500	50	19	500	50	10	300	50	7	>1600	>1600	13
Nov.	1600	900	15	300	23	11	1600	27	12	300	27	16	900	80	57	900	4	3
Dec.	240	23	<1	300	7	2	50	4	1	280	17	<1	50	13	7	300	50	6
Avg.	367	164	11	512	118	14	583	97	35	704	67	19	323	47	20	455	109	18
6-yr. Avg.	TC =	491	FC =	100	EC =	20												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

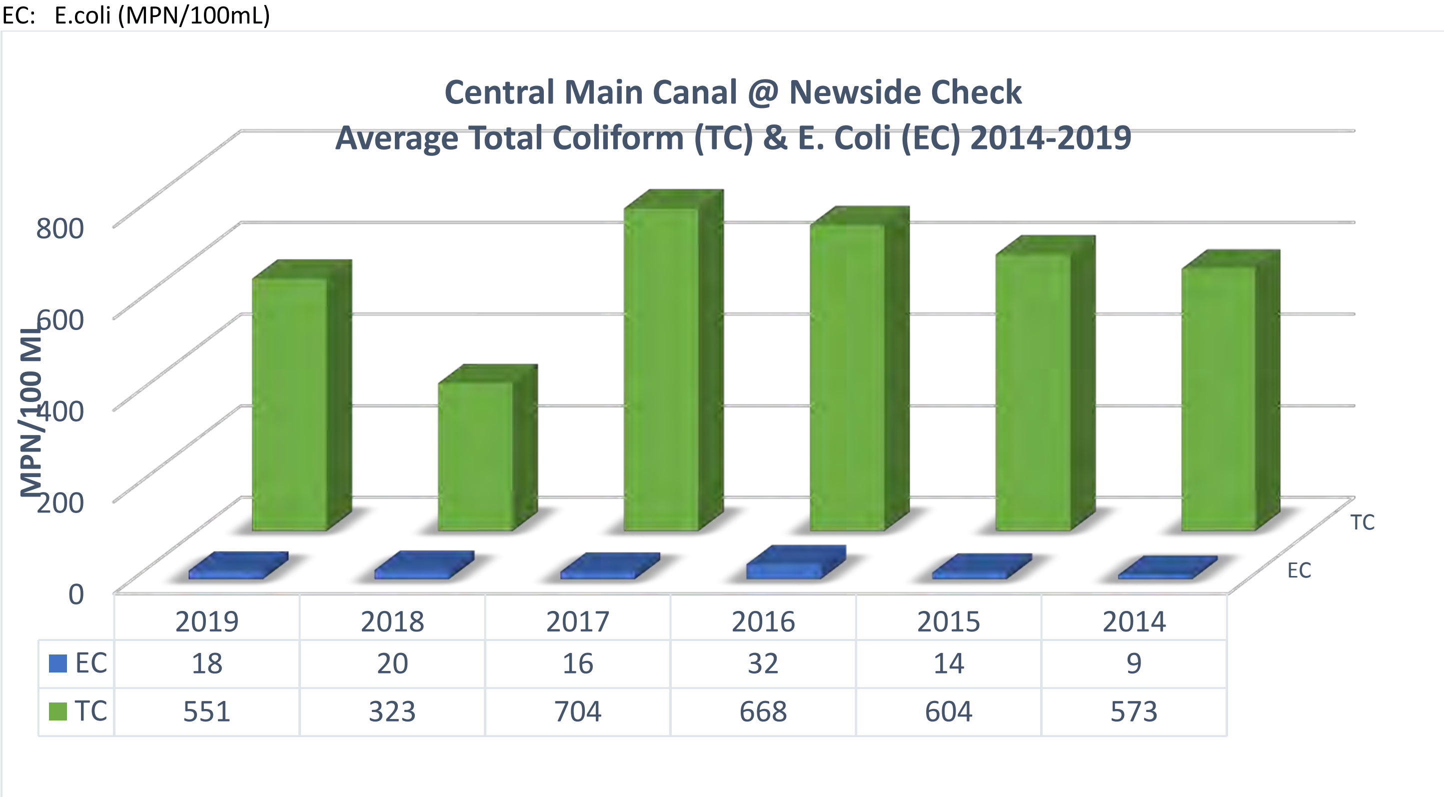


Figure 6-8: CM at Newside Check Coliform Sampling Data (2014-2019)

Table 6-9 shows CM at Rockwood Heading monthly coliform sampling data.

Table 6-9: CM at Rockwood Heading Check Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	130	50	1	50	50	7	900	30	20	50	4	<1	240	22	10	170	50	17
Feb.	130	50	18	130	30	8	80	17	11	240	50	10	300	70	23	110	30	23
March	130	50	33	80	22	2	130	17	14	170	30	10	130	4	<1	300	80	17
April	170	70	13	240	27	1	300	30	17	500	27	5	170	30	23	220	80	18
May	240	240	26	80	50	16	1600	300	250	1600	50	10	500	110	81	1600	300	37
June	80	23	<1	23	23	1	300	30	20	500	70	20	280	50	40	140	50	39
July	240	80	17	N/A	N/A	N/A	500	17	17	170	23	10	500	80	70	500	170	16
Aug.	240	50	6	300	50	5	170	50	16	240	17	4	300	80	6	900	300	7
Sep.	240	80	7	300	30	4	240	130	101	>1600	130	10	220	50	38	240	30	5
Oct.	1600	220	1	900	13	9	500	80	20	900	22	5	900	170	29	>1600	>1600	34
Nov.	300	240	7	500	30	5	1600	70	20	1600	110	35	170	50	30	900	500	4
Dec.	240	50	6	240	14	5	170	30	11	220	50	14	300	26	13	240	30	8
Avg.	312	100	12	258	31	6	541	67	43	563	49	12	334	62	33	484	147	19
6-yr. Avg.	TC =	415	FC =	76	EC =	21												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

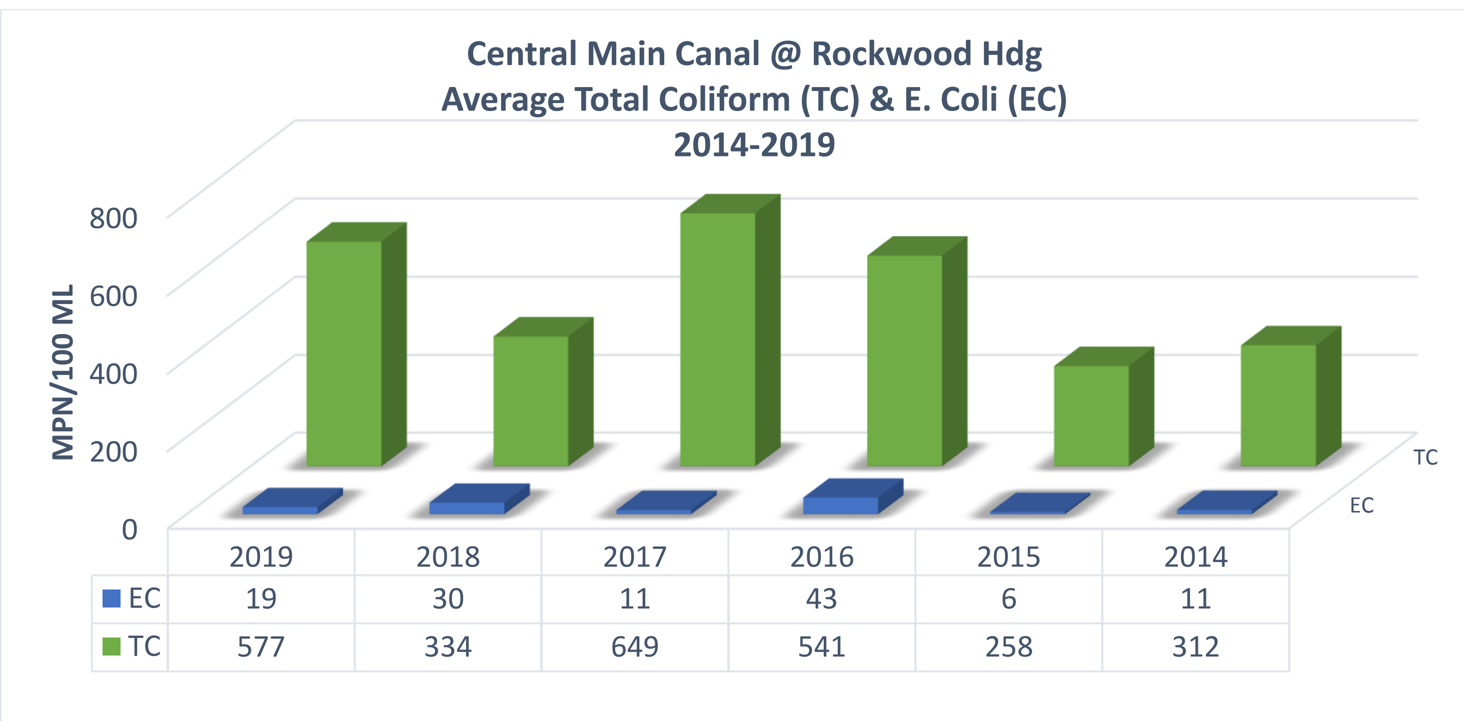


Figure 6-9: CM at Rockwood Heading Coliform Sampling Data (2014-2019)

Table 6-10 shows WSM at No. 8 Check monthly coliform sampling data.

Table 6-10: WSM at No. 8 Check Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	80	8	2	30	23	2	70	8	3	130	11	2	300	30	12	130	27	10
Feb.	30	13	2	23	23	2	500	30	9	900	26	4	170	50	25	80	4	3
March	23	8	3	130	30	2	300	30	18	300	17	3	240	14	5	50	30	11
April	1600	300	35	240	50	8	220	50	37	500	30	9	300	80	59	500	70	5
May	300	50	16	240	23	<1	900	110	79	300	130	20	300	70	41	110	110	38
June	80	23	<1	240	30	2	300	80	17	300	30	11	500	110	50	300	70	24
July	300	300	19	N/A	N/A	N/A	500	80	80	1600	70	16	900	110	32	300	70	21
Aug.	240	130	24	1600	23	4	300	80	13	300	27	9	170	13	4	500	110	20
Sep.	240	240	4	900	130	20	1600	220	104	>1600	110	29	500	30	9	900	130	15
Oct.	>=1600	170	<1	900	17	2	300	30	12	1600	80	25	900	240	15	240	240	66
Nov.	240	240	1	900	80	22	500	23	7	1600	130	23	500	17	3	900	23	15
Dec.	240	30	3	300	11	7	300	17	9	900	<1	17	500	50	17	240	30	3
Avg.	307	126	11	500	40	7	483	63	32	766	60	14	440	68	23	354	76	19
6-yr. Avg.	TC =	475	FC =	72	EC =	18												

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

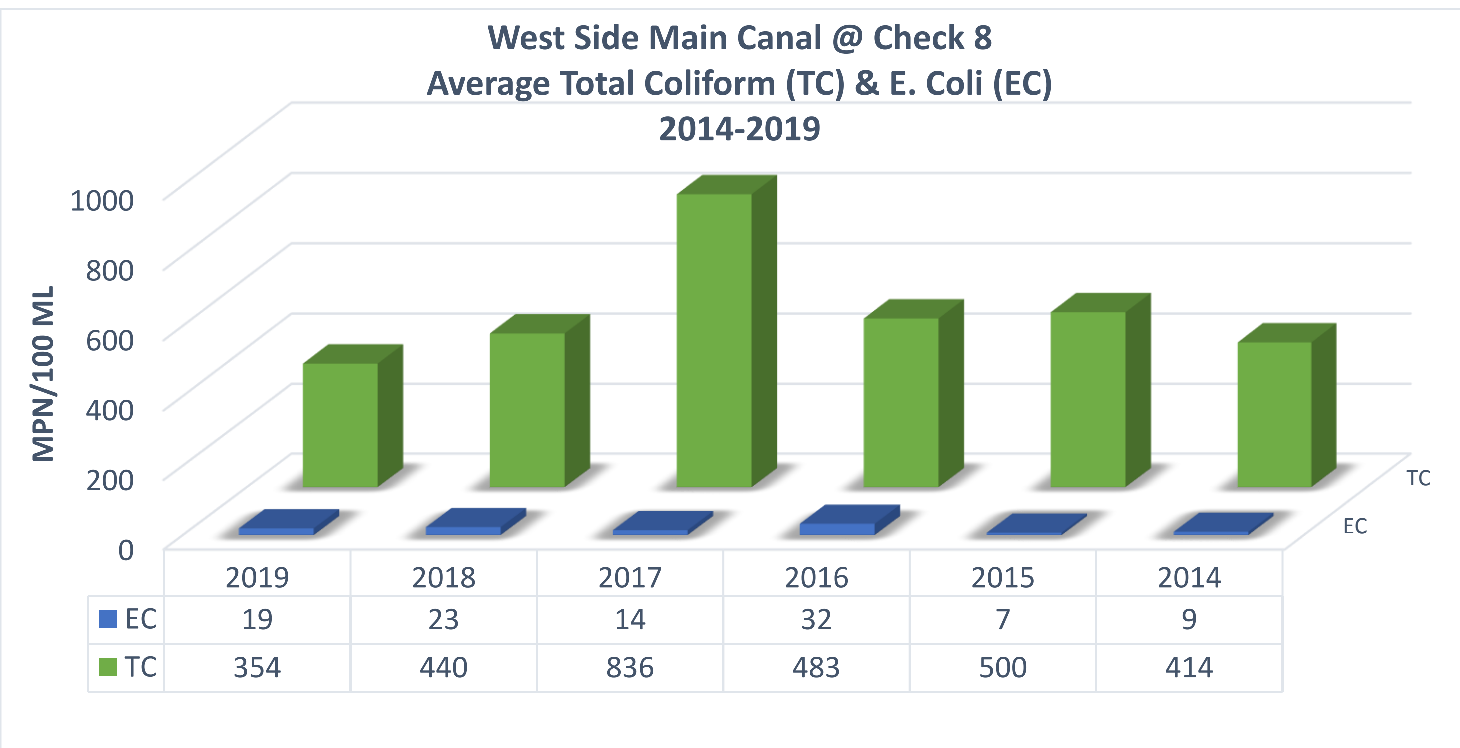


Figure 6-10: WSM at No. 8 Check Coliform Sampling Data (2014-2019)

Table 6-11 shows WSM at Carter Reservoir monthly coliform sampling data.

Table 6-11: WSM at Carter Reservoir Coliform Sampling Data (2014-2019)

Month	2014			2015			2016			2017			2018			2019		
	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC	TC	FC	EC
Jan.	240	8	2	23	8	1	1600	17	3	500	80	28	500	50	10	50	13	4
Feb.	240	30	3	240	8	<1	1600	300	201	500	30	5	900	17	5	500	130	11
March	30	23	10	240	23	<1	900	17	12	500	13	1	240	13	5	220	50	4
April	500	23	7	240	17	<1	900	50	17	900	23	3	500	80	17	240	27	6
May	240	80	17	240	130	2	1600	110	45	900	50	7	500	50	32	300	300	22
June	80	50	3	240	30	1	>1600	170	44	>1600	500	122	900	140	29	1600	140	6
July	240	240	8	N/A	N/A	N/A	1600	220	220	>1600	>1600	326	1600	500	222	500	500	71
Aug.	240	240	2	>1600	170	7	500	170	20	300	34	11	300	130	10	1600	220	19
Sep.	240	240	1	900	300	20	500	50	24	900	130	7	300	80	18	500	130	3
Oct.	1600	300	2	900	110	6	300	110	23	240	80	19	1600	80	11	>1600	>1600	4
Nov.	240	240	1	900	70	1	300	13	2	1600	26	12	300	23	3	500	500	12
Dec.	240	50	5	1600	50	17	500	11	3	240	22	6	300	23	9	80	13	4
Avg.	344	127	5	552	83	7	936	103	51	658	90	46	662	99	31	554	184	14
6-yr. Avg.	TC = 618		FC = 114		EC = 26													

TC: Total Coliforms (MPN/100mL)
FC: Fecal Coliforms (MPN/100mL)
EC: E.coli (MPN/100mL)

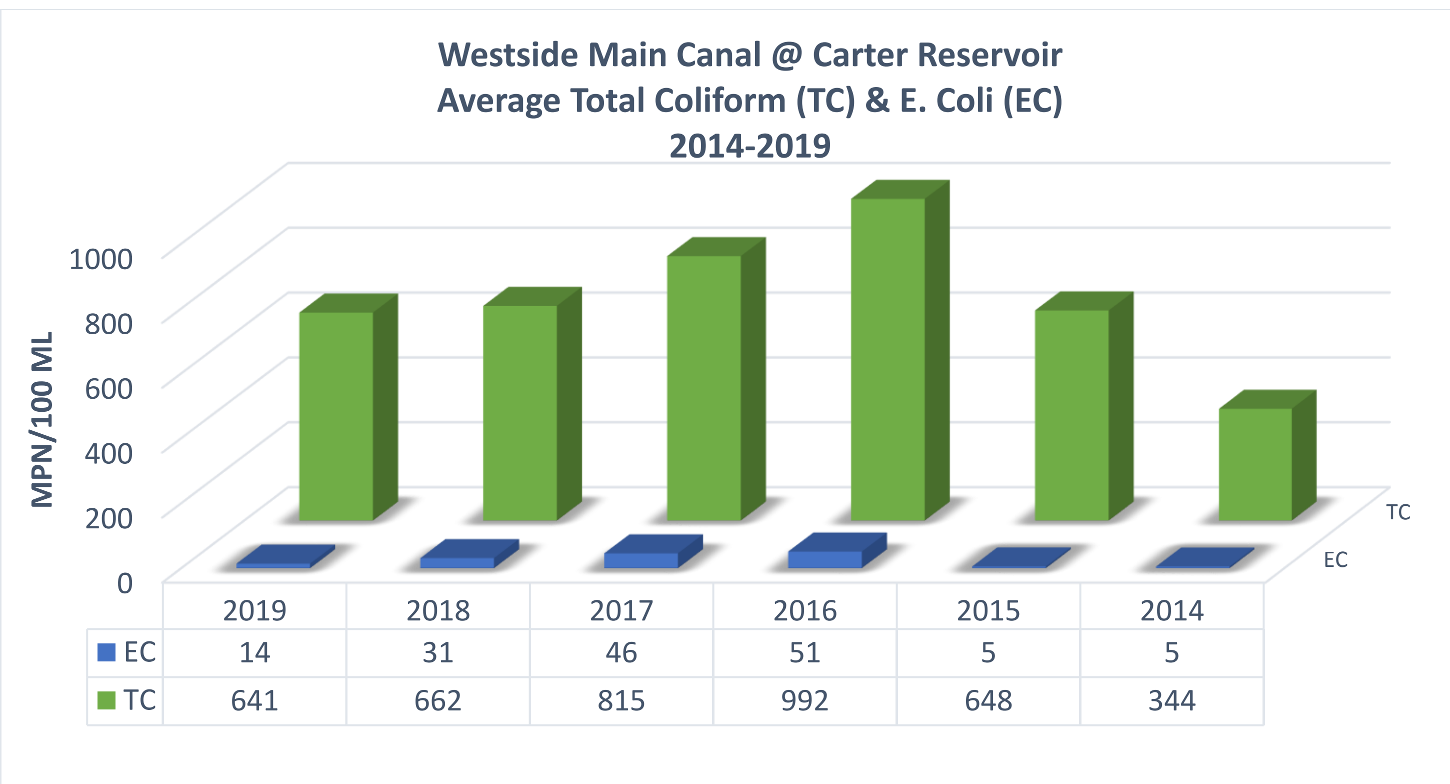


Figure 6-11: WSM at Carter Reservoir Coliform Sampling Data (2014-2019)

6.4 IID Enhanced Joint Monitoring Program

In the 1990's, DDW approved a Joint Monitoring Program that included four representative sample sites. The first sample site is at the All American Canal Drop 4 (PS Code 1310014-004), which is a site on the canal system prior to the water branching off into the three main Imperial County canals. The other three sample sites are located on the three main canal branches: East Highline (1310014-003), Central Main (1310014-002) and Westside Main (1310014-001). East Highline testing location is at the Beal Road crossing, east of Niland. Central Main testing location is at the intersection of Aten and Austin Roads to the southwest of Imperial. Westside Main testing location is at the crossing of Forrester Road, just south of Westmorland. These sites were selected per Title 22 requirements. Annual sampling of the Title 22 sites is provided for all constituents including general physical, general chemical, metals, anion/cations, radiochemistry, volatile organics, and semi-volatile organics.

The State Water Resources Control Board – Division of Drinking Water (DDW) and the County of Imperial, Public Health Department, Division of Environmental Health (DEH) has conducted a review of the Imperial Irrigation District (IID) Joint Monitoring Program and required revisions effective January 1, 2018. The purpose of the Joint Monitoring Program (JMP) is to characterize the raw source water supplied by IID to its customer public water systems and allow participating systems to meet their California Code of Regulations (CCR) Title 22 source water monitoring requirements. All public water systems that purchase raw surface water from IID have the option to participate in the Joint Monitoring Program or conduct the source water monitoring on their own at their surface water treatment plant intake.

In order to further characterize source water quality and ensure all public water systems are meeting the monitoring requirements of CCR Title 22, DDW has made a number of revisions to the Joint Monitoring Program. The revisions are considered a pilot and will be re-evaluated after four years of source water quality data has been collected. The revisions include the addition of 21 sample points for better coverage of the inner canal system with many sites closer to the actual intake of more public water systems, while continuing to monitor at the four historical representative sample site locations. In addition, instead of only sampling during November of each year, the revised program will characterize the seasonality of source water quality by collecting one sample set from each calendar quarter over the four-year monitoring period. The first sample set will be collected by IID in the 2nd quarter of 2018. Subsequent sample sets will be collected in 3rd quarter 2019, 4th quarter 2020, and 1st quarter 2021. If the water quality analysis at any of the sample sites has detections for SOCs or VOCs, IID must notify DDW and collect a confirmation sample within 48 hours.

As part of this study, sampling data is provided from 2014-2019. The results for All-American Canal, East Highline Canal, Central Main Canal and Westside Main Canal and the additional 21 sampling sites per the Title 22 Joint Watershed Monitoring Program can be found below.

The Figure 6-12 below illustrates all sample points in the Imperial Irrigation Districts (IID) Canal Delivery Network

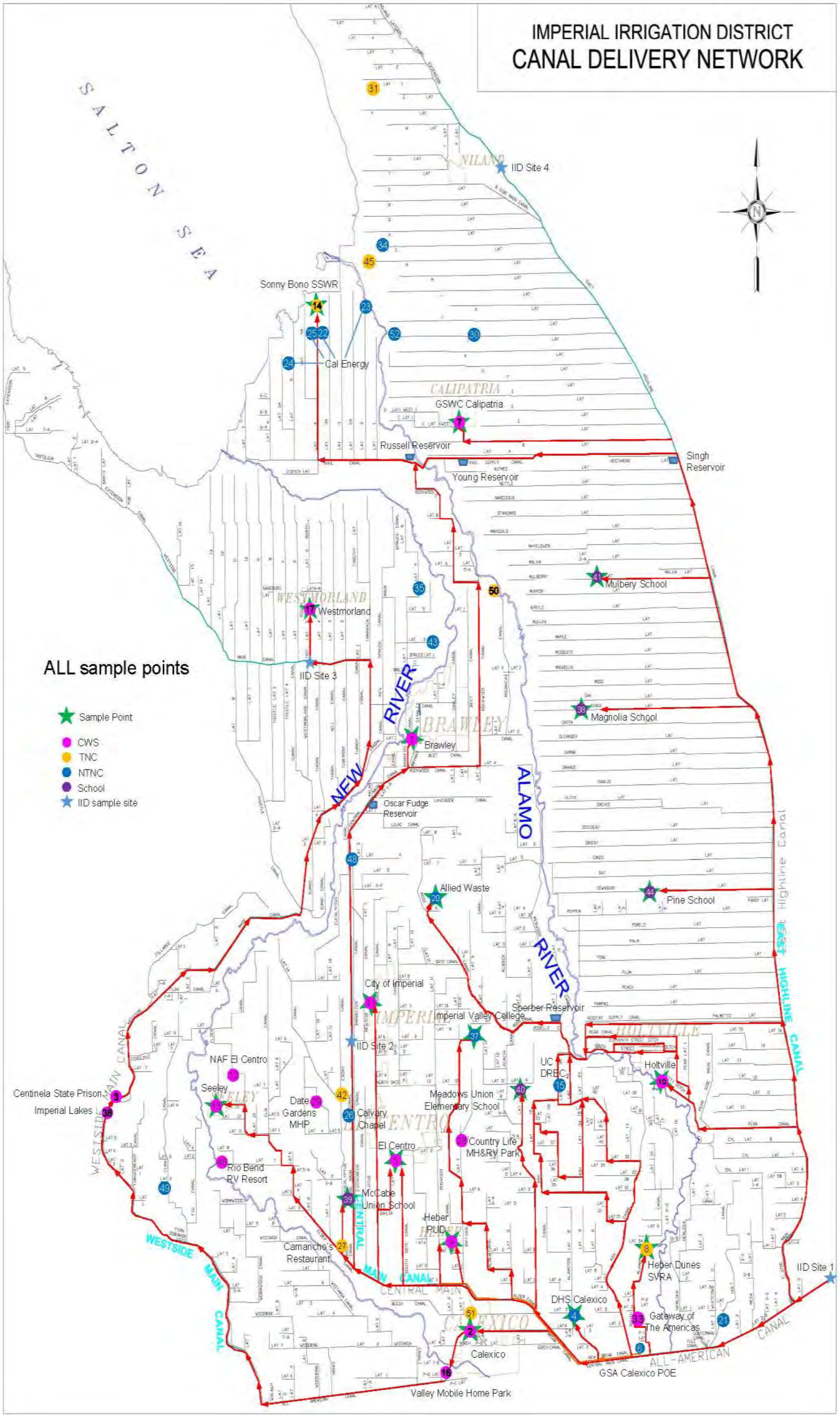


Figure 6-12: IID Canal Delivery Network

Table 6-12 shows sampling locations in the IID Canal Delivery Network

Table 6-12: IID's Joint Monitoring Program (JMP) Sampling Locations

Map#	WS Name	Sampling Locations	Sample Site Coverage	Sample Site Type	PScode
1	City of Brawley	Mansfield - Gate 26	Directly covered by this Sample Site		1310001 -001
2	City of Calexico	AAC - Gate 2	Directly covered by this Sample Site		1310002 -001
3	Centinela State Prison	WSM - Gate 17b	included on Westmorland/#17		1310008 -001
4	DHS Calexico	IID - Alamitos Canal	Directly covered by this Sample Site		1310019 -001
5	City of El Centro	(Primary) South Date - Gate 20b	Directly covered by this Sample Site		1310004 -001
		Dahlia - Gate 18A	Directly covered by this Sample Site		1310004 -002
6	GSA Calexico Port Of Entry	AAC - Gate 23	included on DHS Calexico/#4, Meadows Union School/#40, Rose Canal/#52, IV College/#37		1310019 -001
7	GSWC - Calipatria	C-West Lateral - Gate 38	Directly covered by this Sample Site		1310003 -001
9	Heber Public Utility District	Dogwood - Gate 37a	Directly covered by this Sample Site		1310007 -001
		Central Main Canal	Directly covered by this Sample Site		1310007 -003
10	City of Holtville	Pear - Gate 30l	Directly covered by this Sample Site		1310005 -001
	Imperial Irrigation District (IID)	Westside Main			1310014 -001
		Central Main			1310014 -002
		East High Line			1310014 -003
		Drop 4			1310014 -004
11	City of Imperial	Dahlia - Gate 52	Directly covered by this Sample Site		1310006 -001
12	NAF El Centro	Elder Canal - Gate 104b	closest sample site: Seeley CWD/#13		1310013 -001
13	Seeley CWD	Elder - Gate 94d	Directly covered by this Sample Site		1310013 -001
15	UC Desert Research And Extension Center	Ash Lateral 30 - Gate 205	included on Allied Waste/#20		1300668 -001
16	Valley Mobile Home Park	IID - All American Canal	included on Westmorland/#17		1310008 -001
17	City of Westmorland	Trifolium Lateral 5 - Gate 89	Directly covered by this Sample Site		1310008 -001
20	Allied Waste Of Imperial Valley	Rose Canal - Lateral 6 Gate 59b	Directly covered by this Sample Site		1300668 -001
21	Bornt & Sons Inc.	Holt Canal - Pipe 1	closest sample site: IID Site 1 or Gateway/#33		1300018 -001
22	CalEnergy (Administrative)	Vail Lateral 4a - Gate 461a	Included on Cal Energy / #25		1300638 -001
23	CalEnergy (Eng. & Tech.)	Vail Lateral 2 - Gate 222	closest sample site: Cal Energy / #25		1300638 -001
24	CalEnergy (Salton Sea Unit No III)	Vail Lateral 5 - Gate 513a	closest sample site: Cal Energy / #25		1300638 -001
25	CalEnergy (Vulcan Power Plant)	Vail Lateral 4 - Gate 416a	Directly covered by this Sample Site		1300638 -001
26	Calvary Chapel Church	Central Main Canal	Included on Brawley/#1		1310001 -001
28	Country Life MH & RV Park	Alder - Pipe 32	closest sample site: Imperial Valley College/#37		1300549 -001
29	Date Gardens Mobile Home Park	Eucalyptus - Pipe 90	closest sample site: McCabe Union School/#39		1300579 -001
30	Earthrise Nutritionals, LLC	I Lateral Canal I - Gate 001a	closest sample site: IID Site 003 (EHL)		1310014 -003
33	Gateway	South Alamo Canal Gate 14	Directly covered by this Sample Site		1300018 -001

Map#	WS Name	Sampling Locations	Sample Site Coverage	Sample Site Type	PScode
34	Hudson Ranch Power I LLC	O Lateral - Gate 32	closest sample site: IID Site 4 (EHL)		1310014 -003
35	IID North End Consolidation	Spruce Lateral 4 - Gate 93	closest sample site: Westmorland/#17		1310008 -001
36	Imperial Lakes Inc.	WSM - Gate 17a	included on Westmorland/#17		1310008 -001
37	Imperial Valley College	Dogwood Lateral 6 - Gate 67	Directly covered by this Sample Site		1300549 -001
38	Magnolia Union School	Osage - Gate 23a	Directly covered by this Sample Site		1300553 -001
39	McCabe Union School	Central Main - 3p014	Directly covered by this Sample Site		1300579 -001
		Central Main Canal	included on McCabe Union 001 site		1300579 -001
40	Meadows Union Elementary School	Acacia - Gate 61	Directly covered by this Sample Site		1300554 -001
41	Mulberry Union School	Mulberry Canal - Gate 11a	Directly covered by this Sample Site		1300556 -001
43	Ormat Nevada North Brawley	Spruce Canal	closest sample site: Westmorland/#17		1310008 -001
44	Pine Union School	Township - Gate 21a	Directly covered by this Sample Site		1300560 -001
46	Rio Bend RV Golf Resort & Storm Crossing	Elder Lateral 7 - Gate 68	closest sample site: Seeley/#13		1310013 -001
48	Spreckels Sugar Company	CM - Gate 19	included on Brawley/#1		1310001 -001
49	Westside School	Fern - Gate 16a	closest sample site: Westmorland/#17		1310008 -001
52	Brandt Cattle Company	I Lateral	closest sample site: IID Site 4 (EHL)		1310014 -003
53	La Valle Sabbia	Elm Lateral	closest sample site: Seeley/#13		1310013 -001
		WS is included as a sample site			
		WS is directly along the flow path to a sample site			
		WS is not directly on flow path to a sample site			

Table 6-13 shows All-American Canal Chemical Sampling Data

Table 6-13: All-American Canal Chemical Sampling Data (2014-2019)

All-American Canal								
Analyte	**Units**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**MCL**
General Physical Analyses								
Apparent Color	Color Units	10	ND	10.0	5.0	7.5	25	15
Odor Threshold	TON	3	1	1	2	1	3	3
Turbidity	NTU	17	3.2	8.9	1.30	1.8	19	5
General Chemical Analyses								
Alkalinity, Total (as CaCO3)	mg/L	160	160	140	140	160	160	--
Bicarbonate (HCO3)	mg/L	190	190	180	170	190	190	--
Carbonate (CO3)	mg/L	ND	ND	ND	ND	ND	ND	--
Chloride (Cl)	mg/L	120	120	110	110	120	100	500
Cyanide (CN)	ug/L	ND	ND	ND	ND	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1200	1200	1100	1100	1100	1000	1600
Fluoride (F)	mg/L	0.43	0.44	0.38	0.33	0.48	0.4	2
Hydroxide (OH)	mg/L	ND	ND	ND	ND	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	ND	ND	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	ND	ND	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	ND	ND	ND	ND	6
pH (Lab)	pH Units	8.0	8.1	8.2	8.2	8.2	8.2	--
Sulfate (SO4)	mg/L	290	310	270	280	280	260	500
Total Filterable Residue/TDS	mg/L	800	760	690	650	760	670	1000
Metals								
Aluminum (Al)	ug/L	81	ND	ND	ND	78	200	200
Antimony (Sb)	ug/L	ND	ND	ND	ND	ND	ND	6
Arsenic (As)	ug/L	2.2	ND	ND	2.5	2.1	ND	10
Barium (Ba)	ug/L	110	110	130	120	110	ND	1000
Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	ND	4
Boron (B)	ug/L	210	190	190	180	220	170	--
Cadmium (Cd)	ug/L	ND	ND	ND	ND	ND	ND	5
Calcium (Ca)	mg/L	87	79	84	77	82	76	--
Chromium (+6)	ug/L	ND	ND	ND	ND	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	ND	ND	ND	ND	50
Copper (Cu)	ug/L	ND	ND	ND	ND	ND	ND	1000
Iron (Fe)	ug/L	ND	ND	ND	ND	ND	210	300
Lead (Pb)	ug/L	ND	ND	ND	ND	ND	ND	--
Magnesium (Mg)	mg/L	30	29	31	29	27	25	--
Manganese (Mn)	ug/L	ND	ND	ND	ND	ND	ND	50
Mercury (Hg)	ug/L	ND	ND	ND	ND	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	ND	ND	ND	ND	100
Potassium (K)	mg/L	5.2	4.8	5.3	5.0	4.1	ND	--
Selenium (Se)	ug/L	ND	ND	ND	ND	ND	ND	50
Silver (Ag)	ug/L	ND	ND	ND	ND	ND	ND	100
Sodium (Na)	mg/L	120	120	120	110	120	110	--
Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	ND	2
Vanadium (V)	ug/L	ND	ND	ND	ND	3.9	ND	--
Zinc (Zn)	ug/L	ND	ND	ND	ND	ND	69	5000

All- American Canal								
Analyte	Units	2014	2015	2016	2017	2018	2019	MCL
Anion / Cation Balance								
Hardness, Total (as CaCO3)	mg/L	340	310	340	310	320	290	--
Total Anions	meq/L	12.6	13	11.7	11.7	12.3	11.4	--
Total Cations	meq/L	12.2	11.7	12.1	11.1	11.6	10.6	--
% difference		3.1	10	3.5	5.1	5.9	6.6	--
Radiochemistry Analyses								
Gross Alpha	pCi/L	- -	- -	10	- -	- -	ND	15
Gross Alpha Counting Error	pCi/L	- -	- -	4.1	- -	- -	0.82	--
Gross Alpha Min Det Activity	pCi/L	- -	- -	3.3	- -	- -	0.79	--
Uranium	pCi/L	- -	- -	2.3	- -	- -	2.6	20
Uranium Counting Error	pCi/L	- -	- -	0.79	- -	- -	- -	- -
Uranium Min Det Activity	pCi/L	- -	- -	0.89	- -	- -	- -	- -
Volatile Organic Analyses								
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	ND	ND	ND	ND	5
Toluene	ug/L	ND	ND	ND	ND	ND	ND	150
Semi-Volatile Organic Analyses / EPA 504								
Ethylene Dibromide (EDB)	ug/L	ND	- -	ND	ND	ND	ND	0.05
Dibromochloropropane (DBCP)	ug/L	ND	- -	ND	ND	ND	ND	0.2
Synthetic Organic Analyses / 1,2,3-TCP								
1,2,3-Trichloropropane	ug/L		- -	- -	- -	ND	ND	0.005
Synthetic Organic Analyses								
Diethylhexylphthalate (DEHP)	ug/L	- -	- -	ND	ND	ND	ND	4
Glyphosate	ug/L	- -	- -	ND	ND	ND	ND	700

Table 6-14 shows East Highline Canal Chemical Sampling Data

Table 6-14: East Highline Canal Chemical Sampling Data (2014-2019)

East Highline Canal								
Analyte	Units	2014	2015	2016	2017	2018	2019	MCL
General Physical Analyses								
Apparent Color	Color Units	20	20	ND	10.0	20.0	10.0	15
Odor Threshold	TON	4	4	1	2	2	2	3
Turbidity	NTU	26	48.0	0.9	12.00	19.0	4.3	5
General Chemical Analyses								
Alkalinity, Total (as CaCO3)	mg/L	170	160	150	150	160	170	--
Bicarbonate (HCO3)	mg/L	200	200	180	170	200	200	--
Carbonate (CO3)	mg/L	ND	ND	ND	7.2	ND	ND	--
Chloride (Cl)	mg/L	140	140	120	130	120	130	500
Cyanide (CN)	ug/L	ND	ND	ND	ND	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1200	1300	1200	1200	1100	1200	1600
Fluoride (F)	mg/L	0.42	0.44	0.39	0.32	0.33	0.48	2
Hydroxide (OH)	mg/L	ND	ND	ND	ND	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	ND	ND	ND	ND	0.5

East Highline Canal								
Analyte	**Units**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**MCL**
General Chemical Analyses								
Nitrate as N (NO3-N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	ND	ND	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	ND	ND	ND	ND	6
pH (Lab)	pH Units	8.3	8.2	8.2	8.3	8.3	8.1	--
Sulfate (SO4)	mg/L	300	320	280	300	280	290	500
Total Filterable Residue/TDS	mg/L	830	820	720	670	740	770	1000
Metals								
Aluminum (Al)	ug/L	1600	890	310	220	1700	340	200
Antimony (Sb)	ug/L	ND	ND	ND	ND	ND	ND	6
Arsenic (As)	ug/L	3.2	2.9	ND	2.7	3.2	2.0	10
Barium (Ba)	ug/L	140	140	130	130	140	110	1000
Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	ND	4
Boron (B)	ug/L	220	220	210	200	200	230	--
Cadmium (Cd)	ug/L	ND	ND	ND	ND	ND	ND	5
Calcium (Ca)	mg/L	95	93	91	88	89	97	--
Chromium (+6)	ug/L	ND	ND	ND	ND	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	ND	ND	ND	ND	50
Copper (Cu)	ug/L	ND	130	ND	ND	ND	ND	1000
Iron (Fe)	ug/L	1700	1000	440	260	2300	420	300
Lead (Pb)	ug/L	5	ND	ND	ND	ND	ND	--
Magnesium (Mg)	mg/L	33	32	33	32	32	30	--
Manganese (Mn)	ug/L	67	44	22	ND	65	25	50
Mercury (Hg)	ug/L	ND	ND	ND	ND	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	ND	ND	ND	ND	100
Potassium (K)	mg/L	5.9	5.5	5.6	5.3	5.6	ND	--
Selenium (Se)	ug/L	ND	ND	ND	ND	ND	ND	50
Silver (Ag)	ug/L	ND	ND	ND	ND	ND	ND	100
Sodium (Na)	mg/L	130	130	130	130	120	150	--
Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	ND	2
Vanadium (V)	ug/L	5.5	4.2	3.1	ND	8.1	3.1	--
Zinc (Zn)	ug/L	ND	340	ND	ND	ND	ND	5000
Anion / Cation Balance								
Hardness, Total (as CaCO3)	mg/L	370	370	360	350	350	370	--
Total Anions	meq/L	13.5	13.9	12.2	13.0	12.5	13	--
Total Cations	meq/L	13.3	13.1	13.1	12.8	12.4	13.8	--
% difference		1.6	6.1	7.0	0.98	0.47	6.3	--
Radiochemistry Analyses								
Gross Alpha	pCi/L	- -	- -	5.7	- -	- -	3.2	15
Gross Alpha Counting Error	pCi/L	- -	- -	3.1	- -	- -	0.83	--
Gross Alpha Min Det Activity	pCi/L	- -	- -	2.5	- -	- -	0.74	--
Uranium	pCi/L	- -	- -	3.2	- -	- -	2.7	20
Uranium Counting Error	pCi/L	- -	- -	0.89	- -	- -	- -	- -
Uranium Min Det Activity	pCi/L	- -	- -	0.88	- -	- -	- -	- -
Volatile Organic Analyses								
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	ND	ND	ND	ND	5
Toluene	ug/L	ND	ND	ND	ND	ND	ND	150

East Highline Canal								
Analyte	Units	2014	2015	2016	2017	2018	2019	MCL
Semi-Volatile Organic Analyses / EPA 504								
Ethylene Dibromide (EDB)	ug/L	- -	- -	- -	- -	- -	- -	0.05
Dibromochloropropane (DBCP)	ug/L	- -	- -	- -	- -	- -	- -	0.2
Synthetic Organic Analyses / 1,2,3-TCP								
1,2,3-Trichloropropane	ug/L	- -	- -	ND	- -	ND	ND	0.005
Synthetic Organic Analyses								
Diethylhexylphthalate (DEHP)	ug/L	- -	- -	ND	ND	ND	4.0	4
Glyphosate	ug/L	- -	- -	ND	ND	ND	ND	700

Table 6-15 shows Central Main Canal Chemical Sampling Data

Table 6-15: Central Main Canal Chemical Sampling Data (2014-2019)

Central Main Canal								
Analyte	Units	2014	2015	2016	2017	2018	2019	MCL
General Physical Analyses								
Apparent Color	Color Units	20	7.5	10.0	5.0	10.0	20.0	15
Odor Threshold	TON	4	3	1	2	2	2	3
Turbidity	NTU	36	16.0	7.2	11.00	5.5	16.0	5
General Chemical Analyses								
Alkalinity, Total (as CaCO3)	mg/L	170	160	150	140	160	160	--
Bicarbonate (HCO3)	mg/L	200	190	180	170	190	190	--
Carbonate (CO3)	mg/L	ND	ND	ND	ND	ND	ND	--
Chloride (Cl)	mg/L	130	130	110	110	110	110	500
Cyanide (CN)	ug/L	ND	ND	ND	ND	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1200	1200	1100	1100	1100	1100	1600
Fluoride (F)	mg/L	ND	0.42	0.38	0.30	0.46	0.38	2
Hydroxide (OH)	mg/L	ND	ND	ND	ND	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	ND	ND	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	ND	ND	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	ND	ND	ND	ND	6
pH (Lab)	pH Units	8.2	8.1	8.3	8.3	8.3	8.4	--
Sulfate (SO4)	mg/L	300	320	270	280	280	280	500
Total Filterable Residue/TDS	mg/L	840	770	690	650	730	710	1000
Metals								
Aluminum (Al)	ug/L	460	190	150	260	200	280	200
Antimony (Sb)	ug/L	ND	ND	ND	ND	ND	ND	6
Arsenic (As)	ug/L	2.6	2.4	ND	2.6	2.0	2.0	10
Barium (Ba)	ug/L	120	120	130	120	110	110	1000
Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	ND	4
Boron (B)	ug/L	190	200	180	170	170	170	--
Cadmium (Cd)	ug/L	ND	ND	ND	ND	ND	ND	5
Calcium (Ca)	mg/L	85	84	82	85	82	89	--
Chromium (+6)	ug/L	ND	ND	ND	ND	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	ND	ND	ND	ND	50

Central Main Canal								
Analyte	Units	2014	2015	2016	2017	2018	2019	MCL
Metals								
Copper (Cu)	ug/L	ND	ND	ND	ND	ND	ND	1000
Iron (Fe)	ug/L	440	180	190	270	230	320	300
Lead (Pb)	ug/L	ND	ND	ND	ND	ND	ND	--
Magnesium (Mg)	mg/L	31	31	30	30	28	29	--
Manganese (Mn)	ug/L	25	ND	ND	ND	ND	22	50
Mercury (Hg)	ug/L	ND	ND	ND	ND	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	ND	ND	ND	ND	100
Potassium (K)	mg/L	5.4	5.0	5.3	5.2	5.2	ND	--
Selenium (Se)	ug/L	ND	ND	ND	ND	ND	ND	50
Silver (Ag)	ug/L	ND	ND	ND	ND	ND	ND	100
Sodium (Na)	mg/L	120	120	120	120	110	130	--
Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	ND	2
Vanadium (V)	ug/L	4.2	ND	3.6	ND	3.9	ND	--
Zinc (Zn)	ug/L	ND	ND	ND	ND	ND	ND	5000
Anion / Cation Balance								
Hardness, Total (as CaCO3)	mg/L	340	340	330	340	320	340	--
Total Anions	meq/L	13.2	13.5	11.7	11.7	12.1	12	--
Total Cations	meq/L	12.2	12.1	11.9	12.1	11.3	12.5	--
% difference		8.1	11.0	2.0	2.90	6.40	3.5	--
Radiochemistry Analyses								
Gross Alpha	pCi/L	- -	- -	13.0	- -	- -	3.4	15
Gross Alpha Counting Error	pCi/L	- -	- -	3.7	- -	- -	0.80	--
Gross Alpha Min Det Activity	pCi/L	- -	- -	2.8	- -	- -	0.66	--
Uranium	pCi/L	- -	- -	3.2	- -	- -	2.6	20
Uranium Counting Error	pCi/L	- -	- -	0.87	- -	- -	- -	- -
Uranium Min Det Activity	pCi/L	- -	- -	0.89	- -	- -	- -	- -
Volatile Organic Analyses								
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	ND	ND	ND	ND	5
Toluene	ug/L	ND	ND	ND	ND	ND	ND	150
Semi-Volatile Organic Analyses / EPA 504								
Ethylene Dibromide (EDB)	ug/L	- -	- -	- -	- -	- -	- -	0.05
Dibromochloropropane (DBCP)	ug/L	- -	- -	- -	- -	- -	- -	0.2
Synthetic Organic Analyses / 1,2,3-TCP								
1,2,3-Trichloropropane	ug/L	- -	- -	ND	- -	ND	ND	0.005
Synthetic Organic Analyses								
Diethylhexylphthalate (DEHP)	ug/L	- -	- -	ND	ND	ND	4.0	4
Glyphosate	ug/L	- -	- -	ND	ND	ND	ND	700

Table 6-16 shows Westside Main Canal Chemical Sampling Data

Table 6-16: Westside Main Canal Chemical Sampling Data (2014-2019)

Westside Main Canal								
Analyte	Units	2014	2015	2016	2017	2018	2019	MCL
General Physical Analyses								
Apparent Color	Color Units	ND	25	10.0	15.0	15.0	30.0	15
Odor Threshold	TON	2	1	1	1	1	2	3
Turbidity	NTU	3	27.0	17.0	17.00	8.2	23.0	5
General Chemical Analyses								
Alkalinity, Total (as CaCO3)	mg/L	160	150	150	140	150	160	--
Bicarbonate (HCO3)	mg/L	190	180	180	180	180	190	--
Carbonate (CO3)	mg/L	ND	ND	ND	ND	ND	ND	--
Chloride (Cl)	mg/L	120	130	110	120	110	110	500
Cyanide (CN)	ug/L	ND	ND	ND	ND	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1200	1200	1200	1100	1000	1100	1600
Fluoride (F)	mg/L	0.43	0.43	0.38	0.32	0.50	0.41	2
Hydroxide (OH)	mg/L	ND	ND	ND	ND	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	ND	ND	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	ND	ND	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	ND	ND	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	ND	ND	ND	ND	6
pH (Lab)	pH Units	8.3	8.1	8.2	8.3	8.3	8.3	--
Sulfate (SO4)	mg/L	290	310	280	290	270	270	500
Total Filterable Residue/TDS	mg/L	800	780	720	670	740	690	1000
Metals								
Aluminum (Al)	ug/L	590	700	420	330	510	500	200
Antimony (Sb)	ug/L	ND	ND	ND	ND	ND	ND	6
Arsenic (As)	ug/L	2.6	2.5	ND	2.6	2.2	3.0	10
Barium (Ba)	ug/L	120	130	130	130	120	110	1000
Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	ND	4
Boron (B)	ug/L	210	190	190	190	170	190	--
Cadmium (Cd)	ug/L	ND	ND	ND	ND	ND	ND	5
Calcium (Ca)	mg/L	88	81	91	86	80	86	--
Chromium (+6)	ug/L	ND	ND	ND	ND	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	ND	ND	ND	ND	50
Copper (Cu)	ug/L	ND	ND	ND	ND	ND	ND	1000
Iron (Fe)	ug/L	510	660	490	300	530	560	300
Lead (Pb)	ug/L	ND	ND	ND	ND	ND	ND	--
Magnesium (Mg)	mg/L	31	30	32	32	28	29	--
Manganese (Mn)	ug/L	ND	22	ND	ND	ND	30	50
Mercury (Hg)	ug/L	ND	ND	ND	ND	ND	1.2	2
Nickel (Ni)	ug/L	ND	ND	ND	ND	12	ND	100
Potassium (K)	mg/L	5.4	5.3	5.5	5.4	4.7	ND	--
Selenium (Se)	ug/L	ND	ND	ND	ND	ND	ND	50
Silver (Ag)	ug/L	ND	ND	ND	ND	ND	ND	100
Sodium (Na)	mg/L	120	120	130	120	110	130	--
Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	ND	2
Vanadium (V)	ug/L	3.8	3.5	3.4	ND	4.7	3.7	--
Zinc (Zn)	ug/L	ND	ND	ND	ND	ND	53	5000

Westside Main Canal								
Analyte	Units	2014	2015	2016	2017	2018	2019	MCL
Anion / Cation Balance								
Hardness, Total (as CaCO3)	mg/L	350	320	360	340	320	330	--
Total Anions	meq/L	12.6	13.1	11.9	12.4	11.7	12	--
Total Cations	meq/L	12.3	11.9	13	12.3	11.2	12.3	--
% difference		2	9.7	8.7	0.75	4.20	4.0	--
Radiochemistry Analyses								
Gross Alpha	pCi/L	- -	- -	9.5	- -	- -	3.7	15
Gross Alpha Counting Error	pCi/L	- -	- -	4.3	- -	- -	0.81	--
Gross Alpha Min Det Activity	pCi/L	- -	- -	3.9	- -	- -	0.63	--
Uranium	pCi/L	- -	- -	3.8	- -	- -	3.0	20
Uranium Counting Error	pCi/L	- -	- -	0.92	- -	- -	- -	- -
Uranium Min Det Activity	pCi/L	- -	- -	0.89	- -	- -	- -	- -
Volatile Organic Analyses								
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	ND	ND	ND	ND	5
Toluene	ug/L	ND	ND	ND	ND	ND	ND	150
Semi-Volatile Organic Analyses / EPA 504								
Ethylene Dibromide (EDB)	ug/L	- -	- -	- -	- -	- -	- -	0.05
Dibromochloropropane (DBCP)	ug/L	- -	- -	- -	- -	- -	- -	0.2
Synthetic Organic Analyses / 1,2,3-TCP								
1,2,3-Trichloropropane	ug/L	- -	- -	ND	- -	ND	ND	0.005
Synthetic Organic Analyses								
Diethylhexylphthalate (DEHP)	ug/L	- -	- -	ND	ND	ND	4.0	4
Glyphosate	ug/L	- -	- -	ND	ND	ND	ND	700

Table 6-17: JMP - Brawley Chemical Sampling

JMP – Brawley				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	25.0	40.0	15
Odor Threshold	TON	1	3	3
Turbidity	NTU	16	43	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	140	--
Bicarbonate (HCO3)	mg/L	170	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	99	97	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1600
Fluoride (F)	mg/L	0.47	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.1	8.3	--
Sulfate (SO4)	mg/L	250	250	500
Total Filterable Residue/TDS	mg/L	630	670	1000
Metals				
Aluminum (Al)	ug/L	850	710	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	3.1	10
Barium (Ba)	ug/L	140	120	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	220	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	88	83	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	930	850	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	29	28	--
Manganese (Mn)	ug/L	43	48	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.4	4.9	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	4.7	8.5	--
Zinc (Zn)	ug/L	69	77	5000

JMP - Brawley				
Analyte	**Units**	**2018**	**2019**	**MCL**
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	340	320	--
Total Anions	meq/L	10.8	10.9	--
Total Cations	meq/L	11.7	10.9	--
% difference		8	0.21	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-18: JMP - Calexico Chemical Sampling

JMP - Calexico				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	10.0	10.0	15
Odor Threshold	TON	1	1	3
Turbidity	NTU	6.9	7.1	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	150	--
Bicarbonate (HCO3)	mg/L	170	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	100	97	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1100	970	1600
Fluoride (F)	mg/L	0.39	0.38	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.2	8.3	--
Sulfate (SO4)	mg/L	260	250	500
Total Filterable Residue/TDS	mg/L	680	640	1000
Metals				
Aluminum (Al)	ug/L	360	94	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.5	10

JMP - Calexico				
Analyte	**Units**	**2018**	**2019**	**MCL**
Metals				
Barium (Ba)	ug/L	130	ND	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	160	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	81	75	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	340	110	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	26	26	--
Manganese (Mn)	ug/L	24	ND	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	4.9	4.5	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	6.4	--
Zinc (Zn)	ug/L	ND	68	5000
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	310	290	--
Total Anions	meq/L	11	10.9	--
Total Cations	meq/L	11.1	10.4	--
% difference		0.58	5.2	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-19: JMP - DHS Calexico Chemical Sampling

JMP - DHS Calexico				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	10.0	10.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	2.6	3.9	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	150	150	--
Bicarbonate (HCO3)	mg/L	190	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	97	100	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1600
Fluoride (F)	mg/L	0.39	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.2	8.0	--
Sulfate (SO4)	mg/L	260	250	500
Total Filterable Residue/TDS	mg/L	660	630	1000
Metals				
Aluminum (Al)	ug/L	160	180	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.8	10
Barium (Ba)	ug/L	130	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	180	220	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	79	75	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	160	190	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	26	26	--
Manganese (Mn)	ug/L	ND	ND	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	4.8	4.8	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	100	98	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	7.0	--
Zinc (Zn)	ug/L	ND	140	5000

JMP - DHS Calexico				
Analyte	Units	2018	2019	MCL
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	310	290	--
Total Anions	meq/L	11.3	11	--
Total Cations	meq/L	10.6	10.3	--
% difference		6.6	6.7	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-20: JMP - El Centro Chemical Sampling

JMP - El Centro		Dhalia Lateral 1 Gate 18A		South Date Gate 20B		
Analyte	Units	2018	2019	2018	2019	MCL
General Physical Analyses						
Apparent Color	Color Units	22.5	20.0	30.0	10.0	15
Odor Threshold	TON	1	3	1	2	3
Turbidity	NTU	28	10	25	3.8	5
General Chemical Analyses						
Alkalinity, Total (as CaCO3)	mg/L	140	140	140	140	--
Bicarbonate (HCO3)	mg/L	170	180	180	170	--
Carbonate (CO3)	mg/L	ND	ND	ND	ND	--
Chloride (Cl)	mg/L	100	99	140	95	500
Cyanide (CN)	ug/L	ND	ND	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	980	1200	970	1600
Fluoride (F)	mg/L	0.34	0.39	0.32	0.37	2
Hydroxide (OH)	mg/L	ND	ND	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	0.40	ND	1.1	ND	10
Nitrate + Nitrite (as N)	mg/L	0.43	ND	1.1	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	ND	ND	6
pH (Lab)	pH Units	8.1	8.4	8.3	8.3	--
Sulfate (SO4)	mg/L	250	250	260	250	500
Total Filterable Residue/TDS	mg/L	610	650	750	640	1000

JMP - El Centro		Dhalia Lateral 1 Gate 18A		South Date Gate 20B		
Analyte	Units	2018	2019	2018	2019	MCL
Metals						
Aluminum (Al)	ug/L	1000	160	800	68	200
Antimony (Sb)	ug/L	ND	ND	ND	ND	6
Arsenic (As)	ug/L	ND	2.7	ND	2.5	10
Barium (Ba)	ug/L	140	110	130	100	1000
Beryllium (Be)	ug/L	ND	ND	ND	ND	4
Boron (B)	ug/L	160	180	170	180	--
Cadmium (Cd)	ug/L	ND	ND	ND	ND	5
Calcium (Ca)	mg/L	90	77	90	76	--
Chromium (+6)	ug/L	ND	ND	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	ND	ND	50
Copper (Cu)	ug/L	ND	ND	ND	ND	1000
Iron (Fe)	ug/L	1000	210	780	ND	300
Lead (Pb)	ug/L	ND	ND	5.2	ND	--
Magnesium (Mg)	mg/L	28	26	31	25	--
Manganese (Mn)	ug/L	41	ND	48	ND	50
Mercury (Hg)	ug/L	ND	ND	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	ND	ND	100
Potassium (K)	mg/L	5.0	4.8	6.0	4.8	--
Selenium (Se)	ug/L	ND	ND	ND	ND	50
Silver (Ag)	ug/L	ND	ND	ND	ND	100
Sodium (Na)	mg/L	100	100	130	100	--
Thallium (Tl)	ug/L	ND	ND	ND	ND	2
Vanadium (V)	ug/L	4.8	7.0	4.4	5.7	--
Zinc (Zn)	ug/L	ND	63	ND	89	5000
Anion / Cation Balance						
Hardness, Total (as CaCO3)	mg/L	340	300	350	290	--
Total Anions	meq/L	10.8	11	12.3	10.7	--
Total Cations	meq/L	11.3	10.5	12.9	10.3	--
% difference		4.1	4.7	4.2	3.4	--
Volatile Organic Analyses						
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	ND	ND	5
Toluene	ug/L	ND	ND	ND	ND	150
Synthetic Organic Analyses						
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	ND	ND	4
Glyphosate	ug/L	ND	ND	28	ND	700

Table 6-21: JMP - Calipatria (GSWC) Chemical Sampling

JMP - Calipatria (GSWC)				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	20.0	40.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	27	70	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	150	150	--
Bicarbonate (HCO3)	mg/L	180	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	100	99	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	980	1600
Fluoride (F)	mg/L	0.35	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.3	8.3	--
Sulfate (SO4)	mg/L	260	240	500
Total Filterable Residue/TDS	mg/L	650	610	1000
Metals				
Aluminum (Al)	ug/L	580	820	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	3.1	10
Barium (Ba)	ug/L	130	120	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	190	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	83	79	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	600	960	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	28	26	--
Manganese (Mn)	ug/L	33	47	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.2	4.9	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	94	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	8.8	--
Zinc (Zn)	ug/L	ND	53	5000

JMP - Calipatria (GSWC)				
Analyte	Units	2018	2019	MCL
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	320	310	--
Total Anions	meq/L	11.2	10.8	--
Total Cations	meq/L	11.4	10.3	--
% difference		1.5	4.3	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	0.75	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-22: JMP - Heber Public Utility District Chemical Sampling

JMP - Heber Public Utility District		Dogwood Canal		Central Main Canal		
Analyte	Units	2018	2019	2018	2019	MCL
General Physical Analyses						
Apparent Color	Color Units	20.0	5.0	20.0	20.0	15
Odor Threshold	TON	2	2	1	1	3
Turbidity	NTU	20	26	14	13	5
General Chemical Analyses						
Alkalinity, Total (as CaCO3)	mg/L	140	150	140	150	--
Bicarbonate (HCO3)	mg/L	180	180	170	180	--
Carbonate (CO3)	mg/L	ND	ND	ND	ND	--
Chloride (Cl)	mg/L	99	98	96	98	500
Cyanide (CN)	ug/L	ND	ND	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1000	980	1600
Fluoride (F)	mg/L	0.42	0.39	0.38	0.38	2
Hydroxide (OH)	mg/L	ND	ND	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	ND	ND	6
pH (Lab)	pH Units	8.1	8.3	8.3	8.3	--
Sulfate (SO4)	mg/L	250	250	250	250	500
Total Filterable Residue/TDS	mg/L	650	650	580	690	1000
Metals						
Aluminum (Al)	ug/L	410	540	540	150	200
Antimony (Sb)	ug/L	ND	ND	ND	ND	6
Arsenic (As)	ug/L	ND	2.9	ND	2.8	10
Barium (Ba)	ug/L	130	120	130	110	1000
Beryllium (Be)	ug/L	ND	ND	ND	ND	4
Boron (B)	ug/L	170	220	160	190	--
Cadmium (Cd)	ug/L	ND	ND	ND	ND	5

JMP - Heber Public Utility District		Dogwood Canal		Central Main Canal		
Analyte	Units	2018	2019	2018	2019	MCL
Metals						
Calcium (Ca)	mg/L	89	82	86	79	--
Chromium (+6)	ug/L	ND	ND	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	ND	ND	50
Copper (Cu)	ug/L	ND	ND	ND	ND	1000
Iron (Fe)	ug/L	400	560	530	170	300
Lead (Pb)	ug/L	ND	ND	ND	ND	--
Magnesium (Mg)	mg/L	29	27	28	27	--
Manganese (Mn)	ug/L	24	31	30	ND	50
Mercury (Hg)	ug/L	ND	ND	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	ND	ND	100
Potassium (K)	mg/L	5.2	5.2	5.0	4.6	--
Selenium (Se)	ug/L	ND	ND	ND	ND	50
Silver (Ag)	ug/L	ND	ND	ND	ND	100
Sodium (Na)	mg/L	110	100	100	110	--
Thallium (Tl)	ug/L	ND	ND	ND	ND	2
Vanadium (V)	ug/L	3.1	7.1	3.7	6.4	--
Zinc (Zn)	ug/L	ND	ND	ND	ND	5000
Anion / Cation Balance						
Hardness, Total (as CaCO3)	mg/L	340	320	330	310	--
Total Anions	meq/L	11	10.9	11	10.9	--
Total Cations	meq/L	11.8	10.8	11.1	11.1	--
% difference		6.9	1.2	3.4	1.3	--
Volatile Organic Analyses						
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	ND	ND	5
Toluene	ug/L	ND	ND	ND	ND	150
Synthetic Organic Analyses						
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	ND	ND	4
Glyphosate	ug/L	ND	ND	ND	ND	700

Table 6-23: JMP - Holtville Chemical Sampling

JMP - Holtville				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	20.0	15.0	15
Odor Threshold	TON	2	3	3
Turbidity	NTU	20	8.7	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	150	--
Bicarbonate (HCO3)	mg/L	180	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	99	100	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1600
Fluoride (F)	mg/L	0.42	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.1	8.3	--
Sulfate (SO4)	mg/L	250	250	500
Total Filterable Residue/TDS	mg/L	650	650	1000
Metals				
Aluminum (Al)	ug/L	410	200	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.8	10
Barium (Ba)	ug/L	130	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	190	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	89	76	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	400	210	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	29	26	--
Manganese (Mn)	ug/L	24	ND	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.2	4.6	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	97	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	3.1	7.0	--
Zinc (Zn)	ug/L	ND	51	5000

JMP - Holtville				
Analyte	Units	2018	2019	MCL
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	340	300	--
Total Anions	meq/L	11	11	--
Total Cations	meq/L	11.8	10.3	--
% difference		6.9	6.7	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-24: JMP - Imperial Chemical Sampling

JMP - Imperial				
Analyte	Units	2018	2019	MCL
General Physical Analyses				
Apparent Color	Color Units	7.5	15.0	15
Odor Threshold	TON	1	3	3
Turbidity	NTU	2.5	14	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	150	--
Bicarbonate (HCO3)	mg/L	170	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	96	95	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	970	1600
Fluoride (F)	mg/L	0.29	0.38	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	0.41	ND	10
Nitrate + Nitrite (as N)	mg/L	0.42	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.2	8.2	--
Sulfate (SO4)	mg/L	240	250	500
Total Filterable Residue/TDS	mg/L	620	640	1000
Metals				
Aluminum (Al)	ug/L	670	450	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.6	10
Barium (Ba)	ug/L	130	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	160	180	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	88	79	--
Chromium (+6)	ug/L	ND	ND	--

JMP - Imperial				
Analyte	Units	2018	2019	MCL
Metals				
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	710	480	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	28	27	--
Manganese (Mn)	ug/L	36	27	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.2	4.9	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	100	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	3.4	7.1	--
Zinc (Zn)	ug/L	ND	72	5000
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	340	310	--
Total Anions	meq/L	10.5	10.9	--
Total Cations	meq/L	11.2	10.6	--
% difference		6.3	1.9	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-25: JMP - Seeley CWD Chemical Sampling

JMP - Seeley CWD				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	22.5	20.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	39	9.8	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	140	--
Bicarbonate (HCO3)	mg/L	170	170	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	98	95	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	970	1600
Fluoride (F)	mg/L	0.31	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.2	8.3	--
Sulfate (SO4)	mg/L	250	250	500
Total Filterable Residue/TDS	mg/L	570	640	1000
Metals				
Aluminum (Al)	ug/L	1100	220	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.5	10
Barium (Ba)	ug/L	150	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	160	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	87	76	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	1200	220	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	28	26	--
Manganese (Mn)	ug/L	53	ND	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.2	4.7	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	100	99	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	3.9	6.8	--
Zinc (Zn)	ug/L	ND	76	5000

JMP - Seeley CWD				
Analyte	**Units**	**2018**	**2019**	**MCL**
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	330	290	--
Total Anions	meq/L	10.8	10.7	--
Total Cations	meq/L	11.1	10.4	--
% difference		3.4	3	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-26: JMP - Westmorland Chemical Sampling

JMP - Westmorland				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	37.5	30.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	22	38	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	150	150	--
Bicarbonate (HCO3)	mg/L	180	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	98	100	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1600
Fluoride (F)	mg/L	0.38	0.40	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	0.16	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.1	8.1	--
Sulfate (SO4)	mg/L	250	250	500
Total Filterable Residue/TDS	mg/L	680	680	1000
Metals				
Aluminum (Al)	ug/L	480	950	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.9	10
Barium (Ba)	ug/L	120	130	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	200	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	86	85	--
Chromium (+6)	ug/L	ND	ND	--

JMP - Westmorland				
Analyte	**Units**	**2018**	**2019**	**MCL**
Metals				
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	490	930	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	28	29	--
Manganese (Mn)	ug/L	23	33	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.0	5.4	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	100	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	3.7	8.2	--
Zinc (Zn)	ug/L	ND	170	5000
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	330	330	--
Total Anions	meq/L	10.9	11	--
Total Cations	meq/L	11.1	11.1	--
% difference		1.3	1.2	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-27: JMP - Allied Waste of Imperial Valley Chemical Sampling

JMP - Allied Waste of Imperial Valley				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	30.0	7.5	15
Odor Threshold	TON	1	1	3
Turbidity	NTU	29	5.6	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	130	--
Bicarbonate (HCO3)	mg/L	170	160	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	120	120.0	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1100	1000.0	1600
Fluoride (F)	mg/L	0.45	0.40	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.2	8.1	--
Sulfate (SO4)	mg/L	260	260	500
Total Filterable Residue/TDS	mg/L	620	700	1000
Metals				
Aluminum (Al)	ug/L	1200	340	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	3.1	10
Barium (Ba)	ug/L	140	100	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	180	210	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	89	74	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	1200	200	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	30	27	--
Manganese (Mn)	ug/L	42	27	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.4	5.5	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	110	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	4.2	7.4	--
Zinc (Zn)	ug/L	ND	110	5000

JMP - Allied Waste of Imperial Valley				
Analyte	Units	2018	2019	MCL
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	340	300	--
Total Anions	meq/L	11.6	11.4	--
Total Cations	meq/L	11.8	10.8	--
% difference		2	5.3	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-28: JMP - CalEnergy (Vulcan Power Plant) Chemical Sampling

JMP - CalEnergy (Vulcan Power Plant)				
Analyte	Units	2018	2019	MCL
General Physical Analyses				
Apparent Color	Color Units	20.0	15.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	16	31	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	130	140	--
Bicarbonate (HCO3)	mg/L	160	150	--
Carbonate (CO3)	mg/L	ND	9.6	--
Chloride (Cl)	mg/L	110	100	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1100	1000	1600
Fluoride (F)	mg/L	0.42	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.1	8.6	--
Sulfate (SO4)	mg/L	270	250	500
Total Filterable Residue/TDS	mg/L	670	650	1000
Metals				
Aluminum (Al)	ug/L	1200	310	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	3.2	10
Barium (Ba)	ug/L	150	120	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	180	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	85	79	--

JMP - CalEnergy (Vulcan Power Plant)				
Analyte	**Units**	**2018**	**2019**	**MCL**
Metals				
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	1200	440	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	30	26	--
Manganese (Mn)	ug/L	53	28	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.8	4.7	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	5.9	--
Zinc (Zn)	ug/L	ND	83	5000
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	340	300	--
Total Anions	meq/L	11.4	10.8	--
Total Cations	meq/L	11.7	10.6	--
% difference		2.5	2.4	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	0.97	ND	5
Toluene	ug/L	ND	2.6	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-29: JMP - Gateway Chemical Sampling

JMP - Gateway				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	10.0	7.5	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	5.2	3.2	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	150	--
Bicarbonate (HCO3)	mg/L	170	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	96	100	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	980	1600
Fluoride (F)	mg/L	0.37	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.2	8.1	--
Sulfate (SO4)	mg/L	250	250	500
Total Filterable Residue/TDS	mg/L	640	670	1000
Metals				
Aluminum (Al)	ug/L	130	87	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.7	10
Barium (Ba)	ug/L	120	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	160	190	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	77	75	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	150	190	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	25	26	--
Manganese (Mn)	ug/L	20	ND	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	4.7	4.6	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	98	95	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	6.7	--
Zinc (Zn)	ug/L	ND	ND	5000

JMP - Gateway				
Analyte	**Units**	**2018**	**2019**	**MCL**
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	300	300	--
Total Anions	meq/L	10.7	11	--
Total Cations	meq/L	10.3	10.1	--
% difference		4	8.1	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-30: JMP - Imperial Valley College Chemical Sampling

JMP - Imperial Valley College				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	30.0	30.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	31	27	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	140	--
Bicarbonate (HCO3)	mg/L	180	170	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	100	95	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1100	970	1600
Fluoride (F)	mg/L	0.35	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	0.75	ND	10
Nitrate + Nitrite (as N)	mg/L	0.77	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.2	8.2	--
Sulfate (SO4)	mg/L	260	250	500
Total Filterable Residue/TDS	mg/L	680	680	1000
Metals				
Aluminum (Al)	ug/L	1400	360	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.9	10
Barium (Ba)	ug/L	140	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	200	--
Cadmium (Cd)	ug/L	ND	ND	5

JMP - Imperial Valley College				
Analyte	**Units**	**2018**	**2019**	**MCL**
Metals				
Calcium (Ca)	mg/L	92	81	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	1300	410	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	29	27	--
Manganese (Mn)	ug/L	51	24	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.5	4.9	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	5.2	6.7	--
Zinc (Zn)	ug/L	ND	100	5000
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	350	310	--
Total Anions	meq/L	11.2	10.7	--
Total Cations	meq/L	11.9	10.7	--
% difference		6.2	0.57	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-31: JMP - Magnolia Union School Chemical Sampling

JMP - Magnolia Union School				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	15.0	30.0	15
Odor Threshold	TON	2	5	3
Turbidity	NTU	8.0	8.2	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	150	--
Bicarbonate (HCO3)	mg/L	160	180	--
Carbonate (CO3)	mg/L	6.7	ND	--
Chloride (Cl)	mg/L	100	120	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	1100	1600
Fluoride (F)	mg/L	0.36	0.38	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.7	7.9	--
Sulfate (SO4)	mg/L	260	260	500
Total Filterable Residue/TDS	mg/L	660	700	1000
Metals				
Aluminum (Al)	ug/L	180	120	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	4.3	10
Barium (Ba)	ug/L	120	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	260	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	77	72	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	170	160	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	27	30	--
Manganese (Mn)	ug/L	ND	40	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	4.8	5.2	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	100	110	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	3.4	7.0	--
Zinc (Zn)	ug/L	ND	110	5000

JMP - Magnolia Union School				
Analyte	Units	2018	2019	MCL
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	300	300	--
Total Anions	meq/L	11.1	11.8	--
Total Cations	meq/L	10.5	11	--
% difference		5.1	6.8	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	2.5	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-32: JMP - McCabe Union School Chemical Sampling

JMP - McCabe Union School				
Analyte	Units	2018	2019	MCL
General Physical Analyses				
Apparent Color	Color Units	20.0	40.0	15
Odor Threshold	TON	1	1	3
Turbidity	NTU	21	30	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	150	150	--
Bicarbonate (HCO3)	mg/L	180	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	100	98	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1600
Fluoride (F)	mg/L	0.34	0.39	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	0.40	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.1	8.2	--
Sulfate (SO4)	mg/L	250	250	500
Total Filterable Residue/TDS	mg/L	610	670	1000
Metals				
Aluminum (Al)	ug/L	690	440	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.9	10
Barium (Ba)	ug/L	140	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	200	170	--
Cadmium (Cd)	ug/L	ND	ND	5

JMP - McCabe Union School				
Analyte	Units	2018	2019	MCL
Metals				
Calcium (Ca)	mg/L	90	79	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	740	500	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	29	27	--
Manganese (Mn)	ug/L	44	33	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	13	100
Potassium (K)	mg/L	5.2	4.7	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	4.1	7.2	--
Zinc (Zn)	ug/L	ND	ND	5000
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	350	310	--
Total Anions	meq/L	11	10.9	--
Total Cations	meq/L	11.8	10.6	--
% difference		7.2	2.7	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-33: JMP - Meadows Union Elementary School Chemical Sampling

JMP - Meadows Union Elementary School				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	15.0	10.0	15
Odor Threshold	TON	1	1	3
Turbidity	NTU	7.2	3.0	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	140	--
Bicarbonate (HCO3)	mg/L	170	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	100	98	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1600
Fluoride (F)	mg/L	0.42	0.38	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.3	8.3	--
Sulfate (SO4)	mg/L	250	250	500
Total Filterable Residue/TDS	mg/L	600	620	1000
Metals				
Aluminum (Al)	ug/L	270	67	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.8	10
Barium (Ba)	ug/L	120	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	160	180	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	85	79	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	270	110	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	27	28	--
Manganese (Mn)	ug/L	20	ND	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.0	4.9	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	100	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	6.4	--
Zinc (Zn)	ug/L	ND	77	5000

JMP - Meadows Union Elementary School				
Analyte	**Units**	**2018**	**2019**	**MCL**
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	320	310	--
Total Anions	meq/L	10.8	10.9	--
Total Cations	meq/L	11	10.7	--
% difference		1.1	1.9	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-34: JMP - Mulberry Union School Chemical Sampling

JMP - Mulberry Union School				
Analyte	**Units**	**2018**	**2019**	**MCL**
General Physical Analyses				
Apparent Color	Color Units	15.0	20.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	14	22	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	150	--
Bicarbonate (HCO3)	mg/L	170	180	--
Carbonate (CO3)	mg/L	ND	ND	--
Chloride (Cl)	mg/L	100	100	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1000	990	1600
Fluoride (F)	mg/L	0.40	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.3	8.4	--
Sulfate (SO4)	mg/L	260	250	500
Total Filterable Residue/TDS	mg/L	660	640	1000
Metals				
Aluminum (Al)	ug/L	600	480	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	3.0	10
Barium (Ba)	ug/L	130	120	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	200	--
Cadmium (Cd)	ug/L	ND	ND	5

JMP - Mulberry Union School				
Analyte	**Units**	**2018**	**2019**	**MCL**
Metals				
Calcium (Ca)	mg/L	82	80	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	570	560	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	28	27	--
Manganese (Mn)	ug/L	30	33	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	5.3	4.7	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	98	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	8.4	--
Zinc (Zn)	ug/L	ND	73	5000
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	320	310	--
Total Anions	meq/L	11	11	--
Total Cations	meq/L	11.3	10.6	--
% difference		2.6	3.6	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	ND	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

Table 6-35: JMP - Pine Union School Chemical Sampling

JMP - Pine Union School				
Analyte	Units	2018	2019	MCL
General Physical Analyses				
Apparent Color	Color Units	7.5	10.0	15
Odor Threshold	TON	1	2	3
Turbidity	NTU	2.3	2.3	5
General Chemical Analyses				
Alkalinity, Total (as CaCO3)	mg/L	140	150	--
Bicarbonate (HCO3)	mg/L	160	190	--
Carbonate (CO3)	mg/L	5.8	ND	--
Chloride (Cl)	mg/L	100	100	500
Cyanide (CN)	ug/L	ND	ND	150
Specific Conductance (E.C.)	umhos/cm	1100	1000	1600
Fluoride (F)	mg/L	0.39	0.37	2
Hydroxide (OH)	mg/L	ND	ND	--
MBAS (LAS Mole. Wt 340.0)	mg/L	ND	ND	0.5
Nitrate as N (NO3-N)	mg/L	ND	ND	10
Nitrate + Nitrite (as N)	mg/L	ND	ND	10
Nitrite as N (NO2-N)	mg/L	ND	ND	1
Perchlorate (ClO4)	ug/L	ND	ND	6
pH (Lab)	pH Units	8.5	8.3	--
Sulfate (SO4)	mg/L	260	250	500
Total Filterable Residue/TDS	mg/L	700	620	1000
Metals				
Aluminum (Al)	ug/L	68	69	200
Antimony (Sb)	ug/L	ND	ND	6
Arsenic (As)	ug/L	ND	2.8	10
Barium (Ba)	ug/L	120	110	1000
Beryllium (Be)	ug/L	ND	ND	4
Boron (B)	ug/L	170	280	--
Cadmium (Cd)	ug/L	ND	ND	5
Calcium (Ca)	mg/L	78	79	--
Chromium (+6)	ug/L	ND	ND	--
Chromium (Total Cr)	ug/L	ND	ND	50
Copper (Cu)	ug/L	ND	ND	1000
Iron (Fe)	ug/L	ND	ND	300
Lead (Pb)	ug/L	ND	ND	--
Magnesium (Mg)	mg/L	26	27	--
Manganese (Mn)	ug/L	ND	ND	50
Mercury (Hg)	ug/L	ND	ND	2
Nickel (Ni)	ug/L	ND	ND	100
Potassium (K)	mg/L	4.7	4.6	--
Selenium (Se)	ug/L	ND	ND	50
Silver (Ag)	ug/L	ND	ND	100
Sodium (Na)	mg/L	110	100	--
Thallium (Tl)	ug/L	ND	ND	2
Vanadium (V)	ug/L	ND	6.8	--
Zinc (Zn)	ug/L	ND	53	5000

JMP - Pine Union School				
Analyte	**Units**	**2018**	**2019**	**MCL**
Anion / Cation Balance				
Hardness, Total (as CaCO3)	mg/L	300	310	--
Total Anions	meq/L	11.1	11.2	--
Total Cations	meq/L	10.9	10.6	--
% difference		1.1	4.7	--
Volatile Organic Analyses				
Dichloromethane (Methylene Chloride)	ug/L	ND	ND	5
Toluene	ug/L	ND	3.2	150
Synthetic Organic Analyses				
Diethylhexylphthalate (DEHP)	ug/L	ND	ND	4
Glyphosate	ug/L	ND	ND	700

6.5 Iron and Aluminum

The Environmental Protection Agency (EPA) has the National Primary Drinking Water Regulations (NPDWRs) which set mandatory water quality standards for drinking water contaminants. These standards are called “maximum contaminant levels” (MCLs) and establish protection against consumption of drinking water contaminants that present a risk to human health. EPA also has a set of National Secondary Drinking Water Regulations. These Secondary Standards set non-mandatory water quality standards for 15 contaminants that do not present risk to human health but can impact the aesthetics of drinking water. Aluminum has a Secondary MCL of 0.05 to 0.2 mg/L and can affect the color of the water. Iron has a Secondary MCL of 0.3 mg/L and leaves a rust color, a metallic taste, and creates staining.

Division of Drinking Water provided spreadsheets and figures comparing Iron and Aluminum in the canals to the treated water sampling some of the water systems. The data shows the canal testing data as well as the influent and effluent of the water treatment plant. The Maximum Contaminant Level (MCL) is shown for each chart.

IID samples these sites once per month for coliforms, quarterly for iron & aluminum.

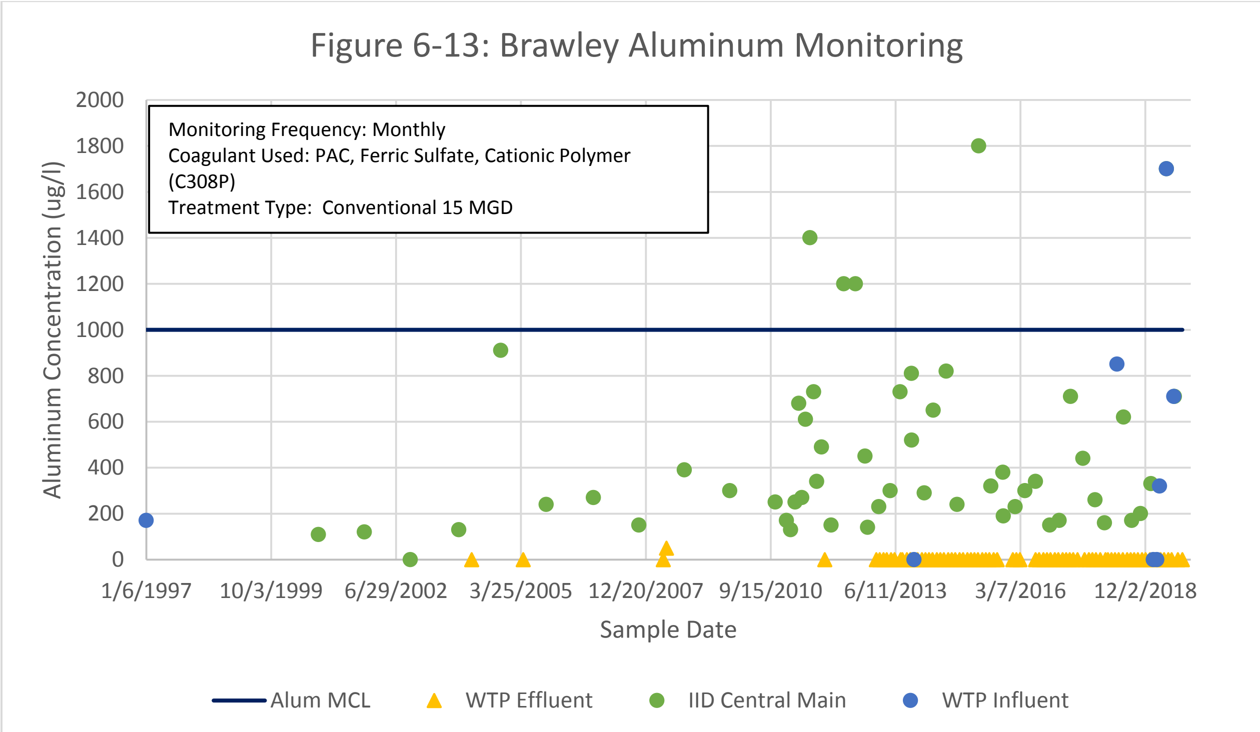


Figure 6-13: Brawley Aluminum Monitoring
Monitoring Frequency: Monthly
Coagulant Used: PAC, Ferric Sulfate, Cationic Polymer (C308P)
Treatment Type: Conventional 15 MGD
Aluminum Concentration (ug/l)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1/6/1997
10/3/1999
6/29/2002
3/25/2005
12/20/2007
9/15/2010
6/11/2013
3/7/2016
12/2/2018
Sample Date
Alum MCL
WTP Effluent
IID Central Main
WTP Influent

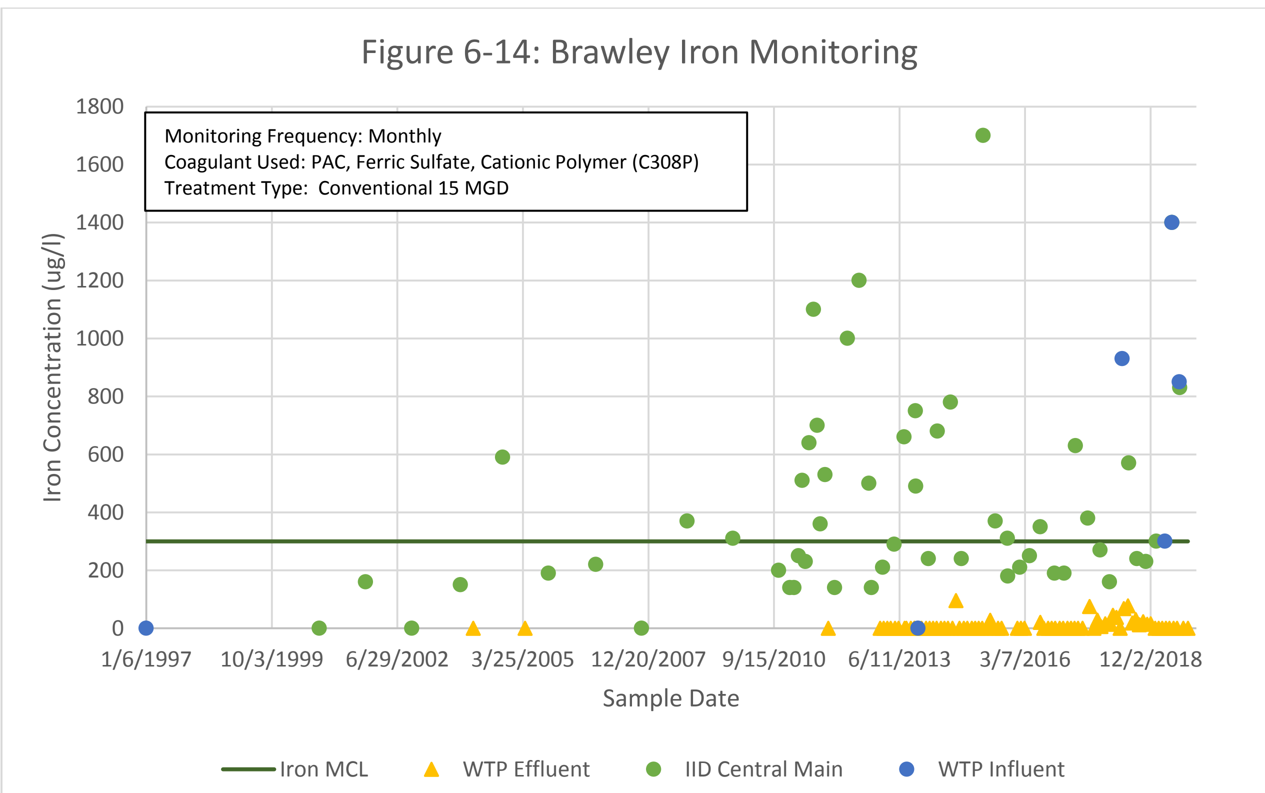


Figure 6-14: Brawley Iron Monitoring
Monitoring Frequency: Monthly
Coagulant Used: PAC, Ferric Sulfate, Cationic Polymer (C308P)
Treatment Type: Conventional 15 MGD
Iron Concentration (ug/l)
1800
1600
1400
1200
1000
800
600
400
200
0
1/6/1997
10/3/1999
6/29/2002
3/25/2005
12/20/2007
9/15/2010
6/11/2013
3/7/2016
12/2/2018
Sample Date
Iron MCL
WTP Effluent
IID Central Main
WTP Influent

Figure 6-15: Calexico Aluminum Monitoring (W)

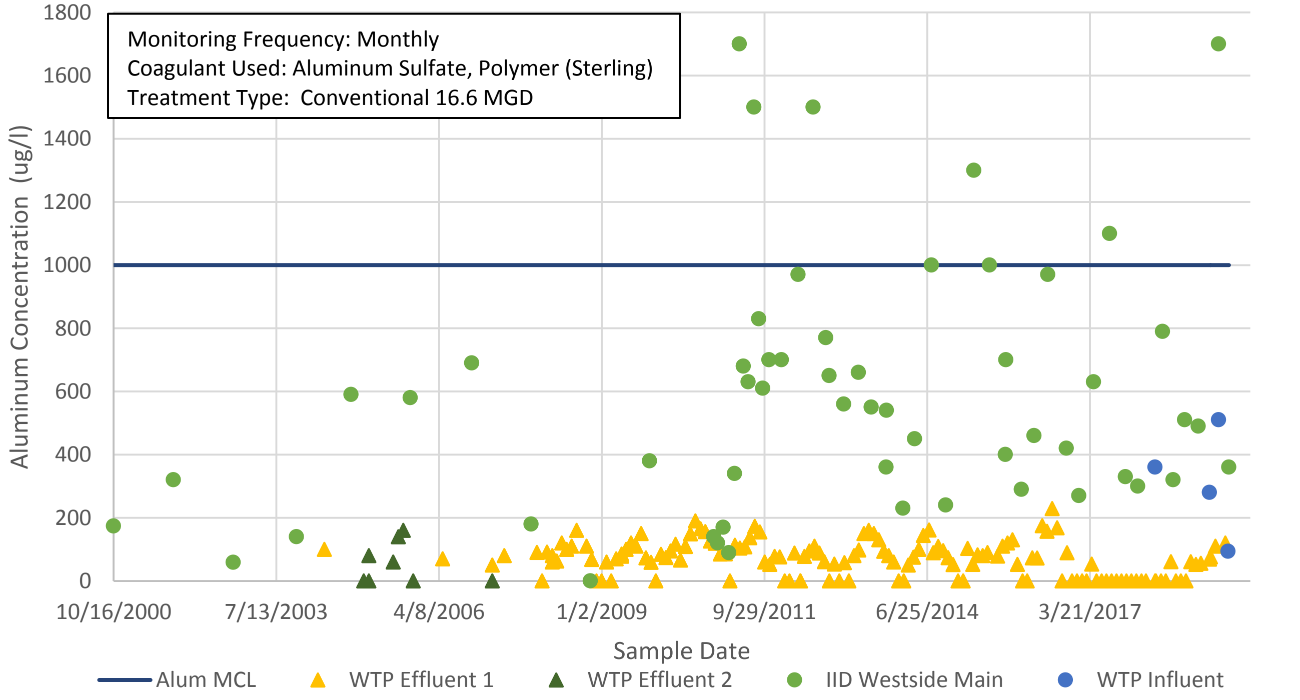
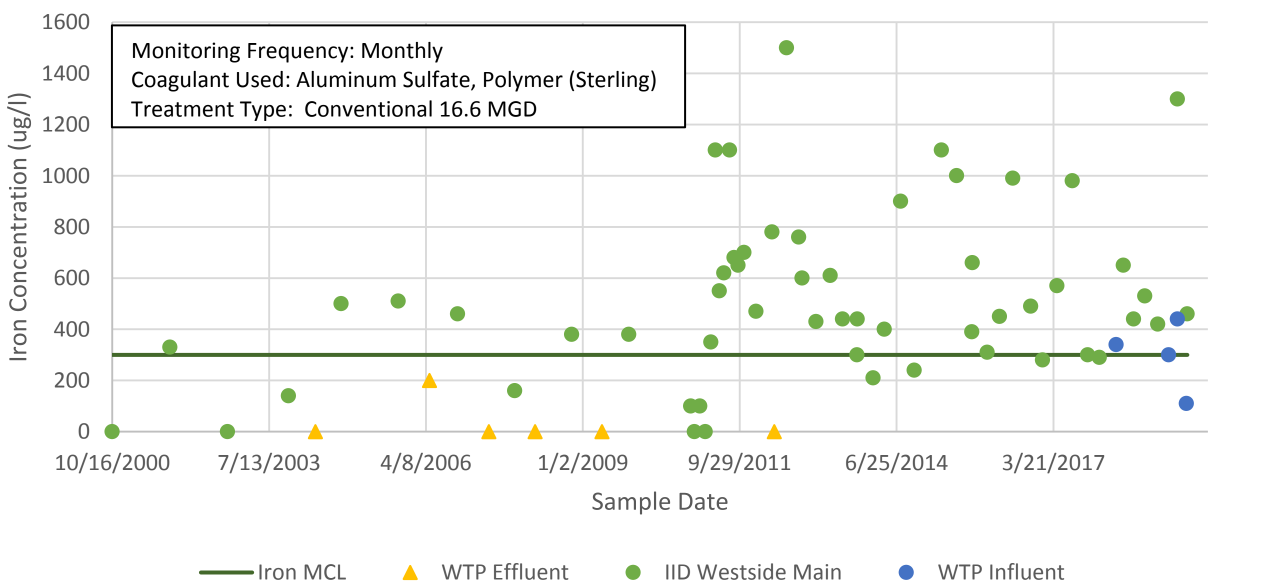


Figure 6-16: Calexico Iron Monitoring (W)



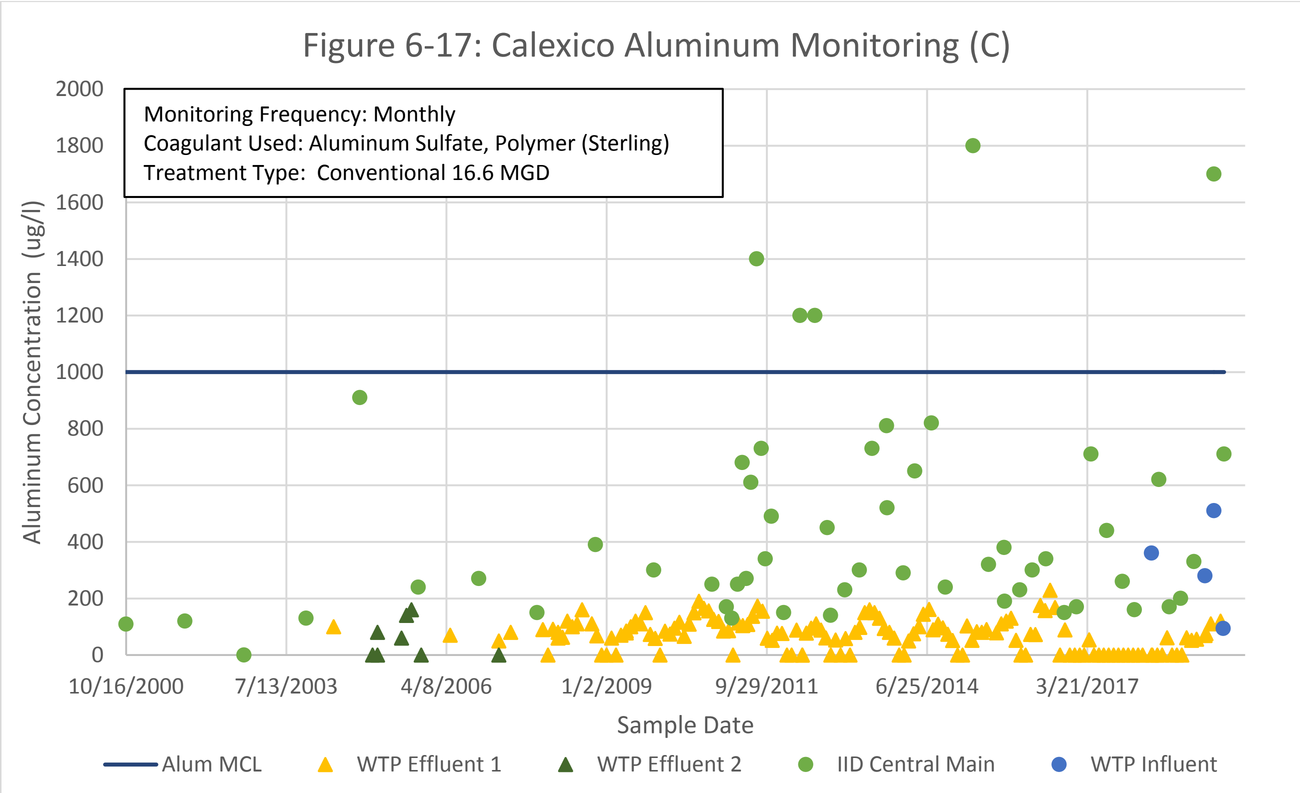


Figure 6-17: Calexico Aluminum Monitoring (C)
Monitoring Frequency: Monthly
Coagulant Used: Aluminum Sulfate, Polymer (Sterling)
Treatment Type: Conventional 16.6 MGD
Aluminum Concentration (ug/l)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Alum MCL
WTP Effluent 1
WTP Effluent 2
IID Central Main
WTP Influent

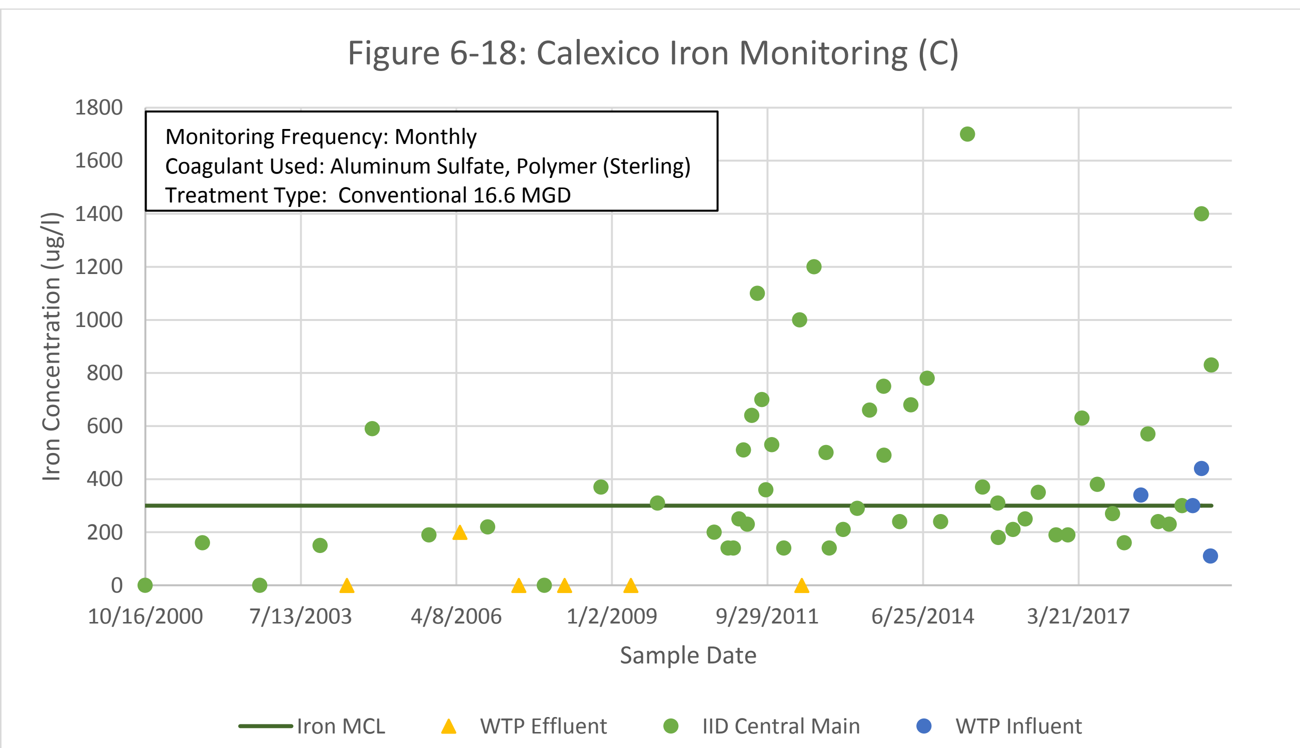


Figure 6-18: Calexico Iron Monitoring (C)
Monitoring Frequency: Monthly
Coagulant Used: Aluminum Sulfate, Polymer (Sterling)
Treatment Type: Conventional 16.6 MGD
Iron Concentration (ug/l)
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Iron MCL
WTP Effluent
IID Central Main
WTP Influent

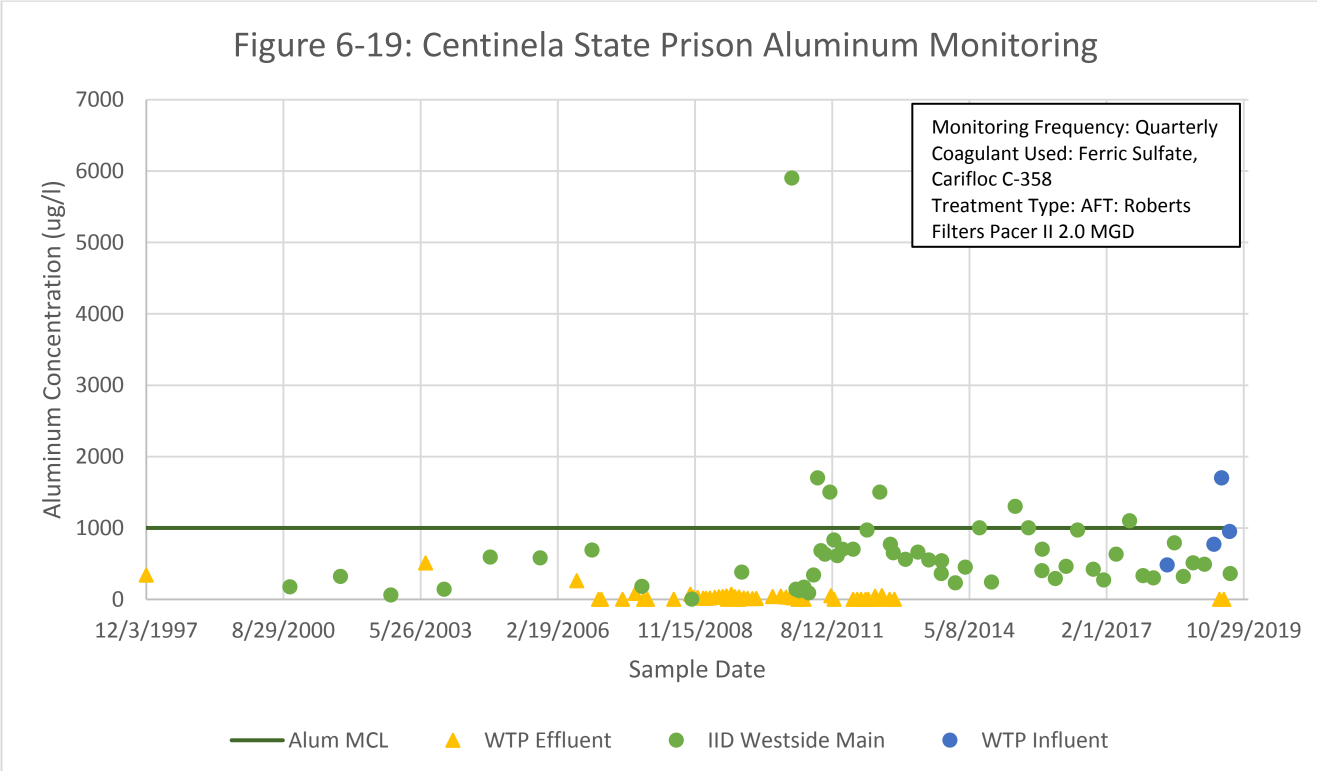


Figure 6-19: Centinela State Prison Aluminum Monitoring
Monitoring Frequency: Quarterly
Coagulant Used: Ferric Sulfate, Carifloc C-358
Treatment Type: AFT: Roberts Filters Pacer II 2.0 MGD
Aluminum Concentration (ug/l)
7000
6000
5000
4000
3000
2000
1000
0
12/3/1997
8/29/2000
5/26/2003
2/19/2006
11/15/2008
8/12/2011
5/8/2014
2/1/2017
10/29/2019
Sample Date
Alum MCL
WTP Effluent
IID Westside Main
WTP Influent

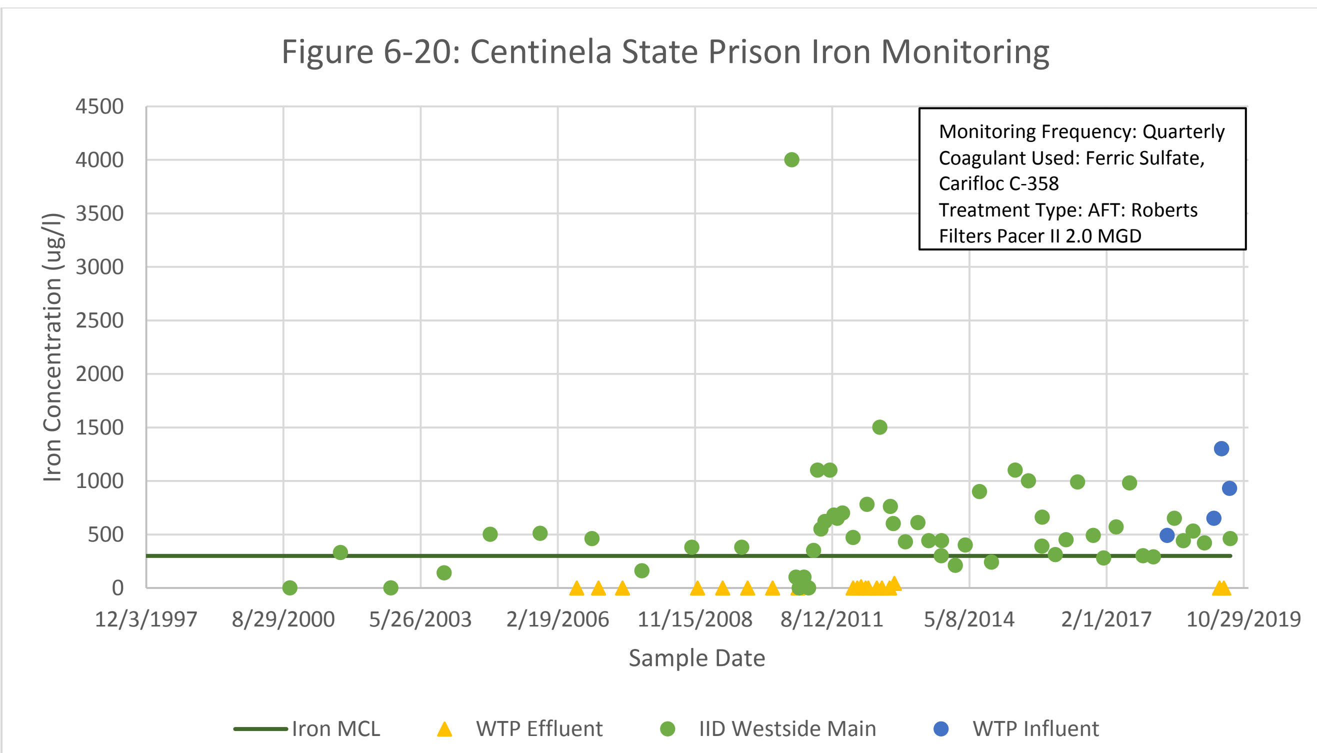


Figure 6-20: Centinela State Prison Iron Monitoring
Monitoring Frequency: Quarterly
Coagulant Used: Ferric Sulfate, Carifloc C-358
Treatment Type: AFT: Roberts Filters Pacer II 2.0 MGD
Iron Concentration (ug/l)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
12/3/1997
8/29/2000
5/26/2003
2/19/2006
11/15/2008
8/12/2011
5/8/2014
2/1/2017
10/29/2019
Sample Date
Iron MCL
WTP Effluent
IID Westside Main
WTP Influent

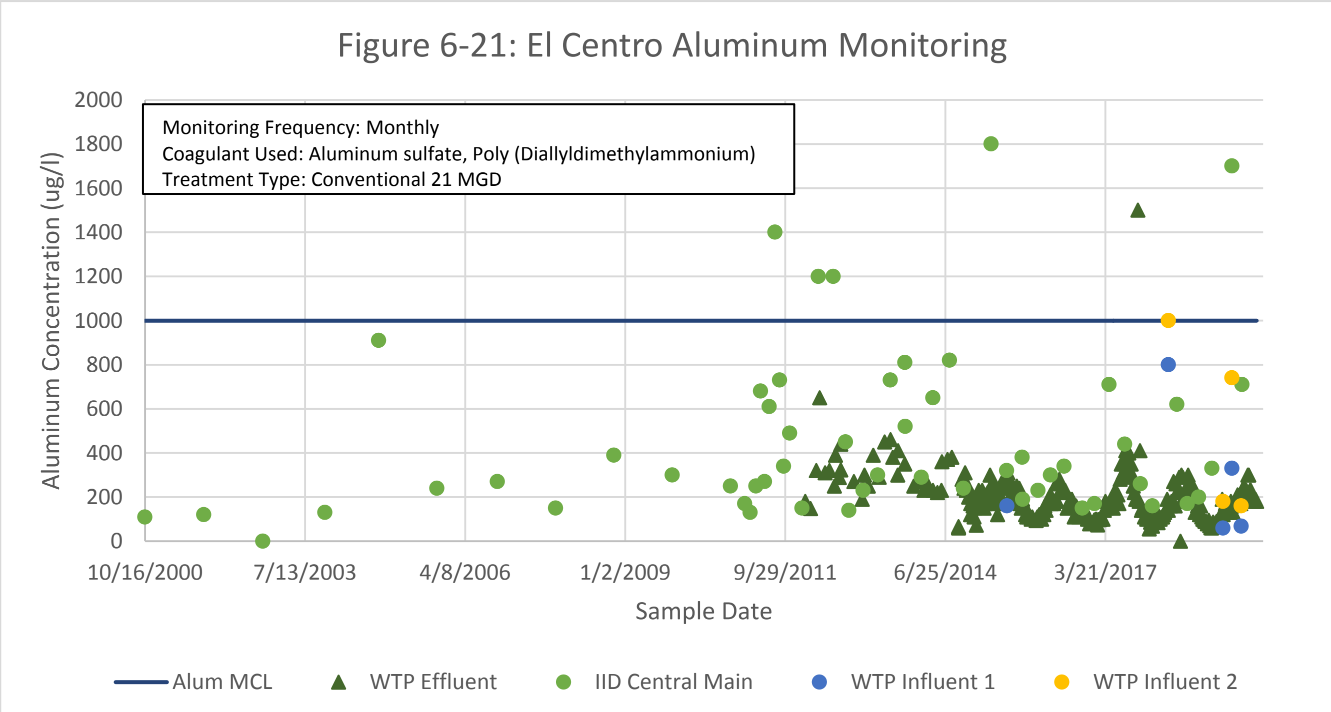


Figure 6-21: El Centro Aluminum Monitoring
Monitoring Frequency: Monthly
Coagulant Used: Aluminum sulfate, Poly (Diallyldimethylammonium)
Treatment Type: Conventional 21 MGD
Aluminum Concentration (ug/l)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Alum MCL
WTP Effluent
IID Central Main
WTP Influent 1
WTP Influent 2

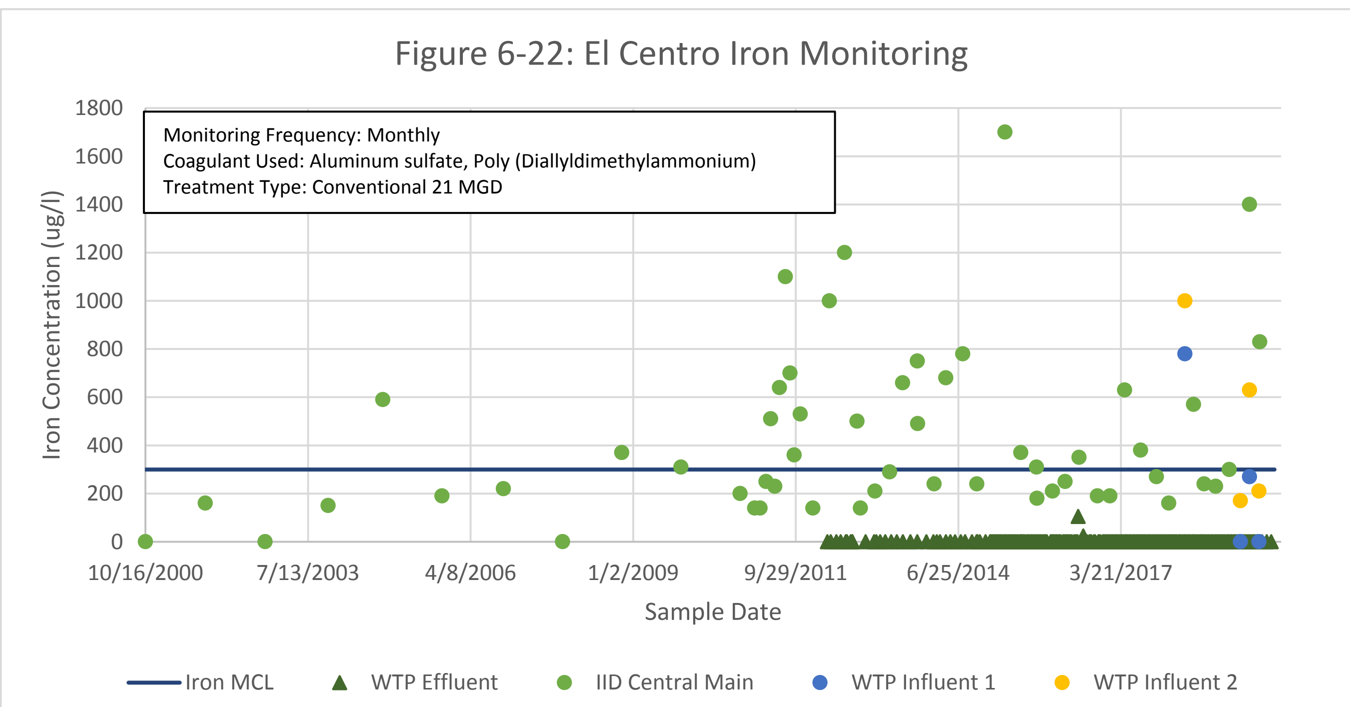


Figure 6-22: El Centro Iron Monitoring
Monitoring Frequency: Monthly
Coagulant Used: Aluminum sulfate, Poly (Diallyldimethylammonium)
Treatment Type: Conventional 21 MGD
Iron Concentration (ug/l)
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Iron MCL
WTP Effluent
IID Central Main
WTP Influent 1
WTP Influent 2

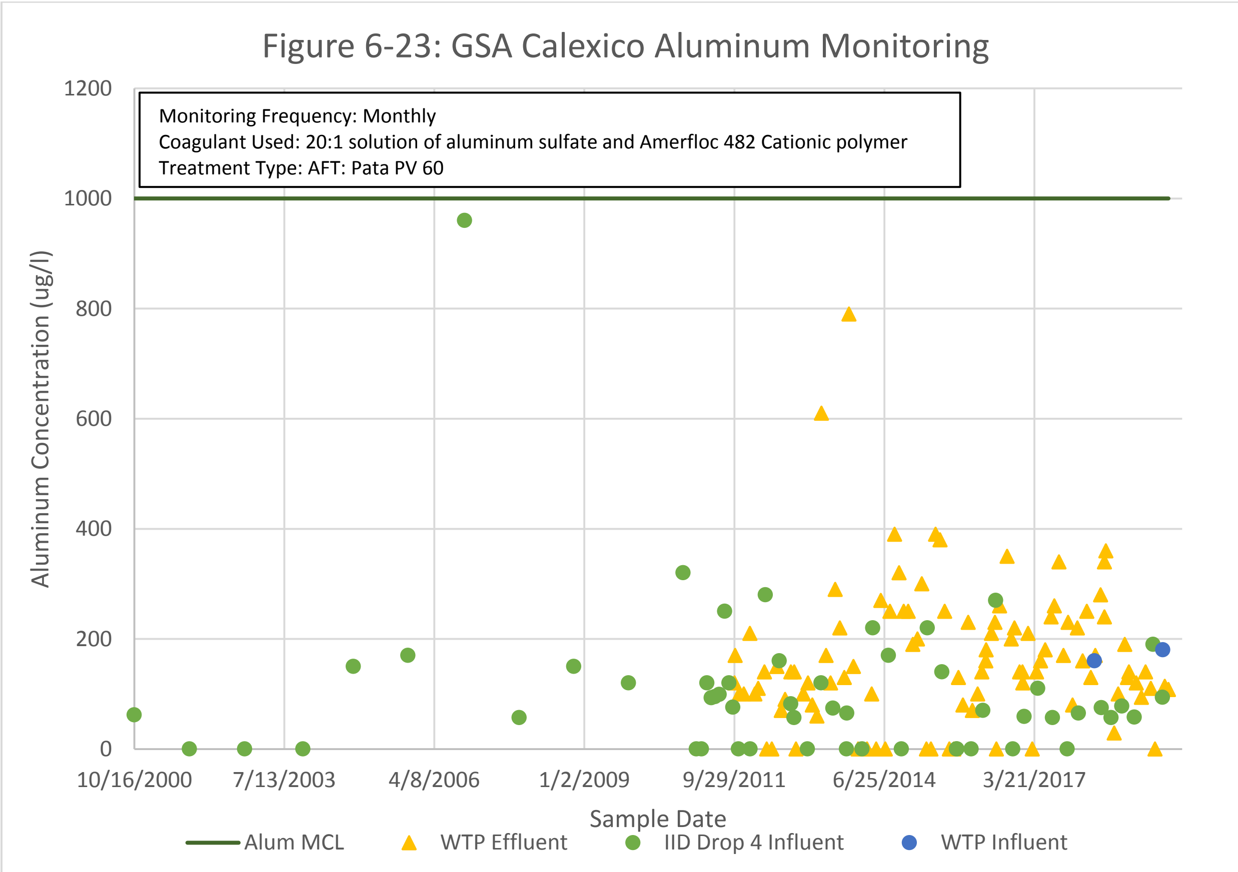


Figure 6-23: GSA Calexico Aluminum Monitoring
Monitoring Frequency: Monthly
Coagulant Used: 20:1 solution of aluminum sulfate and Amerfloc 482 Cationic polymer
Treatment Type: AFT: Pata PV 60
Aluminum Concentration (ug/l)
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Alum MCL
WTP Effluent
IID Drop 4 Influent
WTP Influent

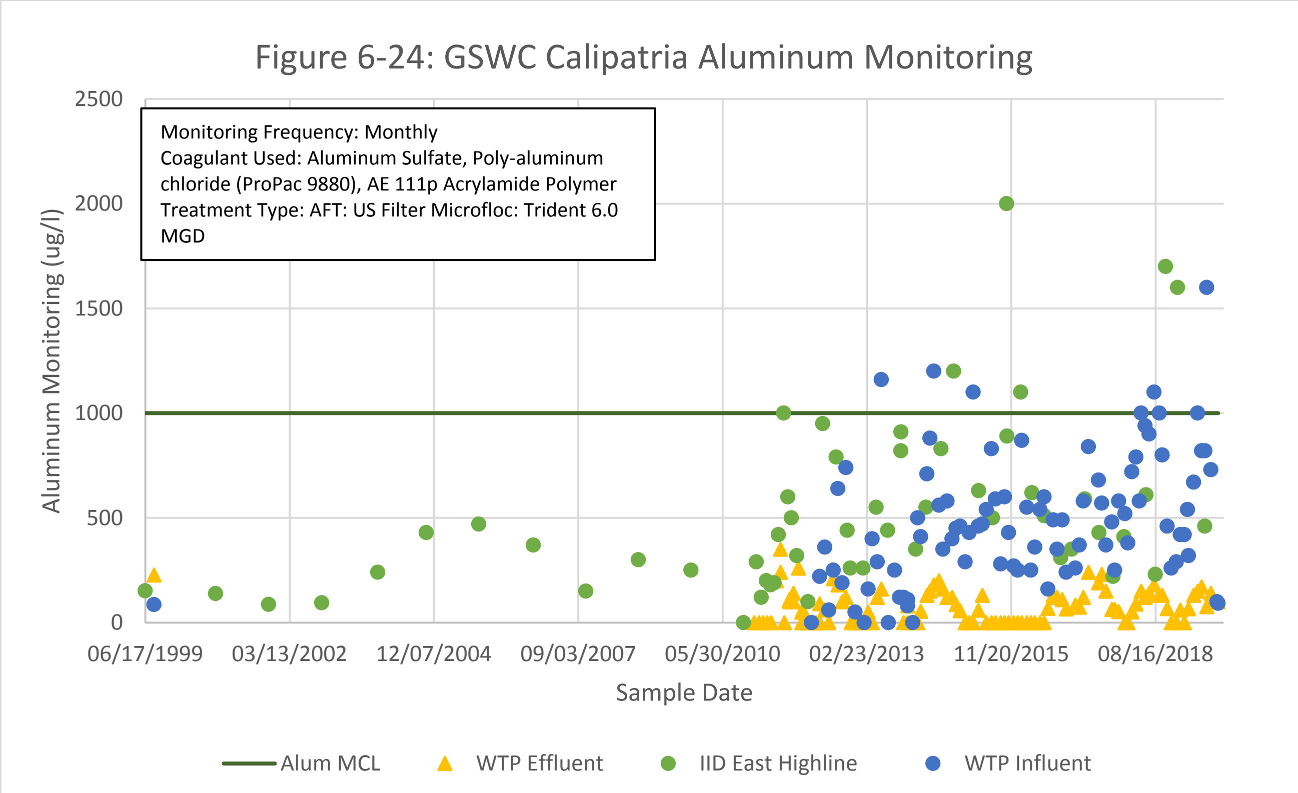


Figure 6-24: GSWC Calipatria Aluminum Monitoring
Monitoring Frequency: Monthly
Coagulant Used: Aluminum Sulfate, Poly-aluminum chloride (ProPac 9880), AE 111p Acrylamide Polymer
Treatment Type: AFT: US Filter Microfloc: Trident 6.0 MGD
Aluminum Monitoring (ug/l)
2500
2000
1500
1000
500
0
06/17/1999
03/13/2002
12/07/2004
09/03/2007
05/30/2010
02/23/2013
11/20/2015
08/16/2018
Sample Date
Alum MCL
WTP Effluent
IID East Highline
WTP Influent

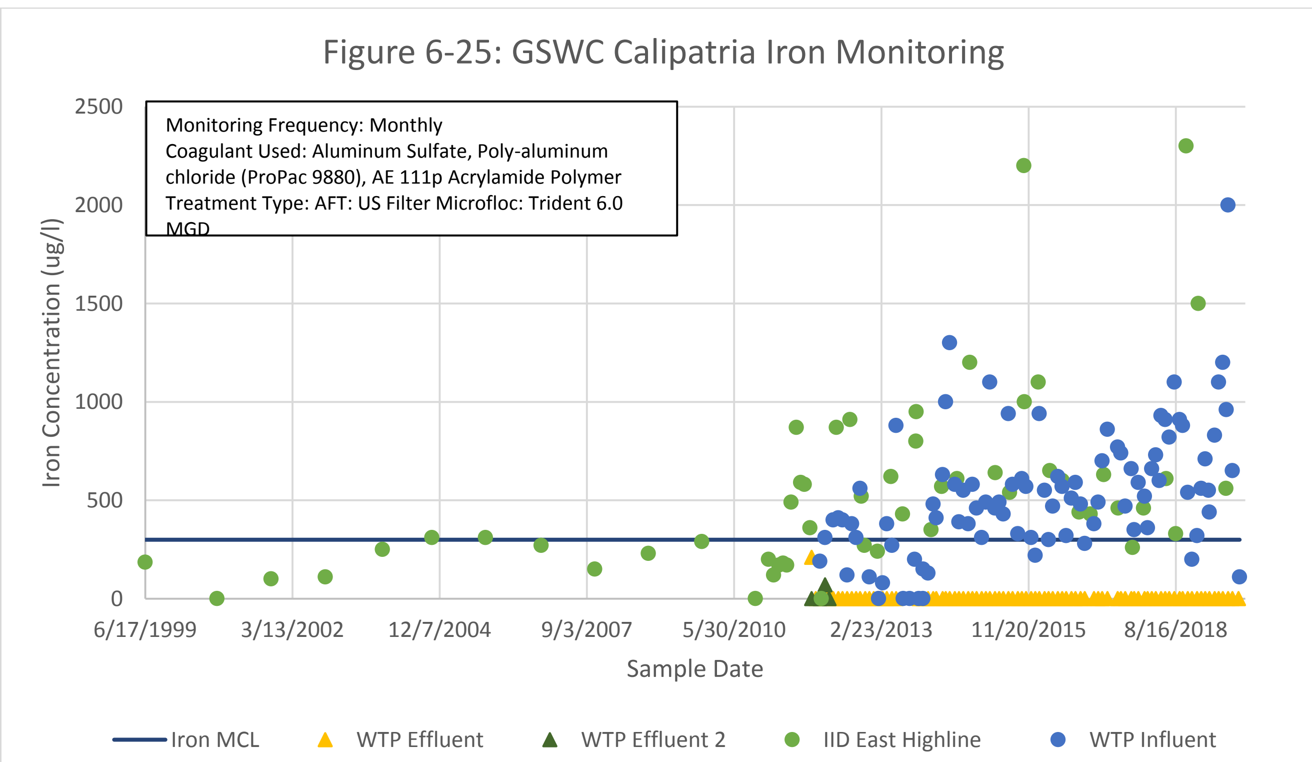


Figure 6-25: GSWC Calipatria Iron Monitoring
Monitoring Frequency: Monthly
Coagulant Used: Aluminum Sulfate, Poly-aluminum chloride (ProPac 9880), AE 111p Acrylamide Polymer
Treatment Type: AFT: US Filter Microfloc: Trident 6.0 MGD
Iron Concentration (ug/l)
2500
2000
1500
1000
500
0
6/17/1999
3/13/2002
12/7/2004
9/3/2007
5/30/2010
2/23/2013
11/20/2015
8/16/2018
Sample Date
Iron MCL
WTP Effluent
WTP Effluent 2
IID East Highline
WTP Influent

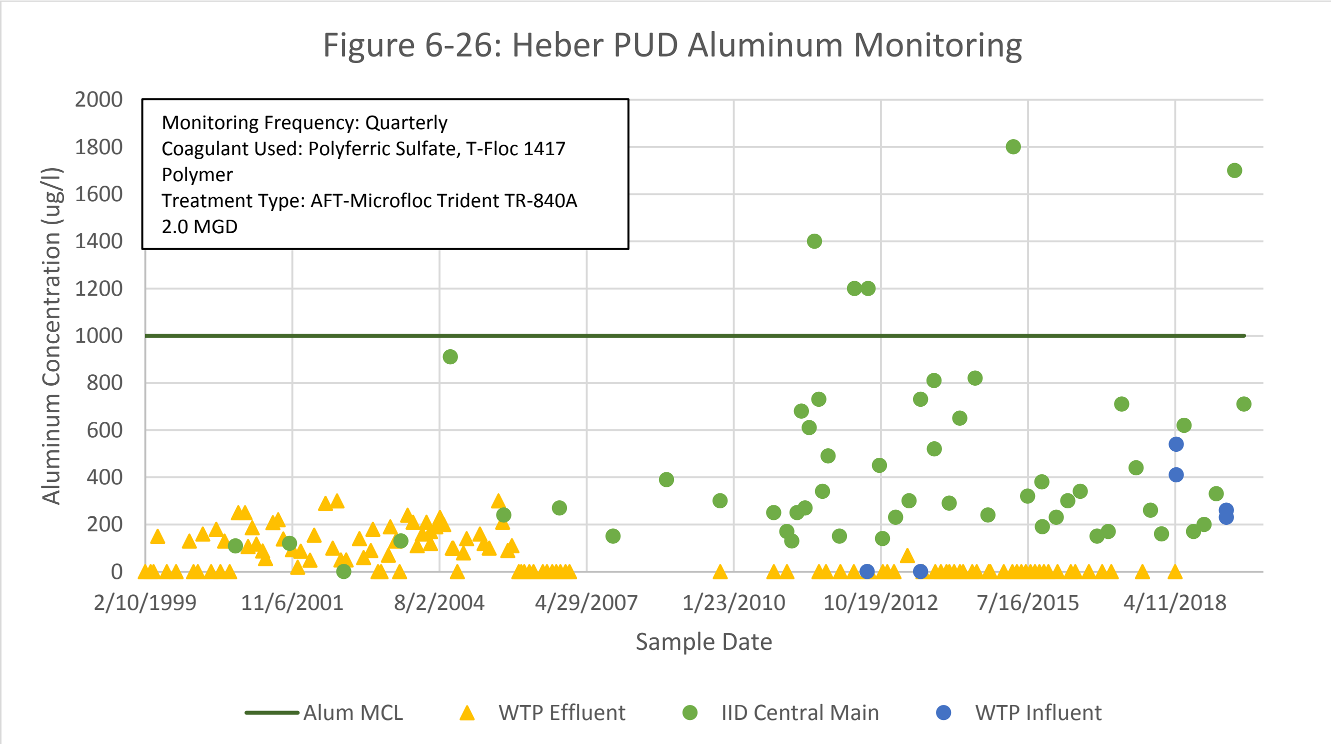


Figure 6-26: Heber PUD Aluminum Monitoring
Monitoring Frequency: Quarterly
Coagulant Used: Polyferric Sulfate, T-Floc 1417 Polymer
Treatment Type: AFT-Microfloc Trident TR-840A 2.0 MGD
Aluminum Concentration (ug/l)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2/10/1999
11/6/2001
8/2/2004
4/29/2007
1/23/2010
10/19/2012
7/16/2015
4/11/2018
Sample Date
Alum MCL
WTP Effluent
IID Central Main
WTP Influent

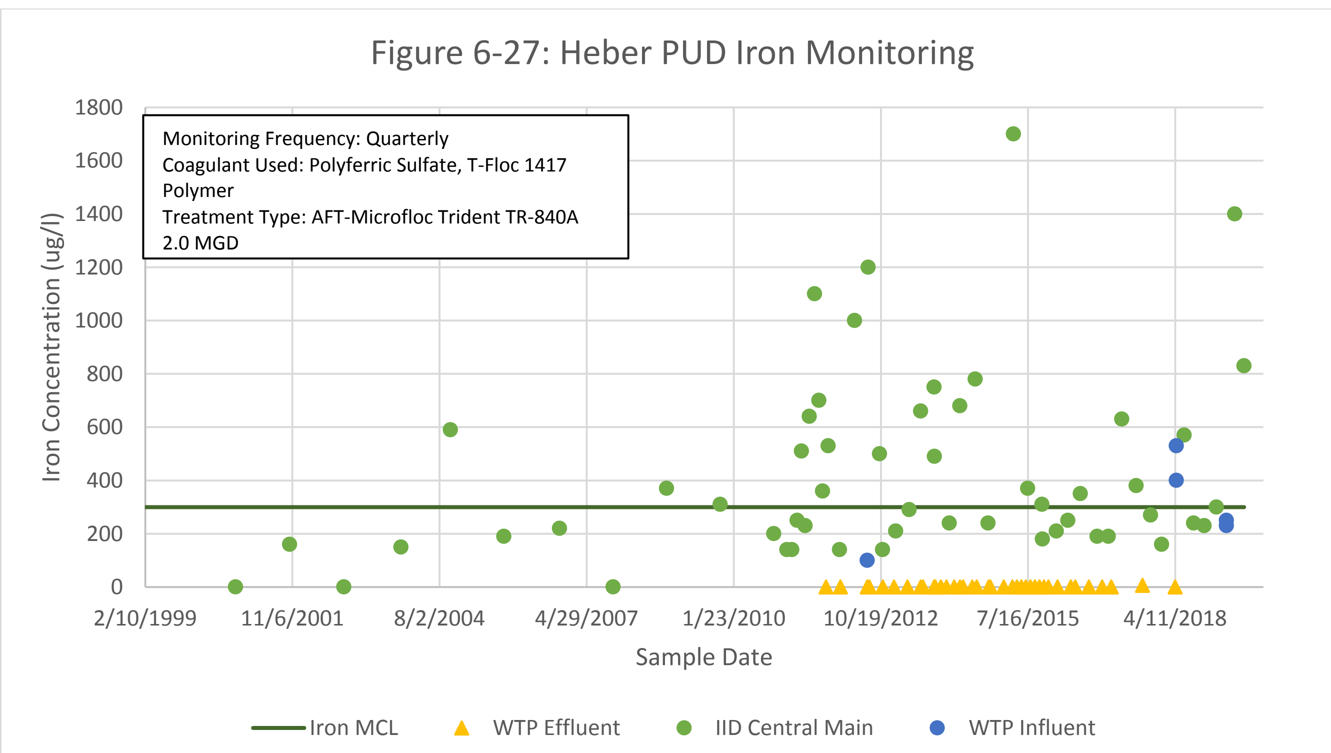


Figure 6-27: Heber PUD Iron Monitoring
Monitoring Frequency: Quarterly
Coagulant Used: Polyferric Sulfate, T-Floc 1417 Polymer
Treatment Type: AFT-Microfloc Trident TR-840A 2.0 MGD
Iron Concentration (ug/l)
1800
1600
1400
1200
1000
800
600
400
200
0
2/10/1999
11/6/2001
8/2/2004
4/29/2007
1/23/2010
10/19/2012
7/16/2015
4/11/2018
Sample Date
Iron MCL
WTP Effluent
IID Central Main
WTP Influent

Figure 6-28: Holtville Aluminum Monitoring

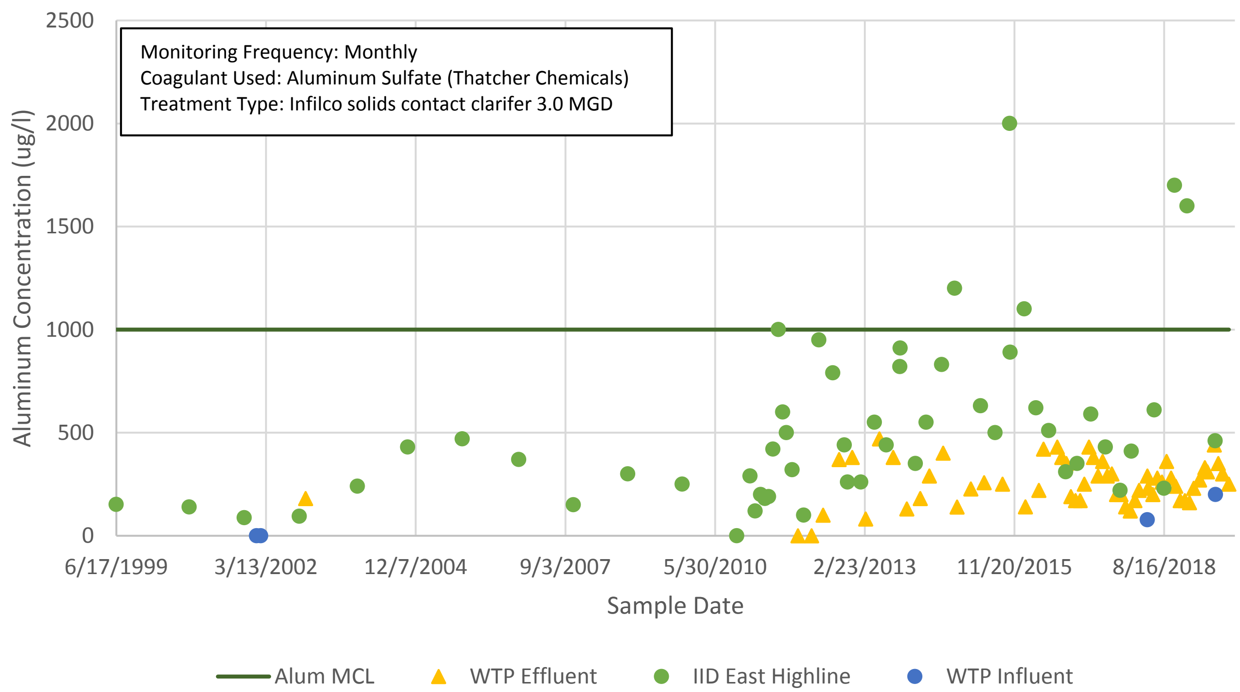


Figure 6-29: Holtville Iron Monitoring

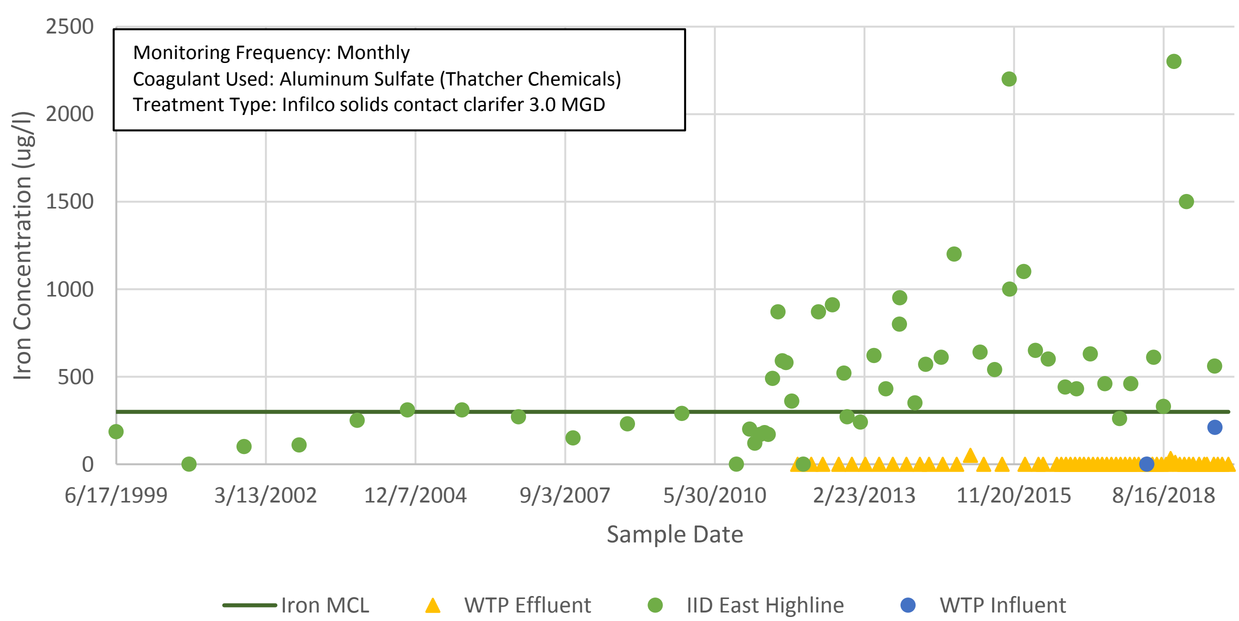


Figure 6-30: City of Imperial Aluminum Monitoring

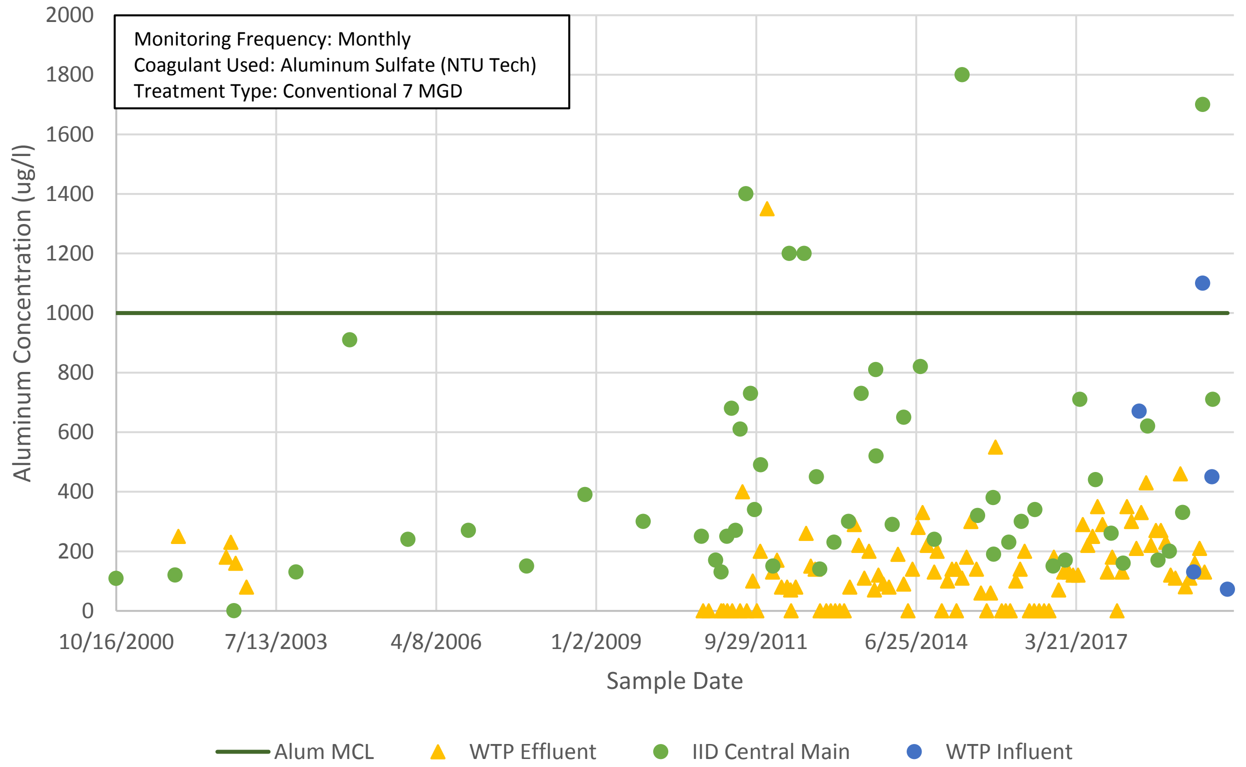
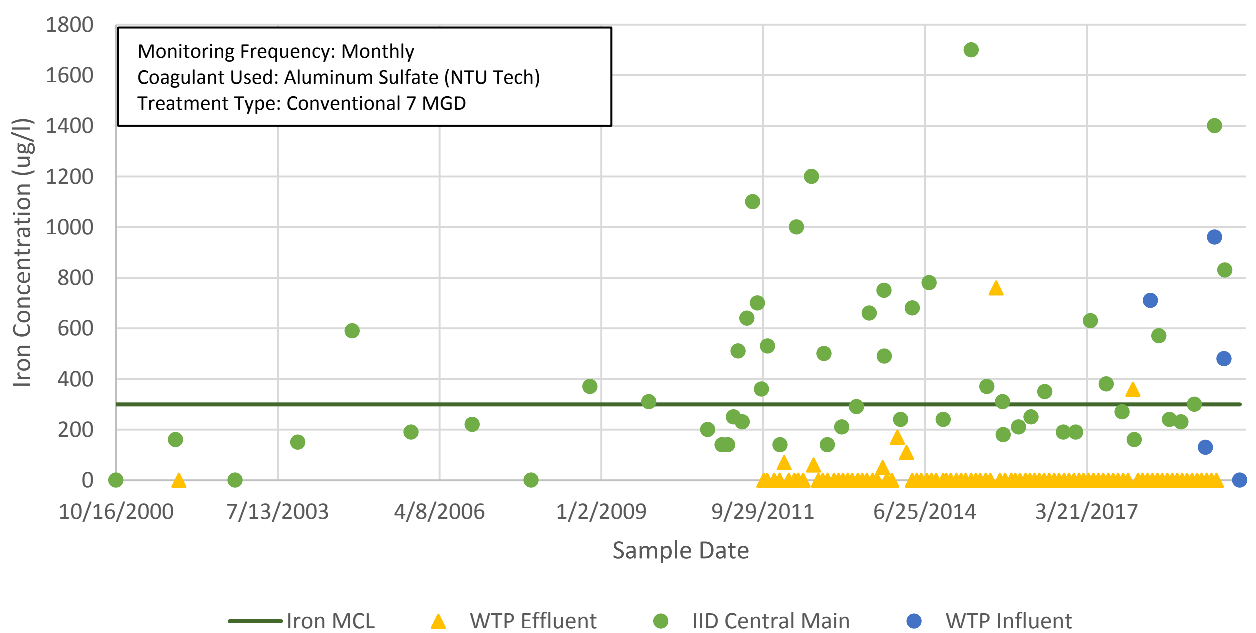


Figure 6-31: City of Imperial Iron Monitoring



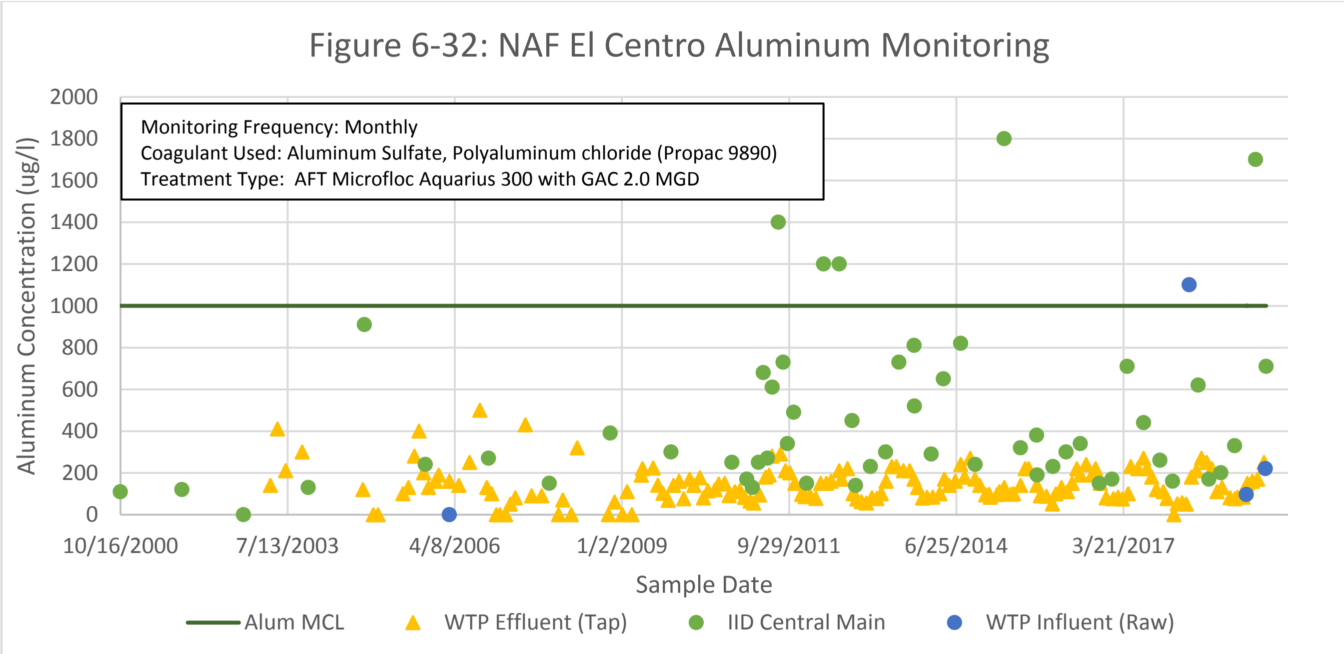


Figure 6-32: NAF El Centro Aluminum Monitoring
Monitoring Frequency: Monthly
Coagulant Used: Aluminum Sulfate, Polyaluminum chloride (Propac 9890)
Treatment Type: AFT Microfloc Aquarius 300 with GAC 2.0 MGD
Aluminum Concentration (ug/l)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Alum MCL
WTP Effluent (Tap)
IID Central Main
WTP Influent (Raw)

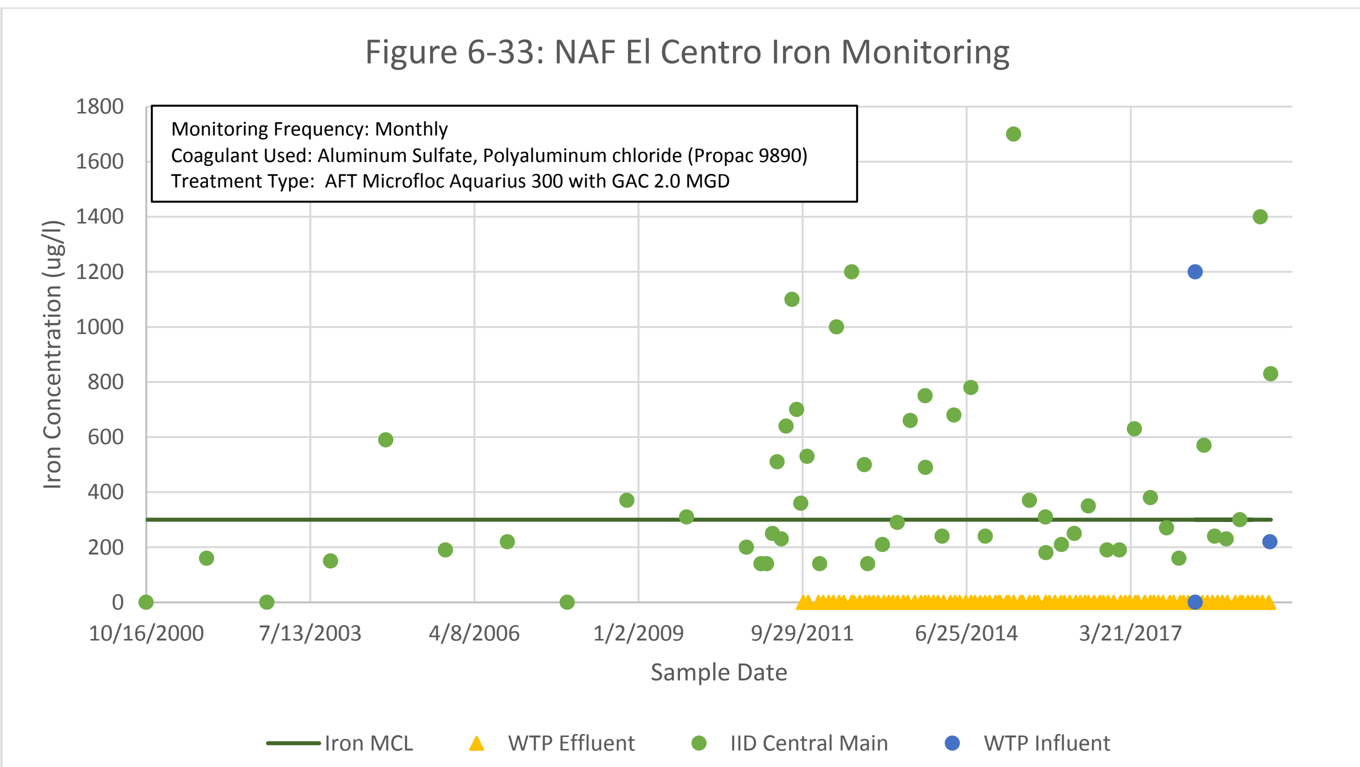


Figure 6-33: NAF El Centro Iron Monitoring
Monitoring Frequency: Monthly
Coagulant Used: Aluminum Sulfate, Polyaluminum chloride (Propac 9890)
Treatment Type: AFT Microfloc Aquarius 300 with GAC 2.0 MGD
Iron Concentration (ug/l)
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Iron MCL
WTP Effluent
IID Central Main
WTP Influent

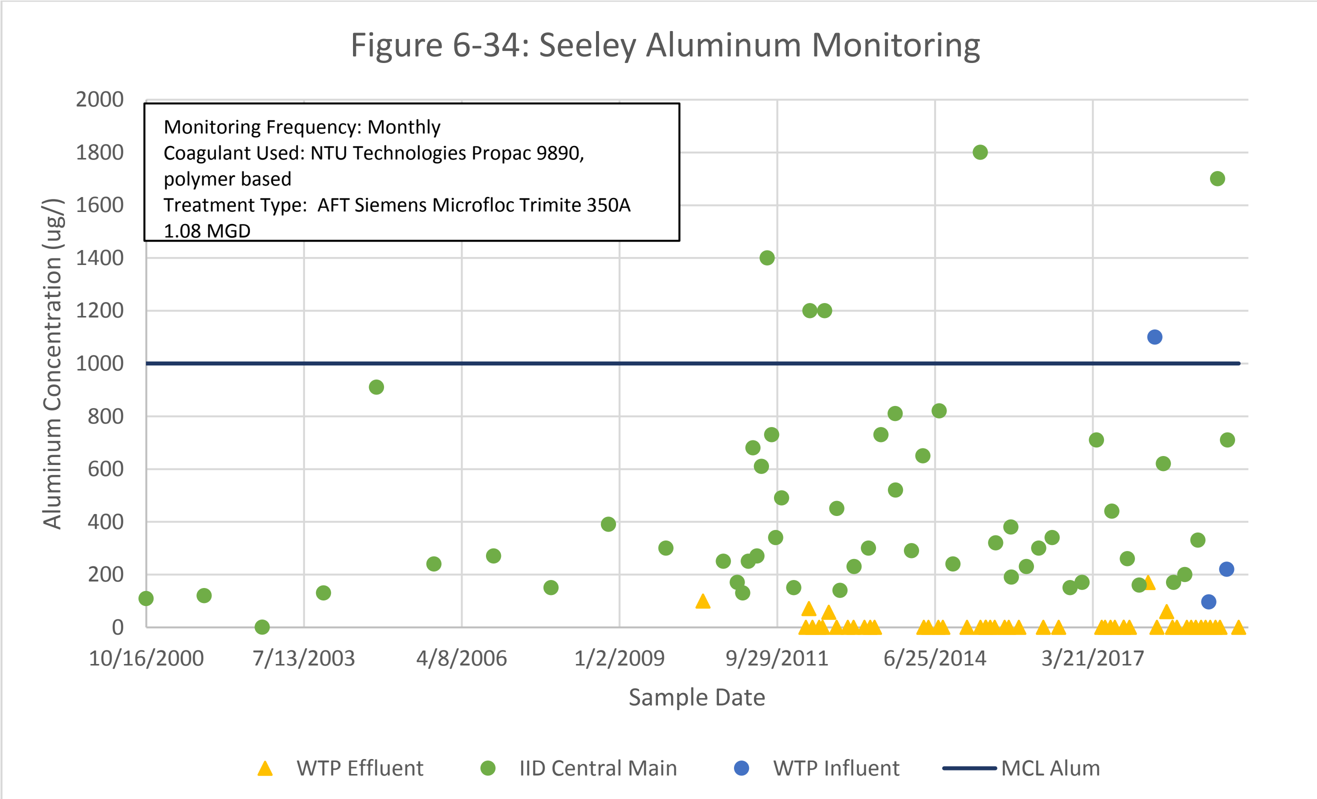


Figure 6-34: Seeley Aluminum Monitoring
Monitoring Frequency: Monthly
Coagulant Used: NTU Technologies Propac 9890, polymer based
Treatment Type: AFT Siemens Microfloc Trimite 350A 1.08 MGD
Aluminum Concentration (ug/)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
WTP Effluent
IID Central Main
WTP Influent
MCL Alum

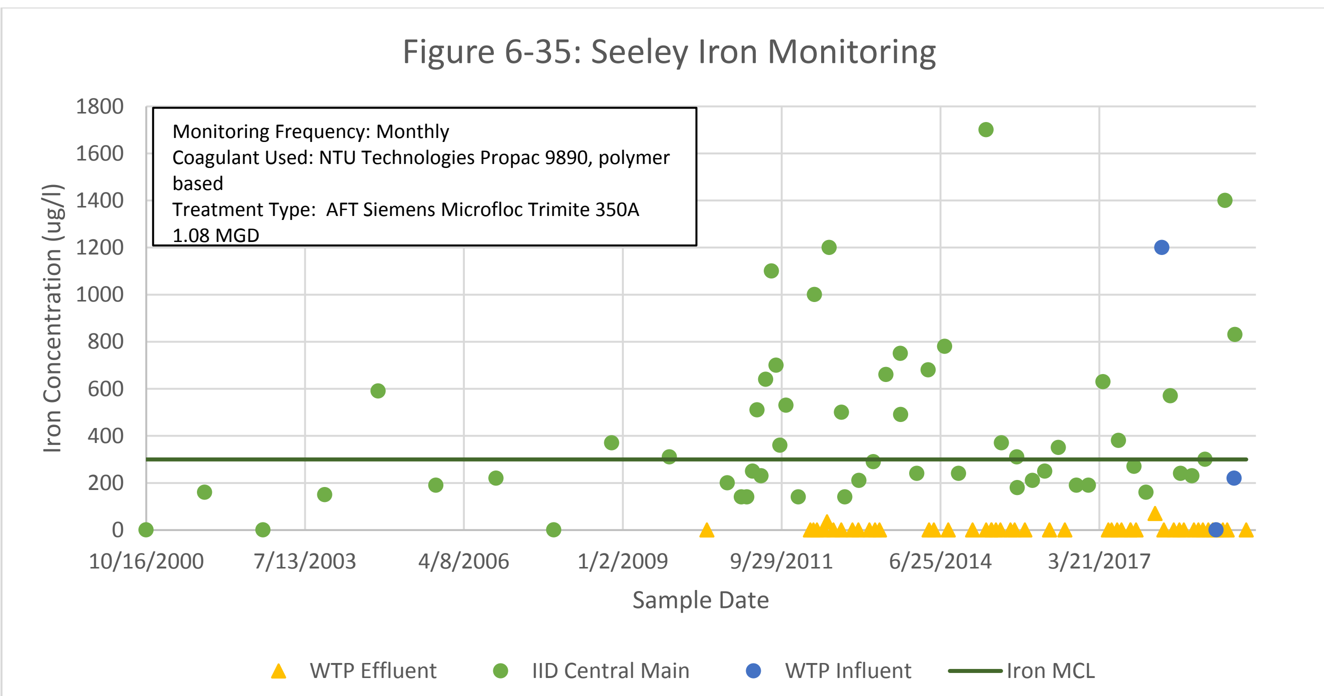


Figure 6-35: Seeley Iron Monitoring
Monitoring Frequency: Monthly
Coagulant Used: NTU Technologies Propac 9890, polymer based
Treatment Type: AFT Siemens Microfloc Trimite 350A 1.08 MGD
Iron Concentration (ug/l)
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
WTP Effluent
IID Central Main
WTP Influent
Iron MCL

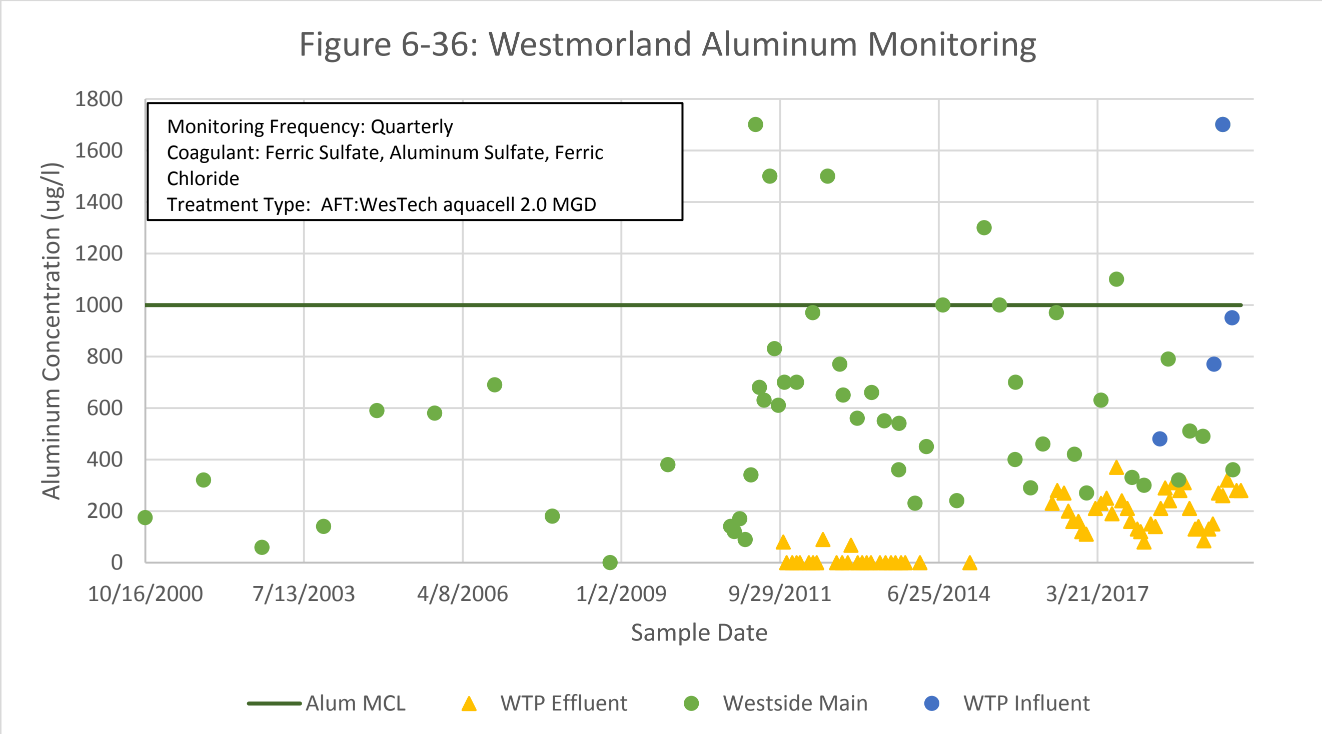


Figure 6-36: Westmorland Aluminum Monitoring
Monitoring Frequency: Quarterly
Coagulant: Ferric Sulfate, Aluminum Sulfate, Ferric Chloride
Treatment Type: AFT:WesTech aquacell 2.0 MGD
Aluminum Concentration (ug/l)
1800
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Alum MCL
WTP Effluent
Westside Main
WTP Influent

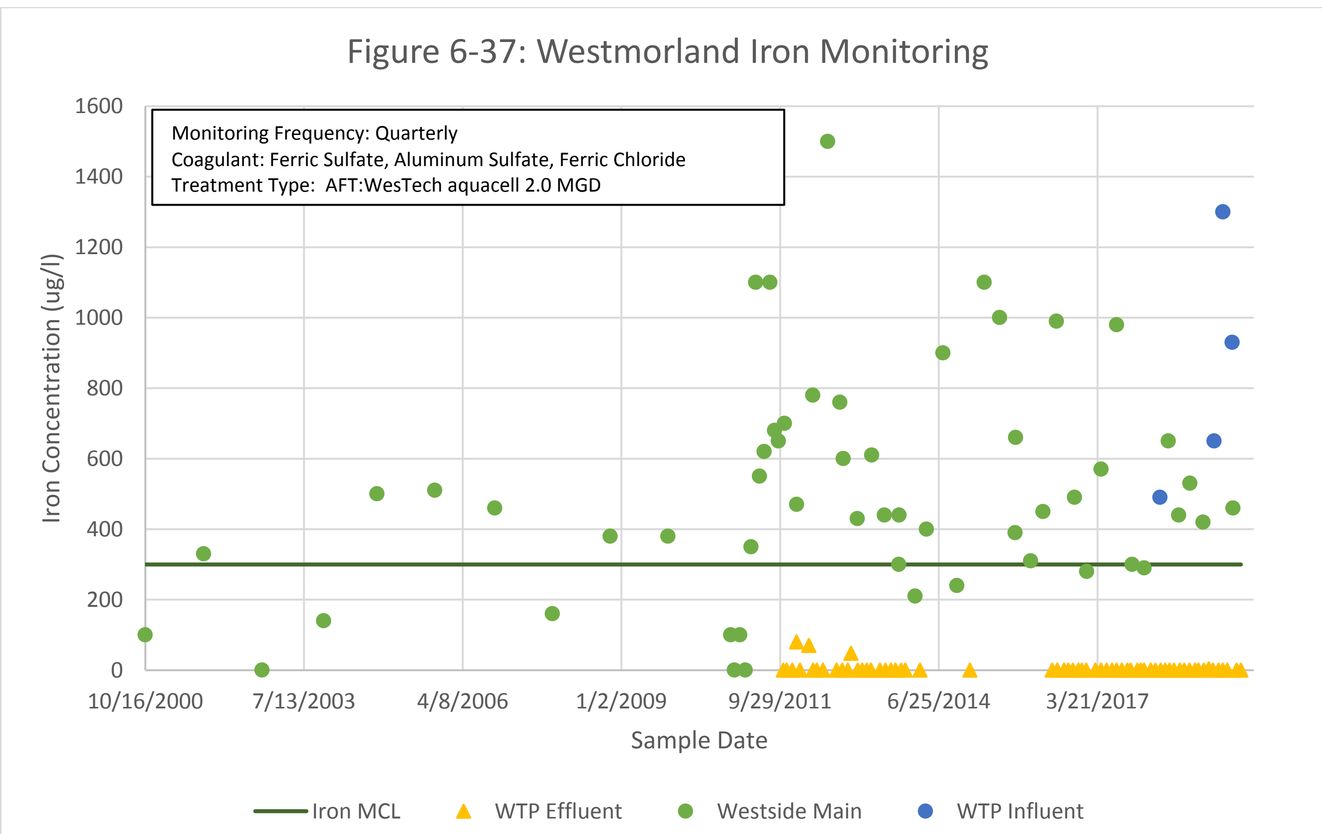


Figure 6-37: Westmorland Iron Monitoring
Monitoring Frequency: Quarterly
Coagulant: Ferric Sulfate, Aluminum Sulfate, Ferric Chloride
Treatment Type: AFT:WesTech aquacell 2.0 MGD
Iron Concentration (ug/l)
1600
1400
1200
1000
800
600
400
200
0
10/16/2000
7/13/2003
4/8/2006
1/2/2009
9/29/2011
6/25/2014
3/21/2017
Sample Date
Iron MCL
WTP Effluent
Westside Main
WTP Influent

6.6 Chemical Monitoring Results

Volatile Organic Chemicals

The following Volatile Organic Chemicals were detected in the testing carried out by IID under their usual canal testing and the Joint Monitoring Program testing.

Dichloromethane (Methylene Chloride)

MCL	5 µg/L
2018	Calipatria - 0.75 µg/L C West Lateral – Gate 48 (branch of East Highline Canal)
2018	CalEnergy (Vulcan Power Plant) 0.97 µg/L Vail Lateral 4 Canal – Gate 416a (branch of Central Main Canal)

The detections occurred in samples taken from the East Highline Canal and Central Main Canal about 30 miles north of their respective headings. Releases of the chemical to water will primarily be removed by evaporation with half-lives of evaporation from water to be 3-5.6 hours under moderate mixing conditions. According to the EPA fact sheet, when released to a river the chemical was not detectable 3-15 miles from the source.[5]

Dichloromethane is used as a solvent; paint stripper, degreaser; extraction agent for flavorings and to decaffeinate coffee and tea; aerosol propellant and blowing agent for polyurethane foams; manufacture of pharmaceuticals, film coatings, and electronics.[6]

Toluene

MCL	150 µg/L
2018	CalEnergy (Vulcan Power Plant) 2.6 µg/L Vail Lateral 4 Canal – Gate 416a (branch of Central Main Canal)
2019	Pine Union School - 3.2 µg/L Township Canal – Gate 21a (branch of East Highline Canal)

The CalEnergy (Vulcan Power Plant) sampling site is about 30 miles north of the Central Main Canal Heading and the Pine Union School sampling site is about 16 miles north of the East Highline Canal heading. If toluene is released into water, its removal can be rapid or take several weeks depending on mixing conditions and temperature. Evaporation half-life is 2.9 to 5.7 hours. It is significantly adsorbed in sediment.[7]

Toluene is added to gasoline and used to produce benzene or as a solvent. It is also used in paints, paint thinners, adhesives, inks, cleaning agents, and synthetic fragrances and nail polish. Toluene exposure is generally from indoor and outdoor air with lower levels in rural areas.[8]

The detection of toluene in canals may be related to leaking fluids from gasoline powered vehicles or equipment that may have fallen into a canal. THG was unable to identify any specific incidents that may have occurred close to the sampling dates and sites because IID does not keep records of such incidents and the sheriff's records do not include incident searchable locations that can be associated with an IID canal.

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[5] EPA 811-F-95-004j-T, National Primary Drinking Water Regulations – Dichloromethane, October 1995.
[6] https://oehha.ca.gov/chemicals/methylene-chloride-dichloromethane
[7] EPA 811-F-95-004p-T, National Primary Drinking Water Regulations – Toluene, October 1995.
[8] EPA 108-88-3, Information Sheet on Toluene created April 1992 and updated July 2012.

Synthetic Organic Compounds

The following Synthetic Organic Chemicals were detected in the testing carried out by IID under their usual canal testing and the Joint Monitoring Program testing.

Diethylhexylphthalate (DEHP)

MCL	4 µg/L
2019	Central Main 4.0 µg/L Intersection of Aten and Austin Roads south of Imperial
2019	East Highline 4.0 µg/L Beal Road crossing, east of Niland

The largest use of DEHP is as a plasticizer to add flexibility to polyvinylchloride (PVC) and other polymers such as rubber, cellulose and styrene. DEHP is found in many products such as packaging materials used in production of foods and beverages; and for medical devices such intravenous (IV) bags and tubing and peritoneal dialysis bags.

DEHP released to water systems will biodegrade rapidly with a half-life of 2-3 weeks and has very little evaporation. It will strongly adsorb in soils or sediment. Except for industrial workers who use the chemical, the highest exposure to the public is from food packaged in plastic that releases DEHP[9].

THG does not see any direct clear pathway for the chemical to enter the IID system. The one feasible method that comes to mind is a release from materials used to maintain the canals that were originally packaged in plastic such as grout or cement. The release would occur after the work is completed shortly after the canals are started up after a dry up period. But the sampling occurred in main delivery canals where flow is rarely interrupted for maintenance.

Glyphosate

MCL	700 µg/L
2018	El Centro – 28 µg/L South Date Gate 20B

Glyphosate is a widely used pesticide in agriculture. It sold as a salt but applied as a spray.

Glyphosate likely enters the water in the canals through accidental spraying or spray drift. The chemical dissipates rapidly in water and may biodegrade. The half-life in water is a few days. It is not expected to volatilize and evaporate from the water.[10]

The sampling date was April 19, 2018 which is during the vegetable growing season in the Imperial Valley. For example, carrots are harvested January to June and production of warm-season vegetables starts in late April with the harvest of Sweet Imperial onions, sweet corn, bell pepper, chili peppers, cantaloupes, mixed melons and watermelons.[11]

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[9] EPA 811-F-95-003y-T, Information Sheet on Phthalate, di(2-ethylhexyl), October 1995 and EPA Summary created in April 1992 and updated in January 2000.

[10] EPA 811-F-95-003q, National Primary Drinking water Regulations – Glyphosate, October 1995.

[11]https://vric.ucdavis.edu/virtual_tour/imp.htm#:~:text=Asparagus%20is%20in%2Dseason%20January,cantaloupes%2C%20mixed%20melons%20and%20watermelons.

Follow Up Testing

The following tables show the results of follow up testing done on a quarterly basis for those locations testing positive for VOCs and SOCs.

Table 6-36: Follow Up Testing (2018)

Pscode	Water System	Facility	Constituent	Q2, 2018 (4/26/18) Result	Q3, 2018 (8/15/18) Result	Q4, 2018 (10/24/18) Result	MCL	DLR	Trigger	Unit
1300638-001	CalEnergy-Vulcan Power Plant	Vail Lat 4 - Gate 416A	Dichloromethane	0.97 µg/L	no detection	no detection	5	0.5	0.5	µg/L
1310004-001	City of El Centro	(Primary) South Date - Gate 20B	Glyphosate	28 µg/L	no detection	no detection	700	25	25	µg/L
1310003-001	GSWC - Calipatria	C-West Lateral - Gate 38	Dichloromethane	0.75 µg/L	no detection	no detection	5	0.5	0.5	µg/L
1300553-001	Magnolia Union School	OSAGE - GATE 23A	Toluene	no detection	-	-	150	0.5	0.5	µg/L
1300560-001	Pine Union School	TOWNSHIP - GATE 21A	Toluene	no detection	-	-	150	0.5	0.5	µg/L
1300638-001	CalEnergy-Vulcan Power Plant	Vail Lat 4 - Gate 416A	Toluene	no detection	-	-	150	0.5	0.5	µg/L

Table 6-37: Follow Up Testing (2019)

Pscode	Water System	Facility	Constituent	Q1, 2019 (1/16/19) Result	Q2, 2019 (5/21/19) Result	Q3, 2019 (7/18/19, 7/25/2019)	Q4, 2019 (10/23/19) Result	MCL	DLR	Trigger	Unit
1300638-001	CalEnergy-Vulcan Power Plant	Vail Lat 4 - Gate 416A	Dichloromethane	no detection	1.2	no detection	no detection	5	0.5	0.5	µg/L
1310004-001	City of El Centro	(Primary) South Date - Gate 20B	Glyphosate	no detection	no detection	no detection	-	700	25	25	µg/L
1310003-001	GSWC - Calipatria	C-West Lateral - Gate 38	Dichloromethane	no detection	no detection	no detection	-	5	0.5	0.5	µg/L
1300553-001	Magnolia Union School	OSAGE - GATE 23A	Toluene	-	-	2.5 µg/L	no detection	150	0.5	0.5	µg/L
1300560-001	Pine Union School	TOWNSHIP - GATE 21A	Toluene	-	-	3.2 µg/L	no detection	150	0.5	0.5	µg/L
1300638-001	CalEnergy-Vulcan Power Plant	Vail Lat 4 - Gate 416A	Toluene	-	-	2.6 µg/L	no detection	150	0.5	0.5	µg/L

Table 6-38: Follow Up Testing (2020)

Pscode	Water System	Facility	Constituent	Q1, 2020 (1/30/20) Result	Q2, 2020 (4/23/20) Result	Q3, 2020 (7/28/20) Result	Q4, 2020 (10/23/20) Result	MCL	DLR	Trigger	Unit
1300638-001	CalEnergy-Vulcan Power Plant	Vail Lat 4 - Gate 416A	Dichloromethane	no detection	no detection	-	no detection	5	0.5	0.5	µg/L
1310004-001	City of El Centro	(Primary) South Date - Gate 20B	Glyphosate	-	no detection	-	no detection	700	25	25	µg/L
1310003-001	GSWC - Calipatria	C-West Lateral - Gate 38	Dichloromethane	-	no detection	-	no detection	5	0.5	0.5	µg/L
1300553-001	Magnolia Union School	OSAGE - GATE 23A	Toluene	no detection	no detection	no detection	no detection	150	0.5	0.5	µg/L
1300560-001	Pine Union School	TOWNSHIP - GATE 21A	Toluene	no detection	no detection	no detection	no detection	150	0.5	0.5	µg/L
1300638-001	CalEnergy-Vulcan Power Plant	Vail Lat 4 - Gate 416A	Toluene	no detection	no detection	no detection	no detection	150	0.5	0.5	µg/L

7.1 Canal and Right of Way Maintenance Procedures

Imperial Irrigation District conveyance system consists of concrete-lined canals including the All American Canal which covers about 1,114 miles. Irrigation canal maintenance is to maintain design flow capacities and in-channel system storage in the overall system so it can perform its intended function. Canal and drain maintenance procedures include grading drains once every five years and canal laterals about once a year. The canal lining is constructed with concrete panels segmented with contraction joints to repair cracked, buckled or defective concrete panels. The joints are often sealed with waterproof mastic. The canals require periodic inspections for replacement or repair; therefore the canals must be dewatered approximately every three to four months for about three days. IID anticipates that the concrete lining on the canals will be replaced up to two times over a 75 year period.

Right of Way

Canals are generally constructed within a 50 to 70 foot right-of-way and drains typically constructed within an 80 to 120 foot wide right-of-way. These right-of-ways or easements represent the drains or canals, roadways on both sides along with the embankments. Right-of-way maintenance involves routine grading and grooming of the embankment to maintain a smooth surface and remove rills that develop during rainstorms. Erosion is a major concern occurring after a rainstorm within the drains or unlined canals as a result of snaking channels of water from irrigation flow or drain water or storm water runoff.

7.2 IID Canal System Routine Maintenance Procedures

IID's Water Department has ongoing routine maintenance procedures for its canals, laterals, and other components of the delivery and conveyance system. Field staff zanjeros (ditch riders) visually inspect the canals and structures during their daily runs, and record any maintenance needs seen in the field. Zanjeros remove nominal trash, vegetation and debris from channels and structures that interfere with their immediate tasks. IID is continually conducting maintenance both preventative and reactive of its waterways. This maintenance is routine and is considered basic to the upkeep of in-line structures to perform their intended function. These employees therefore serve as the IID spotters for maintenance needs as they travel the irrigation canal banks on a daily basis. Zanjeros play a vital role in the control and flow of water in the valley.

IID has multiple maintenance procedures to restore the canal to its original design capacity. Some methods focus on the channel cross section of earthen canals and others focus more on general maintenance for concrete lined canals. The routine maintenance procedures performed by IID maintenance forces are described in further detail are the following:

1. Disking (Earthen Canals)
2. Chaining (Earthen and Concrete Canals)
3. Cleaning/Excavation (Earthen Canals, Concrete Canals)
4. Concrete Lining Repair/Replacement
5. Rip-Rap Placement (Earthen Canals, Reservoirs)

Disking

Disking is performed at routine intervals twice a year to remove aquatic and terrestrial vegetation, weeds and other debris that clog the irrigation channel and reduce the flow of water. The purpose is to have no interference with any structure and to have the channel back at original capacity. This is completed by pulling stubble disk through the channel to achieve the standards. It also assists to loosen up silt buildup so the velocity of the flow will flush it away.

Chaining

Chaining is performed at routine intervals from monthly to annually, depending upon the stretch of channel to remove weeds, vegetation that clog irrigation channels and reduce the flow of water. The purpose is to have no interference with any structure and to have the channel back at original capacity. This is executed by pulling anchor chain through a channel to achieve standards and eliminate silt buildup.

Cleaning/Excavation

Cleaning and excavation is performed at routine intervals from monthly to annually, depending upon the canal, to remove weeds, algae and other debris clogging irrigation channels and reducing the flow of water. The purpose is to have no interference with any structure, original capacity and eliminate risk of silt movement into pump systems to achieve standards.

Concrete Lining Repair/Replacement

Concrete Lining Repair/replacement is performed at routine intervals when lateral canals are dewatered every 60 days or biannually to repair or replace cracked, broken or defective concrete panels for restoration. The purpose is having no water penetrate or pass through the panels and that the lining does not impede flow or use of weed removal equipment. Any sealant, drycrete or any other material by IID needs to be approved in order to achieve standards.

Rip-Rap Placement

Rip Rap placement is performed when erosion threatens earthen canals, drains or reservoirs to reduce erosion reported and movement or disturbance of existing rip rap. The purpose is to restore the channel to its original condition by placing rip-rap to achieve standards.

7.3 Sediment Removal Operations

Sediment removal involves the removal of sediment deposits from District canals and drains, typically with the use of excavators. Sediment buildup must be removed because it can reduce the carrying capacity of waterways, which leads to overflows and flooding. Drains are realigned to reduce erosion and sloughing that may be caused by misalignment. Design and flow capacities of District drains and canals vary with each channel. The frequency of sediment removal activities for channels will range depending on the channel and site conditions. The removal operation is a mechanical process that requires the use of hydraulic excavators or small backhoes to remove the material. Dredged spoil is collected on the side of the canal or drain where it is allowed to dry before a dozer or grader grooms it into the embankment. Canals are cleaned on an as-needed basis. If a canal is taken out of service, notice before the outage will be given to water users who are supplied by that canal. Notification is not issued unless the canal is taken out of service.

7.4 Canal Cutouts, Structures, and Gates

The IID Water Department is continually conducting maintenance both preventative and responsive of its waterways. With procedures like disking, chaining, cleaning, concrete lining repair, vegetation management, and bank, gate, pipe and road maintenance, the Maintenance Unit keeps the Colorado River water flowing. The Construction Unit is responsible for new canal lining projects, adding pipelines, and all other major repair and additions to IID's water system included in the annual capital improvement program (CIP). While some procedures can be done while a canal or drain has water in it, much of the work is completed during planned 'Cut-Out' periods. For a list of planned canal cutouts, see the schedules posted on website.

Maintenance operations including weed, vegetation control and construction work are the contributing factors for water to be cut out of service of the District's canal system. Canal Cutouts are generally for a three to six day period, except in emergencies. Adequate notice is given to affected users prior to all cutouts. Routine three-day cutouts are as often as 60 days except in emergencies. Cutout notices for six-day periods will be color-coded pink. Notification is in the form of a standard post card showing starting date and duration of proposed cutout, and shall be mailed 12 days prior to date of each canal cutout. Recently, IID has begun notifying of outages customers via text message and phone calls if there is an emergency.

Imperial Irrigation District (IID) canal system consists of roughly 5,578 water delivery structures; 306 on the main canals and 5,233 on the laterals. Irrigation gates determine whether water moves through delivery structures by raising or lowering irrigation gates, IID determines how much water flows to a delivery. Well-equipped gates also perform the important function of preventing leaks, which adversely affects IID's ability to move water through its system efficiently. Maintenance is essential to keep gates in good working order to prevent lifting mechanism failure, to ensure adequate deliveries and to prevent leaks.

7.5 Weed and Other Vegetation Control

Vegetation Management Unit is in charge of activities pertaining to the drainage system. Vegetation management includes all planning, preparations and practices of weed prevention control and remedial recovery used to minimize potential adverse effects of vegetation on and in canals, drains and other facilities. The staff will perform drain evaluations for the appropriate cleaning method and spray weed control on the drain and canal systems. Applying adaptive management techniques to vegetation control can assist with maintaining regional ecosystems, managing vegetation in specified areas, preventing system degradation, promoting ecological processes, and reducing adverse environmental effects. It involves identification of beneficial plants and removal of undesirable vegetation in and around District drains and canals. Removal of undesirable vegetation is important because it helps to ensure that District drains and canals are free of excessive vegetation that may interfere with the flow of irrigation and drainage water while possibly assisting beneficial plants to become established. There are three types of vegetation management to ensure the canal can contain the flow for which it was designed. The three types are as follows:

1. Mechanical Weed Control
2. Chemical Weed Control
3. Biological Weed Control

A thorough inspection must be done to determine the appropriate method of weed control and growth should be analyzed and recorded.

Mechanical Weed Control

Mechanical Weed control management is performed at routine intervals (30, 60, 90 days or biannually) to control aquatic and terrestrial growth and limit growth on the IID right-of-way. Appropriate equipment is used to restore road bank to original or operational condition.

Chemical Weed Control

Chemical Weed Control management is performed at an annual schedule kept by the Water Department Vegetation Management Unit to eliminate weed growth that affects operations maintenance and controlling invasive plant species. The Water Department will make an inspection about 28 days following chemical spraying to see if the spraying agent has eradicated or controlled the weed growth. If not, the vegetation manager of his designee will determine further spraying methods.

Biological Weed Control

Biological Weed Control is performed when initial supplemental stocking of grass carp has reached deficiency level to minimize the aquatic vegetation. The IID operates the only grass carp hatchery in California. It produces sterile triploid carp that are vital to the control of aquatic vegetation including hydrilla in waterways. Stocking of grass carp to achieve the maintenance standards is the purpose of this type of management practice.

8.1 Conclusions

The purpose of this Watershed Sanitary Survey Update is to evaluate the watershed area that impacts the Colorado River and the drinking water path. The WSS update includes the area south of the Parker Dam to the drinking water providers along the Colorado River, the All-American Canal, and through the IID canal network within the Imperial Valley Watershed. The area north of the Parker Dam is covered in the Metropolitan Water District Watershed Sanitary Survey.

The Imperial Valley Joint Watershed Sanitary Survey 2020 Update (WSS) covers the following sections:

Section 1: Executive Summary
Section 2: Recommendations
Section 3: Description of Watershed
Section 4: Drinking Water Providers
Section 5: Potential Sources of Contaminants
Section 6: Water Quality Review and Assessment
Section 7: Watershed Control and Management
Section 8: Conclusions

The principal findings of the WSS from Sections 2, 5, 6, and 7 are presented in the following four subsections: (1) Summary of the recommendations , (2) Summary of potential sources of contamination (3) Summary of water quality review and results, and (4)Summary of watershed control and management.

Summary of Recommendations

The recommendations provided in Section 2 are a combination of new recommendations and modified recommendations based on previous Watershed Sanitary Surveys. There were 17 drinking water provider recommendations and 17 Imperial Irrigation District (IID) recommendations.

Drinking water provider recommendations covered a variety of topics, from TTHM and first flush concerns to websites and further testing/ monitoring. Several recommendations focused on more communication between the drinking water providers and the IID. The majority of the drinking water providers that responded to the questionnaire either already had the recommendations in place, were willing to adopt the recommendations, or did not feel the recommendations pertained to them. All except two of the state regulated drinking water providers participated. Ten of the county regulated drinking water providers participated.

The IID had several departments involved in responding to the recommendations. IID has methods in place to address a portion of recommendations. Several recommendations were viewed as difficult to achieve due to the canal system network size consisting of hundreds of miles.

Section 8 Conclusions

Summary of Potential Sources of Contamination

The 2020 Watershed Sanitary Survey Update classifies the potential point and non-point contaminant sources contributing to the watershed upstream and downstream of the Imperial Dam along the Colorado River, a portion of the All American Canal, and the Imperial Valley Canal System. Section 5 focused on the potential sources of contamination within the watershed.

The potential sources of contamination which were identified are summarized in the following categories: Storm Water Runoff and First Flush Events; Spills into the IID Canal System; Drowning; Failing Septic Systems; Wastewater Collection; Treatment and Discharge; Recreation on the River and Associated Bodies of Water; Agricultural Activities; and Other Concerns.

Most sources of potential contamination are regularly monitored and regulated. Many of the issues related to failing septic tanks are in the process of being resolved by the installation of wastewater contamination treatment plants. A major potential source of contamination in the Imperial Valley is agricultural activity. A separate drainage canal system separates the drinking water supply from the contaminated water but does not remove the risk of chemigation backwash. Potential sources of contamination exist but the recommendations of this WSS aim to reduce the likelihood of contamination.

Summary of Water Quality Review and Results

Section 6 summarizes current surface water treatment regulations and identifies upcoming applicable regulations. The Environmental Protection Agency (EPA) establishes federal regulations for the control of contaminants in drinking water and under the provisions of the Safe Drinking Water Act (SDWA); the State Water Resources Control Board – Division of Drinking Water (DDW) has the primary responsibility to enforce drinking water regulations. The California Code of Regulations, establishing the drinking water quality requirements and monitoring standards, can be no less stringent than the federal regulations. Applicable federal regulations under the SDWA are categorized by the following:

- Chemical Contaminants
  - Inorganics
  - Radionuclides
  - Volatile Organic Chemicals (VOCs) and Synthetic Organic Chemicals (SOCs)
  - Contaminants regulated under Secondary Guidelines

- Surface Water Treatment Rules (SWTR)
  - Filter Backwash Recycling Rule (FBRR)
  - Interim Enhanced Surface Water Treatment (IESWTR)
  - Long Term 1 & 2 Enhanced Surface Water Treatment (LT1ESWTR & LT2ESWTR)

- Other Water System Rules
  - Lead and Copper Rule
  - Disinfection Byproducts Rule
  - Total Coliform Rule
  - Total Coliform (TCR) and Revised Total Coliform Rules (RTCR)

Section 6 reviews the regulations in detail. Section 6 includes the testing requirements. The IID's Enhanced Joint Monitoring Plan is the main source of data for the raw water supply directed to the water treatment plants. Concerns about the levels of iron and aluminum in the raw water supply resulted in testing occurring for both of these constituents upstream and downstream of the water treatment plant. Test results indicated that the concentration of these constituents did not exceed the maximum contamination level.

The constituents that were detected above the allowed MCL limit were reviewed in greater detail in section 6.6, Chemical Monitoring Results. Potential sources of the constituents were discussed and follow up testing which was conducted was reviewed. The follow up testing indicated no detection for the constituents previously found in the canals.

Summary of Watershed Control and Management

The IID is responsible for the management of the canal system in the Imperial Valley. IID's Water Department has ongoing routine maintenance procedures for its canals, laterals, and other delivery and conveyance system components.

Routine maintenance procedures employed by the IID include disking (Earthen Canals), chaining (Earthen and Concrete Canals), cleaning/excavation (Earthen Canals, Concrete Canals), concrete lining repair/replacement and rip-rap placement (Earthen Canals, Reservoirs). IID is also responsible for the removal of sediment, weeds, and other vegetation.