East San Joaquin Water Quality Coalition
1201 L Street Modesto, CA 95354
www.esjcoalition.org

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Via Email Only

Steve Weisberg
Southern California Coastal Water Research Project
3535 Harbor Blvd., Suite 110
Costa Mesa, CA 92626
sweisberg@sccwrp.org

SUBJECT: Findings and Recommendations of the Expert Review Panel for the Eastern San Joaquin Surface Water Monitoring Program

Dear Steve:

The East San Joaquin Water Quality Coalition (ESJWQC or Coalition) appreciates the time and effort taken by the Eastern San Joaquin Surface Water Quality Monitoring Review Panel (Expert Review Panel) to prepare the Draft *Findings and Recommendations of the Expert Review Panel for the Eastern San Joaquin Surface Water Monitoring Program Draft Report* (Draft Report), dated October 20, 2020. Overall, we appreciate the Expert Review Panel's willingness and openness to listen carefully to all stakeholders, and the diverse viewpoints provided by many. Much information was conveyed over a short period of time and the Expert Review Panel was quickly able to understand a program that has been iteratively developed for over more than a decade. The Coalition is pleased to see that the Draft Report's first Key Finding concludes that "the Program is, on the whole, appropriately designed and implemented to meet the monitoring program goals laid out in the 2012 Order, …." (Draft Report, p. 6.) The Coalition also finds several other recommendations instructive and intends to implement certain recommendations as soon as appropriate.

However, as it is the Coalition (and its members) that is directly impacted by the Draft Report and its recommendations, the ESJWQC is concerned that it is infeasible and/or impractical to implement some of the recommendations. We share our responses and concerns with respect to recommendations contained in the Draft Report in Part 1 of this communication.

On November 11, 2020, the ESJWQC and the State Water Resources Control Board (State Water Board), received a request from the Expert Review Panel for additional information. ESJWQC responds to this additional information request in Part 2 of this communication.

Part 1 - ESJWQC Response to the Expert Panel Draft Report

In Part 1, the Coalition shares its concerns for implementing certain recommendations as they are currently formulated. The Coalition's concerns can be characterized into five general categories of concern:

1) Lack of technical justification for the new or additional information being recommended (Technical Justification)
2) Need for the data to be obtained as compared to purposes and goal of the program (Need for Data)
3) Cost impacts for implementing the recommendation and/or obtaining the new or additional data/information (Cost Impacts)
4) Policy impacts or constraints associated with the recommendation (Policy Impacts)
5) Program priorities as compared to the data/information to be gathered per the recommendation (Program Priorities)

Categorical concerns for each recommendation are first identified in **Table 1** (as applicable) and further explained in subsequent sections for relative Key Findings and associated recommendations as they appear in the Draft Report.

Table 1. Identification of Categorical Concerns for implementing the Expert Panel's key findings and recommendations.

Recommendations	Technical Justification	Need for Data	Cost Impacts	Policy Impacts	Program Priorities
Key Finding 3.2: The measurement parameters and methods are inadequate for characterizing concentrations and biological effects of some current-use pesticides.					
3.2.1: The *Chironomus sp*. toxicity test should be added to the Program	X		X	X	
3.2.2: Analytical chemistry methods should be refined to ensure the Program is capable of detecting pesticides at biologically active concentrations.	X		X	X	
3.2.3: The Program's Pesticides Evaluation Protocol (PEP) should be expanded to encompass the selection process for toxicity testing, analytical chemistry methods, and temporal sampling density.	X	X	X		
3.2.4: An analysis should be conducted to understand whether grower changes to the pesticides being applied are leading to the Program to improperly credit management plans for observed outcomes.	X	X			
Key Finding 3.3: The Program does not accurately quantify dissolved oxygen (DO) problems or provide appropriate insights about the degree to which agricultural practices contribute to low DO concentrations.					
3.3.1: DO should be measured either continuously or at times of day when concentrations are likely to be lowest.	X	X	X	X	X
3.3.2: Statistical analyses should be improved to enhance the insights provided by existing DO data.		X			
3.3.3: Additional eutrophication parameters, including Chlorophyll-a, should be measured.	X			X	
Key Finding 3.4: The Program's approach to developing management plans – although generally appropriate and sound – results in coverage gaps.					
3.4.1: Development of management plans and focused outreach should be expanded.	X				
Key Finding 3.5: Some types of data displays result in key information being lost or subject to mischaracterization.					
3.5.1: Trends should generally be graphed using constituent concentrations rather than exceedances.		X			
3.5.2: Precipitation curves should be added to trend graphs.		X			
3.5.3: Dry sites should be reported as "no data" rather than "no exceedance".	X				
3.5.4: Any apparent trend lines should be the result of statistical analysis described in the report.					

A. ESJWQC COMMENTS ON KEY FINDING 3.2 RECOMMENDATIONS

Recommendation 3.2.1. - *Chironomus* species toxicity test

The Expert Review Panel recommends "adding *Chironomus sp.* water and sediment toxicity testing to the ESJWQC Program because the current toxicity tests are not sufficiently sensitive to many pesticides." (Draft Report, p. 9.) The ESJWQC has serious concerns with this recommendation for multiple reasons.

Recommendation Lacks Technical Justification

The Expert Review Panel's recommendation to use *Chironomus* in toxicity testing arises because this organism is more sensitive to toxicity from neonicotinoid pesticides than other test species. Thus, the recommendation to include *Chironomus* toxicity tests is intended to address the concern that the Coalition is "missing" toxicity caused by neonicotinoid pesticides.

During the Expert Review Panel meetings, the Coalition expressed concerns with adding *Chironomus* toxicity testing in water for two technical reasons. First, *Chironomus* is a sediment-dwelling organism, and testing in water requires special handling procedures, such as testing without a substrate or using an artificial substrate, that introduce stress to the organism, thereby increasing variability and potentially causing unreliable test results. Second, methods for *Chironomus* testing in water are still in development by commercial laboratories in California (including the lab used by the ESJWQC) and the process for obtaining accreditation by the State's Environmental Laboratory Accreditation Program (ELAP) for this test is unclear. In particular, Toxicity Identification Evaluation (TIE) methods for *Chironomus* are still being developed, such that the ESJWQC-contracted laboratory could not provide cost estimates for performing a TIE for *Chironomus* in water.

The Coalition also has concerns about testing for *Chironomus* toxicity in sediment. The Coalition is currently testing for toxicity in sediment using *Hyalella azteca*, which is the most sensitive species to toxicity from pyrethroids. Because pyrethroids associate strongly with sediment,[1] *Hyalella azteca* testing is designed to identify toxicity in sediments that may be mobilized by high flow events (e.g., winter runoff events, summer irrigation flows) and later deposit to sediments. Toxicity and sediment pesticide samples are required to be collected twice yearly, between August and October and between March and April. However, compared to pyrethroids, neonicotinoid pesticides such as imidacloprid do not partition strongly to sediments.[2] Because these chemicals are not expected to be bound to sediment, sediment toxicity to *Chironomus* due to pesticides with low K_{oc} values is not expected to occur.

[1] Partition coefficient (K_{oc}) values measure the tendency of a chemical to bind to sediment rather than remain in the dissolved phase. Pyrethroids have elevated K_{oc} values (2,000,000-7,000,000). (See Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Pyrethroid Pesticide Discharges (Pyrethroid Control Program).)

[2] The K_{oc} value for imidacloprid ranges between 132 and 256, depending on the properties of the sediment, California Department of Pesticide Regulation, Risk Characterization Document, Dietary and Drinking Water Exposure . (https://www.cdpr.ca.gov/docs/risk/rcd/imidacloprid.pdf) [K_{oc} values for other neonicotinoids range from 20 to 200, Hladik, M. L., A. R. Main, and D. Goulson. 2018. Environmental risks and challenges associated with neonicotinoid insecticides. Environmental Science and Technology, 52:3329-3335.

Ultimately, until there are ELAP-accredited methods for *Chironomus* testing and reliable TIE methods, the addition of *Chironomus* testing to the monitoring program would not be useful or provide value.

Cost Impacts are Significant

The ESJWQC-contracted laboratory provided an estimate for *Chironomus* water column testing of approximately $825 per sample, with monthly reference toxicity test cost of $1,675. As noted above, ELAP-accredited methods for *Chironomus* water column testing are presently not available, and it is not believed that water column toxicity testing would provide reliable, actionable results. Further, it has not been established that it is feasible to obtain reliable, reproducible, actionable results from *Chironomus* water column testing.

Sediment testing using *Chironomus* costs approximately $1,760 per sample; if six sites are sampled twice per year, sediment testing using *Chironomus* would add about $21,000 per year to the toxicity testing costs. Thus, adding *Chironomus* sediment toxicity testing on top of *H. azteca* sediment toxicity testing would double the sediment toxicity testing costs for the Coalition with no expectation that toxicity would be found. The Pyrethroid Control Program requires that the Coalition include *H. azteca* water column toxicity testing in the monitoring program, which is increasing monitoring costs for the ESJWQC by approximately $150,000 for the 2021 Water Year (WY). Depending on the extent of *Chironomus* testing and number of TIEs involved, *Chironomus* water column testing could add another $150,000 to the program costs within a year or two.

Inconsistent with Applicable Policy

The Coalition believes that, as a Policy matter, it is inappropriate to shift the cost burden for new method development and laboratory accreditation to permittees subject to Waste Discharge Requirements (WDRs). The ESJWQC assists growers of irrigated lands in meeting and implementing the WDRs contained in General Order No. R5-2012-0116-R4 For Growers Within the Eastern San Joaquin River Watershed that are Members of the Third-Party Group (ESJ WDRs). The ESJWQC WDRs are issued pursuant to Water Code section 13263, which requires that WDRs implement relevant Water Quality Control Plans, and take into consideration the beneficial uses to be protected, the water quality objectives reasonably required to protect beneficial uses, the need to prevent nuisance and consider the provisions of Water Code section 13241. (Wat. Code, § 13263(a).) Along with the WDRs, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) also adopts a Monitoring and Reporting Program Order pursuant to Water Code section 13267 to monitor compliance with the provisions of the Order and determine whether state waters receiving discharges from growers under the Order are meeting water quality objectives. (Attachment B to Order R5-2021-0116-R4, p. 3.) Under Water Code Section 13267, the Central Valley Water Board has the authority to require preparation and submittal of technical and monitoring reports. When doing so, "the burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports." (Wat. Code, § 13267(b)(1).)

With respect to *Chironomus sp.* toxicity testing in water and sediment, until there are ELAP-accredited methods and reliable TIEs, the burden and cost of such testing as would be imposed on the ESJWQC is not reasonable.

ESJWQC Request

In light of these concerns, the ESJWQC respectfully requests that recommendation 3.2.1 be removed from the Draft Report. At the very least, the recommendation should be re-phrased to suggest that the Central Valley Water Board should consider requiring water column toxicity test for *Chironomus sp.* once there are ELAP accredited methods and reliable TIEs, if the Central Valley Water Board finds it appropriate based on use and practices associated with relevant pesticides in the East San Joaquin Coalition region area. Further, since the Coalition already tests for toxicity in sediment using *H. azteca*, which is the most sensitive species for testing of pesticides likely to be found in sediment, the Coalition does not believe that the testing of *Chironomus* in sediment is necessary.

Recommendation 3.2.2. - Refine Analytical chemistry methods for Pesticides

The Expert Panel recommends "the use of non-standard methods as necessary to improve detection limits to levels that are biologically relevant, and recognizes that there are many methods in routine use at academic, industry and government laboratories that will achieve this." (Draft Report, pps 9-10.)

Lack of Technical Justification

For many chemicals, the Regional Board has not identified a "biologically active concentration" or provided a trigger limit. Without a trigger limit, chemical concentrations cannot be compared to relevant thresholds, and there is no apparent utility to obtaining lower detection limits. In addition, toxicity testing is intended to be a "catch-all" for identifying adverse responses or impacts to aquatic organisms; lower detection limits will not affect the outcome of toxicity tests and thus are of limited utility if there is not an associated trigger limit by which to compare them to.

Cost Impacts May Be Significant

The Coalition is in the process of working with a private contract laboratory to develop lower detection limits for neonicotinoids. For other chemicals, the Coalition will continue to work with contracted laboratories to lower detection limits when appropriate to evaluate potential risk to aquatic life. Analyzing for neonicotinoids at lower detection limits than the current method of EPA 8321A will cost the Coalition almost twice as much per sample (increase from $225 to $400 per sample).

Developing new methods or lowering detection limits for new classes of pesticides (or other emerging constituents) usually occurs in one of two ways: 1) laboratories independently fund the development; or, 2) clients like the ESJWQC request and pay for method development. Typically, laboratories will self-fund the cost of method development when they see that there are substantial market opportunities for the test in question. However, in situations where the demand is likely to exist for only 20 to 30 tests per year, it is highly unlikely that a laboratory will find that there exists enough of a market opportunity to absorb costs of new method development. As a result, costs for method development for emerging constituents, which are significant, would then fall onto the ESJWQC. This cost burden for laboratory method development has never been and should not be imposed on the ESJWQC and its members as part of complying with Waste Discharge Requirements (WDRs).

Inconsistent with Applicable Policy

Like with *Chironomus sp.* testing, the Coalition finds that, as a Policy matter, it is inappropriate to shift the burden for method development and improved laboratory performance (e.g., lower detection limits) onto

those subject to WDRs and monitoring provisions imposed pursuant to Water Code section 13267. Further, the rationale for requiring lower pesticide detection limits should only be considered if relevant water quality trigger limits have also been identified. The ESJWQC Order outlines a stakeholder process for developing water quality trigger limits for constituents related to irrigated agriculture where no other appropriate water quality objectives or criteria are identified. This stakeholder process needs to occur first and should then be used to inform the need for lower method detection limits and reporting limits. Until trigger limits are established and adopted by the Regional Water Board, there is little reasonable relationship between the cost of developing and using lower detection limits as compared to the need for the information. Thus, the recommendation here does not meet the minimum standards in Water Code section 13267 for being imposed on the ESJWQC.

ESJWQC Request

The ESJWQC requests that this recommendation be deleted from the Draft Report. Further, the recommendation is unnecessary. Through the current Pesticide Evaluation Protocol, the Central Valley Water Board, working with stakeholders, already has the discretion to identify when the use of non-standard methods may be appropriate (e.g., after identification of a water quality trigger limit).

Or, in the alternative, the Coalition recommends that laboratory detection limits and analytical methods be evaluated and updated on a prescribed timeline, such as every five years, which would allow stakeholder involvement to determine the need for the data.

Recommendation 3.2.3. – Expand Pesticide Evaluation Protocol (PEP) to Include Toxicity Testing, Analytical Chemistry Methods, and Temporal Sampling Density

The Expert Panel recommends expanding the PEP to encompass other key decisions being made by the Program in developing pesticide monitoring plans. Once pesticides have been selected via the PEP process, the Panel recommends adding the three additional steps of toxicity testing, analytical chemistry methods and temporally sampling density. (Draft Report, page 10.)

Lack of Technical Justification

The Coalition currently uses the results of the PEP to guide the selection of toxicity tests, as the recommendation suggests. The Coalition's technical consultants maintain a database that links chemicals to species used in toxicity tests. When the PEP identifies a chemical that needs to be monitored, the database is consulted to determine which toxicity tests should be performed at the same time. For example, when herbicides are applied, *S. capricornutum* test monitoring is evaluated. In addition, for the few herbicides that have demonstrated toxicity to invertebrates, both *S. capricornutum* and *C. dubia* tests are performed. Thus, the use of the PEP already extends to this consideration and the recommendation as it applies to toxicity tests is unnecessary.

With respect to the two additional steps, analytical chemistry methods and temporal sampling density respectively, the Coalition has concerns regarding their inclusion into the PEP process. First, the Coalition's concerns regarding sensitivity of the analytical methods used are included above in our response to recommendation 3.2.2 (related to the need to develop non-standard analytical methods to obtain lower detection limits).

Second, the recommendation to modify the timing and frequency of monitoring based on the chemical properties of applied pesticides (recommendation to add a Step 10 to the PEP), does not require the addition of another step since the PEP already considers physical-chemical and environmental fate information when determining which months to monitor. If an additional step were to be included, this raises concerns of the intent to more accurately predict when a chemical will be present in the waterway beyond what is already considered in the PEP; there are concerns regarding technical feasibility and ability to implement this recommendation that is its intent. Pesticide applications occur frequently and broadly across each watershed within the East San Joaquin Coalition region (e.g., daily over many acres). Some of these applications have no potential to discharge, while other applications could result in discharge immediately from spray drift from a field adjacent to the waterbody. Other applications could potentially result in a discharge of a pollutant, but it could take one or two days for drift of the pesticide to reach the waterbody. Consequently, discharge could occur on any day during the growing season. Slide 14 in the first presentation Dr. Johnson provided to the Expert Panel in the January 2020 meeting illustrated the point using bifenthrin as an example. But the key conclusion is that monthly monitoring is sufficient to detect exceedances, which then triggers the need for management plans. In regard to sediment, toxicity testing twice a year is sufficient based on the environmental fate and chemical properties of these pesticides. More frequent monitoring (and potentially more frequent detection of exceedances), will not alter the reality that the zone in question is already subject to a management plan.

Notably, the critical assumption made by the Coalition is that when an exceedance is found, all members who applied that chemical, or all members who applied a chemical capable of causing toxicity (if the exceedance is for toxicity), are potentially a source of the exceedance. Therefore, all members who used a product and are upstream of the watershed are targeted for focused outreach. This approach accomplishes the ultimate goal of changing grower behavior with respect to pesticide applications and protection of water quality.

Need for Data

Because of the heterogeneity of farming practices (pesticide applications and irrigation practices) and environmental conditions (soil type, rainfall patterns, watershed characteristics, etc.), available data are not suitable to support an analysis of pesticide environmental fate properties to determine timing and frequency of monitoring beyond monthly monitoring. As with most nonpoint source discharges, determining the factors that influence ambient water quality is difficult, and many of these factors are highly variable in time and space. As such, no practical amount of data and/or information could be gathered to conduct this analysis for each pesticide. Nor would the cost of doing so provide sufficient value to the program. The Expert Panel has agreed that monthly monitoring is adequate for determining the impact of irrigated agriculture on beneficial uses; the need to further refine monitoring to be more frequent will not aid in understanding irrigated agricultural impacts to surface waters as has been demonstrated by the Coalition when they performed twice a month sampling as part of their early Management Plan Monitoring efforts. For this reason, focused outreach targets all members in a watershed using an identified chemical, or using a chemical capable of causing toxicity.

Cost Impact Likely to be Significant

The costs of developing new analytical methods with lower detection limits is described in our response to recommendation 3.2.2.

The implications of changing the timing and frequency of monitoring for each pesticide could substantially change the frequency of sampling events and could result in the need for an individual pesticide-by-pesticide monitoring program. Creating and implementing a monitoring program that includes different timing and frequencies of sampling for individual pesticides would be costly. The number of sampling events would increase dramatically, which alone would result in significant cost impacts. Depending upon the increase in sampling frequency, costs of the monitoring program could more than double. For example, if the Coalition were to sample at 2 different times in the month for different pesticides at the same location, this would result in additional costs to drive to the location twice instead of once. Plus, there would be additional quality control samples that would have to be collected (field duplicates, field blanks and matrix spikes) to represent the method and analyte. On average, the cost to visit a single sample site (excluding analytical costs) is $800 including personnel costs, vehicle rental, and equipment costs. The cost for sending samplers out more than once a month plus the additional quality control costs will result in at least double the costs.

The Coalition has a complex monitoring program with monthly monitoring and varying methods/analytes each month where quality control is planned to ensure that each event has the required quality control samples collected and analyzed. Because of the spatial and temporal heterogeneity in pesticide application practices, discharge frequency, and other conditions, monthly monitoring is adequate to characterize discharges from irrigated agriculture. The Coalition schedules monitoring to capture runoff from storm events, sediment monitoring twice a year to capture deposition of pesticides likely to be found in sediment and monthly monitoring to evaluate runoff from irrigation events throughout the Coalition region. Implementing this recommendation will not provide significant new information that will allow the Coalition to better target outreach eliminate future water quality problems.

ESJWQC Request

For the reasons provided, the ESJWQC requests that this recommendation be deleted from the Draft Report and that the PEP remain as is. The additional recommended steps would increase program costs but would not bring forward new information of much value. The Coalition already considers pesticide environmental fate and toxicity when determining which toxicity species to use in toxicity tests, and the Coalition monitors monthly at a time when the pesticide is likely to be found in the waterway.

Recommendation 3.2.4. – Conduct Analysis To understand If Grower Changes to pesticides being applied are leading the Program to improperly credit management plans for observed outcomes

The Expert Panel recommends "conducting a retrospective analysis of historical data on pesticide use and exceedances to understand whether changing pesticides usage is leading the Program to falsely conclude that water quality is improving" (Draft Report; page 14).

Lack of Technical Justification

The Coalition reviews water quality data and pesticide use data annually when evaluating potential sources of exceedances. These data are also used to develop the monitoring schedule, along with the PEP. The PEP is designed to detect if chemical "switching" is occurring by identifying the chemicals that are being used each year. New chemicals that are substituted for current use chemicals will be monitored in the future as determined by the PEP.

Further, to remove a constituent from a management plan via a Management Plan Completion Request, the ESJWQC is required to provide the justification, data and rationale for recommending completion. This includes evaluating water quality data, changes in pesticide use, and changes in management practices. In other words, the management plan process already takes into consideration the potential impact of "switching" pesticides and a Management Plan Completion Report cannot be justified on the mere fact that a specific pesticide is no longer being used. A recent example is the phase out of chlorpyrifos insecticide. ESJWQC had several chlorpyrifos management plans, a majority have been completed several years before it was phases out. The most commonly used "replacement product" for chlorpyrifos is the pyrethroid insecticides. These products are currently being monitored for both sediment and water column impacts as are other products targeted for the pests controlled previously by chlorpyrifos. Moreover, those products with potential for aquatic impact would be identified through the PEP process.

Need for Data

The Coalition evaluates pesticide use on an annual basis as part of the PEP. The Coalition also monitors toxicity using the most sensitive species as required by its Order. Toxicity testing is intended to serve as a "catch all" to identify impacts to aquatic life that may be caused by any pesticide or combination of pesticides that are present (whether monitored as an individual chemical or not). The data collected by the current monitoring program using the PEP and evaluating the need for toxicity testing based on the species identified by the Order are adequate for characterizing discharges of irrigated agriculture. To do an analysis as recommended by the Expert Panel will not provide data that has not already been reviewed and analyzed as part of the Management Plan Completion requests or evaluated annually as part of the PEP.

ESJWQC Request

The ESJWQC disputes the Draft Report's implications that the Coalition has improperly credited implemented management practices for water quality improvements when requesting completion of a management plan. Regardless, the ESJWQC is willing to work with Central Valley Water Board staff to determine if it is appropriate to conduct such an analysis as recommended.

B. ESJWQC COMMENTS ON KEY FINDING 3.3 RECOMMENDATIONS

Recommendation 3.3.1. – Measure Dissolved Oxygen continuously or at times of the day when concentrations are likely to be lowest.

The Expert Panel recommends "deployment of continuous recording devices that shed light on how DO varies across time of take, or taking all point measurements during the early morning when DO levels are expected to be lowest." (Draft Report, p.15.)

Lack of Technical Justification

The purpose of this recommendation is not clear to the Coalition. The Coalition notes that because every monitoring site/watershed in the entire ESJWQC region is in a management plan for low DO, additional prescribed monitoring will have little utility in determining whether exceedances related to DO measurements are occurring. Further, DO exceedances in and of themselves has little relevance to

determining impacts to aquatic life beneficial uses at many of the ESJWQC's sampling locations considering that many of them are constructed and concrete-lined supply channels and agricultural drains. Notably, the applicability of aquatic life beneficial uses (which drives application of DO water quality objectives) to constructed and concrete-lined supply channels and agricultural drains is questionable.

Currently, the Coalition measures DO at every site scheduled for monitoring, which could occur anywhere from seven o'clock in the morning to eight o'clock in the evening. The time differential is due to the time required for the sampling crew to reach different sampling locations in an area that is over 1,500 square miles. Exceedances of DO have occurred across all zones and over a range of collection times, indicating the water quality exceedances identified by DO measurements are not solely dependent on the time of day it is measured. Thus, there is little technical justification for changing current DO monitoring practices under the ESJWQC's program (See, e.g., **Table 2**).

Table 2. Counts of exceedances of the DO WQTL from 2004-2020 WY).

Zone	7:00am	8:00am	9:00am	10:00am	11:00am	12:00pm	1:00pm	2:00pm	3:00pm	4:00pm	5:00pm	6:00pm	7:00pm	8:00pm
1	**1**	**62**	**53**	**10**	**6**	**2**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	101	83	24	20	10	5	2	2	1	1	1	0	0
2	**2**	**27**	**52**	**69**	**70**	**48**	**30**	**8**	**2**	**1**	**0**	**0**	**2**	**0**
2	2	46	118	122	161	139	91	39	19	10	4	2	2	0
3	**1**	**3**	**6**	**9**	**7**	**2**	**4**	**5**	**2**	**0**	**2**	**0**	**0**	**0**
3	2	19	15	30	48	52	32	43	29	22	11	4	0	1
4	**0**	**4**	**10**	**15**	**14**	**12**	**19**	**16**	**11**	**6**	**2**	**1**	**0**	**0**
4	1	17	42	56	53	63	99	70	71	36	18	7	2	0
5	**0**	**3**	**2**	**13**	**33**	**31**	**26**	**11**	**7**	**1**	**0**	**0**	**0**	**0**
5	0	9	30	43	94	118	90	49	32	14	3	2	0	0
6	**0**	**1**	**8**	**3**	**4**	**4**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
6	2	11	59	54	46	33	16	9	9	3	1	2	0	0
#Result	8	203	347	329	422	415	333	212	162	86	38	18	4	1
#Exceeds	**4**	**100**	**131**	**119**	**134**	**99**	**83**	**43**	**22**	**8**	**4**	**1**	**2**	**0**
% Exceeds	**50%**	**49%**	**38%**	**36%**	**32%**	**24%**	**25%**	**20%**	**14%**	**9%**	**11%**	**6%**	**50%**	**0%**

Need for Data

Moreover, the usefulness of collecting continuous DO data for the ESJWQC monitoring program is minimal to negligible. The use of continuous data (or DO measurements collected on a small time step such as 6 minutes) to better understand the cause(s) of low DO at the irrigated agricultural sampling locations will likely not provide useful information since many interacting factors affect DO levels. Simply observing a diurnal change in DO does not suggest that the cause of the exceedance is eutrophication, as other factors, such as water temperature, also vary diurnally and can generate a diurnal change in DO.

Cost Impacts Likely to be Significant

The costs for performing continuous monitoring include the cost for buying and deploying a data logger with the appropriate sensors to measure DO, a telemetry system and field computer, an apparatus to mount the telemetry system with a solar panel and features to protect the equipment from vandalism and weather. The submersible data logger starts at around $3,000 with a telemetry system costing approximately another $1,000. The sensors range in price but are on average $500 each. This would be a system that relies on a telemetry system to provide real time data. However, there are other options that include data loggers that can be left in the field and then picked up and the data loaded. These also start at $3,000 and run the risk of being stolen, carried downstream if the flow is high and for other reasons lost. Depending on the data logger, there may be additional costs for sondes, antifouling apparatus, and software costs. It is reasonable to expect that regardless of the exact instrument used, the average cost would start at $5,000 and easily increase depending on the number of loggers needed. The concerns for vandalism are high due to the location of Coalition sites which are at public road crossing with easy access. There is a high probability of the equipment being vandalized, stolen or lost making it difficult to justify the costs.

Inconsistent with Applicable Policy

Issues associated with low DO result from a number of factors, potentially including discharges that are not directly regulated by the ESJ WDRs, the ephemeral nature and character of agricultural drains, and other factors. Rather than imposing additional costly burdens on the ESJWQC to increase or change monitoring for DO, the Central Valley Water Board should consider regional investigations and broad watershed solutions. Such an approach would be more consistent with the State Water Resources Control Board's anticipated biostimulatory/biological objectives policy, which has been under development for many years.

Inconsistent with Program Priorities

The Coalition currently collects DO data during normal site visits. Requiring DO data collection at a consistent time of day, and/or requiring continuous data collection, will be of limited value in identifying problem areas or identifying and implementing solutions. The Coalition believes that its resources are more properly put to use in identifying water quality and toxicity issues that can be attributed to Coalition members and thus addressed by its Surface Water Quality Management Plan strategy. The collection of additional data will not help in identifying actions that growers can realistically implement that would reduce the occurrence of low DO, especially in areas where growers are reducing the amount of water use and tail water runoff. In terms of practices that growers could implement to reduce the amount of nutrients leaving their fields, growers within the ESJWQC are already implementing additional practices to reduce the amount of nitrogen applied and improve crop nitrogen use efficiencies. Although this focus is more centered on nitrate contamination to groundwater, both the State Water Board and the Central Valley Water Board have indicated that this is a top priority.

Recommendation 3.3.2. Improve Statistical analyses to enhance the insights provided by existing DO data.

The Expert Panel recommends that the Program should assess the contributions of agriculture to observed low DO and hypoxia by using "a subset of DO data that was collected at nearly the same time of day…only use DO data collected in early morning." (Draft Report, page 15.)

Need for Data

As detailed in the response to recommendation 3.3.1, statistical analyses of existing data can be attempted to try to "tease out" relationships between DO and other variables. Given the spatial and temporal heterogeneity in farming practices and watershed characteristics, as well as the importance of factors and sources beyond the control of Coalition members, the Coalition believes that additional statistical analyses of DO data are unlikely to yield new insights. The Coalition also expects to initiate discussions with the Central Valley Water Board to determine the applicability of aquatic life beneficial uses to constructed ag conveyances and drains.

Recommendation 3.3.3. – Measure Additional eutrophication parameters, including Chlorophyll-a

The Expert Panel recommends that the Coalition add monitoring parameters, including Chlorophyll-a, to assess the role of groundwater and dairy practices in DO deficits, and to evaluate whether nutrients associated with fertilizer play a minor role. (Draft Report, page 16.)

Lack of Technical Justification

There are no trigger limits for eutrophication parameters such as chlorophyll-a or additional parameters (e.g., TOC, PO_4^{3-}), meaning that by themselves, they cannot indicate if impairment of beneficial uses is occurring. The Expert Review Panel appears to be recommending these parameters for measurement solely to support a source identification analysis for low DO. However, relationships between these parameters and DO are expected to be complex and variable.

Inconsistent with Applicable Policy

While collecting measurements of these parameters might be suitable for a Special Study to examine the causes of low DO, the Coalition believes they are not useful as part of a normal monitoring program. The Coalition will work with the Central Valley Water Board to determine if there is a context in which the addition of these parameters will be useful as it evaluates how to move forward with completing management plans for low DO.

The Coalition also notes that the State Water Board is currently developing amendments to the Water Quality Control Plan for Inland Surface Water, Enclosed Bays and Estuaries of California (ISWEBE Plan) and intends to adopt a statewide water quality objective for biostimulatory substances together with a program to implement objectives for biological integrity. Key questions that have been identified as part of this process include how to establish appropriate reference conditions and appropriate expectations for modified streams and identification of regulatory control options for point and non-point sources. We understand that the State Water Board has included the following as a priority for 2021: "Biostimulatory substances and biological integrity. Develop the technical foundation and policy options for a statewide water quality objective and implementation program for nutrients and other biostimulatory substances

for wadeable streams and establish and implement biological condition assessment methods, scoring tools, and targets aimed at protecting biological integrity."[3]

Until the State Water Board completes its process for developing and adopting a statewide policy, it is premature to recommend that the ESJWQC should expand monitoring to the identified parameters.

ESJWQC Requests for Key Finding 3.3 Recommendations

Based on data collected since the inception of the Coalition monitoring program, the Coalition does not believe that the proposed additional data collection and study of DO as recommended by the Expert Review Panel would provide significant value. Rather, the Coalition suggests that the existing framework of the ESJWQC Order can be used as the basis for the Coalition to work with the Central Valley Water Board to determine if a Special Study is warranted, and to determine the details of such a Special Study. This Special Study could be designed to address the concerns mentioned by the Expert Review Panel, but also to consider beneficial uses, priorities, and other statewide processes such as the Biostimulatory Substances / Biological Integrity Stakeholder process.

C. ESJWQC COMMENTS ON KEY FINDING 3.4 RECOMMENDATIONS

Recommendation 3.4.1. – Expand development of management plans and focused outreach

The Expert Review Panel expressed the opinion that because each monitoring site in a zone is representative of the entire zone, "an exceedance anywhere in a zone is likely indicative of potential exceedances across the entire zone." The Expert Review Panel recommends "that management plan development should address all potential exceedances across a zone, including areas within the zone that are not subject to water quality testing." (Draft Report, page 17.)

Lack of Technical Justification

Management plans are initiated when two exceedances of a single constituent occur at a monitoring site within a three-year period. Following the observation of two exceedances, it is meaningful to identify users of chemicals potentially contributing to the exceedances (either toxicity or chemistry) and to focus on those growers who use the chemicals to improve their management practices and eliminate the exceedance.

The Coalition's experience is that outreach to growers is ineffective when there is no established water quality problem. In contrast, establishing the link between an exceedance and Focused Outreach is the foundation of the Core-Represented monitoring approach. It is also the reason why there may appear to be a mismatch in the monitoring results between core and represented sites (see Part 2 below).

The Coalition's monitoring zones are established based on watershed characteristics—watersheds within a zone are similar with respect to physical and land use characteristics. For this reason, an exceedance for a constituent at the Core site may also be reflected in exceedances at the Represented sites. However, Core and Represented watersheds may differ with respect to grower behavior (e.g., the extent to which

[3] California State Water Resources Control Board, 2021 Strategic Work Plan, DRAFT 11/17/2020. At p. 4.

they implement management practices) and the percentage of acreage in the watershed that is enrolled with the Coalition. For example, growers may farm the same crops across a zone, apply the same pesticides using the same methods, and irrigate the same way. But some growers may simply be more careful with those applications and irrigation practices, leading to fewer discharges.

In addition, nonpoint source flows, including agricultural discharges, exhibit highly variable flow rates, flow volumes, and constituent concentrations. Variability occurs due to both natural factors (e.g., changing weather patterns, antecedent conditions, seasonality, natural sources, daily fluctuations in ecological processes and water quality parameters) and anthropogenic factors (e.g., landscape and land-use changes, farming practices, crop stage, etc.). Because it is not possible to conduct monitoring at all places and all times, monitoring programs are designed to "sample" receiving waters, and to allow for the assessment of a system using observations at a few select locations and points in time that are representative of the system. As a result, water quality measurements will exhibit variability from one event to another and from one site to another, and thus will not be reproducible in the traditional sense. Thus, it should not be expected that constituent concentrations will be identical at Core and Represented sites on a given date, or even at a single site for two different sampling events.

The differences between watersheds and our understanding of the variability of water quality data are the reasons that, when an exceedance occurs at a Core site, the Coalition monitors all Represented watersheds within the Zone in the year following the Core site exceedance. The subsequent Core and Represented site monitoring are intended to better characterize water quality conditions within the Zone, rather than assume automatically that a Core site exceedance indicates an exceedance everywhere.

Additional analysis of exceedances at Core and Represented sites is presented in the attachment to these comments, included in Tables 3 and 4.

In addition, dairy acreage is enrolled under the Dairy Order, and those growers are not answerable to the ESJWQC. This is particularly an issue in Zone 2 where there are a large number of dairies. In Zone 2, we see the greatest variability between water quality in Core sites and Represented sites. The variability appears to be in areas with more dairy acreage and associated with water quality impairments that are difficult to source and could be coming from dairies located nearby (e.g. nitrate and ammonia).

All of these factors point to the need to perform additional monitoring at Represented Sites to determine if an exceedance is occurring and to provide the information that makes Focused Outreach successful.

Because the Coalition does understand that growers need to be aware of water quality problems in their coalition region, the Coalition does and will continue to reach out to all members, regardless whether they are located upstream of an exceedance or not, with information about exceedances and management practices that are effective in preventing discharges to surface waters.

ESJWQC Recommendations for Key Finding 3.4

The Coalition agrees with the intent of Recommendation 3.4 that growers need to be informed of water quality issues and the sources of those issues regardless of their location within the Coalition. The Coalition will inform all its members about management practices that are effective at reducing the discharge of constituents that are causing water quality exceedances within the Coalition region and track the changes of practices through the Irrigation and Nitrogen Management Plan Summary Reports

(tracks irrigation practices) and Farm Evaluations (tracks pesticide and sediment/erosion control practices). However, addressing "potential exceedances" is different than addressing a known exceedance. A key component of the monitoring program is to use the Core monitoring to determine the potential of a water quality impairment at a Represented site; it cannot be assumed that there is a water quality concern at another location within the zones without confirming it with water quality monitoring (existing monitoring design). Although the Coalition agrees with continuing to notify all of its members regarding exceedances found within the each zone and to use this information to encourage growers to implement additional practices, it does not agree with assuming that exceedances are occurring without having performed water quality monitoring.

D. ESJWQC COMMENTS ON KEY FINDING 3.5 RECOMMENDATIONS

Recommendation 3.5.1. – Graph Trends using constituent concentrations rather than exceedances

The Expert Review Panel recommends presenting data using constituent concentrations to provide more useful information, stating that displaying the number of exceedances rather than the actual constituent concentrations has the effect of masking the underlying data set. (Draft Report, page 18.)

Need for Data

The Coalition questions the value of representing data in the manner as recommended in the Draft Report. Fundamentally, determinations of impaired beneficial uses (i.e., the need for management plans) are triggered by exceedances - not water quality concentrations. A downward trend in concentration is of little consequence if the measured concentrations are above the trigger limit by 1 mg/L or 50 mg/L. The ESJWQC is not given any leniency in triggering management plans if the second measured concentration of a chemical is lower than the first measured concentration (or vice versa). In the Coalition's experience, trends in the number of impaired water bodies are more important to characterizing water quality throughout the East San Joaquin Coalition's region as compared to looking at trends of concentrations in individual waterbodies.

Recommendation 3.5.2. – Add Precipitation curves to trend graphs.

The Expert Review Panel expressed difficulty in interpreting the data presentations without an understanding of the underlying precipitation events. The Expert Review Panel recommends that the Coalition should be consistent when presenting hydrology and monitoring data results. (Draft Report, page 19.)

Need for Data

On its face, the ESJWQC is not directly opposed to this recommendation. Rather, the ESJWQC believes that additional consideration may be necessary before implementing this recommendation. Before taking on this additional effort, the ESJWQC requests that the Central Valley Water Board first determine if adding precipitation data to the graphs will assist them with addressing the six questions the Coalition is required to address in each annual report.

Recommendation 3.5.3. – Report Dry sites as "no data" rather than "no exceedance."

The Expert Panel recommends when sites scheduled for sampling are dry, data should be presented as 'no data' or equivalent. (Draft Report, page 19.)

Questionable Technical Justification

Technically, when monitoring is conducted and there is a lack of water, sampling cannot result in an exceedance. Accordingly, the Coalition believes that the current reporting protocol is correct. Further, any change in reporting needs to maintain consistency with historical data. Regardless, the Coalition will work with the Central Valley Water Board to determine the best way to represent sites that were scheduled, visited, but at which no samples were collected due to a lack of water. Currently these situations are well documented within the Coalition's Annual Reports and through information submitted to CEDEN.

Recommendation 3.5.4. - Present Trend lines when the result of statistical analyses described in the report

The Expert Panel recommends that trend lines should only be presented when their statistical derivation is described. (Draft Report, page 19.)

The trend lines referenced by the Expert Panel were prepared to provide a generalized or conceptual perspective to growers and other agricultural groups who lack formal statistical training and were in no way intended to mislead or misrepresent monitoring results. The Coalition and its consultants understand the difference between these conceptual representations and formal statistical analyses that would include a regression equation, R2 value, or p-value, and the Coalition will strive to clarify its presentations of trendlines in the future.

ESJWQC Requests for Key Finding 3.5 Recommendations

The Coalition's primary request here pertains to recommendation 3.5.1. and depiction of trend lines. Respectfully, the Coalitions asks the Expert Review Panel to reconsider this recommendation, or how it is phrased. Rather than suggesting that the underlying data set is masked, the Coalition suggests that the recommendation be re-phrased to give discretion to the Central Valley Water Board (working with the Coalition) to determine appropriate graphs and formats for depicting both exceedances and detections reported within its Annual Reports. Further, the Coalition will continue to make all data publicly available through CEDEN so that interested parties can query the data to determine which sites were dry and which constituents had detections, and to compare analytical and toxicity results to water quality objectives and trigger limits.

Part 2 - ESJWQC Response to the Expert Panel Additional Questions

The Expert Panel requested additional information from both the State Water Board and the ESJWQC related to the State Water Board statement on page 55 of the 2018 Waste Discharge Requirements Order: "Our review of the data found monitoring at represented sites can reveal exceedances for a different set of constituents than those found at the core sampling sites, even where the physical characteristics are similar." The Panel requested a comparison of the Core and Represented monitoring data to understand if this statement is based on widespread examples or limited to a few contaminants on a few selected dates.

The Coalition's current monitoring program employs a representative approach where Core sites are monitored monthly for field parameters, pathogens, nutrients, pesticides (as determined by the PEP), and water column toxicity. Sites are monitored twice per year for sediment toxicity. The Core site monitoring results are used as an indicator of water quality exceedances as compared to water quality trigger limits throughout the zone. Monitoring at Represented sites is evaluated each year based on the previous year's Core site results, and an exceedance of a water quality trigger limit at a Core site triggers monitoring at Represented sites. For example, if an exceedance of the WQTL for diuron occurs at a Core site during the 2020 WY, the Coalition evaluates whether the Represented sites in the same zone have been adequately characterized for diuron (i.e., is there enough water quality data to demonstrate that diuron is not causing water quality exceedances?). If not, the Coalition uses the PEP to determine which months to monitor for diuron at the Represented site(s) in the 2021 and 2022 WYs (the Coalition is required to monitor the Represented site for two years).

In addition, the Coalition reviews Core site management plans and evaluates each Represented site in the zone annually to determine if monitoring is required. Monitoring at Represented sites can occur as a result of two situations: 1) an exceedance occurred at the associated Core site in the previous year and the Represented site has not been adequately characterized (as defined in the PEP) for that constituent, or 2) the Represented site is in a management plan for a specific pesticide or toxicity and Management Plan Monitoring (MPM) is scheduled. This process was presented to the Expert Review Panel by the ESJWQC consultants during the August Panel Meetings (Program Effectiveness Case Studies Presentation by Melissa Turner).

To help answer the Panel's question described above, the Coalition reviewed the Core and Represented site exceedance data collected under the current Program's monitoring strategy (2014 WY through the 2020 WY). **Table 3** shows the number of exceedances per zone for Core and Represented sites for nutrients, pesticides, and toxicity. Each Core site is colored to indicate when Core site monitoring was conducted (for a majority of the zones, the Core sites rotate every two years). As a reminder, Core site monitoring includes monitoring for field parameters, bacteria, nutrients, pesticides, and toxicity monthly. Discrepancies between exceedances observed at the Represented site but not at the Core site during the same year are marked in red text. The red arrows in **Table 3** show that each of the Represented site exceedances had matching exceedances at the Core sites in previous years. This demonstrates that the Core and Represented site exceedances occurring from the 2014 WY through the 2020 WY are very similar.

Exceedances at Represented sites may also not be reflected by exceedances at Core sites when water quality impairments were previously identified prior to the current Core and Represented site monitoring

strategy was developed. Most Represented sites have been monitored for multiple years under the Coalition's Conditional Waiver and the multiple iterations of the ESJWQC Monitoring and Reporting Project Plans (2004, 2006, and 2008 MRPP). Management plans were established earlier in the monitoring program history prior to the implementation of the Core and Represented monitoring approach. Therefore, there may be exceedances at a Represented site that are in a management plan even though the Core site does not have a management plan for the same constituent.

Table 4 lists all the active and completed management plans for the ESJWQC, by zone and constituent. Only five of the 20 Represented sites have eight site-specific management plans (either completed or active) that are not consistent with a Core site management plan. Although there are a few locations where there is a management plan at a Represented site and not at a Core site, **Table 4** demonstrates that water quality at both Represented and Core sites in the same zone is similar.

Table 3. Number of exceedances at Core and Represented sites: nutrients, pesticides, toxicity only (2014 WY- 2020 WY).

The primary Core sites are colored. The grey cells indicate MPM (management plan monitoring) and the red bolded text indicates an exceedance at the Represented site but not at the Core site for the same WY. The red arrows indicate that monitoring at the Represented site occurred due to past exceedances at the Core site in the previous one or two years.

ESJWQC Monitoring			WY14										WY15								WY16					WY17							WY18						WY19					WY20			
Zone	Site Type	Site Name	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Diuron	HCH, gamma-	Malathion	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Dimethoate	Malathion	Ceriodaphnia dubia	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Diuron	Selenastrum capricornutum	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Methomyl	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Malathion	Ceriodaphnia dubia	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Pyrethroids	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Pyrethroids	Selenastrum capricornutum	Hyalella azteca sediment toxicity
1	C	**Dry Creek @ Church**			1		1															1					1											1		2	2						
1	R	Mootz Drain dwn of Langworth Pond																																													
2	C	**Prairie Flower Drain @ Crows Landing**	7	1		1					3		9	3	6			5	5	1					2			1	2		2	7	3			1	2	1				2			2	
2	C	**Lateral 5 1/2 @ South Blaker Rd**									4								2		8	1			5	8					4						2				4		7		6	
2	C	**Westport Drain @ Vivian Rd**																																					12			2				1	
2	R	Hatch Drain @ Tuolumne Rd									1	2																			3						1							2	
2	R	Hilmar Drain @ Central Ave																	1						1						2						1				1			2	
2	R	Lateral 2 1/2 near Keyes Rd			1														2						3																1		1	2	1
2	R	Lateral 6 and 7 @ Central Ave									1								2				1			4	1																		2	
2	R	Levee Drain @ Carpenter Rd									2	1																			1													1	
2	R	Lower Stevinson @ Faith Home Rd									3								2							3																				

ESJWQC Monitoring			WY14										WY15								WY16					WY17							WY18							WY19					WY20			
Zone	Site Type	Site Name	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Diuron	HCH, gamma-	Malathion	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Dimethoate	Malathion	Ceriodaphnia dubia	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Diuron	Selenastrum capricornutum	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Methomyl	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Malathion	Ceriodaphnia dubia	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Pyrethroids	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Pyrethroids	Selenastrum capricornutum	Hyalella azteca sediment toxicity
2	R	Unnamed Drain @ Hogin Rd														1																															
3	**C**	**Highline Canal @ Hwy 99**									**2**				**1**				**1**			**3**	**1**				**2**		**1**							**1**					**2**	**4**			**2**	**2**	
3	R	Highline Canal @ Lombardy Rd																	1																													
3	R	Mustang Creek @ East Ave																																											1			
4	**C**	**Merced River @ Oakdale Rd**																	**1**				**1**													**1**				**1**							
4	**C**	**Canal Creek @ West Bellevue Rd**																									**1**			**1**	**1**	**1**													**1**		
4	R	Bear Creek @ Kibby																																													
4	R	Black Rascal Creek @ Yosemite Rd																																													
4	R	Howard Lateral @ Hwy 140																																												1		
4	R	Livingston Drain @ Robin Ave																																											1	1	
4	R	Unnamed Drain @ Hwy 140																																												
4	R	McCoy Lateral @ Hwy 140																																												1		
5	**C**	**Duck Slough @ Gurr**			**1**			**1**	**1**	**1**				**1**	**1**		**1**	**3**	**1**																							**1**				**1**		

ESJWQC Monitoring			WY14										WY15								WY16					WY17							WY18							WY19					WY20			
Zone	Site Type	Site Name	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Diuron	HCH, gamma-	Malathion	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Dimethoate	Malathion	Ceriodaphnia dubia	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Diuron	Selenastrum capricornutum	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Methomyl	Ceriodaphnia dubia	Pimephales promelas	Selenastrum capricornutum	Nitrate + Nitrite as N	Ammonia as N	Chlorpyrifos	Malathion	Ceriodaphnia dubia	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Ammonia as N	Pyrethroids	Selenastrum capricornutum	Hyalella azteca sediment toxicity	Nitrate + Nitrite as N	Pyrethroids	Selenastrum capricornutum	Hyalella azteca sediment toxicity
5	**C**	**Miles Creek @ Reilly**																										**1**		**1**																	**1**		
5	R	Deadman Creek @ Hwy 59																																														
5	R	Deadman Creek @ Gurr Rd							1	2																																						
6	**C**	**Cottonwood Creek @ Rd 20**																																	**1**	**1**								**1**						
6	**C**	**Dry Creek @ Rd 18**																										**1**		**1**																	**1**		
6	R	Ash Slough @ Ave 21																																														
6	R	Berenda Slough along Ave 18 1/2																																													2		

C= Core site
R= Represented site

Table 4. Counts of ESJWQC management plans that are active, removed and reinstated from 2004 through 2019 WY.
Blue highlighted cells indicate a management plan at a Represented site where no management plan has been initiated at the associated Core site. X= active management plan; C= completed management plan; R= reinstated management plan.

Zone	Site Subwatershed	Site Type	Dissolved Oxygen*	pH*	Specific Conductance*	*E. coli*	Ammonia	Nitrate/Nitrite	Arsenic	Copper (Total & Dissolved)	Lead (Total & Dissolved)	Molybdenum	Chlorpyrifos	DDE	Diazinon	Dimethoate	Diuron	Simazine	Malathion	Pyrethroids	*C. dubia* toxicity	*P. promelas toxicity*	*S. capricornutum toxicity*	*H. azteca toxicity*
1	**Dry Creek @ Wellsford Rd/Church**	**Core**	**X**	**X**	**C**	**X**	**X**			**C**			**C**				**C**			**X**	**C**		**C**	
1	Mootz Drain downstream of Langworth Pond	Represented	X		X	X	X						C				C							
2	**Prairie Flower Drain @ Crows Landing Rd**	**Core**	**X**	**R**	**X**	**X**	**X**	**X**				**X**	**R**			**C**					**X**	**C**	**X**	**C**
2	**Lateral 5 ½ @ South Blaker Rd**	**Core**		**X**	**X**	**X**		**X**															**X**	
2	**Westport Drain @ Vivian Rd**	**Core**	**X**	**X**	**X**	**X**		**X**					**C**										**R**	
2	Hatch Drain @ Tuolumne Rd	Represented	X		X	X		X	X														X	C
2	Hilmar Drain @ Central Ave	Represented	X	C	X	X	X	X		C			C				C						X	C
2	Lateral 2 ½ near Keyes Rd	Represented		X	X	C							C										X	
2	Lateral 6 and 7 @ Central Ave	Represented	X	X	X			X															X	
2	Levee Drain @ Carpenter Rd	Represented	X	X	X	X	X	X													C		X	C
2	Lower Stevinson @ Faith Home Rd	Represented	X	X	X			X															X	
2	Unnamed Drain @ Hogin Rd	Represented	X		X																			
3	**Highline Canal @ Hwy 99**	**Core**	**X**	**X**	**R**	**X**	**R**			**X**	**C**		**R**				**C**			**X**	**C**		**R**	**C**
3	Highline Canal @ Lombardy Rd	Represented	X	X	R	X				X	C		C								C		C	C
3	Mustang Creek @ East Ave	Represented	X		X	X		X		X			C	X				C		X				
4	**Canal Creek @ West Bellevue Rd**	**Core**	**X**	**X**	**X**	**X**				**X**														
4	**Merced River @ Santa Fe/Oakdale**	**Core**	**R**			**X**					**C**		**R**								**C**			
4	Bear Creek @ Kibby Rd	Represented	**R**	X		X				C			C								C			

Zone	Site Subwatershed	Site Type	Dissolved Oxygen *	pH*	Specific Conductance*	*E. coli*	Ammonia	Nitrate/Nitrite	Arsenic	Copper (Total & Dissolved)	Lead (Total & Dissolved)	Molybdenum	Chlorpyrifos	DDE	Diazinon	Dimethoate	Diuron	Simazine	Malathion	Pyrethroids	*C. dubia* toxicity	*P. promelas* toxicity	*S. capricornutum* toxicity	*H. azteca* toxicity
4	Black Rascal Creek @ Yosemite Rd	Represented	X	X		X					C		C								C			
4	Howard Lateral @ Hwy 140	Represented	X	X	X	X				X			C											
4	Livingston Drain @ Robin Ave	Represented	X	X		X				X	C		C										C	
4	McCoy Lateral @ Hwy 140	Represented		X						X														
4	Unnamed Drain @ Hwy 140	Represented	X	X		X																		
5	**Duck Slough @ Gurr Rd****	**Core**	**X**	**X**	**R**	**X**	**X**		**X**	**C**	**C**		**C**						**C**		**C**	**C**	**C**	**C**
5	**Miles Creek @ Reilly Rd**	**Core**	**X**	**R**		**X**				**X**	**C**		**R**		**C**						**C**		**C**	
5	Deadman Creek @ Gurr Rd	Represented	X	X	X	X	X		X	R			C								X	X	C	
5	Deadman Creek @ Hwy 59	Represented	X	X		X			X	R			X										C	
6	**Cottonwood Creek @ Rd 20**	**Core**	**R**			**X**				**X**	**C**		**R**		**C**		**C**							
6	**Dry Creek @ Rd 18**	**Core**	**X**	**X**	**X**	**X**				**X**	**C**		**C**		**C**		**C**						**C**	
6	Ash Slough @ Ave 21	Represented			X	C				X	C		C											
6	Berenda Slough along Ave 18 1/2	Represented	X	X		X				X			C							X			C	

X= active management plan; C= completed management plan; R= reinstated management plan.

Submitted respectfully,

Parry Klassen
Executive Director
East San Joaquin Water Quality Coalition