DELTA
Regional Monitoring Program

DRAFT
Workplan and Budget for Fiscal Year 2019 - 2020

For consideration by the Delta RMP Steering Committee on May 29, 2019

AQUATIC SCIENCE CENTER

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Introduction

The purpose of this document is to provide the Delta RMP Steering Committee (SC) with a detailed workplan and budget for Fiscal Year 2019-2020 (FY19-20). The fiscal year covers the period from July 1, 2019 to June 30, 2020, and matches the fiscal year of the state of California.

This workplan covers the core functions of administration, finance, and governance. These annual tasks are planned to take place over the course of the fiscal year. In addition, the workplan describes monitoring projects for mercury, pesticides and aquatic toxicity, special studies for nutrients, and year one of a pilot study of contaminants of emerging concern (CECs). Monitoring projects authorized under this workplan have a project duration of 1.5 to 2 years and are planned to be completed by June 30, 2021.

For the upcoming fiscal year, the overall planned expense is **$1,487,535**. Of this, 18% is for core functions, governance, and administration, and 82% is for water quality monitoring and special studies.

Forecast revenue from Delta RMP participants is **$1,215,663**. Additional cash on hand and expected revenues are sufficient to cover all planned expenses, as described in the section *Revenue Forecast*, under the heading *Other Cash and Expected Revenue* on page 7.

In addition, the workplan leverages an estimated **$873,269** of in-kind contributions from other agencies, including the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers, California Department of Water Resources (DWR), U.S. Bureau of Reclamation (USBR), Moss Landing Marine Laboratory (MLML), the State Water Resources Control Board's Surface Water Ambient Monitoring Program (SWAMP), Regional San, the State Water Contractors, and Metropolitan Water District of Southern California (Met).

Staff of the Aquatic Science Center (ASC) have worked with technical subcommittees to develop study proposals that are consistent with planning budgets set by the Steering Committee. Proposals for monitoring and special studies were vetted by the respective subcommittees and brought to the Technical Advisory Committee (TAC) on May 9, 2019. The subcommittees have continued to endeavor to develop proposals consistent with feedback of the 2016 External Review Panel.

In the spring of 2019, the TAC reviewed and prioritized the scientific studies based on the planning budgets for each focus area. Detailed workplans for these studies are provided as attachments to this workplan. ASC then prepared this detailed workplan for the recommended studies and core functions of the program. This document summarizes:

- Expected revenue for the 2019 – 2020 fiscal year;
- A detailed budget and workplan for the core functions of the program;
- A detailed budget and workplan for monitoring and special studies;
- The overall FY19-20 Delta RMP budget.

Revenue Forecast

In July 2018, the SC voted for a one-time fee increase to all participants of 3%. Expected contributions from new and continuing participants amount to **$1,215,663**. In addition, the Delta RMP has cash reserves (described in more detail below), which can and should be spent down to cover program activities, monitoring, and special studies. Our recommendation is that expenses be held below **$1,492,000** in FY-19-21.

The Delta RMP has access to some in-kind funds that we can use at our discretion, such as a State Board contract with UC-Davis for toxicity testing (the "SWAMP Contract"). These funds are not "fungible." In other words, they cannot be used for any purpose other than toxicity testing, nor can they be used with a different vendor. Our budgeting and financial reporting for the Delta RMP only includes funds that we manage. However, we carefully track in-kind contributions to the program. See Table 12, **In-Kind Contributions** on page 32.

The number of Delta RMP participants has steadily grown over the life of the program, as shown below. Table 1 shows the how the number of Delta RMP participants has evolved, along with their financial contributions.

Table 1 History of Delta RMP participation and revenue

Fiscal Year	Number of Participants		Contributions by Participants	
FY 15-16	33		$751,733	
FY 16-17	35	+6%	$862,082	+15%
FY 17-18	49	+40%	$997,356	+16%
FY 18-19	52	+6%	$1,180,256*	+18%
FY 19-20	52	–	$1,215,663	+3%

*The figures for contributions in FY18-19 and FY19-20 do not include a $50,000 contribution by the Army Corps of Engineers, who joined as a contributor during FY18-19. The Corps is contributing by directly funding the USGS California Water Science Center to perform pesticides monitoring for the Delta RMP, offsetting our costs for monitoring. We are tracking this as an in-kind contribution to the program.

Below, Table 2 summarizes the expected revenue for FY19-20 summarized by category of participant. Figure 1 shows revenue growth by participant category, showing actual revenue for the past three fiscal years and expected revenue for FY19-20.

Table 2 Delta RMP revenue schedule.

Participant Category	FY15-16 Actual	FY16-17 Actual	FY17-18 Actual	FY18-19 Actual*	FY19-20 Expected	Comment
Agriculture	$113,780	$148,780	$148,780	$148,780	$153,243	
Dredgers		$60,000	$60,000	$63,000	$64,890	Includes the Ports of Stockton and West Sacramento (joined during FY16-17) and the Sacramento Yacht Club (joined in FY17-18).
Flood Control and Habitat Restoration				$200,000	$206,000	The California Department of Water Resources joined the program in FY18-19.
POTW (Wastewater)	$209,754	$205,103	$197,077	$197,077	$202,989	The City of Discovery Bay did not participate in the RMP in FY16-17 but did in FY17-18 and thereafter. By approval of the CV Water Board, the City of Stockton contributed $24,777 in FY16-17 but is permitted to pay $12,100 in other years.
State of California	$17,649					The state directly funded the program in FY15-16, but since then has lent in-kind support.
Stormwater	$328,199	$348,199	$491,399	$571,399	$588,541	12 new participants joined in FY17-18. CalTrans joined the program in FY18-19, contributing $80,000.
Water supply	$100,000	$100,000	$100,000			SFCWA announced its dissolution in 2018. To date, no other water supply agency has pledged to support the program.
Total	$769,382	$862,082	$997,256	$1,180,256	$1,215,663	

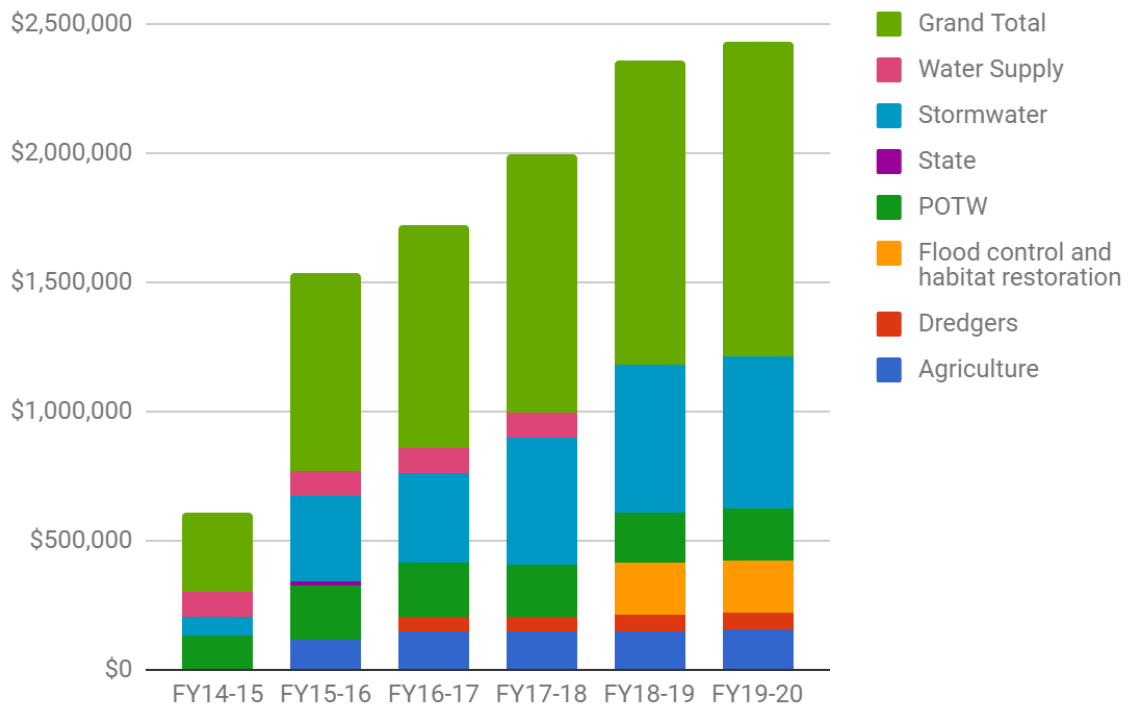

Figure 1 Bar chart of revenue by fiscal year and by participant category, showing actual revenue for the past 4 fiscal years and expected revenue for FY19-20.

Other Cash and Expected Revenue

As of the end of the first quarter of 2019, the Delta RMP's financial standing is as follows (see the following pages for definitions of each term):

Financial Assets	
Cash	$1,096,526
Reserve Fund	$171,322
Accounts Receivable	$0
Expected Revenue	$140,000
	$1,407,848
Liabilities	
Subcontracts	$544,630
ASC Planned Labor & Expenses	$302,071
	$846,701

Definitions:

Financial Assets – Includes cash and cash equivalents and accounts receivable. We refer here only to "financial" assets as the Delta RMP does not own any physical assets such as equipment or supplies.

Reserve Fund – A dedicated "set aside" fund maintained in ASC's accounting system. If there are excess funds in the Program account at the end of a budget year, the funds can be put into the Reserve Fund to be applied toward subsequent years of Program implementation with approval of the Steering Committee.

Cash – Money in the ASC checking account and savings account that belongs to the Delta RMP.

Accounts Receivable - "The balance of money due to a firm for goods or services delivered or used but not yet paid for by customers" (Investopedia). In our case, this represents invoices that we have sent to Delta RMP contributors, but which have not yet been paid.

Liabilities – "A company's legal financial debts or obligations that arise during the course of business operations" (Investopedia). These can be thought of as "encumbered funds" that are restricted for a given purpose, such as subcontracts or honoraria, or planned labor or direct expenses.

Expected revenue is revenue that we *expect* to receive, but we have *not yet invoiced*, therefore it is be counted under accounts receivable. At present, this consists of:

(1) We expect to receive $60,000 from the State Water Contractors, but cannot invoice them until we produce a deliverable, the draft pesticides interpretive report. This work is underway by our subcontractor Deltares.
(2) We cannot invoice CalTrans for $80,000 until the *end* of the fiscal year. According to the terms of our contract, CalTrans will pay for work after it is completed. In our case, this means that their contribution for FY18-19 will be invoiced in June 2019. We hope to resolve this in February or March 2019.

The *current* amount of assets less liabilities is $561,147. The reserve fund is included in this amount. Therefore, the amount of "cash on hand" is $389,825. The Finance Committee has recommended maintaining a balance of $100,000 in the reserve fund. This means that up to $461,147 in cash can be considered immediately available. However, the full amount is available for funding projects at the Steering Committee's discretion.

Annual revenue	$1,215,663
Cash	$461,147
Max. available in FY19-20	**$1,676,810**

This budget forecast does not anticipate any new contributors to the program, nor does it forecast interest income, which may realistically be expected to add $5,000 to $15,000 in the upcoming fiscal year.

During FY9-20, we are faced with the loss of the in-kind contribution from the State Water Resources Control Board (hereafter, State Board). The State Board has paid for the program's aquatic toxicity testing since 2015. The contract funding this work is set to expire in March 2020, and there will be a gap in funding until a new contract is put in place. As a result, the State Board funding will likely only carry us through half of Water Year 2020's planned monitoring. Our understanding is that a new State Board contract will be put in place in 2020 and Delta RMP funding will return to previous levels (around $250,000 per year) after a 3-6 month gap. These funds will be restricted for use by state agencies or within the University of California system. We are actively looking into using State Board's contribution to fund our mercury monitoring work, done by Moss Landing Marine Laboratory, a division of San Jose State University.

Based on the considerations outlined above, it would be prudent to spread the currently-available cash over multiple years, rather than spending it all in one year. The following shows one scenario for expenses over the next 3 years. In this scenario, SWAMP funding returns to previous levels in FY20-21, and the program maintains a $100K reserve fund. In this scenario, program would spend 60% of available cash in FY19-20, and then 15% and 25% in each of the following years, spending down available cash sustainably. This rate allows us to grow the program at 3% per year for the following two years even while revenues are flat.

Table 3. Scenarios of expenses over the next three fiscal years.

	FY19-20	FY20-21	FY21-22
Participant contributions	$1,215,663	$1,215,663	$1,215,663
SWAMP contract		$250,000	$250,000
Current cash ($461,147)	$276,688	$69,172	$115,286.75
(% of cash)	*60%*	*15%*	*25%*
Total	**$1,492,351**	**$1,534,835**	**$1,580,950**
Year-over-year growth:		2.8%	3.0%

Based on the considerations above,, we recommend that expenses in FY19-21 be kept to around $1.49 million.

Program Core Function Expenses

Delta RMP expenses fall into two categories: core function expenses associated with administering a multi-faceted, stakeholder-driven monitoring program; and special studies and monitoring to answer Delta RMP assessment questions. This section details the core function expenses for FY19-20. The core function budget includes the following categories of tasks:

- Preparation of program planning documents (e.g., Workplan, Monitoring Design)
- Contracts and financial management
- Governance
- Quality assurance

The planned budget for core functions is **$273,455**, slightly lower than the budgeted and projected expenses for core functions in FY18-19. Below are notes on certain tasks:

- **Travel expenses** are no longer included under any task. Due to a change in SFEI-ASC's policies and accounting practices, travel expenses are not charged to the Delta RMP when employees use a company vehicle.
- **Task 2A, Steering Committee Meetings, and Task 2B Technical Advisory Committee Meetings ($33,000 each)**. These budget lines are slightly lower than in past years as billing has tracked low as we have become more efficient at running meetings, and current staff have lower billing rates than those in the past.
- **Direct expenses for Tasks 2A and 2B (SC and TAC meetings)**: In FY19-20, we are proposing to have ASC junior staff to attend meetings to take notes and write meeting summaries rather than hiring a contractor for this function. We are also proposing to have lunch delivered by a caterer. This will be more convenient for meeting participants and help boost *esprit de corps*.
- **Subcontractor budget for Task 2B, TAC meetings** has been increased to $38,955 to account for actual staff time contributed by the TAC chair, Stephen McCord, who makes significant contributions to the program outside of meetings, by participating in subcommittees, reviewing documents, and contributing to planning efforts.
- **Task 2D, Multi-Year Planning Workshop ($8,000)** – this new budget line has been added to cover a day-long strategic planning workshop requested by the Steering Committee.
- **Task 2E, Science Advisors Honoraria ($5,000)** – this budget line is lower than when it was introduced two years ago, as several of our advisors are state employees and are barred from receiving an honorarium by state ethics rules.

Full details about the labor, subcontract, and direct costs as well as the deliverables to be accomplished for each of the core functions tasks are provided in Table 4.

Table 4 Delta RMP 2019 – 2020 fiscal year planned expenses for core functions and administration, including task descriptions, budget justifications, and deliverables.

Task	Subtask	Expense Type	Budgeted Expense	Budget Justification	Deliverables
1. Core Functions	A. Program Planning	Labor	$45,000	Planning, preparing annual workplans and budgets, including technical proposals for monitoring and special studies. Tracking deliverables and action items. Updating foundational documents including Charter, Multi-Year Plan, Communications Plan, and Monitoring Design as needed.	40 hours for Program Manager to produce the Annual Workplan and Budget. 100 hours (2 hrs/wk) for Program Manager to track and execute deliverables/ action items. 200 hours (4 hrs/wk) for technical staff to develop study designs and monitoring designs, contribute to workplan, complete project management tasks, and update program documents. (340 hours total.)
	B. Contract and Financial Management	Labor	$55,000	Tracking expenditures versus budget. Providing quarterly financial updates to the Steering Committee. Developing contracts and managing subcontractors. Invoicing program participants.	300 hours for Finance Associates (1.5 hrs/$5000 budget), 80 hours for Contracts Manager (10 hours for each new contract), 80 hours for Program Manager and 40 hours for technical staff to draft and negotiate contracts and compile legal advice (500 hours total).
2. Governance	A. SC meetings	Labor	$31,000	Preparing agendas, agenda packages, participating in meetings, editing meeting summaries, following up on action items, meeting with Co-Chairs and stakeholders outside of meetings.	4 full-day meetings per year plus 1-2 teleconferences as needed. For each meeting: 40 hours for Program Manager, 20 hours for Lead Scientists, 20 hours for Environmental Analyst. Facilitation by the co-chairs at no additional cost to the program.
		Direct Expense	$2,000	Lunch for SC meetings	$500 for each meeting; lunch for 25-30 people.
	B. TAC meetings	Labor	$31,000	Preparing agendas, agenda packages, participating in meetings, writing meeting summaries, following up on action items, meeting with Co-Chairs and stakeholders outside of meetings. The cost for this function assumes that Stephen McCord will continue as chair of the TAC, with ASC serving in a coordination role. The alternative is to have volunteer TAC co-chairs from the Program Participants with	4 meetings per year plus 1-2 teleconferences as needed. For each meeting: 20 hours for Program Manager, 24 hours for Environmental Scientist, 12 hours for Environmental Analyst, 4 hours for Senior Environmental Scientist. TAC Chair services provided by MEI.

Task	Subtask	Expense Type	Budgeted Expense	Budget Justification	Deliverables
2. Governance				ASC providing leadership and support. The cost for this option would be $42,000.	
	B. TAC meetings	Direct Expense	$2,000	Lunch for TAC meetings	$500 for each meeting; lunch coffee for 25-30 people.
		Subcontracts	$38,955	Contract with McCord Environmental, TAC chair	Total of 159 hours for Stephen McCord: Prepare for and facilitate 4 TAC meetings (64 hrs), participate in SC meetings (47 hrs), review documents and coordinate with Delta RMP participants and leadership (48 hrs).
	C. Technical Subcommittees	Labor	$38,000	Preparing agendas, agenda materials and presentations, participating in meetings, writing meeting summaries, following up on action items, discussion with participants and stakeholders outside of meetings. Note that subcommittee meetings are typically shorter than SC & TAC meetings, often 2-3 hours long, and some are held by phone and internet.	16 meetings per year. For each meeting: 4 hours for Program Manager, 12 hours for Lead Staff, 4 hours for Environmental Analyst. Includes leading and participating in technical subcommittee meetings covering pesticides, aquatic toxicity, CECs, Data Management, and Nutrients.
	D. Multi-Year Planning Workshop	Labor	$7,250	Funds a day-long planning workshop requested by the Steering Committee, to be held in the summer or fall of 2019. Budget estimate does not include the fee for a professional facilitator and assumes that facilitation will be pro bono or by program staff.	32 hours for program managers, 8 hours each for analyst and senior scientist.
	D. Multi-Year Planning Workshop	Direct Expense	$750	Lunch for the day-long multi-year planning workshop	Lunch, coffee, and snacks for 30 people.
	E. Science Advisors Honoraria	Subcontracts	$5,000	Honoraria and travel expenses for our independent experts to attend meetings and review program documents.	Note that several of our advisors are state employees and are barred from receiving an honorarium by state ethics rules, hence this budget line is decreased from previous years. Other option is to maintain higher funding and recruit more advisors from industry or academia.
3. Quality Assurance	A. Quality Assurance Project Plan	Labor	$17,500	Updating the Quality Assurance Project Plan, writing Quality Assurance Reports for datasets, coordinating interlaboratory	40 hours for ASC QA Officer. 16 hours for ASC senior chemist, 16 hours for chief data

Task	Subtask	Expense Type	Budgeted Expense	Budget Justification	Deliverables
				comparison tests (as needed), researching analytical methods, maintaining laboratory SOP file system.	scientist, 12 hours for GIS specialist, 44 hours for RMP technical staff. (124 hours total)

Expenses for Monitoring and Special Studies

This workplan contains monitoring and special studies for mercury, nutrients, pesticides and aquatic toxicity, and contaminants of emerging concern (CECs). No further studies are planned for pathogens at this time.

The total cost for the monitoring programs and special studies amounts to **$1,214,080**. Planned expenses are detailed in Table 9 on page 21. At the October 2018 Joint SC and TAC meeting, the subcommittees were charged with developing proposals within certain budget constraints. Funding guidelines from the SC are shown in Table 5 below. The SC guidance was to develop proposals within 25% of these guidelines. The proposals developed by the subcommittees were close to the planning budgets set by the SC. In some cases, options are available at different funding levels.

Table 5 Funding level guidance by focus area from the Delta RMP Steering Committee

Expense	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY19-20	FY20-21	FY21-22	FY22-23
Core Functions	57	234	312	342	300	309	318	328	338
Pathogens	72	112	-	-	-	-	-	-	-
Pesticides	112	225	248	88	212	223	234	280	250
Nutrients	35	50	120	230	228	250	250	250	250
Mercury	-	-	113	234	277	291	180	180	180
CECs	-	-	-	-	45	220	220	220	-
Total Expense	276	621	793	894	1,062	1,452	1,202	1,258	1,018
Forecast Revenue	303	769	862	1,021	1,205	1,226	1,226	1,226	1,263
Surplus/Deficit					128	(66)	24	(32)	245

The planned expense of each of the planned monitoring programs is shown in Table 9. Further details of the budget by task for monitoring and special studies are shown in Table 10. The tasks to be completed, subcontractors, and deliverables for these tasks are described briefly below and in detailed monitoring designs attached as appendices to this document:

Appendix A: Nutrients
Appendix B: Mercury
Appendix C: Pesticides and Aquatic Toxicity
Appendix D: Contaminants of Emerging Concern

Mercury - $220,000 to $389,000

Mercury monitoring in FY19-20 will collect samples of sport fish and water in order to address the highest priority information needs related to implementation of the Methylmercury TMDL. The focus of Delta RMP mercury monitoring is on the concentrations of organic mercury, or methylmercury in fish. This is a toxic form of mercury, and thresholds have been established for protection of human and wildlife health. The program extends upon FY18-19 by continuing annual sport fish sampling at 7 sites and expanding water sampling to 8 times per year at the same 8 sites that have been monitored in the previous two years. Sediment monitoring is not planned in FY18-19.

An interpretive report is planned in FY19-20 that will synthesize data from the first three years of Delta RMP mercury monitoring into information to guide important upcoming management decisions. Among these are the revision of the Methylmercury TMDL by the Central Valley Regional Water Quality Control Board[1] and contribute to ongoing analytical work by the California Department of Water Resources (DWR), and which will be used to guide regulations and operational decisions related to farming, flood control, and wetland management.[2]

Finally, a new program for restoration monitoring is proposed. Annual monitoring methylmercury in black bass and prey fish at new stations (seven for black bass and 16 for prey fish) located near habitat restoration projects will assess the sub-regional impact of the projects on impairment.

Four options have been scoped out for consideration, as shown in Table 6 below, and described in more detail in the proposal in Attachment B. Option A continues funding traditional Delta RMP mercury monitoring activities, and adds the desired interpretive report. Option B adds restoration monitoring at 3 sites, while option C reduces the number of monitoring sites to two areas, and fewer monitoring sites for both bass and prey fish. Option D drops the interpretive report.

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[1]Delta Methylmercury Total Maximum Daily Load, Phase II, see https://www.waterboards.ca.gov/rwqcb5/water_issues/tmdl/central_valley_projects/delta_hg/

[2] Delta Mercury Control Program, see https://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/control_studies/deltahg_oct2015pr_openwater.pdf

Table 6. Mercury monitoring funding options

Study element	A	B	C	D
Sportfish (bass) sites	7	7	**7**	7
Water Sampling				
Number of sampling events	4	4	**4**	2
Number of sampling sites	6	6	**6**	6
Restoration monitoring, # areas:	0	3	**2**	0
new bass sites	0	7	**5**	0
new prey fish sites	0	16	**9**	0
Interpretive Report	yes	yes	**yes**	no
Cost	**$290**	**$389**	**$360**	**$220**

As shown in Table 7 below (based on option C), the scope and budget for mercury monitoring has grown steadily, as the program seeks to provide timely information to the Central Valley Regional Water Quality Control Board as it is updating the Delta Methylmercury TMDL. After FY19-20, budgets for status and trends water monitoring can be reduced, while continuing to conduct annual sportfish monitoring in order to build up a long-term time series that will be useful to managers in the long run. We anticipate conducting restoration monitoring for the next three to five years to understand whether wetland restoration causes an increase in methylmercury in fish.

Table 7. Sampling frequency for the first three years of Delta RMP mercury monitoring, and planned frequency in FY19-20.

	Sportfish (bass)			Water			Sediment			Prey fish		
	Events	Sites	# Samples	Events	Sites	# Samples*	Events	Sites	# Samples*	Events	Sites	# Samples
FY16-17	1	6	6	4	5	20	-	-	-	-	-	-
FY17-18	1	6	6	7	6-8	54	4	6	24	-	-	-
FY18-19	1	7	7	8	8	64	-	-	-	-	-	-
FY19-20	1	12	12	8	8	64	-	-	-	1	9	9

Nutrients - $250,000

A special study is planned for FY19-20: Sacramento River Nutrient Change Study Phase 1: Effluent Valve Replacement Hold.

This study will track the effects of changes in nutrient loading resulting from a short-term wastewater hold at the Sacramento River Wastewater Treatment Plant (SRWTP). In the summer of 2019, scheduled wastewater effluent holds will occur during the Effluent Valve Replacement

(EVR) project, part of the EchoWater upgrade at the SRWTP. During an EVR hold, no treated effluent will enter the Sacramento River for a period of up to 48 hours. Based on prior research (Kraus et al. 2017) this should create a parcel of effluent-free river water over six miles long in the Sacramento River. The impacts of short-term changes in nutrient loading will be tracked in parcels of water with and without effluent during movement downstream in the Sacramento River and nearby channels.

The project consists of one week-long river sampling campaign, field measurements laboratory analyses, numeric modeling, and reporting. The project will use multiple methods, including boat-mounted, high frequency monitoring of nutrients and fluorescence; discrete sampling for analyses of water quality, phytoplankton and zooplankton abundances, clam biomass, and phytoplankton carbon uptake (to determine growth rates). Data and hydrodynamic modeling will be used to evaluate the response of phytoplankton to a range of nutrient loads and forms, as well as factors of light, turbidity, water residence time, and grazing by zooplankton and clams. See the end of the document for conceptual model and project hypotheses.

The project team is targeting an EVR hold in August 2019 for the field work. All data review and submissions, data analyses, modeling, and reporting would be complete within 18 months of the field work.

Regional San will provide staff hours and equipment for project oversight, development of the QAPP, collection of water samples, and coordination of a final report. ASC will provide financial management and contracting services. Other cooperators include:

- Phytoplankton and zooplankton enumeration (BSA Environmental Services)
- Phytoplankton growth evaluations (Applied Marine Sciences, Inc.).
- Numeric modeling of proportional water volumes and mixing (Resource Management Associates)
- Zooplankton growth and condition (San Francisco State University)

Pesticides and Aquatic Toxicity - $381,770 or reduced cost option at $351,770

The Pesticides Subcommittee requested funding for the second year of a four-year monitoring design for pesticides and aquatic toxicity in the Delta. The study will be led by ASC with assistance from USGS through a subcontract. Analyses of aquatic toxicity will be performed by the Aquatic Health Program Laboratory at UC Davis. During the first half of Water Year 2020, aquatic toxicity testing will be paid for by the State Water Resources Control Board's Office. During the first half of the fiscal year, staff of the State Board's Office Information Management and Analysis (OIMA) will be responsible for Data Management and Quality Assurance of toxicity data.

This contract is set to expire in March 2020. As a result, the SWAMP funding will likely only carry us through half of Water Year 2020's planned monitoring. We propose to continue the toxicity testing program as designed through the end of Water Year 2020, with funding for the

final 3 events coming from the Delta RMP, i.e. funds contributed by Delta RMP participants and managed by ASC. This will maintain continuity and allow us to finish up year 2 of the study. Funds have been allocated for Phase I toxicity identification evaluations (TIEs) if they are called for, i.e. when toxicity is observed to one of the test species. For more detailed and expensive Phase II TIEs, funds can be transferred from the reserve to cover this expense at the discretion of the Finance Committee. The estimated cost to the Delta RMP ranges from $320,290 or $378,214.

The cost to the Delta RMP is summarized below:

		Option A (5 tox. species)	Option B (4 tox. species)
USGS	Field sample collection and lab analysis	$165,563	$165,563
AHPL	**Aquatic toxicity testing**	**$144,480**	**$114,480**
AHPL	Toxicity identification evaluations (TIEs)	$13,200	$13,200
ASC	Pesticides Data Management and QA/QC	$38,549	$38,549
ASC	Toxicity Data Management and QA/QC	$19,978	$19,978
	Total	**$381,770**	**$351,770**

The cost of toxicity testing is high and puts a burden on the program finances once the external support is taken away. In order to decrease the cost, the number of test species could be decreased. Option B, covering the second half of the fiscal year, or 3 of 6 sampling events, would cancel testing with the fish species *Pimaphales promelas*, or fathead minnow.

Option A, All 5 test species					Option B: One invertebrate test species		
	Number	Unit Cost	Total		Number	Unit Cost	Total
Invertebrate: *Ceriodaphnia* 7-day test[1]	28	$1,160	$32,480		28	$1,160	$32,480
Invertebrate: *Chironomus* 10-day test	25	$1,160	$29,000		25	$1,160	$29,000
Invertebrate: *Hyalella* 96-hr test[2]	25	$1,160	$29,000		25	$1,160	$29,000
Algae: *Selenastrum* 96-hr test	25	$960	$24,000		25	$960	$24,000
Fish: *Pimephales* 7-day test	25	$1,200	$30,000		0	$1,200	$30,000
Toxicity Testing Subtotal			$144,480				$114,480

Additional details of the pesticides study are shown in Attachment C. This monitoring project includes a $50,000 cost share from the US Army Corps of Engineers, a $14,614 cost share from the USGS for labor and travel expenses and leverages up to $179,480 in funding from the State Water Board to fund aquatic toxicity testing. A portion of the toxicity budget is a set-aside planning budget for toxicity identification evaluations (TIEs), which may not be necessary, depending on whether environmental samples test positive for toxicity.

Contaminants of Emerging Concern Pilot Study Year 1 - $222,310

The past fiscal year has been spent planning for a 3-year pilot study of Contaminants of Emerging Concern (CECs) to begin in FY19-20. This pilot study has been designed to better understand the occurrence of Contaminants of Emerging Concern (CECs) in the Sacramento-San Joaquin Delta. It is part of a statewide pilot study of CECs being conducted in different regions of California following a mandate and guidelines by the State Water Resources Control Board.[3] The Delta RMP is implementing a workplan for this pilot study that was developed by Central Valley Regional Water Quality Control Board (Central Valley Water Board) and the State Water Resources Control Board (State Water Board), the Central Valley Clean Water Association (CVCWA) and several Central Valley Municipal Separate Storm Sewer System (MS4) representatives (collectively "Stakeholders").

The pilot study will sample water, sediment, fish, and bivalve (clam) tissue and analyze these samples for a range of emerging contaminants, including pharmaceuticals, personal care products, and industrial chemicals. While some researchers include pesticides under the heading of CECs, this study does *not* include pesticides, as the Delta RMP already conducts a comprehensive program to monitor current use pesticides.

This is a relatively complicated pilot study with 5 organizations doing field work and 4 analytical labs, so a significant amount of oversight and coordination by ASC will be needed. The total budget for the study is $222,310, under the $250K target set by the Steering Committee. Cost savings are possible due to the contributions in-kind labor by cooperators. Water sampling at 6 of 8 planned monitoring sites will be performed by the Department of Water Resources Municipal Water Quality Investigations (MWQI) branch. Fish sampling will be done by Moss Landing Marine Laboratory (MLML). Two of the fish sampling locations overlap with Delta RMP mercury sampling for fish, helping to keep costs relatively low. Bivalve sampling will be conducted by Applied Marine Sciences (AMS), who have the most experience collecting bivalves in the estuary.

Table 8 gives an overview of the CEC Pilot study sampling locations, target matrices, and field agencies. Details on the monitoring design for this study can be found in the Central Valley Pilot Study for Monitoring Constituents of Emerging Concern Work Plan and in the Quality Assurance Project Plan, currently in draft, but scheduled to be finalized and signed before monitoring begins in the summer/fall of 2019.

[3] Tadesse, Dawit. 2016. "Constituents of Emerging Concern (CECs) Statewide Pilot Study Monitoring Plan." State Water Resources Control Board. https://www.waterboards.ca.gov/water_issues/programs/swamp/cec_aquatic/docs/oima_sw_cec_mon_plan.pdf.

Table 8. Overview of the CEC Pilot study sampling locations, target matrices, and field agencies

		Number of sampling events per year, for each target matrix:					Agency doing sampling for each matrix:			
Station Name		Water	Sediment	Fish	Bivalves		Water	Sediment	Fish	Bivalves
Sacramento River at Veterans Bridge		4	-	1	1		SFEI	-	MLML	AMS
Sacramento River at Freeport		4	-	1	1		DWR-MWQI	-	MLML	AMS
Sacramento River at Hood Monitoring Station Platform		4	-	-	1		DWR-MWQI	-	MLML	AMS
American River at Discovery Park		4	1	-	1		DWR-MWQI	SPOT	MLML	AMS
San Joaquin River at Airport Way near Vernalis		4	-	1	1		DWR-MWQI	-	MLML	AMS
San Joaquin River at Buckley Cove		4	-	1	1		DWR-MWQI	-	MLML	AMS
Dry Creek u/s of WWTP		4	1	-	-		SFEI	SFEI		-
Old Alamo Creek at Lewis Road		4	1	-	-		SFEI	SFEI		-

Summary

On the following page, Table 9 summarizes planned expenses for monitoring and special studies planned in FY19-20 and described in this workplan.

Table 9 Summary of Delta RMP 2019 – 2020 fiscal year monitoring and special studies

Task, Subtask	Direct Expense	ASC Labor	Subcontracts	Total
4. Sacramento River Nutrient Change Study			$250,000	$250,000
5. Mercury Monitoring FY19-20				
A Field Sampling and Lab Analysis			$300,000	$300,000
B. Mercury in Water Data Mgmt and QA		$15,000		$15,000
C. Mercury in Fish Data Mgmt and QA		$15,000		$15,000
D. Mercury Reporting		$30,000		$30,000
		$60,000	$300,000	$360,000
6. Pesticides Monitoring Water Year 2020				
A. Field sample collection and pesticides chemical analysis			$165,563	$165,563
B. Aquatic Toxicity Testing			$144,480	$144,480
C. Toxicity Identification Evaluations			$13,200	$13,200
D. Pesticides Data Mgmt and QA		$38,549		$38,549
E. Aquatic Toxicity Data Mgmt and QA		$19,978		$19,978
		$58,527	$232,243	$381,770
7. CEC Pilot Study Year 1				
A. Water and Sediment Sampling		$32,941		$32,941
S. Sample Shipping	$8,115			$8,115
B. Bivalve Sampling			$32,902	$32,902
C. Fish Sampling			$14,485	$14,485
D. Chemical Laboratory Analysis			$51,287	$51,287
E. Water Data Mgmt and QA		$23,276		$23,276
F. Sediment Data Mgmt and QA		$11,951		$11,951
G. Bivalves Data Mgmt and QA		$10,002		$10,002
H. Fish Data Mgmt and QA		$12,351		$12,351
R. Interpretive Report		$25,000		$25,000
	$8,115	$115,521	$98,674	$222,310
Monitoring & Special Studies Total	$8,115	$234,048	$971,917	$1,214,080

[1]Represents the cost to the Delta RMP. Moss Landing Marine Laboratory (MLML) has pledged $25,000 as in-kind services for mercury field sampling and analytical work.

[2]Cost to the Delta RMP. Includes a contribution of $50,000 by the US Army Corps of Engineers made directly to the USGS. Also includes an in-kind contribution by the USGS in terms of a cost-share on labor and supplies valued at $13,704.

[3]About half of the toxicity lab work by the Aquatic Health Program Laboratory at UC Davis (AHPL) is funded directly by the State Water Resources Control Board through the Surface Water Ambient Monitoring Program 3456(SWAMP).

Table 10 Budget details for monitoring and special studies

Task	Subtask	Expense Type	Budget	Description	Budget Justification	Deliverables
4. Sacramento River Nutrient Change Study	A. Sacramento River Study	Sub-contract	$250,000	Phytoplankton and zooplankton enumeration (BSA Environmental Services) Phytoplankton growth evaluations (Applied Marine Sciences, Inc). Numeric modeling of proportional water volumes and mixing (Resource Management Associates)	Project includes $591,635 in in-kind contributions by San Francisco State University, Regional San, and the USGS.	(1) Final report describing background information for the modeling applications, data acquisition, modeling results, and interpretation of results. (2) Modeling results will include estimates of source water volumes and mixing at sampled locations and times, documentation on grid updates and checks of flow and stage calibration, metadata used in modeling refinements. (3) Particle-tracking products will be documentation describing the particle tracking model set-up, travel time estimates and two movie-style visualizations of particle transport.
5. Mercury Monitoring FY19-20	A Field Sampling and Lab Analysis	Sub-contract	$300,000	Field collection of fish and water samples and laboratory analyses by the Moss Landing Marine Laboratory (MLML).	Includes a $25,000 in-kind contribution from MLML	Cruise report, Electronic data deliverables of lab results

Task	Subtask	Expense Type	Budget	Description	Budget Justification	Deliverables
5. Mercury Monitoring FY19-20	B. Mercury in Water Data Management and Quality Assurance	Labor	$15,000	Project Management and Coordination: setting up internal tracking system, communicate with DS team, PIs and labs on deliverables and issues. Data Management: manage collection info, create electronic data deliverable (EDD) templates, populate data into CEDEN templates from lab spreadsheet, log in Data sets, format data; Data Validation: Conduct data quality assurance procedures outlined in the Quality Assurance Project Plan (QAPP), data storage and release, upload final data CEDEN. Create summary tables for reporting.	45 hours for data services manager, 63 hours for data analysts, and 10 hours for QA officer.	(1) Provisional data provided to TAC and CEC Subcommittee (2) Final data published in CEDEN (3) QA Summary, distributed to TAC and included as an appendix in annual report"
5. Mercury Monitoring FY19-20	C. Mercury in Fish Data Management and Quality Assurance	Labor	$15,000	Same as above. Water and fish are different "matrices," therefore are handled separately.	20 hours for data services manager, 55 hours for data analysts, and 14 hours for QA officer.	(1) Provisional data provided to TAC and CEC Subcommittee (2) Final data published in CEDEN (3) QA Summary, distributed to TAC and included as an appendix in annual report
	D. Mercury Reporting	Labor	$30,000	Interpretive report summarizing the first 3 years of Delta RMP mercury monitoring, with a goal of providing information to staff at the Central Valley Water Board responsible for updating the Methylmercury TMDL.	Includes 80 hours for Principal Investigator, 80 hours for Environmental Analyst, 16 hours for program manager, 16 hours for data analyst, and 8 hours for programmer.	Mercury Interpretive Report: (1) Draft report (2) Response to comments (3) Final draft report (4) Final report

Task	Subtask	Expense Type	Budget	Description	Budget Justification	Deliverables
6. Pesticides Monitoring Water Year 2020	A. Field sample collection and pesticides chemical analysis	Sub-contract	$165,563	USGS subcontract for field sample collection, laboratory analysis.	Subcontract with USGS PFRG for collecting 48 environmental water samples and laboratory analysis for a suite of Current Use Pesticides. Includes a $50,000 contribution by the Corps of Engineers, paid directly to USGS, and a $14,610 cost share on labor and supplies from the USGS.	(1) Field data sheets (2) Chain of Custody Forms (3) Electronic Data Deliverables of pesticide chemistry results in CEDEN template format. (4) Pesticides Chemistry Lab Report (Report to the Delta RMP; not a formal USGS Data Series Report)
	B. Aquatic Toxicity Testing	Sub-contract	$83,000	Aquatic toxicity testing with 3 species: Invertebrate, Hyalella 96-hr test[2] Algae, Selenastrum (algae) 96-hr test Fish, Pimephales (fathead minnow) 7-day test Another two invertebrate species would bring the total cost to $144,480: Invertebrate Ceriodaphnia 7-day test[1] Invertebrate Chironomus (midge larvae) 10-day test	25 tests for each species. 3 sampling events with 8 sampling locations each, plus one field duplicate. Higher cost option includes up to 3 additional tests for Ceriodaphnia dubia, to cover an experimental nutrient addition, to test whether this is having an impact on the test results, only in instances where a low-conductivity control is necessary.	(1) Provisional Data for distribution to TAC members SWAMP Toxicity Transformers (2) Three Electronic Data Deliverables of toxicity test results in CEDEN format. (3) Attendance at meetings to present preliminary results (4) Quarterly report including: Bench Sheet Copies SWAMP Toxicity Transformers Reference Toxicant Control Charts
6. Pesticides Monitoring Water Year 2020	C. Toxicity Identification Evaluations	Sub-contract	$13,200	Two Phase I TIEs, if necessary. Phase II TIE not included in the planning budget. If deemed necessary, we can transfer funds from the reserve fund with SC authorization.	2 Phase II TIEs @ $6,600 each.	For each TIE: (1) Summary of the TIE treatment and results. (2) Tabular data in an Excel workbook.

Task	Subtask	Expense Type	Budget	Description	Budget Justification	Deliverables
	D. Pesticides Data Management and Quality Assurance	Labor	$38,549	Includes: DS Project Management and Coordination (40 hours); Data Receipt and Data Management (157 hours); Data Validation (52 hours); Data Storage and Release (46 hours);	Includes 40 hours for data services manager, 203 hours for data analysts, and 52 hours for QA officer.	(1) Pesticides chemistry QA Summary; (2) Spreadsheets of provisional data for sharing with Technical Advisory Committee (twice annually); (3) Data and metadata uploaded to CEDEN.
	E. Aquatic Toxicity Data Management and Quality Assurance	Labor	$19,978	Data Services Project Management and Coordination (40 hrs) Data Receipt and Data Management (64 hrs) Data Validation (14 hrs) Data Storage and Release (20 hrs) Expert review by staff toxicologist (20 hours).	40 hours for data services manager, 84 hours for data analysts, 14 hours for QA officer, 20 hours for staff toxicologist.	(1) Aquatic toxicity QA Summary; (2) Spreadsheets of provisional data for sharing with Technical Advisory Committee (twice annually); (3) Data and metadata uploaded to CEDEN.
7. CEC Pilot Study Year 1	A. Water and Sediment Sampling	Labor	$32,941	Field sample collection of water and sediment, 4 times per year. Includes season preparation, event prep, field sampling, packaging and shipping of samples, and coordination.	Includes 139 hours for environmental analyst, 48 hours for environmental scientist, 40 hours for environmental analyst II, and 84 hours for program manager.	CEDEN Templates Field Data and Collection Info SWAMP Field Data Forms Completed Chain of Custody Forms Permit from County Parks
	B. Bivalve Sampling	Sub-contract	$32,902	Subcontract with Applied Marine Sciences.	Includes 193 labor hours, subcontract for vessel and captain, transportation, sample shipping, and supplies.	CEDEN Templates Field Data and Collection Info SWAMP Field Data Forms Field Report (1 for each annual event) Scientific Collection Permit Reports

Task	Subtask	Expense Type	Budget	Description	Budget Justification	Deliverables
7. CEC Pilot Study Year 1	C. Fish Sampling	Sub-contract	$14,485	Subcontract with Moss Landing Marine Laboratory. CEC fish collection at Delta RMP Mercury Monitoring site CEC fish collection at new site specific to this study Fish compositing (2) Archive sample storage for up to two years	Cost is held low as MLML are combining fishing with Delta RMP mercury sampling. Fish collection at 2 current Delta RMP mercury monitoring sites, and at 2 "new" sites. Compositing of fish tissue from 5 fish into a homogenized sample in ultra-clean laboratory.	(1) Field Collection Info in the CEDEN template (2) Chain of Custody Forms (3) Cruise Report
	D. Chemical Laboratory Analysis	Sub-contract	$51,287	Subcontracts with: Weck Analytical Laboratories, SGS Axys, and Vista Laboratory.	Laboratory analysis of a suite of Contaminants of Emerging Concern (CECs) in water, sediment, bivalves, and fish tissue.	Electronic data deliverables in CEDEN templates submitted by labs to ASC.
	E. CECs in water data management and quality assurance	Labor	$23,276	Project Management and Coordination: setting up internal tracking system, communicate with DS team, PIs and labs on deliverables and issues. Data Management: manage collection info, create electronic data deliverable (EDD) templates, populate data into CEDEN templates from lab spreadsheet, log in Data sets, format data; Data Validation: Conduct data quality assurance procedures outlined in the Quality Assurance Project Plan (QAPP), data storage and release, upload final data CEDEN. Create summary tables for reporting.	Includes 32 hours for data services manager, 124 hour for data analysts, and 24 hours for QA officer.	Water chemistry data uploaded to CEDEN

Task	Subtask	Expense Type	Budget	Description	Budget Justification	Deliverables
	F. CECs in sediment data management and quality assurance	Labor	$11,951	as above	10 hours for data services manager, 60 hours for data analysts, and 20 hours for QA officer.	Sediment chemistry data uploaded to CEDEN
	G. CECs in bivalves data management and quality assurance	Labor	$10,002	as above	10 hours for data services manager, 44 hours for data analysts, and 20 hours for QA officer.	Bivalve chemistry data uploaded to CEDEN
7. CEC Pilot Study Year 1	H. CECs in fish data management and quality assurance	Labor	$12,351	as above	10 hours for data services manager, 61 hours for data analysts, and 22 hours for QA officer.	Fish chemistry data uploaded to CEDEN
	R. Reporting	Labor	$25,000	Data report and QA summary in year 1, which will help to communicate results with stakeholders and the water management community in a timely manner and aid staff in adaptive management of the project.	60 hours for Sr. Environmental Scientist, 40 hours for Environmental Scientist, 40 hours for Environmental Analyst 32 hours for Program Manager, 12 hours for QA Officer	(1) Draft report (2) Response to comments (3) Draft final report (4) Final report

Task	Subtask	Expense Type	Budget	Description	Budget Justification	Deliverables
	S. Sample Shipping	Direct Expense	$8,115	Shipping of samples to analytical labs.	Cost to ship (FedEx or equivalent): (1)Fish tissue from MLML to Axys (2)Sediment samples from SFEI to Axys (most sed. analytes) (3)Sediment samples from SFEI to Weck (for TOC) (4)Water samples from SFEI to Vista (for triclocarban) (5)Water samples from SFEI to Physis (for galaxolide) (6)Water samples from SFEI to Weck (for most sed. analytes)	

Science Advisors

This year's workplan includes a $5,000 budget to cover honoraria and travel for up to 4 independent science advisors. Having advisors work with the Program over multiple years is efficient because they will become familiar with the Program and be able to help with adaptive management and review technical reports. The Bay RMP uses this approach to have ongoing, independent peer review of plans and final reports. The science advisor program is *not* a formal program review. Nor do we expect a great deal of written material in the form of reports or papers.

At its May 11, 2018 meeting the Steering Committee requested additional details and a strategy on how we will work with our advisors and engage their expertise. The section below provides the job description that we shared with nominated advisors, and outlines a process to gather input from the advisors in FY19-20.

Job Description

The Delta RMP seeks to work with scientists who can lend their expertise according to our needs and their skills and interest. This includes reviewing proposed monitoring plans, draft reports, and other program documents and give comments on how they can be improved to better support the goals of the Delta RMP. We would like to have advisors attend one meeting per year in person, it could be a meeting of our Technical Advisory Committee, which is a single day usually from 10 am to 4, or a technical subcommittee meeting, which are typically a maximum of 3 to 4 hours long. Further, we would also expect advisors to be available for infrequent, and informal, consultations with program staff to answer questions or discuss technical matters by phone and email. It is difficult to give an exact estimate for time commitment but will likely be on the order of 5 – 15 hours per quarter.

The science advisor program is *not* a formal program review. Nor do we expect a great deal of written material in the form of reports or papers.

In the winter of 2017, the SC and TAC agreed that the program's greatest need was for a statistical expertise. Beyond this, the SC and TAC identified three other areas of support: Environmental Statistics/Large Scale Monitoring Programs, Monitoring Design/Interpretation of Data, and Ecosystem Level Effects. Members of the TAC, SC, and technical subcommittees were asked to nominate advisors. In May 2018, the SC confirmed the following advisors (one of them later declined):

- **Statistics and Monitoring Design**
    1) Dr. Neal Willits, UC Davis
    2) Dr. Thomas Grieb, TetraTech
    3) Steve Saiz, Central Valley Regional Water Quality Control Board
- **Toxicity / Pesticides / Contaminants**

1) Dr. Lisa Nowell, USGS
2) Dr. Gary Cherr, UC Davis

Plan for Engaging Advisors

During the 2019 - 2020 fiscal year, the Science Advisors will be asked to provide input on:

1. Draft reports when they are sent to the TAC (ongoing)
2. Draft Pesticides Interpretive Report (fall 2019)
3. Proposed studies for FY20-21 (spring 2020)
4. Attend and participate in our Multi-Year Planning Workshop (summer/fall 2019)

For the FY12-21 proposed studies, the advisors will be asked to review proposals and attend the TAC meeting or technical subcommittee meetings where proposals are discussed.

Subcontractors

Table 11 lists the subcontractors included in the Delta RMP FY19-20 workplan. The contractors and service providers listed below are experienced and familiar with the Delta RMP and the Program's needs. Per the Delta RMP Charter, sole source justifications are provided in Appendix E for the subcontracts greater than $50,000, Moss Landing Marine Laboratory and the U.S. Geological Survey.

Table 11 Delta RMP Subcontractors in FY19-20

Contractor	Task	Services	Budget amount
McCord Environmental	2B	TAC Co-Chair, meeting facilitation, coordination with stakeholders	$38,955
Science Advisors	2E	Not technically subcontractors, but categorized this way for budgeting and accounting: Honoraria for science advisors	$5,000
Moss Landing Marine Laboratory	5A	Mercury Monitoring – field sampling and laboratory analysis	$300,000
U.S. Geological Survey Pesticide Fate Research Group (PFRG)	6A	Field sampling and laboratory analysis for pesticides	$165,563
Aquatic Health Program Laboratory at UC Davis (AHPL)	6B	Aquatic toxicity testing, reporting, meeting attendance	$83,000
AHPL	6C	Toxicity identification evaluations (TIEs)	$13,200
BSA Environmental Services	4A	Phytoplankton and zooplankton enumeration	$30,000
Applied Marine Sciences, Inc.	4A	Phytoplankton growth evaluations	$103,000
Resource Management Associates	4A	Numeric modeling of proportional water volumes and mixing	$117,000
Applied Marine Services	7B	Bivalve (clam) field sampling	$32,902
Moss Landing Marine Laboratory	7C	Fish collection for the CEC Pilot study	$14,485
Weck Analytical Laboratory	7D	Analysis of water samples for most CEC analytes, and sediment for total organic carbon (TOC).	$18,620
Vista Laboratory	7D	Analysis of water samples for Galaxolide (HHCB) and Triclocarban	$9,457
SGS Axys Laboratory	7D	Analysis of bivalve tissue, fish tissue, and sediment for PBDEs and PFCs.	$23,210
TOTAL			**$954,392**

In-Kind Contributions

Financial reporting for the Delta RMP only includes funds managed by ASC. However, we carefully track in-kind contributions to the program. The success of the program relies on leveraging valuable contributions from partner agencies. Table 12 shows the value of planned in-kind contributions to the Delta RMP during FY19-20.

Table 12. Planned in-kind contributions to the Delta RMP in FY19-20.

Agency	Description	Value
DWR Municipal Water Quality Investigations (MWQI) branch	Staff time, boat and equipment for CEC water sampling (planned: 3 staff, 8 days)	$28,000
U.S. Geological Survey (USGS, Pesticide Fate Research Group, PFRG)	Matching funds for pesticide monitoring project (10% of labor and travel)	$14,614
Moss Landing Marine Laboratory (MLML)	Cost share for mercury field sampling and laboratory analysis to cover staff time, equipment, and supplies	$25,000
State Water Resources Control Board, Surface Water Ambient Monitoring Program (SWAMP)	Direct funding to the Aquatic Health Program Laboratory at UC Davis covering aquatic toxicity laboratory testing	$164,020
State Water Contractors and Metropolitan Water District of Southern California	Direct funding to San Francisco State University to analyze zooplankton growth and condition, as part of the Sacramento River Nutrient Change Study	$170,000
Regional San	Discrete water quality sampling performed as part of the Sacramento River Nutrient Change Study	$211,635
US Bureau of Reclamation	Funding to the USGS for high frequency data collection and mapping, as part of the Sacramento River Nutrient Change Study	$150,000
USGS California Water Science Center	Use of boat and equipment for high frequency data collection and mapping, as part of the Sacramento River Nutrient Change Study	$60,000
US Army Corps of Engineers	Direct funding to USGS to cover a portion of the costs of pesticide sample collection and analysis.	$50,000
Total		**$873,269**

Overall Delta RMP FY19-20 Budget

The programmatic and scientific budgets for the Delta RMP are shown together in Table 13 on the next page. The total planned expense for the program in FY19-20 are **$1,426,055**.

The bar chart in Figure 2 shows how the planned program expenses for FY19-20 compares to budgeted expenses for the past four fiscal years.

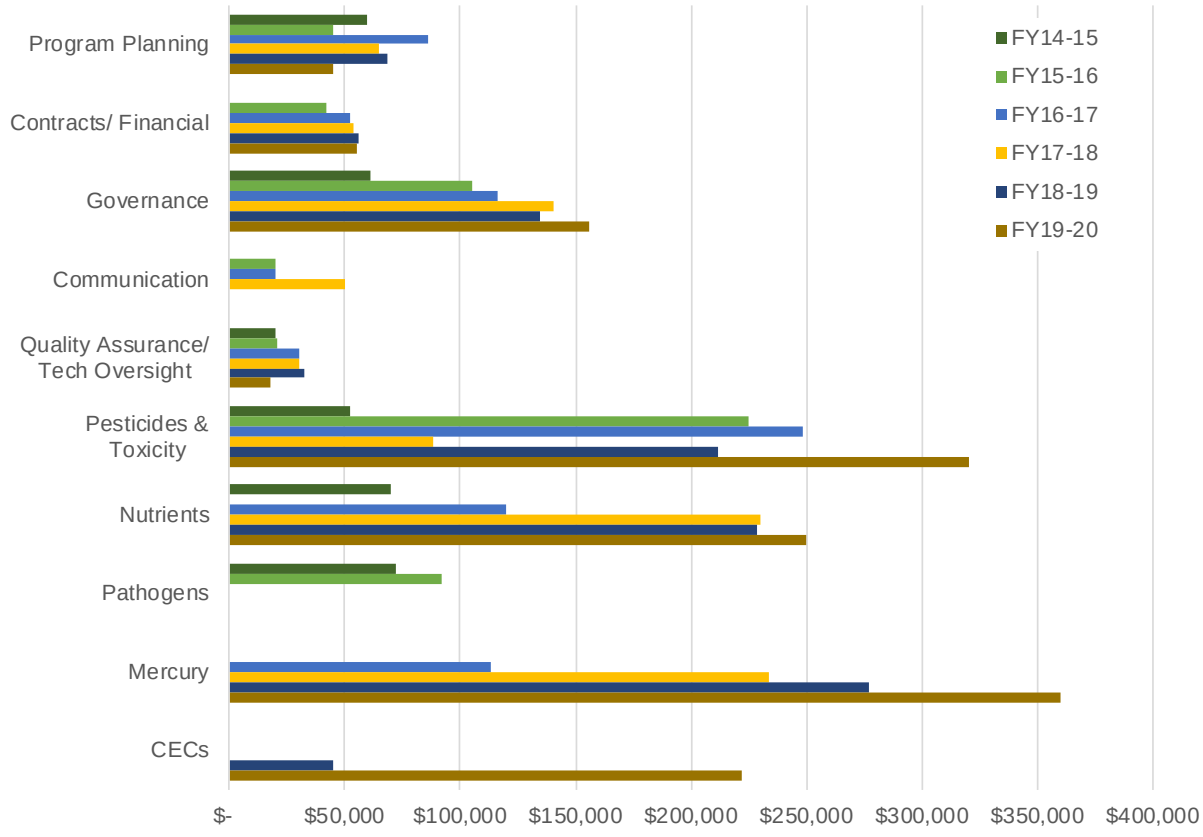

Figure 2 Bar chart of budgeted expenses for the Delta RMP over last 5 fiscal years.

Table 13 Delta RMP FY19-20 Overall Budget

Task	*Subtask*	Direct Expense	Labor	Sub-contracts	Grand Total
1. Core Functions	A. Program Planning		$45,000		$45,000
	B. Contract and Financial Mgmt		$55,000		$55,000
1. Core Functions Total			$100,000		$100,000
2. Governance	A. SC meetings	$2,000	$31,000		$33,000
	B. TAC meetings	$2,000	$31,000	$38,955	$71,955
	C. Technical Subcommittees		$38,000		$38,000
	D. Multi-Year Planning Workshop	$750	$7,250		$8,000
	E. Science Advisors Honoraria			$5,000	$5,000
2. Governance Total		$4,750	$107,250	$43,955	$155,955
3. QA	A. QA Project Plan		$17,500		$17,500
3. QA Total			$17,500		$17,500
4. Sacramento River Nutrient Change Study	A. Sacramento River Study			$250,000	$250,000
4. Sacramento River Nutrient Change Study Total				$250,000	$250,000
5. Mercury Monitoring FY19-20	A Field Sampling and Lab Analysis			$300,000	$300,000
	B. Mercury in Water Data Mgmt and QA		$15,000		$15,000
	C. Mercury in Fish Data Mgmt and QA		$15,000		$15,000
	D. Mercury Reporting		$30,000		$30,000
5. Mercury Monitoring FY19-20 Total			$60,000	$300,000	$360,000
6. Pesticides Monitoring Water Year 2020	A. Field sample collection and pesticides chemical analysis			$165,563	$165,563
	B. Aquatic Toxicity Testing			$144,480	$144,480
	C. Toxicity Identification Evaluations			$13,200	$13,200
	D. Pesticides Data Mgmt and QA		$38,549		$38,549
	E. Aquatic Toxicity Data Mgmt and QA		$19,978		$19,978
6. Pesticides Monitoring Water Year 2020 Total			$58,527	$323,243	$381,770
7. CEC Pilot Study Year 1	A. Water and Sediment Sampling		$32,941		$32,941
	B. Bivalve Sampling			$32,902	$32,902
	C. Fish Sampling			$14,485	$14,485
	D. Chemical Laboratory Analysis			$51,287	$51,287
	E. CECs in water data Mgmt and QA		$23,276		$23,276
	F. CECs in sediment data Mgmt and QA		$11,951		$11,951
	G. CECs in bivalves data Mgmt and QA		$10,002		$10,002
	H. CECs in fish data Mgmt and QA		$12,351		$12,351
	R. Reporting		$25,000		$25,000
	S. Sample Shipping	$8,115			$8,115
7. CEC Pilot Study Year 1 Total		$8,115	$115,521	$98,674	$222,310
Grand Total		$12,865	$458,798	$1,015,872	$1,487,535

Attachment A Sacramento River Nutrient Change Study

Document to be inserted in final version. For now, see:
https://drive.google.com/file/d/1LfelRVM8ZLi9ExA_slhePOTJ6uXqbk5r/view?usp=sharing

Attachment B Mercury Monitoring

Document to be inserted in final workplan. For now, see:
https://drive.google.com/file/d/1LOnEzI0IYKGyRr2ARWQGtvrQMXProiI5/view?usp=sharing

Attachment D Contaminants of Emerging Concern

Pages to be inserted in final document. Details on the monitoring design for this study can be found in the Central Valley Pilot Study for Monitoring Constituents of Emerging Concern Work Plan and in the Quality Assurance Project Plan, currently in draft, but scheduled to be finalized and signed before monitoring begins in the summer/fall of 2019.

Detailed budget:
https://docs.google.com/spreadsheets/d/1JE0X6VgUEpE3JDhOTm2tX6UQKQsYfk7JQuwpU_3Ivmo/edit#gid=772836422

Attachment C Pesticides and Aquatic Toxicity Monitoring

In 2018, staff of the Aquatic Science Center (ASC), in collaboration with the Delta RMP Technical Advisory Committee (TAC) and its technical subcommittees, created a new 4-year monitoring plan for pesticides and aquatic toxicity in the Sacramento-San Joaquin Delta. The monitoring design was created from the ground up, and is based on probabilistic, or random, monitoring locations across Delta subregions. The monitoring design is described in detail in the current Delta RMP FY18-19 Workplan, Attachment C, Pesticides and Aquatic Toxicity Monitoring. Detailed information can also be found in the Delta RMP Quality Assurance Project Plan, v. 4.3.

We are currently mid-way through half of the first year of this study, having recently completed the third of six planned monitoring events. While the monitoring design covers four years, it was always intended to be "adaptively managed," where adjustments could be made as we go along.

Recommended changes to triggers for monitoring during wet-weather/ high-flow

In the fall/winter 2018, we received quite a bit of rain before the river rose enough to meet the "trigger" for sampling. The USGS crew first mobilized to sample on December 19. As a result, we may have missed non-point source pollution from local runoff.

The subcommittee recommended updated triggers for Water Year 2020 as follows:

1. The first event shall be an "urban first flush" event. The trigger shall be 0.5" of rainfall forecast in 24 hours for the basin.
2. There should be at least 10 consecutive dry days between sampling events. This allows pesticide applicators time to go out and spray.

Changes to funding for aquatic toxicity testing

For the past 3 years, all of the program's aquatic toxicity testing has been performed by the Aquatic Health Program Laboratory at UC Davis (AHPL). This work has been funded directly by the State Water Board through the Surface Water Ambient Monitoring Program (SWAMP). This contract is set to expire in March 2020. As a result, the SWAMP funding will likely only carry us through half of Water Year 2020's planned monitoring.

We propose to continue the toxicity testing program as designed through the end of Water Year 2020, with funding for the final 3 events coming from the Delta RMP, i.e. funds contributed by Delta RMP participants and managed by ASC. This will maintain continuity and allow us to finish up year 2 of the study. Sufficient funds should be allocated to allow for toxicity identification evaluations (TIEs) if they are called for.

We may wish to open a competitive bidding process for toxicity testing in Year 3, or Water Year 2021. In the instance that we do switch laboratories, it may be appropriate to send split samples to both old and new labs for a period of time to evaluate intercomparability of the results. A Steering Committee member has suggested inviting labs from around the state to participate in a round-robin style lab intercomparison exercise. The suggestion was that labs will participate in this for free, as a condition for being eligible to bid on future work with the Delta RMP. These are both ideas that should be considered by both the TAC and SC to determine if this is the direction we would like to go.

Detailed budget:
https://docs.google.com/spreadsheets/d/1RNvmvAM3dzc_Z5zsJfqHi6wrYOrbeknraPjQ85_SjRQ/edit#gid=1210191734

Delta Regional Monitoring Program

FY19-20 Detailed Workplan and Budget

Attachment E

Sole Source Vendor Justification Forms

Section 8.B.1 of the Delta RMP Charter states:

> *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 the FY19-20 Workplan and Budget, threee subcontracts greater than $50,000 are proposed:

- U.S. Geological Survey (USGS)
- Moss Landing Marine Laboratory (MLML)
- Aquatic Health Program Laboratory at UC Davis

Each subcontract meets the criteria for a sole source justification. The rationale for each justification is provided in the following sections.

Vendor Selection Form for the U.S. Geological Survey

In order to provide open and free competition and to obtain the maximum value for each dollar expended, SFEI-ASC has a competitive bidding policy for purchasing services or goods greater than or equal to $50,000. In addition, positive efforts shall be made by SFEI-ASC to utilize small business, minority owned firms, and women business enterprises, whenever possible. Such efforts, as outlined in 45 CFR Part 74.44 will allow these sources the maximum feasible opportunity to compete for contracts. SFEI-ASC will use, but not be limited to, the State of California DBE online directory as a source for possible references: http://www.dot.ca.gov/hq/bep/find_certified.htm

Submit this form, along with original quotes, to the Program Director or Executive Director for review. Original documents go to the Contracts Manager for retention. An electronic copy will be made available on the shared drive.

Date: 5/2/2019 *Requestor*: Matthew Heberger

Stage of funding for vendor: ☒ Proposal ☐ In negotiations ☐ Contracted

Program: Delta RMP *Project/Task # (if known)*: 8111.20.

☐ I have obtained at least three (3) competitive quotes and have chosen the supplier based on price, reliability, delivery, service, or other factors (attach quotes). If chosen vendor is not lowest cost bidder, detail the reason(s) why the vendor was selected on the next page.

VENDOR	Date of Quote	Total $	Comments
USGS		$165,563	Field sample collection and pesticides chemical analysis

Vendor Selected:

Vendor Name: U.S. Geological Survey
Contact: James Orlando
Address: 6000 J. Street, Sacramento, CA 95819
Phone: 916-278-3271 Fax: Email: jorlando@usgs.gov

Reason for Selection (explanation required below):

☐ Vendor is the lowest cost provider ☒ Vendor is sole acceptable provider

☐ Vendor provided best overall offer ☐ Emergency/Urgency

☐ Vendor is sole provider ☐ Other

Explanation (attach additional information if necessary):

ASC staff recommend a **sole source** subcontract with the US Geological Survey (USGS) for this work because of the unique, specialized, technical experience and unique or specialized access to data or information as documented by:

- The specialized nature of the proposed work, which is research outside the domain of typical contractors.
- USGS unique ability to analyze 160+ Current Use Pesticides (CUP) in water and suspended sediment, with detection limits much lower than available from commercial laboratories.
- As a project partner, USGS staff have played a significant role in
- Further, the USGS PFRG has offered to contribute $14,61 in matching funds for pesticide monitoring project (10% of labor and travel).

For these reasons, staff recommend a sole source contract with the USGS because this vendor is the sole acceptable provider for the work.

We respectfully request your approval.

To be completed by Program Director or Executive Director

☐ Yes ☐ No The vendor quote(s)/explanation have been reviewed and appear reasonable for the proposed work.

Matthew Heberger
Requestor's Printed / Typed Name

_____ _____
Requestor's Signature Date

_____ _____
Program Director or Executive Director's Signature Date

_____ _____
Contracts Manager's Signature Date

Vendor Selection Form – Moss Landing Marine Laboratory

In order to provide open and free competition and to obtain the maximum value for each dollar expended, SFEI-ASC has a competitive bidding policy for purchasing services or goods greater than or equal to $50,000. In addition, positive efforts shall be made by SFEI-ASC to utilize small business, minority owned firms, and women business enterprises, whenever possible. Such efforts, as outlined in 45 CFR Part 74.44 will allow these sources the maximum feasible opportunity to compete for contracts. SFEI-ASC will use, but not be limited to, the State of California DBE online directory as a source for possible references: http://www.dot.ca.gov/hq/bep/find_certified.htm

Submit this form, along with original quotes, to the Program Director or Executive Director for review. Original documents go to the Contracts Manager for retention. An electronic copy will be made available on the shared drive.

Date: 5/2/2018 *Requestor*: Matthew Heberger

Stage of funding for vendor: ☒ Proposal ☐ In negotiations ☐ Contracted

Program: Delta RMP *Project/Task # (if known)*: 8111.18

☐ I have obtained at least three (3) competitive quotes and have chosen the supplier based on price, reliability, delivery, service, or other factors (attach quotes). If chosen vendor is not lowest cost bidder, detail the reason(s) why the vendor was selected on the next page.

VENDOR	**Date of Quote**	**Total $**	**Comments**
Marine Pollution Studies Laboratory at Moss Landing		$360,000	MPSL will provide a partial cost match of $25,000

Vendor Selected:

Vendor Name: Marine Pollution Studies Laboratory at Moss Landing
Contact: Wes Heim (Director)
Address: 7544 Sandholdt Road Moss Landing, CA 95039
Phone: (831) 771-4459 Fax: Email: wheim@mlml.calstate.edu

Reason for Selection (explanation required below):

☐ Vendor is the lowest cost provider ☒ Vendor is sole acceptable provider

☐ Vendor provided best overall offer ☐ Emergency/Urgency

☐ Vendor is sole provider ☐ Other

Explanation (attach additional information if necessary):

ASC staff recommend a **sole source** subcontract with the Marine Pollution Studies Laboratory (MPSL) at Moss Landing for this work because of the unique, specialized, technical experience as documented by:

- MPSL is a SWAMP contractor and has been involved with state-wide studies of mercury over many years. Therefore, data collected by MPSL will be comparable to regional and statewide datasets.
- MPLS has collected the first two years of Delta RMP data in FY16/17 and FY17/18. Continuing to use MPSL will ensure consistency of analytical and field sampling protocols.
- Wes Heim and his colleagues are recognized as national experts on the monitoring of mercury in biological tissues and in water, having developed trace metal methods for measuring mercury speciation in these matrices. This laboratory group has been involved with the State Surface Water Ambient Monitoring Program since 2001 and has extensive experience collecting and analyzing water and fish tissues for mercury as evident by the following projects they have completed in the Delta: Assessment of ecological and human health impacts of mercury in the Bay-Delta watershed (1999-2003); Transport, cycling, and fate of mercury and monomethyl mercury in the San Francisco Delta and tributaries – An integrated mass balance assessment approach (2003-2006); and Development of best management practices to reduce methyl mercury exports and concentrations from seasonal wetlands in the Yolo Wildlife Area (2011-2016)
- Measuring mercury concentrations at low levels requires high precision and accuracy. ASC recommend a sole source laboratory that can conduct the collection and the analyses to avoid the potential cross contamination that can occur when multiple laboratories and field collection teams are involved in a project. In addition, it is more cost-effective to have one entity conducting the field sampling and chemical analyses.
- This laboratory has participated in multiple interlaboratory exercises and consistently been able to obtain high quality results. MPSL has participated in multiple interlaboratory exercises including those conducted by the CALFED Mercury Program, State of Florida Department of Environmental Protections, and Brooks Rand Labs. MPSL placements in interlaboratory studies are consistently in the top ranks. Furthermore, MPSL analytical results consistently exceed the quality assurance and quality control requirements outlined in the SWAMP Laboratory Quality Assurance Program Plan. Finally, MPSL has been audited to assess mercury analytical abilities as a requirement for participation in both the federal and California State sponsored CALFED Mercury Program and SWAMP. Audits concluded: 1) MPSL laboratory's preparation and analytical spaces are more than sufficient for the utilized methods and SOPs; 2) Instrumentation and equipment is current, and in many cases, state-of-the-art; 3) staff expertise and retention are outstanding; and 4) QA systems implemented at

MPSL have greatly benefitted SWAMP, and are certainly worthy of federal and state-level certifications.

In addition to the unique technical experience, MPSL is also providing $25,020 of in-kind matching funds (10% of the value of the contract).

For these two reasons, staff recommend a sole source contract with the Marine Pollution Studies Laboratory because this vendor is the sole acceptable provider for the work.

We respectfully request your approval.

To be completed by Program Director or Executive Director

☐ Yes ☐ No The vendor quote(s)/explanation have been reviewed and appear reasonable for the proposed work.

Matthew Heberger

Requestor's Printed / Typed Name

_____ _____

Requestor's Signature Date

_____ _____

Program Director or Executive Director's Signature Date

_____ _____

Contracts Manager's Signature Date

Vendor Selection Form – Aquatic Health Program Laboratory at UC Davis

In order to provide open and free competition and to obtain the maximum value for each dollar expended, SFEI-ASC has a competitive bidding policy for purchasing services or goods greater than or equal to $50,000. In addition, positive efforts shall be made by SFEI-ASC to utilize small business, minority owned firms, and women business enterprises, whenever possible. Such efforts, as outlined in 45 CFR Part 74.44 will allow these sources the maximum feasible opportunity to compete for contracts. SFEI-ASC will use, but not be limited to, the State of California DBE online directory as a source for possible references: http://www.dot.ca.gov/hq/bep/find_certified.htm

Submit this form, along with original quotes, to the Program Director or Executive Director for review. Original documents go to the Contracts Manager for retention. An electronic copy will be made available on the shared drive.

Date: 5/2/2019 *Requestor*: Matthew Heberger

Stage of funding for vendor: ☒ Proposal ☐ In negotiations ☐ Contracted

Program: Delta RMP *Project/Task # (if known)*: 8111.18

☐ I have obtained at least three (3) competitive quotes and have chosen the supplier based on price, reliability, delivery, service, or other factors (attach quotes). If chosen vendor is not lowest cost bidder, detail the reason(s) why the vendor was selected on the next page.

VENDOR	Date of Quote	Total $	Comments
Marine Pollution Studies Laboratory at Moss Landing		$83,000	AHPL has offered ASC the same rates it used for the SWAMP contract for the past 2 years.

Vendor Selected:

Vendor Name: Aquatic Health Program Laboratory at UC Davis
Contact: Marie Stillway (Director)
Address: 2625 Garrod Drive, Lab Facility Bldg 5, Davis, CA 95616
Phone: (530) 754-6772 Fax: Email: mstillway@ucdavis.edu

Reason for Selection (explanation required below):

☐ Vendor is the lowest cost provider ☒ Vendor is sole acceptable provider

☐ Vendor provided best overall offer ☐ Emergency/Urgency

☐ Vendor is sole provider ☐ Other

Explanation (attach additional information if necessary):

ASC staff recommend a **sole source** subcontract with the Aquatic Health Program Laboratory at UC Davis for this work because of their role joint venture already specified in a proposal.

- AHPL has conducted aquatic toxicity testing for the Delta Regional Monitoring Program since 2015. This testing was funded by the State Water Resources Control Board through a contract with the Surface Water Ambient Monitoring Program (SWAMP). This contract is scheduled to expire in March 2020. As a result, the SWAMP funding will likely only carry us through half of Water Year 2020's planned monitoring.

- We propose to continue the toxicity testing program as designed through the end of Water Year 2020, with funding for the final 3 events coming from the Delta RMP, i.e. funds contributed by Delta RMP participants and managed by ASC.

- We may wish to open a competitive bidding process for toxicity testing in Year 3, or Water Year 2021. In the instance that we do switch laboratories, it may be appropriate to send split samples to both old and new labs for a period of time to evaluate intercomparability of the results. Such a study will take time and resources to design.

- AHPL is among the only laboratories in the state that is certified to perform toxicity testing with midge larvae, *Chironomus dilutus*. In order to maintain the same services offered by AHPL, we would likely need to contract with 2 or more laboratories simultaneously.

For these two reasons, staff recommend a sole source contract with the Aquatic Health Program Laboratory at UC Davis.

We respectfully request your approval.

To be completed by Program Director or Executive Director

☐ Yes ☐ No The vendor quote(s)/explanation have been reviewed and appear reasonable for the proposed work.

Matthew Heberger

Requestor’s Printed / Typed Name

Requestor’s Signature	Date
Program Director or Executive Director’s Signature	Date
Contracts Manager’s Signature	Date