



Delta RMP Steering Committee Meeting
January 26, 2017 10:00 am – 4:00 pm

LOCATION

Central Valley Water Board offices, 11020 Sun Center Drive #200, Rancho Cordova CA

REMOTE ACCESS

<https://stateofcaswrcbweb.centurylinkccc.com/CenturylinkWeb/DeltaRMP>

Primary Access Number: 1-877-820-7831; Guest Passcode: 593727

Agenda

1.	<p>Introductions and Review Agenda Introduce TAC and SC members, establish quorum, and explain goals of the meeting</p>		10:00 Brock Bernstein
2	<p>Decision: Approve Meeting Summary from October 18, 2016 and Confirm/Set Next Meeting Dates</p> <p><u>Desired outcomes:</u></p> <ul style="list-style-type: none"> ● Approve meeting summary ● Confirm next meeting date for SC is in May 3, 2017 ● Select a date for summer SC meeting: Check your calendar for the weeks July 17 or 24. 	<p>10/18/16 SC Mtg Summary</p> <p>RMP Decision Record (Excel Spreadsheet)</p>	10:05 Brock Bernstein
3.	<p>Information: TAC Update The TAC co-chairs will summarize the outcomes of the last TAC meeting and the status of monitoring activities.</p> <p><u>Desired outcome:</u></p> <ul style="list-style-type: none"> ● Informed committee 	<p>12/13/16 TAC Mtg Summary</p> <p>Table of Mgmt Drivers</p>	10:20 Stephen McCord

4.	<p>Information: Financial Update The Financial Update memo summarizes the balance of budgeted and reserved RMP funds as well as the status of revenue received.</p> <p>Desired outcomes:</p> <ul style="list-style-type: none"> ● Informed committee 	Financial Update Memo	11:00 Philip Trowbridge
5.	<p>Information: Financial Subcommittee Report The Financial Subcommittee will report out on their recommendations.</p> <p>Desired outcomes:</p> <ul style="list-style-type: none"> ● Informed committee 	None	11:30 Dalia Fadl
6.	<p>Decision: Confirm Fees for FY17/18 and Discuss Fees for FY18/19 In July, the SC provisionally decided to leave the fees for FY17/18 the same as they were for FY16/17. This decision needs to be confirmed before ASC starts work on the budget for next year. Also, the SC needs to discuss whether to raise the fees for FY18/19.</p> <p><u>Desired outcomes:</u></p> <ul style="list-style-type: none"> ● Confirmation that FY17/18 fees will equal FY16/17 fees for individual participants. Overall revenues may increase if new participants join. ● Early discussion about whether to raise fees for FY18/19 and the process for doing so. 	Fees Memo	12:00 Philip Trowbridge
	<p>Lunch - If you want to join a shared order for pizza, bring \$5 cash.</p>		12:30
7.	<p>Science Update: Nutrients Data Synthesis The outcomes of recent nutrient data synthesis tasks will be summarized.</p> <p><u>Desired outcomes:</u></p> <ul style="list-style-type: none"> ● Informed committee ● Select the topic for the next Science Update 	None	1:15 Philip Trowbridge with co- presenters

8.	<p>Decision: Approve Response Letter to Independent Review Panel</p> <p>The TAC and technical subcommittees have prepared a response to the Independent Review Panel. The letter provides more information that was not presented to the Panel to address some of their questions. The letter has been reviewed by the TAC and the External Review Planning Subcommittee.</p> <p><u>Desired outcomes:</u></p> <ul style="list-style-type: none"> • Approval of response letter to DSP Independent Review Panel 	Draft Response Letter	2:15 Philip Trowbridge
9.	<p>Decision: Approve Revisions to Charter</p> <p>Minor edits to the Charter were suggested at the 10/18/16 SC meeting and from SC members subsequently. The SC co-chair positions need to be confirmed for 2017-2018. The SC also requested time to discuss membership terms and the TAC co-chair positions.</p> <p><u>Desired outcomes:</u></p> <ul style="list-style-type: none"> • Approval of revised Charter • Approval of Adam Laputz and Linda Dorn as SC co-chairs for 2017-2018. • Confirmation of staff recommendation regarding membership terms and TAC co-chairs. 	Revised Charter Memo on Membership Terms and TAC co-chairs	3:00 Philip Trowbridge
10.	<p>Information: Updates</p> <p>Brief updates will be given on SEPs, Prop 1 funding, Estuary News, and anything else.</p> <p><u>Desired outcomes:</u></p> <ul style="list-style-type: none"> • Informed committee 	<p>Comments from CDFW on rejected Prop 1 proposal and ASC responses</p> <p>Estuary News article on the Delta RMP (see p.11 of December issue)</p> <p>Delta RMP mention in “Delta and Fast Forward” (see p.14 in November 2016 Report)</p>	3:30 Patrick Morris

11.	<p>Information: Status of RMP Deliverables and Action Items</p> <p><u>Desired outcomes:</u></p> <ul style="list-style-type: none"> ● Informed committee regarding the status of Delta RMP deliverables. ● Confirmation of action items from this meeting 	Delta RMP Stoplight Reports	3:45 Philip Trowbridge
12.	Discussion: Plan Agenda Items for Next Meeting		3:55 Brock Bernstein
13.	Adjourn		4:00

Meeting Materials for Item 4



DATE: January 18, 2017
TO: Delta RMP Steering Committee
THROUGH: Delta RMP Finance Committee
FROM: Philip Trowbridge, Program Manager
RE: Summary of Delta RMP Financials – period ending 11/30/16

The purpose of this memorandum is to provide an update of budgets and expenses for all open RMP budget years (FY14/15, FY15/16 and FY16/17) and the balance of Program Reserve funds. All of the presented values are current through 11/30/16.

Delta RMP FY14/15 Budget

Revenue

All of the expected contributions for the FY14/15 Delta RMP budget have been received.

Expenses

The FY14/15 budget was originally \$251,000 but was adjusted down to \$210,000 by the Steering Committee. At the June 16, 2015 meeting, the Steering Committee voted to move funds that had been allocated for Current Use Pesticide Monitoring (\$41,000) in the FY14/15 budget to the FY15/16 budget.

Expenses to date are within budget. All of remaining funds in this budget are for the final invoice for the USGS High-Frequency Nutrient Sensor Synthesis Report. The report is complete. Any unused funds in this budget will be unencumbered in June 2017. There were no expenses posted in September, October, and November.

Figure 1 shows a comparison of expenses to budget by category. For more detailed information on budgets and expenses by line item, please refer to Table 1.

Delta RMP FY15/16 Budget

Revenue

All expected contributions for the Delta RMP FY15/16 Budget have been received (see Table 2). A total of \$1,097,382 in contributions for the FY15/16 Delta RMP budget were received or committed as in-kind resources (SWAMP contract).

An unpaid invoice issued to the Sacramento Valley Water Quality Coalition in the amount of \$35,000 was voided because this organization joined the Delta RMP after FY15/16. The potential revenue from this invoice was not included in the FY15/16 budget so voiding the invoice does not affect the budget or income projections.

Expenses

Approximately 67% of the budget has been spent (\$607,871 of the \$912,938 budget).

Expenses to date are within budget overall and mostly within budgets for the individual tasks. The tasks for Program Management, Governance, Quality Assurance, Communications, and Pathogens Year 1 Data Management are complete. \$5,731 in unused funds in the budgets for these tasks will be unencumbered in June 2017. The Nutrients Synthesis task is also complete. This task ended slightly over budget (\$1,610) but the overage will be offset by the surplus in other closed tasks. Most of the remaining funds are for subcontractors for Pesticide/Toxicity and Pathogens monitoring and a data report for the FY15/16 Pesticide/Toxicity monitoring. We anticipate being able to finish these deliverables on budget.

Figure 2 shows a comparison of expenses to budget by task. Table 3 contains detailed information on budgets, expenses, outputs, and deliverables completed by line item.

Delta RMP FY16/17 Budget

Revenue

In April, the Steering Committee approved the revenue for FY16/17 of \$1,056,053. This revenue target assumed \$211,320 in SWAMP funds for toxicity testing. The actual amount of SWAMP funds available is \$254,145 (an increase of \$42,825) due to left over SWAMP funds from FY15/16 (see Table 2). Therefore, the new revenue target for the year is \$1,098,878.

ASC has invoiced most participants based on the approved revenue. A total of \$1,022,927 (93%) has been received or committed as in-kind resources (SWAMP contract), \$17,951 has been invoiced but not paid, and approximately \$58,000 is still being negotiated (placeholder amount, exact amount TBD after negotiations are complete). See Figure 4 and Table 4 for a breakdown of contributions for FY16/17.

Expenses

On October 18, 2016, Steering Committee approved an increase to the budget of \$10,000 for ASC to coordinate and prepare responses to the External Review report. Therefore, the budget total increased from \$1,043,030 to \$1,053,030.

Approximately 22% of the budget has been spent (\$227,740 of the \$1,053,030 budget). Expenses for the individual tasks are tracking well relative to budget. For example, the budgets for Core Functions and Governance are 31% and 39% spent, respectively, despite having completed 42% of the year.

Figure 3 shows a comparison of expenses to budget by task. Table 5 contains detailed information on budgets, expenses, outputs, and deliverables completed by line item.

RESERVE FUNDS

Table 6 shows a running list of deposits and withdrawals into the Undesignated Funds Reserve. The current balance of undesignated funds is \$106,347.

No withdrawals or deposits to the Reserve are requested at this time.

Figures and Tables

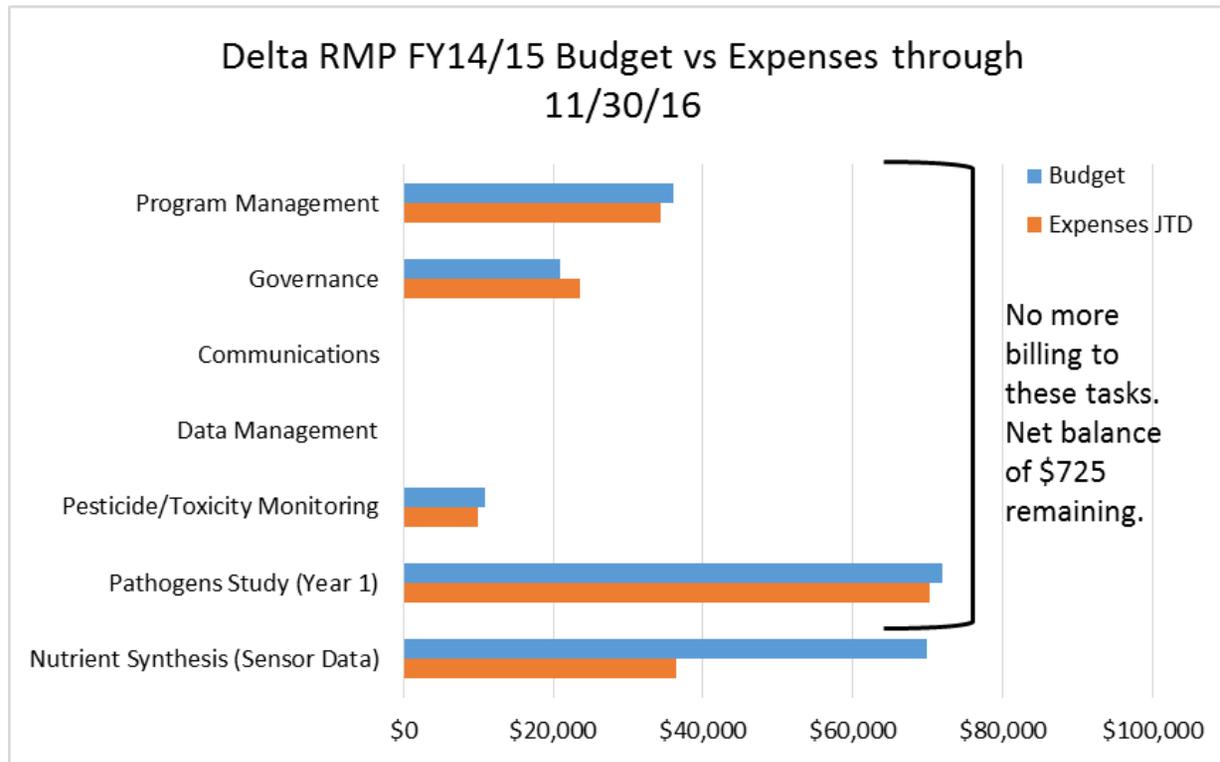


Figure 1: Delta RMP FY14/15 Budget. Budget and expenses from 1/1/15 through 11/30/16 by task.

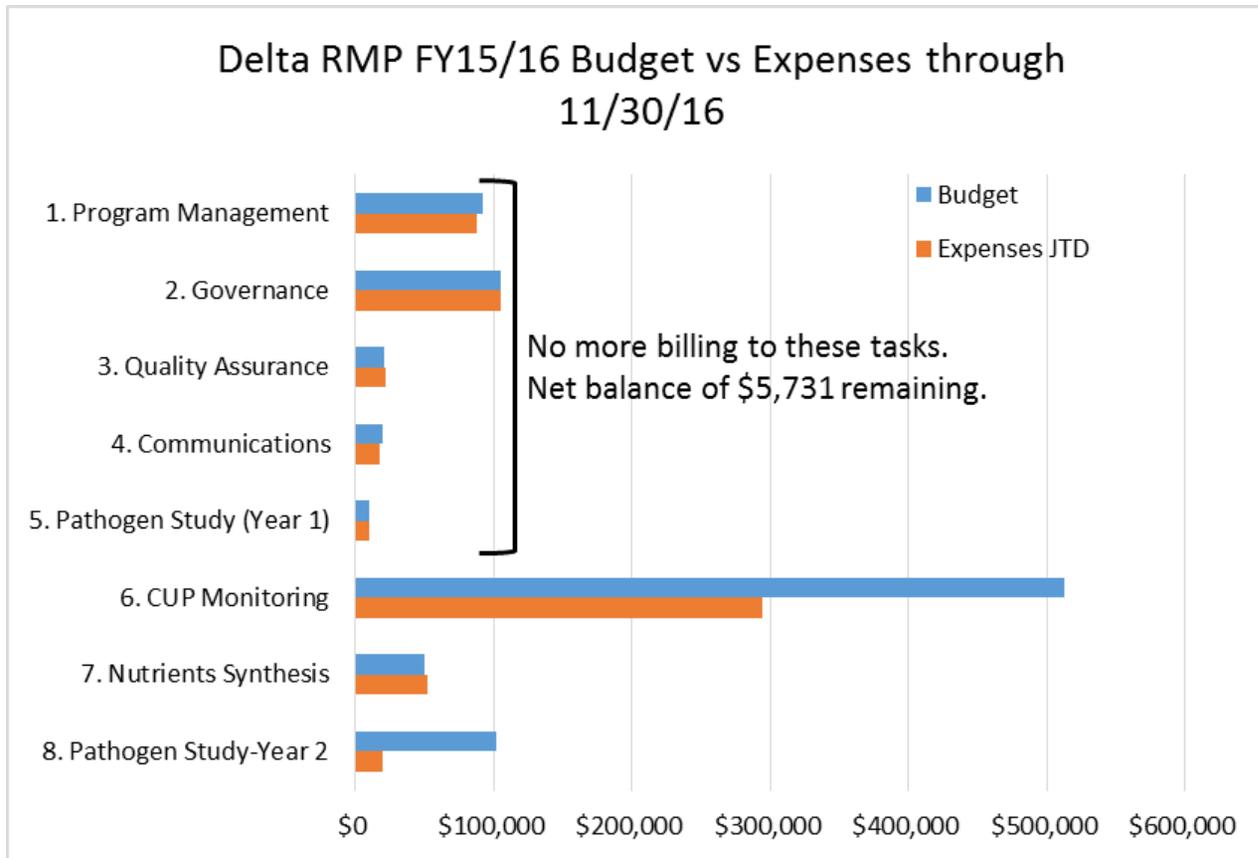


Figure 2: Delta RMP FY15/16 Budget. Budget and expenses from 7/1/15 through 11/30/16 by task.

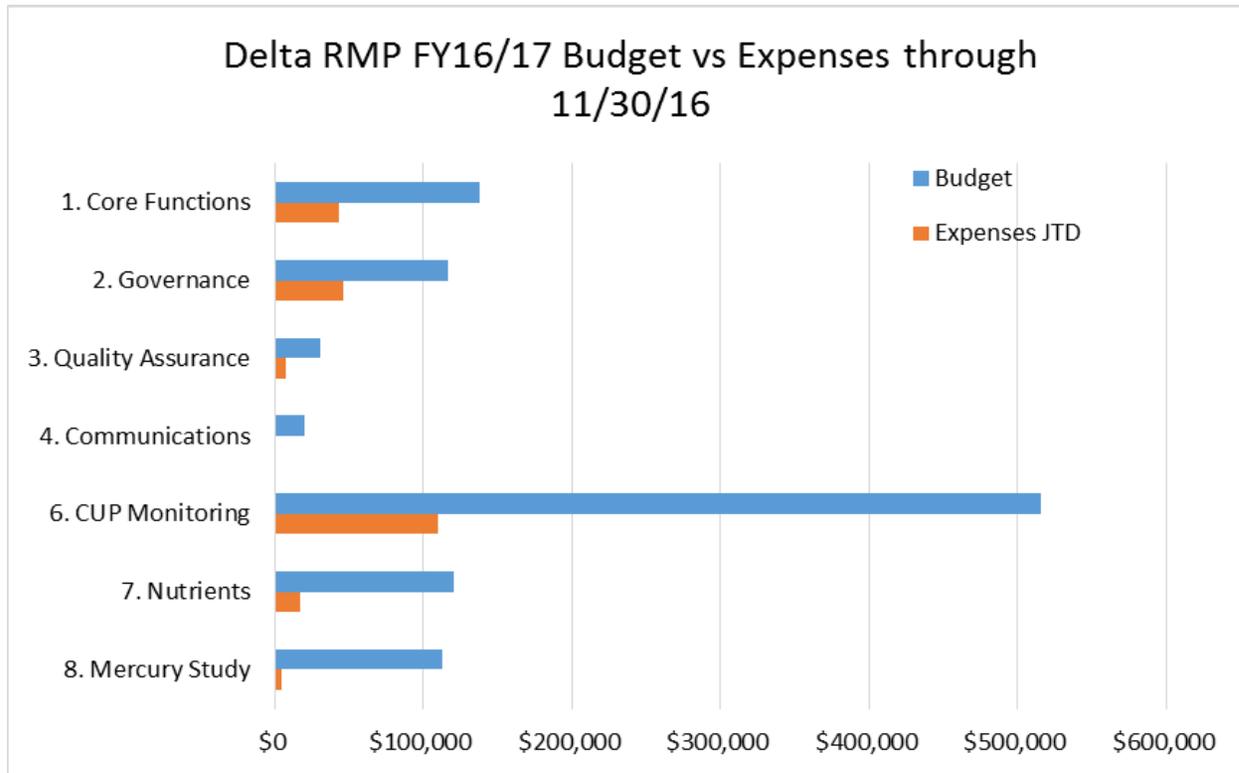


Figure 3: Delta RMP FY16/17 Budget. Budget and expenses from 5/1/16 through 11/30/16 by task.

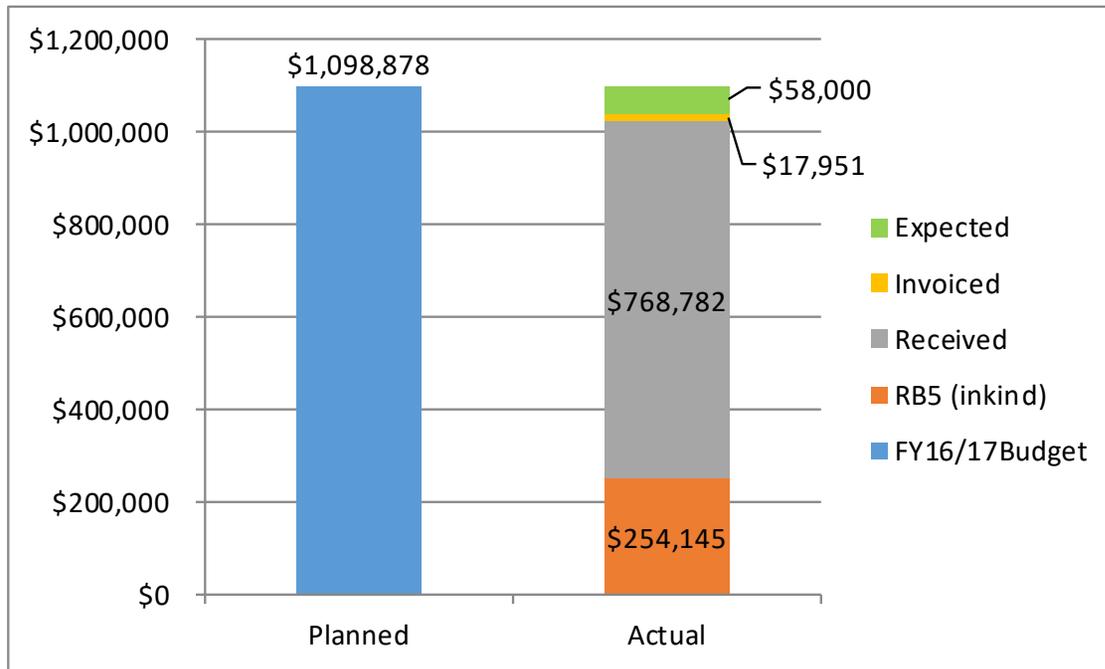


Figure 4: Delta RMP Revenue for FY16/17. Planned revenue versus revenue received to date.

Table 1: Delta RMP FY14/15 Budget. Budget and expenses from 1/1/15 through 11/30/16 by line item.

Task	Original Budget	Budget Adjustment	Final Budget	Expenses Through Last Report	New Expenses Since Last Report	Staff and Subcontractors Billing Since Last Report	Work Summary For This Report	Total Expenses To Date	Funds Remaining
Program Management	\$36,000		\$36,000	\$34,393	\$0	task closed		\$34,393	\$1,607
Governance	\$21,000		\$21,000	\$23,600	\$0	task closed		\$23,600	-\$2,600
Communications	\$0		\$0	\$0	\$0	task closed		\$0	\$0
Data Management	\$0		\$0	\$0	\$0	task closed		\$0	\$0
Pesticide/Toxicity Monitoring						task closed			
<i>Logistics and Coordination</i>	\$11,000		\$11,000	\$9,932	\$0	task closed		\$9,932	\$1,068
<i>Field Sampling and Pesticide Lab</i>	\$41,000	-\$41,000	\$0	\$0	\$0	task closed	Funds Moved to FY15/16 budget	\$0	\$0
<i>Toxicity/TIE Lab</i>	\$0		\$0	\$0	\$0	task closed		\$0	\$0
Pathogens Study (Year 1)	\$72,000		\$72,000	\$71,350	\$0	task closed		\$71,350	\$650
Nutrient Synthesis (Sensor Data)	\$70,000		\$70,000	\$36,401	\$0	USGS subcontract		\$36,401	\$33,599
Total	\$251,000	-\$41,000	\$210,000	\$175,675	\$0			\$175,675	\$34,325

Table 2: Delta RMP FY15/16 Revenue (invoiced, received or reserve funds) through 11/30/16 by participant group.

	In-Kind	Invoiced	Received	Total
ILRP		\$0	\$113,780	\$113,780
MS4 Phase 1		\$0	\$158,200	\$158,200
MS4 Phase 2		\$0	\$169,999	\$169,999
POTW		\$0	\$209,754	\$209,754
SFCWA		\$0	\$100,000	\$100,000
RB5	\$267,000			\$267,000
Carryover from FY14/15			\$41,000	\$41,000
Water Board Funds for Comms Plan			\$17,649	\$17,649
Reserve funds allocated for Pathogen trigger study (SC approved 4/25/16)			\$20,000	\$20,000
Total	\$267,000		\$830,382	\$1,097,382
Total Budgeted Expense	\$212,855		\$645,938	\$912,938
Projected Surplus/Deficit for In-Kind and Received Resources (Revenue minus Budget)*	\$54,145		\$184,444	
Transfer of SFCWA funds to reserve and then FY16/17 budget (SC approved 4/25/16)			(\$100,000)	
Surplus as of July 1, 2016	\$54,145		\$84,444	
Surplus transferred to reserve (SC approved 7/20/16)			(\$84,444)	
Surplus transferred to FY16/17 budget**	(\$54,145)			

*Surplus calculation does not include invoiced funds, only received.

**The SWAMP contract funds are part of a 3-year contract so surplus in FY15/16 automatically rolls over to FY16/17.

In-Kind Revenue = SWAMP contract funds or other in-kind services that can only be used for a defined purpose

Received Revenue = Funds received by ASC

Invoiced Revenue = Funds for which ASC has sent invoices to participants but has not yet received

Expected Revenue = Funds that are expected but are not formally committed through an invoice or contract.

Table 3: Delta RMP FY15/16 Budget. Budget and cumulative expenses through 11/30/16 by line item, with detailed report for expenses for the period since the last report (9/1/16 to 11/30/16).

Task	Subtask	Budget	Expenses Through Last Report	New Expenses Since Last Report	Staff and Subcontractors Billing Since Last Report	Work Summary for This Report	Total Expenses To Date	Funds Remaining
1. Program Management	A. Program Planning	\$45,000	\$44,832	\$0	Closed		\$44,832	\$168
	B. Contract and Financial Management	\$47,000	\$42,622	\$0	Closed		\$42,622	\$4,378
2. Governance	A. SC meetings	\$45,900	\$45,678	\$0	Closed		\$45,678	\$222
	B. TAC meetings	\$59,000	\$59,755	\$0	Closed		\$59,755	(\$755)
3. Quality Assurance	A. Quality Assurance System	\$10,000	\$11,507	\$0	Closed		\$11,507	(\$1,507)
	B. Technical Oversight and Coordination	\$11,000	\$10,056	\$0	Closed		\$10,056	\$944
4. Communications	A. Communications Plan	\$16,000	\$16,000	\$0	Closed		\$16,000	\$0
	B. Communications Product	\$4,000	\$1,649	\$0	Closed		\$1,649	\$2,351
5. Pathogen Study (Year 1)	A. Data Management	\$10,000	\$10,070	\$0	Closed		\$10,070	(\$70)
6. CUP Monitoring	B. Pesticide Laboratory Work	\$189,208	\$58,889	\$0	USGS Subcontract	Outputs: Provided preliminary data to ASC; reviewed field sampling report. Deliverables Completed: None. The report on FY15/16 Pesticides/Toxicity will be completed in February 2017. (No invoices from USGS were paid during this period.)	\$58,889	\$130,319
	C. Toxicity Laboratory Work	\$287,830	\$212,855	\$0	Closed	All monthly toxicity testing for the year is complete. All the costs for the year were covered by the SWAMP contract. The total cost for the year ending 6/30/16 was \$212,855. The cost covered monthly results for 3 toxicity tests (not including Hyallela) and one TIE. The balance shown is a combination of unused SWAMP funds that will be rolled over to FY16/17 (\$54,145) and unused RMP funds that can be unencumbered to the Reserve (\$20,830).	\$212,855	\$74,975
	D. Data Management	\$21,000	\$12,103	\$3,839	Adam Wong (7 hrs) Amy Franz (18.5 hrs) Don Yee (5 hrs) Jennifer Sun (-0.5 hrs) John Ross (5 hrs)	Outputs: Reviewed and formatted raw UCD toxicity and USGS pesticide data to get it ready for CEDEN uploads. Deliverables Completed: None. The data will be uploaded in February 2017.	\$15,942	\$5,058

Task	Subtask	Budget	Expenses Through Last Report	New Expenses Since Last Report	Staff and Subcontractors Billing Since Last Report	Work Summary for This Report	Total Expenses To Date	Funds Remaining
	E. Reporting	\$15,000	\$611	\$5,619	Ila Shimabuku (42.5 hrs) Philip Trowbridge (5.25 hrs) Thomas Jabusch (13 hrs)	Outputs: Compiled field data, weather data, and field notes into a field data report; incorporated edits from UCD and USGS; presented draft report to TAC on 9/21/16. Deliverables Completed: Field Data Report for FY15/16 CUP/Toxicity Monitoring. This report will be an appendix to the FY15/16 CUP/Toxicity Data Report.	\$6,230	\$8,770
7. Nutrients Synthesis	A. Synthesis Report - Monitoring Data Gaps	\$50,000	\$25,629	\$25,981	Dave Senn (12 hrs) Philip Trowbridge (19.5 hrs) Thomas Jabusch (126 hrs) RMA (subcontractor)	Outputs: Completed draft of nutrients monitoring gaps report; coordinated with speakers; held workshop; revised report with comments received at workshop. Deliverables Completed: Nutrient Monitoring Workshop on 9/30/16; Synthesis Report on "No Regrets" Nutrient Monitoring Actions.	\$51,610	(\$1,610)
8. Pathogen Study-Year 2	A. Monthly Pathogen Sampling	\$72,000	\$10,360	\$6,957	BioVir and Eurofins lab subcontracts	Outputs: Laboratory analyses of pathogens. Deliverables Completed: None. The pathogens data will be uploaded in June 2017	\$17,317	\$54,683
	B. Data Management	\$10,000	\$1,165	\$1,693	Amy Franz (16.5 hrs)	Outputs: Provided EDD templates to laboratories; checked lab invoices for accuracy; organized data as it was submitted. Deliverables Completed: None. The pathogens data will be uploaded in June 2017.	\$2,858	\$7,142
	C. Pathogen Followup Trigger Study	\$20,000	\$0	\$0		No activity.	\$0	\$20,000
	TOTAL	\$912,938	\$563,783	\$44,088			\$607,871	\$305,067

Item 4. Communications. Funded by \$20,000 from the Water Board contract with ASC. This contract was closed because it was unable to be extended; \$2,351 was returned to Water Board.

Item 6C. Estimated expenditures on the SWAMP contract for toxicity analyses were based on unit costs, the number of samples collected to date, and discussions with RB5/UCD staff.

Table 4: Delta RMP FY16/17 Revenue (expected, invoiced, received or reserve funds) through 11/30/16 by participant group

Participant	In-Kind	Expected	Invoiced	Received	Total
ILRP				\$148,780	\$148,780
MS4 Phase 1		\$38,000		\$158,200	\$196,200
MS4 Phase 2		\$20,000		\$169,999	\$189,999
POTW			\$17,951	\$191,803	\$209,754
SFCWA					\$0
RB5 (in-kind)	\$254,145				\$254,145
Reserve				\$100,000	\$100,000
Total	\$254,145	\$58,000	\$17,951	\$768,782	\$1,098,878

In-Kind Revenue = SWAMP contract funds or other in-kind services that can only be used for a defined purpose

Received Revenue = Funds received by ASC

Invoiced Revenue = Funds for which ASC has sent invoices to participants but has not yet received

Expected Revenue = Funds that are expected but are not formally committed through an invoice or contract.

The \$100,000 contribution from Reserve was the SFCWA contribution in March 2016, which was originally credited to the FY15/16 budget, transferred to Reserve, and then re-allocated to the FY16/17 budget.

Unpaid Invoices as of January 17, 2017

Sacramento Combined POTW	\$13,300
Discovery Bay POTW	\$4,651

Table 5: Delta RMP FY16/17 Budget. Budget and cumulative expenses through 11/30/16 by line item, with detailed report for expenses for the period since the last report (9/1/16 to 11/30/16).

Task	Subtask	Budget	Expenses Through Last Report	New Expenses Since Last Report	Staff and Subcontractors Billing Since Last Report	Work Summary For This Report	Total Expenses To Date	Funds Remaining
1. Core Functions	A. Program Planning	\$76,000	\$15,609	\$6,275	Jennifer Sun (6.5 hrs) Philip Trowbridge (30.5 hrs) Thomas Jabusch (4.5 hrs) Meg Sedlak (0.5 hrs) Cristina Grosso (1 hrs)	Outputs: Coordination calls with RB5 staff, chairs, DPR and others; POTW and MS4 CEC studies planning meetings; coordinated Estuary News story on Delta RMP; compiled pesticide unit costs for pesticide prioritization decision; prepared initial responses to External Review report (before the SC allocated funding to Task 1C); organized a call with Val Connor and Linda Dorn on RMP data access; prepared multi-year planning budgets and tables; discussed management drivers with RB5; internal staff coordination meetings; action item follow-up. Deliverables Completed: Multi-Year Plan and Drivers Table for 10/18/16 SC meeting. Delta RMP Data Access meeting on 12/7/16. Maintained stoplight reports. Estuary News article.	\$21,884	\$54,116
	B. Contract and Financial Management	\$52,000	\$5,668	\$11,529	Ila Shimabuku (4.75 hrs) Philip Trowbridge (25 hrs) Frank Leung (18 hrs) Meredith Lofthouse (57 hrs)	Outputs: Internal accounting; subcontract management; contracts with participants for fee payments; checked and approved internal and external invoices; tracked expenses by task; Finance Subcommittee call on 9/29/16; responded to questions on financial report; scoped projects for SEP settlements; discussed SWAMP contracts with RB5 staff; participated in calls with USACE and Port of Stockton re: dredger fees; responded to questions about unpaid fee invoices. Deliverables Completed: Quarterly Financial Report and Finance Subcommittee call	\$17,197	\$34,803
	C. External Review Response	\$10,000	\$0	\$4,182	Philip Trowbridge (8.75 hrs) Thomas Jabusch (22 hrs)	Outputs: Organized subcommittee meetings (Nutrients, Pesticides) and wrote/coordinated responses to External Review report. Deliverables Completed: None. The response letter will be completed in January.	\$4,182	\$10,000
2. Governance	A. SC meetings	\$51,300	\$16,785	\$10,521	Philip Trowbridge (21 hrs) Thomas Jabusch (33.5 hrs) Brock Bernstein (subcontractor)	Outputs: Prepared agenda package for SC meeting; pre-meeting calls with members; held meeting on 10/18/16; facilitated meeting (Brock Bernstein); prepared meeting summary; updated Record of Decision; scheduled future meetings; led Coordination Committee calls before and after the SC meeting. Deliverables Completed: SC meeting on 10/18/16 and meeting summary. Coordinating Committee meetings on 9/29/16 and 10/26/16. (Note: The expenses through last report were revised upwards by \$92 to \$16,785 to account for a SC meeting travel expense in August that did not show up on the August invoice but is in the Deltek accounting system.)	\$27,306	\$23,994

Task	Subtask	Budget	Expenses Through Last Report	New Expenses Since Last Report	Staff and Subcontractors Billing Since Last Report	Work Summary For This Report	Total Expenses To Date	Funds Remaining
	B. TAC meetings	\$64,800	\$5,200	\$13,138	Philip Trowbridge (18.75 hrs) Thomas Jabusch (46 hrs) Stephen McCord (subcontractor)	Outputs: Prepared agenda package for TAC meeting; pre-meeting calls; held meeting on 9/21/16; chaired meeting (Stephen McCord); prepared meeting summary; scheduled future meetings; held a conference call with Nutrients Subcommittee; held a conference call with Pesticides Subcommittee. Deliverables Completed: TAC meeting on 9/21/16 and meeting summary. Nutrient Subcommittee meeting on 11/18/16. Pesticide Subcommittee meeting on 10/27/16.	\$18,338	\$46,462
3. Quality Assurance	A. Quality Assurance System	\$15,000	\$4,299	\$2,932	Amy Franz (2 hrs) Thomas Jabusch (4 hrs) Micha Salomon (23.5 hrs)	Outputs: Made final edits to the QAPP in response to comments; added maps. Deliverables Completed: Updated QAPP.	\$7,231	\$7,769
	B. Technical Oversight and Coordination	\$15,000	\$376	\$0			\$376	\$14,624
4. Communications	A. Factsheet	\$5,000	\$0	\$0			\$0	\$5,000
	B. Workshops on Technical Issues	\$15,000	\$0	\$0			\$0	\$15,000
6. CUP Monitoring	B. Pesticide Laboratory Work	\$190,830	\$0	\$0	USGS subcontractor	Outputs: Collected samples for pesticide and toxicity analyses; performed pesticides analyses. Deliverables Completed: None. The report on FY16/17 Pesticides/Toxicity will be completed in February 2018. (No invoices from USGS were paid during this period.)	\$0	\$190,830
	C. Toxicity Laboratory Work	\$267,700	\$41,400	\$60,295	UCD AHPL	Outputs: Analyzed wate samples for toxicity. Deliverables Completed: None. (Note: There are \$254,145 of SWAMP funds available for use by 6/30/17.)	\$101,695	\$166,005
	D. Data Management	\$37,400	\$4,040	\$2,868	Adam Wong (6 hrs) Amy Franz (21.5 hrs) Thomas Jabusch (1 hrs)	Outputs: Prepared lists of expected analytes and templates; processed first quarter data from USGS; held coordination call with SWAMP, RB5, and Central Valley RDC. Deliverables Completed: None. The data will be uploaded in February 2018.	\$6,908	\$30,492
	E. Reporting	\$20,000	\$125	\$1,127	Thomas Jabusch (9 hrs)	Outputs: Reviewed/responded to comments from PER on UCD toxicity report format; developed report outline. Deliverables Completed: None. The report will be completed in February 2018.	\$1,252	\$18,748
7. Nutrients	A. Synthesis of Existing Data	\$33,000	\$0	\$1,002	Thomas Jabusch (8 hrs)	Outputs: Prepared a detailed scope of work for data synthesis for the Nutrient Subcommittee to approve. Deliverables Completed: None, although the scope was approved which is a major step. The report will be completed in July 2017.	\$1,002	\$31,998

Task	Subtask	Budget	Expenses Through Last Report	New Expenses Since Last Report	Staff and Subcontractors Billing Since Last Report	Work Summary For This Report	Total Expenses To Date	Funds Remaining
	B. Modeling	\$50,000	\$1,614	\$13,343	Philip Trowbridge (6 hrs) Thomas Jabusch (10 hrs) Marianne Guerrin (RMA subcontractor)	Outputs: Prepared a detailed scope of work for modeling for the Nutrient Subcommittee to approve; RMA conducted initial model runs (see description in RMA invoice). Deliverables Completed: None, although the scope was approved which is a major step. The report will be completed in July 2017.	\$14,958	\$35,042
	C. Statistics	\$37,000	\$125	\$1,002	Thomas Jabusch (8 hrs)	Outputs: Prepared a detailed scope of work for statistical analyses for the Nutrient Subcommittee to approve; provided data and feedback to EPA statistician; held planning calls with EPA statistician. Deliverables Completed: None, although the scope was approved which is a major step. The report will be completed in July 2017.	\$1,127	\$35,873
8. Mercury Study	A Data collection	\$90,000	\$0	\$0			\$0	\$90,000
	B. RMP Data Management	\$14,500	\$0	\$1,256	Adam Wong (2 hrs) Amy Franz (10.5 hrs)	Outputs: Developed expected analyte lists; processed data submittals. Deliverables Completed: None. Data will be uploaded in 2018 after the field work is complete.	\$1,256	\$13,244
	C. ASC Oversight	\$3,500	\$1,252	\$1,776	Jay Davis (9 hrs)	Outputs: Coordinated with MLML teams on sampling methods; gathered information from Hg Subcommittee for External Review responses (before the SC allocated funds for the response to Task 1C). Deliverables Completed: None. The report on Hg sampling will be completed in 2018.	\$3,028	\$472
	D. Reporting	\$5,000	\$0	\$0			\$0	\$5,000
	TOTAL	\$1,053,030	\$96,493	\$131,247			\$227,740	\$829,472

Item 6C. Estimated expenditures on the SWAMP contract for toxicity analyses were based on unit costs, the number of samples collected to date, and discussions with RB5 staff.

Table 6: Delta RMP Undesignated Funds Reserve Ledger through 8/31/16.

Budget Year	Deposit or Withdrawal	Reserve Type	Authorized By	Date	Amount	Comment
FY14/15	Deposit	Undesignated Funds	Steering Committee	6/16/2015	\$41,000	Release funds allocated for CUP monitoring in FY14/15 budget in order to re-allocate these funds into the FY1516 budget for CUP monitoring.
FY14/15	Deposit	Undesignated Funds		10/15/2016	\$51,903	Extra revenue received in FY14/15. Actual revenue minus budgeted expenses for FY1415 (number is updated whenever budget is changed, date reflects most recent update).
FY15/16	Withdrawal	Undesignated Funds	Steering Committee	6/16/2015	(\$41,000)	Release funds allocated for CUP monitoring in FY14/15 budget in order to re-allocate these funds into the FY1516 budget for CUP monitoring.
FY15/16	Withdrawal	Undesignated Funds	Steering Committee	4/25/2016	(\$20,000)	Allocate funding to FY15/16 for possible pathogen trigger study (TBD).
FY15/16	Deposit	Undesignated Funds	Steering Committee	4/25/2016	\$100,000	SC directed that SFCWA funding of \$100K (contribution for FY15/16) be transferred to reserve.
FY 16/17	Withdrawal	Undesignated Funds	Steering Committee	4/25/2016	(\$100,000)	SC directed that \$100K be withdrawn from the reserve to be reallocated as revenue for FY16/17. SFCWA contribution in March 2017 (\$100K) will be allocated to FY17/18 revenue.
FY15/16	Deposit	Undesignated Funds	Steering Committee	7/20/2016	\$84,444	SC approved that \$84,444 be transferred from FY15/16 revenue to the reserve as undesignated funds.
FY16/17	Withdrawal	Undesignated Funds	Steering Committee	10/18/16	(\$10,000)	SC approved up to \$10,000 for coordinating and drafting a response to the External Panel Review.
TOTAL		Undesignated Funds			\$106,347	

Meeting Materials for Item 6



DATE: January 19, 2017
TO: Delta RMP Steering Committee
FROM: Philip Trowbridge, Program Manager
RE: Delta RMP Fees for FY17/18 and FY18/19

Purpose

In July, the Steering Committee provisionally decided to leave the fees for FY17/18 the same as they were for FY16/17. This decision needs to be confirmed before ASC starts work on the budget for next year. Also, the SC needs to discuss whether to raise the fees for FY18/19.

Explanation

By the end of FY17/18, the Program will have been running for 3 full years. The total fees paid by permittees (Irrigated Agriculture, Stormwater, and POTWs) are approximately \$700k. The effect of inflation on this amount is a loss of \$14k each year in purchasing power (assuming 2% per year increases in the Consumer Price Index, CPI).¹ Inflation effects on the full \$1M budget, which includes the SWAMP contract and SFCWA contribution, amounts to a loss of \$20k per year in purchasing power.

For the first few years, the Delta RMP has been able to grow despite flat fees and inflation because new participants have joined. However, fewer new participants will join over time. At some point, the Program will need to increase fees to maintain the purchasing power of its core funding.

¹ The Consumer Price Index, or CPI, is a measure compiled by the US Department of Labor's Bureau of Labor Statistics, and the most widely-used indicator for inflation. According to an agency factsheet, "Escalation agreements often use the CPI—the most widely used measure of price change—to adjust payments for changes in prices. The most frequently used escalation applications are in private sector collective bargaining agreements, rental contracts, insurance policies with automatic inflation protection, and alimony and child support payments."

Source: "How to Use the Consumer Price Index for Escalation." September 25, 2013.
<https://www.bls.gov/cpi/cpi1998d.htm>

While it is difficult, if not impossible, to predict the inflation rate for the next few years, since 2009, growth in CPI has averaged 1.75% per year.

2009	2010	2011	2012	2013	2014	2015	2016
2.7%	1.5%	3.0%	1.7%	1.5%	0.8%	0.7%	2.1%

Source: Current CPI Detailed Report, December 2016, <https://www.bls.gov/cpi/cpid1612.pdf>

The purpose of this memo is not to request higher fees for FY18/19. Rather, the purpose is to ask the Steering Committee to have an early discussion about raising fees and how to approach this decision.

- Under what conditions will increased fees be warranted?
- How much advance notice will be needed?
- What type of outreach will be needed? To whom? By who?
- What budget justification will be needed?

Requested Action

- Confirmation that FY17/18 fees will equal FY16/17 fees for individual participants. Overall revenues may increase if new participants join.
- Early discussion about whether to raise fees for FY18/19 and the process for doing so.

Meeting Materials for Item 8



January XX, 2017

Dr. Cliff Dahm, Lead Scientist
Delta Science Program
980 9th Street
Sacramento, CA 95814

Cc: Dr. Peter Raimondi, University of California, Santa Cruz
Dr. Barry Noon, University of Colorado
Dr. Michael MacWilliams, Anchor QEA
Dr. Allan Stewart-Oaten, University of California, Santa Barbara (emeritus)
Ms. Laura Valoppi, United States Geological Survey (formerly, now SFCWA)

Re: Independent Panel Review of the Delta Regional Monitoring Program

Dear Dr. Dahm et al.:

As co-chairs of the Delta Regional Monitoring Program (Delta RMP), we would like to thank the Delta Science Program for performing an Independent Panel Review of the Program's Monitoring Design. The reviewers provided constructive comments that will improve the utility and relevance of the data collected by the Delta RMP. The main points of the initial review provided by the Panel were:

- The monitoring design should be more closely linked to management decisions.
- The monitoring design should allow for sample data to draw inferences about unmonitored areas of the Delta.
- Statistical analyses should be used to determine if monitoring objectives can be met by the monitoring designs.
- Program documents that were provided lacked enough information for the Panel to determine if the monitoring designs were adequate to answer management questions.

In response to this initial review, the Delta RMP committees have already taken action. In October 2016, the Steering Committee and Technical Advisory Committee held a joint meeting and identified three management decisions with which to develop tighter linkages. The Pesticide Subcommittee has started on a redesign of the pesticides/toxicity monitoring for FY17/18. The Nutrients Subcommittee is refining the assessment questions to better inform management needs. Simultaneous with the initial review, the Program completed a report that used power analysis to evaluate whether monthly monitoring for nutrients

could detect trends of management interest. These actions show that the Program understands, values, and is implementing the guidance provided by the Panel.

In addition, all of the Program committees have participated in developing detailed responses to questions and comments from the initial review (see attached appendices). We are providing these responses so that the reviewers have a better understanding of the Program and can tailor their recommendations accordingly. In light of the new information provided, we would like to know if there are remaining concerns and how the reviewers recommend we proceed to implement their recommendations.

The Delta RMP is committed to making the high-level improvements recommended by the reviewers. Some of the improvements will be implemented quickly, while others may take several years to complete. Table 1 on the following page summarizes the main actions we are taking improve the monitoring design, following the suggestions from the Independent Panel Review.

We are grateful for the advice provided by the Independent Panel and to the Delta Science Program for funding and facilitating the Panel.

Sincerely,

Adam Laputz
Central Valley RWQCB

Linda Dorn
Sacramento Regional County Sanitation District

Attachments

- Responses from the Technical Advisory Committee
- Responses from the Mercury Subcommittee
- Responses from the Nutrients Subcommittee
- Responses from the Pesticides Subcommittee
- Responses from the Pathogens Subcommittee

Table 1: Summary of Delta RMP Actions to Improve the Monitoring Design

<p>Immediate actions that are already underway</p>	<p>Pesticides: A comprehensive monitoring plan redesign is underway. A new design will be implemented as early as FY17/18.</p>
<p>Actions that will be taken during the next 1-2 years</p>	<p>Nutrients: The Delta RMP is not collecting any data for nutrients now. Before data collection starts, we will undergo a systematic planning process, the results of which will be documented in an updated Monitoring Design document.</p>
<p>Items that we are resolving by providing additional information to the Panel</p>	<p>Mercury: We have provided more information to clarify aspects that were missing or unclear in the Monitoring Design Summary. This additional information will be incorporated into the Monitoring Design document when it is updated in 2020.</p>
	<p>Pathogens: We have provided more information to clarify aspects that were missing or unclear in the Monitoring Design Summary. No additional planning is needed because monitoring will cease after this year. The 2-year study was specifically designed to fulfill the requirements set forth by state regulators in the Central Valley Basin Plan Amendment.</p>

Response to Review Panel Comments from the Technical Advisory Committee

The Panel made many excellent points about the Delta RMP monitoring design. Responses to Review Panel comments and questions about the monitoring design and the Program in general are provided below. Some comments can be addressed by providing additional background information that was not previously communicated or available to the panel. Other comments are appreciated as valuable feedback and will be considered by the program as the long-term monitoring design is further developed.

In the following sections, quoted comments from the review are shown in italics followed by a response. The page number from the report from which the quote was taken is listed after the quote. Similar comments are grouped together with one response.

Background

One of the important goals of the Delta RMP is to engage in “joint fact-finding” between regulators and dischargers. In the first few years of the Program, the initial focus has been on assessing the status and trends for each water quality constituent of concern. Over the next few years, the focus is expected to shift toward answering other types of important management questions, such as 1) sources, pathways, loadings, and processes, 2) forecasting scenarios, and 3) tracking the effectiveness of management options.

Responses to Fundamental Questions and Comments on the Monitoring Design

The reviewers’ major critiques of the Monitoring Design Summary (MDS) were (1) the lack of quantitative design and analysis details and (2) poor linkage between monitoring and management decisions. There are multiple references to these criticisms so the main points have been paraphrased here for simplicity.

Lack of Quantitative Design and Analysis Details. *The reviewers commented that the MDS lacked details on:*

- *Statistical models to be used for analysis;*
- *Analytical protocols to be used to estimate contaminant concentrations over larger areas or periods, or of processes that management action might affect; and*
- *The measure of “reliability”, not only for estimates at a given place and time but for expanded inference in time and space.*

Poor Linkage to Management Decisions. *The reviewers recommended that the monitoring designs should:*

- *Explain how each important estimate can lead to management actions, either on its own or as part of a more general assessment of the Delta or a subregion of it;*
- *Describe the protocols that might be used to decide the action; and*
- *Explain why the specified reliability is adequate for these protocols.*

These comments raise fundamental questions about the Delta RMP monitoring designs. As a result of these comments and the External Review in general, the Steering Committee directed the TAC and Pesticide Subcommittee to redesign the pesticide monitoring program immediately. In October, the committees identified three key management decisions which could be informed by Delta RMP monitoring (the Pyrethroid TMDL, Nutrient Research Plan, Methylmercury TMDL). Planning is underway to tighten linkages to these decisions and better define design and analysis details for all aspects of the Program. The reviewers' comments also provided helpful guidance on the type of information that should be included in an updated Monitoring Design document, such as statistical analyses to demonstrate that the monitoring objectives will be achieved by implementing the sampling design.

While the Delta RMP will strive to produce data that inform management decisions, the actual regulatory and management decisions happen by necessity outside of the Delta RMP. Regulatory decisions are made by the Water Board and other agencies. This separation prevents the Delta RMP from specifying exactly what decision will be made based on its data. However, through the stakeholder process of the Delta RMP, which includes the Water Board and other agencies, the Program will define the regulatory decision and identify how data collected by the Program will fill a data or information gap. More details on the linkages to management decisions for the current designs are provided in the other appendices to this letter with responses from the technical committees.

The main process we will use to forge better linkages between monitoring and management questions and to outline data analysis methods is the type of systematic planning known as the Data Quality Objectives (DQO) Process ([USEPA 2006](#)). The DQO Process is used to establish performance and acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of the study. This process will be a key component of the program re-evaluation and re-design. Implementing a DQO planning process will address most of the key criticisms by the panel and provide the program with a sound scientific basis for planning and design, data evaluation, and the required QA/QC criteria.

Each focus area of the Delta RMP is at a different stage in applying the DQO planning process. Redesigning the pesticides monitoring design is a high priority, and we have already begun a systematic planning process following the DQO guidance. For nutrients, over the next 1-2 years we will undergo a systematic planning process before any data collection starts. The Delta RMP does not currently have its own nutrient monitoring program. For mercury, the additional information compiled for this response will be incorporated into the Monitoring Design document when it is updated on the regular 5-

year schedule. For pathogens, no additional planning is needed because monitoring will cease after this year. The 2-year Delta RMP Pathogen Study was specifically designed to fulfill the requirements set forth by state regulators in the Central Valley Basin Plan Amendment.

Responses to Specific Questions and Comments on the Monitoring Design

The Panel cannot be certain that the Monitoring Design is inadequate. It is possible that appropriate summaries could be defined, and that models and methods could be developed by which they could be estimated reliably from this sampling design. Some of this work may have been done in the discussions that led to the design. However, none of this supporting information appears in the MDS. (p. 1)

Supporting information on the rationale for the initial monitoring designs have been provided in the other appendices from the different technical committees. Nonetheless, the Program is undergoing a review and redesign of the Monitoring Design to demonstrate its adequacy.

The MDS (p. 16) says "Interpretation and reporting methods will be described in a Communications Plan" but they are not. (p. 1)

One of the reviewers' main critiques was that the MDS did not have details on statistical models and analytical protocols to be used for analysis. The Program has always intended to compare sample results with state and federal water quality standards and aquatic life benchmarks. Factors such as the frequency, duration, and magnitude of concentrations above thresholds will be considered. We agree that the lack of details is a deficiency. The Program is committed to adding more of these details to an updated document through systematic planning (see response regarding the DQO process on pages 2-3).

We recommend that the monitoring team include one or more environmental statisticians, employed full-time, to refine the sampling design and develop the methods for data analysis. (p. 2)

We understand the importance of statistics in coming up with a robust design and we are committed doing this going forward (refer to DQO process). Statisticians will be consulted during the redesign of the monitoring program. We have access to statistical experts at ASC, USEPA, USGS, and other participating organizations. The level of effort involved will depend on the scope and types of monitoring activities that are being planned.

How well do the "lower", "midrange" and "higher" sampling levels achieve the monitoring goals? How were the prioritization decisions (shown by stars in Table 4) made? ... In some cases, the sampling may not be worth doing, because it is not tied to management goals or is too sparse to be useful. (p. 2)

In an earlier response, we acknowledge the reviewers' overall comment that the Monitoring Design should be updated with statistical analyses to demonstrate that the monitoring objectives will be achieved by implementing the sampling design. Table 4 on page 15 of the Monitoring Design is a summary of the range of costs for the monitoring designs for each focus area. The caption for Table 4 states that the recommended funding level for the first year of sampling for each focus area is marked with an asterisk. These asterisks were included when the committees were deciding about the first year of monitoring and had to prioritize which designs to implement taking into account management priorities, likelihood of success, and cost. In subsequent versions of the Monitoring Design document, the asterisks were not needed and were deleted, which has created a mismatch between the caption and the table. More details about the rationale for the initial monitoring designs are provided in the responses from each of the technical subcommittees.

What logic was invoked to justify the selection of the indicators to be measured? (p. 3)

The Delta RMP is a stakeholder effort with representatives from publicly owned treatment works, municipal storm water permittees, irrigated agriculture, coordinated monitoring groups, water supply, federal regulators, resource agencies, and staff from the Central Valley Water Board and State Water Board. Indicators were chosen to respond to the major water quality issues faced in the Delta, namely pathogens, mercury, pesticides/toxicity, and nutrients. These focus areas are important aspects of water quality for maintaining the beneficial uses in the Delta water such as municipal water supply, irrigation, fish and wildlife, and recreation. Analyzing the status and trends of the above constituents was seen as important to understanding current conditions within the Delta and developing rational and defensible bases for regulatory and management decisions.

Justifications for the initial monitoring designs have been provided in the appendices from the technical subcommittees (Mercury, Nutrients, Pesticides, and Pathogens).

Initial management questions in the documents were usually in words, not numbers: "is there a problem?", "what is the status?", or "is toxicity too high?" These need to be restated in measurable terms, usually as means or trends over time or space (including subregions or tributaries, etc.) or both. Even when a numerical quantity is given, as for some water quality objectives, it may refer to a single observation or to an average over a sample size, area or time period which has not been specified. (p. 4)

The high-level management questions for the Delta RMP are “text-based” following the convention of other large monitoring programs, such as the Regional Monitoring Program for Water Quality in San Francisco Bay (see page 7 of the 2016 Multi-Year Plan¹). The detailed “assessment questions” and subquestions are more amenable to numeric goals. During the DQO planning process (see response on pages 2-3), the committees will determine how to add numeric targets to any of the assessment questions. The Program has always intended to compare sample results with state and federal water quality standards and aquatic life benchmarks (see response on page 3). Establishing analytical protocols for interpreting the data will also help to remove ambiguity about the assessment questions.

Why sample monthly if bi-monthly or annual samples would be nearly as good, and allow more sites? (p. 5)

This is a question specific to the pesticides and pathogens monitoring designs. For pesticides, the subcommittee originally decided on monitoring fewer sites more frequently to develop a baseline for trend analysis, in parts for the need to better understand temporal variability relative to flow. For pathogens, the monthly frequency was chosen to match the monitoring frequency of the LT2 Program. Please see the responses from the technical committees for more information.

Earlier Programs

In what specific ways were former/current monitoring programs "not adequate"? (QAPP, p. 12). Was there a report that evaluated the programs and identified specific deficiencies and

¹ <http://www.sfei.org/documents/2016-rmp-multi-year-plan>

made recommendations for improvement? If so, it would be helpful to address how this plan makes up for prior monitoring program deficiencies. (p. 9)

The specific statement referenced is “that data from current monitoring programs ... were not adequate to support a rigorous analysis of the role of contaminants in the POD”. This was a conclusion from Johnson, M.L., Werner, I., Teh, S., Loge, F. 2010. Evaluation of chemical, toxicological, and histopathological data to determine their role in the Pelagic Organism Decline. University of California, Davis, California². This report revealed the following major deficiencies:

- Gaps in the historical data record. Only a few chemicals had a time series of historical data sufficient to assess their role in the POD. And for the few chemicals with longer time series, there was insufficient sampling during the presumed sensitive January to June period (except for diazinon and chlorpyrifos).
- Data quality issues associated with older data, including detection limits above toxic levels and inadequately preserved samples.
- The difficulty involved in finding, accessing and integrating data from multiple sources.

Recommendations from this report included:

- Develop a long-term water quality monitoring program that includes regionally coordinated water chemistry, toxicity, and histopathology samples and incorporates new and emerging contaminants in a multiple lines-of-evidence assessment approach;
- Develop a conceptual model of the Delta that combines critical physical forcing functions and biological elements of the ecosystem and apply this model to inform decision-making and the adaptive management process;
- Provide for ongoing data integration and interpretation aimed at both scientists and decision-makers;
- Improve data management and integration to provide for more consistent quality control and easier access; and
- Address key research needs such as identification of unknown toxicants, the toxicity of contaminants on invertebrate prey species, improved data mining of historical data, and the role of sediment toxicity, among others.

The Delta RMP was initiated to help address some of these deficiencies as a comprehensive water quality program that would help transform existing piecemeal monitoring into a more efficient, whole-scale system through coordination with other efforts and entities.

Associated objectives are to:

- Help standardize data formats and protocols;
- Improved data management systems; and
- Improved access to the wealth of collected data.

² http://www.water.ca.gov/iep/docs/contaminant_synthesis_report.pdf

The Delta RMP explicitly chose to start small and focus on a few high priorities for participants (mercury, nutrients, pathogens, pesticides). From the beginning, it was clear that the available resources would not be able to address all the important water quality concerns of the Delta, and that therefore the program would need to build partnerships and work with other programs to achieve the goals of a more efficient, better-coordinated, more useful monitoring system to address questions on a regional level.

Water Quality Objectives.

What are the time frame definitions for "acute" and "chronic" in the WQO or WQC (QAPP, p. 17)? Many of the samples in the Specific Monitoring Designs are monthly grab samples, so it is not clear that the sampling timeframes are consistent with the evaluation criteria. If they are not, then how is Delta RMP to be used for its primary objective, to assess whether Beneficial Uses are being impaired? (p. 9)

Definitions, methods, and processes to derive the criteria maximum concentrations (CMC, acute criteria) and criteria continuous concentrations (CCC, chronic criteria) for the protection of aquatic life are defined in USEPA scientific water quality criteria guidance documents and summarized in the USEPA Water Quality Standards Handbook (Chapter 3). Aquatic life criteria indicate a time period over which exposure is to be averaged, as well as an upper limit on the average concentration, thereby limiting the duration of exposure to elevated concentrations. For acute criteria, EPA recommends an averaging period of 1 hour. That is, to protect against acute effects, the 1-hour average exposure should not be higher than the CMC. For chronic criteria, EPA recommends an averaging period of 4 days. That is, the 4-day average exposure should not be higher than the CCC.

The thresholds will provide a screening tool for Delta RMP results to determine if there is a potential problem. Additional study over the time scale of the acute and chronic water quality criteria exposure periods (one hour and four days, respectively) would be required to determine actual compliance with WQOs/WQCs. Follow-up studies may occur under the umbrella of the Delta RMP, but not necessarily. The regulatory agencies and other stakeholders may decide to follow up outside of the Program. Beneficial use determinations are made by the Water Board but the data collected by the Delta RMP will be used to inform those decisions.

Lab measurements (QAPP p. 48.)

Is the plan to compare concentrations in water to water quality objectives/criteria or other benchmarks? Are these reporting limits and method detection limits sufficiently below the benchmarks that there is confidence in the quantification of the concentration? ... It is not

clear from the information provided in QAPP, whether the stated analytical methods are able to accurately detect concentrations at or near the WQO or WQC. (p. 9)

Yes: applicable WQOs/WQCs and other benchmarks are listed in Tables 3.3 – 3.5. (pp.17-24) of the QAPP. MDLs and RLs (Table 4.4.) are sufficiently below lowest reported benchmarks for most constituents for which benchmarks existed when the QAPP was written. The TAC will continue to review and update these benchmarks, new or revised QOQs/WQCs, and MDL/RLs as they change.

What are the detection limits/limits of quantification for the analyses (QAPP p. 93)? These limits can be lab specific. (p. 9)

Method Detection Limits are listed in Table 4.4. Although the MDLs are adapted from the labs in this case, the general process is that any contracted lab would need to demonstrate that they are able to meet the QAQC requirements specified in the QAPP.

Adaptive Design

QAPP (p. 78) says "Collected data are used to evaluate future data needs and adjust the sampling and analysis plan as needed to optimize data collection in an adaptive manner. The program will be continually adjusted to optimize data collection." There seems to be nothing on how this is to be done. (p. 9)

The quote from the QAPP on adaptive design refers to the incremental improvement of the Monitoring Design over time as indicators, methods, data, and priorities change. At a basic level, the Program is committed to updating the Monitoring Design at least every 5 years to make these adjustments. By following the DQO planning process (see pages 2-3), the updates will consider and incorporate the changes listed above.

The main value of plots is to convey much information clearly and succinctly, but thought and explanatory text are often needed; MDS, p. 28, contains much information but is uninterpretable (other than high scores for Diuron). Plots on p. 52 are better, but still need summarization of both the messages and their reliability. (p. 9)

The original intent with the plot on p.28 was to show an example of how to visualize temporal and spatial variability across different pesticides in a single graph. We acknowledge that it requires more explanation to be useful to the reader. We will update the Monitoring Design to provide more explanation, and we will likely replace this figure with something else following the DQO planning process. More refined graphs with actual Delta RMP data and more detailed explanations will be developed for the 2-year summary report. The plots on page 52 are shown as an example for how to visualize seasonal variability and long-term trends in nutrient variables. It is from a completed technical report (Novick et al. 2015) that provides the interpretation and additional detail about statistical approaches used.

To clarify the components of variance concept, we assume a design in which each site is visited in each of a set of years. Given this assumption, the key components of variation are (see expanded discussion by Scott Urquhart in chapter 7 in Gitzen et al. 2012):

- 1) Spatial: variation among sample units (sites); treated as a random effect in an ANOVA model*
- 2) Temporal: how much the state variable varies from year-to-year across all sample units; treated as a random effect*
- 3) Space by time interaction: how much the state variable changes across time within a sample unit independent of changes in other sample units*
- 4) Error variance*

Partitioning the total variance is expressed as:

$$\sigma^2_{Total} = \sigma^2_{site} + \sigma^2_{time} + \sigma^2_{site \times time} + \sigma^2_{error}$$

To estimate trend, we must first assume a model for how the response variable (e.g., indicator value at sample unit i) changes over time. For example, if we assume a simple linear time-trend model for the indicator, y , our model is:

$$y_{ij} = \mu + S_i + T_j + \epsilon_{ij}$$

where, y_{ij} = the value of the state variable at site i in year j

S_i = effect of site T_j = effect of year j ; $\{j = 1, 2, \dots, t\}$

ϵ_{ij} = error term. Then our estimation model for a linear trend, assuming a common trend across sample sites, is:

$$\hat{y}_{ij} = \beta_0 + \beta_1 j + \epsilon_{ij}$$

where, β_1 estimates trend

$\beta_0 + \beta_1(t+1)/2$ estimates 'status'

The null and alternative hypotheses of interest are, respectively: $H_0: E[\beta_1] = 0$; $H_a: E[\beta_1] \neq 0$. That is, to detect trend we test the null hypothesis that no trend is present in the indicator against the alternative hypothesis that a trend is present. (p. 13, Appendix 1)

We agree that statistical analyses to evaluate the effectiveness of monitoring design are important. We will develop specific plans for how to analyze water quality data as a part of the Data Quality Objective planning process (USEPA 2006). As noted above, we will begin using the DQO process to amend the monitoring design in stages, beginning with the pesticides, then moving on to nutrients, and lastly mercury. The Delta RMP has already used power analysis to evaluate some of its designs monitoring designs (e.g., nutrient trends). We have also learned from the outcomes of power analyses for other programs (SWAMP, SPoT, BOG). Going forward, the technical committees will be sure to document this important step. For example, a recent ASC report documented the ability of current DWR-EMP water quality monitoring to detect long-term trends in nutrients in different subregions. As reviewers suggest, the best source of information for power analyses is from preliminary survey data. It could be said that the Delta RMP is in the stage of collecting that type of preliminary data.

References

- EPA. 1994. Water Quality Standards Handbook Chapter 3: Water Quality Criteria. EPA 823-B-94-005a.
- EPA. 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA/240/B-06/001.
- Johnson, M.L., Werner, I., Teh, S., Loge, F. 2010, Evaluation of chemical, toxicological, and histopathological data to determine their role in the Pelagic Organism Decline. University of California, Davis, California. URL http://www.water.ca.gov/iep/docs/contaminant_synthesis_report.pdf
- Novick E, Holleman H, Jabusch T, Sun J, Trowbridge P, and Senn D, Guerin M, Kendall C, Young M, Peek S. 2015. Characterizing and quantifying nutrient sources, sinks and transformations in the Delta: synthesis, modeling, and recommendations for monitoring. San Francisco Estuary Institute, Richmond, CA. http://sfbaynutrients.sfei.org/sites/default/files/Main_manuscript.pdf
- SFEI. 2016. Regional Monitoring Program for Water Quality in San Francisco Bay, Multi-Year Plan, 2016 Annual Update. San Francisco Estuary Institute, Richmond, CA. Published online: <http://www.sfei.org/documents/2016-rmp-multi-year-plan>.

Response to Review Panel Comments on the Mercury Design from the Mercury Subcommittee

The Panel made many excellent points about the Delta RMP monitoring design. The comments and questions that relate to the mercury monitoring design can be addressed through a more complete summary of the design, its rationale, and the process through which it was developed. A brief overview of the design process and rationale is presented here to address many of the overarching concerns, such as linkage to management actions. Responses to specific Review Panel questions on mercury are then also provided.

Brief Overview of the Mercury Monitoring Design Process and Rationale

A Mercury Subcommittee was formed to develop the mercury monitoring design. The Subcommittee consisted of a Water Board staff member (Janis Cooke) with a lead role in implementation of the Methylmercury TMDL for the Delta, representatives of several other Delta RMP stakeholder groups, and several leading local mercury experts familiar with the Delta.

The starting point for the design was careful consideration, refinement, and prioritization of the assessment questions articulated by the Steering Committee and Technical Advisory Committee for mercury, resulting in the priorities identified in Table 1 of the Monitoring Design Summary. The top priority questions for this initial phase of monitoring are as follows:

What are the status and trends in ambient concentrations of methylmercury and total mercury in sport fish and water, particularly in subareas likely to be affected by major existing or new sources (e.g., large-scale restoration projects)?

- A. Do trends over time in methylmercury in sport fish vary among Delta subareas?
- B. Do trends over time in methylmercury in water vary among Delta subareas?

Maximizing Linkage to Management

The next step was to maximize relevance to management through identification and consideration of the regulatory and management actions that were either in effect or on the horizon (Table 1). The TMDL is the dominant regulatory driver of actions to control mercury in the Delta, establishing water quality goals and directing the various discharger groups to conduct monitoring and take actions to minimize mercury impairment of beneficial uses. Critical information needs related to various elements of the TMDL were identified, and the urgency (timing) of the needs was considered.

Development of a mercury model for the Delta is an important element of TMDL implementation. In response to TMDL requirements for a control study, the Department of Water Resources (DWR) is leading development of mathematical mercury models for the Delta and Yolo Bypass. The Dynamic Mercury Cycling Model, a well-established mercury model, is being used in the Yolo Bypass, while in the Delta, mercury and other mercury-related algorithms are being added to DWR's existing Delta Simulation Model. The USGS and partners are also working to integrate methylmercury into the CASCaDE model (<http://cascade.wr.usgs.gov/>) to allow testing of scenarios to better understand how changes to the Delta will affect mercury impairment. The goal of these modeling efforts is to predict the cumulative effect of multiple changes in the Delta and to predict the effectiveness of regulatory requirements within scenarios of climate change and large-scale wetland restoration.

Priority Data Needs

Mercury concentrations in sport fish were established in the TMDL as the crucial measure of impairment, and a tissue-based water quality objective of 0.24 ppm in top predator sport fish was established. Monitoring of sport fish mercury as an index of mercury impairment in the Delta and as a performance measure for the TMDL was identified by the Subcommittee as the top priority data need. Based on extensive past monitoring and many desirable attributes as an indicator species, largemouth bass was specifically identified as the key species for tracking impairment.

The Subcommittee identified aqueous methylmercury concentrations as a second priority of the mercury monitoring program. In contrast to many other aquatic ecosystems, aqueous methylmercury in the Delta has been shown to correlate well with mercury in the food web, including in largemouth bass. The Delta Methylmercury TMDL describes a statistically significant relationship between the annual average concentration of methylmercury in unfiltered water and average mercury in 350 mm largemouth bass when data are organized by subarea (Figure 1). The linkage of aqueous methylmercury concentration to fish mercury concentration provides a connection, essential for management, between methylmercury inputs from various in-Delta pathways (e.g., municipal wastewater, municipal stormwater, agricultural drainage, and wetlands) and impairment of beneficial uses. Because of this linkage, the TMDL established an implementation goal of 0.06 ng/L of unfiltered aqueous methylmercury. Monitoring of aqueous methylmercury is needed to:

- 1) better quantify the fish-water linkage that is the foundation of the TMDL,
- 2) support development of a mercury model for the Delta, and
- 3) support evaluation of the fish data by providing information on processes and trends.

The Subcommittee then reviewed existing data to evaluate the need for monitoring by the Delta RMP and to inform decisions on details of the monitoring designs for fish and water.

A lack of data on long-term interannual trends in sport fish mercury was identified as the most critical information gap. With a major control program being implemented, it is imperative to know whether the key indicator of interest is trending up, down, or not all across the Delta.

Significant sport fish monitoring efforts conducted in the Delta over the past 20 years include a one-year survey in 1998 (Davis et al. 2000), the CALFED Mercury Study in 1999 and 2000 (Davis et al. 2003, 2008), the Fish Mercury Project from 2005-2007 (SFEI 2007, Melwani et al. 2009), and monitoring by California's Surface Water Ambient Monitoring Program (SWAMP) in 2011 (Davis et al. 2013). The studies from 1999 and beyond benefitted from robust peer review by national experts in mercury science. The TMDL (CVRWQCB 2010) provided a synthesis of Delta fish data from 1998 to 2007. A Surface Water Ambient Monitoring Program report (Davis et al. 2013) on contaminants in fish from California rivers and streams presented results from sampling in the Delta in 2011 and provided a comparison to past data for the Delta sites. Distinct and persistent spatial patterns have been observed throughout the period of record, most notably higher concentrations on the northern and southern ends of the Delta and lower concentrations in the Central Delta. However, due to the intermittent nature of the sampling that has been performed, variation in the locations sampled, variation in fish availability, and variation in the types of sample collected, time series for evaluating interannual trends in sport fish mercury are weak and inconclusive (Figure 2). While these past efforts have firmly established robust methods for monitoring mercury in Delta sport fish, the methods have not yet been consistently applied in a sustained manner to allow for evaluation of interannual trends.

The Subcommittee identified two priority data needs for ambient water monitoring: 1) contemporaneous sampling with sport fish to better quantify the relationship of water and fish concentrations and 2) collection of input data for the mercury fate models for the Delta. The key existing water datasets are from 2000-2001 and 2003-2006: the studies of Foe et al. (2003, 2008). These studies monitored methylmercury and mercury at multiple sites in the Delta, collecting sub-surface grab samples once every 4-6 weeks. These studies provided a basis for the linkage analysis in the TMDL. However, additional water monitoring is needed to expand and update this relatively limited dataset that is of great importance for implementing the TMDL and developing predictive mercury models. There may be opportunities in the short term to increase the frequency of monitoring through Supplemental Environmental Project funds.

Sampling Design Options

Fixed station and probabilistic monitoring designs were considered for both fish and water monitoring (Table 2). Budget constraints and linkage to other data collection efforts (such as hydrology and monitoring of other basic water quality parameters) led the Subcommittee to favor the fixed station design for the lower funding level scenario.

Sport fish monitoring was the primary driver of the sampling design. For sport fish monitoring, human exposure is the ultimate concern, so locations with angler access are of particular interest (as opposed to an equal interest in the entire aquatic surface area of the Delta). The probabilistic sampling design considered for this scenario was to identify all of the popular fishing locations in the Delta, and to randomly select from this population on an annual basis. The statewide Surface Water Ambient Monitoring Program recently adopted a design of this type for monitoring largemouth bass mercury in a population of 190 reservoirs (Bioaccumulation Oversight Group 2015). The Subcommittee referred to this as a “random draw” approach. This design could generate representative estimates of the mean for the Delta as a whole and for the subareas identified in the TMDL. Disadvantages of this approach would include 1) an inability to link to other data collection efforts that occur at fixed stations, and 2) lower power for detection of interannual trend. The higher funding level design recommended by the Subcommittee included a component of this random draw sampling, with 10 sites sampled per year.

For the lower funding level, however, the Subcommittee recommended focusing on fixed station monitoring. While this approach is less representative of the region, it allows for coordinated data collection at key sites of interest (including sites important for the fate model) and it maximizes power for detection of interannual trend at the selected stations. The Mercury Subcommittee had a strong interest in monitoring at or near sites where other parameters useful for evaluating the mercury data were being collected. Ancillary parameters of interest are flow, temperature, suspended sediment, salinity, nutrients, and organic carbon. A lack of information on within-station interannual variation in concentration was identified as an important data gap that can be addressed with fixed station monitoring. An important advantage of the fixed station approach is that it retains value even at low funding levels such as the six station level that was ultimately approved by the Steering Committee (in contrast, the information yield of the random draw design diminishes more rapidly if only a few stations are sampled each year). The goal of the recommended fish sampling design at the lower funding level is to evaluate interannual trends in mean concentration at each site (11 fish are collected per year at each site to generate an annual mean). A primary aim of the initial fish sampling under the Delta RMP is to establish time series that will provide the estimates of intra- and inter-annual variance that are needed to inform a power analysis to support an optimized long-term design. This power analysis could be done after an initial period of data collection (e.g., 5 years). However, given the importance of fish

concentrations as a performance measure for evaluating the effectiveness of the TMDL, the recommended design calls for development of a 10-year dataset, and then re-evaluating the design.

Responses to Specific Questions and Comments on the Mercury Design

In this section, quoted comments from the review are shown in italics followed by a response. The page number from the report from which the quote was taken is listed after the quote. Similar comments are grouped together with one response.

What is the goal of the mercury program? (p. 5)

In a management context, the goal is to provide a critical performance measure for the TMDL by comparison of fish tissue concentrations to the water quality objective. The water data:

- 1) provide additional data for evaluation of status relative to the TMDL and water quality objectives;
- 2) support evaluation of the fish data in understanding processes and trends,
- 3) test the fish-water linkage advanced that is the foundation of the TMDL, and
- 4) support development of mercury fate models for the Delta.

However, using sportfish to monitor impacts on MeHg from large restoration projects does not make sense. Large sportfish have fairly large territories/home ranges, so it would be hard to attribute change to a specific restoration action or location. Also, the change would be hard to detect, since large sportfish have higher Hg body burdens that vary more between individual fish. As a result, a small change from a management or restoration action won't stand out. Small, resident fish with small home ranges would reflect such changes more quickly and clearly. Ideally a Before-After-Control-Intervention design could be used. (p. 5)

The sport fish species selected for monitoring (largemouth bass) has been shown through extensive monitoring (Davis et al. 2000, 2003, 2008, 2013; SFEI 2007; Melwani et al. 2009) to have relatively small home ranges and to be an excellent indicator of spatial patterns across large regions such as the Delta¹. The approach being employed to evaluate change (ANCOVA to generate annual mean length-adjusted concentrations) will likely have ample power, and has the added benefit of being the key indicator of impairment. Prey fish monitoring was also considered, but given a lower priority and could not be accommodated with currently available funds.

¹ The scale of this monitoring design is regional. It is not intended to assess conditions at individual restoration sites.

The sportfish are sampled annually. Do we know if mercury varies seasonally in sportfish, as it does in smaller fish? If so, then annual samples are unlikely be adequate unless people catch and consume the fish in only one season, or there is a way to adjust for other seasons (without sampling at those times). If mercury in sportfish varies spatially within a subregion, then sampling one location per subregion is unlikely be adequate. This could be a case where the goal is useful but the effort is far short of what is needed, and thus achieves nothing. How will the data be analyzed to compare trends among sites? (p. 5)

Annual sampling of sport fish is widely performed. There is seasonal variation, but sampling in late summer when fish feeding rates are highest, hydrology is relatively consistent, and human fishing activity is greatest is a cost-effective approach to monitoring impairment. Seasonal sampling would greatly increase the cost. Extensive data and analysis support the existence of subregions and the use of index sites to represent them. Funding is not available to sample multiple sites within subregions. Trends in annual length-adjusted means at each site will be evaluated by regression or nonparametric methods.

The mercury water samples are monthly. What connects them to the fish tissue samples? Are they at the same sites (including Mokelumne River)? Are they to be compared to the water quality (WQ) criterion of 0.06 ng/L of MeHg in unfiltered water (QAPP, p. 24, Table 3.4)? What will a monthly grab sample at 4 sites in the Delta tell you about MeHg status in the entire Delta? How were the number and locations to be sampled determined? What are the flows at these locations? Will all samples be taken under the same tide/flow conditions? (p. 5)

The water samples are collected quarterly, not monthly. The water and fish sites are co-located to support items 2 and 3 in paragraph 1 of the specific responses above. Aqueous concentrations will be compared to the TMDL implementation goal (0.06 ng/L). The water sampling is admittedly limited, but provides useful information for the limited funding available. The number was driven by the budget. The locations were determined based on co-location with fish sampling and co-location with USGS continuous monitoring stations to support model development. Flow information is available. Collecting all samples at the same point in the tidal cycle would be valuable, but prohibitively expensive. Efforts are directed at sampling on ebbing tides at sampling locations most susceptible to tidal influences such as the Sacramento River at Freeport site.

Why is there a low level of fish sampling and a medium level of water sampling? What is the value of the water sampling? How does current fish sampling data relate to previously collected sampling data? If the primary management question is trends over time, are there existing long term data sets that can be built on. The study plan mentions but does not elaborate on these points (MDS, p. 38). (p. 5)

The levels of sampling are basically equivalent (six sites for fish, five sites for water). The fish sites were selected based on extensive prior sampling. However, past sampling has not done much in establishing time series to build on (Davis et al. 2013). The sport fish design will firmly establish time series at index sites for the Delta. The value of water sampling was covered in the first paragraph of the response to “*What is the goal of the mercury program?*” above. Quarterly sampling for water (rather than annual as for sport fish) is needed to illuminate seasonal patterns and to better characterize overall variability in concentrations.

How were the bin lengths for the Largemouth Bass determined (QAPP p. 86)? The Central Valley Basin Plan has water quality objectives (WQO) for fish 150-500 mm TL, and for fish <50mm TL, so the proposal's sampling divisions (200-249, 250-304, 305-407 and > 407 mm) are not consistent with this Plan. Fish Hg will often vary by length of fish (surrogate for age). How will the data be compared to WQO? Will bins be analyzed separately? The sampled fish can be assumed random within bins, but not between them; is the plan to fit a regression of fish Hg against length? Note the Basin Plan is specific as to trophic level of fish for the WQO: any alternative predator species should be at the same trophic level. (p.6)

The bin lengths were chosen to support estimation of length-adjusted means at a size of 350 mm. This approach has been used widely across the state and over the past 15 years in the Delta. Collecting over this range of sizes provides a sound basis for ANCOVA (basically, regression of Hg versus length at each site). The length-adjusted means or a subset of the overall size range can be compared to the WQO.

References

- Bioaccumulation Oversight Group. 2015. Sampling and Analysis Plan for Long-term Monitoring of Bass Lakes and Reservoirs in California. Surface Water Ambient Monitoring Program. California State Water Resources Control Board, Sacramento, CA.
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/lakes_study/bass_lakes_sampling_plan.pdf
- CVRWQCB, 2010. Sacramento-San Joaquin Delta Estuary TMDL for Methylmercury. Staff Report for the Central Valley Regional Water Quality Control Board, April. Available:
http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/april_2010_hg_tmdl_hearing/apr2010_tmdl_staffrpt_final.pdf
- Davis, J.A., M.D. May, G. Ichikawa, and D. Crane. 2000. Contaminant Concentrations in Fish from the Sacramento-San Joaquin Delta and Lower San Joaquin River - 1998. San Francisco Estuary Institute report. Richmond, California. September. Available: <http://www.sfei.org/documents/contaminant-concentrations-fish-sacramento-san-joaquin-delta-and-lower-san-joaquin-river>
- Davis, J.A, B.K. Greenfield, G. Ichikawa and M. Stephenson. 2003. Mercury in Sport Fish from the Delta Region. Final report submitted to the CALFED Bay-Delta Program for the project: An Assessment of the Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed (Task 2A). San Francisco Estuary Institute and Moss Landing Marine Laboratories. Available at: <https://mercury.mlml.calstate.edu/reports/2003-reports/>
- Davis, J.A., B.K. Greenfield, G. Ichikawa, and M. Stephenson. 2008. Mercury in sport fish from the Sacramento-San Joaquin Delta region, California, USA. *Science of the Total Environment* 391: 66-75.
- Davis, J.A., J.R.M. Ross, S.N. Bezalel, J.A. Hunt, G. Ichikawa, A. Bonnema, W.A. Heim, D. Crane, S. Swenson, and C. Lamerdin. 2013. Contaminants in Fish from California Rivers and Streams, 2011. A Report of the Surface Water Ambient Monitoring Program (SWAMP). California State Water Resources Control Board, Sacramento, CA.
http://www.waterboards.ca.gov/water_issues/programs/swamp/rivers_study.shtml
- Foe, C.G. 2003. Mercury Mass Balance for the Freshwater Sacramento-San Joaquin Delta Estuary. Final report submitted to the CALFED Bay-Delta Program for the project: An Assessment of the Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed (Task 1A). Central Valley Regional Water Quality Control Board, September. Available:
<https://mercury.mlml.calstate.edu/wp-content/uploads/2008/12/finalrpt-task-1a-1b-foe-final-calfed-hg-report.pdf>
- Foe, C.G., S. Louie, and D. Bosworth. 2008. Methylmercury Concentrations and Loads in the Central Valley and Freshwater Delta. CALFED Final Report, Task 2. Available: https://mercury.mlml.calstate.edu/wp-content/uploads/2008/10/04_task2mmhg_final.pdf

- Hebert, C.E., Keenleyside, K.A., 1995. To normalize or not to normalize? Fat is the question. *Environmental Toxicology and Chemistry* 14 (5), 801–807.
- Melwani, A.R., S.N. Bezalel, J.A. Hunt, J.L. Grenier, G. Ichikawa, W. Heim, A. Bonnema, C. Foe, D.G. Slotton, J.A. Davis. 2009. Spatial trends and impairment assessment of mercury in sport fish in the Sacramento–San Joaquin Delta watershed. *Environ. Pollut.* 157: 3137-3149.
- SFEI. 2007. The Fish Mercury Project: Monitoring and Reducing Methylmercury Exposure in the Bay-Delta Watershed. SFEI Contribution 531. San Francisco Estuary Institute, Oakland, CA. <http://www.sfei.org/documents/cal-feds-fish-mercury-project>

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Table 1.

Mercury Monitoring Regulatory and Management Drivers

Driver	Monitoring Element	Urgency	Notes
TMDL – fish tissue targets monitoring	THg in TL3 and TL4 fish	For Water Board: Long-term (BPA calls for comprehensive monitoring in 2025)	Not assigned to other Delta entities. No season- or flow-based conditions associated with the allocations.
TMDL – open water control study	Aqueous MeHg; other information (e.g., flux from sediment) to support development of a MeHg transport, transformation, and bioaccumulation model	Near-term (by 2018)	Would support major (> \$1M) modeling effort by DWR. Model may also inform other control measures. TMDL Phase 1 review after 2018; open water allocation is based on sediment flux
TMDL – NPDES permittee discharge monitoring	Ambient aqueous MeHg as context for discharge monitoring	Near-term. All in-Delta POTWs and Phase I MS4s are currently monitoring their discharges; Phase II MS4 monitoring requirements need to be negotiated with RegBd by summer 2014	Upgraded POTWs and improved analytical methods are portraying lower loads than estimated in the TMDL. POTWs have proposed a network of stations.
TMDL – Wetland restoration projects	Ambient aqueous MeHg as context for discharge monitoring. Project-specific fish monitoring. Associated ambient fish monitoring?	Near-term? Need broad baseline for restoration project implementation	Flood control operations are considered an unquantified component of the wetlands load; BPA requires new projects to participate in or conduct control studies; BDCP accepts MeHg impacts of projects as unavoidable
TMDL – Agricultural tailwater	Ambient aqueous MeHg as context for discharge monitoring	Near term. Ongoing control studies at Yolo Wildlife Area, Cosumnes River Preserve, Twitchell Is.; Delta coalition submitted 319(h) grant application for MeHg discharge monitoring (begin in 2015, if approved)	New WDR for Delta coalition does not require MeHg discharge monitoring
TMDL – Dredging	Sediment releases into the water column from dredging activities	Near term. Applies to all new 401 WQ certifications	Dredging activities and activities that reuse dredge material in the Delta should minimize increases in MeHg and inorganic Hg discharges to Delta waterways

Table 2. Comparison of different fish monitoring design options.

	Decadal Blitz	Annual Random Draw	Annual Index Sites (Low n)	Annual Index Sites (High n)	Hybrid: Index (Low n) + Annual Random
Power to detect Whole-Delta trend	▲	▲▲▲▲	▲▲	▲▲▲	▲▲▲▲
Power to detect Subarea trend	▲	▲▲▲	▲▲	▲▲▲	▲▲▲
Power to detect Site trend	▲	▲▲	▲▲▲	▲▲▲▲	▲▲▲
Infrastructure sustainability	▲	▲▲▲▲	▲▲	▲▲▲▲	▲▲▲▲
Flexible subarea boundaries	▲▲▲▲	▲▲▲▲	▲	▲▲▲	▲▲▲▲
Information flow	▲	▲▲▲▲	▲▲	▲▲▲	▲▲▲▲
Cost per year	\$40K (\$400K for 40 sites every 10 yr)	\$80K (\$80K for 10 sites every yr)	\$80K (\$80K for 10 sites every yr)	\$160K (\$160K for 20 sites every yr)	\$160K (\$160K for 20 sites every yr)

Figure 1.

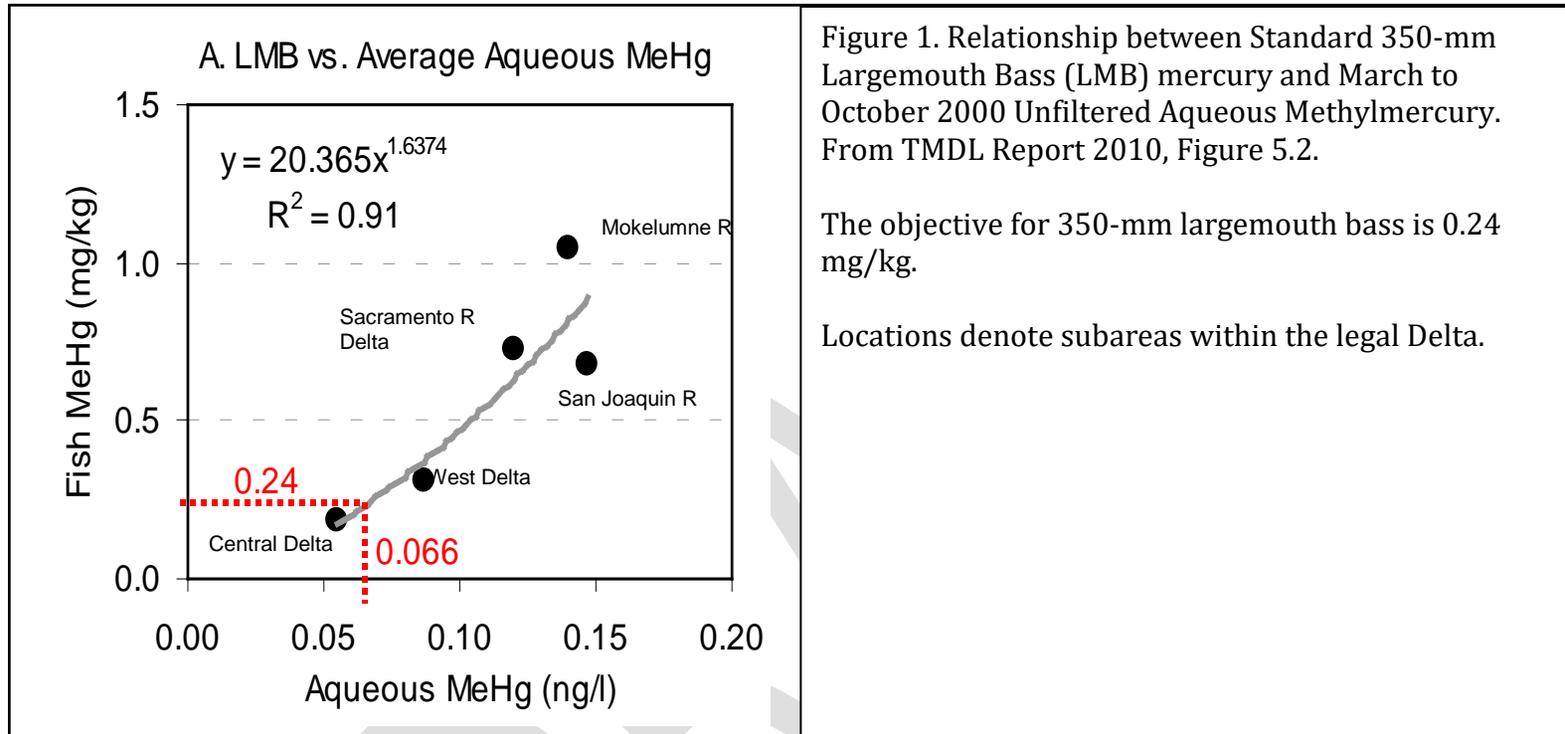
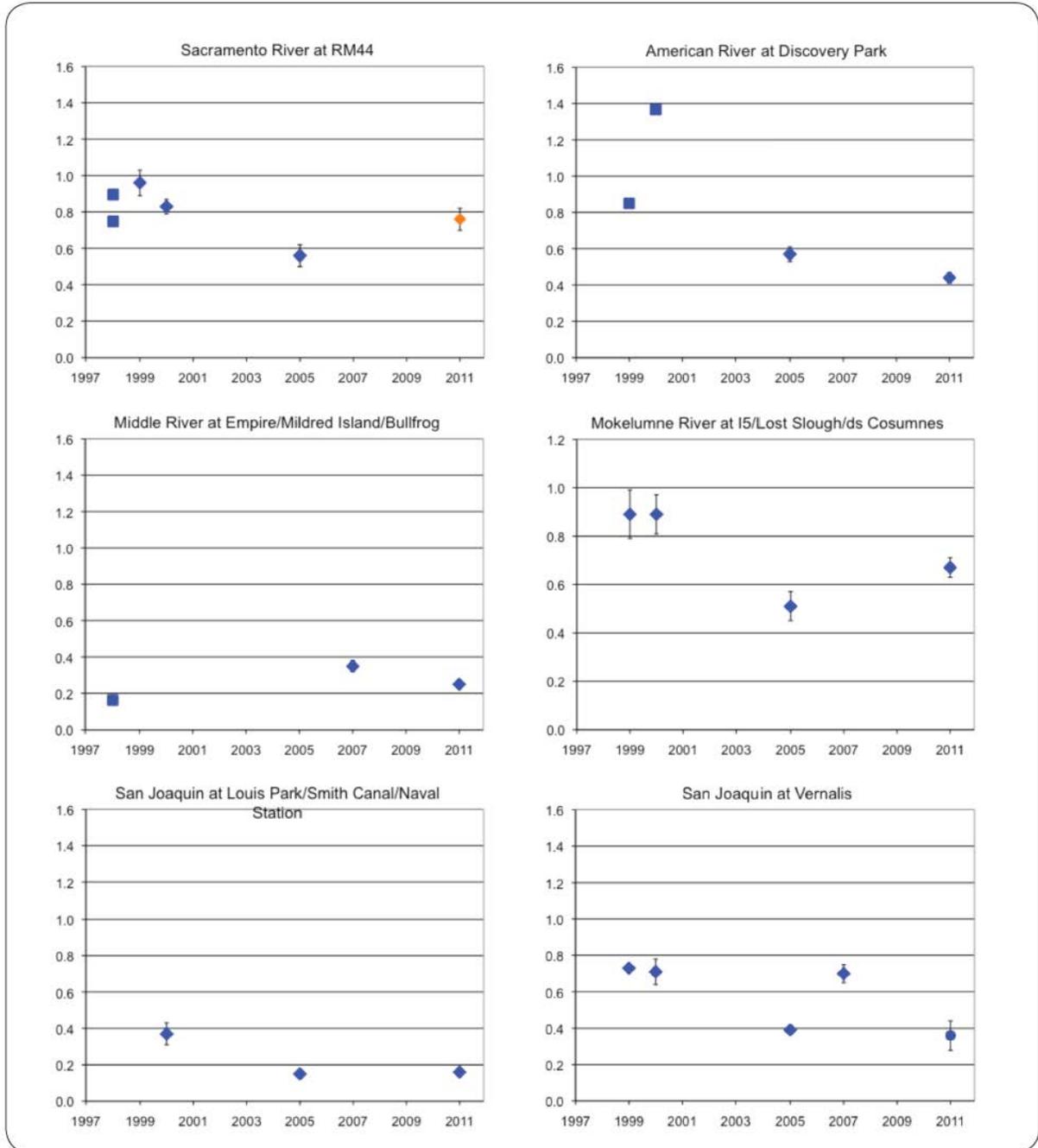


Figure 2. Mercury concentrations in fish for the sites with the best available time series. Largemouth bass shown in blue, smallmouth bass in orange. Diamonds represent averages based on ANCOVA-generated estimates for a size of 350 mm. Squares represent composite samples. Circles represent simple averages for cases where no length correlation was observed. Bars indicate one standard error.



Response to Review Panel Comments on the Nutrients Design from the Nutrients Subcommittee

The Panel made many excellent points about the Delta RMP monitoring design, and we appreciate the time and effort the Panel put into guiding our future efforts. Our responses to Review Panel comments and questions specific to the nutrients monitoring design are provided below. Most comments can be addressed by providing additional background information that was not previously communicated or available to the panel. Other comments are appreciated as valuable feedback and will be considered by the program as the long-term monitoring design for nutrients is being developed.

An important point that needs clarification is that the Delta RMP has not yet started monitoring for nutrients. All of the work to date has been synthesis of data from other nutrient monitoring programs to identify data gaps and information needs that the future program should address. One of the objectives for FY17/18 is to develop the long-term monitoring design for nutrients, taking into consideration the comments from the External Review, results from data syntheses, and the goals of the Program.

Similarly, the regulatory framework for nutrients in the Delta is still uncertain. The Central Valley Regional Water Quality Control Board is developing a Nutrient Research Plan to determine whether nutrient concentrations cause or contribute to water quality problems in the Delta. The Regional Board will make a decision about nutrient water quality objectives at some point in the future. The nutrient synthesis and studies conducted by the Delta RMP aim to support this decision-making process.

In lieu of a specific regulatory driver, there was consensus to focus initial efforts primarily on synthesis and analysis of existing data and information, and specifically on status and trends and mass balance for nutrients (forms of dissolved and total N and P) and nutrient-associated parameters (chlorophyll, dissolved oxygen). These parameters were identified as the most relevant, based on their significance as indicators relative to the assessment questions, conceptual understanding of biogeochemical processes, and availability and quality of existing data (Figures 1 and 2).

In the following section, quoted comments from the review are shown in italics followed by a response. The page number from the report from which the quote was taken is listed after the quote. Similar comments are grouped together with one response.

Responses to Specific Questions and Comments on the Nutrients Design

The monitoring program identifies state variables (e.g., indicators) to be measured at sample locations but does not fully explain why these indicators were selected. For example, lab analyses do not assess "pesticides" or "nutrients": they assess particular pesticides and nutrients. Each one added can increase costs, each one ignored can increase risks, and there may be legal requirements. What logic was invoked to justify the selection of the indicators to be measured? (p. 3)

As stated in the introduction, the Delta RMP's nutrient monitoring program has not yet been developed. Nutrient "state variables" to be measured have not yet been specified. The Monitoring Design Summary (MDS) states that the nutrient *data synthesis* would focus on the following parameters: ammonium (NH₄), nitrate (NO₃), dissolved inorganic nitrogen (DIN), total dissolved nitrogen (TDN), dissolved organic nitrogen (DON), phosphate (PO₄), chlorophyll a (chl-a), and dissolved oxygen (DO).

The nutrient subcommittee recommended focusing on the parameters above because they have been identified as the most relevant for addressing management questions and main issues of concern related to nutrients.

Monitoring design – One of the initial driving questions (p. 44) is “are there important data gaps associated with particular water bodies within the Delta subregions.” It seems appropriate to answer this question before designing the sampling plan and locations for the Delta RMP. (p. 8)

We concur and this is the approach being taken by the Delta RMP. A Delta RMP nutrient monitoring planning workshop was held on September 30, 2016. The goals of this workshop were to:

- **Identify** how much of the nutrient monitoring needed to answer the Delta RMP assessment questions is already happening through **existing programs**,
- Identify critical nutrient data **gaps** for the Delta RMP and develop “no regrets” monitoring activities to fill them (beginning in Calendar year 2017), and
- Develop **budget estimates for “no regrets”** monitoring activities to facilitate multi-year budget planning for the Delta RMP multi-year plan

In preparation for the workshop, a background report was produced that summarizes existing nutrient monitoring programs, data gaps, and potential Delta RMP “no regrets” monitoring activities. This report synthesizes information and recommendations gathered in a) interviews with representatives of Delta monitoring and resource management programs, b) updating earlier information gathered on current monitoring efforts in the Delta ([Central Valley Monitoring Directory](#), Jabusch and Gilbreath 2010), and c) conclusions and recommendations from recently completed data syntheses by ASC (Novick et al. 2015, Jabusch et al. 2016) and USGS (Bergamaschi et al., in press).

How are tides, flows, and other hydrodynamic conditions considered in choosing where and when to sample? (p. 8)

This issue will be considered for the development of the monitoring program design. It will depend on the specific question being addressed by the monitoring and the approach taken to answer it. Examples for how these important considerations are being discussed are as follows:

Efforts already underway or will be implemented in the short-term

- To the extent possible, any new stations (both continuous and discrete) will be co-located with existing flow stations.
- The California Department of Water Resources (DWR) – Environmental Monitoring Program (EMP) has been collecting monthly data for more than 40 years with consistent timing relative to tides. Since 1975, the sampling times were planned to occur within a one-hour window of the expected occurrence of high slack tide at the sampling location. The EMP can be considered as the core data collection effort for addressing the Delta RMP Status & Trends (S&T) nutrient assessment questions. Any augmentation of the existing station network, for example, to strengthen the statistical power for long-term trend detection or increase spatial coverage, would maintain that consistency of sampling relative to the tide to minimize tidal variation as a factor affecting the long-term dataset.
- High-frequency (HF) data collection cruises have been proposed to understand nutrient transformations and potential internal loading in under-sampled Delta locations. The recommended monitoring cruises would be designed to characterize seasonal changes in flow and water quality and consist of data collection cruises under different flow scenarios.
- A data analysis that involves hydrodynamic modeling is currently underway to help identify temporal and spatial data gaps, in order to inform the future monitoring design. The goal of this analysis is to address the Delta RMP Assessment Question: “Are there important data gaps associated with particular water bodies within the Delta subregions, *relative to the potential for biogeochemical transformations to occur in those places, as inferred by transport time scales, hydrodynamic condition, and the source of the water*” The expected outcome are recommendations for representative sites for trends monitoring, high-frequency mapping sites, and informing biogeochemical models, based on hydrodynamic modeling results.

Additional efforts that have been discussed for future implementation

- One potential Delta RMP activity that was discussed by program participants is to improve estimates of loads from upstream sources at important inflows. Nutrient load estimates for upstream sources are probably biased low, because storm events are not adequately captured. This gap could be filled and prevented from widening through storm sampling to better characterize the hydrograph.
- Additional short-term high frequency sampling to address data needs for hydrological-biogeochemical modeling would be timed for when boundary conditions (inflows and water exports) are changing rapidly.

The MDS (pp. 47-52) shows several ways to display the data, including its variation over time and space. Displays like these are informative, and might help in developing the nutrient monitoring design, or redirect or focus future sampling. However, displays are not a sufficient end point. They do not provide clear criteria for management actions. Such criteria usually

need to be numerical estimates, with estimates of reliability. They will arise from comparisons to water quality objectives or other benchmarks of environmental or human health. (p. 8)

We concur with the observation. However, a nutrient assessment framework does not yet exist for the Delta and there are only a few existing water quality objectives or benchmarks that would be appropriate and meaningful in the context of the Delta RMP assessment questions. Examples for meaningful benchmarks are TMDL targets for dissolved oxygen in the lower San Joaquin River (Figure 3, from ASC 2012) or World Health Organization (WHO) thresholds of risk associated with potential exposure to cyanotoxins (Table 1, USEPA 2009). Water quality criteria also exist for ammonium and nitrate. However, these criteria are related to toxicity, whereas the primary management concern for these constituents is about their impact on ecosystem productivity and trophic status.

The Delta Stewardship Council's 2013 Delta Plan recommended that the San Francisco and Central Valley Water Board prepare study plans for the development of nutrient objectives in the Delta and Suisun Bay. In response to the Council's recommendation, Water Board staff developed a Strategic Workplan for the Delta that was presented to the Central Valley Water Board in February 2014. This Strategic Work Plan contained a nutrient strategy that included tasks, deliverables and a timeline for developing the research plan. The goal of this project is to develop a Delta Nutrient Research Plan to determine whether nutrient concentrations cause or contribute to water quality problems in the Delta. Completion of the Delta Nutrient Research Plan (by 2018) is expected to lead to the development of a nutrients assessment framework for the Delta.

We recommend that a PhD-level statistician be added to your team to help develop the nutrient monitoring design. (p. 8)

We have access to additional statistical expertise through ASC, USGS, USEPA, and other partners and will bring it in as needed to assist with the design development. The level of effort involved will depend on the scope and types of monitoring activities that are being planned.

Synthesis – An allocation of \$435,000 seems high for mostly synthesizing the existing data (MDS, pp. 45-52). (p. 8)

There is agreement among scientists and managers participating in the Delta RMP Monitoring Planning Workshop that a) existing nutrient and nutrient-associated data are underutilized, and b) synthesizing, assessing, and reporting on the wealth of data generated by monitoring agencies could be a valuable function of the Delta RMP. The total annual cost for these activities was estimated at \$100 - \$500K, or approximately 0.5 – 2.5 FTEs/yr to compile data, perform data analyses, perform modeling, write reports, and interact and coordinate with stakeholder groups, collaborators, and additional technical experts.

However, the \$435,000 mentioned above is not the funding level proposed in the MDS to be spent by the Delta RMP on synthesis activities alone (Table 2). This amount includes costs for coordination with related efforts and for developing the monitoring design. It also includes costs of projects that had already been funded through external sources but were expected to provide partial answers to several assessment questions related to concentrations and the mass balance of nutrients and nutrient-associated parameters. The costs listed in the column named **Shortfall (RMP funding needed)** were the funds proposed for the Delta RMP to build on these studies and address additional needs. The total proposed cost to the Delta RMP was \$225K.

Restate Table 1 (Assessment Questions) of Monitoring Design to more specifically address the management questions, monitoring goals, and likelihood of achieving these goals for each constituent. (p. 2. This recommendation is for the entire design and not specific to the nutrient element.)

We concur with the need to review the assessment questions as they pertain to nutrients. The Nutrient Subcommittee is planning to review the assessment questions for nutrients at an upcoming meeting. The current plan is to discuss whether changes should be made to the assessment questions and their hierarchy that would strengthen the linkage between activities and management questions/drivers. This will be done in the context of linking the parallel efforts of the Delta RMP and the Delta Nutrient Research Plan more closely together and placing more emphasis on evaluating the linkages between nutrients as potential stressors and biological effects (Assessment Question S&T2 in Table 3). The discussion will also review and assess the scope of activities to be undertaken to address remaining data gaps under each assessment question.

References

- Aquatic Science Center. 2010. Central Valley Monitoring. Directory. <http://www.centralvalleymonitoring.org/> [accessed November 28, 2016].
- Aquatic Science Center. 2012. The Pulse of the Delta: Linking Science & Management through Regional Monitoring. Contribution No. 673. Aquatic Science Center, Richmond, CA.
- Bennett, W. A. 2005. Critical assessment of the delta smelt population in the San Francisco Estuary, California. San Francisco Estuary and Watershed Science 3, <http://repositories.cdlib.org/jmie/sfews/vol3/iss2/art1>.
- Bergamaschi BA, Downing BD, Kraus TEC, Pellerin BA. In review. REVIEW DRAFT: Designing a high frequency nutrient and biogeochemistry monitoring network for the Sacramento-San Joaquin Delta. U.S. Geological Survey Open File Report. U.S. Geological Survey, Reston, Virginia

- Dugdale, R.C., Wilkerson, F.P., Hogue, V.E., Marchi, A. 2007. The role of ammonium and nitrate in spring bloom development in San Francisco Bay. *Estuarine, Coastal and Shelf Science*, V. 73, p. 17-29.
- Glibert, P.M., Dugdale, R.C., Parker, A.E., Wilkerson, F., Alexander, J., Blaser, S., Kress, E., Murasko, S. 2012. Elevated ammonium concentrations inhibit total nitrogen uptake and growth, not just nitrate uptake. Poster presentation at Interagency Ecological Program Annual Workshop, April 2012, Folsom, CA.
- Jabusch, T, Gilbreath AN. 2009. Current water quality monitoring efforts in the Delta. Prepared for the Central Valley Regional Water Quality Control Board, Aquatic Science Center, Oakland, CA.
- Jabusch T, Bresnahan P, Trowbridge P, Wong A, Salomon M, and Senn D. 2015. Summary and Evaluation of Delta Subregions for Nutrient Monitoring and Assessment. San Francisco Estuary Institute, Richmond, CA.
http://www.sfei.org/sites/default/files/biblio_files/MainReport-DSP_2016-06-30.pdf
- Jassby AD, Van Nieuwenhuysse EE. 2005. Low dissolved oxygen in an estuarine channel (San Joaquin River, California): mechanisms and models based on long-term time series. *San Francisco Estuary and Watershed Science*, V. 3(2).
<http://escholarship.org/uc/item/0tb0f19p>
- Kimmerer, W. J. 2002. Effects of freshwater flow on abundance of estuarine organisms: physical effects or trophic linkages? *Marine Ecology Progress Series* 243, p. 39-55.
- Kimmerer, W. J. 2006. Response of anchovies dampens effects of the invasive bivalve *Corbula amurensis* on the San Francisco Estuary foodweb. *Marine Ecology Progress Series* 324, p. 207-218.
- Lehman, P. W., G. Boyer, C. Hall, S. Waller and K. Gehrts. 2005. Distribution and toxicity of a new colonial *Microcystis aeruginosa* bloom in the San Francisco Bay Estuary, California. *Hydrobiologia* 541:87-99.
- Novick E, Holleman H, Jabusch T, Sun J, Trowbridge P, and Senn D, Guerin M, Kendall C, Young M, Peek S. 2015. Characterizing and quantifying nutrient sources, sinks and transformations in the Delta: synthesis, modeling, and recommendations for monitoring. San Francisco Estuary Institute, Richmond, CA.
<http://sfbaynutrients.sfei.org/sites/default/files/Main manuscript.pdf>
- Parker, A.E., V. E. Hogue, F.P. Wilkerson, and R.C. Dugdale. 2012b. The effect of inorganic nitrogen speciation on primary production in the San Francisco Estuary. *Estuarine, Coastal and Shelf Science* 104-105, p. 91-101.
- Thomson, J. R., Kimmerer, W. J., Brown, L. R., Newman, K. B., Mac Nally, R., Bennett, W. A., Feyrer, F., Fleishman, E. 2010. Bayesian change-point analysis of abundance trends for

pelagic fishes in the upper San Francisco Estuary. *Ecological Applications* 20, p. 1431-1448.

USEPA. 2009. National Lakes Assessment: A Collaborative Survey of the Nation's Lakes. EPA 841-R-09-001. U.S. Environmental Protection Agency, Office of Water and Office of Research and Development, Washington, D.C.

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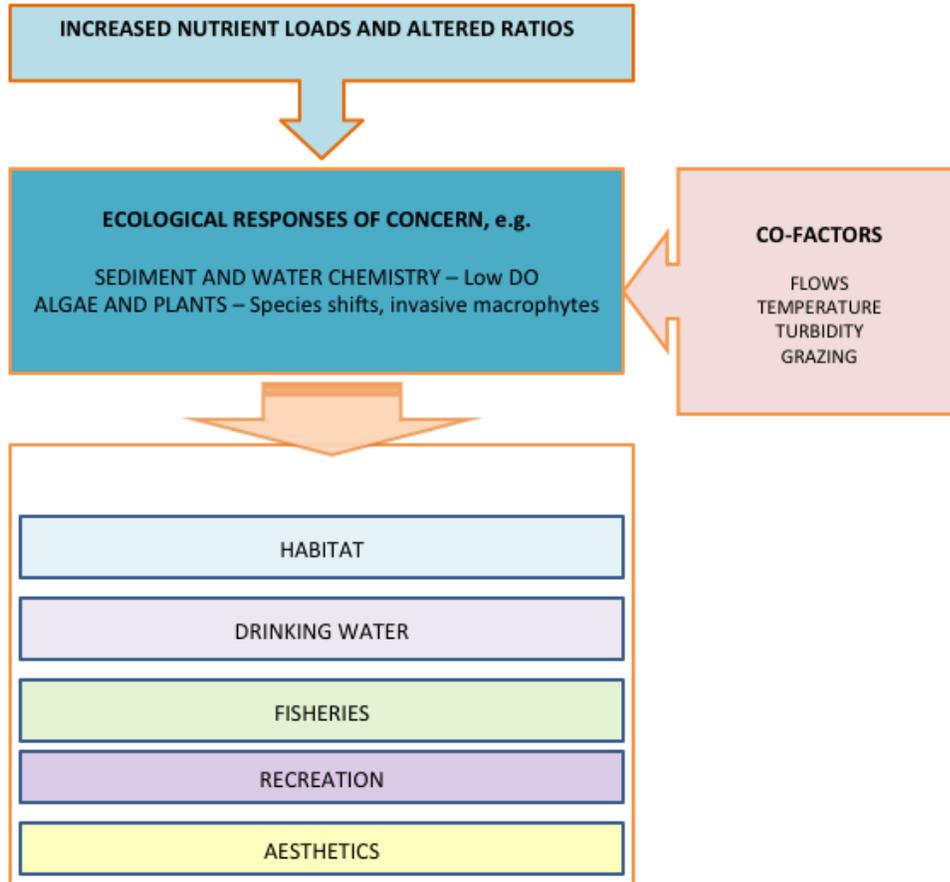


Figure 1. Simplified conceptual framework showing the linkage of nutrients loading, ecological response, co-factors modulating the ecological response, and altered ecological and human services.

Potential Pathways to Adverse Impacts

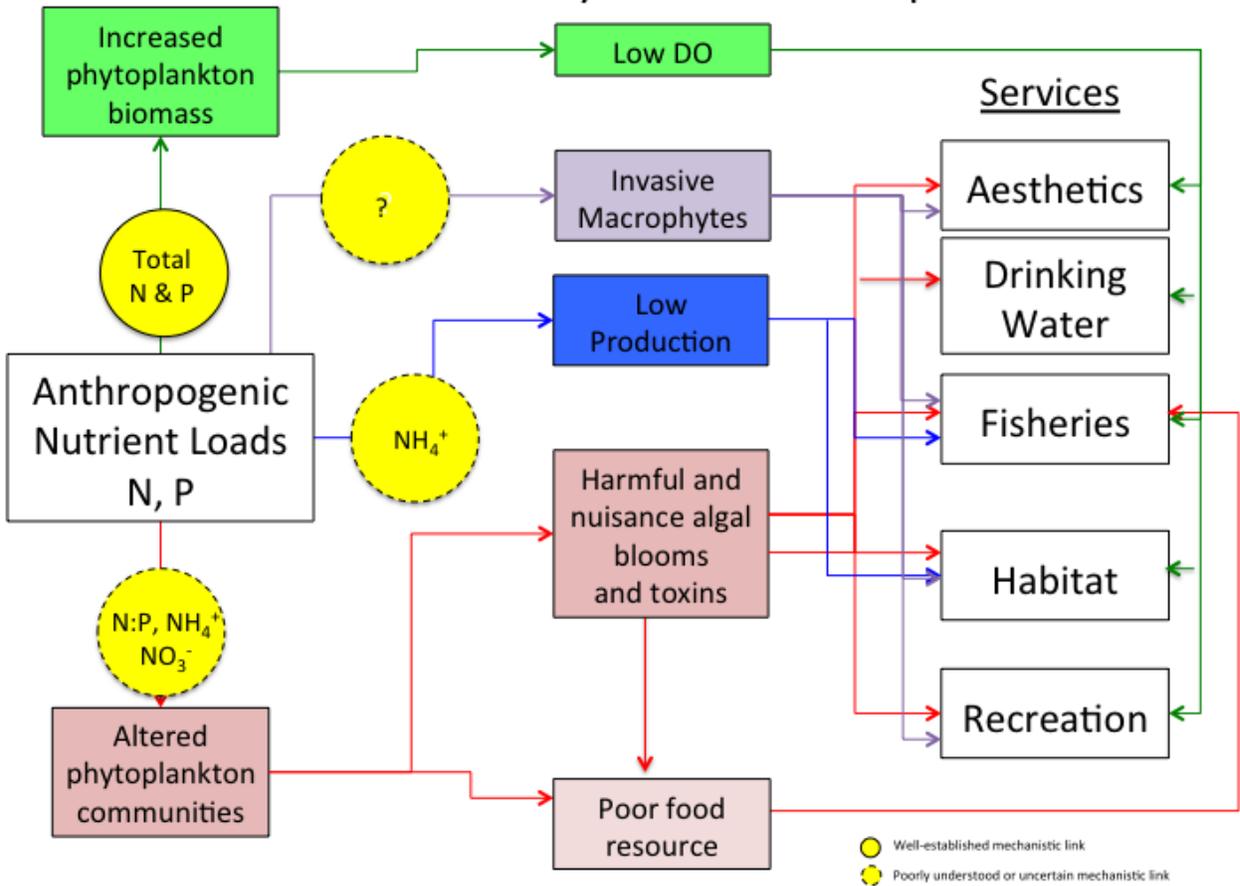


Figure 2. Conceptual diagram of potential pathways from elevated nitrogen and phosphorus loads to adverse impacts on beneficial uses.

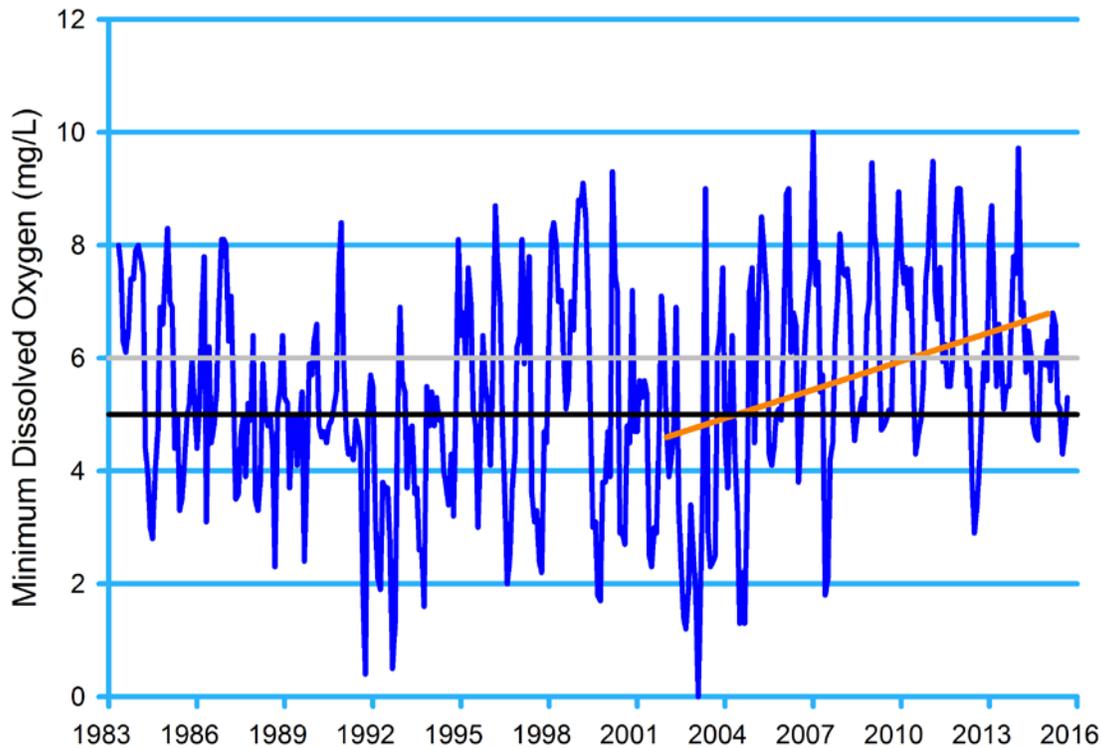


Figure 3. Dissolved Oxygen in the Lower San Joaquin River. ***Example graph and example interpretation***. Low dissolved oxygen in Delta waters pose significant migration barriers to salmon and other migrating fishes. Dissolved oxygen barriers occur in the Stockton Deep Water Ship Channel (DWSC) and on Old and Middle Rivers and have resulted in the establishment of a Total Maximum Daily Load (TMDL) to control low DO in the San Joaquin River. The deepened channel, reduced flows, decomposing algae from upstream, and oxygen-demanding substances from the City of Stockton wastewater treatment plant all contribute to the low DO issue. Seasonal variability of DO is mainly due to seasonal variability in river flow, but fluctuations in river phytoplankton and wastewater effluent also play a role. Dissolved oxygen in the lower San Joaquin River has increased since the early 2000s (see trend line), primarily due to the implementation of algae removal ponds and nitrification treatment by the City of Stockton wastewater treatment plant. However, monthly minimum values continue to fall frequently below the statutory limits of 5 mg/L (December 1 to September 30) and 6 mg/L (October 1 to November 30).

Footnotes: Minimum monthly values of dissolved oxygen measured at the Rough and Ready Island monitoring station in the Stockton DWSC. The Middle River and Old River split off from the mainstem of the San Joaquin River upstream of the DWSC. The orange trend line represents a linear regression of the annual averages of minimum monthly DO concentration 2002 – 2015 vs. time. Data are from the Continuous Multiparameter Monitoring by the IEP Environmental Monitoring Program.

Reference: Jassby & Van Nieuwenhuysse 2005.

Table 1. World Health Organization thresholds of risk associated with potential exposure to cyanotoxins (USEPA 2009). [_____](#)

Indicator (units)	Low Risk of Exposure	Moderate Risk	of	High Risk of Exposure
Cyanobacteria cell counts (#/L)	< 20,000	20,000 - <100,000		≥ 100,000
Microcystin (µg/L)	<10	10 - ≤20		>20

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Table 2.

The following table from the MDS shows the initial cost estimates for steps to develop the nutrient monitoring design. For projects that already have funding from outside the Delta RMP, the cost of the project is shown but is offset by the available outside funding. This table does not include the costs of routine nutrient monitoring. Costs for a longer-term nutrient monitoring will be developed after the monitoring design has been produced.

Task	Cost	Available Funding from non-RMP sources	Shortfall (RMP funding needed)
1. Synthesis and analysis of existing information and data			
a. Synthesize and analyze existing data			
Synthesis of EMP and Nutrient Loads data (ASC-DWR contract)	\$82,000	\$82,000	\$0
Interpretation of stable isotope data (ASC-DWR contract)	\$34,000	\$34,000	\$0
Calibration and interpretation of DSM2 nutrient models (ASC-DWR contract)	\$39,000	\$39,000	\$0
Synthesis of high-frequency sensor data	\$70,000	\$0	\$70,000
Compilation and synthesis of other nutrient datasets from the Delta	\$40,000	\$0	\$40,000
b. Establish meaningful subregions			
Synthesis of Nutrient Data and Analyses to Determine Delta Segments for Nutrient Assessments and Modeling (ASC-DSP contract)	\$40,000	\$40,000	\$0
c. Identify critical data gaps and develop initial recommendations for monitoring design	\$50,000	\$0	\$50,000
2. Coordination			
a. Coordination with the development of the Delta Nutrient Research Plan and related efforts (ASC-DSP contract)	\$15,000	\$15,000	\$0
3. Develop nutrient monitoring design			
a. Define sampling frame (habitats, subareas)	\$65,000	\$0	\$65,000
b. Data evaluation and reconciliation			
c. Complete and vet a detailed monitoring and design proposal for nutrients			
d. Develop mechanisms for systematically compiling, assessing, and reporting data			
Total amount	\$435,000	\$210,000	\$225,000

Table 3. Delta RMP assessment questions for nutrients. *Italicized bold-faced questions* are the highest priority for the initial program.

Type	Core Management Questions	Nutrient Assessment Questions
Status & Trends	<p>IS THERE A PROBLEM OR ARE THERE SIGNS OF A PROBLEM?</p> <p>a. Is water quality currently, or trending towards, adversely affecting beneficial uses of the Delta?</p> <p>b. Which constituents may be impairing beneficial uses in subregions of the Delta?</p> <p>c. Are trends similar or different across different subregions of the Delta?</p>	<p><i>ST1. How do concentrations of nutrients (and nutrient-associated parameters) vary spatially and temporally?</i></p> <p><i>A. Are trends similar or different across subregions of the Delta?</i></p> <p><i>B. How are ambient levels and trends affected by variability in climate, hydrology, and ecology?</i></p> <p><i>C. Are there important data gaps associated with particular water bodies within the Delta subregions?</i></p> <p>ST2. What is the current status of the Delta ecosystem as influenced by nutrients?</p> <p>A. What is the current ecosystem status of habitat types in different types of Delta waterways, and how are the conditions related to nutrients?</p>
Sources, Pathways, Loadings & Processes	<p>WHICH SOURCES AND PROCESSES ARE MOST IMPORTANT TO UNDERSTAND AND QUANTIFY?</p> <p>a. Which sources, pathways, loadings, and processes (e.g., transformations, bioaccumulation) contribute most to identified problems?</p> <p>b. What is the magnitude of each source and/or pathway (e.g., municipal wastewater, atmospheric deposition)?</p> <p>c. What are the magnitudes of internal sources and/or pathways (e.g. benthic flux) and sinks in the Delta?</p>	<p><i>SPLP1. Which sources, pathways, and processes contribute most to observed levels of nutrients?</i></p> <p><i>A. How have nutrient or nutrient-related source controls and water management actions changed ambient levels of nutrients and nutrient-associated parameters?</i></p> <p><i>B. What are the loads from tributaries to the Delta?</i></p> <p><i>C. What are the sources and loads of nutrients within the Delta?</i></p> <p><i>D. What role do internal sources play in influencing observed nutrient levels?</i></p> <p><i>E. Which factors in the Delta influence the effects of nutrients?</i></p> <p><i>F. What are the types and sources of nutrient sinks within the Delta?</i></p> <p><i>G. What are the types and magnitudes of nutrient exports from the Delta to Suisun Bay and water intakes for the State and Federal Water Projects?</i></p>
Forecasting Scenarios	<p>a. How do ambient water quality conditions respond to different management scenarios</p> <p>b. What constituent loads can the Delta assimilate without impairment of beneficial uses?</p> <p>c. What is the likelihood that the Delta will be water quality-impaired in the future?</p>	<p>FS1. How will ambient water quality conditions respond to potential or planned future source control actions, restoration projects, and water resource management changes?</p>

Response to Review Panel Comments on the Pesticides Design from the Pesticides Subcommittee

The Panel made many excellent points about the Delta RMP monitoring design. Responses to Review Panel comments and questions specific to the pesticides monitoring design are provided below. Some comments can be addressed by providing additional background information that was not previously communicated or available to the panel. Other comments are appreciated as valuable feedback and will be considered by the program as the long-term monitoring design for pesticides is further developed. One of the objectives for FY17/18 is to develop the long-term monitoring design for pesticides, taking into consideration the comments from the External Review, results from the first two years, and the goals of the Program.

In the following section, quoted comments from the review are shown in italics followed by a response. The page number from the report from which the quote was taken is listed after the quote. Similar comments are grouped together with one response.

Responses to Specific Questions and Comments on the Pesticides Design

At present it is proposed to conduct "Pesticide-focused TIEs for samples with > 50% reduction in the organism response compared to the lab control treatment (not to exceed 20% of samples or \$40,000)" (MDS p. 21). What criteria led to these numbers? (p. 7)

The decision of when to conduct a TIE is made by a subcommittee of the TAC based on a number of factors, such as details provided by the laboratory and expenses to date relative to budget. TIEs are not performed on all samples with observed toxicity because financial resources are limited for the RMP. Therefore, at the outset of the program, the Pesticide Subcommittee decided to follow other programs which have utilized the $\geq 50\%$ threshold as the trigger level for when to consider conducting a TIE. If toxicity is above this value, the subcommittee will meet and thoroughly discuss the issue and make a decision. This decision process ensures that the most toxic samples, those with an observed effect greater than 50%, will be considered for a TIE to help narrow down the possible sources such as metals or organophosphate pesticides, while also controlling costs. Conducting TIEs on samples with a lower observed effect often results in the toxicity not being persistent for the duration of the multiple manipulations and the results being inconclusive due to toxicity being lost. In summary, the decision about whether to conduct a TIE is made on a case-by-case basis by a subcommittee of the TAC when a sample is above the trigger level of 50%.

The toxicity tests use "EPA, 2002, Appendix H" (QAPP, p. 61, it should be "2002a"). It is an old t-test (its formal pre-tests are not useful). How the test is to be used (what action it might lead to), and how reliable it should be (a function of sample sizes and variances) are not clearly discussed. (The aims and meaning of the measurement quality objectives column in Table 4.10 is not clear.) (p. 7)

The EPA acute toxicity testing manual explains the process to test for meeting data assumptions of normality and equal variance. The initial goals and measurement quality objectives for toxicity monitoring of the Delta RMP are related to evaluating Status and Trends, which are very similar and complementary to those of the statewide Surface Water Ambient Monitoring Program (SWAMP). Therefore, the Delta RMP has adapted the scientifically vetted approach used by the SWAMP for individual toxicity testing analysis. (It should also be noted that the discussion about the most appropriate statistical test has not been unequivocally resolved. Some pesticide subcommittee members are recommending the Test of Significant Toxicity (EPA 2010; Denton et al., 2011) with the argument that it would provide more statistical rigor).

Delta RMP data are expected to contribute to an information basis for assessing conditions at a regional scale and fill prioritized data gaps. There is a continuing discussion about how the Delta RMP should interface with regulators and other managers outside the program and the issue still needs to be resolved, especially with regards to follow-up on any observations. However, results are not "actioned" on within the Program. Regulatory and management decisions (e.g. determining beneficial use impairments, etc.) may involve participants but occur outside of the Delta RMP. The key contribution of the Delta RMP is in providing a shared dataset and serving as a forum for joint-fact finding and consensus building. The goal is broadly described in the Communications Plan goal as to develop the interpretation and potential recommendations for management in a science-based and collaborative process.

The plan is not clear about methods for sampling sediments. The QAPP has no information on sediment collection or analysis. (p. 7)

- a. *Is the Stream Pollutions Trends Monitoring Program (SPoT) collection, toxicity testing and chemistry of sediments considered part of the Delta RMP? (p. 7)*

No. SPoT is a separate statewide water quality monitoring program that focuses on toxicity and concentrations of stream-borne contaminants in sediments with the goals to:

1. Determine long-term trends in stream contaminant concentrations statewide;
2. Relate water quality indicators to land-use characteristics; and
3. Establish a network of sites throughout the state to serve as a backbone for collaboration with local, regional, & federal monitoring programs.

The SPoT Delta RMP will benefit by utilizing the information generated by the SPoT program. Leveraging resources between the two programs is beneficial.

b. Where are those sample locations? (p. 7)

SPoT sampling locations were shown on the map on page 24 of the Monitoring Design Summary and listed in the table of monitoring locations following the map on pages 25 and 26. Generally, SPoT prioritizes sites with a rich history of monitoring; in highly urban watersheds; with depositional sediments; within relatively small watersheds with short sediment transit times that would react quickly to changes in pesticide loading. Current sites are:

Mokelumne River @ New Hope

San Joaquin @Vernalis

Marsh Creek @ East Cypress Crossing

American River @Discovery Park

c. A yearly grab sample seems very limited - what is known about the spatial distribution of pesticides in sediment, or their seasonal variation? (p. 7)

Effectively, not all locations are only sampled yearly as the comment suggests.

However, sediment chemical composition and toxicity does not typically change rapidly over time. Toxicity was estimated using 10-day amphipod survival tests, and contamination was characterized by measurement of pyrethroid pesticides. Pyrethroids were selected because of their pervasive use in urban and agricultural watersheds and increasing importance in driving sediment toxicity in California watersheds. The toxicity and chemistry data were analyzed by first conducting a two-factor analysis of variance on the spatial and temporal data within the 2010 sampling season. If the amphipod survival results are more variable among years than they are within a year, then it is assumed that yearly sampling is adequate to characterize long-term trends. The results from three base station samples conducted within 2010 were compared to the base station results from other years using an F-Ratio test to determine if seasonal variability was significantly greater than annual variability. Results of the F-Ratio tests indicate that annual variability

was greater than seasonal variability at all three sites. These results indicate that in most instances, a single baseline sample was representative of sediment toxicity at proximate stations and in different seasons. Therefore, in answering the SPoT program objective to “Determine long term trends in sediment contaminant concentrations and effect statewide”, collecting sediment samples on an annual basis is sufficient.

In addition, five years of data were evaluated to determine variability in toxicity (2008-2012). Statistical analysis was conducted at selected SPoT sites (called "variability" sites) to assess the temporal and spatial variability of toxicity and contamination. The results indicated that samples collected once per year were representative of spatial and temporal variability within the selected watersheds (same as current watersheds).

Pages 46 & 47 of this report includes power analysis:

http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/workplans/spot%20fourteen_rpt.pdf

Based on the data from the variability study, yearly sampling was representative for toxicity and bifenthrin, but the power analysis results also suggested increasing the sampling of more variable parameters, such as total pyrethroids, to determine whether a newly adopted management practice is effective. Based on the variability of toxicity test results measured once per year for the past five years, it can take an average of 3 to 4 years to observe a 25% change in toxicity. Parameters that are more variable, such as total pyrethroids, can take 5 to 9 years to observe a 25% change.

Power analysis conducted on the data from the variability sites demonstrated that trends in total pyrethroids could be detected more quickly by sampling the sites multiple times per year. It is predicted that sampling three times per year at the variability sites could detect trends in toxicity and bifenthrin concentrations in an average of two years. In collaboration with DPR, SPoT now samples 4 sites 4 times per year to assess reductions in toxicity and pyrethroid pesticides associated with recent DPR revisions to pyrethroid label recommendations for use in urban settings. This monitoring is performed to answer the 2nd SPoT program objective, “Relate water quality indicators to land use characteristics and management efforts”. In this case, the program has identified 4 “intensive” sites to collect more samples per year to facilitate answering a management practice that has been implemented. These 4 sites have replaced the "variability" sites.

- d. *What will the estimated concentrations be compared to in order to evaluate the presence and degree of sediment toxicity? (p. 7)*
- e. *There are no standards, criteria, or objectives for the prevalence of current use pesticides in sediment, so what would be done with this information? (p. 7)*

The information gleaned from SPoT will be used to help understand the risk level and to assist as baseline information in future monitoring. The general information is that the data would be obtained and used to evaluate the overarching management question: Is there a problem or are there signs of a problem? Results will also help inform future monitoring needs and whether adaptive changes to the monitoring design are needed (e.g., should there be additional sediment monitoring to address Delta RMP management questions? Which constituents? When? Where? How often?)

Evaluation of SPoT data within the context of the Delta RMP will draw from data evaluation procedures and analyses performed by the SPoT. However, more detailed discussions on the approach for how to assess the "risk" level within the Delta RMP contact and feedback to the Delta RMP design are still pending, i.e. the degree to which SPoT data evaluation approaches can be directly adapted or would require modification.

In SPoT evaluations, for example, amphipod survival is compared to individual chemical threshold values (also referred to as benchmarks) to determine which chemical occurred at concentrations that could cause toxicity. These toxicity benchmark concentrations are assembled from various sources. Where possible, median lethal concentrations (LC50s) derived from spiked sediment toxicity studies using *H. azteca* were used to evaluate chemistry data. Median lethal concentrations are preferable because they are derived from exposure experiments with single chemicals. The probable effects concentration (PEC) sediment quality guidelines (MacDonald et al. 1990) were used when spiked-sediment LC50s were not available. Probable effects concentrations are consensus-based guidelines that were developed from other empirically-derived sediment quality guideline values. These benchmarks identify concentrations above which adverse effects to benthic invertebrates are expected.

- f. The map on p. 26 of MDS shows there are existing sediment and/or water toxicity test locations in the Delta that have known toxicity (at least within the vague categories). Can these locations be used as negative and positive controls, respectively? (p. 7)*

There are no system positive or negative controls. The best approach in toxicity testing for a negative control is the use of standard laboratory control water to compare with the site water. Reference toxicant tests are performed as a positive control test. This is the approach that has been utilized in ambient toxicity testing for over three decades.

Some water samples are scheduled and others triggered by events. If these are to be combined over time, how will they be analyzed? Presumably "event" times have special characteristics, and wet ones are different from dry ones. (This is a question, not a criticism of taking the two

types of samples.) It seems that monthly samples are not taken when "events" occur. In that case, why are the "event" sites different from the regular sites? (p. 7)

All data will be treated in the analyses as monthly samples. "Event" times represent five time periods that were selected because they were considered by the pesticide subcommittee as the most critical points or windows in time over the course of the year to evaluate temporal and spatial variability of pesticides and their effects. The pesticide subcommittee selected these five "event" times to be monitored at a minimum, if there is insufficient funding for monthly monitoring at all proposed sites. The selected "event" times include two wet-weather event types and three dry-season periods. The wet-weather event types are: (1) first flush and (2) one additional significant winter storm after first flush has occurred. The three dry-season sampling events are: (1) early spring, (2) 1st irrigation season sampling (late spring/ early summer), and (3) 2nd irrigation season sampling (late spring/ early summer).

"Event" sites were selected to increase the spatial coverage of monitoring. Ideally, these sites would also be monitored monthly. The proposed "events-only" sampling at these sites (5x/year instead of 12x/year) represents a compromise driven by budget considerations. This option is currently not implemented. The pesticides monitoring is currently only funded for the five "regular" or baseline sites. At these regular sites, monthly samples in the wet season are scheduled to capture the wet-weather events.

In the analyses, samples may be binned into periods representing different event times for comparison. For example, results from wet events may be pooled from all years and compared to data collected during dry periods.

QAPP p. 30. Are the same sites used for both pesticide analyses and toxicity testing? (p. 7)

Yes. The initial monitoring design combines chemical analysis and toxicity testing on all samples for all sites.

More detail on toxicity tests is needed. (p. 6)

The Delta RMP uses water toxicity tests that are common across numerous ambient monitoring programs, including the SWAMP and other regional monitoring programs. The Delta RMP uses the three-species freshwater tests typically used for toxicity testing of receiving waters (EPA 2002a and b) using a fish (fathead minnow, *Pimephales promelas*), a cladoceran (*Ceriodaphnia dubia*), and a green alga (*Selenastrum capricornutum*). Recently

(i.e. November 2016), toxicity testing with a second invertebrate, the amphipod *Hyaella azteca*, was added to increase the response range to potential toxicants. The testing approach includes acute (i.e., survival) and chronic (i.e. growth and reproduction) endpoints:

- *Selenastrum capricornutum* (growth)
- *Ceriodaphnia dubia* (survival and reproduction)
- *Hyaella azteca* (survival)
- *Pimephales promelas* (larval survival and biomass)

Each test has specific strengths, weaknesses, and sensitivity to toxic constituents. *H. azteca* was added to the standard three species because it is most sensitive to low levels of pyrethroid pesticides. *Ceriodaphnia* are more sensitive to the presence of organophosphorus (OP) pesticides. Herbicide toxicity is detectable by testing with *Selenastrum*. Fish toxicity (represented by *Pimephales promelas*) is an important management concern in the Delta. In the selection of the test species and endpoints, the pesticides subcommittee considered the response range to potential toxicants, relevance of the test organisms, costs, feasibility, and potential test interferences and other caveats not related to toxicity.

Additional details can be found in the USEPA freshwater toxicity testing manuals (USEPA 2002a and b) and the Standard Operating Procedures for each test:

- [Initiation of *Selenastrum capricornutum* 96-Hour Chronic Toxicity Test \(4th Edition\)](#)
- [Initiation of *Ceriodaphnia dubia* Chronic Toxicity Test \(4th Edition\)](#)
- [Initiation of *Pimephales promelas* \(Fathead Minnow\) Chronic Toxicity Test \(4th Edition\)](#)
- [Initiation of *Hyaella azteca* Acute 96-hour Water Column Toxicity Test](#)

This is by far the most expensive program and has the potential to become much more so if new or unknown pesticides become an issue. Yet, at present, we do not know the answer to the basic Table 1 question: "What are the spatial and temporal extents of lethal and sub-lethal toxicity?" (p. 6)

It seems more cost-effective to document the toxicity problem first, by postponing pesticide analyses to pay for toxicity testing over more sites, more widely spread, and during times of year when pesticide use/runoff would be expected to be high. When the sites or areas experiencing toxicity, and the times of the year are known, then samples from these sites and times can be analyzed for the chemicals that might cause that toxicity. This information can then be used to determine source(s), which can then lead to control/management. (p. 6)

- a. *What samples sizes will be used, and why?*

- b. In the 2-stage approach above, a decision procedure will be needed to decide which sites and times are candidates for pesticide analysis, and perhaps to choose the pesticides to look for.*
- c. Thresholds, trigger points, and estimates of reliability will be needed, especially if information from different sites or times is to be combined.*
- d. When samples are collected from locations with observed toxicity and analyzed for chemicals, will current use pesticides be the only targets?*
- e. Is there reason also to consider personal care products, PBDEs (flame retardants), pharmaceuticals, legacy pesticides in sediment (e.g., DDT) or Hg as causes or contributors to observed toxicity? (p. 7)*

This comment raises fundamental questions about the Delta RMP monitoring design for current use pesticides and toxicity. They are best addressed as part of the re-evaluation of the pesticides design that is getting underway. The Steering Committee directed the TAC and Pesticide Subcommittee to complete the re-evaluation in time for the FY18/19 workplan. The re-evaluation is in response to the outcomes of the External Review as well as to the needs for reducing the relative proportion of program costs for pesticide monitoring and for bringing the focus on pyrethroid pesticides. This may require aligning the Delta RMP assessment questions more directly with pyrethroid TMDL-related management decisions and evaluating whether there are critical data that the Delta RMP could generate to inform the Central Valley Pyrethroids TMDL. The outcomes of the re-alignment will inform decisions about data quality criteria to be used, site selection, the list of pesticides to be analyzed, the pros and cons of a toxicity-first approach and a toxicity with paired chemistry approach, and how to best meet the updated data evaluation and information needs.

However, the issues raised here by the panel have been thoroughly discussed during the development of the initial design and the pesticide subcommittee has carefully considered various approaches for addressing them. The resulting design represents a compromise between the best possible technical design for addressing the questions, budget constraints, and data needs of different participants. At the beginning of the design development, the planning budget was uncertain and the plans had to capture a range of effort. Ultimately, a lower cost design was implemented. The following paragraphs will outline some of the pros and cons of various approaches that were considered as well as the rationale for the decisions that had been made about the design.

A key point to resolve during the design development was the question of whether the monitoring should be primarily toxicity based (with follow-up chemical analyses in toxic samples as well as some non-toxic samples as reference), primarily or exclusively chemistry-based, or involve both toxicity testing and chemical analysis on all samples from all sites. Consistent with the comment made here, a toxicity-first design was discussed as the potentially most cost-efficient option to assess whether there is a potential problem. Toxicity testing is an integrative tool, it can determine effects of multiple constituents

concurrently, and can help to understand how the combination of pesticide active ingredients (AIs) + AI degradates + formulation “inert” ingredient(s) + their degradation products + any other potential toxicants overlying in the water and sediment (e.g., heavy metals) contribute to toxicity. However, there are also significant caveats to this approach. First, chemical-analytical results are important for evaluating if the observed toxicity might potentially be related to the occurrence of pesticides. Second, there are potential issues with preserving samples such that, if samples are not immediately processed and analyzed, there may be changes in sample chemistry between collection and analysis. Third, some of the program participants required chemical results for compliance reporting purposes. (Compliance reporting requirements have since changed and this may no longer be necessary. This will be evaluated in the development of the new monitoring design.) Based on these considerations, it was decided to perform toxicity testing and chemical analysis on all samples from all sites.

As pointed out in the comments, there is a possibility of impacts from other contaminant classes and there were also extensive discussions about the range of potential chemicals that should be considered as potential sources of toxicity. The linkage of toxicity testing to pesticides monitoring does not indicate a presumption that pesticides are the sole cause of toxicity in the Delta. However, current use pesticides were identified as a monitoring priority based on previous studies indicating that these chemicals can be important for understanding toxicity in the region (e.g., Central Valley Regional Water Board 2007, Hoogeweg et al. 2011, Johnson et al. 2010, Kuivila and Foe 1995, Lundberg & Laurenson 2012, Markewicz et al. 2012, State Water Resources Control Board 2010, State Water Resources Control Board et al. 2008, Werner et al. 2010, Weston et al. 2012, Weston et al. 2005, Weston & Lydy 2010). Thus, toxicity testing is primarily being used as tool to assist in the monitoring of pesticides. If other toxicants are determined to potentially contribute more to toxicity than expected, alternate priority constituents may be proposed to the Steering Committee for consideration. Future plans are likely to include monitoring of Chemicals of Emerging Concern (CECs) as a new program element. Potential coordination opportunities between monitoring for pesticides/toxicity and CECs can be investigated at that time.

Monitoring and assessment of the state of the Delta is based on a sample of the study area—that is, not all possible locations are sampled and indicator values measured. Therefore, the ability to use the sample data to draw inferences about unmonitored sites is a key part of sample site selection. This has several components. One is to use models of flow, transport and degradation to help estimate values up- or down-stream of monitored sites. The five pesticide sampling sites may allow crucial areas to be estimated this way (but they are likely to be small and no methods are given). (p. 2)

There are two broad categories of environmental monitoring programs—design-based and model-based. Both require that the target population and the sample frame be clearly defined

in order to avoid the potential for confounding arising from changing frame errors. Those programs that use design-based inference use the selection probabilities of the sample units to calculate an estimate for the statistical population and provide estimates of uncertainty. In contrast, programs that use model-based inference assume an a priori statistical model for the distribution of indicator values and do not require a probability based sample design. (p. 13)

Why are sites for monthly pesticide samples all near the edge of the Delta if these are not informative about interior sites? (Pages 24 and 38 of the MDS lists reasons for site choices but they are vague.) How would one decide whether the proposed design is better than one with half as many times and twice as many sites? The QAPP aims to ensure that results from individual (site, time) samples meet reliability criteria: how are these determined? How would one decide whether to relax some of them so as to add more sites or times, or tighten others due to health risks? (p. 5)

These comments raise fundamental questions about the Delta RMP monitoring design for current use pesticides and toxicity. As a result of these comments and the External Review in general, the Steering Committee directed the TAC and Pesticide Subcommittee to redesign the monitoring program in time for the FY18/19 workplan.

Initial site selection and other design considerations were based on subcommittee member knowledge of important sources; what is known about where toxicity might occur and be detectable; spatial and temporal variability in pesticide concentrations based on the existing monitoring data; important influencing factors of loads and concentrations, such as flows and tides; etc. The subcommittee decided on initially monitoring fewer sites more frequently to develop a baseline for trend analysis, potentially identifying pesticide sources to the Delta, and in part for the need to better understand temporal variability relative to flow. The need to also characterize the interior Delta was discussed. However, flows in the interior Delta are more difficult to characterize and there were time and budget constraints for dealing with these challenges, and a feasible compromise was necessary to get the monitoring started in a timely way. The selected sites are critical integrator and/or representative indicator sites representing the most important sources to the inner Delta:

1. Sacramento R @ Hood: terminus site for the Sacramento River watershed, the largest tributary to the Delta. Integrator site with a variety of land uses upstream.
2. San Joaquin R @ Vernalis: terminus site for the San Joaquin River watershed. Integrator site with a variety of land uses upstream.
3. San Joaquin River @ Buckley Cove: the main stem San Joaquin River, below the influence of the Stockton urban area. Integrator site with a variety of land uses upstream.
4. Mokelumne R @ New Hope Rd: represents the most important tributary influences (Mokelumne and Cosumnes Rivers) at the eastside boundary. Integrator site with a variety of land uses upstream.

5. Ulatis Creek @ Brown Road: represents agricultural and urban influences in the North Delta discharging to the ecologically significant Cache/Prospect Slough complex.

These integrator sites were selected by the Pesticide Subcommittee with an understanding of the hydraulics of the Delta, the upstream land uses, and results from previous pesticide and toxicity monitoring by other programs. Documentation of all the existing data on which these decisions were formed was beyond the scope of the initial design effort.

The rationale behind selecting the peripheral “integrator” sites was to characterize the spatial and temporal variations in loadings to the inner Delta as a first step. A monitoring design to measure loads of pesticides to the Delta is an appropriate first step toward understanding conditions in the inner Delta. Interior Delta sampling locations were intended to be included in future work plans after a 1-2 year baseline was established for these integrator sites.

We concur that an alternative sampling design could be based on modeling or probabilistic surveys and the committees will consider these alternatives for the redesign. Both of these options have the advantage of covering more of the surface area of the Delta and being more amenable to analytical techniques to optimize data quality objectives, sampling locations, and frequency. A probabilistic design was discussed as an option for monitoring the interior of the Delta in the next program phase, once the spatial and temporal variability of contributions from important sources to the inner Delta would be better characterized. Next planned steps in the re-design are expected to involve a re-evaluation of the assessment questions (and their linkage to monitoring questions). When completed, decisions on the best monitoring design to address the new or refined questions can be made.

Data products

- a. *The vague categories used (non-toxic, some, moderate and high: MDS p. 26, 27) are not useful. (p. 7)*

Proposed data products will be re-evaluated, based on the outcomes of the re-design, refined assessment questions, and pending decisions on thresholds to be used for comparison.

The pie charts referred to here are shown as an example for a potential format to communicate complex toxicity data to a non-expert audience. The pie charts and categories are those used by the SWAMP and the California Water Quality Monitoring Council's MyWaterQuality Portals for assessment and graphical display of toxicity data. Some program participants consider them as useful for summarizing toxicity data for managers.

However, the committees haven't reached consensus on what would constitute useful data products and this issue needs to be resolved as part of the re-design process.

- b. *The main value of plots is to convey much information clearly and succinctly, but thought and explanatory text are often needed; MDS, p. 28, contains much information but is uninterpretable (other than high scores for Diuron). (p. 9)*

This plot served as an example for how to visualize temporal and spatial variability across different pesticides in a single graph. More refined graphs with actual Delta RMP data and more detailed explanations will be developed for the 2-year summary report.

References

- Central Valley Regional Water Board. 2007. Resolution No. R5-2007-0161: Water Board's actions to protect Beneficial Uses of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2007-0161_res.pdf
- Denton DL, Diamond J, Zheng L. 2011. Test of Significant Toxicity: A statistical application of assessing whether an effluent or site water is truly toxic. *Environ Toxicol Chem* 30(5):1117-1126.
- EPA. 2002a. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition. EPA-821-R-02-013
- EPA. 2002b. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012
- EPA, 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Technical Document. EPA 833-R-10-004. Office of Wastewater Management. Washington DC.
- Hoogeweg CG, Williams WM, Breuer R, Denton D, Rook B, Watry C. 2011. Spatial and Temporal Quantification of Pesticide Loadings to the Sacramento River, San Joaquin River, and Bay-Delta to Guide Risk Assessment for Sensitive Species. CALFED Science Grant #1055. Nov, 2 2011. 293 pp.
- Johnson, M.L., Werner, I., Teh, S., Loge, F. 2010. Evaluation of chemical, toxicological, and histopathological data to determine their role in the Pelagic Organism Decline.

University of California, Davis, California. URL
http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/contaminant_synthesis_report.pdf

- Kuivila KM, Foe CG (1995). Concentrations, transport, and biological effects of dormant spray pesticides in the San Francisco Estuary, California. *Environmental Toxicology and Chemistry* 14: 1141–1150.
- Lundberg K, Laurenson B (2012). Summary of 2011/2012 Sacramento stormwater toxicity sampling and analysis. Memorandum to Delia McGrath, City of Sacramento, Ken Ballard, Sacramento County, Vyomini Pandya, SRCSD.
- Macdonald, D.D., Ingersoll, C.G., Berger, T.A., 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Arch Environ Contam Toxicol* 39, 20-31.
- Markewicz D, Stillway M, Teh S. 2012. Toxicity in California Waters: Central Valley Region. California State Water Resources Control Board, Sacramento, CA. 38 pp.
- State Water Resources Control Board. 2010. 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report).
http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtm
- State Water Resources Control Board, Central Valley Regional Water Quality Control Board, and San Francisco Bay Regional Water Quality Control Board. 2008. Strategic Workplan for Activities in the San Francisco Bay/Sacramento- San Joaquin Delta Estuary.
http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/strategic_plan/docs/baydelta_workplan_final.pdf.
- Werner I, Deanovic LA, Markewicz D, Khamphanh J, Reece CK, Stillway M, Reece C. 2010. Monitoring acute and chronic water column toxicity in the northern Sacramento-San Joaquin Estuary, California, USA, using the euryhaline amphipod, *Hyaella azteca*: 2006-2007. *Environmental Toxicology and Chemistry* 29(10): 2190–2199.
- Weston D, Poynton HC, Wellborn G, Lydy M. 2012. Variation in contaminant sensitivity among *Hyaella azteca* from different sources. Society of Environmental Toxicology and Chemistry North America 33rd Annual Meeting. Long Beach, CA, SETAC.
- Weston DP, Holmes RW, You J, Lydy MJ. 2005. Aquatic toxicity due to residential use of pyrethroid pesticides. *Environmental Science and Technology*, V. 39, p. 9778–9784.
- Weston DP, Lydy MJ. 2010. Urban and Agricultural Sources of Pyrethroid Insecticides to the Sacramento-San Joaquin Delta of California. *Environmental Science & Technology*, 44(5): 1833-1840.

Table 1. Summary of Delta RMP Pesticide Monitoring (implemented in FY15-17).

Component	Water Sampling
Design	“Bare Bones” 5 baseline sites
Frequency	Monthly (captures 2 wet events: first flush and 2 nd significant winter storm)
Toxicity	All samples
Chemistry	All samples
Pesticide-focused TIEs	Up to 20% of samples found \geq 50% toxic for at least one endpoint (not to exceed \$40,000)

Response to Review Panel Comments on the Pathogen Design from the Pathogen Subcommittee

We appreciate the thoughtful and thorough review of the Delta RMP monitoring design by the Panel. Responses to Review Panel comments and questions specific to the pathogen monitoring design are provided below. Most comments can be addressed by providing the Panel with additional background information about the Central Valley Drinking Water Policy Basin Plan Amendment¹ (Basin Plan Amendment), which is the regulatory driver for the pathogen study. The Basin Plan Amendment was adopted by the Central Valley Regional Water Quality Control Board on July 26, 2013, to protect drinking water source quality. The Policy includes a narrative water quality objective for two pathogens, *Cryptosporidium* and *Giardia*, with associated implementation and monitoring provisions, as well as language addressing other constituents of potential concern to drinking water. The proposed Pathogen Study is intended to satisfy the data needs and monitoring for any follow-up required if Basin Plan “trigger” values are exceeded. The Basin Plan Amendment specified an implementation program designed to maintain existing conditions for public water systems, and included the Long Term 2 Enhanced Surface Water Treatment Rule (LT2)² bin levels and an 80% “trigger.” The trigger is the *Cryptosporidium* concentration reaching 80% of the next highest bin level at a drinking water intake.

In the following section, quoted comments from the review are shown in italics followed by a response. The page number from the report from which the quote was taken is listed after the quote. Similar comments are grouped together with one response.

Responses to Specific Questions and Comments on the Pathogen Design

How are the sites called “general characterization” (MDS, p. 61) to be used? The Fact Sheet for Pathogens (p. 6-7) says monitoring for ambient levels and sources “should entail representative discharge /effluent locations such as wetlands, urban runoff, POTWs, agricultural/farmland animal areas.” It is not apparent that the locations selected for the study are near such areas (see Figure, MDS, p. 62). (p. 8)

The “general characterization” sites (Sacramento River at Hood, Rock Slough, Old River) are “integrator sites,” and are representative of multiple sources (e.g., Hood is downstream of urban runoff, POTWs, and agriculture). They are representative of conditions in the Delta between potential sources of interest and existing or proposed water intake or export locations. When considered in conjunction with the source-specific sites, they can inform the source evaluations if a follow up investigation in response to a trigger exceedance is needed (i.e., if a trigger signal persists upstream toward the sources).

¹http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/resolutions/r5-2013-0098_res.pdf#page=7

²<https://www.gpo.gov/fdsys/pkg/FR-2006-01-05/pdf/06-4.pdf>

MDS, p. 14. Pathogens - Cryptosporidium and Giardia only have narrative WQO - "Waters shall not contain C and G in concentrations that adversely affect ...MUN beneficial uses." What is that level? How do we know what a reasonable detection limit needs to be? (p. 8)

The Basin Plan Amendment defined that the narrative objective is for the public water system component of the MUN beneficial use. The Basin Plan Amendment specification of the LT2 bin levels and the 80% "trigger" are designed to maintain existing conditions for public water systems, and therefore support the narrative water quality objective. The Basin Plan Amendment notes that a trigger exceedance is not an exceedance of the narrative water quality objective, but may prompt action from the Regional Water Board.

The Delta RMP Pathogen Study is designed to fulfill the special study requirement described in the Basin Plan Amendment. The Basin Plan Amendment specifies that the special study will be performed in conjunction with drinking water intake LT2 monitoring, and the LT2 program specifies use of EPA Method 1623. LT2 bin levels consider method performance, including factors of safety for protection of the drinking water beneficial use. A reasonable detection limit and analytical method should then be consistent with the acceptance criteria in EPA Method 1623.

MDS, p. 60. This involves "triggers". What are they and how are they determined? (p. 8)

The "trigger" is specified in the Central Valley Drinking Water Policy Basin Plan Amendment. The Basin Plan Amendment defines the trigger as the *Cryptosporidium* concentration reaching 80% of the next highest bin level at a drinking water intake. The *Cryptosporidium* concentrations corresponding with the bin level classifications are defined by the LT2. The 80% value was used in the Basin Plan Amendment to provide an additional factor of safety so that drinking water agencies may have additional time to plan for or perform management actions to prevent bin level changes.

MDS, p. 61. Fate and transport should include a consideration of hydrodynamics. How will sources be identified with this study design? (p. 8)

Special study/studies would be performed during Year 2 if a likely trigger exceedance is detected at a drinking water intake. Within the section describing the Year 2 Special Studies, the Design Summary includes a description of hydrodynamic modeling that could be performed. It is anticipated that the water quality data used in conjunction with the

hydrodynamic fingerprinting would be used to identify the boundaries and inform a more detailed fate and transport evaluation, if necessary.

During the Year 2 Special Studies, sources could be discerned using the flowchart process. The process for the source evaluation includes an external data evaluation (WWTP monitoring, other monitoring, and from literature review), and microbial source tracking if there is sufficient detection at an intake or source location.

QAPP, p. 31. Another program is also collecting pathogens at different sites? Are the analytical methods, quantification limits, etc. similar between the lab that MWQI uses and that which RMP uses? (p. 8)

MWQI is collecting ambient pathogen samples for the Delta RMP, and there is no separate ambient sampling taking place. Drinking water agencies are concurrently collecting monthly samples at their intakes, and many of them are using the same labs as the RMP. The LT2 program specifies approved analytical methods and laboratories that can perform the work. Both concurrent efforts are following LT2 requirements.

"MWQI ... at each of the locations shown in Table A-1..." There is no Table A-1. (p. 8)

Thank you for the feedback. This reference is incorrect, and should refer to the table of ambient monitoring locations in the Delta RMP monitoring design study (page 63).

QAPP, p. 112. Table 3.5 lists values for Cryptosporidium only - are those values what the monthly sampling will be compared against? What will the Giardia sample results be compared against? (p. 8)

Table 3.5 contains the bin level classifications are defined by the LT2. The *Cryptosporidium* concentrations corresponding to the bin levels are the highest annual running arithmetic mean concentration. There is no similar requirement for *Giardia*, as the LT2 establishes the bin levels for *Cryptosporidium* to ensure that drinking water treatment processes will also remove other pathogens (e.g., *Giardia*, viruses) from intake water. While *Giardia* results are not specifically used for trigger values, they will be evaluated for spatial trends and co-occurrence with other factors (e.g., triggers, storm events, etc.).

Meeting Materials for Item 9

Delta Regional Monitoring Program

Charter



Prepared for
Delta RMP Steering Committee
Approved
July 20, 2016

[Showing Proposed Revisions as of 1/19/17](#)

Delta RMP Charter
Revised Draft 1/19/17

1. Introduction

The Delta Regional Monitoring Program (RMP) was initiated by the Central Valley Regional Water Quality Control Board with the primary goal of tracking and documenting the effectiveness of beneficial use protection and restoration efforts through comprehensive monitoring of water quality constituents and their effects in the Delta. The development of the Delta RMP was initially prompted by the collapse of the populations of several species of fish in the early 2000s, an event that triggered new inquiries into the potential role of contaminants in what is now termed the Pelagic Organism Decline (POD). However, these inquiries highlighted shortcomings of existing monitoring efforts to address questions at the scale of the Delta. The recognition that data from current monitoring programs were program specific, sometimes duplicative, inadequate in coverage, could not easily be combined, and were not adequate to support a rigorous analysis of the role of contaminants in the POD persuaded regulatory agencies of the need to improve coordination across multiple monitoring programs.

In addition, the Delta RMP reflects an increasing desire among water quality and resource managers throughout the state for more integrated information about patterns and trends in ambient conditions across watersheds and regions. Moreover, many stressors on beneficial uses are interrelated and must be addressed more holistically. The Delta RMP can be seen as a complement to existing larger-scale collaborative monitoring efforts throughout the state that attempt to address questions and concerns about regional conditions and trends (e.g., San Francisco Bay RMP, Southern California Bight Monitoring Program, Surface Water Ambient Monitoring Program).

2. Definitions

- a. *“Annual Program Workplan”* means the detailed plan of activities and the budget for implementing the Program each year as approved by the Steering Committee.
- b. *“Aquatic Science Center”* or *“ASC”* means the joint powers agency, created July 1, 2007, by a Joint Powers Agreement between the Bay Area Clean Water Agencies and the State Water Resources Control Board for the purpose of assisting with the efficient delivery of financial, scientific, monitoring, and information management support functions. The San Francisco Estuary Institute (SFEI), a California 501(c)(3) non-profit corporation, serves as the administrative agency for the Aquatic Science Center.
- c. *“Central Valley Regional Water Quality Control Board”* or *“Regional Board”* is the regulatory authority for overseeing the Clean Water Act, California Water Code, and associated permits in the Delta.
- d. *“Coordinating Committee”* means the facilitating committee made up of the Steering Committee Co-Chairs, one representative from the Implementing Entity, one representative from the Central Valley Regional Water Quality Control Board, and the facilitator.
- e. *“Cost Allocation Schedule”* means the document, developed by the Program Participants and approved by the Steering Committee, which specifies the amount of money that each group of Participants will contribute to the Program each year.
- f. *“Delta Regional Monitoring Program”* or *“Delta RMP”* or the *“Program”* means the stakeholder effort to provide improved Delta monitoring and data evaluation.
- g. *“Facilitator”* Facilitates Steering Committee meetings at the discretion of the Steering Committee, and participates on the Coordination Committee.
- h. *“Finance Subcommittee”* The Finance Subcommittee is comprised of one representative each from Regulatory, Water Supply, Publicly Owned Treatment Works, Stormwater, and Agriculture, of whom three form a quorum. The Co-Chairs of the Steering Committee (SC), or their designee, will hold two of the five seats on the Finance Subcommittee representing a regulatory and regulated category.

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- i. *“Implementing Entity”* means ASC, which with respect to the Delta RMP will be responsible for implementing the Program activities and the financial management of the Program with oversight from the Steering Committee.
- j. *“Participants”* means individual agencies or organizations that provide financial contributions and/or in-kind services for Delta RMP activities, which includes regulatory agencies, resource agencies, water supply, coordinated monitoring programs, wastewater treatment agencies, stormwater municipalities, and irrigated agriculture coalitions.
- k. *“Participant Groups”* means groups of similar types of Participants such as publicly owned treatment works (POTWs), stormwater agencies, agricultural coalitions, water supply, coordinated monitoring programs, and regulatory agencies.
- l. *“Regulatory Agencies”* means agencies administering state and federal water quality regulations, i.e. Central Valley Regional Water Quality Control Board, State Water Resources Control Board, and United States Environmental Protection Agency.
- m. *“Representative”* means a person who represents a particular Participant Group on a committee (see Attachments 1 and 2 for a list of representatives).
- n. *“Resources Agencies”* means a state or federal agency responsible for the conservation, management, and enhancement of natural and cultural resources; including land, wildlife, water, and minerals.
- o. *“Revenue Subcommittee”* is a group of Steering Committee members charged with identifying opportunities for generating revenue for the Program through grant solicitations, cost-sharing, and coordination with other programs. Participation is voluntary and will include at least three Steering Committee members that are most appropriate.
- p. *“Steering Committee”* or *“SC”* means the decision-making body of the Delta RMP. The core responsibilities and authorities of the Steering Committee are to determine the overall budget, allocate program funds, track progress, and provide strategic direction and priorities for the Program and the TAC, from a manager’s perspective.
- q. *“Subcommittee”* is a group convened by the Steering Committee or Technical Advisory Committee to evaluate an issue and to report findings back to the larger group. Subcommittees serve at the direction of the Steering Committee or Technical Advisory

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Committee and consist of representatives from the Steering Committee, Technical Advisory Committee and other sectors such as academia, nongovernmental organizations, governmental organizations and industry.

- r. *“Technical Advisory Committee” or “TAC”* means the advisory body that provides technical advice to the Steering Committee. The TAC makes recommendations to the Steering Committee based on technical evaluation of proposed or existing program elements, and based on priorities set by the Steering Committee. Responsible for developing and revising the monitoring design based on Steering Committee direction and priorities.

3. Mission

The Program's mission is to inform decisions on how to protect, and where necessary, 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.

4. Goals and Objectives

The primary goal of the Delta RMP is to provide coordinated Delta-wide monitoring, reporting, and assessment of water quality¹, while pursuing the following objectives:

1. Improve the efficiency of water quality data collection and management in the Delta;
2. Generate products that inform and educate the public, agencies, and decision makers;
3. Raise awareness of Delta water quality conditions and how they impact beneficial uses;
and
4. Foster independent science, objective peer review, and a transparent review process.

¹ See Attachment 3 for information about Regional Board use of Delta RMP data for permit compliance.

5. Management Questions

Delta RMP participants have articulated core management questions that organize and guide RMP studies:

Type	Management Questions
Status and Trends	<p>Is there a problem or are there signs of a problem?</p> <ol style="list-style-type: none"> Is water quality currently, or trending towards, adversely affecting beneficial uses of the Delta? Which constituents may be impairing beneficial uses in subregions of the Delta? Are trends similar or different across different subregions of the Delta?
Sources, Pathways, Loadings, and Processes	<p>Which sources and processes are most important to understand and quantify?</p> <ol style="list-style-type: none"> Which sources, pathways, loadings, and processes (e.g., transformations, bioaccumulation) contribute most to identified problems? What is the magnitude of each source and/or pathway (e.g., municipal wastewater, atmospheric deposition)? What are the magnitudes of internal sources and/or pathways (e.g. benthic flux) and sinks in the Delta?
Forecasting Water Quality Under Different Management Scenarios	<ol style="list-style-type: none"> How do ambient water quality conditions respond to different management scenarios? What constituent loads can the Delta assimilate without impairment of beneficial uses? What is the likelihood that the Delta will be water quality-impaired in the future?
Effectiveness Tracking	<ol style="list-style-type: none"> Are water quality conditions improving as a result of management actions such that beneficial uses will be met? Are loadings changing as a result of management actions?

6. Principles of Operation

The Delta RMP’s Principles of Operation form the foundation of Program activity and are described below.

- Focus on the Delta:** The geographic scope of the Delta RMP encompasses the legal Delta (as defined by Section 12220 of the California Water Code), including water bodies that directly drain into the Delta, Yolo Bypass, and Suisun Bay. In addition, the base monitoring and special studies of the Delta RMP may extend upstream, if required to address specific management questions. Because Suisun Bay is outside the jurisdiction of the Central Valley Regional Board, sampling here will require coordination and collaboration with the San Francisco Bay RMP.
- Focus on the highest priority water quality information needs:** A strategic planning process ensures that the Delta RMP focuses on the highest priority water quality information needs for beneficial use protection and restoration in the Delta.
- Contribute to a holistic understanding of the Bay-Delta:** The Delta Science Plan will serve as a framework that contributes to a holistic understanding of the Bay-Delta and, thus, as a conduit for tying Delta RMP monitoring and assessment activities to the Delta Science Plan adaptive management approach.
- Leverage activities and resources:** The Delta RMP will leverage activities and resources by building on and partnering with existing programs, initiatives, and organizations to the extent possible. The Summary of Current Water Quality Monitoring Programs in the Delta (http://www.waterboards.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program/draftfinal_deltamon_25nov09.pdf) and the Central Valley Monitoring Directory (centralvalleymonitoring.org) provide information that might be helpful in identifying potential partners.
- Operate with clearly described and transparent processes and agreements:** Clearly described and transparent processes and agreements will guide the program

Commented [DW1]: The suggestions below are more editorial in nature so that there is consistency in reading.

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Commented [DW2]: Need a verb – recommend something like Operate with a clearly described and transparent process. Not sure how “and agreements” fits.

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governance and its operations. Following governance ground rules established by the SC, all stakeholders have the opportunity to participate in the RMP.

- **Adaptability and flexibility:** Frequent committee and workgroup meetings and periodic program reviews will maintain the Delta RMP's capacity to adapt in response to changing management priorities and advances in scientific understanding. Pilot and special studies constitute a mechanism for responding quickly to new information and/or concerns, assessing new technical approaches, investigating particular questions that have defined scientific, management, or regulatory endpoints, and evaluating new directions for the Delta RMP as a whole.
- **Collaborative culture:** Fostering a collaborative culture will enable participants to work together to address multiple competing and potentially conflicting interests (such as habitat restoration, flood protection, water supply, and human and wildlife consumption of fish) in an environment that encourages objectivity, consensus-building, and science-based decision making.

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7. Governance

As shown on Figure 1, the Steering Committee (SC) is the decision-making body of the Delta RMP, overseeing the Implementing Entity and reviewing recommendations of the Technical Advisory Committee (TAC) and Subcommittees.

7.A Steering Committee (SC)

The SC is responsible for establishing the Program's strategic direction and the policies and procedures that govern its operation. It is responsible for authorizing the implementation of agreements among the Participants, specifically:

- Directs the Implementing Entity to request and receive federal, state, local, and private funds from any source and to expend those moneys to accomplish the Delta RMP's goals;
- Approves budgets and expenditures;
- Directs the Implementing Entity to enter into partnerships, contracts, and other legal agreements on behalf of the Delta RMP, as necessary to fulfill the Delta RMP's mission;
- Approves Delta RMP work products and any other plans, products, or resolutions of the Delta RMP;
- Provides direction to TAC on priorities, constraints, and management questions to develop technical recommendations and products within the resource allocations determined by the Steering Committee;
- Convenes a joint meeting with the TAC as necessary to communicate priorities and funding allocations;
- Selects, convenes, and oversees subcommittees to provide guidance on specific issues on an as needed basis; and

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- Establishes and oversees the implementation of policies and procedures necessary to the day-to-day functioning of the Delta RMP.

7.A.1 Steering Committee Membership

The Steering Committee has seats for representatives from each of the following Participant Groups:

- 3 seats for publicly owned treatment works (POTWs) ideally representing small, medium and large POTWs;
- 3 seats for stormwater agencies, ideally one representing large cities and two representing smaller cities;
- 1 seat for coordinated monitoring;
- 1 seat for water supply;
- 2 seats for irrigated agriculture;
- 1 seat for the resources agencies; and
- 3 seats for regulatory agencies.

Commented [P3]: In response to Debbie Webster's comment "I don't think we should specifically call these out."

Deleted: (USEPA, State Water Resources Control Board, and Central Valley Regional Water Quality Control Board);

See Figure 1, Organization Chart for Delta RMP.

Each SC member is responsible for working with agencies in their Participant Group to bring common interests forward. The SC may add seats for other Participant Groups or adjust the number of seats for certain Participant Groups by using its decision-making procedures to change the Charter.

The SC has agreed that a Participant Group can hold a seat on the SC, without contributing to the Program financially, but is not allowed to vote on financial issues. See Section 8 on Adequate Participation for more discussion of this issue.

Membership on the SC will not diminish the regulatory responsibilities or authority of any participating agency or organization.

SC members shall serve at the discretion of the Participant Groups they represent (i.e., they may be removed at any time) and shall be explicitly reconfirmed every two years. An individual representing a Participant Group can serve indefinitely with the support of their group.

Attachment 1 contains the most recent roster of SC members. This attachment may be updated as needed without requiring a vote to update the whole Charter document.

7.A. 2 Steering Committee Representative Resignation and Replacement

Representatives may resign from the SC at their choosing. If this occurs, the Participant Group will be notified and will be requested to select a new Representative for the Group. The Representative resigning will provide written resignation communication (e.g., letter, email) to the Steering Committee Co-Chairs, the Implementing Entity, and any other Steering Committee representatives of that Participant Group.

7.A.3 Steering Committee Co-Chairs

Steering Committee Co-Chairs serve as chair of the meetings, facilitate discussion, and encourage members to participate in discussions. The Co-Chairs have an oversight role and are responsible for the overall functioning of the committee. The SC will select or reaffirm the Co-Chairs once per year using its decision-making process. Co-Chairs have no term limits and may continue to serve annual terms indefinitely with support of the SC. One Co-Chair represents a regulatory Participant Group and one Co-Chair represents a regulated Participant Group.

7.A.4 Steering Committee Subcommittees

The SC may convene subcommittees to focus on issues of particular concern on an as-needed basis. These subcommittees will report to the SC and may consist of Representatives of the Participant Groups on the SC as well as external experts in the subject of interest. The SC will determine the makeup of Participant Groups on the subcommittee and evaluate the need for external expertise (e.g., legal, financial, governance, etc.).

Coordinating Committee

The Coordinating Committee is comprised of the Steering Committee Co-Chairs, one representative from the Implementing Entity, one representative from the Central Valley Regional Water Quality Control Board, and the facilitator. The committee is responsible for setting the agenda for the Steering Committee, reviewing Steering Committee meeting summaries and record of decisions, communicating action items to the Technical Advisory Committee, and providing clarifications to the Implementing Entity required to fulfill their contractual obligations and be responsive to the Participant Groups. A TAC co-Chair may attend by invitation of the Coordinating Committee.

The Coordinating Committee has the following specific responsibilities:

- Review and confirm the record of decision by the Steering Committee as prepared by the Implementing Entity.
- Review and confirm the summary of Steering Committee action items prepared by the Implementing Entity for other Committees, Subcommittees, and Participants. In cases where interpretation of Steering Committee directions are necessary, the Steering Committee will be consulted for issues related to participant membership or any financial issues. For other clarifications, the Coordinating Committee will document clarifying interpretations they make as part of the record of decision.

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- As necessary, refine and clarify direction provided by the Steering Committee to the TAC and the Implementing Entity.
- Respond to clarifying questions from Participant Groups and committees.
- Coordinate report backs from committees and Participant Groups on action items from the Steering Committee.
- Review Steering Committee meeting agendas that the Implementing Entity has prepared.

The Coordinating Committee will meet within two weeks following Steering Committee meetings to review outcomes and action items and at least two weeks before Steering Committee meetings to set the agenda.

Finance Subcommittee

The Finance Subcommittee is responsible for reviewing financial planning documents, policies, goals, budgets, revenue, and expenditures, assuring that support for the mission and strategic goals of the Delta RMP are maintained. The Finance Subcommittee also reviews the Delta RMP's financial performance and proposes recommendations to the Steering Committee.

The Finance Subcommittee's specific responsibilities include:

- Recommending policies to the SC that maintain and improve the financial health and integrity of the Delta RMP.
- Reviewing draft long-term and short-term budgets and work plans for the Delta RMP.
- Recommending actions to improve program efficiency and identify potential cost savings to the SC.
- Reviewing expenditures.

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- Reviewing and approving unbudgeted operating expenses that, per the SC-approved policy (See Section 8.D), are above the Implementing Entities authority (\$5,000) but below the threshold (\$25,000) required for SC approval.
- Reviewing the financial aspects of new contracts and services, as well as proposals to discontinue programs or services, and making action recommendations to the SC.
- Monitoring and evaluating the financial performance of the Delta RMP, comparing budgets and long term financial trends to other regional monitoring programs.
- Recommending and monitoring corrective actions to keep the Delta RMP in-line with its budget and other financial targets.

The Finance Subcommittee will meet quarterly before the Steering Committee meetings for reviewing finances from the Implementing Entity. The Implementing Entity will provide financial information in a format that meets the Finance Subcommittee needs on a quarterly basis, three weeks before Steering Committee meetings. The Finance Subcommittee will provide comments on the financial information to the Implementing Entity two weeks before the Steering Committee meeting so that the Implementing Entity can address them before submitting the report to the Steering Committee one week before the meeting. The Finance Subcommittee will report and make recommendations to the Steering Committee when necessary.

Revenue Subcommittee

The Revenue Subcommittee is a group of Steering Committee members charged with identifying opportunities for generating revenue for the Program through grant solicitations, cost-sharing, and coordination with other programs. The Revenue Subcommittee does not have defined membership nor rules for a quorum. Participation is voluntary and will include at least three Steering Committee members that are most appropriate.

7.A.5 Notice of Meetings and Frequency

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All SC meetings must be noticed, which consists of e-mail distribution of the meeting date, time, and agenda at least one week prior to the meeting. The SC meets quarterly and the agenda package is distributed through the State's lyris web service as well as posted on the Delta RMP website² prior to the meeting. In addition, draft meeting summaries, specifically intended for only the SC, will be distributed via a separate e-mail list to SC members and their alternates for review and comment prior to posting of the final meeting summary on the Program's website.

7.A.6 Steering Committee Decisions

A quorum is necessary for any decisions to be made by the SC; a quorum is defined as 50% or more of the SC members and 50% or more of the Participant Groups (e.g., POTW, agricultural, stormwater, etc.). A quorum may be established at any time during the meeting and, once established, will continue to exist for purposes of decision making even if the number of SC members present drops below the level defining a quorum (e.g., if one or more members leave the meeting).

Decisions are made by the SC through consensus unless one or more of the SC members dissent or for important decisions such as budget approvals, in which case the Chairs will call for a vote. If voting is required, a simple majority of the SC members will be required for a decision. Decisions can only be made for items that are on the agenda. Some decisions that are time sensitive or less significant can be made via e-mail or telephone conference, but only if these items have previously been discussed in a SC meeting.

² http://www.swrcb.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program

7.B. Technical Advisory Committee (TAC)

Under direction of the SC, the TAC provides technical support to the Delta RMP. It consists of technical representatives from the Delta RMP Participant Groups, with technical and administrative support from the Implementing Entity.

The TAC makes recommendations to the SC based on technical evaluation of proposed or existing program elements. The TAC provides technical recommendations with options and justifications based on the priorities and resource allocations set by the SC. The SC then considers TAC recommendations in formulating their decisions. Recommendations should be reached through consensus. In the event that the TAC representatives cannot come to consensus on a recommendation, majority and minority opinions should be reported to the SC (See Section 7.B.6 for more details on the TAC decision-making process). The Coordinating Committee communicates SC direction to the TAC through the Implementing Entity and the TAC Co-Chairs.

The responsibilities of the TAC are to:

- respond to action items and specific requests from the Steering Committee as communicated through the record of decision and action item compilation prepared by the Implementing Entity and reviewed by the Coordinating Committee;
- assist the SC in developing, reviewing, and revising the Delta RMP's monitoring design and special studies to ensure responsiveness to the management and assessment questions, consistent with the priorities and funding set by the Steering Committee;
- report to the SC on technical issues and guide the development of white papers as requested by the SC;
- select and convene subcommittees to develop monitoring designs and provide guidance on specific technical issues, with members drawn from both within and outside the TAC, as needed, to include specialized scientific or technical expertise not fully represented on the TAC;

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- review subcommittee recommendations to the Steering Committee for monitoring design and other technical requests from the Steering Committee;
- provide technical review and recommendations to the SC on project proposals;
- provide technical review and recommendations to the SC on policies being considered for adoption;
- provide technical review of the planning, development, and publication of Delta RMP communication products, including the *Pulse of the Delta* report;
- request clarification from the Coordinating Committee/Steering Committee if instructions or action items to the TAC are unclear; and
- work collaboratively to examine technical issues and develop advice and recommendations for the SC.

Commented [DW5]: What does entail, this seems a bit circular.

Commented [P6R5]: No change made. The SC asks the TAC for review and recommendations. The text seems clear to me but we can make changes if I am missing something.

Deleted: and

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The TAC consists of experts in water quality, estuarine science, and related fields who are able to provide scientific opinions on the broad range of subject areas related to the Delta RMP's activities. Finally, TAC members

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7.B.1 Technical Advisory Committee Membership

The TAC consists of experts in water quality, estuarine science, and related fields who are able to provide scientific opinions on the broad range of subject areas related to the Delta RMP's activities. TAC members will be drawn from Participant Groups represented on the SC. Each designated SC member designates one person to sit on the TAC. Thus, the membership of the TAC consists of technical representatives of the groups represented on the SC. That is, membership of the TAC will reflect the membership of the SC (i.e., there will be the same number of representatives from each of the Participant Groups on the TAC and the SC).

Deleted: voting

TAC members shall serve at the discretion of the Participant Groups they represent (i.e., they may be removed at any time) and shall be explicitly reconfirmed every two years. An individual representing a Participant Group can serve indefinitely with the support of their group.

Commented [m7]: confirm with SC when this will start

Commented [P8R7]: Members do not have "terms". The rosters are just updated each year. See separate memo dated December 6, 2016.

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In particular instances (e.g., a represented group has only a few staff with the appropriate expertise), a SC member or alternate may serve on the TAC. If a particular issue comes up that may create a conflict of interest, the SC member serving on the TAC would recuse themselves from decisions on the SC.

A conflict of interest may also arise if members of the TAC or its subcommittees have a direct financial interest in a funding recommendation or decision (e.g., a consultant or researcher intending to bid on a contract for a proposed program activity). The participation of local scientists in planning processes can bring tremendous value to the RMP, but the RMP needs to ensure that the monitoring that is recommended and performed is not inappropriately biased by scientists who may have a conflict of interest. In cases where a conflict of interest exists, the TAC or subcommittee members will recuse themselves from funding recommendations. External peer review of workplans and products by scientists with no financial interest in the work to be done is essential not only to attaining high standards of scientific rigor, but also to provide a mechanism for preventing the inappropriate influence of scientists with a conflict of interest. This practice is consistent with the Conflict of Interest Policy in Section 8.

Attachment 2 contains the current roster of the TAC members. This attachment may be updated as needed without requiring a vote to update the whole Charter document.

7.B.2 Technical Advisory Committee Representative Resignation and Replacement

Representatives may resign from the TAC at their choosing. If this occurs, the Participant Group will be notified and will be requested to select a new Representative for the Group. The Representative resigning will provide written resignation communication (e.g., letter, email) to the Steering Committee Co-Chairs, TAC Co-Chairs, the Implementing Entity, and any other Steering Committee representatives of that Participant Group.

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7.B.3 TAC Co-Chairs

The Co-Chairs coordinate the TAC's oversight of the technical content and quality of the RMP, co-chair TAC meetings, and help ensure review of all program proposals and technical products. They also provide a communication link between the SC, TAC and Implementing Entity as members of the Coordinating Committee and help ensure consistencies and resolve timing and scheduling issues between the SC, TAC, and subcommittees. The members of the TAC will appoint two Co-Chairs for a two-year term. The selection of the Co-Chairs is subject to review by the Steering Committee. The Co-Chairs can serve indefinitely with the support of the TAC and the SC. A qualified Co-Chair has a broad understanding of scientific issues in the Delta and can provide strong leadership, meeting management, and direction to the group.

Commented [m9]: SC decision needed
* confirm when this should happen
* reconcile with fact that Joe and Stephen aren't TAC members (not appointed by SC seats)

See separate briefing memo dated December 6, 2016.

7.B.4 TAC Subcommittees

If there is need for additional expertise, subcommittees may be formed that report to the TAC. The subcommittees may have representatives from the Participant Groups as well as other sectors, such as academia, nongovernmental agencies, government agencies, and industry. The TAC will determine the makeup of Participant Groups on the subcommittee and evaluate the need for external expertise. If a subcommittee composition is not agreed upon by the TAC, the Steering Committee will determine the subcommittee members, considering recommendations from the TAC. A subcommittee formed to develop a specific monitoring design should be consulted about modifications to the subcommittees recommended design before any changes are presented to the TAC for recommendations to the Steering Committee. In addition, the TAC may recommend to the SC that the Implementing Entity convene appropriate science advisory panels and/or independent experts for program reviews, specific projects, initiatives, reports, and studies.

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7.B.5 Notice of Meetings and Frequency

The TAC meets quarterly and the agenda package is posted on the Delta RMP website³ one week prior to the meeting. In addition, the agenda and relevant materials are sent by electronic mail to the TAC members.

7.B.6 TAC Decisions

Because the TAC makes technical recommendations to the SC, and not policy decisions, there is no formal procedure for voting. In the event that the TAC representatives cannot come to consensus on a recommendation, majority and minority opinions will be noted verbally at the meeting and described in the meeting summary. The TAC Co-Chairs will coordinate with the Coordinating Committee to ensure that the meeting summary prepared by the Implementing Entity adequately documents majority and minority viewpoints of the seated representatives. The **meeting summary** is the primary tool to communicate TAC discussions to the SC for SC resolution, and will include direct responses to SC requests and directives. If the recommendations do not reflect broad Participant input due to lack of attendance at a meeting, those not in attendance will be afforded an opportunity to weigh in on preliminary recommendations via email, conference calls, or another meeting, if necessary.

Commented [m10]: Stephen McCord:
Confirm with the SC that I can stop producing the TAC Highlights. Those weren't budgeted and we're slimming the meeting summary to be more like a Highlights doc anyway.

Commented [P11R10]: This decision was made and documented in the meeting summaries. No need to change the Charter. The "highlights" document was not required by the Charter.

7.C Other Stakeholders

All meetings of the SC and TAC are open to the public. Stakeholders who are not Delta RMP participants will have the opportunity to weigh in by participating in meetings and providing additional project and product review. Stakeholders may also participate in specific technical subcommittees.

³ http://www.swrcb.ca.gov/centralvalley/water_issues/delta_water_quality/comprehensive_monitoring_program

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7.D Implementing Entity

The Implementing Entity oversees and administers the Delta RMP. The main responsibilities of the Implementing Entity are outlined in Table 1. The Implementing Entity works closely with the committee co-chairs and the Coordinating Committee to 1) plan, guide, and lead program activities, 2) ensure planned activities efficiently achieve program goals and objectives, and 3) identify potential issues and challenges as well as options for effectively addressing them. The Implementing Entity is contracted to perform these services and manage the operation of the Delta RMP according to the annual Workplan approved by the SC and within the approved budget.

Table 1. Main responsibilities of the Implementing Entity of the Delta RMP

Responsibilities	Tasks
1. Program management	<ul style="list-style-type: none"> a. Program planning <ul style="list-style-type: none"> • Prepare draft workplans / budgets and present to SC for approval b. Coordinate program activities <ul style="list-style-type: none"> • Act as a liaison between the SC, the TAC, and the TAC subcommittees • Convene the Coordinating Committee to review Steering Committee action items, document directives from the Steering Committee to the TAC and Participant Groups, and review Steering Committee agendas Coordinate with Participants <ul style="list-style-type: none"> • Plan workflow • Track deliverables c. Coordinate collaborating agencies and organizations <ul style="list-style-type: none"> • Organize and participate in meetings to coordinate work and programs d. Contract and financial management <ul style="list-style-type: none"> • Track expenditures • Accounting • Coordinate audits • Provide financial updates to SC and Finance Subcommittee • Develop and oversee contracts • Invoice Participants • Report finances quarterly to Finance Subcommittee for review of budget and work plan e. Technical oversight f. Coordinate peer review g. Review and coordinate review of RMP work products to ensure the quality of deliverables

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<p>2. Governance</p>	<p>a. SC meetings:</p> <ul style="list-style-type: none"> • Prepare agenda packages and background documents; participate in meetings, write meeting summaries, action item follow-up, plan meetings with Coordinating Committee. <p>b. TAC meetings:</p> <ul style="list-style-type: none"> • Prepare agenda packages and background documents; participate in meetings, write meeting summaries, action item follow-up. <p>c. TAC subcommittee meetings</p> <ul style="list-style-type: none"> • Prepare agendas and background documents; participate in meetings, write meeting summaries, action item follow-up and communicate with Coordinating Committee.
<p>3. Communications</p>	<p>a. Implement communications plan</p> <ul style="list-style-type: none"> • Produce and distribute RMP products • Develop and maintain a calendar of RMP communications products • Identify appropriate communication channels and disseminate RMP information • Implement planned events (e.g. annual meeting) • Respond to or coordinate response to inquiries for RMP data and reports, including press calls.

Commented [DW12]: Isn't this done in coordination with the SC leadership?

Commented [P13R12]: No change needed. The text "plan meetings with Coordination Committee" in the bullet provides the appropriate context.

4. Data management	<p><i>Perform and/or coordinate the following activities</i></p> <p>a. Data processing and upload to CEDEN:</p> <ul style="list-style-type: none"> • Format data • Upload RMP results to RDC database and replicate to CEDEN • Coordinate data collection, data management, and laboratories • Track data deliverables and pending issues <p>b. Database maintenance and online data access:</p> <ul style="list-style-type: none"> • Incorporate updates and corrections to data as needed, including re-analyzed results and updates implemented by CEDEN/SWAMP • Provide, maintain, and upgrade web-based data access tools <p>c. Quality assurance:</p> <ul style="list-style-type: none"> • Perform QA/QC review • Develop, maintain, and update Quality Assurance Program Plan (QAPP) • Coordinate interlaboratory comparison tests <p>d. SOPs and templates:</p> <ul style="list-style-type: none"> • Develop and maintain laboratory SOP file system • Provide, maintain, and enhance software tools and processes such as EDD templates • Write and maintain internal SOPs to increase efficiency of data management tasks
5. Sampling Coordination and Logistics	<p><i>Perform and/or coordinate the following activities:</i></p> <ol style="list-style-type: none"> a. Coordinate field sampling b. Prepare sampling plans c. Make maps of sampling locations d. Field sampling e. Ensure delivery of samples to laboratories
6. Analysis, Assessment, and Reporting	<ol style="list-style-type: none"> a. Summarize information on data collected b. Develop technical content (text, analysis, graphics) c. Design and publish reporting products d. Establish, coordinate, and maintain web presence of RMP products and results

8. Financial Management

The Implementing Entity will be responsible for the financial management of the Program with direction from the SC and with oversight from the Finance Subcommittee. Program Participants will either enter into a multi-year Memorandum of Agreement, contract, or other payment agreements with the Implementing Entity which will serve as a contract for the services of program implementation, fiscal management, and invoicing.

8.A Program Activities and Budget

The Delta RMP budget for each Fiscal Year will be set by the Steering Committee. The plan of Program activities within the available budget for each year shall be proposed by the Implementing Entity in the Annual Program Workplan. The Steering Committee shall be responsible for approving the Annual Program Workplan prior to the start of the Fiscal Year.

With each yearly budget, the Steering Committee shall also approve a Cost Allocation Schedule, which will set forth the portion of the Program costs payable by each group of Participants. If an entity becomes a Participant after the start of a Fiscal Year, the Steering Committee shall have the discretion to pro rate costs payable by that Participant for its first year of participation in the Program.

8.B Program Implementation

As authorized by the Steering Committee, the Implementing Entity will be responsible for implementing the Annual Program Workplan. Specifically, to the extent that Program funds are available, the Implementing Entity is authorized to conduct work itself and enter into and manage third party contracts to accomplish the Annual Program Workplan.

8.B.1 Third-Party Contracts

For third-party contracts exceeding \$50,000, the Implementing Entity will use a competitive process. Proposals may be obtained by either (a) issuance of a formal Request for Proposals, or (b) solicitation of at least three proposals from qualified contractors; recognizing that, for highly specialized work, it may only be possible to obtain proposals from fewer contractors. The requirement for a competitive process may be waived by the Implementing Entity when it determines that there is only one source for the merchandise or service needed, and no other product/service reasonably meets the stated need or specifications. Criteria that may be considered in agreeing upon a sole source contract include, for example: unique or specialized technical expertise, unique or specialized access to data or information, a joint venture already specified in a proposal, and access to matching funds or in-kind services. For all sole source contracts exceeding \$50,000, the Steering Committee must approve the selected contractor. A competitive process will not be required for in-kind services offered by Program Participants, or stakeholders, using their existing contractors or contractors selected through the State contracting process. Guidance for issuing and evaluating requests for proposals is provided in Attachment 4.

For expenses up to \$5,000, the Implementing Entity may act without prior approval. For expenses greater than \$5,000, the Implementing Entity must obtain prior approval from the Finance Subcommittee (between \$5,000 and \$25,000) or the Steering Committee (greater than \$25,000). For expenses between \$25,000 and \$50,000 the Steering Committee must provide prior approval.

8.B.2 Services Provided by ASC

Contracts between the Program Participants and ASC as the Implementing Entity do not require a competitive process. See State Contracting Manual (Volume 1⁴, Sections 3.06 “Contracts with other Governmental Entities & Public Universities” and 5.80 “Contracts Exempt from Advertising in the CSCR and Competitive Bidding” or successor documents). State contracts with an organization acting as a governmental agency under a joint powers agreement are statutorily exempt from the requirement for a competitive bid process.

8.C Fiscal Management

The Implementing Entity shall provide fiscal and administrative services for the Program with oversight by the Steering Committee and review by the Finance Subcommittee. Specifically, the Implementing Entity shall:

- Set up and maintain an account for funds received for the purpose of execution of the Program.
- Set up and maintain an invoicing system that provides an invoice to each Program Participant for its share of Program costs and provides written confirmation to the Central Valley Regional Water Quality Control Board of the amount paid by each Program Participant to the Program each year;
- Keep financial records of all transactions relating to the execution of the Program, and make these records available to all Program Participants upon request; and
- Report to the Steering Committee and Finance Subcommittee quarterly regarding status of Program finances, including the status of payments from each Program Participant, expenditures, and an updated budget report.

⁴ <http://www.dgs.ca.gov/ols/Resources/StateContractManual.aspx> (Accessed March 31, 2016)

If funds are insufficient to carry out the Annual Program Workplan, including reasonable program management costs, the Implementing Entity will work with the Steering Committee and Technical Advisory Committee to identify possible amendments to the Annual Program Workplan such that the work can be implemented within the budget, or propose to use other sources of funds, such as interest, Reserve Funds, grants, or matching funds, to complete the Program.

8.D Reserve Funds

If there are excess funds in the Program account at the end of a budget year, the funds will be put into a Reserve Fund to be applied toward subsequent years of Program implementation with approval of the Steering Committee. The recommended minimum balance of Reserve Funds is \$100,000 but the Steering Committee has the discretion to maintain a balance above or below this amount.

8.D.1 Monitoring Contingency Funds

If there are sufficient Reserve Funds, the SC may allocate up to \$50,000 of these funds to a Dedicated Set-Aside Fund for Monitoring Contingencies. The Monitoring Contingency Funds may only be used for unexpected monitoring costs or opportunities that arise during the course of the year after the RMP budget has been approved.

Process for Use of Monitoring Contingency Funds

For expenses greater than \$5,000, the Implementing Entity must obtain prior approval from the Finance Subcommittee (between \$5,000 and \$25,000) or the Steering Committee (greater than \$25,000).

For expenses up to \$5,000, the Implementing Entity may act without prior approval from the Steering Committee, under the following circumstances:

- A strategically important sampling opportunity arises (e.g., due to rare weather events or a chance to leverage other monitoring efforts);
- A mechanical failure during field sampling necessitates rapid action to repair or replace equipment in order to maintain the sampling schedule; or
- An unexpected event that, in the judgment of the Implementing Entity, requires immediate action.

Should the Monitoring Contingency Funds be obligated by the Implementing Entity under these circumstances, the Implementing Entity would inform the Steering Committee via email and provide a justification. The Steering Committee would then provide feedback at the next scheduled meeting on the appropriateness of the decision to maintain clear expectations for use of these funds.

If Monitoring Contingency Funds are used during a year, the Implementing Entity will seek SC approval to replenish the Set-Aside Fund up to the \$50,000 balance when requesting approval for the following year's budget.

8.E Conflict of Interest Policy

All Program Participants serving on Delta RMP committees shall avoid both actual and perceived conflicts of interest when selecting contractors. Any committee member with an actual or perceived conflict of interest in a contract has a duty to disclose this interest to the committee and to recuse himself/herself from the decision. In order to avoid potential conflicts of interest with technical contractors, the TAC shall not recommend specific contractors, but

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may provide criteria to be used in the contractor selection process. Additional details about handling conflicts of interest by public officials are available in Government Code Sections 1090-1099.

8.F Adequate Participation

The Steering Committee has determined the basic criteria for “adequate participation” in the Delta Regional Monitoring Program (RMP) is contributing financial or in-kind services to the RMP, at the level established on a yearly basis, as described below. The Regional Board relies on the Delta RMP Steering Committee to determine what “adequate participation” is, and whether or not dischargers and other Steering Committee members are adequately participating in the Delta RMP. The Steering Committee expects and depends on the Regional Board to be sufficiently flexible in its approval of proposed monitoring requirement exchanges, so as to encourage permitted dischargers to participate.

Contributions from Permitted Discharger Participant Groups

Permitted dischargers are entities subject to NPDES or WDR permit requirements for monitoring. The Regional Board allows, through amended permits, permitted dischargers in the Sacramento/San Joaquin watershed to demonstrate “adequate participation” in the Delta RMP *in lieu* of conducting specific receiving water monitoring that is otherwise required by their permits.

Contributions from Non Permitted Participant Groups

For Participant Groups of Steering Committee members that do not have permits issued by the Regional Water Board requiring monitoring that could be exchanged, adequate participation will consist of funding or in-kind services contributed to the RMP that are reasonably equivalent to other participants (of similar type) in the Delta RMP. [There may be several types non-permitted participant groups that fall under this category. For groups of](#)

Deleted: a

similar participants, the participants would choose their Steering Committee representative(s). The Steering Committee must consider for such categories whether the entity may vote based on the level of participation. For example, any entity may provide funding to the Delta RMP, but the Steering Committee must consider what level of funding would constitute a “voting” Steering Committee member. The Steering Committee has agreed that a category can hold a seat on the Steering Committee, without contributing financially, but is not allowed to vote on financial issues. Thereby, financial obligations of the program are only supported by those that financially contribute to the program. Steering Committee members that do not contribute financially can be a voting member on non-financial issues if the category/member adds value to the program, as described below.

Definition of In-Kind Services

In-kind contributions may count towards a Participant’s contribution, but only if they can be monetized and replace a cost in the program budget. In-kind services do not include participation on the Steering Committee, or Technical Advisory Committee, or any subcommittees formed by either the Steering Committee or Technical Advisory Committee.

Factors for Determining Adequate Participation

The following factors will be considered when making a determination of adequate participation.

- Program Budget

The total Delta RMP program budget will be set by the Steering Committee annually and will be based on realistic estimates of funds likely to be received. Each Steering Committee Participant Group (coordinated monitoring program, permittees representing irrigated lands, publicly owned treatment works, stormwater, regulatory, resources agency, and water supply) will be assigned, by the Steering Committee, a specified portion of the total program

Commented [DW14]: We should probably also recognize that there may be several non-participant groups that fall under a category, where they would be categorized under a category (i.e. water supply). Those contributors in the water supply category would choose their steering committee representative(s).

Commented [P15R14]: Clarifying text added.

Commented [DW16]: Where do we identify this group.

Commented [P17R16]: SC Decision Needed

We do not have an explicit list in the Charter. The text is meant to outline general principles. Practically, the representatives that do not vote on budget issues are the Coordinating Monitoring seat, Resource Agencies seat, and USEPA. This information could be included in the charter if the SC would like.

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budget (see definition of “Cost Allocation Schedule” in Section 2). As a starting point, these amounts may be determined using the previous year’s level of support for each category.

- Whether Additional Funds are Expected

The Delta RMP may receive grants, new categories, or funding from unanticipated sources. These funds will be used in developing the program budget, and could be used for determining adequate participation.

- Exchange of Existing Individual Monitoring

Notwithstanding consideration of the program budget and whether additional funds are expected, an individual permitted discharger may be deemed to have adequate participation in the Delta RMP, for a particular funding year, only if they contribute funds to the program based on the following methodology:

For the first year, after a lapse of membership, or when what is being “traded” is substantially different than negotiated in the past:

The contribution level determined through negotiations between Regional Board staff and the individual discharger. The contribution level must not be less than the savings due to receiving water monitoring and/or study reduction approved by the Regional Board.

For subsequent years following the initial assessment:

Steering Committee members are expected to negotiate within their Participant Groups to develop an ongoing formula for the expected contribution for each of its members. Individual members of a permitted discharger Participant Group are responsible only for contributing their individual funding allotment. Failure of any member to contribute their expected individual funding will not result in an increase of funding requirements for the other members. However, failure of any discharger to

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contribute their expected individual funding will result in a finding of inadequate participation by that individual discharger. Contribution must not be less than the savings due to receiving water monitoring reduction originally approved by the Regional Board (under the above bullet).

- Value Added Considerations

Any Steering Committee member representing a Participant Group needs to be committed to attending meetings regularly to ensure that a quorum is met at meetings and progress can be made. Categories that do not contribute financially may bring additional perspective or skill sets to the Steering Committee that is needed to achieve program goals, and therefore can be a voting member on non-financial issues. Participant Groups that help broaden the funding base either directly or indirectly by increasing the ability for the Delta RMP to compete for grants, achieve broader coordination with other programs, or other means of growing the program's credibility and influence can be voting Steering Committee members on non-financial issues. New Participant Groups should not conflict with current representation (i.e., Is there already sufficient representation?).

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9. Charter Revisions

The Steering Committee may amend this Charter by following the decision method described in Section 7.A.6 above. Charter amendments may be proposed by Steering Committee Representatives, Technical Advisory Committee Representatives, or the Implementing Entity, either during or between meetings. Any proposed amendments will be placed on the Steering Committee meeting agenda for discussion and possible action, or decided through email or conference call communication if feasible and appropriate.

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Attachments

Table of Contents

Figure 1: Organizational Chart of the Delta RMP

Attachment 1: Roster of Steering Committee Members

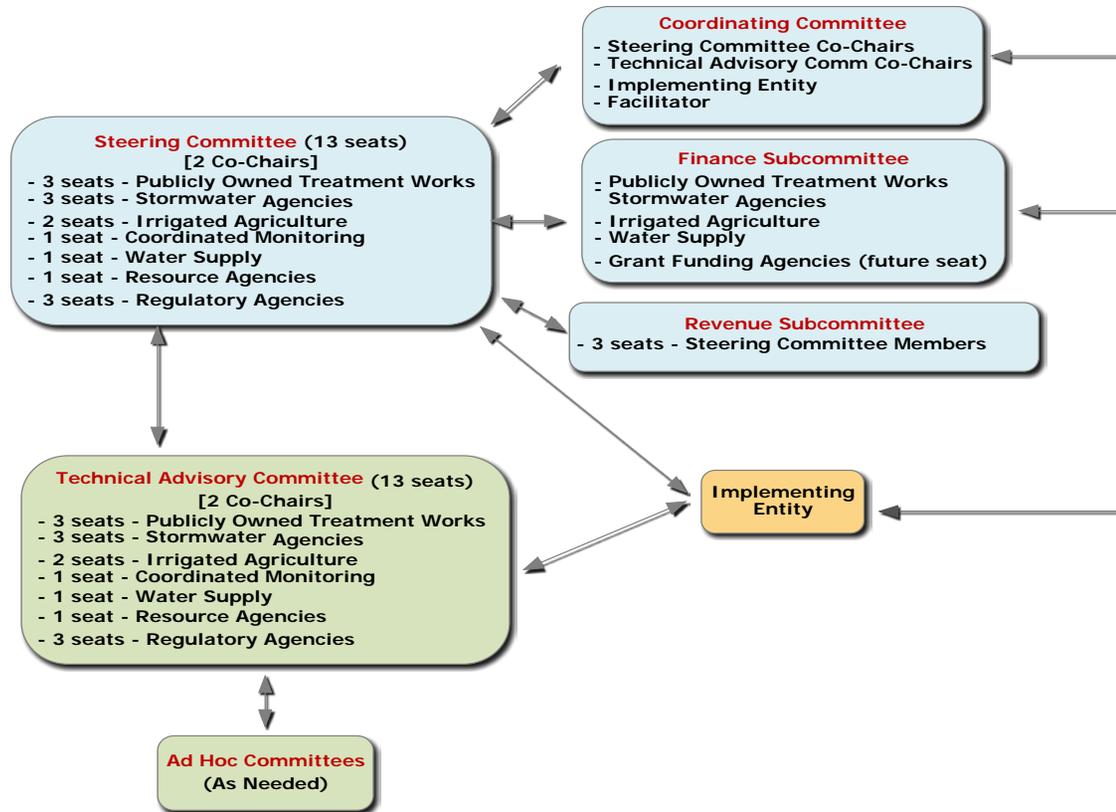
Attachment 2: Roster of Technical Advisory Committee Members

Attachment 3: [Regional Board Use of Delta RMP Data for Permit Compliance](#)

Attachment 4: Guidance for Issuing and Evaluating Requests for Proposals for the Delta RMP

Deleted: Flowchart for Regulatory Decision-making (7/7/14 version)

Figure 1. Organizational Chart of the Delta RMP



Delta RMP Charter
Revised Draft 1/19/17**Attachment 1: Roster of Steering Committee Members (updated 07/20/2016)**

Name	Affiliation	Representing	Position
Mike Wackman	San Joaquin County & Delta Water Quality Coalition	Agriculture 1	Primary
Bruce Houdesheldt	Sacramento Valley Water Quality Coalition	Agriculture 1	Alternate
David Cory	Westside San Joaquin River Watershed Coalition	Agriculture 2	Primary
Parry Klassen	East San Joaquin Water Quality Coalition	Agriculture 2	Alternate
Gregg Erickson	Interagency Ecological Program/DFW	Coordinated Monitoring	Primary
Erwin Van Nieuwenhuysse	Interagency Ecological Program/Reclamation	Coordinated Monitoring	Alternate
Karen Gehrts	Interagency Ecological Program/DWR	Coordinated Monitoring	Alternate
Linda Dorn	Regional San	POTW	Primary
Josie Tellers	City of Davis	POTW	Primary
Deedee Antypas	City of Stockton	POTW	Primary
Casey Wichert	City of Brentwood	POTW	Alternate
Debbie Webster	CVCWA	POTW	Alternate
Nader Shareghi	Mountain House CSD	POTW	Alternate
Vyomini Upadhyay	Regional San	POTW	Alternate
Samsor Safis	Regional San	POTW	Alternate
Jenny Skrel	Ironhouse SD	POTW	Alternate
Tony Pirondini	City of Vacaville	POTW	Alternate
Tom Grovhoug	LWA	POTW	Alternate
Terry Fleming	U.S. EPA Region 9 Water Division	Regulatory-Federal	Primary
Valentina Cabrera-Stagno	U.S. EPA Region 9 Water Division	Regulatory-Federal	Alternate
Adam Laputz	Central Valley Regional Water Board	Regulatory-State 1	Primary
Pamela Creedon	Central Valley Regional Water Board	Regulatory-State 1	Alternate
Greg Gearheart	State Water Board	Regulatory-State 2	Primary
Vacant	State Water Board	Regulatory-State 2	Alternate

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Dave Tamayo	County of Sacramento	Stormwater, Phase I	Primary
Dalia Fadl	City of Sacramento	Stormwater, Phase I	Alternate
Stephanie Reyna- Hiestand	City of Tracy	Stormwater, Phase II 1	Primary
Brandon Nakagawa	County of San Joaquin	Stormwater, Phase II 1	Alternate
Brendan Ferry	County of El Dorado	Stormwater, Phase II 2	Primary
Vacant		Stormwater, Phase II 2	Alternate
Val Connor	GEI	Water Supply	Primary
Smith, Lynda	MWD	Water Supply	Alternate
Stephanie Fong	SFCWA	Water Supply	Alternate
Melanie Okoro	NMFS	Resource Agencies	Primary
Jeff Stuart	NMFS	Resource Agencies	Alternate

Delta RMP Charter
Revised Draft 1/19/17**Attachment 2: Roster of Technical Advisory Committee Members (updated 07/20/2016)**

Name	Representing	Affiliation
<u>Rich Breuer</u>	Regulatory – State	State Water Resources Control Board
Alternate: <u>Dawit Tadesse</u>		
Tessa Fojut Alternates: Danny McClure Janis Cooke	Regulatory - State	Central Valley Regional Water Board
Debra Denton Alternate: Valentina Cabrera-Stagno	Regulatory - Federal	U.S. EPA Region 9 Water Division
Erwin Van Nieuwenhuysse Alternate: Shaun Philippart	Coordinated Monitoring	US Bureau of Reclamation DWR-EMP
Brian Laurensen Alternate: Hope McCaslin Taylor	Stormwater, Phase I	Larry Walker Associates
Karen Ashby Alternate: Gerardo Dominguez	Stormwater, Phase II 1	Larry Walker Associates San Joaquin County
Amy Phillips Alternate: Vacant	Stormwater, Phase II 2	El Dorado County
Tim Mussen Tony Pirondini Vyomini Upadhyay Alternate: Lisa Thompson	POTW	Regional San City of Vacaville Regional San
Michael Johnson Alternate: Vacant	Agriculture 1	MLJ-LLC
Melissa Turner Alternate: Vacant	Agriculture 2	MLJ-LLC
Stephanie Fong Alternate: Vacant	Water Supply	SFCWA
Jeff Stuart Alternate: Vacant	Resource Agency	NOAA-NMFS
Joe Domagalski	USGS	TAC Co-chair
Stephen McCord	MEI	TAC Co-chair

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Attachment 3

Regional Board Use of Delta RMP Data for Permit Compliance

The Delta RMP is a collaborative process where the regulatory agencies, dischargers, and other active participants are working together to jointly identify what types of water quality stressors are causing water quality concerns and characterize the sources, causal factors and beneficial use impacts of any issues of concern to ensure that regulatory decisions are well founded and effective.

POTWs and Regional Board staff met early during the development of the Delta RMP to discuss program participation in lieu of individual discharger monitoring and how RMP data would be used with respect to permit compliance so that the dischargers would be willing participate in the RMP. As a result of those discussions, waste discharge requirements were subsequently amended, not only for the POTWs but also for MS4 and ILRP permittees, specifying reductions in portions of receiving water monitoring requirements if the dischargers participated in the RMP.

As described in the amended waste discharge requirements, Delta RMP data is not being used directly to determine whether individual discharges are in violation of permit conditions. Delta RMP monitoring stations are established generally as “integrator sites” to evaluate the combined impacts on water quality of multiple discharges into the Delta. Delta RMP monitoring stations would not normally be able to identify the source of any specific constituent, but will be used to identify water quality issues needing further evaluation.

If additional information or data is needed for regulatory decision making, the Delta RMP will be used as much as possible to collect that information. Additional monitoring requests by the Regional Board per Section 13267 would only be needed in cases where the Delta RMP is not working to collect such information. The Delta RMP process does not limit the Regional Board’s authority to request additional information or data from individual dischargers, or groups of dischargers.

Deleted: Attachment 3: Flowchart illustrating the proposed interaction of the Delta RMP with the Regional Board in data evaluation and follow-up¶

As the Delta RMP was being formed, POTWs and Regional Board staff developed this flowchart independently of the Delta RMP decision-making process, to facilitate discussions about program participation by POTWs. This flowchart was considered fundamental by POTWs for agreeing to the permit language change that allows for program participation in lieu of individual permit monitoring.¶

The flowchart represents the expectation is that regulatory agencies and dischargers will work together to jointly characterize the sources, causal factors and beneficial use impacts of any issues of concern to ensure that regulatory decisions are well founded and effective. The expectation is further that the Delta RMP will be used as much as possible to collect the information needed for decision making and that additional monitoring requests by regulatory agencies per Section 13267 should be minimized. ¶

Delta RMP data will not be used directly to determine that individual discharges are in violation of permit conditions. Delta RMP monitoring stations are established generally as “integrator sites” to evaluate the combined impacts on water quality of multiple discharges into the Delta. Delta RMP monitoring stations would not normally be able to identify the source of any specific constituent, but would be used to identify water quality issues needing further evaluation.¶

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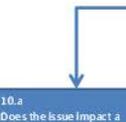


Draft: 1 May 2014, revised 7 July 2014

Interaction between RMP and
Regional Water Board in data
evaluation and followup

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Attachment 4

Guidance for Issuing and Evaluating Requests for Proposals (RFPs) for the Delta RMP

Introduction

The purposes of the Request for Proposal (RFP) process are to ensure:

- Accountability, good governance, and transparency;
- Effective and efficient use of program resources; and
- Achievement of program objectives and quality standards.

Implementing Entity for the Delta RMP will prepare the RFP and manage the RFP process. The Delta RMP Steering Committee (SC) will approve the RFP and approve the selected contractor.

Steps in the RFP Process

1. **The Implementing Entity obtains SC approval for proposed work, budget, and schedule.** Work described in an RFP should correspond directly to a workplan task or subtask with an approved budget and schedule.
2. **The Implementing Entity assembles an advisory group to assist with developing the RFP and evaluating proposals.** The advisory group could be the Technical Advisory Committee (TAC), a TAC subgroup, and/or other subject-area experts. In some instances (e.g. work is non-technical in nature), the SC or a SC subgroup may serve as the advisory group. The advisory group should not include individuals with an actual or potential conflict of interest in the RFP.
3. **The Implementing Entity writes the RFP with feedback and assistance from the advisory group.** The RFP should include specific, closed questions by which to evaluate and compare each proposal's technical merit. Proposal scoring criteria and weighting should correspond to the requirements, services, and features of the project.
4. **The Implementing Entity solicits or invites proposals.** Based on the project needs, the Implementing Entity may solicit proposals from specific vendors or distribute a general solicitation via appropriate channels.
5. **The Implementing Entity and advisory group review proposals.** The Implementing Entity may pre-screen proposals based on minimum or non-negotiable project requirements. Advisory group members may be asked to score individual proposals or otherwise provide feedback to the Implementing Entity. Any advisory group member with an actual or perceived conflict of interest in a proposal has a duty to disclose this interest to the group and to recuse himself/herself from the entire RFP process.
6. **The Implementing Entity requests external review as necessary.** The Implementing Entity may ask external reviewers with specific expertise to participate in the evaluation.
7. **The Implementing Entity compiles feedback on proposals and recommends a contractor for the SC to approve.** The recommendation report will include a summary

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of the contractors who submitted proposals, the costs of the various proposals, and feedback received from the advisory group and others.

8. **SC votes to award the contract.** Considering all of the factors presented by the Implementing Entity and any other relevant information, the SC will vote to award the project contract with any necessary amendments.
9. **The Implementing Entity develops, negotiates, and signs contract.** As the fiscal/operating agent, the Implementing Entity will enter into partnerships, contracts, and other legal agreements on behalf of the Delta RMP. The Implementing Entity will negotiate details concerning schedules and project deliverables, and act as the contract manager.

Typical Information to Include in RFPs

1. Delta RMP background and status
2. Project description
3. Eligibility requirements (if any)
4. Required products and services
5. Schedule with milestones
6. Evaluation criteria
7. Format for proposals
8. Format and instructions for budgets included with proposals
9. Any other information needed to evaluate and score responses
10. Contact information and deadline for proposal submissions



DATE: December 6, 2016
TO: Delta RMP Steering Committee and Technical Advisory Committee
FROM: Philip Trowbridge
RE: Recommendation for Steering Committee and TAC member terms

At the October 18, 2016, joint meeting of the Steering Committee and the Technical Review Committee, there was discussion about terms for members of the Delta RMP committees and chairs. I took an action item to “Work with the Coordinating Committee to establish when terms will start and end for SC members, TAC members, and TAC co-chairs.” This memo describes my recommendation.

After re-reading the Charter, I believe that the Delta RMP should not consider members to have defined terms. Members can serve indefinitely with the support of their participant group (see pages 11 and 17). The Charter calls for the members for the SC and TAC to be "explicitly reconfirmed" every 2 years. I interpret this to mean that the committees should review the roster for accuracy and completeness at least every 2 years. I recommend that this step be taken each year when the committees revisit the Charter at the joint meeting. The charter was approved in July 2016 with the full rosters included. The next time the rosters need to be explicitly confirmed is October 2017. However, changes can be made to the roster at any time.

For the co-chair positions, the Charter states that the SC will select or re-affirm the co-chairs once per year and that the TAC will select co-chairs for a two-year term, subject to approval by the SC (see pages 11 and 19). The co-chairs can serve indefinitely with support of the committees. At the January 2017 meeting, the SC should select or reaffirm the SC co-chairs since it has been more than a year since the last vote on this issue. The SC should also discuss the issue of the TAC co-chairs since the current chairs were appointed by the SC, not the TAC.

Meeting Materials for Item 10

Project ID Number:	36177		
Project Title:	Delta RMP Steering Committee 1/26/17 Agenda Package Page 149 Monitoring for Mercury in Delta Fish, Water and Sediment by the Delta Regional Monitoring Program		
Applicant:	Aquatic Science Center		
Grant Program:	Delta		
Project Category:	Scientific Studies		
This project comprehensively evaluates mercury/methylmercury (MeHg) in Delta sediment, water, and fish. This project			
Requested Funds:	\$507,028.00		
Criteria		Average Score	Maximum Possible Score
Purpose and Background		10.00	12.5
Applicability to Solicitation Priorities		9.00	10
Project Team Qualifications		9.33	10
Schedule and Deliverables		9.33	10
Approach and Feasibility		8.33	10
Community Support and Collaboration		6.00	7.5
Consistency with Other Plans		4.83	5
Project Outcomes - Diversity and Significance of the Benefits		4.50	5
Project Outcomes - Durability of Investment		4.50	5
Climate Change Considerations		4.50	5
Project Category - Specific Considerations		3.83	5
Budget		5.00	5
Cost Share		0.00	7.5
Disadvantaged Communities		2.50	2.5
Total Score		81.67	100
Subcommittee:	Delta		
Selection Panel Summary:			
Delta: Proposal establishes baseline that can be referenced in the future to establish trends. Tenuous connection to restoration. Management application to mercury TMDL. Water quality is an ongoing issue in the Delta that needs to be addressed.			
Technical Review Summary:			
Restoration and other impacts to mobilization of sediments are implicated in Hg mobilization and transformations. However it is less than clear why CDFW Prop 1 funds should be the source of funding given its prior investments and the indication that the RMP is on the cusp of "full funding". Project costs on the MLML side seem high. A full time technician and graduate assistant should be able to do all the field and lab work modest amounts of additional help. The proposal could be strengthened by re-evaluating the number of fish that will be collected at each location to better estimate what changes in mercury will be detectable both between sampling sites and among years (e.g. 80% probability of being able to detect a statistically significant ($p < 0.05$) difference of 20% in mercury between locations and among years at the same location). Moreover the number of water and sediment samples to be collected could be better defined to allow estimation of analytical precision. Finally a description of statistical methods to address changes in mercury among years (i.e. time series) could be provided. The need to understand Hg trends in fish and restoration is mentioned; but it is not clear from the narrative that a substantial knowledge gap or novel experiment design remains to be identified. Whether restoration is a solution to mercury and other stressors/problems or is the source of stressors is an implicit uncertainty lurking in the proposal but not explicitly stated as a Key Uncertainty. Sampling to get at a the solution or source quandary is described but not definitively hypothesized. It is as if the study does not really want to answer that question. They did a nice job discussing the uncertainty drivers they wanted to discuss and deal with. But the lack of appreciation for the importance of tides and filtering water samples is a big problem.			

Meeting Materials for Item 11

Delta RMP Deliverables Scorecard Report

Key to Status Colors:

Green indicates greater than 90 days until the deliverable is due.

Yellow indicates a deliverable due within 90 days.

Red indicates a deliverable that is overdue.

Project	Primary	Deliverable	Assigned To	Due Date	Status	Comments
Delta RMP (FY14/15)	Pathogens Monitoring	Set up contracts with BioVir and Eurofins	Thomas Jabusch	04/06/15	Complete	
Delta RMP (FY14/15)	Data Management	Prepare QAPP for FY14/15	Thomas Jabusch	04/15/15	Complete	QAPP completed and sent to SWAMP QAO for review.
Delta RMP (FY14/15)	Pesticide/Toxicity Monitoring	Set up contract with USGS for pesticide analyses	Thomas Jabusch	04/30/15	Complete	
Delta RMP (FY14/15)	Pesticide/Toxicity Monitoring	Arrange for UCD/ATL to participate in SCCWRP Interlaboratory Calibration Study	Thomas Jabusch	04/30/15	Complete	APHL will participate in the study without funding from the Delta RMP.
Delta RMP (FY14/15)	Nutrient Synthesis	Set up contract with USGS for synthesis of high-frequency sensor data	Thomas Jabusch	05/15/15	Complete	
Delta RMP (FY14/15)	Program Management	Revised Monitoring Design	Thomas Jabusch	05/22/15	Complete	The Monitoring Design has been revised and was sent to the TAC and SC on 6/8/15 for review.
Delta RMP (FY14/15)	Program Management	FY15-16 Annual Program Workplan	Philip Trowbridge	05/22/15	Complete	FY15/16 Budget and Workplan sent to SC on 6/9/15.
Delta RMP (FY14/15)	Program Management	Framework for Interpretation of Monitoring Results	Thomas Jabusch	05/22/15	Complete	An outline for the Communications Plan was included in the revised Monitoring Design sent on 6/8/15 and will be discussed at the 6/16/15 SC meeting.
Delta RMP (FY14/15)	Program Management	FY15/16 Revenue Projections and Plan for Efficiently Invoicing Participants	Philip Trowbridge	05/22/15	Complete	
Delta RMP (FY14/15)	Program Management	Quarterly financial reports	Lawrence Leung	05/31/15	Complete	
Delta RMP (FY14/15)	Program Management	System for tracking deliverables and action items	Philip Trowbridge	05/31/15	Complete	For June SC meeting
Delta RMP (FY14/15)	Data Management	Set up templates and EDD reports for the pesticide/toxicity and pathogen laboratories	Amy Franz	05/31/15	Complete	EDDs for pathogens labs have been created. EDDs for pesticide/toxicity labs has been deferred to FY15/16.
Delta RMP (FY14/15)	Pesticide/Toxicity Monitoring	Collect two rounds of samples and analyze the samples for pesticides and toxicity	Contractors	06/30/15	Complete	This task has been deferred to FY15/16 workplan.
Delta RMP (FY14/15)	Nutrient Synthesis	Final report on high-frequency sensor data nutrient synthesis	Brian Bergamashi	12/31/15	Complete	USGS draft report was presented to TAC for review. Report was revised based on internal USGS comments. Revised report was sent to TRC and SC in October 2016 with a deadline of 11/1/16 for comments. No comments were received. On 11/8/16, the Nutrient Subcommittee agreed that the report should be considered "done" for the Delta RMP.
Delta RMP (FY14/15)	Pathogens Monitoring	Pathogens Year 1 Final report	Contractors	06/30/16	Complete	Summary memo provided to TAC.

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Project	Primary	Deliverable	Assigned To	Due Date	Status	Comments
Delta RMP (FY15/16)	Program Management	Supplemental Budget Request to analyze split samples for CUPs	Thomas Jabusch	08/31/15	Complete	
Delta RMP (FY15/16)	Program Management	Prop 1 Application	Jennifer Sun	09/16/15	Complete	An application for 2 years of mercury monitoring (\$640k) was submitted in response to the DFW solicitation.
Delta RMP (FY15/16)	Governance	TAC Meeting #1 and Summary	Thomas Jabusch	09/30/15	Complete	
Delta RMP (FY15/16)	Communications	Communications Plan	Thomas Jabusch	09/30/15	Complete	The draft Communications Plan and Program Planning Outline were sent to the TAC on 9/17/15 and the Steering Committee on 10/15/15.
Delta RMP (FY15/16)	Governance	Steering Committee Meeting #1 and Summary	Philip Trowbridge	10/30/15	Complete	
Delta RMP (FY15/16)	Governance	TAC Meeting #2 and Summary	Thomas Jabusch	12/31/15	Complete	
Delta RMP (FY15/16)	Governance	Steering Committee Meeting #2 and Summary	Philip Trowbridge	01/31/16	Complete	
Delta RMP (FY15/16)	Communications	Communications Product (The Charter)	Meg Sedlak	01/31/16	Complete	Charter was approved at 7/20/16 meeting.
Delta RMP (FY15/16)	Program Management	MOU for financial management and invoicing	Philip Trowbridge	03/31/16	Complete	MOU was discussed at the 4/25/16 SC meeting. The SC recommended changing the document to be a contract template for entities that need a contract to pay their fees. The MOU was sent to those entities to consider for a template.
Delta RMP (FY15/16)	Governance	TAC Meeting #3 and Summary	Thomas Jabusch	03/31/16	Complete	
Delta RMP (FY15/16)	Governance	Steering Committee Meeting #3 and Summary	Philip Trowbridge	04/29/16	Complete	
Delta RMP (FY15/16)	Nutrients Synthesis	Nutrient Synthesis - Preparation of a memorandum summarizing recommendations for FY16/17	Thomas Jabusch	04/30/16	Complete	A draft of the report will be prepared by April 30, 2016 so that the recommendations can be considered for funding in the FY16/17 Workplan. The final report will be completed by June 30, 2016.
Delta RMP (FY15/16)	Program Management	FY16/17 Annual Workplan and Budget	Philip Trowbridge	05/13/16	Complete	Draft in May 2016. Final by June 30, 2016.
Delta RMP (FY15/16)	Governance	Steering Committee Meeting #4 and Summary	Philip Trowbridge	06/30/16	Complete	
Delta RMP (FY15/16)	Governance	TAC Meeting #4 and Summary	Thomas Jabusch	06/30/16	Complete	
Delta RMP (FY15/16)	Quality Assurance	QAPP Update	Thomas Jabusch	06/30/16	Complete	The QAPP was revised to reflect the addition of mercury monitoring. QAPP was approved by SC in July 2016. State and SWAMP QAOs have re-confirmed their approval. All that remains to be done is to collect all signature, which is delayed due to summer vacation schedules.
Delta RMP (FY15/16)	Pathogens Study - Year 1	Data Management of Year 1 Pathogens Data	Amy Franz	07/31/16	Complete	Data from BioVir and Eurofins has been uploaded to SFEI's RDC database; it takes approximately 2 weeks for it to be loaded into CEDEN.
Delta RMP (FY15/16)	Pathogens Study - Year 1	Quality Assurance Report on Year 1 Pathogens Data	Don Yee	09/30/16	Complete	QAO report. The report is on the agenda for the 9/20/16 TAC meeting.
Delta RMP (FY15/16)	CUP Monitoring	Field Sampling Report for FY15/16 CUP Monitoring	Ila Shimabuku	09/30/16	Complete	On agenda for 9/20/16 TAC meeting
Delta RMP (FY15/16)	Nutrients Synthesis	Nutrient Synthesis - Convene 2-day workshop with expert panel in October 2016.	Thomas Jabusch	10/31/16	Complete	Workshop convened on 9/30/16.

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Project	Primary	Deliverable	Assigned To	Due Date	Status	Comments
Delta RMP (FY15/16)	CUP Monitoring	Data Management of FY15/16 CUP Data	Amy Franz	12/31/16		Pesticide, toxicity, copper, carbon, SSC. Labs: USGS and UCD and a second pesticide lab to be named later. Data need to be uploaded to CEDEN by 2/1/17.
Delta RMP (FY15/16)	CUP Monitoring	Quality Assurance Report for FY15/16 CUP Monitoring	Don Yee	12/31/16		Delay due to late delivery of the data. The data have now been received and we are on schedule to upload by 2/1/17 as planned.
Delta RMP (FY15/16)	Nutrients Synthesis	Nutrient Synthesis - Based on workshop, prepare draft report summarizing recommendations for on-going monitoring plan development. Draft 12/31/2016. Final 3/31/2017	Thomas Jabusch	12/31/16	Complete	
Delta RMP (FY15/16)	CUP Monitoring	Annual Monitoring Report for FY15/16 CUP Monitoring	Thomas Jabusch	02/28/17		Data need to be uploaded to CEDEN by 2/1/17.
Delta RMP (FY15/16)	Pathogens Study - Year 2	Sample Collection and Data Management of Year 2 Pathogens Data	Amy Franz	07/31/17		Data from BioVir and Eurofins. Formatting, transcribing field collection information, performing QA/QC review, and uploading field and analytical results to SFEI's RDC database and replicating to CEDEN.
Delta RMP (FY15/16)	Pathogens Study - Year 2	Quality Assurance Report on Year 2 Pathogens Data	Don Yee	07/31/17		QAO report. Funded from Data Management budget.
Delta RMP (FY16/17)	Governance	Steering Committee Meeting #1 and Summary	Meg Sedlak	07/20/16	Complete	SC draft minutes sent to group for comments.
Delta RMP (FY16/17)	Program Management	Completion of the MOA	Philip Trowbridge	09/01/16	Complete	MOA was completed and used as a bilateral agreement between ASC and Regional San.
Delta RMP (FY16/17)	Program Management	Proposal for Prop 1 Funding	Meg Sedlak	09/21/16	Complete	Prop 1 Hg proposal submitted.
Delta RMP (FY16/17)	Governance	TAC Meeting #1 and Summary	Philip Trowbridge	09/21/16	Complete	
Delta RMP (FY16/17)	Governance	Financial Subcommittee report and conference call	Philip Trowbridge	09/29/16	Complete	Report delivered on 9/26. Conference call held on 9/29.
Delta RMP (FY16/17)	Governance	Steering Committee Meeting #2 and Summary	Philip Trowbridge	10/18/16	Complete	
Delta RMP (FY16/17)	Nutrients Synthesis	7A1.2 Synthesis Report - compile additional data and information	Thomas Jabusch	10/31/16	Complete	Compiled all of the following: IEP-EMP data report (ASC) - done; DSP report (ASC) - done; Delta RMP Sensor Synthesis (USGS); WRTDS/GAMA results (USEPA/ASC)
Delta RMP (FY16/17)	Nutrients Synthesis	7B2.1 Modeling and Synthesis of Modeling Results - Convene nutrient subcommittee in-person meeting or conference call	Thomas Jabusch	11/16/16	Complete	Call completed on 11/08/16
Delta RMP (FY16/17)	Nutrients Synthesis	7B2.2 Modeling and Synthesis of Modeling Results - Select appropriate model and design experiments	Thomas Jabusch	11/30/16	Complete	By 11/30/16: Final design of analyses to be performed
Delta RMP (FY16/17)	Governance	TAC Meeting #2 and Summary	Thomas Jabusch	12/19/16	Complete	
Delta RMP (FY16/17)	Program Management	Updated Multi-Year Plan	Philip Trowbridge	12/30/16	Complete	Multi-Year Plan presented at 10/18/16 meeting. Updates to the plan being made by the subcommittees.
Delta RMP (FY16/17)	Governance	Financial Subcommittee report and conference call	Philip Trowbridge	01/05/17	Complete	
Delta RMP (FY16/17)	Governance	Steering Committee Meeting #3 and Summary	Philip Trowbridge	01/26/17		

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Project	Primary	Deliverable	Assigned To	Due Date	Status	Comments
Delta RMP (FY16/17)	Nutrients Synthesis	7A1.1 Synthesis Report - Additional data analyses	Thomas Jabusch	01/31/17		Downloaded most recent IEP-EMP data through FY15. Contacted EMP to inquire about availability of FY16 data. By 1/31/16: All analyses should be complete
Delta RMP (FY16/17)	Program Management	FY17/18 Annual Workplan and Budget	Philip Trowbridge	02/10/17		Early draft for Finance Subcommittee by 2/10/17. Draft for SC by 4/30/17. Final by 6/30/16.
Delta RMP (FY16/17)	Program Management	Updated Monitoring Design	Philip Trowbridge	02/15/17		
Delta RMP (FY16/17)	Nutrients Synthesis	7A1.3 Synthesis Report - Prepare synthesis report	Thomas Jabusch	02/28/17		By 2/28/16: Draft outline with example write-ups/graphs/maps to Nutrient Subcommittee/TAC; By 3/31/16: Comments due; By 5/31/17: Draft report to Nutrient Subcommittee/TAC; By 6/30/17: Comments due; By 7/31/17: Final technical report to SC.
Delta RMP (FY16/17)	Governance	TAC Meeting #3 and Summary	Thomas Jabusch	03/15/17		
Delta RMP (FY16/17)	Governance	Steering Committee Meeting #4 and Summary	Philip Trowbridge	04/12/17		
Delta RMP (FY16/17)	Nutrients Synthesis	7B2.3 Modeling and Synthesis of Modeling Results - Run simulations	Marianne Guerin	04/30/17		By 4/30/16: Final model simulation results and output
Delta RMP (FY16/17)	Nutrients Synthesis	7B2.4 Nutrients - Analyze and synthesize model output data	Thomas Jabusch	05/04/17		By 5/4/16: Draft outline to Nutrient Subcommittee/TAC. By 7/31/17: Incorporate into data synthesis report.
Delta RMP (FY16/17)	Nutrients Synthesis	7C3.1 Nutrients- Statistical Modeling	Thomas Jabusch	05/31/17		Held Nutrient subcommittee meeting/call (same meeting/call as in Task 2) on 11/8.16. The group decided to postpone this task. All subsequent deadlines are shown as "TBD". By TBD: All additional statistical modeling complete; By TBD: Draft outline to Nutrient Subcommittee/TAC; By TBD: Comments due; By 5/31/17: Draft report to Nutrient Subcommittee/TAC; By 6/30/17: Comments due; By 7/31/17: Final technical report to SC.
Delta RMP (FY16/17)	Governance	TAC Meeting #4 and Summary	Thomas Jabusch	06/14/17		
Delta RMP (FY16/17)	Quality Assurance	QAPP Update	Thomas Jabusch	06/14/17		
Delta RMP (FY16/17)	Communications	Technical Workshop / summary memorandum of findings	Philip Trowbridge	06/30/17		Purpose of workshop TBD
Delta RMP (FY16/17)	CUP Monitoring	6. Field Sampling Report for FY16/17 CUP Monitoring	Philip Trowbridge	09/29/17		
Delta RMP (FY16/17)	CUP Monitoring	6. Data Management of FY16/17 CUP Data	Amy Franz	12/31/17		
Delta RMP (FY16/17)	CUP Monitoring	6. Quality Assurance Report for FY16/17 CUP Monitoring	Don Yee	12/31/17		
Delta RMP (FY16/17)	CUP Monitoring	6. Permit Compliance Data for ILRP	Amy Franz	02/01/18		
Delta RMP (FY16/17)	CUP Monitoring	6. Annual Monitoring Report for FY16/17 CUP Monitoring	Thomas Jabusch	02/28/18		
Delta RMP (FY16/17)	Mercury	8. Mercury YR1 report summarizing fish and water analyses	Thomas Jabusch	12/03/18		

Delta RMP Action Items

Key to Status Colors:

Green indicates greater than 90 days until the deliverable is due.

Yellow indicates a deliverable is due within 90 days.

Red indicates a deliverable that is overdue.

	Primary	Meeting Date	Deliverable	Assigned To	Due Date	Status	Comments
1	TAC Action Items from 12/13/2016	12/13/16	Revise 9/20/16 meeting summary	Thomas Jabusch	01/18/17	Complete	
2	TAC Action Items from 12/13/2016	12/13/16	On the matrix of management drivers and assessment questions, use underline or text color to indicate the questions currently being addressed by the Delta RMP	Philip Trowbridge	01/18/17	Complete	
3	TAC Action Items from 12/13/2016	12/13/16	Schedule and prepare materials/maps for a discussion about changes in SPoT sampling stations and coordination of Delta RMP with SPoT, STORMS, and MS4 monitoring for the 1/25 Pesticide Subcommittee meeting	Thomas Jabusch	01/18/17	Complete	
4	TAC Action Items from 12/13/2016	12/13/16	Add "Technical Subcommittee Updates" as a standing item on the TAC agenda and prepare a running table showing the samples that have been collected and those that are scheduled	Thomas Jabusch	03/06/17		
5	TAC Action Items from 12/13/2016	12/13/16	Provide reference for Test of Statistical Significance and edits on response to TIE question	Debra Denton	12/16/16	Complete	
6	TAC Action Items from 12/13/2016	12/13/16	Add an introductory paragraph and reformat the pathogen responses	Brian Lauerson	12/22/16	Complete	
7	TAC Action Items from 12/13/2016	12/13/16	Draft a cover letter that a) will summarize the main themes and concepts of the responses, b) expresses a commitment to making changes and addressing the issues that have been identified, and c) explains what type of input is being sought for improving the program	Philip Trowbridge	12/23/16	Complete	
8	TAC Action Items from 12/13/2016	12/13/16	Send the revised draft response letter to the Planning Subcommittee and cc the TAC	Philip Trowbridge	12/23/16	Complete	
9	TAC Action Items from 12/13/2016	12/13/16	Prepare a table for the Finance Subcommittee showing the different roles and responsibilities of ASC and the TAC co-Chairs	Philip Trowbridge	01/04/17	Complete	
10	SC Action Items 10/18/2016	10/18/16	Schedule call to discuss flowchart	Selina Cole	01/26/17	Complete	This group would include Regional Board staff (Adam Laputz), State Board staff (Greg Gearheart, Rich Breuer), USEPA (Debra Denton), and representatives of POTWs (Debbie Webster), stormwater (Karen Ashby), and agriculture (Bruce Houdesheldt as placeholder pending follow-up discussion within the group).
11	SC Action Items 10/18/2016	10/18/16	Work with the Coordinating Committee to establish when terms will start and end for SC members, TAC members, and TAC co-chairs.	Philip Trowbridge	01/26/17	Complete	Process memo prepared and presented to TAC on 12/13/16.
12	SC Action Items 10/18/2016	10/18/16	Schedule a SC agenda item to discuss whether the TAC should continue to have two appointed co-chairs	Philip Trowbridge	01/26/17	Complete	
13	SC Action Items 10/18/2016	10/18/16	Distribute Word version of the SC-approved Charter document to the TAC	Thomas Jabusch	10/21/16	Complete	

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	Primary	Meeting Date	Deliverable	Assigned To	Due Date	Status	Comments
14	SC Action Items 10/18/2016	10/18/16	Send additional specific changes and edits to the charter to Phil Trowbridge	TAC members	11/18/16	Complete	Comments were received from CVCWA.
15	SC Action Items 10/18/2016	10/18/16	Bring Charter with additional edits to the SC for approval	Philip Trowbridge	01/26/17	Complete	
16	SC Action Items 10/18/2016	10/18/16	Develop a matrix that shows the intersect between the 3 major drivers (NRP, Pyrethroids TMDL, MeHg TMDL) and the Delta RMP assessment questions	Philip Trowbridge	01/26/17	Complete	
17	SC Action Items 10/18/2016	10/18/16	Look into "pooling" multiple settlements into one larger Supplemental Environmental Project	Patrick Morris	01/26/17		Will be discussed at SC meeting.
18	SC Action Items 10/18/2016	10/18/16	Send comments on USGS report to Joe Domagalski	Steering Committee	11/01/16	Complete	Comment period expired without any comments received.
19	TAC Action Items from 9/20/2016	09/20/16	Send Nutrient Sensor Synthesis Report including reconciled comments to TAC and SC	Joe Domagalski	10/11/16	Complete	
20	TAC Action Items from 9/20/2016	09/20/16	Modify the slides for the proposed process for pesticide prioritization before including them in the Oct 18 SC/TAC meeting agenda package or sending them to the Pesticides Subcommittee	Stephen McCord	10/04/16	Complete	
21	TAC Action Items from 9/20/2016	09/20/16	Send Doodle poll for first Pesticides Subcommittee Meeting	Thomas Jabusch	09/22/16	Complete	
22	TAC Action Items from 9/20/2016	09/20/16	Add a cover page to the toxicity report that explains how it fits into the overall reporting plan	Thomas Jabusch	12/06/16	Complete	This update has been noted and will be completed when the FY15/16 CUP Report is formatted.
23	TAC Action Items from 9/20/2016	09/20/16	Send comments on management drivers table and Section 7B (TAC) of the approved Delta RMP Charter to Phil Trowbridge	TAC members	10/04/16	Complete	
24	TAC Action Items from 9/20/2016	09/20/16	Prepare slides about the TAC roles and responsibilities in the Charter and share them with the TAC for review before the October 18 meeting	Stephen McCord	10/17/16	Complete	
25	SC Action Items 07/20/2016	07/20/16	Send an invite to SC for January 26, 2017 meeting	Meg Sedlak	09/01/16	Complete	
26	SC Action Items 07/20/2016	07/20/16	Include page numbers in the agenda indicating location of agenda items, add blank pages between items in the agenda package.	Meg Sedlak	10/03/16	Complete	
27	SC Action Items 07/20/2016	07/20/16	Accept Charter track changes sent to SC and incorporate language modifications requested. Place final version in google drive under foundational documents.	Philip Trowbridge	08/17/16	Complete	
28	SC Action Items 07/20/2016	07/20/16	Send TAC the final version of the Charter before the 10/18/16 meeting.	Meg Sedlak	09/30/16	Complete	
29	SC Action Items 07/20/2016	07/20/16	ASC and Finance Subcommittee will meet to determine a way to provide the level of information requested. ASC will provide a cost estimate for any extra work associated with the increased reporting.	Meg Sedlak	10/03/16	Complete	This meeting took place immediately following the SC meeting. For future financial reports, ASC will use the same format as was developed for the Q2 report but also add the hours billed by each staff member for each task from the invoices.
30	SC Action Items 07/20/2016	07/20/16	Send out Management Driver table to SC and TAC	Meg Sedlak	09/30/16	Complete	
31	SC Action Items 07/20/2016	07/20/16	Add an agenda item to the October 18th Joint meeting agenda to discuss TAC comments on the Charter.	Meg Sedlak	09/30/16	Complete	
32	SC Action Items 07/20/2016	07/20/16	Table for TAC roster needs to be updated to reflect the composition indicated in the charter (e.g. resource agencies). Greg Gearheart and Jeff Stuart requested that they be added to the TAC mailing list as they seek to find TAC representatives.	Thomas Jabusch	09/30/16	Complete	

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	Primary	Meeting Date	Deliverable	Assigned To	Due Date	Status	Comments
33	SC Action Items 07/20/2016	07/20/16	Develop a list of SEP projects that can be discussed at the MYP meeting.	Adam Laputz	09/30/16	Complete	
34	TAC Action Items from 6/14/2015	06/14/16	TAC needs to provide comments on QAPP by June 30th, 2016	TAC members	06/30/16	Complete	
35	TAC Action Items from 6/14/2016	06/14/16	ASC to confirm chlorophyll measurements conducted as part of FY16/17 Hg project are conducted using standardized procedures (e.g., SWAMP methods). TAC would like results to be comparable among other agencies.	Thomas Jabusch	07/01/16	Complete	
36	TAC Action Items from 6/14/2016	06/14/16	ASC to schedule meeting for the nutrient planning meeting (Day 1)	Thomas Jabusch	06/22/16	Complete	Doodle poll sent and possible dates identified.
37	TAC Action Items from 6/14/2016	06/14/16	Revise workshop description; send to nutrient subcommittee; send to TAC by July 1; and include in agenda package for SC meeting.	Thomas Jabusch	06/21/16	Complete	
38	TAC Action Items from 6/14/2016	06/14/16	For the FY16/17 nutrient synthesis task, Janis Cook requested that a clear explanation of EOF be included.	Thomas Jabusch	02/28/17		
39	TAC Action Items from 6/14/2016	06/14/16	TAC requested that minutes be more concise if possible	Thomas Jabusch	09/13/16	Complete	
40	TAC Action Items from 6/14/2016	06/14/16	Send out list of representatives on TAC and subcommittees	Thomas Jabusch	06/28/16	Complete	
41	TAC Action Items from 6/14/2016	06/14/16	Prepare a table of changes to the QAPP and send out the revised QAPP to TAC for approval by the end of the month. Indicate revision number (Rev 2).	Thomas Jabusch	06/21/16	Complete	
42	TAC Action Items from 6/14/2016	06/14/16	Co-chair report to SC should be prepared by 6/30/2016 and sent to TAC for comment. TAC comments need to be received by July 6th so the report can appear in SC agenda package.	Stephen McCord	06/22/16	Complete	
43	TAC Action Items from 6/14/2016	06/14/16	Post pdfs of presentations from June 14 meeting on TAC google drive	Thomas Jabusch	06/20/16	Complete	
44	SC Action Items 04/25/2016	04/25/16	SC members will provide ASC with comments on the Charter	Group	05/05/16	Complete	
45	SC Action Items 04/25/2016	04/25/16	Add an agenda item for the July SC meeting to discuss fees for FY17/18.	Meg Sedlak	07/20/16	Complete	
46	SC Action Items 04/25/2016	04/25/16	Work with Linda Dorn and Dave Tamayo to review the MOA to determine how they can adapt it to be a contract template for use by their respective organizations.	Philip Trowbridge	06/30/16	Complete	Sacramento County will extend the existing contract. Regional San will develop a multi-year MOU.
47	SC Action Items 04/25/2016	04/25/16	Val Connor will organize a Finance Subcommittee (members include Dalia Fadh, Mike Wackman, Linda Dorn, and Adam Laputz, only 3 needed for quorum). The Finance Committee will address questions such as: is the program as cost-efficient as possible?; what format and information is needed for the financial memorandums?; Are there places where the budget assumptions are flawed?; is the program on the right track financially?	Val Connor	07/20/16	Complete	
48	SC Action Items 04/25/2016	04/25/16	Incorporate edits from Debbie Webster and Linda Dorn on the December SC meeting minutes and then distribute the draft minutes back to the SC for review.	Thomas Jabusch	05/05/16	Complete	
49	SC Action Items 04/25/2016	04/25/16	Prepare a short summary of Delta RMP preliminary monitoring results/activities for the July SC agenda package.	Stephen McCord	07/20/16	Complete	
50	SC Action Items 04/25/2016	04/25/16	Revise the FY16/17 Detailed Workplan as follows: Table 1 to reflect the changes in FY16/17 revenue approved at the 4/25/16 meeting; and the last paragraph of the pathogens study description to reflect the allocation of funding for pathogens trigger studies to the FY15/16 budget.	Meg Sedlak	06/01/16	Complete	

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	Primary	Meeting Date	Deliverable	Assigned To	Due Date	Status	Comments
51	SC Action Items 04/25/2016	04/25/16	Revise the Charter with edits from SC members (at the meeting and in writing) particularly regarding the Coordination Committee, Finance Committee, Revenue Committee, use of contingency funds, adding/changing members, financial management, and minimum balance for Reserve funds.	Meg Sedlak	07/20/16	Complete	
52	SC Action Items 04/25/2016	04/25/16	Report back to the SC in July as to whether additional funds, besides the extra \$20,000 added to the FY15/16 budget, are needed for pathogens trigger studies.	Brian Lauerson	07/20/16	Complete	According to LWA, additional funds are not needed at this time.
53	SC Action Items 04/25/2016	04/25/16	Send meeting invitations for the next SC meetings on July 20, 2016 and October 18, 2016.	Thomas Jabusch	05/05/16	Complete	
54	SC Action Items 04/25/2016	04/25/16	Add an agenda item to July SC meeting regarding the Hyallela workshop being organized by Regional Board.	Meg Sedlak	07/20/16	Complete	
55	TAC Action Items from 3/30/15	03/30/16	Confirm that the Delta RMP website is up to date	Selina Cole	06/14/16	Complete	
56	TAC Action Items from 3/30/15	03/30/16	Send out to the TAC the consensus-based option for FY16/17 studies	Meg Sedlak	04/01/16	Complete	
57	TAC Action Items from 3/30/15	03/30/16	Revise scope of work for nutrient study for FY16/17 and send back to TAC	Thomas Jabusch	04/14/16	Complete	
58	TAC Action Items from 3/30/15	03/30/16	Trouble-shoot PDF printing problems at Regional San (Agenda package does not print correctly)	Meg	04/14/16	Complete	