



Delta RMP Technical Advisory Committee Meeting

Thursday, September 24, 2015, 1:00 – 4:30pm

*Sacramento Regional County Sanitation District, 10060 Goethe Road, Sacramento
Sunset Maple Room*

Call-In Number: 415.655.0381
Attendee access code: 943-326-397#
<https://join.me/sfei-conf-cw1>

DRAFT Agenda

1.	<p>Introductions and Agenda</p> <ul style="list-style-type: none"> Review and agree on agenda and desired outcomes 		<p>1:00 Stephen McCord</p>
2.	<p>Approve Meeting Summary from May 27, 2015</p>	 Item 02 - TAC meeting summary 2015-05-2	<p>1:10 Stephen McCord</p>
3.	<p>SC Updates Staff and TAC co-Chairs will</p> <ul style="list-style-type: none"> Summarize the outcomes of the 6/16/15 SC Meeting Update the TAC on SC decisions Review final approved versions of Monitoring Design and FY15/16 Workplan. The review will be brief and highlight major revisions that were requested by the SC for approval of the final versions (additional assessment question edits, deferring water column toxicity testing with <i>Hyalella</i>) Update TAC on Prop 1 proposal for Delta RMP <p><u>Desired Outcome:</u> Informed Committee regarding SC decisions and approved final versions of program documents</p>	<p>Monitoring Design</p> <p>FY1516 Detailed Workplan and Budget</p>	<p>1:20 Thomas Jabusch Joe Domagalski Stephen McCord</p>
4.	<p>Monitoring Update Review initial sampling and analyses and evaluate proposed design and workplan modifications. Liaisons for the pesticide and pathogen monitoring efforts will a) recap the initial sampling events and preliminary results, b) review QA issues</p>	 Item 04a - RMP Pathogen memo 20150715re	<p>1:40 Joe Domagalski Linda Deanovic Brian Laurenson Thomas Jabusch</p>



	<p>encountered, and c) review proposed design modifications, workplan adjustments, and corrective actions. Staff will update the TAC on the status of the Pesticide TIE guidance document.</p> <p><u>Desired Outcome:</u></p> <ul style="list-style-type: none"> - Recommendations to SC for approving proposed design and workplan modifications - Feedback on proposed corrective actions - Feedback on TIE guidance document and guidance for wrap-up 	<p> Item 04b - PesticideTIEguidance v1.708</p> <p> Item 04c - Delta RMP TIE Treatment List</p>	
<p>5.</p>	<p>Supplemental budget request for 2nd pesticide lab SC members have proposed to send 5% of the Current Use Pesticides (CUP) samples to a second analytical laboratory for comparison as an additional Quality Assurance procedure.</p> <p><u>Desired Outcome:</u> TAC feedback on memo requesting to support the analysis of three samples by a secondary laboratory.</p>	<p> Item 05 - Memo re Secondary Lab Analysis</p>	<p>2:40 Thomas Jabusch</p>
<p>6.</p>	<p>DRAFT Communications Plan and Program Planning Overview ASC has drafted two documents. The DRAFT Communications Plan describes proposed interpretation and reporting methods of the RMP. The DRAFT Program Planning Overview describes the proposed annual planning cycle. The documents are presented for TAC review.</p> <p>Recommendations are also sought for optimizing the annual planning cycle for collaborating/partnering (e.g., coordination with ag coalition pesticides monitoring, working with IEP, etc.)</p> <p><u>Desired Outcome:</u> TAC feedback on Communications Plan and Program Planning Overview.</p>	<p> Item 06a - DRAFT Communications Plan 20</p> <p> Item 06b - Program Planning Overview 20</p>	<p>3:00 Thomas Jabusch</p>
<p>7.</p>	<p>External Review of Monitoring Design Staff will present options for external review of the monitoring design</p>		<p>4:15 Thomas Jabusch</p>
<p>8.</p>	<p>Parking Lot</p> <ul style="list-style-type: none"> - Provisional data policy - Central Valley Pyrethroid TMDL nexus - <i>Hyalella</i> memo revisions 		<p>If time available</p>



	<ul style="list-style-type: none"> - Update on Stormwater Toxicity Testing Laboratory Intercalibration (SCCWRP) - TAC input on components of planned Delta RMP Charter: <ul style="list-style-type: none"> ▪ Document review process ▪ Conflict of Interest policy ▪ RFP guidelines 		
	<p>10. Wrap-up</p> <ul style="list-style-type: none"> - Review and capture TAC recommendations and action items - Message points for SC - Next meeting logistics & agenda items 	<p>TAC Record Google Sheet</p>	<p>4:15 Stephen McCord Joe Domagalski</p>
	<p>Adjourn</p>		<p>4:30 pm</p>



Delta Regional Monitoring Program (RMP) Technical Advisory Committee (TAC) Meeting

**May 27, 2015
1:00 PM – 5:00 PM
Sacramento Regional County Sanitation District Building
Sunset Maple Room
10060 Goethe Road, Sacramento, CA 95827**

Summary

Attendees:

TAC (and/or Alternate) members present¹:

Stephanie Fong, Water Supply (State and Federal Contractors Water Agency)
Brian Laurenson, Stormwater – Phase I (Larry Walker Associates)
Joe Domagalski, TAC co-Chair (U.S. Geological Survey)
Stephen McCord, TAC co-Chair (McCord Environmental, Inc.)
Tessa Fojut, Regulatory – State (Central Valley Regional Water Quality Control Board)
Mike Johnson, MLJ LLC (Agriculture)
Karen Ashby, Stormwater – Phase II (Larry Walker Associates)
Debra Denton, Regulatory – Federal (U.S. EPA Region 9)

Others present:

Patrick Morris, Central Valley Regional Water Board
Thomas Jabusch, SFEI-ASC
Selina Cole, Central Valley Regional Water Board
Cam Irvine, CH2M Hill
Rachel Kubiak, Western Plant Health Association
Linda Deanovic, UC Davis APHL
Adam Laputz, Central Valley Regional Water Board
Thalles Perdigao, McCord Environmental, Inc.
Sam Safi, Regional San
Stephen Clark, Pacific EcoRisk
Phil Trowbridge, SFEI-ASC
Yumiko Henneberry, Delta Science Program
Josie Tellers, City of Davis

On phone:

Hamid Parsa, Mountain House CSD
Stephen Louie, CDFW

¹ Name, Representing Category (Affiliation)

Gerardo Dominguez, San Joaquin County

1.	Welcome and Introductions
2.	Approval of Agenda Stephen McCord introduced the agenda. The group agreed to also cover a brief discussion of the pyrethroid TMDL and its potential nexus with the Delta RMP under the Monitoring Design item.
3.	Approve Meeting Summary from April 22, 2015 The summary of the previous meeting (with edits submitted) was approved.
4.	Review Revised Monitoring Design and Response to Comments Stephen McCord introduced the Item by explaining that the Monitoring Design Summary presents the longer-term conceptual plan for the Delta RMP that is based on information developed by the TAC subcommittees and information sheets that were developed for the initial Delta RMP priorities. It is meant to be broad and high-level and not to include all the specific details of implementation nor be fully implemented in year 1. Thomas Jabusch provided an overview of the revised Monitoring Design Summary document and a Response to Comments prepared by ASC. He explained that there are no substantial changes to the design itself from when it was agreed upon by the TAC on October 22, 2014 and submitted to the SC on November 5, 2014. The SC provisionally approved the monitoring design on January 22, provided that specific revisions would be made that were requested at the meeting. Following that meeting, program participants also provided additional comment letters requesting more revisions to the document. In response, ASC revised the Monitoring Design Summary document and prepared a Response to Comments. Thomas highlighted some of the changes, such as an updated and more detailed proposed 5-year schedule for the program. More detail will be provided in a 5-year plan that is to be produced by the end of the calendar year. He also explained that certain comments relating to the interpretation and reporting of results would be addressed in another document, i.e. the Communications Plan that is to be produced with State Board funds by the end of the calendar year. The Communications Plan will have information on reporting for all program elements, a list of all existing documents, and merge documents as necessary. Pending changes to the design document include: (1) harmonizing the budget tables with the recently prepared FY15/16 budget and (2) further simplifying the budget tables for general planning purposes only.

Participants raised a question about the planning horizon for the 5-year plan and whether the 5-year projection would be updated annually. This would be important with regards to special studies. Phil Trowbridge explained that in the Bay RMP, special studies are part of the 5-yr planning process, and that each year the program would look five years forward. Special studies of the Bay RMP are developed by workgroups. Currently there are six Bay RMP workgroups: 1) Sources, Pathways, and Loadings, 2) Emerging Contaminants, 3) Dioxin, 4) PCBs, 5) Mercury, and 6) Exposure and Effects. Each workgroup meets annually to propose special studies to the Technical Review Committee (TRC). The TRC selects special studies to propose to the SC after fitting them to the available budget. Stephen McCord suggested that another possibility for funding special studies would be grants.

There was a discussion about the Central Valley Pyrethroid TMDL and a potential nexus with the Delta RMP. Tessa Fojut explained that, if any, the nexus would be in monitoring. The proposed monitoring related to the TMDL has some flexibility, but monitoring sites would need to be in impaired waters. There are currently 15 listings for pyrethroids in the San Joaquin and Sacramento basins. Most impaired waters are in the Sacramento urban area (mostly small creeks, such as Arcade Creek) and Roseville, and some are in agricultural areas farther upstream of the Delta. Proposed Delta RMP monitoring sites for current use pesticides (CUPs) are mostly in the mainstems of rivers and not representative of these impaired waterbodies. The group concluded that there is a potential nexus, albeit small. Since Tessa is part of both efforts, she can help ensure that there is coordination. Brian Laurenson noted that it would be important from a regulated perspective to identify where the Delta RMP can provide input into the TMDL development. The TMDL will be presented to the Regional Board for approval in June 2016. There was interest in having the DRMP CUP monitoring data be ready in time for the June 2016 deadline.

Stephen McCord asked if the TAC would recommend approval of the revised document by the SC. Mike Johnson and Debra Denton noted that they would have some comments to share. The group was not able to make a recommendation to approve the document and requested more time to review. Adam Laputz advised that the SC would likely not approve a workplan if the TAC does not at least provisionally approve the design. The SC meeting may need to be delayed to July.

	<p><u>Recommendations:</u></p> <ul style="list-style-type: none"> - Not necessary to include the Workplans or future Communications Plan as attachments - Ensure there is consistency in terminology and conditions among the Monitoring Design, QAPP, and Workplan documents.
5.	<p>Review Revised QAPP and Response to Comments</p> <p>Thomas Jabusch provided an overview of the revised QAPP and Response to Comments prepared by ASC. He advised that labs are also currently reviewing the QAPP. Their comments are due by June 1st. Debra Denton pointed to a footnote in the QAPP about the SC's decision to suspend <i>Hyaella</i> monitoring that does not match Tim Vendlinski's recollection of the meeting. There was discussion whether the State Board Quality Assurance Officer must approve the QAPP, because the program is receiving SWAMP funding. This process could take several months. Adam Laputz agreed to have a discussion with the State Board about what scope of the QAPP needed to be reviewed.</p> <p>The group stated that they had not had enough time to review the revised QAPP and that information from the labs needed to be incorporated into the plan before they could recommend approval by the SC. Phil Trowbridge advised that the QAPP would not address interpretation of results (which would be addressed by the Communications Plan) and noted that the QAPP's draft status had not prevented the RMP from initiating monitoring for pathogens.</p> <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> - The SC co-chairs should sign the QAPP. - Lab managers and QAOs should sign the QAPP. - The State Board QAO may also need to sign the QAPP - Jim Orlando can serve as the QAO for both USGS labs (the PFRG lab and the lab in Denver). - Field work and lab SOPs will be burned to a CD once the QAPP is final, rather than appended to the hardcopy
6.	<p>Review Preliminary FY15/16 Budget and Workplan</p> <p>Phil Trowbridge led the discussion with the purpose of obtaining input on in the preliminary FY15/16 Budget and Workplan. Several TAC members stated that it would be difficult to provide feedback on the questions, especially since budget decisions are policy decisions and up to the SC. However, they advised that it would be critical to inform the SC about what the "bare-bones" options are for each of the</p>

	<p>monitoring elements. It was clarified that there are no cost savings in reducing the list of target analytes for USGS.</p> <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> - Present "bare bones" Monitoring Design funding levels as a menu of options for the TAC to review and the SC to decide - Present "CUP bare-bones" as 5 Delta input sites approximately monthly - TAC members and constituent subcommittee participants respond to Phil answering questions raised in the budget slides ("Item 06 - Delta RMP FY1516 Budget Slides") - The TAC agreed that scheduling CUP monitoring based on the water year was appropriate. The TAC also agreed that there would be limited value in presenting CUP monitoring results for only the remainder of water year 2015. Rather, combine those data with water year 2016 data and report on the results for the first time in spring 2017.
7.	<p>TIE Process and Subcommittee</p> <p>The TAC discussed Karen Ashby's recommendation to add Stephen Clark to the TIE Subcommittee and Mike Johnson as his alternate. There was consensus on the importance for the TIE Subcommittee to remain technically competent, rapidly available, and not having conflicting interests. However, the meeting had gone overtime at this point and some TAC members needed to leave before a decision on the Subcommittee members could be reached.</p>
8.	<p>Planning for Pesticide Monitoring and Reporting</p> <p>The item was deferred.</p>
9.	<p>Update on Stormwater Toxicity Testing Laboratory Intercalibration (SCCWRP).</p> <p>This item was taken out of order and discussed after agenda item 4. The group had a lengthy discussion but concluded rather unanimously that the SCCWRP study would not answer most of the questions they had about the use of <i>Hyaella</i> as a test organism (within the broad categories of variability and environmental relevance). Therefore, they should report to the SC on options for resolving the questions. One option was to start including <i>Hyaella</i> to gain experience. Another option was to propose special studies to resolve the remaining questions.</p> <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> - Stephen McCord will ask the SC to state its decision point for including <i>Hyaella</i> (or not) as a toxicity test organism.
10.	<p>Wrap-up</p> <p>Action items from the meeting were recounted and clarified (see 11.)</p>

	<p><u>Recommendations</u></p> <p>TAC Process Improvements</p> <ul style="list-style-type: none"> - When developing technical documents, build in a clearly described structure of the review process.
<p>11.</p>	<p>Action items:</p> <p>Monitoring Design</p> <ul style="list-style-type: none"> - TAC members: provide comments (by June 4). - Thomas Jabusch: revise the Design document and send it back out the TAC with 5 business days for review (by June 8). - Stephen McCord: convene a conference call or use an online polling method before June 16 so that he can report to the SC whether the TAC recommends approval or provisional approval of the revised Monitoring Design (by June 15). - TAC co-Chairs: Schedule an agenda item for Tessa Fojut to discuss the nexus between Delta RMP and Central Valley Pyrethroids TMDL (by April 2016). <p>QAPP</p> <ul style="list-style-type: none"> - Adam Laputz: follow up with Rich Breuer to learn if the requirement for State Board approval of the QAPP only applied to SWAMP-funded part of the work or the full QAPP (by June 3). - Phil Trowbridge will check with Cristina Grosso to make sure that the data management provisions in the QAPP are SWAMP compatible (by June 3). - Thomas: After receiving comments from the laboratories by June 1, revise the QAPP and send it back out to the TAC with 5 business days to review (by June 8). - Stephen: convene a TAC conference call or use an online polling method to determine whether the TAC recommends approval of the QAPP or provisional approval (by June 16). Stephen McCord will provide a verbal report to the SC on June 16. - Joe (USGS) and Linda (AHPL): coordinate to add “alert” triggers for toxicity sampling to the pesticides monitoring event triggers table (by June 1). – <i>Complete</i>. <p>FY 15/16 Budget and Workplan</p> <ul style="list-style-type: none"> - Phil: Discuss with the SC co-chairs about having a joint meeting of the SC and TAC (or portion of the SC meeting) to decide about the funding allocations for FY15/16 (by June 3)

	<ul style="list-style-type: none"> - Phil: Revise the budget for the SC to show the available funding relative to the "bare bones" Monitoring Design funding levels so the SC can make the trade-off decisions (by June 5) <p>TIE Process and Subcommittee</p> <ul style="list-style-type: none"> - Stephen McCord will send a message to the whole TAC inquiring if there are any issues with the final TIE Subcommittee appointments (by June 3). If there are any issues remaining to be resolved, the decision will be deferred to the SC. - Cam and Stephanie will revise the draft TIE decision process document, for ASC to then circulate a revised version for other TAC/TIE Subcommittee members to review (by June 22). - Thomas: receive comments on the revised TIE process memo. When all the comments have been received, ASC will send them to the TIE subcommittee to review and incorporate into the memo (by June 29). <p><i>Hyaella</i> Interlab Study</p> <ul style="list-style-type: none"> - Mike Johnson: send Stephen McCord his slides with questions about the <i>Hyaella</i> test (by June 3) - Stephen Clark: send Stephen McCord information about possible special studies that could be done to resolve questions about the <i>Hyaella</i> test (by June 3). - Brian Laurenson: send Stephen McCord his comments on the last set of slides for the SC, which had information on possible special studies (by June 3). - Stephen McCord: write a brief memo to the SC with options regarding the <i>Hyaella</i> test (by June 9).
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MEMORANDUM



DATE: September 17, 2015

TO: Phil Trowbridge, Aquatic Science Center
Thomas Jabusch, Aquatic Science Center

CC: Delta Regional Monitoring Program Technical
Advisory Committee

Elaine Archibald, Archibald Consulting

SUBJECT: **TEMPORARY VARIANCE TO DELTA REGIONAL MONITORING
PROGRAM PATHOGEN MONITORING SCHEDULE TO EVALUATE
REAGENT SUPPLY AND METHOD PERFORMANCE**

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The Pathogen Subgroup to the Delta Regional Monitoring Program (RMP) Technical Advisory Committee (TAC) designed and is assisting in the implementation of a pathogen monitoring work plan (Pathogen Study). The Pathogen Study is based on the monitoring needs specified in the Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan (Basin Plan). The Pathogen Study coordinates “external” Long Term 2 Enhanced Surface Water Treatment Rule (LT2) monitoring performed by water agencies between April 2015 and April 2017 with the Delta RMP “ambient” monitoring at key locations in and tributary to the Delta. In this way the Delta RMP ambient monitoring can support investigations and follow-up related to any identified changes in water intake pathogen (*Cryptosporidium* or *Giardia*) concentrations based on the LT2 reporting and assessment criteria. The Pathogen Subgroup performed an initial quality control (QC) review of the first three sample results collected by the Delta RMP from April 2015 through June 2015.

The Pathogen Subgroup identified low matrix recoveries (<5% for *Cryptosporidium*) as a potential issue through the first three events, though laboratory QC were acceptable based on the analytical method and LT2 measurement quality objectives, which do not consider matrix recoveries. One key goal of the Pathogen Study was to maintain consistency with the LT2 program, which already accounts for the known method recovery limitations. Environmental Protection Agency (EPA) Method 1622 or 1623 are required for LT2 samples. The Pathogen Subgroup and the analytical laboratories identified an additional potential cause of the lower than

expected recoveries and developed a short term action plan to better assess data quality and improve the understanding of the recovery limitations.

This memorandum describes the expected short-term issue with the immunomagnetic separation (IMS) beads used for EPA Method 1623, the Delta RMP sample recoveries, and the recommended modifications to the sampling analysis approach.

IMS Bead Recovery Issue

EPA summarized (see Attachment A) the occurrence of a nationwide production problem with the reagent (IMS beads) used for Method 1623. The manufacturer (IDEXX) expects the problem to be resolved before August 2015. In the meantime, labs have been noting inconsistent recoveries in their Ongoing Precision and Recovery (OPR) samples, with some recoveries reduced to half of the historical performance level. The OPR samples are a component of internal lab QC for Method 1623, which involve weekly analyses of reagent water samples spiked with *Cryptosporidium* or *Giardia* oocysts/cysts to verify all performance criteria. The issue with inconsistent OPR sample recoveries applies to all LT2 work nationwide. EPA is working with laboratories to evaluate the *Cryptosporidium* and *Giardia* recoveries associated with various lots of IMS beads (Attachment A).

The primary Delta RMP and LT2-approved laboratory (BioVir) OPR results are typically >60%, but they have noted much lower OPR results for batches of IMS beads used during April-June. 2015 BioVir OPR performance is shown in Table 1.

Table 1. BioVir 2015 Ongoing Precision and Recovery (OPR) Results

BioVir Sample No.	Week No.	Date	% Giardia	% Crypto	Negative Staining Control Result
150001	1	01/05/15	57.58	61.62	neg
150054	3	01/12/15	42.42	62.63	neg
150095	4	01/19/15	39.39	63.64	neg
150112	5	01/23/15	42.00	62.63	neg
150153	6	02/02/15	79.00	80.81	neg
150194	7	02/10/15	57.00	81.82	neg
150223	8	02/16/15	47.00	56.57	neg
150262	9	02/23/15	63.00	58.59	neg
150293	10	03/02/15	59.00	54.55	neg
150321	11	03/09/15	76.00	76.77	neg
150421	13	03/25/15	62.63	70.71	neg
150476	15	04/06/15	61.62	68.69	neg
150537	15	04/09/15	40.00	52.53	neg
150599	16	04/17/15	57.00	28.28	neg
150604	17	04/20/15	65.00	23.23	neg

BioVir Sample No.	Week No.	Date	% Giardia	% Crypto	Negative Staining
					Control Result
150752	19	05/06/15	52.00	16.16	neg
150761	19	05/08/15	65.00	19.19	neg
150761	19	05/14/15	67.00	69.70	neg
150795	20	05/14/15	68.00	71.72	neg
150801	21	05/18/15	79.00	69.70	neg
150801	21	05/18/15	63.00	80.81	neg
150801	21	05/18/15	53.00	57.58	neg
150839	21	05/21/15	84.00	56.57	neg
150866	22	05/27/15	69.00	22.22	neg
150943	23	06/01/15	84.00	53.54	neg
150943	23	06/01/15	24.00	24.24	neg

Delta RMP Matrix Spike Recoveries

The Pathogen Subgroup review of the initial quality control data for the pathogen study identified low matrix spike (MS) recoveries, though laboratory QC (OPR sample recovery) was acceptable based on the LT2 measurement quality objectives. Matrix spike samples are ambient water samples spiked with a known quantity of *Cryptosporidium* or *Giardia* oocysts/cysts, and then analyzed to determine the effect of the matrix on the method's oocyst/cyst recovery. The first two MS samples were collected from sites with potentially more complex and variable matrices (Natomas East Main Drain and Colusa Basin Ag Drain) than the main-stem Delta locations. However, without additional information, it is not possible to confirm whether recovery problems are related to the reagent, site-specific matrix interference or other lab issues. The matrix spike sample recoveries and laboratory OPR performance for the first three months of sample collection are shown in Table 2.

Table 2. Matrix Spike (MS) and Laboratory Ongoing Precision and Recovery (OPR) Performance

Month	Location	MS Recovery		OPR Recovery	
		<i>Cryptosporidium</i>	<i>Giardia</i>	<i>Cryptosporidium</i>	<i>Giardia</i>
April	Natomas East Main Drainage Canal	1%	1%	69%	62%
May	Colusa Basin Ag Drain	0%	3%	22%	66%
June	Sacramento River at Westin Boat Dock	27%	1%	54%	84%

Modified Sampling and Analysis Approach

The Pathogen Study was designed to maintain consistency with the LT2 program, which already accounts for the known method recovery limitations. The matrix spike recoveries for EPA

Method 1623 can be low, but still acceptable by LT2 measurement quality objective standards. However, the Pathogen Subcommittee determined that additional investigation of matrix recoveries, LT2-allowable method modifications, and alternate laboratories could inform changes to the Pathogen Study and better quantify uncertainty in the results.

The Pathogen Study is constrained to the current Delta RMP budget and cost-neutral sample collection modifications include the following:

- Reduce the total number of sites to five, limiting them to the main-stem of the Delta where the matrices are less complex and less variable and would have potentially better recovery rates. Each of the main stem sites will be sampled each month as shown in Table 3 as “active” sites.
- Conduct additional QA/QC samples to evaluate the method performance, and to compare BioVir and Eurofins performance.
 - Collect matrix spike samples from two locations per event for BioVir to better assess recovery performance in different matrices,
 - Send a matrix spike sample from one of the matrix spike locations to Eurofins to assess inter-laboratory matrix spike recovery performance. These samples will be used to assess laboratory performance and inform Year 2 Pathogen Study planning.
 - Collect an additional inter-method field duplicate and matrix spike for BioVir to analyze using Method 1623.1. Method 1623.1 is a modification to 1623 that has been shown to improve *Cryptosporidium* recovery by >20%. Method 1623.1 is allowed for LT2 use. These samples will assess method performance and provide a basis for any recommended changes.

The Pathogen Subcommittee recommends following this modified sampling approach at least through August 2015. The decision to switch back to the original sampling plan will be adaptively managed based on the results from these additional QA analyses, and on the resolution of the reagent issue with the manufacturer.

BioVir recently received new batches of IMS beads, and the OPRs have improved (>80%). The Pathogen Subcommittee will wait until consistent OPR results are observed before reverting to the original sampling approach. The modified sampling approach will allow evaluation of the performance of method 1623.1, with a replicate field sample and MS to be analyzed using both 1623 and 1623.1 at one location.

Table 3. RMP Pathogen Study Monitoring Locations

Location ID	Description	Short Term Status
MWQI #14	Colusa Basin Ag Drain	Inactive through August 2015
MWQI #1	Natomas East Main Drainage Canal	Inactive through August 2015
MWQI #18	Sacramento River at Westin Boat Dock	Active
MWQI #4	Sacramento River at Hood	Active
MWQI #20	Cache Slough near Ryder Island	Active
MWQI #16	Mokelumne River at Benson's Ferry	Inactive through August 2015

MWQI #17	Calaveras River at UOP Footbridge	Inactive through August 2015
MWQI #10	Rock Slough at CCWD Fish Facility	Active
MWQI #7	Old River at Bacon Island	Inactive through August 2015
MWQI #9	Banks Pumping Plant	Inactive through August 2015
MWQI #12	Jones Pumping Plant	Inactive through August 2015
MWQI #6	San Joaquin River near Vernalis	Active

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Table 4. Short Term Quality Control Sample Collection Schedule

Location ID	Location Description	BioVir Method 1623		BioVir Method 1623.1		Eurofins Method 1623		
		Field Sample [1]	Matrix Spike	Second Matrix Spike	Inter-Method Duplicate	Matrix Spike	Inter-Lab Duplicate	Matrix Spike
MWQI #18	Sacramento River at Westin Boat Dock	X	June ²	July ²				
MWQI #4	Sacramento River at Hood	X	July ²	Aug.	July ²	July ²	July ²	July ³
MWQI #6	San Joaquin River near Vernalis	X	Aug.	Sept.	Aug.	Aug.	Aug.	Aug.
MWQI #20	Cache Slough near Ryder Island	X	Sept.	Oct.	Sept.	Sept.	Sept.	Sept.
MWQI #10	Rock Slough at CCWD Fish Facility	X	Oct.		Oct.	Oct.	Oct.	Oct.

Notes:

[1] Field samples are collected at every active location in Table 3 each month.

[2] Monitoring has been completed for this event.

[3] Matrix spike was not analyzed due to laboratory error.

Schedule is provisional and likely will continue through August 2015, pending Pathogen Subcommittee review

Attachment A.

Environmental Protection Agency Correspondence

Rick Zimmer

From: Miller, Carrie <Miller.Carrie@epa.gov>
Sent: Tuesday, April 28, 2015 2:11 PM
To: Miller, Carrie
Subject: LT2 Monitoring for Cryptosporidium

To All Concerned:

It has come to TSC's attention that some laboratories are experiencing lower than usual crypto recovery in their quality control (QC) samples. Several laboratories and vendors are actively investigating the issue which appears to be a synergistic effect between some of the method reagents. TSC will follow up when we have more conclusive information about the cause of the recovery issue and will share any advice we become aware of as to how laboratories may address it.

Laboratories performing analyses for the LT2 follow Method 1622, 1623 or 1623.1 and any sample in a batch associated with unacceptable quality control samples is unacceptable. Per the LT2 "SOURCE WATER MONITORING GUIDANCE MANUAL FOR PUBLIC WATER SYSTEMS:"¹

If a PWS is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in 40 CFR § 141.704 or the failure of an approved laboratory to analyze the sample, the PWS must collect a replacement sample. The PWS must collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date, unless the PWS demonstrates that collecting a replacement sample within this time frame is not feasible or EPA/the State approves an alternative resampling date. The PWS must submit an explanation for the delayed sampling date to EPA/the State concurrent with the shipment of the sample to the laboratory [40 CFR § 141.702(b)(2)].

PWSs may contact their state representative, on the list accessed from the link below, and request an alternative resampling date.

<http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/upload/lt2contactnov20141.pdf>

¹Information taken from section 3.2.2 in the [Source Water Monitoring Guidance for Public Water Systems PDF](#) (EPA 815-R06-005 February 2006)

Thank you,

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Delta RMP Pesticide TIE Guidance

PREPARED FOR: Delta RMP TAC
PREPARED BY: Delta RMP TAC – Pesticide Subcommittee
DATE: July 23, 2015
REVISION NO.: 1.5

Introduction

The Delta Regional Monitoring Program (RMP) is collecting surface water samples for freshwater toxicity testing to assess sources and potential risks to aquatic organisms from pesticides in the Delta. The sample locations, timing, and rationale are described in the *Delta RMP Quality Assurance Program Plan* (SFEI-ASC 2014). This technical memorandum is intended to provide guidance for conducting Toxicity Identification Evaluations (TIEs) and support decisions by a TIE subcommittee in directing TIE testing.

The main responsibility of the TIE subcommittee will be to rapidly decide, on a case-by-case basis, whether and how to allocate resources to conduct TIEs for samples exceeding a toxicity threshold ($\geq 50\%$ reduction in organism response relative to the lab control) and whether or how to conduct any follow-up analyses (e.g., additional TIE treatments, supporting analytical chemistry) with a sample where results may not clearly indicate a pesticide or class of contaminants causing toxicity. The TIE subcommittee will report results to the Delta RMP Technical Advisory Committee (TAC).

This technical memorandum is intended to be a living document that will be most helpful and can inform the discussion and interpretation of toxicity and TIE testing when revised periodically to include data interpretation, questions considered and their resolution, and lessons learned as the TIE subcommittee reviews test results.

TIEs

Phase 1 TIEs identify the physical and chemical properties of contaminants causing toxicity by selectively either reducing or increasing the toxicity in the sample. When toxicity is reduced in a treated sample, information is gained regarding the physical/chemical properties of the toxicant(s), adding to the weight of evidence regarding the class of contaminants that may have caused the toxicity. Phase 2 TIEs can include chemical analyses that further identify specific constituents causing or contributing to toxicity, or additional TIE treatments (e.g., elution and fractionation of non-polar organic compounds off of a solid phase extraction column). Multiple TIE methods are presented in EPA guidance documents (USEPA 1991, 1992, 1993a,b) and other approaches may be adopted from the peer-reviewed literature (e.g., Wheelock et al., 2004) or developed to address study-specific questions.

TIEs are planned for Delta RMP samples where there is $\geq 50\%$ reduction in the organism response compared to the lab control. TIEs should be initiated within 48-hrs of exceeding the toxicity trigger and following approval of the Delta RMP TIE Committee; the lab must also validate the initial toxicity test results by confirming that basic water quality parameters (e.g., dissolved oxygen) were within acceptable ranges for the affected test species. Figure 1 presents a flowchart describing the decisions related to Delta RMP TIE testing with the primary goal of identifying whether pesticides are causing or contributing to observed toxicity. A secondary goal may be to identify other factors (i.e., water quality conditions or other toxicants) contributing to reduced survival, growth, or reproduction. A phased TIE approach will be used to achieve these goals by initially focusing on treatments that identify major classes of contaminants that could include pesticides:

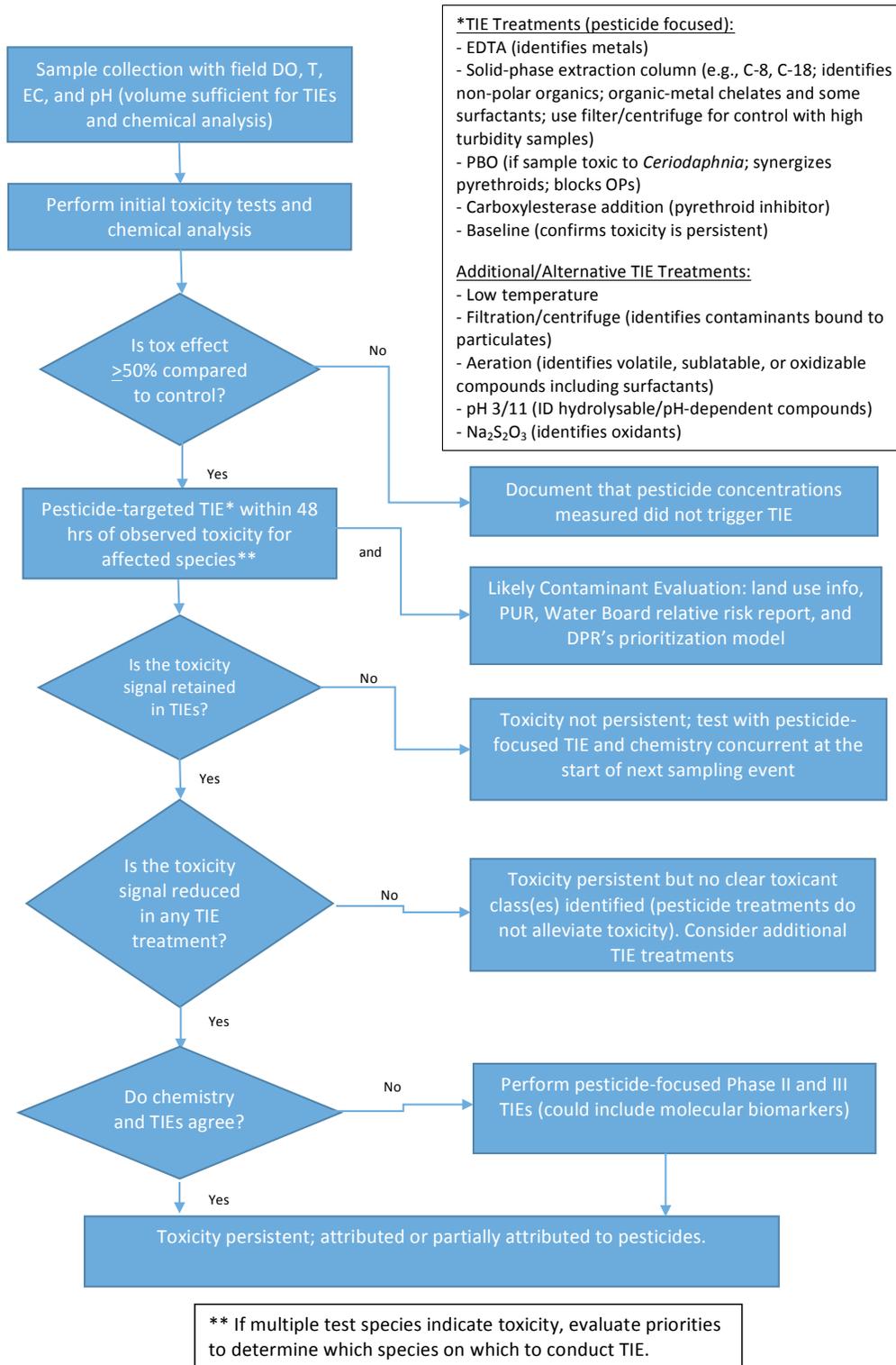


Figure 1. TIE decision guidance flowchart for the Delta RMP.

- EDTA (evidence of metals toxicity; minimum of 2 EDTA concentrations will be tested)
- Solid-phase extraction column (e.g., C-8 or C-18; evidence of toxicity due to non-polar organics, organic-metal chelates, and some surfactants)
- Centrifugation (evidence of toxicity due to particulate-bound contaminants such as chlorpyrifos and pyrethroids; use with turbid samples or at the discretion of the TIE subcommittee)
- PBO (evidence of toxicity due to a substance that is metabolized by the CYP450 enzyme system; evidence of OP insecticides if toxicity is reduced and of pyrethroid insecticides if toxicity is potentiated)
- Carboxylesterase addition (evidence of toxicity due to a contaminant with an ester bond, such as pyrethroid insecticides)
- Baseline (confirms if the toxicity is persistent)

If the cause of toxicity is not clear after initial TIE testing, or if further detail describing the type or specific toxicant is desired, then the TIE subcommittee may choose to have the laboratory conduct additional TIE treatments. Considerations for additional TIEs could include the level of available funding, magnitude of toxicity (TIE treatment effectiveness is easier to determine when there is a strong toxicity signal), species tested, and other data (e.g., potential sources, initial TIE results, and the likelihood that pesticides will be identified). As examples, the following TIE treatments could be selected to assess other contributing factors affecting toxicity:

- Low temperature (evidence of toxicity due to a contaminant that is metabolized, so lower temperatures slow the organisms metabolism; increases the toxicity of pyrethroid insecticides)
- Aeration (evidence of toxicity due to volatile, sublutable, or oxidizable compounds including surfactants)
- Non-polar organic solid-phase extraction column (evidence of toxicity due to a relatively polar organic contaminant)
- pH 3/11 (evidence of toxicity due to hydrolysable/pH-dependent compounds)(+ filtration to assess/remove/control for settleable/coagulated toxicants and particulates).
- Na₂S₂O₃ (evidence of toxicity due to oxidants)
- Baseline (confirms toxicity is persistent)

Salinity/conductivity is an important factor affecting toxicity test results in the Delta. Specific conductance will be measured and recorded by sample collectors and provided to the toxicity testing laboratory to inform the testing.

Communication

The TIE subcommittee consists of the following:

- Bryn Phillips/UCD Granite Canyon Lab
 - Brian Anderson/UCD Granite Canyon Lab (alternate for B. Phillips)
- Cameron Irvine/CH2M HILL (representing WWTP dischargers on behalf of SRCSD)
 - Tony Pirondini (alternate for C. Irvine)
- Stephanie Fong/SFWCA
- Stephen Clark/Pacific EcoRisk Lab
 - Michael Johnson/MLJ Environmental

Other collaborators who will be involved in discussion of toxicity and TIEs include:

- Thomas Jabusch – Liaison to the Delta RMP TAC
- Linda Deanovic (AHPL) – Lab Manager; conduct toxicity tests and TIEs
- Jim Orlando/ USGS - Lab Manager; conduct chemical analyses of surface water samples; report preliminary results to the TIE subcommittee upon request

The laboratory must notify the entire TIE subcommittee via email on the day an observation is made that a sample (or samples) exceeded the toxicity threshold so that decisions for additional analyses can be made in the shortest time to minimize the potential loss of a toxicity signal (e.g., due to sorption to sample containers, degradation, or transformations). This notification must clearly provide the results of the associated lab control and the affected sample, identify the species affected, and confirm the validity of the test (e.g., water quality parameters were within the acceptable range). The availability of laboratory resources and possible timing for conducting additional testing will also be communicated to the TIE subcommittee so that any potential scheduling issues can be considered in the response from the TIE subcommittee (e.g., delays for ordering test supplies or days when tests can/cannot be started).

Within 24 hours of test result notification from the bioassay lab, the TIE subcommittee will review the laboratory results and meet (or discuss over email) to discuss a consensus decision regarding how to proceed via email to the laboratory. TIEs will therefore be initiated within 24 hours of notification (i.e., within ~48 hours of the observation of toxicity) from the TIE subcommittee. It is critical to make decisions and start any testing as soon as possible to minimize the potential loss of a toxicity signal (e.g., due to sorption to sample containers, degradation, or transformations) and every attempt will be made to minimize the time between sampling and testing. However, extenuating circumstances may delay TIE initiation beyond these goals (e.g., organisms need to be ordered from a supplier). These delays will be communicated to the TIE subcommittee and documented so that corrective actions/alternative planning can be considered for the next sampling event. Decisions and their rationale will be documented to justify the intended objective and benefits of any additional use of resources (i.e., by updating Table 1).

If the TIE subcommittee cannot make a consensus decision to act within the specified timeline, the laboratory will not conduct any additional TIE testing beyond the Phase 1 treatments outlined above for the initial TIE so that resources are not expended without clear justification. Rather, a clear description of the goals of any intended TIE testing and explanation of the expected results will be developed, available data will be reviewed, additional discussion could occur among the TIE subcommittee, or a discussion of the options could be brought to the TAC. Resolution of the issue will be documented to inform decisions for additional TIE testing when the issue arises in future sampling.

The bioassay laboratory should plan to/proceed with the default course of action according to the decision flowchart (Figure 1) in the absence of clear direction from the TIE subcommittee (e.g., if none of the subcommittee members are available).

Discussion

Table 1 will be completed to document any issues and their resolution, or lessons learned, as they arise.

TABLE 1
Delta RMP Pesticide TIE Issue Resolutions and Lessons Learned

Sample Affected	Issue	Resolution
Provide the sample location, date, test species and endpoint affected	Describe the question/issue discussed or lesson learned	Describe the resolution, corrective action, lesson learned, or what additional information might be

TABLE 1
Delta RMP Pesticide TIE Issue Resolutions and Lessons Learned

Sample Affected	Issue	Resolution
		needed

References

SFEI-ASC. 2014. *Delta RMP Quality Assurance Program Plan*.

USEPA. 1991. *Methods for Aquatic Toxicity Identification Evaluations. Phase I Toxicity Characterization Procedures. Second Edition. EPA 600/6-97/005F. February.*

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USEPA. 1993a. *Methods for Aquatic Toxicity Identification Evaluations. Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity. Office of Research and Development, Washington, D.C. September 1993. EPA 600/R-92/080.*

USEPA. 1993b. *Methods for Aquatic Toxicity Identification Evaluations. Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity. Office of Research and Development, Washington, D.C. September 1993. EPA 600/R-92/081.*

USEPA. 2002. *Short-term chronic methods for estimating chronic toxicity of effluents and receiving waters to freshwater organisms. Fourth Edition. EPA-821-R-02-013. October.*

Wheelock, C.E., J.L. Miller, M.J. Miller, S.J. Gee, G. Shan, and B.D. Hammock. 2004. *Development of Toxicity Identification Evaluation Procedures for Pyrethroid Detection using Esterase Activity. Environmental Toxicology and Chemistry, Vol. 23, No. 11, pp. 2699–2708*

Appendix A

TIE procedures (from AHPL)

Delta RMP Ceriodaphnia TIE Treatment List

Client Name: SWRCB - SWAMP

Sample Name and Field Date:

Test Set Up Date:

Samples kept in Chamber #:

Experiment kept in:

Pouring volumes: Pour 100 ml for setup and renewal days, see exceptions for 101, 102 and 113

Instructions: This is a 96-hour test with five animals per replicate and four replicates per treatment. The test is conducted at 25 °C. We must update the TIE Subcommittee at the end of this test. Feed 150 µl YCT/Selenastrum mixture into each replicate two hours prior to renewing water. You will need to pour and spike samples with EDTA two hours prior to changing. Use 5 g/L stock EDTA. Waters will be renewed daily. Score mortality daily. DO NOT AERATE. Please do initial chemistry on Day 0 for treatments 101, 102 and 113 and final water chemistry on Day 1 for all treatments. BEFORE terminating the test, please discuss the results with the lab manager.

ID	Treatment	Instructions
101	Control Water	Pour 250 mL on Day 0 for I. Chem
102	Hardness Adjusted Control (HAC) @ ___ mg/L	Pour 250 mL on Day 0 for I. Chem
103	HAC + MeOH @ 0.5%	Add 500 µl plain MeOH to 100 ml
104	HAC + Eluate addback @ 3x	Add 500 µl Eluate to 100 ml
105	HAC + Low mg/L EDTA	Add XXX µl EDTA to 100 ml
106	HAC + Medium mg/L EDTA	Add XXX µl EDTA to 100 ml
107	HAC + High mg/L EDTA	Add XXX µl EDTA to 100 ml
108	HAC + 100 ppb PBO	Add 2000 µl 5ppm PBO to 100 ml
109	HAC + BSA	Concentration TBD
110	HAC + Carboxylesterase	Concentration TBD
111	HAC* C8 Blank	
112	HAC Centrifuged	
113	Ambient Sample	Pour 250 mL on Day 0 for I. Chem
114	Ambient Sample + Low mg/L EDTA	Add XXX µl EDTA to 100 ml
115	Ambient Sample + Medium mg/L EDTA	Add XXX µl EDTA to 100 ml
116	Ambient Sample + High mg/L EDTA	Add XXX µl EDTA to 100 ml
117	Ambient Sample + 100 ppb PBO	Add 2000 µl 5ppm PBO to 100 ml
118	Ambient Sample + BSA	Concentration TBD
119	Ambient Sample + Carboxylesterase	Concentration TBD
120	Ambient Sample C8 Rinsate	
121	Ambient Sample Centrifuged	

*Regular Control Water might be substituted for this treatment if making HAC delays running columns

Linda Deanovic 8/19/2015 3:52 PM

Comment [1]: Our high EDTA concentration usually matches the hardness of the sample. For example, if the hardness is 80 mg/L, our high EDTA concentration would be 80 mg/L. The lower concentrations are 50% concentration reductions from there. Alternatively, the concentrations could be reduced to 25% and 6.25% of the highest EDTA concentration. In very soft water, we will make the highest EDTA concentration about ¼ of the hardness.

Linda Deanovic 5/26/2015 11:40 AM

Comment [2]: We would definitely add an additional manipulation (a dilution of the ambient sample) with and without PBO if the sample was highly toxic (>2 TUs). If the undiluted ambient sample dies in 24 hours, we have no mechanisms to observe accelerated mortality with the addition of PBO unless the sample is diluted.

Delta RMP Selenastrum TIE Treatment List

Client Name: SWRCB - SWAMP

Sample Name and Field Date:

Test Set Up Date:

Samples kept in Chamber #:

Experiment kept in:

Instructions: This is a 96-hour algae test without EDTA. Take initial chemistry at test set up and final chemistry at test termination. Randomize flasks twice daily. Flasks must be inoculated individually. This TIE test has 4 replicates per treatment with no daily pH measurements. Start spiking algae cells at 94 hours of testing whenever possible.

ID	Treatment
101	Control Water (Distilled Water)
102	Control Water Blank for Non-Polar SPE (SM-2 Adsorbant?)
103	Control Water Blank for Chelex 100 Sodium Form
104	Ambient Water
105	Ambient Water - Non-Polar SPE (SM-2 Adsorbant?) (for hydrophobic compounds)
106	Ambient Water - Chelex 100 Sodium Form (for divalent cations)
Optional Ideas	
107	Control Water Blank for Chelex 100 Iron Form
108	Control Water Blank for AG1-X8
109	Ambient Water - Chelex 100 Iron Form (for glyphosate)
110	Ambient Water - AG1-X8 (for inorganic anions)

This treatment list is just an idea for approaching toxic algae samples. I talked to the Biorad representative and she said all of these products can be applied in batch, which is considerably faster than passing the samples through columns. The sample is stirred with each resin type for 1 hour and then filtered out during the normal sample filtration process. A biological buffer will need to be added to the Chelex 100 manipulation because the sample will be basic after application. I have very little experience using resins in batch, so the methods would be experimental. The resins are very expensive, but can be regenerated and reused.

Linda Deanovic 8/19/2015 1:53 PM

Comment [3]: This is a Biorad product for removal of hydrophobic compounds that could be used in a batch approach (described below). One alternative is to pass the columns through a C8 column, but consistently using a batch approach for all resins would be ideal.

Delta RMP Fish TIE Treatment List

Client Name: SWRCB - SWAMP

Sample Name and Field Date:

Test Set Up Date:

Samples kept in Chamber #:

Experiment kept in:

Pouring volumes: Pour 100 ml for setup and renewal days, see exceptions for 101, 102 and 113

Instructions: This is a 96-hour test with 5 animals per replicate and 4 replicates per treatment. Each replicate contains of 100ml of sample. Feed 2X times daily. Do not feed on the last day of the test. You will need to pour and spike samples with EDTA two hours prior to changing. Use 5 g/L stock EDTA. Waters will be renewed every other day. Score mortality daily. DO NOT AERATE. Please do initial chemistry on Day 0 for treatments 101, 102 and 109 and final water chemistry on Day 2 for all treatments. BEFORE terminating the test, please discuss the results with the lab manager.

ID	Treatment	Instructions
101	Control Water	
102	Hardness Adjusted Control (HAC) @ ____ mg/L	
103	HAC + MeOH @ 0.5%	
104	HAC + Eluate addback @ 3x	
105	HAC + Low mg/L EDTA	
106	HAC + Medium mg/L EDTA	
107	HAC + High mg/L EDTA	
108	HAC* C8 Blank	
109	Ambient Sample	
110	Ambient Sample + Low mg/L EDTA	
111	Ambient Sample + Medium mg/L EDTA	
112	Ambient Sample + High mg/L EDTA	
113	Ambient Sample C8 Rinsate	

*Regular Control Water might be substituted for this treatment if making HAC delays running columns

Linda Deanovic 8/19/2015 4:13 PM

Comment [4]: Our high EDTA concentration usually matches the hardness of the sample. For example, if the hardness is 80 mg/L, our high EDTA concentration would be 80 mg/L. Since we haven't run a fish TIE in years, the lower concentrations would be reduced to 25% and 6.25% of the highest concentration. In very soft water, we might make the highest EDTA concentration about 1/4 of the hardness.

DATE: September 7, 2015

TO: RMP Steering Committee

FROM: Thomas Jabusch, ASC and Phil Trowbridge, ASC

RE: Supplemental Budget Request for Undesignated Funds for Secondary Laboratory Analysis for Pesticides

REQUESTED ACTION

Some Delta RMP participants have requested that 5% of the samples for Current Use Pesticides (CUP) should be sent to a second laboratory for comparison as an additional Quality Assurance procedure. The rationale would be to confirm accuracy and evaluate bias in the chemical analyses, thus ensuring confidence in the chemical laboratory analysis results. Since this task was not part of the approved FY15/16 workplan, an additional \$12,847 from Undesignated Reserve Funds is requested to support the analysis of three CUP samples by a secondary laboratory. *(Proposed by Linda Dorn on behalf of POTWs in comments on the FY15/16 Workplan provided on 6/20/15)*

FISCAL SITUATION

Undesignated Funds Balance: \$51,903 (as of 7/22/15)

EXPLANATION

In FY15/16, the RMP has contracted the U.S. Geological Survey (USGS) Pesticide Fate Research Group (PFRG) Organic Chemistry Research Laboratory (OCRL) to conduct analyses of the occurrence of current use pesticides (CUPs) in water samples because of its unique analytical capabilities to assess the occurrence of 114 current-use pesticides and pesticide degradates. The USGS method have been developed and standardized for distinct research activities that are conducted on a frequent or ongoing basis and for types of data that are produced in large quantities and adhere to high scientific standards of excellence. However, quality-assurance procedures are different from those of certified testing laboratories routinely contracted by regulated dischargers. Due to its research mission, OCRL does not pursue mandatory proficiency testing as required of commercial laboratories seeking accreditation as a certified testing laboratory. Therefore, some program participants have proposed that 3 of the 60

FY15/16 CUP samples (5%) be split and sent to a second laboratory for comparison. An additional \$12,847 is requested to support the analysis of three split CUP samples by a secondary laboratory.

The recommended secondary laboratory is the CA Dept. of Fish and Wildlife Water Pollution Control Laboratory (WPCL). The WPCL can provide the largest overlap in analytes (50 of 114) at the lowest cost per analyte in comparison with other labs. WPCL is certified/registered as a State environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act of 1988 (Health and Safety Code, Div 1, Part 2, Chapter 7.5, Section 1010) and participates semi-annually in the U.S. EPA Water Pollution Laboratory Performance Evaluation Studies.

The cost of the analyses of three samples by WPCL is \$11,247, including quality control (method blank, laboratory control standard). An additional \$1,600 is requested to cover added data management cost.

The Undesignated Funds would be allocated to the CUP and Toxicity Monitoring task in the FY15/16 Delta RMP budget as follows:

Category	Original Budget	Additional Funds	Updated Budget
Labor	\$36,000	\$1,600	\$37,600
Subcontractors	\$277,038	\$11,247	\$288,285
Direct Expenses	\$0	\$0	\$0
In-Kind	\$200,000	\$0	\$200,000
Total	\$513,038	\$12,847	\$525,885

Delta Regional Monitoring Program

Communications Plan



Prepared for
Delta RMP Steering Committee
October 2015

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1. Introduction

The mission of the Delta Regional Monitoring Program (RMP) is to inform decisions on how to protect and restore beneficial uses of water in the Delta, by producing objective and cost-effective scientific information critical to understanding regional water quality conditions and trends. To achieve this mission, the Delta RMP developed a Monitoring Design (ASC 2015) that contains detailed assessment questions relevant to each of the program's priority management questions. This Communications Plan describes the products and processes that will be used by the Delta RMP to interpret and report its data to answer the assessment questions and inform decisions.

2. Reporting

The reporting goal of the Delta RMP is to generate communication products that inform and educate target audiences about Delta water quality conditions and trends. The information in such projects is targeted at the highest priority questions faced by managers.

2.1 Target Audiences

The target audiences for Delta RMP communication products include internal (program participants) and external (other Delta managers and policymakers, local scientists and the scientific community at large, and the public) stakeholders. Delta RMP communication products aim to effectively serve these diverse audiences. To meet this goal, the communication products need to provide objective and accessible information, distributed in a timely and effective manner.

2.2. Data Portals

Monitoring data will be available for download via Contaminant Data Display and Download (CD3, at <http://cd3.sfei.org>) and incorporated into the California Environmental Data Exchange Network (CEDEN, at <http://www.ceden.org/index.shtml>); and additional portals such as Bay Delta Live (<http://www.baydeltalive.com/>) and the California Estuaries Workgroup (<http://caestuaries.opennrm.org/>) web portals as funding allows. CD3 is an innovative visualization tool for accessing water quality data that allows users to perform spatial queries to dynamically map, chart, and download data.

2.3. Communication Products

The Delta RMP will produce an Annual Monitoring Report, which documents the activities of the program each year, a summary report (*The Pulse of The Delta*), and technical reports that document specific studies and synthesize information from diverse sources.

The Pulse of the Delta

A summary report (*The Pulse of the Delta*) will be the main public reporting vehicle for Delta RMP information (data interpreted relative to the Program's management questions). The Steering Committee will decide when to publish a Pulse of the Delta and its theme. The first two editions of the Pulse of the Delta (ASC 2011, ASC 2012) preceded the Delta RMP's current

organizational structure. The information in the Pulse of the Delta will include Delta RMP monitoring data as well as other relevant information.

Annual Monitoring Report

The Annual Monitoring Report will present the results of the previous July-June fiscal year of sampling. Interpretation of the results will be very basic. The main purpose of this report is to share the final data with project partners and collaborators in a timely way.

Technical Reports

Technical reports will be produced to provide a more in-depth evaluation of monitoring and special study results. Technical reports will facilitate technical peer review of Delta RMP monitoring and assessment products. A technical report may be appropriate for each of the monitoring elements after 2-3 years of study. Technical reports can be the basis for peer-reviewed publications by the Principal Investigators. Although the Delta RMP would not necessarily fund the preparation of manuscripts, such manuscripts would benefit the scientific credibility of the program.

2.4. Internal review process

All Delta RMP communication products will go through internal technical review and Steering Committee approval. The Technical Advisory Committee (TAC) is the lead group for providing technical review. Technical subcommittees or workgroups may be invited to review products or components of a product that fall in their specific expertise. For example, the nutrient subcommittee will be invited to review the draft nutrient synthesis report. Before they are released to the public, all communication products require final approval by the Steering Committee.

2.5. External review process

The SC will decide on a case-by-case basis whether communication products should be submitted to external review. The TAC, Steering Committee, or staff may recommend additional external expert peer review for draft technical or summary reports. Depending on the timeline and specific needs, external review may be done in parallel to or following internal review.

When planning a new communication product, an advisory group representative of targeted audiences may be formed to help focus the content and outreach.

2.6. Communication channels

At this time, the Delta RMP does not have its own independent communication channels to reach internal and external target audiences. It would benefit the program to develop these channels eventually. The following sections describe the current communication channels.

Website

Currently, there are two websites with different purposes for the Delta RMP. The Central Valley Regional Water Quality Control Board (Water Board) maintains a web page for the Delta RMP that lists recent program news and updated events, SC and TAC meeting information and materials, and access to reports (http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/index.shtml). ASC maintains a Google site for the TAC that features a basic home page with an interactive event calendar and a link to the Water Board's Delta RMP page (<https://sites.google.com/a/sfei.org/delta-rmp/home>). The TAC Google site also features a password-restricted area that provides access to technical materials, archived documents, and collaborative workspace for members of the TAC and its subcommittees.

In the future, program participants and external stakeholders would benefit from a single website for online information about the program, access to documents, and the schedule of upcoming events.

Email subscription list

Currently, distribution of communication products relies on external communication channels of program partners and participants; including the Delta Water Quality Issues Lyris email list (maintained by Water Board staff) and the Delta eNews electronic newsletter (maintained by California Department of Water Resources).

In the future, an email subscription list specific to the Delta RMP would be an effective and relatively inexpensive tool for tailored announcements. The email subscription list can be used to update participants and the interested public on report and data releases and other program announcements, such as meeting dates, events, and periodic updates on program news.

An integrated Delta RMP website and email list would allow for announcements to be archived for easy access outside of the email applications.

Social Media

Additional considerations would be a social media presence such as a Twitter feed and/or Facebook page to raise awareness about the program and to garner support for its activities and interest in its findings.

Public Notice of Meetings

All meetings are open to the public and publicly noticed through the Delta Water Quality Issues Lyris list. Agenda and materials (except the draft minutes) are posted on the Water Board's Delta RMP web page at least one week in advance. Water Board staff is responsible for maintaining the web page and sending emails through Lyris.

2.7. Delta RMP reporting schedule

Table 1 provides an overview of the Delta RMP reporting cycle. This schedule was developed by working backwards from a proposed fall release date of The Pulse of the Delta and by assuming that monitoring will be conducted on a July-June fiscal year basis.

Basic data will be reported through various web portals and Annual Monitoring Reports. Data will be collected on fiscal year basis, with each monitoring year ending on June 30. The data will be quality assured and uploaded to web portals for public access by January 1. The Annual Monitoring Report will present these data with minimal interpretation by March 1.

Interpretation of the data will be completed less frequently and at the direction of the Steering Committee. It is anticipated that technical reports, produced every 2-3 years, will synthesize results and make recommendations.

The Pulse of the Delta is envisioned as the main interpretive reporting vehicle for Delta RMP results. The themes of the Pulse of the Delta will be outlined by the Steering Committee based on prior technical reports. The Pulse of the Delta will be released in the fall to provide maximum impact of the program during the Bay Delta Science Conference and the State of the Estuary Conference.

Interpretation of the data will be completed less frequently and at the direction of the Steering Committee. It is anticipated that technical reports will be produced after every two or three years of data. The technical reports will synthesize the results and make recommendations.

The Pulse of the Delta will be the main interpretive reporting vehicle for Delta RMP results. The themes of the Pulse of the Delta will be outlined by the Steering Committee based on prior technical reports and other input received.

Table 1. Delta RMP reporting cycle.

Deliverable	Frequency	Release date
<i>Data uploads</i>		
CD3	Annually	January 1
CEDEN	Annually	January 1
California Estuaries web portal	Annually	January 1
<i>Reports</i>		
Annual Monitoring Reports (including QA report)	Annually	March 1
Technical Reports	Variable	Variable
Pulse of the Delta	Variable	Fall

Table 2 presents the reporting schedule for the first four years of the Delta RMP, building toward a Pulse of the Delta in the fall of 2018. The general concept is that nutrient synthesis reports in FY15/16 and FY16/17 and technical reports for Current Use Pesticides and Pathogens in FY17/18 would provide the majority of the content for the Pulse of the Delta in FY18/19.

Table 2. Proposed Delta RMP reporting schedule through FY18/19.

Program Element	FY 15/16	FY 16/17	FY 17/18	FY 18/19
Current Use Pesticides	Monitoring	Monitoring	Tech Report/ Monitoring	Monitoring
Mercury		Monitoring	Monitoring	Tech Report/ Monitoring
Nutrients	Synthesis	Synthesis/ Monitoring	Monitoring	Monitoring
Pathogens	Monitoring	Monitoring	Tech Report	
Pulse of the Delta				X (Fall)

3. Data Analysis and Interpretation

The key interpretive product of the program will be the Pulse of the Delta, which will be produced when decided by the Steering Committee. Analyses will emphasize past trends, current status, and projected future trends. Attachment 2 summarizes examples of the analyses that could be useful for the different types of data collected by the Delta RMP. The over-arching objective will be to answer the priority management questions using the most appropriate and credible scientific methods.

The exact methods for data analysis are not prescribed in this plan because doing so would limit the options for the program. Instead, program participants develop the interpretation of Delta RMP data collectively in a science-based and collaborative process. With oversight by the TAC and Steering Committee, program staff and subcontractors will conduct the relevant analyses by evaluating the data in light of the assessment questions, the best scientific methods, and any stated benchmarks or performance targets. A solid review process (see Section 2) ensures that information generated by the program is high quality, objective, and relevant.

The Delta RMP is not a regulatory program. The Water Board will make regulatory decisions, such as impairment determinations, using its own process. When RMP data exceed water quality objectives or an upward trend is observed, the Delta RMP will follow the process shown in Attachment 1 to evaluate the representativeness and quality of that data and other relevant information. This information will inform any subsequent regulatory decisions by the Water Board.

4. References

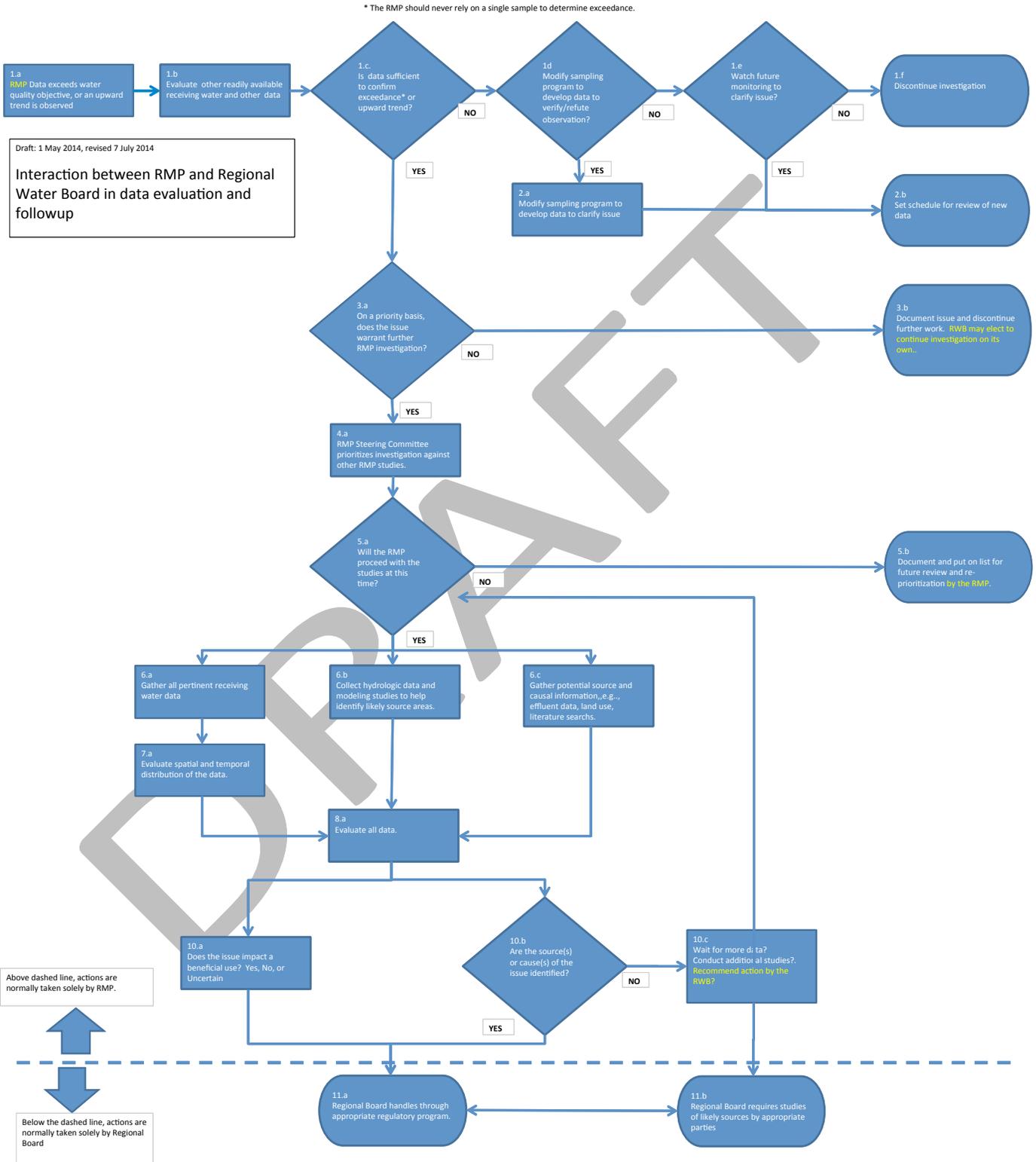
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5. Attachments:

1. Interaction between RMP and Water Board in Data Evaluation and Follow-up
2. Analyses Needed to Answer Prioritized Management and Assessment Questions

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Attachment 1: Interaction between RMP and Water Board in Data Evaluation and Follow-up



Attachment 2: Analyses Needed to Answer Prioritized Management and Assessment Questions

Current Use Pesticides (CUPs)

Current Use Pesticides (CUPs) monitoring results will be evaluated in a weight of evidence-based approach. CUP monitoring results include chemical-analytical and toxicity data. Toxicity data include the results of toxicity tests and any triggered Toxicity Identification Evaluations (TIEs). The data evaluation will consider any additional information that may help to inform the interpretation of results (for example: land use and management activities, flows, and other influencing physical-chemical properties and water quality constituents).

Determination of sample toxicity

Statistical analyses: Toxicity testing is supported by funding from the State Water Board and thus adheres to the data analysis protocols of the Surface Water Ambient Monitoring Program (SWAMP). Toxicity tests will be conducted using a single-concentration test design, and results will be analyzed following USEPA's standard t-test hypothesis testing approach according to Appendix H of the Chronic Toxicity Testing Manuals (USEPA 2002). The SWAMP will eventually complete its database configuration for use of the USEPA Test of Significant Toxicity (TST) statistical approach. This USEPA method of data analysis involves the comparison of each sample (100% environmental sample water) to one standard laboratory control and a conductivity control, if needed.

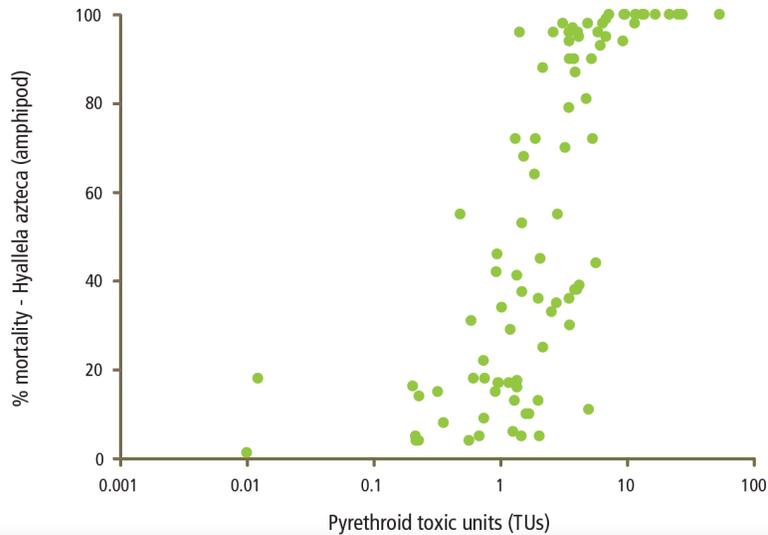
Pesticide detection

Statistical analyses: The Method Detection Limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero (USEPA 1997). MDLs are calculated based on the standard deviation of samples at known concentrations near the expected MDL and are determined according to the procedure outlined by the USEPA in 40 CFR 136, Appendix B (USEPA 1997).

Identification of pesticides responsible for producing toxicity

Statistical analyses: The determination of post-treatment sample toxicity in TIEs will be based on t-test or TST (see Determination of sample toxicity above) statistical tests.

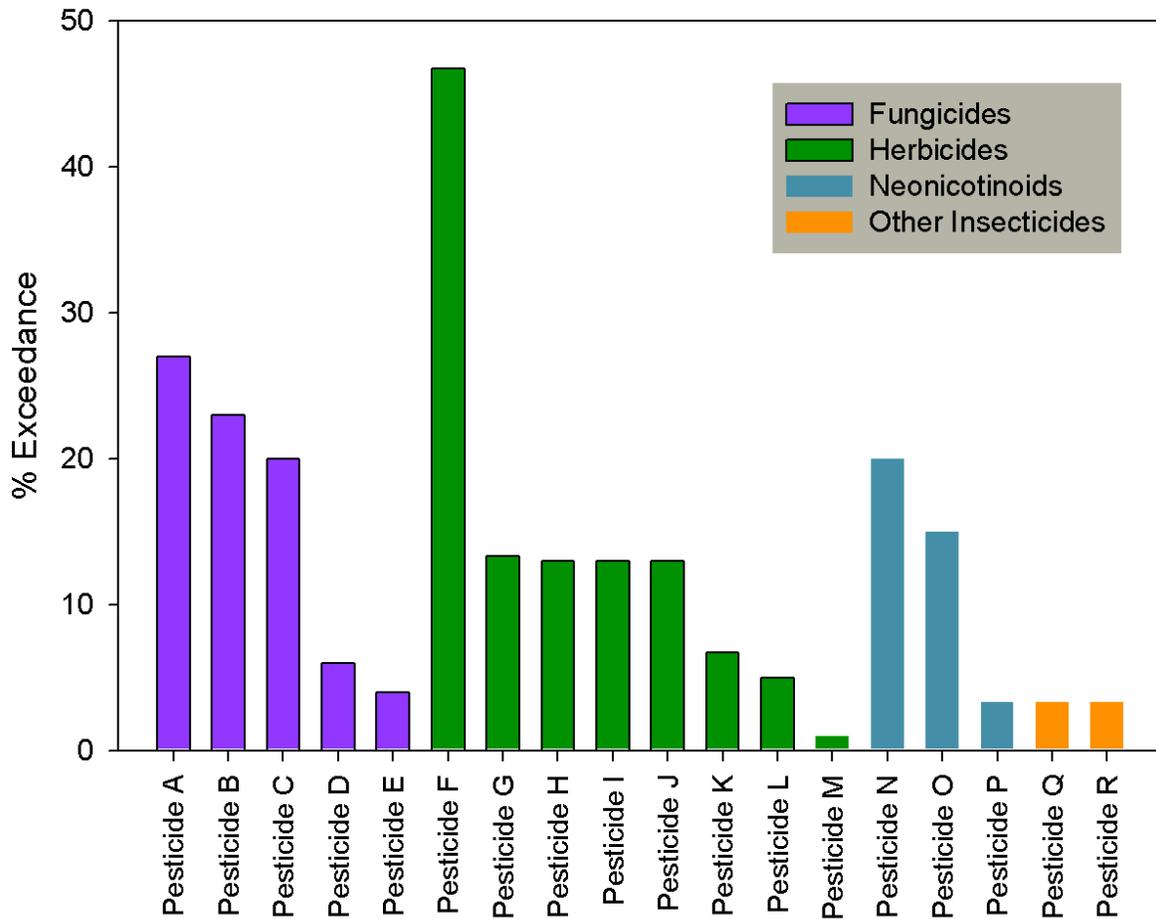
Graphical tools: Scatter plots (percent mortality of test organisms used in TIEs vs. toxic units [TUs] estimated from chemistry results) can be applied to evaluate if chemistry results support toxicity identification, for example:



Evaluation of exceedances of thresholds of concern

Graphical tools: The evaluation of exceedances of thresholds of concern will be a simple comparison of all sample concentrations against USEPA levels of toxicological concern. Key findings can be communicated visually. For example, a bar graph showing (for all stations and all samples at each station) percent of samples exceeding target thresholds for analyzed pesticides that a) were detected, b) have established thresholds, and c) exceeded thresholds:

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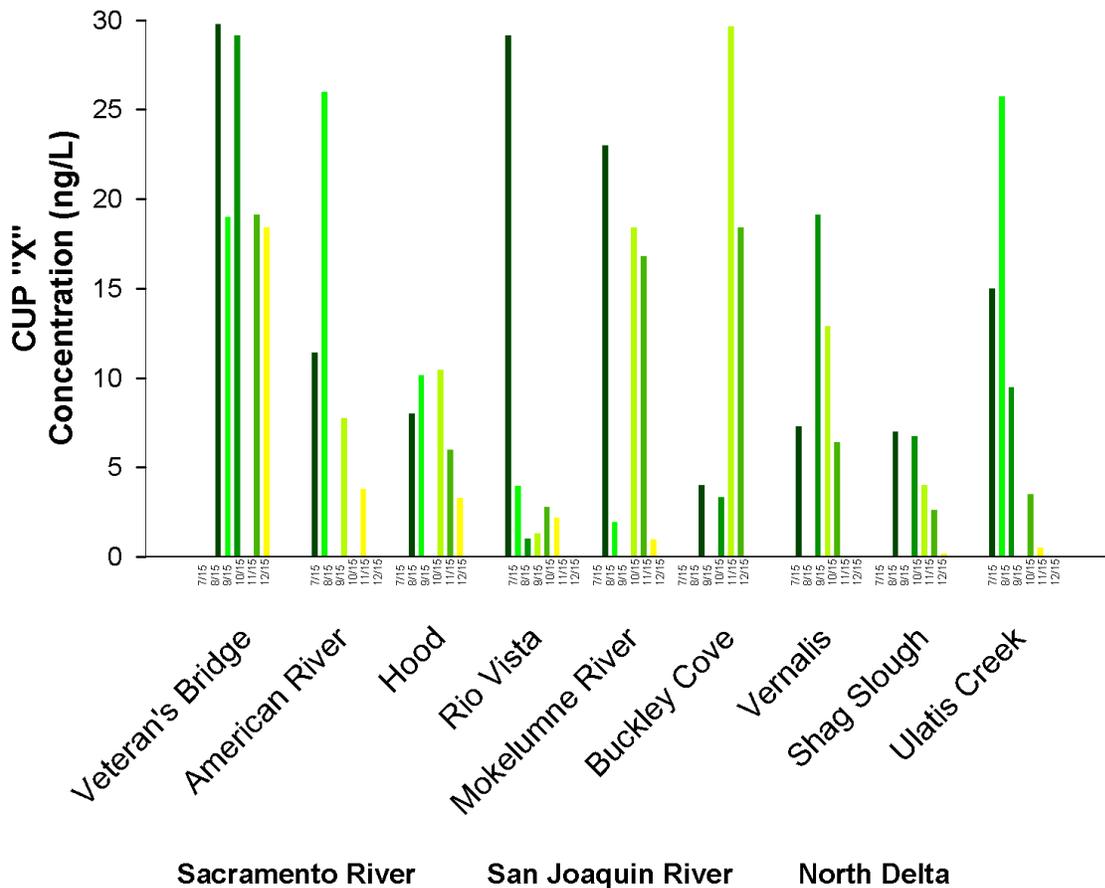


Characterization of spatial and temporal data variability

Statistical analyses: A descriptive statistical summary will describe the variability in toxicity results and pesticide concentrations overall, seasonally, and among stations.

Graphical tools: Color-coded maps with pie charts may be included to visualize the magnitude of toxicity by medium (water column or sediment), site, test specie, and endpoint (see Monitoring Design Summary p.26-27 for examples).

Grouped bar graphs are appropriate for visualizing variation in pesticide concentrations among sampling events for each sampling site. The following example graph illustrates how spatial and temporal variation can be visually represented:



Mercury

Mercury is monitored to evaluate and compare status and long-term trends in mercury concentrations in sport fish tissue and methylmercury in water at sites representing different subareas of the Delta. Subareas likely to be affected by major alterations (e.g., large-scale restoration projects) are a priority. Status will be evaluated by comparing annual averages tissue concentration against the applicable water quality objective, and monthly average water concentrations against the TMDL implementation goal.

Evaluation of long-term trends

Statistical analyses: Analysis of covariance (ANCOVA) will be used to evaluate differences in annual average mercury in **sport fish** between years and stations or subareas, following the methods of Davis et al. (2013). The key metric is size-standardized (350-mm) black bass tissue concentrations (indicator for sport fish tissue levels) (Davis et al. 2013). Analysis of variance (ANOVA) will be used to evaluate differences in annual average methylmercury concentrations in **water** among the five stations. As annual time series are established for fish and water, regression analysis will be used to evaluate temporal trends in annual average concentrations for each station and for the Delta as a whole.

Graphical tools: Line and scatter plots will be visualizing trends in methylmercury concentrations over time as shown in the Monitoring Design Summary (p. 40-41).

Status

Graphical tools: Annual averages will be compared to regulatory benchmarks for descriptive purposes only. Benchmarks will be shown in the line and scatter plots as horizontal lines (see examples on p. 40-41 of the Monitoring Design Summary).

Nutrients

The initial effort consists of syntheses and analyses of existing data and information. The goal is to provide a characterization of the temporal and spatial variability in concentrations of nutrients and nutrient-associated parameters as well as important sources, pathways, and processes. Results will help evaluate to what extent the existing monitoring already collects the appropriate data to inform the management questions of RMP participants and what the data gaps are.

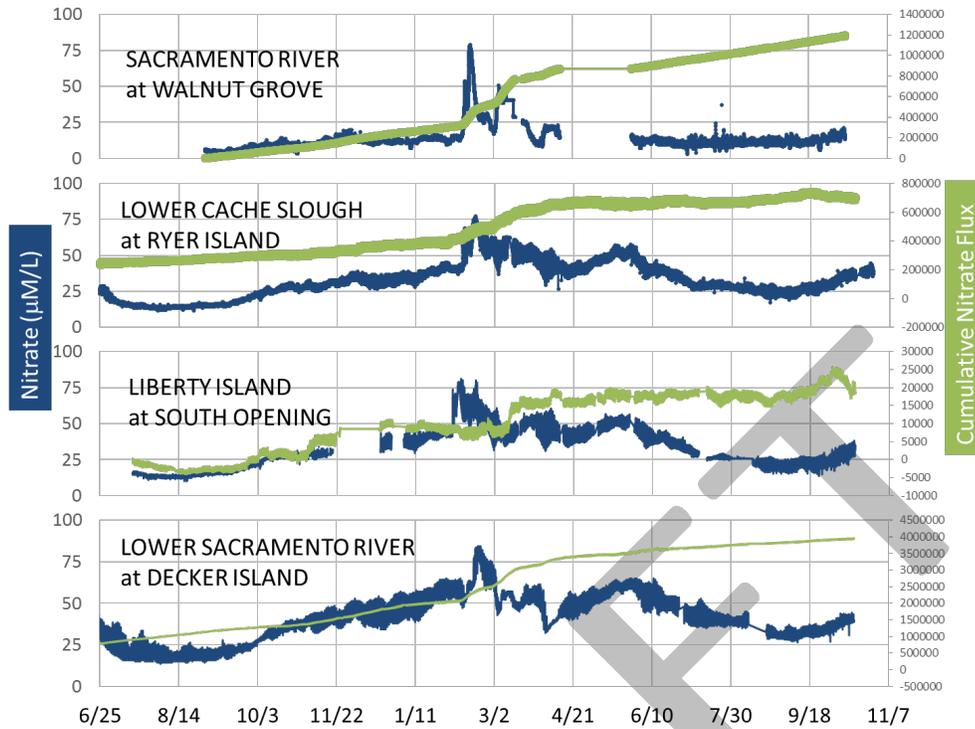
Characterization of temporal trends (seasonal, interannual, and decadal)

Statistical analyses: Descriptive statistics will be applied to characterize temporal variability and draw comparisons between monitoring sites. The choice of statistical methods depends on data distribution and quality and will be finalized as part of the exploratory data analysis.

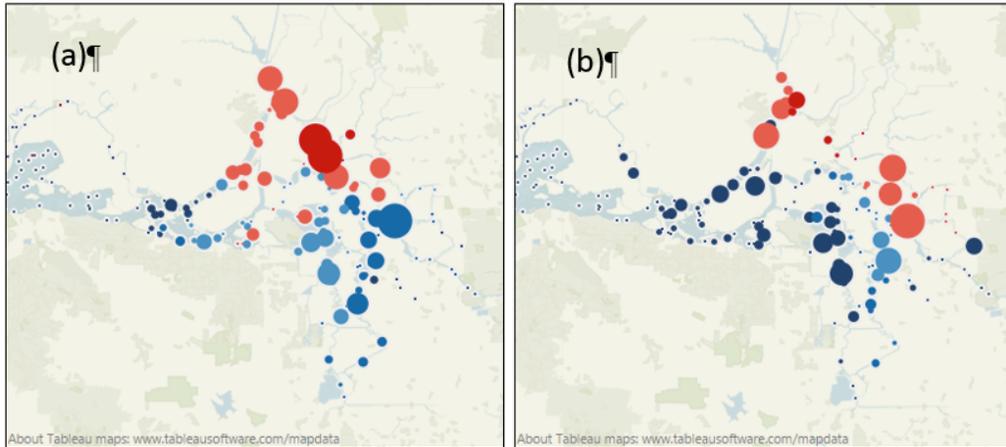
Appropriate methodologies may include both non-parametric (Mann-Kendall statistics, Mann-Whitney U tests) and parametric analyses (linear regression methods).

Graphical tools: Stacked whisker-box plots visualizing trends in concentrations and proportions as shown in the Monitoring Design Summary (p. 49, 52)

The following are example plots for summarizing time series of high-frequency data:



Maps are effective for comparing ranges of concentrations between stations as shown in this example:

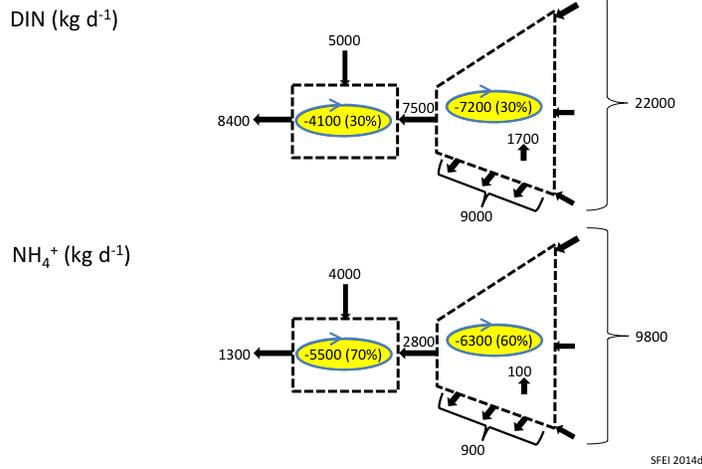


Characterization of important sources, pathways, and processes

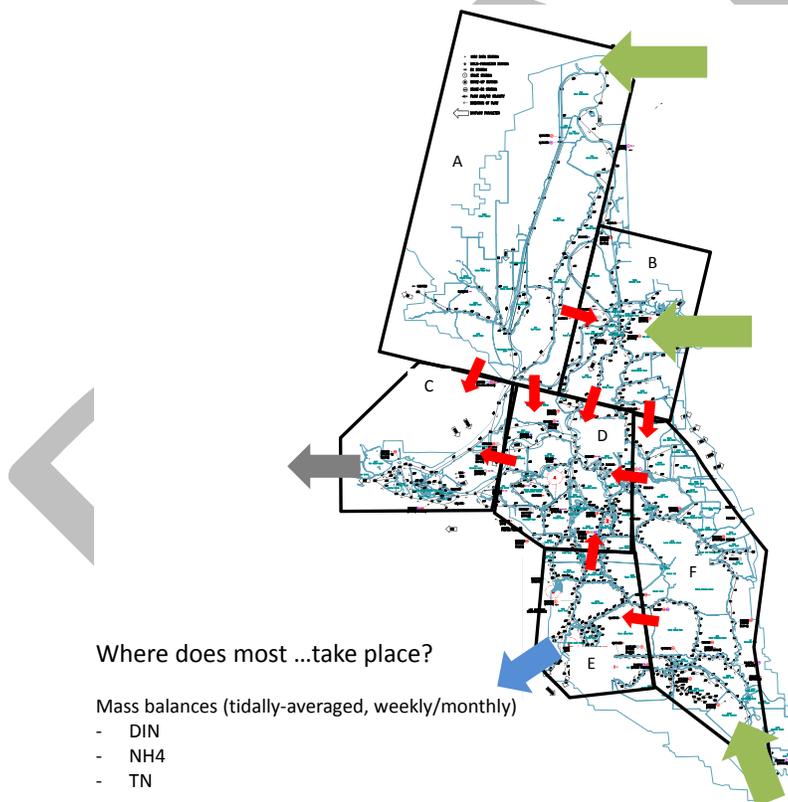
Statistical analyses: Appropriate analyses include Mann-Whitney U tests to assess differences between time periods.

Graphical tools: A refined mass balance diagram will characterize major sources and loads in the Delta. The following diagram shows an example based on preliminary findings:

Delta-Suisun Mass Balance – June-October



Results of ongoing analyses will be further synthesized into a map of the Delta with draft subregions based on major nutrient fluxes, as shown in this preliminary example:



Pathogens

The purpose of this two-year monitoring project is to characterize pathogen levels (*Cryptosporidium* and *Giardia*) to fulfill the requirement for a Pathogen Special Study in the Central Valley Drinking Water Policy Basin Plan Amendment:

Assess whether current pathogen levels are supportive of the municipal drinking water quality beneficial use as described in the Basin Plan

Statistical analyses: Descriptive statistics will be employed to a) assess trigger exceedances, b) compare current pathogen concentrations with results from the previous LT2 sampling (2007), and 3) evaluate if any drinking water intakes should be reclassified into a higher bin level.

Graphical tools: A map combined with a data summary will synthesize ambient concentrations and percent detection (Monitoring Design Summary, p. 66). Scatter plots will be used for visualizing the distribution of *Cryptosporidium* and *Giardia* by site and time (Monitoring Design Summary, p. 66).

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Delta Regional Monitoring Program

Program Planning Overview



Prepared for
Delta RMP Steering Committee
October 2015

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1. Program Planning Overview

The annual program planning cycle allows adaptation, re-evaluation and adjustment of assessment questions and monitoring design. **Figure 1** illustrates how the main program planning documents and associated steps in the adaptive management process relate to one another.

Table 1 outlines the program planning cycle. Program planning is a continuing process by which monitoring outcomes inform changes to the monitoring design and other implementation decisions. An annual Steering Committee planning meeting will provide an opportunity for review of the prioritized management and associated assessment questions and the monitoring design and special studies to address them. The Steering Committee will identify adaptations needed to the monitoring program, which will inform whether any updates are required to the monitoring design. Updates to the monitoring design will be reflected in the workplan and budget and updates to the Quality Assurance Program Plan (QAPP). Monitoring results and Field Sampling and Quality Assurance (QA) reports provide information for the Technical Advisory Committee (TAC) to recommend changes to the monitoring design.

In addition, the RMP will coordinate with other programs to leverage program resources. **Table 2** outlines planning documents and coordination points with external partners and what kind of input is needed by when for each of the steps in the planning cycle. For example, updates to the monitoring design, such as updating lists of target analytes, will be informed by monitoring plans and recommendations provided by the Irrigated Lands Regulatory Program (ILRP).

Figure 1 and **Table 2** also refer to a multi-year plan and a program review. A multi-year planning process will allow periodic re-evaluation of management questions, upcoming management decisions, and program priorities, as well as preliminary budget allocations for longer periods of time. An intensive, periodic program review would convene an expert panel to examine all or specific aspects of the program, including objectives and management questions, sampling design, overall adequacy and allocation of resources, QA expenses, data management, data analysis, information dissemination, and use of information by target audiences.

Table1. Program planning cycle.

Document	Content	Frequency (relative due date)
Multi-Year Plan	Summary of <ul style="list-style-type: none"> – Core questions – Upcoming management decisions – Priority studies – Preliminary budget allocations for next 3-5 years 	2-5-year cycle (TBD, as necessary) (Start and frequency to be decided by the SC)
Monitoring Design	Prioritized management and associated assessment questions and monitoring design and special studies to address them.	Annual Steering Committee planning meeting/workshop (starting in January 2016): – Update annually
Annual Workplan	Annual budget and program activities	Annually (April)
Quality Assurance Program Plan (QAPP)	Target analyte lists, field sampling protocols, sampling sites, laboratory contractors, and other design features in the QAPP will be updated as needed. Updates to the target analyte lists, methods, and contractors will be based on: (1) updates to the Monitoring Design, (2) approved Annual Workplan and Budget. (3) Coordination with other monitoring programs.	Annually (May)
Field and QA Reports	Field and QA reports are part of the decision basis for updates to the Monitoring Design, Workplan, and QAPP. The Field Sampling Report will document how samples were collected, target sampling sites, actual sampling sites, how	Annually (May)

	<p>many samples were collected, measurements made using field instruments, and any deviations from the QAPP for field sampling methods.</p> <p>The QA Report will document the quality assurance / quality control measurements performed by laboratories, the results of these tests relative to data quality objectives, any data that were deemed unusable, and any deviations from the QAPP for laboratory methods.</p>	
Monitoring Report	Basic documentation of the results of the previous year of sampling. Review of results will directly influence updates to the monitoring design and other implementation decisions	Annually (April)
Pulse of the Delta	Main reporting vehicle for Delta RMP information (data interpreted relative to the Program's management questions). Part of decision-basis for multi-year planning.	To be decided by Steering Committee
Program Review	In-depth external review	5-year cycle (starting in with an in-depth review of the initial Program Plan) – Planned date to be decided by the SC

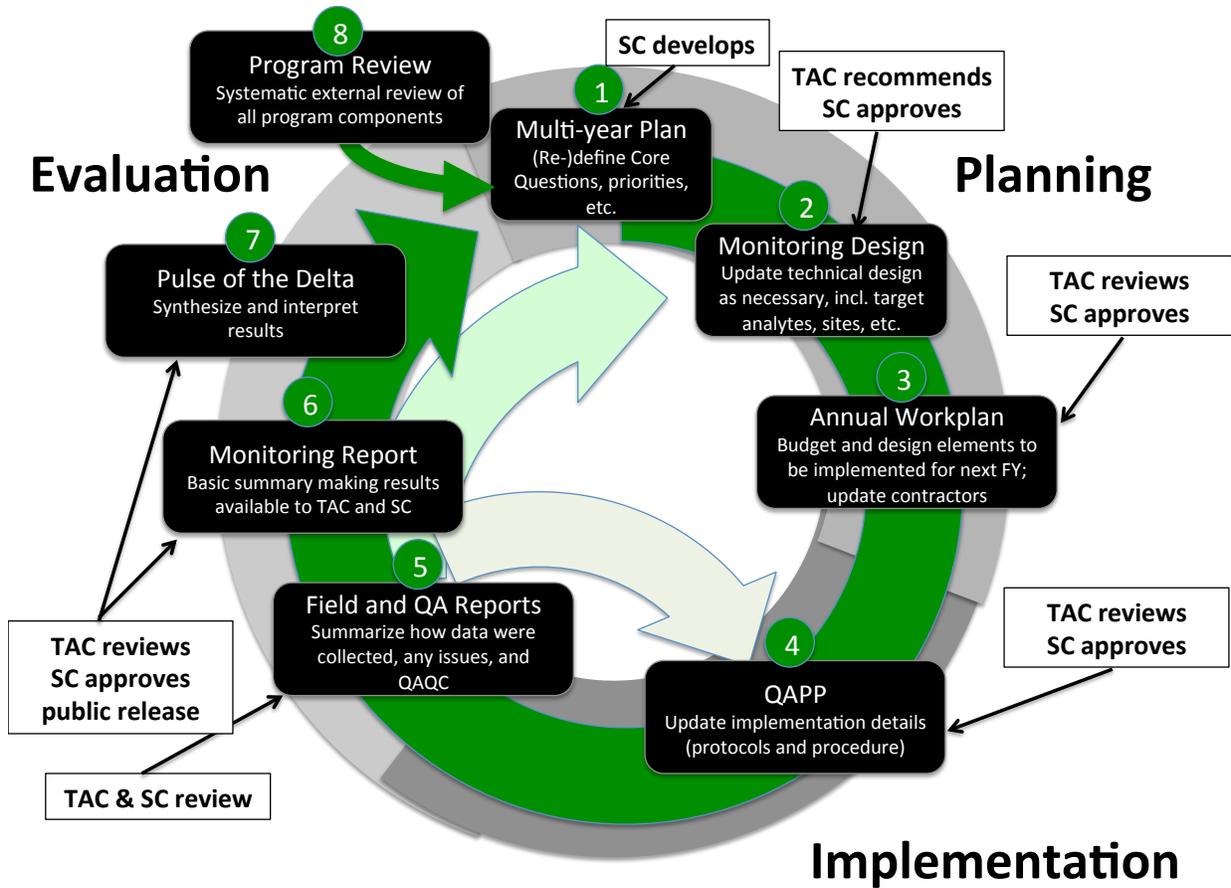


Figure 1. Flow diagram illustrating the Delta RMP's adaptive management cycle. The shading represents the three broad phases of the management cycle: planning, implementation, and evaluation. The circular arrow represents the general sequence of main program products and associated steps. The additional arrows represent additional important feedback loops: a review of previous monitoring results documented in the Annual Monitoring Report will directly influence updates to the monitoring design and other implementation decisions; lessons learned from sampling implementation and QAQC review will directly influence updates to the QAPP (e.g., QC procedures, SOPs).

Table 2. Planning documents and important coordination points for updating Delta RMP Plans and Monitoring Design.

Planning Document (anticipated date)	Internal input needed (anticipated date)	External input needed (anticipated date)	Needed from
Multi-year Plan • Core questions • Priorities (January, every 2-5 years)	Summary reports from previous monitoring years (Available by December 1)	Information about • Long-term Management Plans and Priorities • Prioritization and timing of current and future policies and actions (Due by December)	– Regional Board – State Water Board – Delta Stewardship Council – USEPA
Monitoring Design (January, annually)	Summary reports and monitoring results from previous monitoring years (Available by December 1)	Monitoring Plan updates (including sites, target analytes, frequency) and Study Plans (By December 1)	– Regional Board – Ag coalitions in Sac and SJ watersheds – IEP – SWAMP – USGS
		Monitoring Results (By December 1)	– Regional Board – Ag coalitions in Sac and SJ watersheds – IEP – SWAMP – USGS
		Updated pesticide use data and output from Pesticide Use Risk Model (By December 1)	– DPR
		Recommendations for pesticides and degradates to add/drop (By December 1)	– ILRP Pesticide Evaluation Advisory Group
Annual Workplan (March/April)	Multi-Year Plan; TAC recommendations based on Multi-Year Plan; Updated Monitoring Design; Specific requests for in-kind contributions (January)	In-kind contribution proposals (By April)	– All program participants planning on in-kind contributions (e.g., IEP, ag coalitions)
		Cost estimates or proposals (By April)	– Existing and potential contractors for field sampling and laboratories
		Confirmation of no-cost in-kind contribution offers	– External partners (e.g., MWQI)
QAPP	Field and QA reports Annual Monitoring Results (by March)	Updated SOPs (By May)	– Contractors for field sampling and laboratories