MEMBER ANNUAL REPORT

2021-2022

ASSESSING NITRATE IMPACTS ON GROUNDWATER

East San Joaquin
WATER QUALITY COALITION

Table of Contents

2021-2022 in Review

It's become the time marker for this decade: pre-Covid; during Covid and after Covid.

During and now after Covid lockdowns, the ESJWQC continues operations under the new normal that applied to almost all other businesses. Live member meetings were canceled but now have resumed. Farm Bureau offices in the three counties were generally closed but now are open again. While most membership management business is handled over the phone and through email, members can now come into an office again.

Farming continued and overall, ESJWQC members fulfilled their reporting requirements and water sampling was performed according to schedule.

A growing concern is surface water monitoring results for the last three years. In 2019, the Water Board changed the requirement for measuring pyrethroid insecticides in water. Since then, ESJWQC sampling results continue to show that pyrethroid insecticides are being found above water quality objective thresholds throughout the region. Major, recurring pests in almonds and walnuts can't be ignored and pyrethroid insecticides are the most cost-effective tool. These exceedances are triggering more Surface Water Quality Management Plans; up to 20 new Pyrethroid Management Plans from the 2020 through the 2022 Water Years. Watershed-based Management Plans require member visits by ESJWQC staff, completion of management practice surveys and follow-up to ensure changes in practices are being used to address the problem and result in at least three years of clean water quality data.

The ESJWQC Groundwater Quality Trend Monitoring Program began in 2018. Groundwater sampling in 2021 for 37 trend monitoring wells showed little to no changes from 2020 results. In 2021, 13 monitoring wells were added to the network. The 2022 groundwater samples were recently taken in July. The Coalition partnered with Groundwater Sustainability Act (GSA) agencies to share sampling costs for the trend monitoring events.

Overall, wells sampled the longest showed no significant changes in nitrate levels. Nine domestic wells sampled in the trend monitoring network have had nitrate concentrations above the drinking water Maximum Contaminant Level for three or more years.

For the fifth year of groundwater trend monitoring, the ESJWQC, as part of the Central Valley Groundwater Monitoring Collaborative (CVGMC), submitted the first 5-Year Characterization Analysis that included multiple coalitions across the Central Valley.

Where progress is being made is development of Groundwater Protection Formulas, Values and Targets. This requirement from the revised 2018 General Order is intended for use in measuring progress in groundwater quality, in particular, nitrate concentrations. A formula was developed by the Central Valley coalitions and their technical consultants that was subsequently approved by the Water Board in 2021. This formula was then used in 2022 to create values that represent the amount of nitrogen applied to crops in a township and potential amounts moving past the root zone into groundwater. Groundwater Protection Targets, the final step and submitted in July 2022, are still being evaluated by the Water Board.

Getting approval of the proposed nitrate loading targets for townships by the Water Board won't be easy. Comment letters by activist groups panned the plan submitted by the Central Valley coalitions. Legal challenges are possible if the Water Board adopts the targets as proposed.

Executive Director Klassen Resigns Position

On May 31, I announced to the ESJWQC Board of Directors my resignation as Executive Director.

While applications for my replacement are evaluated, I will continue performing my role and responsibilities. Once the new Executive Director is hired, I will continue as an advisor to the Coalition as needed.

It's been 20 years since the ESJWQC was formed and I took on this role. Resigning my position was a difficult decision but I'm confident the Board of Directors and consultants who manage the organization will continue to provide the expertise and services needed by members to comply with the Irrigated Lands Regulatory Program. It's been my honor to serve this organization, getting to know so many of our members through the years and working as your representative for this program.

My best to you all!

Parry Klassen
Executive Director
209-846-6112 or director@esjcoalition.org

Coalition Overview

New Board Members Seated

Expansion of the ESJWQC Board of Directors to 11 seats was approved by the membership in 2020. Three new board members were added after an election in 2021. Also, two long time board members retired: William McKinney and Bill Brush. The current board members are:

Board Members/Officers	
Alan Reynolds	President
Breanne Vandenberg	Secretary
David Brush	Treasurer
Tom Roduner	Board member
Christina Beckstead	Board member
Patrick Machado	Board member
Mark Hudson	Board member
Joey Biscay	Board member
Domonic Rossini	Board member
John Mendonca	Board member
Loren Scoto	Board member

Terms Of ESJWQC Board Members

Board members in open seats covering the three counties serve three years, with several terms ending in 2023. Board members periodically resign mid-term for health or business reasons, so vacancies periodically occur.

Taking a board seat on ESJWQC is not committing time to "just another volunteer farm organization." Unlike most farm organizations (other than the 11 other Central Valley water quality coalitions), ESJWQC directly represents growers to a State regulatory agency that has oversight of important farming inputs and activities. The Irrigated Lands Regulatory Program (ILRP) in coming years faces some incredible challenges as the Nitrate Control Program (see page 7) and evaluation of nitrogen fertilizer use on crops enters into its next phases and attracts more scrutiny.

Board Election In Late 2023

Watch for a letter in September 2023 soliciting nominations for the Board of Directors. Positions open include seats in the three major counties encompassed by ESJWQC. The ESJWQC board in 2021-22 adopted or refined the following policies that affect membership;

Updated Membership Invoice Policy

In anticipation of fallowing irrigated crop land due to the drought, the ESJWQC Board adopted a policy to address a potential dramatic drop in acreage in years ahead. A step initiated in 2023 membership invoicing is reporting acreage to cover the previous year's irrigated acreage (instead of the upcoming year).

When the Board of Directors sets dues in September for the following year, it uses the acreage reported to the Regional Water Board in July of the current year. Invoicing members for July reported acreage in the future years ensures that the coalition budget is adequate to fulfill regulatory responsibilities.

Back Dues Payments

Periodically a grower not in the program applies for membership to ESJWQC. A policy since the coalition's formation is charging back dues. The board continues to deny requests for exemptions on the principle of fairness to existing members who have participated for years. After filing an appeal, some new members are given the option of making payments to cover the back dues. The only alternative to participating in ESJWQC is an individual discharge permit, an option yet to be taken by any Central Valley grower.

Contact ESJWQC staff or existing board members (see back page) if you are interested in learning more about the participation on the Board of Directors.

Voting Membership

As of January 2022:
3,121 landowner/operators
694,240 irrigated acres

Boundaries

The Coalition area includes Madera County and portions of Stanislaus, Merced, Tuolumne and Mariposa counties.

Financial Report

Summary of Financial Activities
January 1, 2021 thru December 31, 2021, and January 1, 2022 thru December 31, 2022
Current vs. Budget:

Reported below is a financial overview presenting the ESJWQC 2021 financial statement numbers, and 2022 current income and expenses compared to budgeted amounts. The 2022 net income was higher than projected. As of December 31, 2022, there was approximately $1.86 million in ESJWQC banking accounts. A complete financial statement of 2022 expenditures is available upon request.

	2021, $K (Thousands)	Current* 2022, $K (Thousands)	Budget 2022, $K (Thousands)	Description
Total Income	$4,154	$3,969	$3,969	Membership dues plus interest on bank accounts in 2022
Expenses				
Program	$3,575	$3,214	$3,758	Program manager, State Ag Waiver fees, site monitoring/special studies, quality control/ assurance, executive director, membership management and correspondence, BMP assessment, and contractors doing work for the Coalition
Organizational	$116	$165	$228	Insurance, legal, accounting, meetings, website, and miscellaneous business costs
Total Expenses	$3,691	$3,379	$3,986	
Net Income (Loss)	$463	$590**	$(17)	Difference between Total Income and Total Expenses

* Current 2022 includes an estimate of the 2022-2023 State Ag Waiver Fee that will be received February 2023.

** ESJWQC staff and consultants realized significant savings in 2022 expenditures through: staff reductions (Wayne Zipser retired from SCFB); dry weather led to fewer surface water samples; 2021 Annual Member report was not published; and litigation costs were less than anticipated.

Dues & Membership Policy

Dues Remain $5.50 an Acre

The ESJWQC Board of Directors approved the 2023 member dues rate of $5.50 an acre on September 19, 2022, unchanged from 2022. Stable membership acreage and tapping reserve funds enabled the board to maintain the current dues level and balance the budget for 2023.

State Water Board Fee Increase

Fees to the State Water Resources Control Board (State Water Board) were set in the Governor's 2022-23 fiscal year budget at $1.36 an acre. That continues the increases of years past: $1.29 in 2022, up from $1.12 in 2020. The trend is obvious. The increases are due to the State Water Board's increased costs for personnel to implement the Irrigated Lands Regulatory Program, which are then passed on to agriculture to pay. All growers in Central Valley water quality coalitions are assessed the same per acre fee. A collaborative of coalitions and farm groups continue to lobby the Governor for use of General Funds to support part of the ILRP budget.

Management Zone Fees

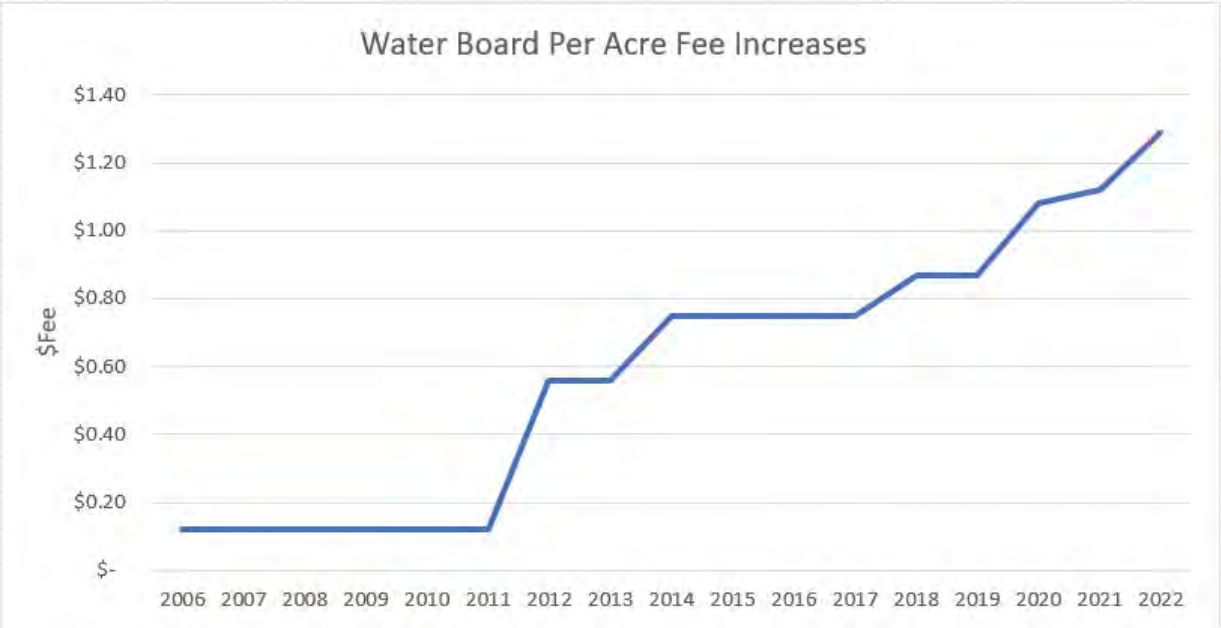
Members in the Modesto, Turlock and Chowchilla Management Zones received supplemental invoices in 2022 to cover irrigated agriculture's portion of Nitrate Control Program costs. In 2023, members in the Merced and Madera groundwater basins (where Management Zones will be required next) are expected to also face supplemental dues to cover the costs for the Nitrate Control Program (see page 7).

Cost Sharing With Central Valley Coalitions

Central Valley Coalitions have joined forces to split costs to fund some program elements to save money, including the Groundwater Protection Targets process. This involves evaluating approaches for determining the impact of nitrogen fertilizer use on groundwater aquifers across townships in high vulnerability areas. Model development and reporting of model results is being split between the 13 Central Valley coalitions based on acres covered by each organization.

Efforts To Reduce Expenses

The Board of Directors continues to examine every element of the budget to identify savings to realize. Another step taken by the Board in 2022 was to decrease budget reserves. Its efforts are to ensure that farmers can grow their crops using effective management practices to minimize or eliminate impacts of farm inputs to surface water and groundwater.



Breakdown of 2023 Membership Fees

2023 Fee Breakdown	Base Coalition Fee		Priority 1 Management Zones*					
			Modesto		Turlock		Chowchilla	
	Per Acre	% Total	Per Acre	% Total	Per Acre	% Total	Per Acre	% Total
State Board Fees	$1.34	22.6%	$1.34	18%	$1.34	18%	$1.34	24%
Organizational	0.50	10.6%	0.50	7%	0.50	7%	0.50	9%
Membership	1.05	19.2%	1.05	14%	1.05	14%	1.05	19%
Surface Water Quality	2.17	39.4%	2.17	29%	2.17	29%	2.17	39%
Groundwater Quality	0.34	6.2%	0.34	4%	0.34	4%	0.34	6%
Salt Control Program	0.10	2.0%	0.10	1%	0.10	1%	0.10	2%
Management Zones	NA	NA	2.10	28%	2.09	28%	4.80	47%
Per Acre Membership Fee	**$5.50**	**100%**	**$7.60**	**100%**	**$7.59**	**100%**	**$10.30**	**100%**

*Priority 1 Management Zone per acre fees are being determined by the Valley Water Collaborative and Chowchilla Farm Bureau Management Zone Boards. **Management Zone fees for the Chowchilla Nitrate Control Program will be set in early 2023; invoices will follow after.**

Fee Category	Description
State Board Fees	Annual administration fee charged all irrigated agriculture in California to staff Regional Water Boards. ESJWQC is invoiced annually by California State Water Resource Control Board (State Board). Annual fee set by the State Board and legislature. Fee increased from last year; however, the Coalition determined not to raise the overall per acre for members.
Organizational	Includes the ESJWQC costs for administration, legal, bank fees, insurance, office and meeting expenses.
Membership	Includes costs to manage the ESJWQC membership, including Farm Bureau staff and MLJ Environmental (technical consultant). Tasks include preparing annual member invoice packets, maintaining online membership portal, tracking grower meeting compliance, preparing annual membership lists submitted to the Regional Water Board and grower assistance with membership and invoicing questions/updates.
Surface Water Quality	Includes technical consultants' cost for surface water quality monitoring and reporting. Also, the coalition's participation in the Delta Regional Monitoring Program.
Groundwater Quality	Includes technical consultants' cost to provide groundwater quality monitoring and reporting; to participate in the Management Practice Evaluation Program (MPEP); perform the annual Groundwater Quality Trend Monitoring (GQTM) Program; participate in the Groundwater Protection development; and participate in the Central Valley Groundwater Monitoring Collaborative (CVGMC).
Salt Control Program	Includes ESJWQC's participation in CV-SALTS and the Prioritization and Optimization Study being cost-shared with other Central Valley dischargers to address long term management of salt discharges to ground and surface water.
Management Zones	ESJWQC member's portion of costs to implement the Nitrate Control Program (NCP) in Management Zones encompassed by ESJWQC boundaries. Priority 1 management zones include Modesto, Turlock and Chowchilla. Nitrate dischargers in Modesto and Turlock formed the Valley Water Collaborative (VWC); Chowchilla formed the Chowchilla Basin Group (any industry that uses nitrogen or has nitrate discharges in waste is considered a discharger). Both entities collect fees from all nitrate dischargers (including ESJWQC members) to undertake the required NCP Implementation Plans. Management Zones will be initiated in the Merced and Madera basins in 2024.

ESJWQC Member Web Portal

Your Online Membership Management Tool

Subscribe to MLJ Crop ET Portal
(additional service fee)
https://mljcropet.com/
VIEW DEMO:
https://mljenvironmental.com/software/cropetc/

How To Access Your Member Portal

Web Address: *www.esjmemberlogin.com*

The Member Portal offers convenient, 24/7 access to your membership information including enrolled parcels, invoice, nitrogen and management practice reporting, and upcoming Coalition events. The portal is your tool to help manage your membership and comply with state regulations.

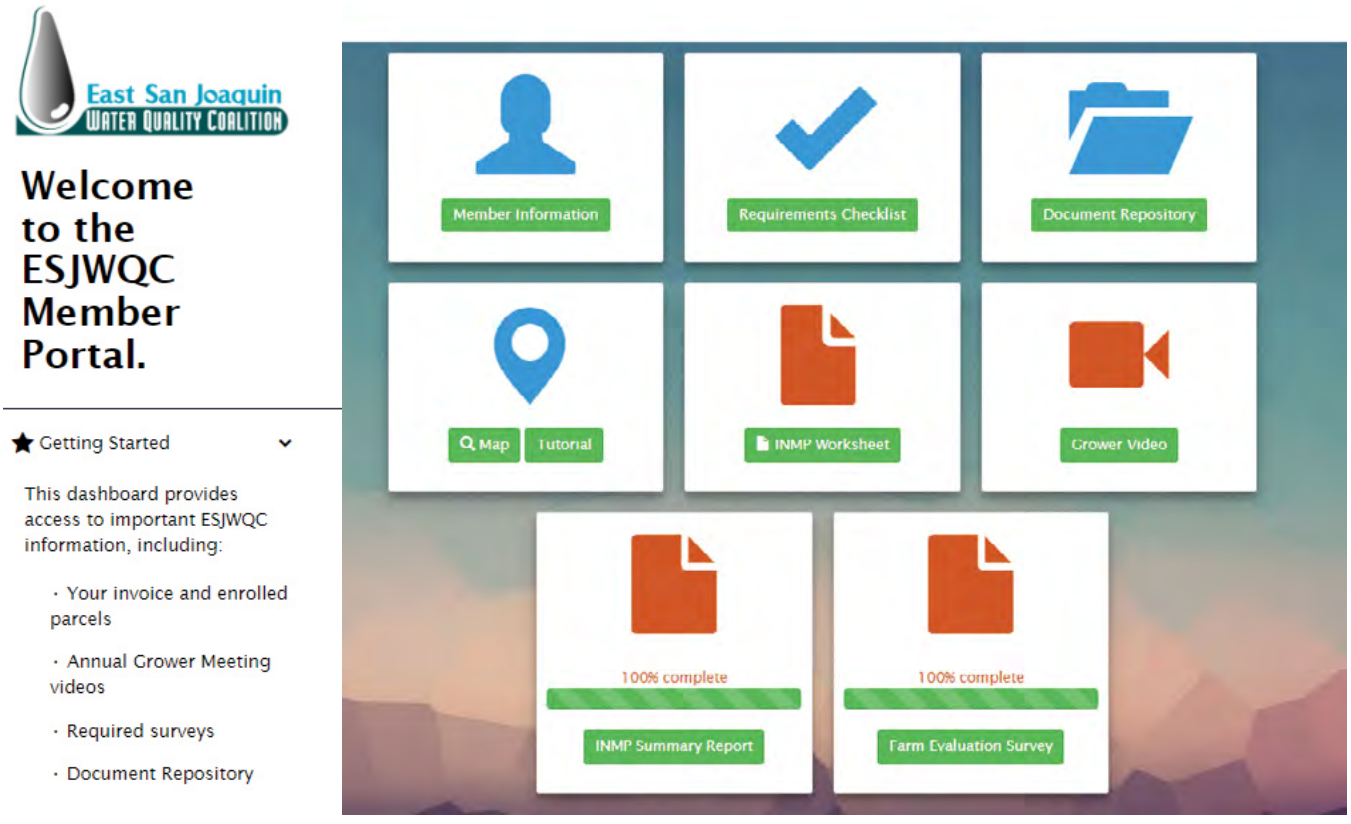
Get Started with 3 Easy Steps:

Step 1. Request a passcode by emailing ESJWQC staff at contactesj@esjcoalition.org or call (209) 846-6112.
Step 2. Navigate to website at address above.
Step 3. Login using your email address and passcode; personalize your passcode after logging in.

Portal Features- Did You Know?

- **New users receive $50 credit on your next year's invoice**
- Go Paperless!
- Fill out your Irrigation and Nitrogen Management Plan (INMP) Online Worksheet
- Real time and efficient data tracking
- Input nitrogen applications throughout the year
- Auto calculates and tracks amount of applied nitrogen by product
- Import INMP Worksheet information into your INMP Summary Report
- Complete and instantly submit your INMP Summary Report & Farm Evaluation (FE)
- Submit past due reports online
- Watch Annual Grower Meetings and Outlier Crop Workshops Online

  Once viewed, your participation is automatically checked off!



Nitrate Control Program

Nitrate Control Program & Management Zones

The Nitrate Control Program (NCP) was established to address the problem of high nitrate levels in groundwater throughout the Central Valley. Although the program is aimed at reducing levels of nitrate in groundwater in the Central Valley over the long term, it prioritizes, first and foremost, providing clean drinking water to residents relying on wells where nitrate exceeds the drinking water standard (10 mg/L). This is being accomplished by groundwater basin-specific organizations called Management Zones.

The NCP and Management Zones came into being through a Basin Plan Amendment* (BPA) covering nitrate and salt discharges from agriculture, industry, public agencies and other dischargers. This regulation was adopted by the State Water Resources Control Board on October 16, 2019. ESJWQC representatives along with others regulated by Waste Discharge Requirements (WDRs) and environmental stakeholders participated in development of the regulatory framework that is shaping nitrate and salt regulations for decades to come.

For the NCP, the Notice to Comply was received by ESJWQC and other dischargers in February 2020. The program sets a series of requirements for Management Zones. Waste discharge permit holders must show that communities and others that rely on groundwater for their drinking water have access to drinking water that meets nitrate standards. In addition to providing access to safe drinking water, Management Zone participants must also show how nitrate discharges to groundwater are being managed. In addition to ESJWQC, other WDR permit holders participating in Management Zones include dairies, wineries, poultry operations, city wastewater treatment plants and food processors.

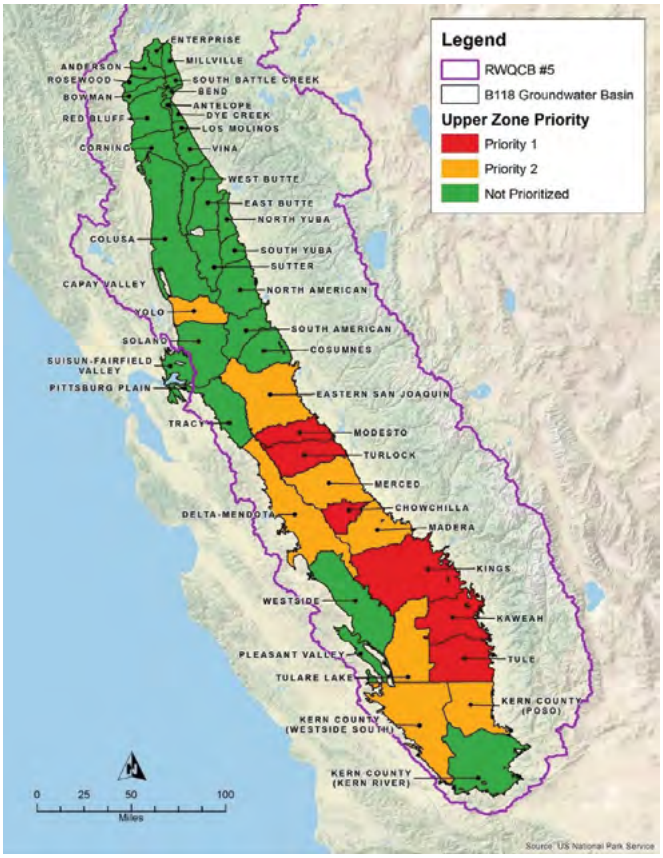
Six priority basins for Management Zones were identified in the Central Valley through evaluation of existing groundwater nitrate levels. Of the six basins (Modesto, Turlock, Chowchilla, Kings, Kaweah and Tule), three are located in the ESJWQC region (see maps pages 11-12).

**Amendments to Water Quality Control Plans for Sacramento River and San Joaquin River Basins and Tulare Lake Basin to Incorporate a Central Valley-Wide Salt and Nitrate Control Program. BPA developed through a stakeholder process called CV-Salts (Central Valley Alternatives for Long-Term Sustainability). The CV-SALTS was formed more than a decade ago as a collaborative stakeholder group tasked with developing a sustainable salt and nitrate management program for the Central Valley. In 2008, the Central Valley Salinity Coalition was established to help fund the needed scientific and technical studies.*

Activities in the three basins encompassed by ESJWQC are managed by Valley Water Collaborative, which encompasses the Modesto and Turlock basins and Madera County Farm Bureau which manages the Chowchilla basin.

VWC's 12-member board of directors represents agriculture, including dairies and poultry facilities, cities, wineries and food processors. The new organization combines the resources and expertise of its member organizations to ensure that all residents in the Modesto and Turlock basins whose wells are impacted by high nitrates have access to safe drinking water. ***www.valleywaterc.org***

Dischargers participating in the Chowchilla Management Zone have developed a plan that will ensure all residents impacted by nitrates have access to safe drinking water. The group is governed by representatives from agriculture, including irrigated cropland and dairy, the City of Chowchilla, composting/sludge facilities as well as disadvantaged communities.
www.chowchillamanagementzone.com



Each management zone in the Central Valley has identical requirements; test domestic wells and provide safe drinking water if the well is contaminated. More importantly, all permit holders who participate in a Management Zone must show progress in minimizing its contribution to nitrate groundwater contamination. For ESJWQC members, that is accomplished through improvements tracked in grower reporting of the Irrigation and Nitrogen Management Plan (INMP). By continuing to show improvements and innovations, agriculture and other dischargers are given up to 35 years to meet the nitrate water quality standard in discharges to groundwater.

In late 2023, dischargers in Priority 2 groundwater basins can expect notifications from the Regional Water Board to begin efforts on Management Zone development. The priority 2 basins in ESJWQC region include the Merced and Madera basins. Other basins in the Central Valley are Yolo, East San Joaquin, Delta Mendota, Kern County (west side south) and Kern County (Peso).

Nitrate Control Program Goals

- Provide safe drinking water supplies as the priority.
- Reduce nitrate impacts to water supplies.
- Restore groundwater quality.

Overview of Central Valley Management Zones

Management Zones have worked diligently to provide safe drinking water to households since May 2021 when the program was initiated. Safe, free bottled water delivery sounds like an easy sell, but connecting with these rural residents is surprisingly difficult. The application process includes submitting an application, having their water tested, and if it exceeds the safe threshold, receiving free bottled water.

Management Zones face multiple challenges as they conduct outreach and encourage people to apply to the program. Challenges include limitations on personal interactions and social gatherings due to COVID; the lack of computers and internet access in some areas; a lack of awareness about water quality problems; language and cultural barriers; distrust of government or "free" programs; and the fact that people have busy lives and limited bandwidth to focus on something new.

So, the management zones are using dozens of outreach methods, learning what works and what doesn't, regularly experimenting with new approaches, and adapting to local needs to reach the 7,000 to 10,000 households that could be affected in the highest priority areas.

All Management Zones offer a similar service. They ask households who might be eligible for free bottled water delivery to fill out an application. The applications are slightly different for each area, but take little effort, and there is extensive communication and support provided to applicants.

When a household submits an application and is determined to be eligible, the Management Zone will test the residential well water to find if levels of nitrate (and sometimes other contaminants) exceed safe drinking water levels. If it does, the Management Zone will immediately begin weekly deliveries of free, clean drinking water for that household.

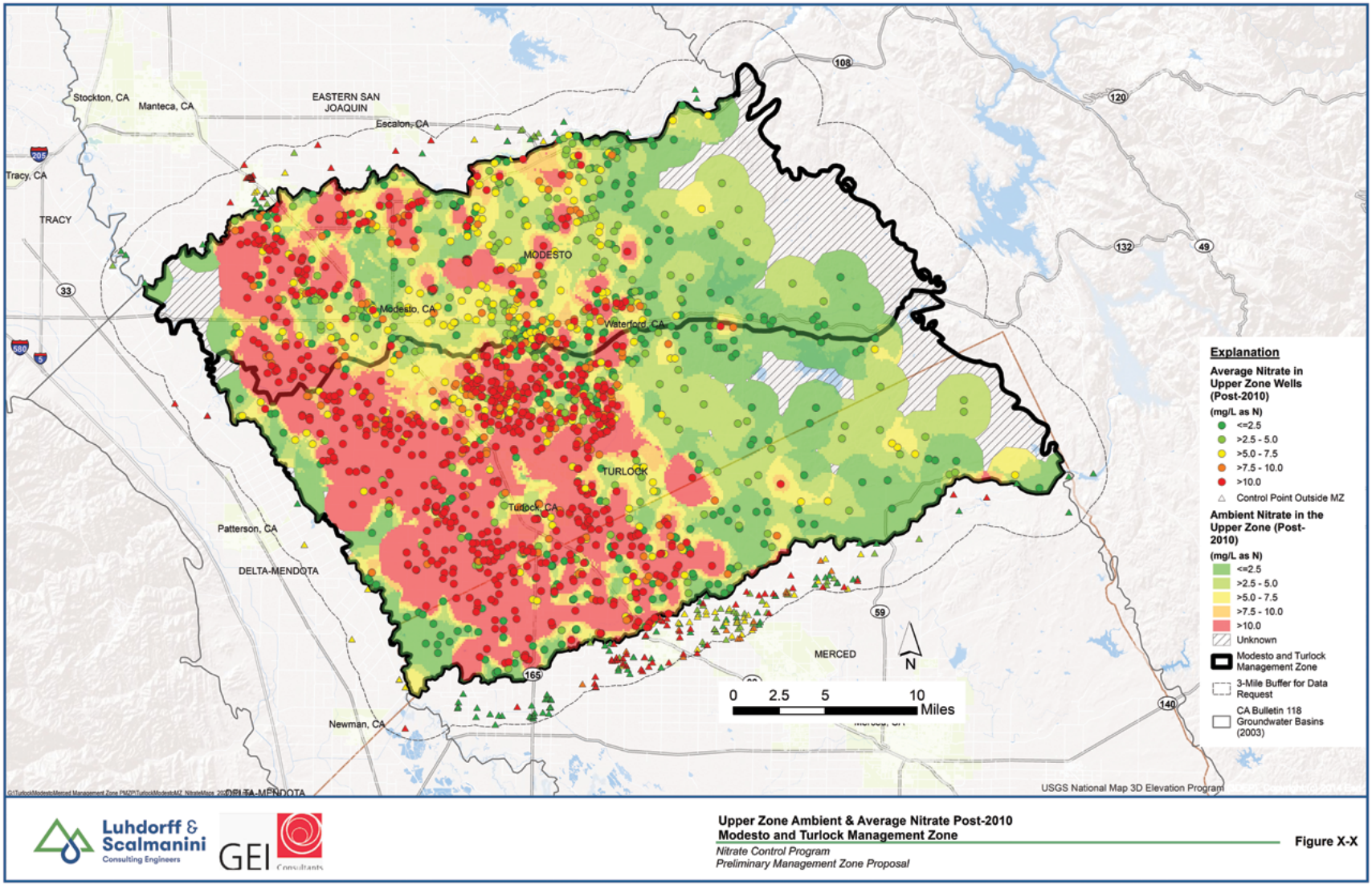
The Management Zones are keenly aware that the best results will come through word of mouth and by establishing good relationships with local communities. To reach as many people as possible, they are leveraging the power of personal connection and asking for help from local officials, leaders, educators, influencers, and reporters. They are providing bilingual content and access to Spanish-speaking staff every step of the way.

Existing Efforts to Manage Nitrate

As part of each Management Zone participant's responsibilities, these permitted dischargers have been working with regulators and taking steps for years to measure and reduce nitrate levels where they exceed safe drinking water standards. Some examples include:

- For irrigated agriculture, implementing the Irrigation and Nitrogen Management Plans (INMP).
- For cities and municipalities, making upgrades to wastewater treatment plants and collection systems.
- Passing Onsite Wastewater Treatment Systems policies to control nitrates.
- Funding septic system to sewer system transitions.
- Plans are in the works to develop even more impactful, long-term initiatives to tackle the nitrate problem.

Modesto and Turlock Sub-basins Management Zones Map



Luhdorff & Scalmanini Consulting Engineers

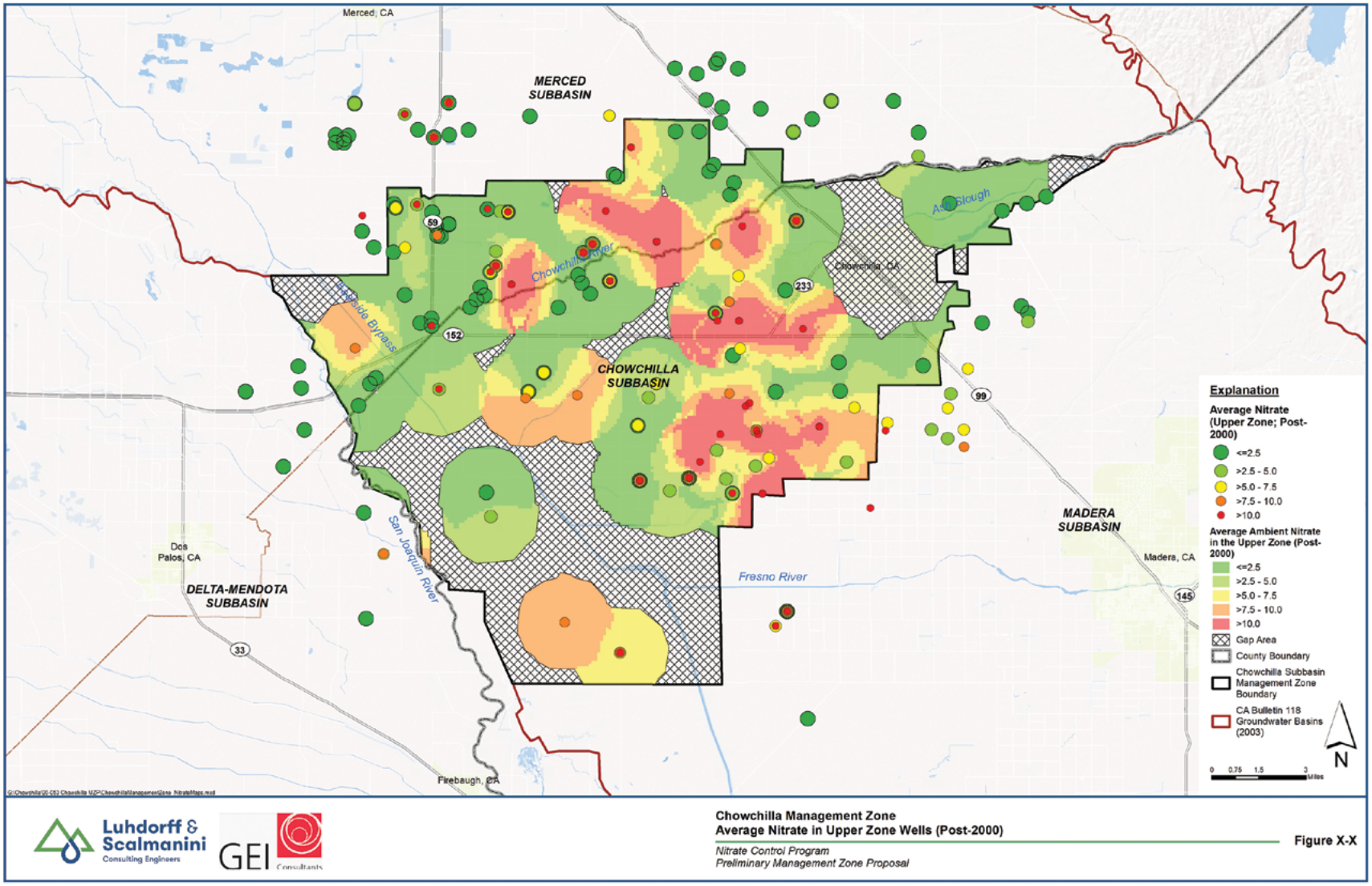
GEI Consultants

Upper Zone Ambient & Average Nitrate Post-2010
Modesto and Turlock Management Zone

Nitrate Control Program
Preliminary Management Zone Proposal

Figure X-X

Chowchilla Sub-basin Management Zone Map



Luhdorff & Scalmanini Consulting Engineers

GEI Consultants

Chowchilla Management Zone
Average Nitrate in Upper Zone Wells (Post-2000)

Nitrate Control Program
Preliminary Management Zone Proposal

Figure X-X

Bell Curves for Priority Crops

2021 CY Nitrogen Evaluation

Bell Curves (distribution curves) are generated using INMP reports submitted by ESJWQC members for the past three years. Each curve is crop-specific.

- The peak of the curve represents the amount of nitrogen applied (A) compared to the amount of nitrogen removed (R) for the most parcels in the Coalition region.
- The 3-Year A/R curves also show each crop's outlier threshold if it can be calculated. Any fields with 3-Year A/R values above that threshold are considered outliers.
- The Outlier Threshold is calculated every year based on the most recent 3 years of data; therefore, the thresholds will vary slightly from year to year.

Nitrogen Reporting, Start to Finish!

Step 1: Return your Irrigation and Nitrogen Management Plan (INMP) Summary Report to the Coalition by March 1 by using the Member Portal (see Page 6) or returning the completed hard copy.

Step 2: The distribution (bell curve) of the amount of nitrogen applied and removed is created for each crop in the Coalition region based on reported information.

Step 3: Compare the amount of nitrogen applied and removed for your field(s) to other fields in the Coalition region with the same crop.

Step 4: Outliers are identified if the nitrogen applied and removed is above the statistically calculated threshold.

Step 5: You receive a Nitrogen Evaluation Packet from the Coalition with the distribution curve, your data marked on the curve and fields designated as outliers identified.

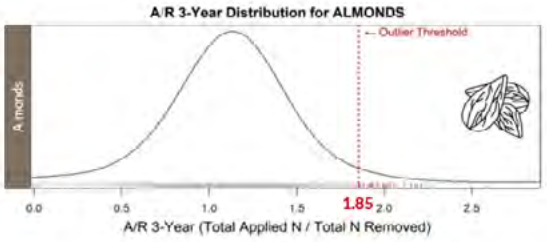
N-Evaluation Packet Information

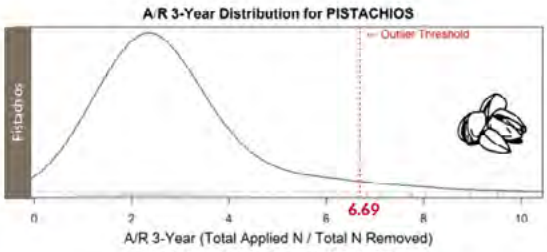
Purpose

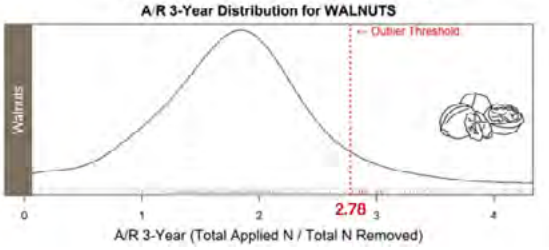
The Coalition analyzes information provided on INMP Summary Reports submitted by growers. The analysis compares your nitrogen applications to Coalition members growing the same crop.

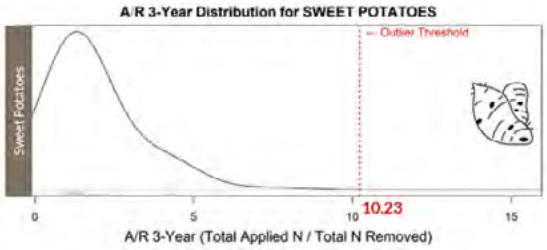
What's Included in Your Packet

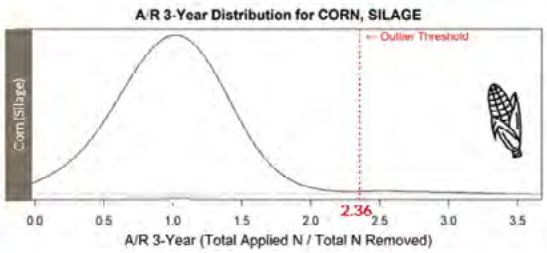
- 3-year Nitrogen Use Evaluation (one for each crop)
- Crop Year Nitrogen Use Evaluation (one for each crop)
- NMP/INMP Summary Report data by parcel
- How to interpret your Nitrogen Evaluation & the Importance of Crop Coefficients
- Future Actions Required of Members with Outlier Parcels

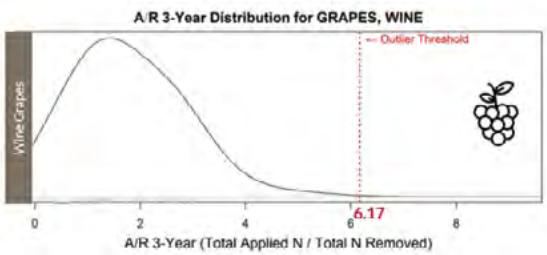












Outlier Parcel Designation

What Is An Outlier Parcel?

An outlier designation is determined for each parcel and crop by a mathematical calculation using reported nitrogen applications (A) and yield or nitrogen removed (R). Three years of A/R values from each parcel are compared to a threshold identified by the calculations done for all parcels.

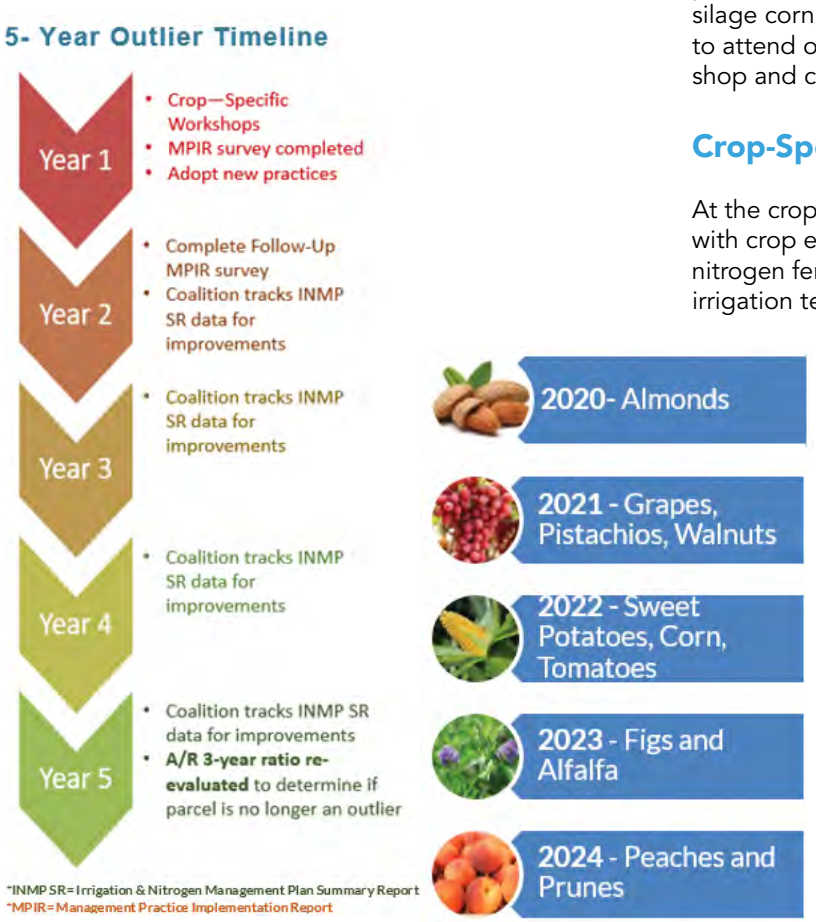
Goal Of Outlier Designation

Identify parcels where nitrogen applications exceed crop need and provide information to members on management practices to minimize excess nitrogen applications.

Management Practice Implementation Report (MPIR)

If you have a parcel that is identified as an outlier AND a priority crop is being grown on that parcel, you will need to complete a Management Practice Implementation Report (MPIR). The survey lists:

- Effective management practices to reduce nitrogen leaching past the root zone, and
- Your current and planned practices to be implemented (if any) on parcel designated as outlier.
- One year later, a follow-up MPIR survey is mailed to confirm the new practices were implemented. Annually, the Coalition tracks improvements in members' A/R ratios on the Outlier parcels. Three years after new management practices have been implemented, the Coalition will re-evaluate each member's 3-year A/R ratio to determine if improve ments were made.
- 5-Year Outlier Timeline



Growers Notified As Outliers

Growers with parcels identified as outliers from the 2021 CY for any of the eight priority crops (almonds, pistachios, walnuts, wine grapes, sweet potatoes, silage corn, processing tomatoes, figs) are required to attend or watch a video of a crop-specific work shop and complete an MPIR survey in 2023.

Crop-Specific Workshops

At the crop-specific workshops, the Coalition staff, along with crop experts, present the most current information on nitrogen fertilizer management. This information will cover irrigation techniques plus nitrogen fertilizer types and application practices.

The goal is to offer growers the most current approaches and techniques to minimize the potential for excess nitrogen being applied that could potentially leach beyond the root zone and into groundwater.

The Coalition has online presentations available to fulfill the outreach requirement for outlier status. Video workshops can be viewed on the ESJWQC website and Member Portal.

Groundwater Quality Trend Monitoring and Central Valley Collaboration

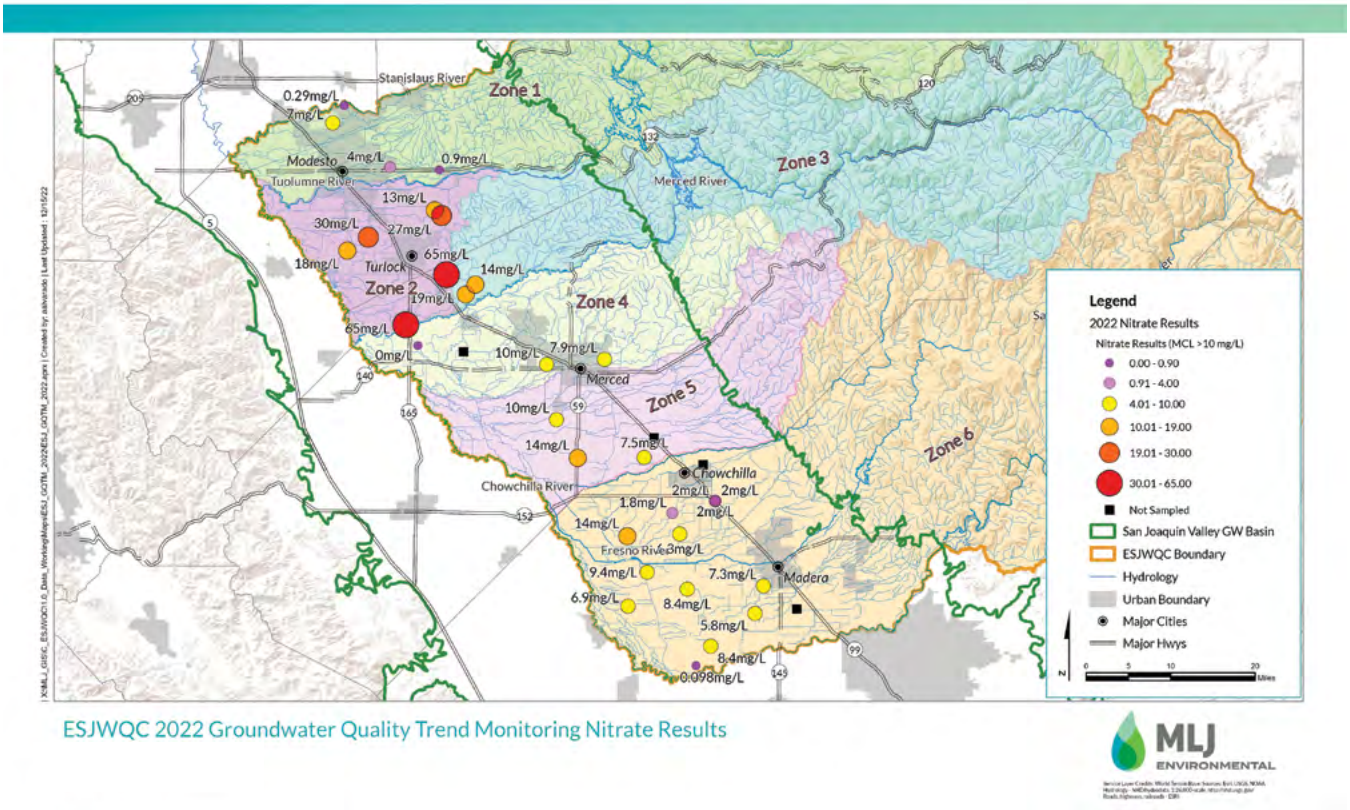
All Central Valley coalitions are required to track changes in aquifer water quality in basins encompassed by their organizations. Specifically, samples must be taken from wells that access shallow groundwater. The goal is twofold: determine current water quality conditions relevant to irrigated agriculture and evaluate the regional effects of farm practices on groundwater over time. In the ESJWQC basin, wells selected for trend monitoring draw water from the Upper Zone of the aquifer above the Corcoran Clay layer. In high vulnerability areas, the bottom of the Upper Zone ranges from 40 to 300 feet below ground surface.

As required by the coalition General Order, a registered hydrogeological consulting firm, Luhdorff and Scalmanini Consulting Engineers, evaluated each well for its construction parameters and location to irrigated crop land.

Additional groundwater data is gathered from 74 public supply wells. These "complementary wells" located throughout the region include municipal drinking water wells and dedicated monitoring wells accessing groundwater at various depths.

ESJWQC participates in the Central Valley Groundwater Monitoring Collaborative (CVGMC) with nine other Central Valley coalitions. The collaboration of these ten agricultural coalitions includes monitoring and characterizing regional groundwater quality conditions and trends. The CVGMC is efficient and cost-effective by compiling, organizing, analyzing, sharing of regional data, and reporting. The CVGMC submitted the first 5-year Analysis Report on behalf of the ten coalitions on November 30, 2021.

In 2022, the ESJWQC sampled 37 wells consisting of domestic wells belonging to members in addition to dedicated monitoring wells operated by various entities. The map below shows the nitrate results from the GQTM monitoring; concentrations of nitrate over 10 mg/L exceeded the Maximum Contaminant Level (MCL).



ESJWQC 2022 Groundwater Quality Trend Monitoring Nitrate Results

Assessing Nitrate Impacts to Groundwater

Groundwater Protection Formula, Values and Targets

New regulations focusing on nitrogen fertilizer use and its impact to groundwater were part of the 2016 revisions to Eastern San Joaquin Waste Discharge Requirements.

Key changes include:

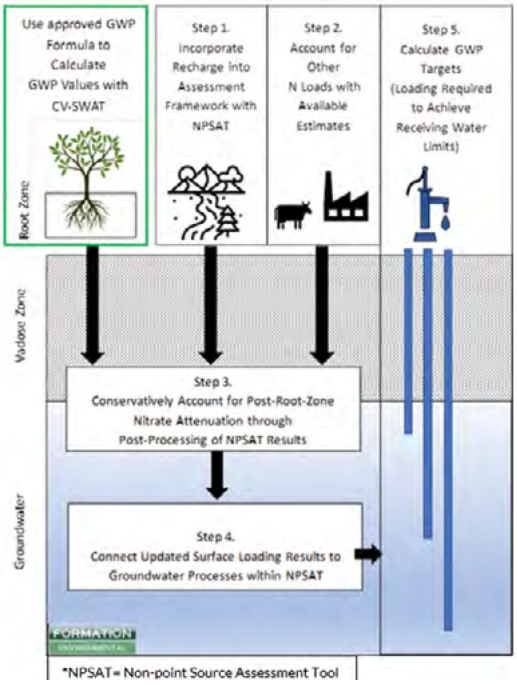
Additional individual reporting: All growers must submit an Irrigation and Nitrogen Management Plan Summary Report (INMP Summary Report) not just growers in high vulnerability areas.

Member anonymity for reports: Anonymous reporting of nitrogen applied, yield, and implemented management practices; outliers not individually identified.

Measuring nitrate impacts: A new metric for determining if the amount of nitrogen applied by irrigated agriculture could contaminate groundwater across a broad area. The process to measure nitrate impacts is intended to answer the question: is groundwater quality in basins improving or getting worse?

This new groundwater quality assessment approach involves three elements:

- Groundwater Protection Formula
- Groundwater Protection Values
- Groundwater Protection Targets



Groundwater Protection Formula And Values

The Central Valley coalitions submitted to the Regional Water Board a single proposal for a Groundwater Protection Formula on July 1, 2020 which uses outputs from the Central Valley Soil and Water Assessment Tool (SWAT) computer model. The Groundwater Protection Formula was approved by the Regional Water Board in January 2021. The Groundwater Protection Values were submitted to the Regional Water Board on July 19, 2021.

Formula
Mathematical formula used to calculate the GWP Value.

Value
Estimates leaching of nitrogen under specific conditions within a township

Target
Used to establish reasonable, quantifiable milestones

The benefits of using the SWAT model include:

- SWAT is already set up for the major crops grown in the Central Valley.
- The model generates comprehensive nutrient cycling estimates throughout an entire crop year.
- The model uses location-specific geographical information such as climate and soils.
- The model incorporates township-specific nitrogen applied and yield data from INMP reports as inputs for estimating potential nitrate leaching.

Groundwater Protection Targets Defined

As stated in the ESJWQC Order, "The purpose of Groundwater Protection Targets is to set a desired target that is intended for all growers (including growers that are Members of the Third Party and growers regulated under an individual order) within the township collectively to achieve compliance with the Receiving Water Limitations for groundwater within the time schedule for compliance specified in the General WDRs."

The Central Valley coalitions submitted to the Regional Water Board a proposal for a Groundwater Protection Targets on July 19, 2022. The Groundwater Protection Targets will incorporate regional aquifer recharge, post root zone processes, existing aquifer conditions among other factors.

Once targets are developed, the Groundwater Protection Values will be compared to the Groundwater Protection Target for each township to determine if receiving water limits for nitrate in groundwater are being met.

More Waterways Showing Pyrethroid Insecticide Problems; Monitoring Costs Skyrocket

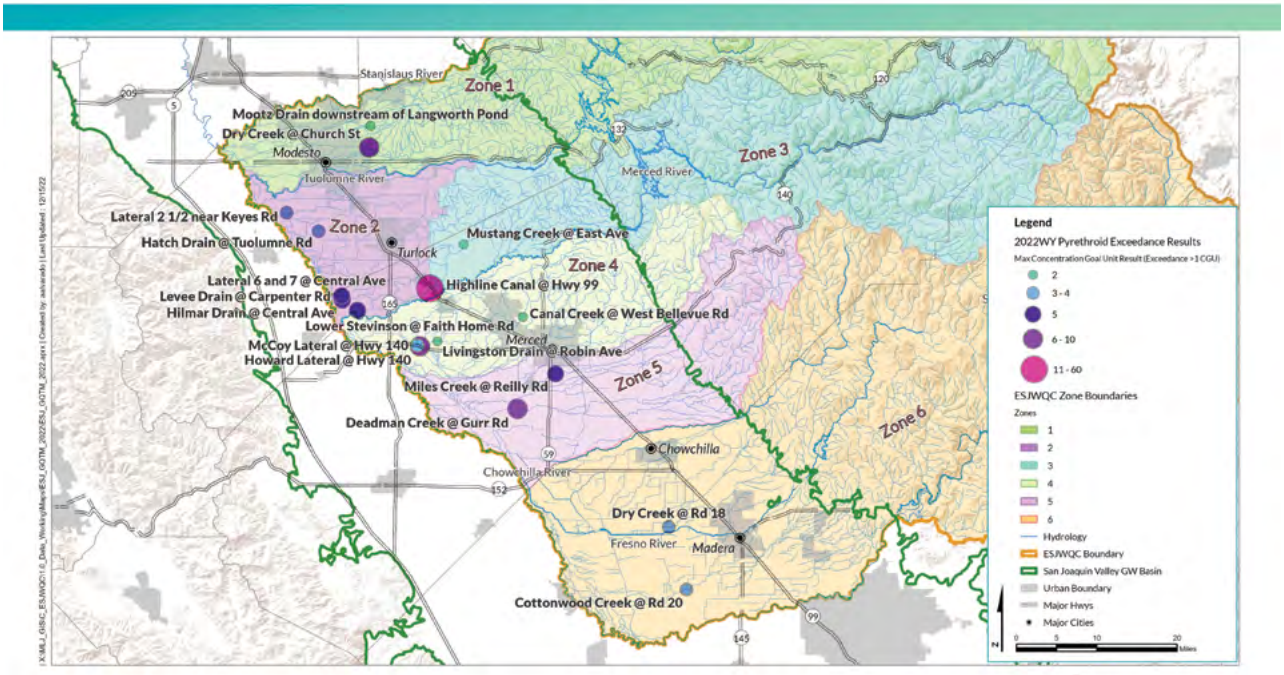
Orchard Spray Drift Believed To Be Cause

A new method for measuring pyrethroids in waterways is resulting in a record number of water quality exceedances in the ESJWQC region. Pyrethroids are known to cause adverse effects to aquatic life even at very low concentrations, so the State revised its approach for measuring impacts.

Pyrethroid	Most Used Products
(S)-CYPERMETHRIN	MUSTANG MAXX INSECTICIDE
	MUSTANG MAX EW INSECTICIDE
	GLADIATOR INSECTICIDE/MITICIDE
CYFLUTHRIN	TOMBSTONE HELIOS INSECTICIDE
BIFENTHRIN	BIFENTURE EC AGRICULTURAL INSECTICIDE
	BIFEN 2 AG GOLD
	SNIPER
	BATALLION 2 EC
	ACETO BIFENTHRIN 2EC
	FANFARE EC
	REVEAL
	SNIPER HELIOS
ESFENVALERATE	ASANA XL INSECTICIDE
FENPROPATHRIN	DANITOL 2.4 EC SPRAY
LAMBDA-CYHALOTHRIN	BESIEGE INSECTICIDE
	SERPENT 1 EC
	WARRIOR II WITH ZEON TECHNOLOGY
	RAVAGE
	GRIZZLY TOO
PERMETHRIN	PERMASTAR AG

The six pyrethroids are: bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, lambda-cyhalothrin and permethrin. On the left is the list of most commonly applied product names for pyrethroid insecticides. Commercial product names listed are not intended to be comprehensive for each active ingredient. Check with your supplier or PCA for additional commercial product names.

The main source of the pyrethroids: spray drift from orchard applications. That conclusion is based on time of year when the insecticide is found in waterways and crops grown near the affected waterways. The Coalition is required to monitor for the six pyrethroid products in the water column. An exceedance of the chronic Concentration Goal Unit (CGU) is determined through an additive calculation that factors in the six pyrethroid concentrations, each with a reporting limit in micrograms (10^{-6}). CGU results above 1 are considered an exceedance of the pyrethroid water quality objective. The map below shows the maximum CGU results across the Coalition for the 2022 water year.



ESJWQC 2022 Pyrethroid Exceedances >1 CGU

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Additional management plans translate to more costs for the Coalition and therefore ESJWQC members. The Coalition must conduct additional outreach to growers in the watersheds where pyrethroid exceedance occurred. Members will need to implement and report on additional management practices. The Coalition will need to conduct extra monitoring and pyrethroid analysis to determine if management practices are effective.

Based on sampling results from 2019 through the 2022 WY, 19 management plans were triggered for specific watersheds. New management plans lead to additional follow-up sampling costs and additional outreach to growers in the watersheds where pyrethroids were found.

Spray Drift Suspected Of Causing Pyrethroid Detections

Several factors lead to the conclusion that spray drift from orchards is the pathway to waterways. When pyrethroids were first causing sediment toxicity in Coalition waterways in the early 2000s, many of the exceedances were believed to originate from irrigation runoff carrying sediment from treated fields. With the widespread planting of orchards over the last 10-15 years, the majority on drip and microsprinkler irrigation, runoff in the coalition region is virtually nonexistent.

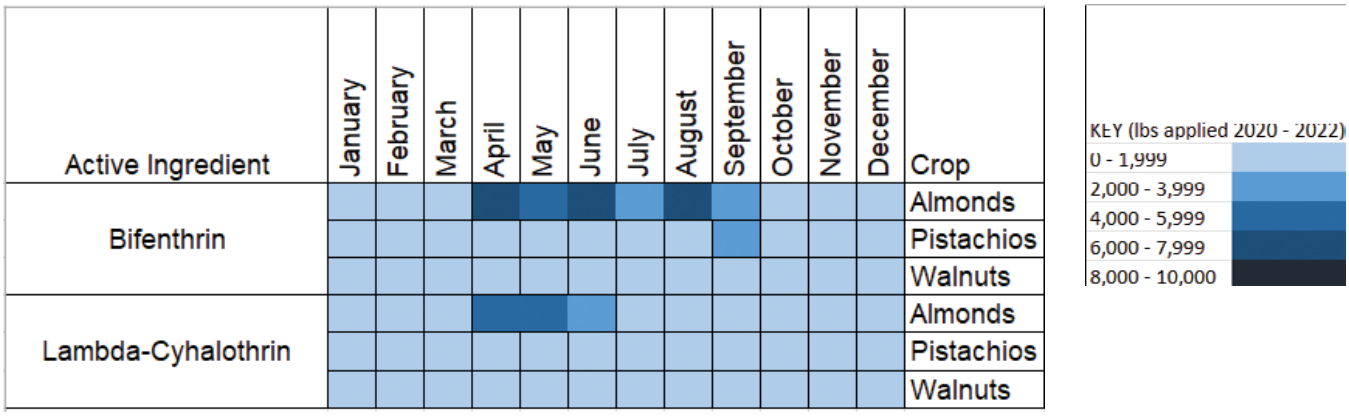
This leads to the conclusion that spray drift from orchards adjacent to waterways may be the main source of the detections. And while only small amounts of drift may travel into a waterway, the new analytical technique can detect levels at incredibly low levels, measured in parts per trillion.

A physical characteristic of pyrethroids is they tend to adhere or stick strongly to soil particles. In addition to spray drift, another mode of transport for pyrethroids into the Coalition waterways is irrigation or storm runoff carrying sediment particles. Pyrethroids bound to sediment can be found at detectable levels for up to 6 months, even at the bottom of a waterway.

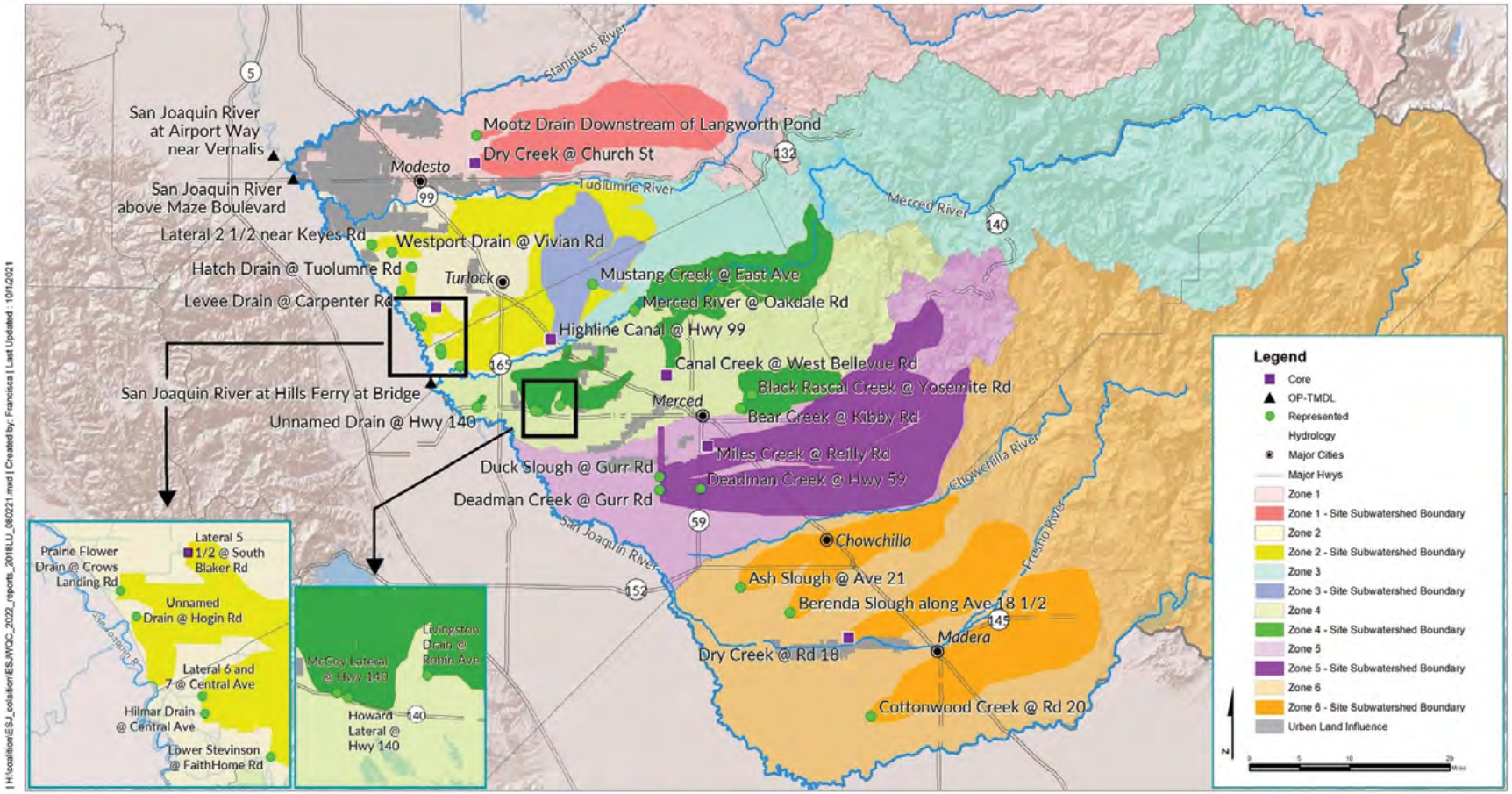
Pyrethroid Applications In The Coalition Region

Based on information from the Department of Pesticide Regulation (DPR) Pesticide Use Reports, pyrethroids are applied most commonly to almonds, pistachios, and walnuts during the irrigation season (April – September). Concentrations detected in the water column of the pyrethroid active ingredients bifenthrin and lambda-cyhalothrin are most commonly detected.

The table below shows bifenthrin and lambda-cyhalothrin applications from 2020-2022, average applications by month applied to almonds, pistachios, and walnuts.



Surface Water Monitoring Site Map



ESJWQC 2021 WY Monitoring Sites Zone Boundaries & Urban Land Influence

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Coalition Monitoring Sites

Zone	Site Type	Site Name	County
1	C	Dry Creek @ Church St	Stanislaus
	R	Mootz Drain Dwnstm of Langworth Pd	Stanislaus
2	C	Westport Drain @ Vivian Rd	Stanislaus
	C	Lateral 5 1/2 @ South Blaker Rd	Stanislaus
	R	Hatch Drain @ Tuolumne Rd	Stanislaus
	R	Hilmar Drain @ Central Ave	Merced
	R	Lateral 2 1/2 near Keyes Rd	Stanislaus
	R	Lateral 6 and 7 @ Central Ave	Merced
	R	Levee Drain @ Carpenter Rd	Stanislaus
	R	Lower Stevinson @ Faith Home Rd	Merced
	R	Prairie Flower Drain @ Crows Landing Rd	Stanislaus
	R	Unnamed Drain @ Hogin Rd	Stanislaus
3	C	Highline Canal @ Hwy 99	Merced
	R	Highline Canal @ Lombardy Rd	Merced
	R	Mustang Creek @ East Ave	Merced
4	C	Merced River @ Oakdale Rd	Merced
	C	Canal Creek @ West Bellevue Rd	Merced
	R	Bear Creek @ Kibby Rd	Merced
	R	Black Rascal Creek @ Yosemite Rd	Merced
	R	Howard Lateral @ Hwy 140	Merced
	R	Livingston Drain @ Robin Ave	Merced
	R	McCoy Lateral @ Hwy 140	Merced
	R	Unnamed Drain @ Hwy 140	Merced
5	C	Duck Slough @ Gurr Rd	Merced
	C	Miles Creek @ Reilly Rd	Merced
	R	Deadman Creek @ Gurr Rd	Merced
	R	Deadman Creek @ Hwy 59	Merced
6	C	Cottonwood Creek @ Rd 20	Madera
	C	Dry Creek @ Rd 18	Madera
	R	Ash Slough @ Ave 21	Madera
	R	Berenda Slough along Ave 18 1/2	

C= Core site (when two Core sites per zone, sites rotate every two years).
R= Represented site.

Exceedances of Water Quality Trigger Limits within the ESJWQC from October 2019 through September 2022.

2024 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Ash Slough @ Ave 21	1/18/2022										Dry
	3/8/2022										Dry
	5/17/2022										Dry
	3/30/2022										Dry
	7/13/2022										Dry
	8/10/2022										Dry
Bear Creek @ Kibby Rd	12/8/2021										Dry
	12/15/2021										Dry
	1/18/2022										Dry
	2/8/2022										Dry
	3/9/2022										NR
	3/30/2022										NR
	7/12/2022										NR
Berenda Slough along Ave 18 1/2	1/18/2022										Dry
	3/30/2022										Dry
	5/17/2022										Dry
	6/14/2022										Dry
	7/13/2022										Dry
	8/10/2022										Dry
	9/13/2022										Dry
Black Rascal Creek @ Yosemite Rd	12/8/2021										Dry
	12/15/2021										Dry
	1/18/2022	5.94							68		0
	2/8/2022										Dry
	3/9/2022										NA
	3/30/2022	5.22	6.39						72		NA
	5/17/2022	3.72							56		0
	7/12/2022										Dry

2024 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Canal Creek @ West Bellevue Rd	10/12/2021										NA
	10/28/2021										0
	12/8/2021										Dry
	12/15/2021						4.6				3.91
	1/18/2022										Dry
	2/8/2022										Dry
	3/9/2022										0
	3/31/2022	6.92									NR
	5/17/2022							2			NR
	6/15/2022										NR
	7/12/2022										NR
	8/9/2022										NR
	9/14/2022							2			NR
Cottonwood Creek @ Rd 20	10/12/2021										Dry
	10/28/2021										Dry
	12/7/2021										Dry
	12/16/2021										Dry
	1/18/2022										Dry
	2/8/2022										Dry
	3/8/2022										Dry
	3/30/2022										Dry
	5/17/2022										Dry
	6/14/2022										Dry
	7/13/2022	0.3						3			0
	8/10/2022	1.68									0
	9/13/2022										Dry

2024 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Deadman Creek @ Gurr Rd	1/18/2022										Dry
	3/8/2022										Dry
	3/30/2022										Dry
	5/10/2022							3			0
	6/14/2022	5.51									0
	7/13/2022	4.27						8			0
	8/10/2022										Dry
	9/14/2022	5.63						2			NR
Deadman Creek @ Hwy 59	1/18/2022										Dry
	3/8/2022										Dry
	3/30/2022										Dry
	5/10/2022										Dry
	6/14/2022										Dry
	7/13/2022										Dry
	8/10/2022										Dry
	9/14/2022										Dry
Dry Creek @ Church St	10/12/2021	5.32			365.4						1.5
	10/28/2021	5.69			2419.6						35.42
	12/8/2021										Dry
	12/15/2021				2419.6						85.78
	1/18/2022	6.03			1986.3			3			0
	2/8/2022										Dry
	3/9/2022										Dry
	3/31/2022	5.52									4.63
	5/17/2022	6.74			920.8						18.46
	6/15/2022	4.05			387.3						5.04
	7/12/2022	5.81			344.8			8			9.59
	8/9/2022	4.46			260.3						19.18
	9/14/2022	4.32			396.8						10.26

2024 WY Exceedance Results		DO*	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Dry Creek @ Rd 18	10/28/2021										Dry
	12/16/2021										Dry
	1/18/2022										Dry
	3/30/2022										Dry
	5/17/2022										Dry
	6/14/2022										Dry
	7/13/2022		6.27					4			NR
	8/10/2022										NR
	9/13/2022										Dry
Duck Slough @ Gurr Rd	10/12/2021							4			1.37
	10/28/2021										0.34
	12/7/2021										Dry
	12/16/2021										Dry
	1/18/2022										Dry
	2/8/2022										Dry
	3/8/2022									69	NR
	3/30/2022										1.02
	5/10/2022							2			NR
	6/14/2022							4			NR
	7/13/2022	6.56			275.5			2			NR
	8/10/2022	6.93						3			NR
	9/14/2022	6.44						2			NR
Hatch Drain @ Tuolumne Rd	1/19/2022	3.89		1491					23		NA
	3/8/2022			1284				4			0
	5/10/2022	3.36		1014							0
	7/12/2022	2.1		715				2			0
	8/9/2022	3.54		861							0
	9/13/2022	4.36									0

2024 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Highline Canal @ Hwy 99	10/12/2021										NR
	10/28/2021										10.36
	12/7/2021										Dry
	12/16/2021				2419.6			5			0
	1/18/2022										Dry
	2/8/2022										Dry
	3/9/2022										Dry
	3/30/2022						2.2				NR
	5/17/2022							2			NR
	6/14/2022										NR
	7/13/2022							60			NR
	8/10/2022										NR
	9/13/2022										NR
	9/21/2022										NR
Hilmar Drain @ Central Ave	10/28/2021	5.65		1048					70		0
	3/9/2022	4.78		1332				5			0
	3/30/2022	4.95									0
	5/10/2022	1.63		1085							NR
	6/15/2022	1.3						3	73		0
	7/12/2022	0.51		1108							0
	8/10/2022	0.15		716							0
	9/14/2022	1.2		971							0
Howard Lateral @ Hwy 140	10/28/2021						4				3.46
	12/7/2021										Dry
	12/16/2021						4.9	10			0.9
	1/18/2022										Dry
	2/8/2022										Dry
	3/9/2022										Dry
	3/30/2022										Dry
	5/10/2022		8.53					6			21.1
	6/14/2022							2			NR
	7/13/2022							4			NR
	8/10/2022										22.32
	9/14/2022										NA

2024 WY Exceedance Results		DO*	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Lateral 6 and 7 @ Central Ave	12/7/2021			1074					20		1.38
	12/16/2021			1276					17		NR
	1/19/2022			1003					3		10.37
	2/8/2022			1324					2		NR
	3/9/2022								40		NA
	3/30/2022		8.56								NA
	5/10/2022										NR
	6/15/2022										NR
	7/12/2022	2.8		818				5			NR
	8/9/2022										NR
	9/14/2022	4.18									NR
Levee Drain @ Carpenter Rd	1/19/2022	1.05		3044							0
	3/8/2022	6.45		1168							0
	3/30/2022	3.34		1233				5			0.28
	5/10/2022	4									0.7
	6/15/2022	0.45									0
	7/12/2022	1.56		1292				2			0
	8/9/2022	2.92		774							0
Livingston Drain @ Robin Ave	12/7/2021										Dry
	12/16/2021										Dry
	1/18/2022										Dry
	3/30/2022	3.92					6.4				0
	5/10/2022							7			6.03
	6/14/2022										17.37
	7/13/2022										3.95
	8/9/2022										9.91
	9/14/2022							2			0

2024 WY Exceedance Results		DO*	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Lower Stevinson @ Faith Home Rd	12/7/2021			1072					65		1.75
	12/16/2021							5			6.11
	1/19/2022										Dry
	2/8/2022		8.73	1279							0
	3/9/2022			1447					35	61	NA
	3/30/2022			1052					60		NR
	5/10/2022							2			0
	6/14/2022			829					77		0.45
	7/13/2022							4			NR
	8/10/2022			710					86		NR
	9/14/2022							3		76	NR
McCoy Lateral @ Hwy 140	10/28/2021										NA
	12/7/2021										Dry
	12/16/2021										Dry
	1/18/2022										Dry
	2/8/2022										Dry
	3/9/2022										Dry
	3/30/2022										2.87
	5/10/2022		8.61					3			8.16
	6/14/2022										6.85
	7/13/2022							2			7.69
	8/10/2022										12.71
	9/14/2022										NA
Merced River @ Oakdale Rd	10/12/2021										NR
	10/28/2021										NR
	12/8/2021										98
	12/15/2021				866.4						151
	1/18/2022										129
	2/8/2022		8.51								111
	3/9/2022										96
	3/31/2022										94
	5/17/2022				1413.6						106
	6/15/2022										50
	7/12/2022	5.92									38
	8/9/2022	6.28									26
	9/14/2022	6.34									7
	9/21/2022	6.93									18

2024 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Miles Creek @ Reilly Rd	12/7/2021										Dry
	12/16/2021										0
	1/18/2022										0
	3/30/2022	5.42									0
	5/17/2022							3			2.12
	6/15/2022	6.54									0.51
	7/12/2022	5.23						5			0.18
	8/9/2022	6.66	6.21								1.78
	9/14/2022	5.6	6.28								0
Mootz Drain downstream of Langworth Pond	1/18/2022										Dry
	3/9/2022									71	0
	5/17/2022	4.86									NR
	6/15/2022	3.19						2			1.17
	7/12/2022	3.75									NR
	8/9/2022	4.11									2.36
	9/14/2022	5.67	6.34								4.32
Mustang Creek @ East Ave	10/28/2021										Dry
	12/8/2021										Dry
	12/16/2021	4.16					16	2	72		0
	1/18/2022										Dry
	2/8/2022										Dry
	3/9/2022										Dry
	3/31/2022										Dry
	5/17/2022										Dry
	6/15/2022										Dry
	7/12/2022										Dry
	8/9/2022										Dry

2024 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Prairie Flower Drain @ Crows Landing Rd	10/28/2021			1309							NA
	1/19/2022			2307							NA
	2/8/2022			3028					63		0
	3/30/2022			2094					32		NA
	5/10/2022			2498							0
	7/12/2022	1.84		1326							0
	8/9/2022	3.79		1799					52		0
	9/13/2022	4.64									NR
Unnamed Drain @ Hogin Rd	3/9/2022	1.37		1474							0
	3/30/2022	3.05		1701							NR
	5/10/2022	1.36		1141							NR
	6/15/2022	2.35		1007							NR
	7/12/2022	0.2		1567							0
	9/13/2022			1365							0
Unnamed Drain @ Hwy 140	12/7/2021										No Access
	12/16/2021										No Access
	1/18/2022										Dry
	7/13/2022	1.39									NA
Westport Drain @ Vivian Rd	10/12/2021										Dry
	10/28/2021										Dry
	12/7/2021										Dry
	12/16/2021										Dry
	1/19/2022										Dry
	2/8/2022										Dry
	3/8/2022										Dry
	3/30/2022										Dry
	5/10/2022										Dry
	6/15/2022										Dry
	7/12/2022										Dry
	8/9/2022										Dry
	9/13/2022										Dry
Count Exceedances		**69**	**13**	**51**	**13**	**2**	**6**	**44**	**29**	**5**	

DO+ The WQTL for DO is <5 mg/L for Ash Slough@ Ave 21, Berenda Slough@ Ave 2 1/2, Cottonwood Creek@ Rd 20, Dry Creek@ Rd 18.
Dry - No water at site; no samples collected.
NR-No measurement: Too deep to measure flow or toxicity monitoring only.

Exceedances of Water Quality Trigger Limits within the ESJWQC from October 2020 through September 2021

2021 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/ cm	235 MPN/ 100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Ash Slough @ Ave 21	1/29/2021						6				Dry
	3/11/2021										Dry
Bear Creek @ Kibby Rd	1/13/2021										Dry
	4/14/2021	6.19									NA
	6/16/2021										NR
	7/14/2021										NR
Berenda Slough along Ave 18 1/2	1/13/2021										Dry
	1/29/2021										Dry
	3/11/2021										Dry
	4/14/2021										Dry
	5/12/2021										Dry
	6/16/2021										Dry
	7/14/2021										Dry
	8/11/2021										Dry
	9/22/2021										Dry
Black Rascal Creek @ Yosemite Rd	1/13/2021										Dry
	1/29/2021										NA
	3/10/2021										NA
	4/14/2021	4.6									NA
	5/12/2021										NA
	6/16/2021										NA
	7/14/2021	5.8									NA

2021 WY Exceedance Results		DO*	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/ cm	235 MPN/ 100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Canal Creek @ West Bellevue Rd	10/13/2020										81.17
	11/10/2020										-0.04
	12/8/2020										6.17
	1/13/2021								8		9.37
	1/29/2021				1203.3						NR
	3/10/2020										NR
	4/13/2020										NR
	5/12/2021				248.9						NR
	6/16/2020										NR
	7/14/2021							3			NR
	8/11/2021										NR
	9/22/2021										NR
Cottonwood Creek @ Rd 20	1/13/2021										Dry
	4/14/2021										Dry
	5/12/2021										Dry
	6/16/2021										Dry
	7/14/2021	1.4									1.97
	8/11/2021										Dry
	9/22/2021										Dry
Deadman Creek @ Gurr Rd	10/14/2020										0.44
	1/13/2021										Dry
	1/29/2021						4.5				0.17
	3/11/2021										Dry
	4/14/2021	5.07									2.16
	5/12/2021							2			NR
	6/16/2021										2.13
	7/14/2021	5.5						2			0
	8/11/2021										-4.38
	9/22/2021	4.44									NR

2021 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/ cm	235 MPN/ 100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Deadman Creek @ Hwy 59	10/14/2020										Dry
	1/13/2021										Dry
	1/29/2021										Dry
	3/11/2021	6.33						2			0.07
	4/14/2021										Dry
	5/12/2021										Dry
	6/16/2021										Dry
	7/14/2021										Dry
	8/11/2021										Dry
	9/22/2021										Dry
Dry Creek @ Church St	10/13/2020				328.2						8.01
	11/10/2020				1413.6						8.79
	12/8/2021										Dry
	1/12/2021										Dry
	1/29/2021				2419.6						NR
	3/10/2021										-0.36
	4/13/2021	5.65			261.3						1.51
	5/11/2021	6.6			2419.6			3		78	5.33
	6/15/2021	5.46			648.8						6.55
	7/13/2021	4.02			517.2						NR
	8/10/2021	6.79			1986.3						13.33
	9/21/2021										13.09
	9/23/2021	6.46									8.11

2021 WY Exceedance Results		DO*	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/ cm	235 MPN/ 100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Dry Creek @ Rd 18	10/14/2020										Dry
	11/10/2020										Dry
	12/8/2020										Dry
	1/13/2021										Dry
	1/29/2021										Dry
	3/11/2021										Dry
	4/14/2021				2419.6						0
	5/12/2021										Dry
	6/16/2021										Dry
	7/14/2021	4.92					4.3				NR
	8/11/2021										Dry
	9/22/2021										Dry
Duck Slough @ Gurr Rd	10/14/2020										4.16
	1/13/2021										Dry
	4/14/2021										1.35
	5/12/2021										1.41
	6/16/2021										2.71
	7/14/2021	4.62						3			0.28
	8/11/2021	6.78						2			NR
	9/22/2021										3
Hatch Drain @ Tuolumne Rd	1/12/2021	0.5		1268							NA
	3/10/2021	5.04		1203							0
	7/13/2021	5.81		1342							0

2021 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Highline Canal @ Hwy 99	10/13/2020										NR
	11/10/2020		8.77								0
	12/8/2020										Dry
	1/12/2021										Dry
	1/29/2021				2419.6		26				46.79
	3/10/2021										Dry
	4/13/2021							3			NR
	5/11/2021				260.3						NR
	6/15/2021										NR
	7/13/2021		8.59					4			NR
	8/10/2021										NR
	9/21/2021										NR
	9/22/2021										NR
Hilmar Drain @ Central Ave	11/10/2020			925					60		0
	4/13/2021	5.05									NA
	6/15/2021	3.07									NA
	7/13/2021	2.56		1156							NR
	9/21/2021	6.53		1098							NA
Howard Lateral @ Hwy 140	10/13/2020										3.94
	12/8/2021										Dry
	1/12/2021										Dry
	1/29/2021						5				6.81
	3/10/2021		8.55								NA
	4/13/2021										2.47
	5/11/2021										9.81
	6/15/2021							2			23.33
	7/13/2021		8.75					4			19.05
	8/10/2021										2.01
Lateral 2 1/2 near Keyes Rd	4/13/2021										1.07
	7/13/2021										NA
	8/10/2021			734		11					NR
	9/21/2021										NR

2021 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/ cm	235 MPN/ 100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Lateral 5 1/2 @ South Blaker Rd	10/13/2020			1123		28			53		24.58
	11/10/2020			1210		31			16		13.53
	12/8/2020			1197		26			18		6.26
	1/12/2021			1313		23			24		0.72
	1/29/2021		8.6								0.73
	3/10/2021	6.36				22			21		13.82
	4/13/2021					24		2	25		9.69
	5/11/2021	6.53		1007		27		3	33	67	16.06
	6/15/2021			841		19			29		18.27
	7/13/2021			1112		15		2			19.02
	8/10/2021	5.12		882		14					2.82
	9/21/2021			1281							16.93
	9/23/2021			702							24.16
Lateral 6 and 7 @ Central Ave	12/8/2020			1158					13		NA
	1/12/2021			1143					6		NA
	1/29/2021										NA
Levee Drain @ Carpenter Rd	1/12/2021										Dry
	6/15/2021	6.46		1214							NA
Livingston Drain @ Robin Ave	12/8/2020										Dry
	1/12/2021										Dry
	1/29/2021						6				5.66
	3/10/2021										Dry
	5/11/2021										0.091
	6/15/2021							8			12.343
	7/13/2021							4			14.65
	8/10/2021										3.6
	9/21/2021										8.279945
	9/22/2021										8.838437

2021 WY Exceedance Results		DO*	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/cm	235 MPN/100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Lower Stevinson @ Faith Home Rd	11/10/2020	5.84		1085							0
	4/13/2021			762					31		NA
	6/15/2021			1023							NA
	8/10/2021										NA
McCoy Lateral @ Hwy 140	12/8/2020										Dry
	1/12/2021										Dry
	1/29/2021										Dry
	3/10/2021										Dry
	4/13/2021										1.81
	5/11/2021										7.92
	6/15/2021								72		2.77
	7/13/2021		8.63					20			3.91
	8/10/2021										4.29
Merced River @ Oakdale Rd	10/13/2020										151
	11/10/2020										151
	12/8/2020										168
	1/12/2021		8.7								157
	5/11/2021										137
	6/16/2021	6.85									66
	7/14/2021	5.01									81
	8/11/2021	6.45						10			63
	9/22/2021	5.08									37
Miles Creek @ Reilly Rd	10/14/2020										0.13
	11/10/2020				410.6						0
	12/8/2020										Dry
	1/13/2021										Dry
	1/29/2021				2419.6		7.3				10.88
	3/11/2021										Dry
	4/14/2021	5.01									0
	5/12/2021	6.17									NR
	6/16/2021	6.63									1.22
	7/14/2021	5.82						2			0.54
	8/11/2021							2			1.57
	9/22/2021	5.05									0

2021 WY Exceedance Results		DO*	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/ cm	235 MPN/ 100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
Mootz Drain downstream of Langworth Pond	10/13/2020	5.44									NR
	1/12/2021										Dry
	5/11/2021	4.94									0
	6/15/2021	5.7									0
	7/13/2021	3.69									0.96
	8/10/2021	4.94						4			NR
	9/21/2021										NR
	9/23/2021	4.35									2.907521
Mustang Creek @ East Ave	10/13/2020										NR
	11/10/2020	5.23									0
	12/8/2020										Dry
	1/12/2021										Dry
	1/29/2021	4.82					22				9.79
	3/10/2021										0.06
	4/13/2021	2.58		809				5			0
	5/11/2021	3.49						3			0
	7/14/2021	0.76						3			0
	8/11/2021										Dry
Mustang Creek @ Oakdale Road	10/14/2020										0
Prairie Flower Drain @ Crows Landing Rd	12/8/2020	5.08		1836							NA
	1/12/2021			1914							NA
	1/29/2021			1598							NA
	3/10/2021			1949							NA
	5/11/2021										NA
	7/13/2021	3.9		1905							0
	8/10/2021	3.71		844							NA

2021 WY Exceedance Results		DO+	pH	SC	*E. coli*	Nitrate	Copper	Pyrethroids	Algae Toxicity	Sediment Toxicity	Discharge
Monitoring Location (Listed Alphabetically)	Water Quality Goal (units)	5 or 7 mg/L	<6.5 or >8.5	700 µmhos/ cm	235 MPN/ 100	10 mg/L	µg/L (variable)	Chronic Goal Unit > 1	(% compared to control)	(% compared to control)	CFS
San Joaquin River above Maze Boulevard	6/15/2021	6.13									297
	7/13/2021	6.38									30
	8/17/2021	6.3		705							NR
	9/21/2021	6.02		872							102
San Joaquin River at Airport Way near Vernalis	1/29/2021										1959
	5/11/2021	6.77									700
	6/15/2021										1270
	7/13/2021										1341
	8/10/2021										1313
	9/21/2021	6.52									435
San Joaquin River at Hills Ferry at Bridge	1/29/2021										1056
	5/11/2021			1755							209
	6/15/2021			1086							134.87
	7/13/2021			1032							52
	8/10/2021			1346							44
	9/21/2021			1303							28
Unnamed Drain @ Hogin Rd	5/11/2021	0.12		985							NA
	6/15/2021	3.09		1770							NA
	7/13/2021	6.6		1204							0
Unnamed Drain @ Hwy 140	1/12/2021										Dry
	6/15/2021										NA
	7/13/2021	6.18									NA
Westport Drain @ Vivian Rd	1/12/2021										Dry
	1/29/2021	2.82		725							NA
	3/10/2021										Dry
	8/10/2021										Dry
Count Exceedances		**64**	**7**	**41**	**15**	**11**	**8**	**24**	**14**	**2**	

DO+ The WQTL for DO is <5 mg/L for Ash Slough@ Ave 21, Berenda Slough@ Ave 2 1/2, Cottonwood Creek@ Rd 20, Dry Creek@ Rd 18.
Dry - No water at site; no samples collected.

NR-No measurement: Too deep to measure flow or toxicity monitoring only.

Monitoring Constituents Definitions

Dissolved Oxygen (DO): DO criterion is protective of aquatic life: (min. of 7 mg/L). DO levels are affected by water temperature, photosynthesis & respiration. Added nutrients can stimulate algae production which dies and breaks down by microbial activity. The activity requires oxygen, depleting DO and resulting in an inability to support aquatic communities.

pH: Power of Hydrogen (pH) measures acidic or basic levels in a solution. Acceptable range = 6.5-8.5. Water temperature, photosynthesis & respiration can affect levels. Fertilizers & pesticides can affect pH of water/soil.

Specific Conductance (SC): A measure of salt and is measured in µS/cm. SC is an indirect measure of the presence of ions such as chloride, nitrate, sulfate, phosphate, sodium, magnesium, calcium and iron. The SC standard (700 µS/cm) is protective of sensitive agricultural crops such as beans.

Ammonia: Total ammonia consists of the unionized (NH3) form plus the ionized (NH4 +) form also called ammonium. Ammonium can enter a water body through direct discharge from agricultural fertilizers or animal waste, discharges from wastewater treatment plants, or from the breakdown of organic matter in the stream. In soils, ammonium from fertilizers is typically converted to nitrite and then to nitrate over a short period of time. Exceedances of the ammonia standard are based on water temperature and pH which affect the level at which ammonia is toxic to aquatic life. Regardless of the water temperature or pH, all ammonia concentrations above 1.5 mg/L are exceedances of the drinking water standard.

Nitrate + Nitrite: Potential sources include runoff of fertilizers or organic matter from irrigated pasture, leaking septic systems, wastewater treatment plant effluent and animal waste. Nitrate and nitrite are very soluble and can enter surface or groundwater with irrigation and/or storm water. Animal waste can be converted to nitrate by nitrifying bacteria. Sources of animal waste include dairies, poultry, pasture and/or wildlife.

E. coli: Common bacterium in intestinal tracts and voided in fecal matter. E. coli in water is compared to the water quality standard protective of recreational activities (235 MPN/100mL). E. coli may persist in presence of oxygen for periods of time after being voided. Any feces voiding species of vertebrate can contribute E. coli to surface waters. Potential sources: leaky septic systems or sewer lines, wastewater treatment plant discharge, application of biosolids to ag land, defecation in or near waterbodies, dairies, manure or poultry operations.

Arsenic: Arsenic is found in sodium cacodylate which is applied by agriculture for broadleaf weed control and as a cotton defoliant. California Department of Pesticide Regulation records indicate no agricultural use of sodium cacodylate across the Coalition region between 1998 and 2010. Exceedances of the Arsenic WQTL can be attributed to legacy pesticide use.

Copper: Dissolved or sediment bound in water. Measurement of dissolved copper=dissolved form only measurement of total copper= both dissolved & bound. Dissolved copper is adjusted for the hardness (CaCO3) in water to determine concentrations that would be toxic to aquatic species. Total copper is also evaluated based on the criteria protective of the drinking water beneficial use.

Molybdenum: Products containing molybdenum are rarely if ever used in the Coalition area. Molybdenum can be a byproduct in copper and tungsten mining and is used in alloys due to its ability to withstand high temperatures, resistance to corrosion, and weldability. The westside region is naturally elevated in molybdenum and tends to be flushed into surface waters during periods of high rainfall. Drains such as Prairie Flower Drain which were constructed to drain shallow ground water and allow agriculture can develop elevated concentrations of molybdenum when the ground water is driven into the channel. In living organisms, molybdenum acts as a metal heteroatom and is present in various enzymes including aldehyde oxidase, sulfite oxidase and xanthine oxidase. Molybdenum can also be found in green beans, eggs, sunflower seeds, wheat flour, lentils and cereal grains. In animal studies chronic ingestion of 10 mg/kg of molybdenum can cause diarrhea, growth retardation, sterility, low birth weight, and gout.

Chlorpyrifos: An organophosphate insecticide used in alfalfa, grapes & orchards (among other crops). Trademarked names include: Govern™, Lock- On™, Lorsban™, NuPhos™, etc. Chlorpyrifos can bind to sediment or remain in water column. The 0.015 µg/L objective is protective of aquatic life.

Malathion: Malathion is an organophosphate insecticide applied to over 100 crops in the United States including alfalfa, rice, cotton, sorghum, wheat, and walnuts. It is also used for structural pest control (mosquito and fruit fly eradication, and home settings). Malathion is easily mixed with water and can be found in both urban and agricultural runoff. Malathion is a prohibited discharge pesticide except under the Rice Coalition Management Plan and any detection of the constituent is considered an exceedance. Malathion is known to be toxic to C. dubia (LC50 = 3.35 µg/L).

Pyrethroids: Are synthetic chemicals based on naturally occurring pyrethrins, found in chrysanthemums. They are an effective and widely used class of chemical for the control of pests. Pyrethroids readily bind to sediment and can also be found in the water column.

Algae toxicity: algae (aquatic plants) are sensitive to herbicides and fungicides. Algae toxicity is measured as percent growth in the sample water compared to the growth in a control treatment.

Fathead minnow toxicity: fathead minnows (fish) are sensitive to ammonia toxicity. At high concentrations pesticides and metals can also cause fish mortality. Fathead minnow toxicity is measured as percent survival within the sample water compared to survival in a control treatment.

Water flea toxicity: water fleas (invertebrates) are especially sensitive to water soluble pesticides such as chlorpyrifos & diazinon. Toxicity is measured as % survival in sample compared to survival in control treatment.

Sediment Toxicity: One species (Hyalella azteca – amphipod) is used in sediment analysis to determine toxicity that may occur to pelagic organisms. Amphipods are sensitive to pyrethroids and other pesticides that are not highly water soluble including some herbicides, fungicides and insecticides. Amphipod toxicity is measured as percent survival within the sediment sample as compared to the survival in a control treatments.

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