Detailed Workplan and Budget for Quarters 2-4 of the 2020-2021 Fiscal Year

As approved by the Delta RMP Steering Committee on January 26, 2021

Prepared by staff of the Aquatic Science Center,
the Sacramento State Consensus and Collaboration Program,
and MLJ Environmental

Summary of Changes to this Draft

A draft budget for work in Quarters 2-4 of fiscal year 2020/2021 was considered by the Delta Regional Monitoring Program (Delta RMP) Steering Committee (SC) on September 22, 2020. The SC directed that the budgets for Aquatic Science Center (ASC) and the Sacramento State Consensus and Collaboration Program (CCP) be revised per the guidance of the Financial Committee. These revisions were reviewed and agreed upon by the Financial Committee and are reflected in this document. In addition, during the December 15, 2020 SC meeting, the SC voted to contract with Melissa Turner from MLJ Environmental to serve as Interim Program Manager. The budget for the Interim Program Manager from December – June has been added as Appendix 3. Reference to M. Turner and MLJ Environmental have been added to the text. The overall total planned budget for program management has been updated from $339,924 to $257,881 with the following breakdown by entity:
ASC: $112,007 (updated Appendix 1)
CCP: $81,074 (updated Appendix 2)
MLJ Environmental: $64,800 (added Appendix 3).

Table 3 of the original Workplan listed out Tasks and Subtasks combined for ASC and CCP. Due to the three contracting entities having different tasks and subtasks it did not make sense to continue to include this table moving forward. Similarly, Figure 1 (Distribution of funds among major task categories) was removed since it only applied to ASC. Appendices 1, 2 and 3 include the individual task, subtask, costs and deliverables for each contract.

Table 3 in this document (originally Table 4) includes the planning timeline for FY20-21. There has been much discussion within the Delta RMP regarding the need to finish up past deliverables and determine a new governance structure moving forward, which may delay some of the monitoring planning for FY 21-22. Many of the details are still being worked out in terms of priorities and agenda items for the Steering Committee, TAC, and Subcommittees. Table 3 was not updated in this draft due to the ongoing nature of many of these discussions. Table 3 still serves as a guideline for planning in FY20-21.

The original Workplan included a reference to $250,000 of funding as in-kind contribution from the State Board through the Marine Pollution Studies Laboratory (MPSL) at Moss Landing to help fund the Delta RMP's mercury monitoring. This was incorrectly stated and has been updated to reference $200,000 per year.

Other edits made to this document include updates to the monitoring plans including updated text to reference the approved cyanotoxin monitoring. The cyanotoxin monitoring (under Nutrients) was originally included as Appendix 3. With the addition of the MLJ Environmental scope and budget as Appendix 3, the cyanotoxin monitoring plan was updated to be Appendix 4. The Supplemental Environmental Project (SEP) for "Source Tracking of the Cyanobacteria Blooms in the Sacramento-San Joaquin Delta" was added to the text and as Appendix 5.

The Pesticides and Aquatic Toxicity monitoring plan and budget for has been added (Appendix 6) although the toxicity laboratory is still pending; the text currently reads "TBD" for the toxicity laboratory which should be selected at the end of January.

Introduction

The purpose of this document is to provide the Delta Regional Monitoring Program (Delta RMP or Program) Steering Committee (SC) with a detailed workplan and budget for the second, third, and fourth quarters (Q2-4) of the 2020–2021 fiscal year (FY20-21). The fiscal year covers the period from July 1, 2020 to June 30, 2021 and matches the fiscal year of the State of California and State agencies with whom the Program works closely.

The Delta RMP is undergoing a major transition. The Aquatic Science Center (ASC), based in Richmond, California, helped establish the Delta RMP and has served as the "Implementing Entity" since the Program began in 2015, performing all Program support tasks related to governance, financial management, and administration. In the fourth quarter of FY 2019-2020, the Program began a transition to having the Consensus and Collaboration Program (CCP) of California State University Sacramento assume many of the program management tasks that ASC had been performing. The SC plans to have CCP continue in this as an interim role through some portion of FY20-21. In December 2020, the SC also brought on Melissa Turner from MLJ Environmental to serve as interim Program Manager. The SC also intends to establish a new governance structure in FY20-21 which may result in a change of responsibilities and authorities for the current or a to-be-determined future Implementing Entity.

Given the magnitude and rapid pace of these changes, the SC directed ASC and CCP to develop a workplan for FY20-21 in two phases. The first phase covering Q1 was approved at the SC meeting on June 25, 2020. The second phase covering Q2-4 is described in this document.

FY20/21 will include transitions in the management and administration of the Program, addressing a backlog of items from prior years, and the routine business that occurs every year with the annual Program planning cycle. Q1 was exceptionally busy, with monthly meetings of the Technical Advisory Committee (TAC) and SC, and many meetings of subcommittees. Q2-4 will also be busy as the Program continues to catch up on the backlog, conducts routine business, and undergoes a transition in governance.

This workplan covers the core functions of administration, finance, and governance.

This workplan also includes the plan and budget for a FY20-21 monitoring project ("Cyanotoxin Monitoring in the Delta") that was approved by the SC on 9/22/20. This workplan also includes a plan and budget that was approved by the SC on 12/15/20 for continuation of the current use pesticide monitoring. The current use pesticide monitoring includes the analysis of pesticides and toxicity. The Delta RMP is currently undergoing a Request for Proposal process to select a toxicity laboratory. Therefore, the pesticide budget and plan includes "TBD" for the toxicity laboratory. Another monitoring project for FY20-21 for mercury is awaiting review and

approval by the TAC and SC. An addendum for the mercury monitoring will be added to this Workplan after that project is approved.

ASC staff and collaborators will continue to perform and report on monitoring and studies that were planned and funded in previous annual workplans. All current and past workplans are available on the Program's website at https://sfei.org/DeltaRMP.

This document summarizes:

- expected revenue for FY20-21;
- a detailed budget and workplan for the core functions of the program;
- the overall FY20-21 Q1 Delta RMP budget.

This workplan provides a critically important foundation for tracking Delta RMP expenditures and deliverables. CCP, ASC, and MLJ Environmental will follow existing and proposed protocols for communications such that all RMP participants are kept abreast of decisions at all levels of the RMP process.

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 be spent to cover Program activities, monitoring, and special studies.

Further, it is currently understood that the State Water Resources Control Board (State Board) will make a sizable in-kind contribution to the Delta RMP over the next three years. The State Board will contract with the Marine Pollution Studies Laboratory (MPSL) at Moss Landing to fund the Delta RMP's program of mercury monitoring. Our understanding is that this funding will be around $200,000 per year, and that the Delta RMP SC will direct how these funds are used. As additional in-kind support, State Board staff will assume all responsibility for the data produced under the contract with MPSL, including all data management, quality assurance, and public release via the California Environmental Data Exchange Network (CEDEN).

These in-kind funds from the State Board are not "fungible." In other words, they cannot be used for any purpose other than field work and lab work by MPSL, nor can they be used with a different vendor. The budgeting and financial reporting for the Delta RMP only includes funds that ASC manages. However, in-kind contributions to the Program are carefully tracked to ensure an accurate reflection of the total costs to implement the Program.

Regarding revenue history, the number of Delta RMP participants has steadily grown over the life of the Program.

Table 1 shows how the number of Delta RMP participants has evolved, along with their financial contributions. Table 2 summarizes the expected revenue for FY20-21 summarized by category of participant.

Table 1. Delta RMP participation and revenue over time.

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%
FY 20-21	52	–	$1,215,663	–

*The figures for contributions from FY18-19 to present do not include a $50,000 contribution by the U.S. Army Corps of Engineers (Corps), who joined as a contributor during FY18-19. The Corps is contributing by directly funding the U.S. Geological Survey, California Water Science Center to perform pesticides monitoring for the Delta RMP, offsetting costs for monitoring. This is tracked as an in-kind contribution to the Program.

Table 2. Delta RMP revenue schedule.

Participant Category	FY15-16 Actual	FY16-17 Actual	FY17-18 Actual	FY18-19 Actual	FY19-20 Actual	FY20-21 Expected	Comment
Agriculture	$113,780	$148,780	$148,780	$148,780	$153,243	$153,243	
Dredgers		$60,000	$60,000	$63,000	$64,890	$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	$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	$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 Central Valley Regional Water Quality Control 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	$588,541	12 new participants joined in FY17-18. The California Department of Transportation (Caltrans) joined the program in FY18-19, contributing $80,000.
Water supply	$100,000	$100,000	$100,000				The State and Federal Contractors Water Agency (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**	**$1,215,663**	

Program Management Expenses

Delta RMP expenses fall into two categories: program management expenses associated with administering a multi-faceted, stakeholder-driven monitoring program; and monitoring and special studies to answer Delta RMP assessment questions. This section details the program management expenses for FY20-21 Q2-4. The program management budget includes the following categories of tasks:

- preparation of program planning documents (e.g., Workplan, Monitoring Design);
- contracts and financial management;
- general program management (e.g., internal project planning, website maintenance, technical input on deliverables);
- governance (e.g., committee and subcommittee meeting support); and
- data management and quality assurance.

The overall total planned budget for program management is **$257,881**.

The total budget for ASC tasks is $112,007. A detailed breakdown of the ASC labor budget for these tasks is provided in **Appendix 1**. This proposed budget reflects ASC's best estimate of the expected time and expense of the assigned work tasks. If additional tasks are requested (e.g., convening the Conflict Resolution Committee, or preparing additional quality assurance documentation), ASC will request additional funds. If tasks are completed in less time than estimated, ASC will bill for only the hours needed for task completion.

The total budget for CCP tasks is $81,074. A detailed scope and budget for CCP activities is provided in **Appendix 2**. This proposed budget reflects CCP's best estimate of the expected time and expense of the assigned work tasks. If additional tasks are requested or if the level of effort to continue interim program management support (IPM) exceeds assumptions in this Workplan, CCP will communicate said changed conditions through the use of a monthly Description of Services document and will identify for Finance Subcommittee and SC consideration, identified needs for additional funds. If tasks are completed in less time than estimated, CCP will bill for only the hours needed for task completion.

The total budget for MLJ Environmental tasks is $64,800. A detailed scope and budget for MLJ Environmental activities is provided in **Appendix 3**. The cost estimate is based off recent discussions within the Delta RMP regarding priority work and deliverables planned for Q2-4. It does not include time for developing proposals for the next fiscal year. A majority of the time during this interim year will be focused on communication, monitoring tracking, tracking of budgets and scheduling in coordination with CCP and ASC.

A timeline for the major elements of the planning process for the fiscal year is shown in Table 3. The Program is catching up on a backlog of planning activities and deliverables. The goal for this fiscal year is to have a complete slate of approved workplans for all of the monitoring elements by June. It

will not be feasible to also complete the associated QA documents by the end of this fiscal year; these will be completed in the first quarter of FY21-22 and are not included in the budget for FY20-21.

Table 3. Planning timeline for FY20-21.

	Q2 (Oct-Dec)	Q3 (Jan-Mar)	Q4 (Apr-Jun)	Q1 (Jul-Sep)
Steering Committee	• Joint SC-TAC multi-year planning meeting • Update multi-year plan	• Discuss **program management** workplan for 21-22	• Approve **monitoring workplans** for 21-22 • Approve **program management** workplan for 21-22	• Approve **QA documents** for 21-22
TAC	•	• Discuss **program management** workplan for 21-22 (e.g., QA elements)	• Recommend **monitoring workplans** for 21-22 for approval	• Recommend **QA documents** for 21-22 for approval
Subcommittees	• Update multi-year monitoring workplans	• Recommend monitoring workplans for 21-22	•	•

Expenses for Monitoring and Special Studies

The Delta RMP is conducting multi-year study programs for mercury, nutrients, pesticides and aquatic toxicity, and contaminants of emerging concern (CECs).

Mercury

At the time of preparation of this Workplan, the plan for mercury monitoring in FY20/21 has not been approved. Approval of this mercury monitoring plan is anticipated for later in FY20-21. The work will be led by Dr. Jay Davis of ASC and Dr. Wes Heim of Moss Landing Marine Laboratory (MLML) as co-principal investigators. The sampling and analysis will be performed by MLML. Funds for ASC will come from the Delta RMP. The MLML work will be covered by the State Water Board as an in-kind contribution to the Delta RMP. When the mercury workplan is approved, a description of the scope and budget will be added as an Appendix to this Workplan.

Nutrients

At their meeting on 9/22/20 the SC approved a new funding allocation in FY20-21 for a study of cyanotoxins under the nutrient focus area. A description of the rationale, scope, and budget details for this study is included as Appendix 4. The funding allocation for this study is $163,814. The work will be led by scientists at the US Geological Survey (USGS) and the California Department of Water Resources, and will be funded through subcontracts with USGS ($86,312) and BSA Environmental ($89,716).

At their meeting on 8/27/20 the SC approved a study to be supported using Supplemental Environmental Project funds ($59,808) for a project titled "Source Tracking of the Cyanobacteria Blooms in the Sacramento- San Joaquin Delta." A description of the scope and budget for this study is provided as Appendix 5. The study will be led by Ellen Preece of Robertson-Bryan, Dr. Tim Otten of Bend Genetics, and Dr. Janis Cooke of the Central Valley Regional Water Board.

Pesticides and Aquatic Toxicity

At their meeting on 12/15/20 the SC approved an additional allotment of Delta RMP funding ($144,180) for continuing pesticide monitoring. A brief description of the work is provided in Appendix 6. The study will be led by Dr. Jim Orlando of the U.S. Geological Survey (USGS). USGS will collect the water samples for analysis of current-use pesticides by the USGS Organic Chemistry Research Laboratory and copper, dissolved organic carbon, and particulate organic carbon by the USGS National Water Quality Laboratory. Samples will also be analyzed for toxicity although the toxicity laboratory is still being selected by the Delta RMP SC. The current budget reflects the cost for the pesticide monitoring and chemical analysis; the budget will be updated once the toxicity

laboratory is selected to include the toxicity laboratory costs and associated data management for both chemistry and toxicity.

Contaminants of Emerging Concern (CECs)

Monitoring of CECs by the Delta RMP began in September 2020 with a budget that was approved in the FY19-20 Workplan. Monitoring could not be implemented until September 2020 due to the pandemic and the need to have an approved QAPP.

Overall Delta RMP FY20-21 Budget

The programmatic and monitoring budgets for the Delta RMP for the first quarter, quarters 2-4, and for the fiscal year are provided in Tables 4, 5, and 6, respectively.

Table 4. Delta RMP FY20-21 Overall Budget, Program Funds, Quarter 1.

Task	*Subtask*	Direct Expense	ASC Labor	CCP Labor	Subcontracts	Grand Total
1. Core Functions	A. Program Planning		$26,103			$26,103
	B. Contract and Financial Management		$6,667			$6,667
1. Core Functions Total			$32,770			$32,770
2. Governance	A. SC meetings		$12,668	$19,258		$31,926
	B. Coordinating Committee meetings		$3,191	$8,696		$11,887
	C. Governance Subcommittee meetings		$5,616	$0*		$5,616
	D. Finance Subcommittee meetings		$496	$2,759		$3,255
	E. TAC meetings		$10,688	$19,258		$29,946
	F. Technical Subcommittees		$13,733	$19,313		$33,046
	G. Conflict Resolution Subcommittee					
	H. Implementing Entity Coordination and Transition		$11,692	$19,740		$31,432
2. Governance Total			$58,084	$89,024		$147,108
3. Data Management and QA	A. QA Documents and Completed Datasets		$16,484			$16,484
3. Data Management and QA Total			$16,484			$16,484
4. Nutrient Monitoring	-- no funding allocated for Quarter 1 --					$0
4. Nutrient Monitoring Total						$0
5. Mercury Monitoring FY20-21	-- no funding allocated for Quarter 1 --					$0
5. Mercury Monitoring FY19-20 Total						$0
6. Pesticides Monitoring Water Year 2020	-- no funding allocated for Quarter 1 --					$0
6. Pesticides Monitoring Water Year 2020 Total						$0
7. CEC Pilot Study Year 1	-- no funding allocated for Quarter 1 --					$0
7. CEC Pilot Study Year 1 Total						$0
Grand Total			**$107,338**	**$89,024**		**$196,362**

Table 5. Delta RMP FY20-21 Overall Budget, Program Funds, Quarters 2-4

Task	*Subtask*	Direct	ASC Labor	CCP Labor	MLJ Labor	Subcontracts	Grand Total
1. Core Functions	A. Program Planning		$3,018		See		
	B. Contract and Financial Management		$26,462		Task Total		
	C. Program Management		$12,075		Below		
1. Core Functions Total			$41,555		$41,760		$83,315
2. Governance	A. SC meetings		$4,056	See	See		
	B. Coordinating Committee meetings		$1,319	Task Total	Task Total		
	C. Governance Subcommittee meetings		$0	Below	Below		
	D. Finance Subcommittee meetings		$2,340				
	E. TAC meetings		$8,526				
	F. Technical Subcommittees		$20,528				
	G. Conflict Resolution Subcommittee						
	H. Implementing Entity Coord. and Transition		$1,759				
	I. Stakeholder Engagement						
2. Governance Total			$38,528	$81,074	$23,040		$142,642
3. Data Mgt and QA	A. QA Documents and Completed Datasets		$31,924				$31,924
3. Data Mgt and QA Total			$31,924				$31,924
4. Nutrient Monitoring	A. Cyanotoxin Monitoring in the Delta					$163,814	$163,814
4. Nutrient Monitoring Total							$163,814
5. Mercury Monitoring FY20-21	-- no funding yet allocated for Quarters 2-4 --						$0
5. Mercury Monitoring FY19-20 Total							$0
6. Pesticides Monitoring Water Year 2020	A. Sample collection and chemical analysis (USGS)					$144,180	$144,180
	B. Toxicity testing (TBD)					TBD	TBD
6. Pesticides Monitoring Water Year 2020 Total							$144,180
7. CEC Pilot Study Year 1	-- no funding allocated for Quarters 2-4 --						$0
7. CEC Pilot Study Year 1 Total							$0
Grand Total			**$112,007**	**$81,074**	**$64,800**		**$565,875**

Table 6. Delta RMP FY20-21 Overall Budget, Program Funds, Quarters 1-4

Task	*Subtask*	Direct	ASC Labor	CCP Labor	MLJ Labor	Subcontracts	Grand Total
1. Core Functions	A. Program Planning		$29,121		See		
	B. Contract and Financial Management		$33,129		Task Total		
	C. Program Management		$12,075		Below		
1. Core Functions Total			$74,325		$41,760		$116,085
2. Governance	A. SC meetings		$16,724	See	See		
	B. Coordinating Committee meetings		$4,510	Task Total	Task Total		
	C. Governance Subcommittee meetings		$5,616	Below	Below		
	D. Finance Subcommittee meetings		$2,836				
	E. TAC meetings		$19,214				
	F. Technical Subcommittees		$34,261				
	G. Conflict Resolution Subcommittee		0				
	H. Implementing Entity Coord. and Transition		$13,451				
	I. Stakeholder Engagement		0				
2. Governance Total			$96,612	$170,098	$23,040		$289,750
3. Data Mgt and QA	A. QA Documents and Completed Datasets		$48,408				$48,408
3. Data Mgt and QA Total			$48,408				$48,408
4. Nutrient Monitoring	A. Cyanotoxin Monitoring in the Delta					$163,814	$163,814
4. Nutrient Monitoring Total							$163,814
5. Mercury Monitoring FY20-21	-- no funding yet allocated --						$0
5. Mercury Monitoring FY19-20 Total							$0
6. Pesticides Monitoring WY 2020	A. Sample collection and chemistry (USGS)					$144,180	$144,180
	B. Toxicity testing (TBD)					TBD	TBD
6. Pesticides Monitoring Water Year 2020 Total							$144,180
7. CEC Pilot Study Year 1	-- no funding allocated --						$0
7. CEC Pilot Study Year 1 Total							$0
Grand Total			$219,345	$170,098	$64,800	$307,994	$762,237

Multi-Year Budget Summary

Funding guidelines from the SC developed in the 2019 Multi-year Planning Workshop are shown in Table 8, along with updated information on actual expenditures. The SC guidance was to develop proposals within 25% of the guidelines. Overall, expenditures in FY19-20 were below the planned amount, and anticipated expenditures for FY20-21 are significantly lower than the amount anticipated at the October 2019 planning workshop.

Table 8. Funding allocations and guidance from the Delta RMP Steering Committee by focus area.

Expense	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY19-20 (10/19 Work-shop)	FY19-20 (approved 5/29/19)	FY19-20 (actual)	FY20-21 (10/19 Workshop)	FY20-21 (planned as of 1/11/21)	FY21-22 (10/19 Workshop)	FY22-23 (10/19 Workshop)
Core, Gov, QA	57	234	312	342	300	309	275	320	318	454	328	338
Pathogens	72	112	-	-	-	-	-	-	-	-	-	-
Pesticides	112	225	248	88	212	223	118	118[a]	234	144	280	250
Nutrients	35	50	120	230	228	250	259	344	250	164	250	250
Mercury	-	-	113	234	277	291	282	239[b]	180	35[c]	180	180
CECs	-	-	-	-	45	220	34	122	220	0	220	-
Total Expense	**276**	**621**	**793**	**894**	**1,062**	**1,452**	**968**	1,143	**1,202**	**762**	**1,258**	**1,018**
Forecast Revenue	303	769	862	1,021	1,205	1,226	1,226	1,226	1,226	1,226	1,226	1,263
Surplus/Deficit					128	(66)	258	83	24	464	(32)	245

a – SC only approved first half of Water Year 2019 pesticide and toxicity monitoring.
b – $360K was allocated overall; $78K of prey fish restoration monitoring approved in September 2019 could not occur; water scope was reduced by $43K in anticipation of reduced budget and design in 20-21 and beyond.
c – for ASC work; Moss Landing work covered by the State Board.

APPENDIX 1: DETAILED ASC LABOR BUDGET

								ASC HOURS PHASE 1 (JUL-SEP)																						
								Total Hours	123	15	5	225	94	9	86	139	9	7	17	1	33	37	TOTAL			
								Rate	$ 220	$ 248	$ 204	$ 92	$ 156	$ 116	$ 183	$ 105	$ 138	$ 123	$ 138	$ 198	$ 156	$ 99		Table 3	$	112,007
								Dollars	$ 27,039	$ 3,723	$ 1,021	$ 20,742	$ 14,665	$ 1,047	$ 15,734	$ 14,588	$ 1,238	$ 861	$ 2,339	$ 198	$ 5,148	$ 3,663	**$ 112,007**	Budget	Category	Sums
MEETINGS	Q2	Q3	Q4	Special	Special	After 20/21	Comments	**Jay**	**Warner**	**Dave**	**Jamie**	**Jen**	**Ezra**	**Don**	**Michael**	**Diana**	**April**	**Pat**	**Tony**	**Sarah**	**Meredith**				
SC	XX	X	X	X	X			10			10	6											$ 4,056	2A	$	4,056
TAC	X	X	X					21			21			6	6		2						$ 8,526	2E	$	8,526
Coordinating Committee	X	X	X					6															$ 1,319	2B	$	1,319
Governance Committee	X	X	X																				$ -	2C	$	-
Finance Committee	X	X	X									15											$ 2,340	2D	$	2,340
Conflict Resolution																							$ -	2G	$	-
Mercury		X						6									4						$ 1,811	2F	$	20,528
Nutrients	X	X	X							4	12												$ 1,923	2F		
Pesticides	XX	X	X	X				4			18			6	6								$ 4,266	2F		
CECS	X		X					4			12			6	6	8							$ 4,814	2F		
Data Management	X	X	X					12			4			9	12								$ 5,913	2F		
Tox Lab Subcommittee	XX	XX							4		2	4											$ 1,801	2F		
ASC-TAC Co-Chairs-CCP-New Impler	XX	XX	XX					8															$ 1,759	2H	$	1,759
DELIVERABLES	Q2	Q3	Q4																							
Governance recommendation	X																									
Draft 21/22 workplan		X																					$ -	1A1	$	-
Final 21/22 workplan			X																				$ -	1A1		
DMQA SOP V1							includes related updates to CEC QAPF	4			5			6	6								$ 3,068	3A1		
Draft DMQA SOP V2						X																	$ -	3A		
Final DMQA SOP V2						X																		3A		
Draft Tox SOP V1	X							4			8			8	8								$ 3,920	3A2	$	31,924
Final Tox SOP V1		X					Adjusted up a little to cover final revi	4			4			20	20								$ 7,006	3A2		
Draft 20/21 QAPP	X						Update the General QAPP, any other	4			16			16	16								$ 6,961	3A3		
Final 20/21 QAPP		X						4			8			8	8								$ 3,920	3A3		
Draft 21/22 QAPP						X																	$ -	3A		
Final 21/22 QAPP						X																	$ -	3A		
Programmatic QAPP						X																		3A		
Quarterly Financial Reports	X	X	X								6	18									9		$ 4,765	1B1	$	4,765
Multi-Year Plan	X																						$ -	1A1		
Pulse of the Delta						X																	$ -			
CEC Proposal for 21/22 Sampling			X																				$ -	1A2	$	3,018
Hg Monitoring Plan Update 21/22			X																				$ -	1A2		
Tox Lab RFP	X							2			6	4	3										$ 1,966	1A2		
Tox Lab Selection		X						2			2	2	1										$ 1,052	1A2		
Nutrient Proposal 21/22			X																				$ -	1A2		
GENERAL TASKS																										
ASC internal project planning								12	1	1	16	6	1	1	1	1	1	1	1	12	1		$ 8,473	1C	$	12,075
Contract development and management								4	10		24	12	4					16		12	24		$ 14,360	1B2	$	19,955
Participant invoicing											6										12		$ 1,741	1B3	$	1,741
Website maintenance and update											12												$ 1,106	1C		
Dashboard updates and deviation forms								4			10				6								$ 2,431	3A4		
Processing and uploading field measurement data															44								$ 4,618	3A5		
Miscellaneous program management							Examples: unanticipated meeting 10/	8			8												$ 2,496	1C		
Manage sub invoices and monthly project invoices, track budgets monthly											15	27											$ 5,595	1B2		

Contract 90000185 - TASK ORDER No. 5
Facilitation and Program Support to the Delta Regional Monitoring Program

Contract 90000185 *– Regional San and SASD On-Call Meeting Facilitation and Strategic Consulting Services* ***Task Order No.5,***
For services: October 1, 2020 –June 30, 2021.

The following represents services to be provided by the Sacramento State, Consensus and Collaboration Program (CCP) to the Delta Regional Monitoring Program (RMP). Regional San has requested said support as an in-kind service on behalf of the RMP and in partial fulfillment of Regional San's annual mandatory contribution to the RMP.

Project Understanding

Consistent with services CCP provided in Quarter 1 (Q1), Fiscal Year (FY) 2020-2021 (FY 20-21) and as directed by the RMP Steering Committee on September 22, 2020, CCP understands that it has a maximum budget for this agreement of $90,000. The following tasks describe services to the RMP as directed via email on October 16, 2020 by Ms. Melissa Turner, RMP Technical Advisory Committee Co-Chair, and as additionally informed by standard project management tasks, and outstanding services remaining from the RMP Phase 1 effort for Fiscal Year 20-21 (completion of meeting summaries and monthly reports that were unable to be completed due to the pace of RMP activities during Phase 1). The verbatim text of Ms. Turner's direction is as follows:

- *"Governance Subcommittee – I do not know how many of these meetings there will be through the rest of the FY. There does seem to be the most questions around this subcommittee and CCP's role. For the purpose of an estimate to the Finance Committee, it might make the most sense to put this in an optional category and to highlight your assumptions (possibly keep with the original number of meetings).*
- *TLS Subcommittee – I think CCP staff has a good estimate of the number of meetings as they've been discussed this week (I think it is about 6 meetings).*
- *SC/TAC - with everything in flux it is hard to know exactly how many meetings will occur in the next 3 quarters. To assist with your cost estimate I suggest planning for quarterly meetings for the SC and TAC (6 meetings total) between now and the end of the FY. This does not account for a Joint Meeting in November.*
- *Coordinating Committee – plan for 3 meetings (1 prior to each SC)*
- *Pesticide Subcommittee (Deltares) – plan for 3 meetings"*

In this context, as well as modifications based on CCP best professional judgement for project support, we propose the following tasks and associated cost estimate.

CCP will provide support to the following groups for Q2 – Q4, FY 20-21

RMP Groups

- Steering Committee
- Coordinating Committee
- Governance Subcommittee
- Finance Subcommittee (as requested)
- Technical Advisory Committee
- Pesticide Subcommittee
- Toxicity Laboratory Selection Subcommittee

For all the above RMP groups, CCP will provide support on subtasks that fall under the "governance" function of historic RMP Workplans. This may include the following (including general planning activities with RMP participants and staff from the RMP Implementing Entity (Aquatic Science Center [ASC]). Specific services will vary based on group needs and leadership dynamics.

- Meeting scheduling and logistics
- Agenda / Facilitation Plan development
- Agenda packet assembly and distribution
- Meeting preparation
- Meeting materials preparation and rehearsal
- Meeting facilitation
- Meeting summarization
- Action Item tracking and accountability

More specifically, CCP services commonly include the following support as the basis of best professional service delivery. As per discussions between the CCP Director and the RMP Chairs, RMP Finance Subcommittee Lead, and Ms. Turner, it is mutually understand that these services are the basis for CCP's level of support to the RMP and that any requests by RMP leadership to provide services less than the following may result in CCP's request to cancel this task order.

- Preparation: Develop the agenda, facilitation strategy, and supporting facilitation materials; provide feedback on other meeting materials; and speakers (if warranted). Liaise offline with stakeholders and project leadership as needed between meetings. Assist, as needed, in electronically distributing materials in advance of or following each meeting.
- Facilitation: Provide meeting facilitation and management services, including encouraging and balancing stakeholder participation, maintaining focus, promoting good faith discussions (i.e., sharing information, seeking to understand one another, generating inclusive solutions), and, when appropriate, managing conflict and building consensus.
- Follow-up: Debrief the meeting, provide a list of action items, follow-up on facilitation-related action items.
- Meeting summarization: Assist in the preparation and/or review of draft and final meeting summaries.

Due to current Coronavirus health and safety protocols, all meetings are expected to be conducted virtually rather than in person and CCP is prohibited by Sacramento State's Executive Branch to attend meetings in person. Should State of California Coronavirus shelter-in-place, health and safety protocols change during the FY and result in RMP adjustments to the format and location of meetings, CCP will review these changes with the Regional San project manager and the RMP Finance Subcommittee and such changes may necessitate CCP's preparation and submittal of a revised task order including revised level of effort and associated cost estimate to support in-person support.

CCP will prepare a monthly Description of Services (DoS) document describing the prior month's level of effort, achievements, and challenges encountered. If challenges are incurred such that they might

necessitate changes in the SOW, CCP will review these changes with Regional San's project manager leadership and the RMP Finance Subcommittee and such changes may necessitate CCP's preparation and submittal of a revised task order including revised level of effort and associated cost estimate. For cost estimating purpose and based on actual support activities provided by CCP at the end of FY 19-20 and through Q1 of FY 20-21, subtask assumptions have been prepared for each Task and will be carried out by CCP staff at various labor classifications. Actual conditions will vary, subject to numerous meeting-specific variables. Information learned through prior work has resulted in some adjustments to estimated levels of effort for some subtasks when compared to the previously approved Q1 Workplan.

SCOPE OF WORK

Task 1: Steering Committee Support.

CCP will facilitate up to three (3) Steering Committee meetings.

Task assumptions per meeting:

Subtask	hrs	Subtask	hrs
• Meeting scheduling and logistics	1	• Meeting materials preparation/ rehearsal	2
• Agenda /Facilitation Plan development	3	• Meeting facilitation	6
• Agenda packet assembly and distribution	2	• Meeting summarization and review	3
• Meeting preparation	4	• Action Item tracking and accountability	1

Task 2: Technical Advisory Committee Support

CCP will facilitate up to three (3) Technical Advisory Committee meetings.

Task assumptions per meeting:

Subtask	hrs	Subtask	hrs
• Meeting scheduling and logistics	1	• Meeting materials preparation/ rehearsal	3
• Agenda /Facilitation Plan development	3	• Meeting facilitation	6
• Agenda packet assembly and distribution	3	• Meeting summarization and review	3
• Meeting preparation	5	• Action Item tracking and accountability	1

Task 3: Coordinating Committee Support

CCP will facilitate up to three (3) Coordinating Committee meetings.

Task assumptions per meeting:

Subtask	hrs	Subtask	hrs
• Meeting scheduling and logistics	1	• Meeting materials preparation/ rehearsal	1
• Agenda /Facilitation Plan development	1	• Meeting facilitation / attendance	2
• Agenda packet assembly and distribution	1	• Meeting summarization and review	1
• Meeting preparation	1	• Action Item tracking and accountability	1

Task 4: Technical Subcommittee Support

CCP will facilitate up to nine (9) technical subcommittee meetings including:

• Pesticide Subcommittee (3)	• Toxicity Laboratory Selection Subcommittee (6)

Task assumptions per meeting:

Subtask	hrs	Subtask	hrs
• Meeting scheduling and logistics	4	• Meeting materials preparation/ rehearsal	
• Agenda /Facilitation Plan development	4	• Meeting facilitation	4
• Agenda packet assembly and distribution	1	• Meeting summarization and review	6
• Meeting preparation	10	• Action Item tracking and accountability	1

Task 5: Other Subcommittee Support

CCP will provide subject matter expertise to the Governance Subcommittee in up to five (5) meetings. This will include attendance at Subcommittee meetings, preparation of meeting summaries, and review / consultation on proposed governance documents prepared by Subcommittee members.

CCP may also prepare for and/or attend up to two (2) Finance subcommittee meetings if requested by RMP leadership:

- Governance Subcommittee (5)
- Finance Subcommittee (2) (Note: hours expected in support of this subcommittee are for meeting preparation (1 hour/ meeting) and attendance only (1 hour/meeting).

Task assumptions per meeting:

Subtask	hrs	Subtask	hrs
• Meeting preparation	.5	• Governance documents preparation	4
• Meeting summarization and review	2	• Meeting attendance	4

Task 6: Project Management

CCP will conduct project management activities to ensure accurate and appropriate oversight of project budget, activities, and similar. Services will include preparation of monthly invoices and DoS documents, and ongoing, as-needed project management communications including budget assessments for presentation to the Finance Subcommittee and scope revisions (if warranted).

COST ESTIMATE

Exhibit A presents CCP estimated costs for IPM support to the RMP for Q2 – Q4 of FY 20/21. The estimated cost for services is $81,073.65

EXHIBIT A

Delta Regional Monitoring Program

Program Support - Q2 to Q4 - FY 20/21

Task Descriptions / Labor Resource	Deb Hunt, Program Director (PI)	Mng. Senior Mediator	Associate/ Assistant Facilitator	Associate/ Project Support	Contract / Financial Management	Admin Support	Total Hours by Task	Hrs x rate	Summary
Billing Rates	**$204**	**$198**	**$127**	**$91**	**$88**	**$56**			
Task 1: Steering Committee Support (3)									
Meeting scheduling and logistics						3	3	$168	
Agenda /Facilitation Plan development		9					9	$1,782	
Agenda packet assembly and distribution				6			6	$546	
Meeting preparation		12		3			15	$2,649	
Meeting material preparation/ rehearsal		3		3			6	$867	
Meeting facilitation		18		18			36	$5,202	
Meeting summarization and review		6		9			15	$2,007	
Action Item tracking and accountability				3			3	$273	
Subtotal Task 1	0	48	0	42	0	3	93		$13,494
Task 2: TAC Support (3)									
Meeting scheduling and logistics						3	3	$168	
Agenda /Facilitation Plan development		9					9	$1,782	
Agenda packet assembly and distribution				9			9	$819	
Meeting preparation		15		3			18	$3,243	
Meeting material preparation/ rehearsal		3		6			9	$1,140	
Meeting facilitation		18		18			36	$5,202	
Meeting summarization and review		6		9			15	$2,007	
Action Item tracking and accountability				3			3	$273	
Subtotal Task 2	0	51	0	48	0	3	102		$14,634
Task 3: Coordinating Committee Support (3)									
Meeting scheduling and logistics						3	3	$168	
Agenda /Facilitation Plan development		3					3	$594	
Agenda packet assembly and distribution		2		2			4	$578	
Meeting preparation		2		2			4	$578	
Meeting material preparation/ rehearsal		1		2			3	$380	
Meeting facilitation		6					6	$1,188	
Meeting summarization and review		3					3	$594	
Action Item tracking and accountability				3			3	$273	
Subtotal Task 3	0	17	0	9	0	3	29		$4,353
Task 4: Technical Subcommittee Support (9)									
Meeting scheduling and logistics			15			6	21	$2,241	
Agenda /Facilitation Plan development			16				16	$2,032	
Agenda packet assembly and distribution			4				4	$508	
Meeting preparation		8	40				48	$6,664	
Meeting material preparation/ rehearsal			36				36	$4,572	
Meeting facilitation			36				36	$4,572	
Meeting summarization and review			8	54			62	$5,930	
Action Item tracking and accountability			2	8			10	$982	
Subtotal Task 4	0	8	157	62	0	6	233		$27,501
Task 5: Other Subcommittee Meetings (7 incld Finance)									
Meeting preparation		5					5	$990	
Meeting material preparation		22					22	$4,356	
Meeting attendance		22					22	$4,356	
Meeting summarization and review		10					10	$1,980	
Subtotal Task 5	0	59	0	3	0	0	62		$11,955
Task 8: Project Management									
Project Management Communications		6					6	$1,188	
Invoicing					5		5	$440	
DoS Monthly Reports and Contract Management		10		18			28	$3,618	
Subtotal Task 8	0	16	0	18	5	0	39		$5,246
Total Professional Services	**0**	**199**	**157**	**182**	**5**	**15**	**558**		**$ 77,183.00**
Other Direct Costs (ODC)	**Assumptions**		**UOM**		**Qty**	**Unit Rate**		**Extended Value**	
Photocopying b/w			lot		500	$ 0.06		$ 30.00	
Subtotal Other Direct Costs									**$ 30.00**
Indirect Cost 5%									**$ 3,860.65**
ESTIMATED BUDGET									**$ 81,073.65**

APPENDIX 3

Attachment A

DRMP Interim Program Manager – Scope of Work

The Delta Regional Monitoring Program (RMP) Program Manager will be responsible for planning and overseeing Delta RMP projects to ensure that they are completed within a timely manner and within budget. It is the Program Manager's responsibility to plan projects, prepare budgets, monitor progress, and keep stakeholders informed. In order to monitor progress towards the Delta RMPs objectives the Program Manager will need to have an in depth understanding of schedules, budgets, deliverables, and resources including people, tools and materials used in each project. The following is a list of specific responsibilities of the Program Manager.

1. Planning / Scope
    a. Work with the Delta RMP SC and TAC to determine annual monitoring objectives
    b. Work with the Delta RMP SC to determine long term objectives
    c. Shepherd proposals through the review process
2. Communication
    a. Coordinate communication between the various Delta RMP committees
    b. Document procedures to ensure transparency and consistency
    c. Ensure that documents are available to stakeholders
3. Monitoring Tracking
    a. Oversee and coordinate individual monitoring elements
    b. Track progress of the following deliverables and ensure they are completed on time
        i. Workplans
        ii. QAPP
        iii. Scheduled monitoring
        iv. Data delivery, review, and storage
        v. All interim and final reports
    c. Track monitoring element budgets and spending
    d. Communicate issues/problems to the appropriate Delta RMP committees and propose solutions
    e. Track status of deliverables
4. Scheduling
    a. Regulate workload for TAC and SC participants
    b. Develop yearly schedules for proposal and workplan evaluation and report review
    c. Schedule subcommittee meetings for TAC as necessary
5. Budgeting
    a. Work with the SC to develop funding levels for each of the four monitoring elements, and programmatic/project priorities.
    b. Assist the Finance Subcommittee with tracking program expenses and approving invoices from the implementing entities (ASC and CCP

APPENDIX 3

The budget in Table 1 reflects the estimated hours and rates for Melissa Turner (MLJ Environmental) to perform the role of Program Manager for the Delta RMP from November 2020 through June 2021. The cost estimate is based off recent discussions within the Delta RMP regarding priority work and deliverables planned for the next 8 months. It does not include time for developing proposals for the next fiscal year. A majority of the time during this interim year will be focused on communication, monitoring tracking, tracking of budgets and scheduling in coordination with CCP and ASC. The items marked with an "X" under the Co-Chair column highlight time and hours associated with the current responsibilities assigned to the TAC Co-Chairs.

Table 1. Program manager costs for 8 months (November 2020 - June 2021).

Co Chair	Task	Subtask	Description	Hours	Rate	Cost
	Communication	Communication	Communication between committees and ensure documents are available to stakeholders.	16	$ 160.00	$ 2,560.00
x	Communication	QAPP Procedures	Update QAPP procedures and associated process.	20	$ 160.00	$ 3,200.00
x	Meetings	Steering Committee	Steering Committee (4 meetings, 4 hours prep, 4 hours attendance)	32	$ 160.00	$ 5,120.00
x	Meetings	Coordinating Committee	Coordinating Committee (4 meetings, 2 hours)	8	$ 160.00	$ 1,280.00
x	Meetings	Finance Subcommittee	Financial Committee (4 meetings, 2 hours, 1 hour review of financials)	12	$ 160.00	$ 1,920.00
x	Meetings	TAC	TAC Meetings (3 meetings, 6 hours prep, 4 hours attendance, 2 hours follow up)	30	$ 160.00	$ 4,800.00
x	Meetings	TAC Subcommittees	TAC Subcommittee Meetings (5 meetings, 3 hours prep, 3 hours attendance, 1 hour meeting notes)	35	$ 160.00	$ 5,600.00
x	Meetings	Toxicity Laboratory Selection	TLS (5 meetings, compile questions, distribute proposals, calculate scores)	27	$ 160.00	$ 4,320.00
x	Monitoring Tracking	QAPP - FY 20/21	20/21 QAPP (oversee development, amendments, deviation forms)	40	$ 160.00	$ 6,400.00
x	Monitoring Tracking	QAPP - Cyanotoxin	QAPP - Cyanotoxin DWR / USGS Study	20	$ 160.00	$ 3,200.00
x	Monitoring Tracking	Toxicity Data Management SOP	Toxicity Data Management SOP - Review, coordinate edits to ensure approval of QAPP.	16	$ 160.00	$ 2,560.00
x	Monitoring Tracking	Deltares Report	Deltares Report (3 meetings, 2 hours prep, 4 hours attendance, 1 follow up)	21	$ 160.00	$ 3,360.00
x	Monitoring Tracking	MeHg	MeHg Reports (outstanding reports, review and faciliation of comments/responses); tracking of MeHg monitoring for 20/21.	24	$ 160.00	$ 3,840.00
x	Monitoring Tracking	Other	Track monitoring activities, create tools for project leads to provide updates, tracking of outstanding deliverables and reports.	80	$ 160.00	$ 12,800.00
	Budgeting	Invoice Approval	Review and approval of invoices (2 hours each month)	16	$ 160.00	$ 2,560.00
x	Scheduling	Yearly Planning	Schedule for meetings and meeting goals including list of deliverables to review and approve for the remainder of 20/21.	8	$ 160.00	$ 1,280.00
					TOTAL	**$ 64,800.00**

Delta RMP Special Study Proposal – FY2020

Cyanotoxin Monitoring in the Delta: Leveraging existing USGS and DWR field efforts to identify cyanotoxin occurrence, duration, and drivers

Proposed by: USGS Biogeochemistry Group, California Water Science Center
Tamara Kraus (tkraus@usgs.gov); Angela Hansen (anhansen@usgs.gov)

Problem Statement

One major impediment to improved understanding and prediction of harmful algal blooms (HABs) and the cyanotoxins they produce is the dearth of systematic collection of observational data across both space and time. HABs, which in freshwater comprise mostly cyanobacteria (CyanoHABs), are distributed worldwide and are a growing concern because they can adversely affect drinking water supplies, interfere with water transfers, harm aquatic organisms, and potentially harm humans and wildlife. Worldwide, the distribution and abundance of CyanoHABs are intensified by increased nutrient loads from agriculture and urban runoff, atmospheric deposition, global warming, and droughts. It is most often the cyanotoxins produced by these organisms that are the hazard rather than the organisms themselves – which may or may not produce toxins – so improved monitoring efforts seek to combine cyanobacterial detection with measurement of the toxins themselves.

Identifying drivers of HABs and their associated toxins requires an understanding of the conditions that foster their growth as well as hydrologic drivers that then transport them through the ecosystem. Environmental factors that have been attributed to the occurrence of HABs and the toxins they produce include nutrient concentrations, light conditions, water temperature, hydrologic conditions, water residence time, and meteorological conditions. These factors change rapidly in aquatic systems, particularly in hydrologically complex and tidal estuaries like the Delta (Kraus et al., 2017). Thus, a robust monitoring program for HABs and cyanotoxins requires investing in collection of a wide array of parameters, a task that is often cost prohibitive. Due to the high costs of these efforts, there has been limited and sporadic cyanotoxin sampling in the Delta to date (Lehman et al. 2005, 2008, 2017; Otten et al. 2017). However, we do know from this work that HABs occur each year and negatively impact aquatic species at multiple trophic levels in the estuary (Lehman et al. 2010, 2017). Here we propose to add cyanotoxin sampling to existing water quality monitoring programs run by the US Geological Survey California Water Science Center (USGS) and California Department of Water Resources (DWR) that already collect flow, water quality, nutrient, and phytoplankton data (Table 1; Figure 2).

Another challenge for monitoring cyanotoxins is that the occurrence of these compounds can be ephemeral and/or episodic. Thus, discrete sampling programs that occur on a monthly or even bimonthly interval can miss key events and underestimate cyanotoxin risk, or if they capture a high-concentration event can give a false impression that cyanotoxins are a widespread health hazard. The use of SPATT (Solid Phase Adsorption Toxin Tracking) samplers helps address this issue by providing a temporally integrated signal of dissolved cyanotoxin concentrations (Kudela, 2017; Howard et al, 2017; Peacock et

al., 2018, Howard et al., 2018). SPATT have been used as a compliment to traditional monitoring programs and can elucidate toxin dynamics and environmental drivers. SPATT samplers have detected HAB toxins when simultaneous "grab" samples of water have failed to detect the same toxins in a given waterway as SPATT captures ephemeral events that may be missed by whole water sampling, including the prevalence of toxins, and exhibits more sensitivity compared with grab samples (Lane et al., 2010, Kudela, 2011; Howard et al., 2017; Kudela, 2017; Peacock et al., 2018). A timeseries of water (particulate fraction) and SPATT samples were collected in San Francisco Bay (SFB) from 2011 to 2016 and analyzed for both cyanotoxins and marine toxins (Peacock et al., 2018). The SPATT results indicated ubiquitous toxins throughout SFB, however, the particulate water samples only captured toxins during some timepoints and generally indicated toxins were not very prevalent. Both particulate and dissolved toxins are concentrated by shellfish (Miller et al., 2010; Gibble et al., 2016) and additional studies indicated multiple toxins were routinely present in mussels indicating a potential for transfer of toxins throughout the food web (Gibble et al., 2016; Peacock et al., 2018). Therefore, utilizing SPATT as a monitoring tool provided insight into the toxin detections in mussel samples, and the potential for transfer to the food web that the grab samples did not capture (Peacock et al., 2018).

Table 1. Configuration of USGS and DWR continuous monitoring stations.

Type	Description
ADCP, Pressure Sensors	Flow, Discharge, Gauge Height
Infrastructure	Data Collection Platform (Enclosure, Datalogger, wire and cable, telemetry, solar panels, regulators and batteries)
YSI EXO	EXO Temp/Cond sensor
	EXO pH sensor
	EXO D.O. sensor
	EXO Turbidity sensor
	EXO fDOM sensor*
	EXO Total algae sensor (Total chlorophyll (fCHL) and Phycocyanin (PC)
	EXO Central Wiper
	YSI signal output adaptors
Nutrient Sensors	SUNA Nitrate Analyzer*

**Vernalis and Rough and Ready stations are not equipped with an fDOM sensor, and Rough and Ready does not have a SUNA.*

Background

The Sacramento-San Joaquin Delta (Delta) serves as critical aquatic habitat and as a vital drinking water resource for almost 30 million Californians. It is also a physically, biologically, and hydrologically complex system, receiving flows from the Sacramento and San Joaquin Rivers, which drain approximately 40% of California and then move through and merge within the Delta, a maze-like network of interconnected channels and sloughs (Figure 1). Analysis of long-term observational data demonstrate that the Delta is in a state of severe ecological decline (Sommer et al. 2007; Thomson et al. 2010). Population collapses of several pelagic fish species, including the endemic Delta smelt, have received considerable scientific attention in terms of both extensive monitoring and targeted investigations, with results pointing to the combined impacts of multiple anthropogenic stressors contributing to the population declines (Sommer et al, 2007; Baxter et al. 2010; Hanak et al. 2013; Meyer et al. 2009), including: landscape alterations and habitat loss; species invasions; water withdrawals; declining food

resources; and agriculturally and wastewater-derived contaminants, including nutrients. There is also considerable evidence for negative impacts on habitat quality at lower trophic levels, such as invasive aquatic macrophytes, localized issues with low dissolved oxygen, excessive anthropogenic nutrients, and harmful algal blooms (HABs). Information about HABs and cyanotoxins in the Delta are available for the summer and fall months (Lehman et al. 2005, 2008, 2010, 2017; Otten et al. 2017). However, with warmer conditions due to climate change, blooms are starting earlier and lasting longer, suggesting that more extensive temporal sampling is needed to determine the current bloom impact (Lehman et al. 2017). The spatial extent of cyanoHABs is also changing; while these organisms have been detected in the Central and Southern Delta for many years, they have more recently been observed in the northern Delta including the Cache Slough Complex (Figure 1).

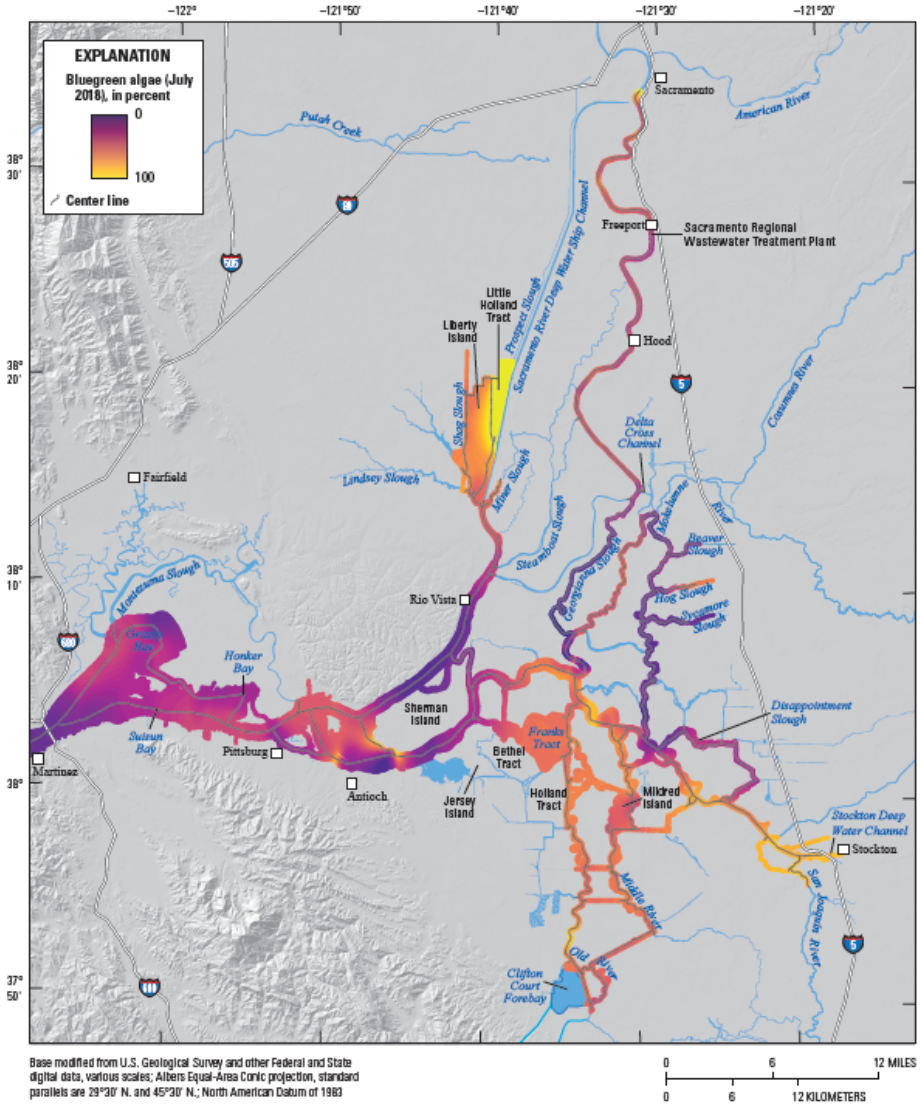

Figure 1: Map of the study area (Sacramento-San Joaquin Delta, California). Color gradient shows variation in the percent of the total chlorophyll-a pool attributed to blue green algae (aka cyanobacteria) measured using a bbe Fluoroprobe during high resolution boat-based mapping surveys conducted by the USGS in July 2018.

The U.S. Geological Survey (USGS) California Water Science Center (CAWSC) and the California Department of Water Resources (CDWR) operate a network of continuous flow and water quality monitoring stations across the Delta (Figure 2). Stations are instrumented with multiparameter sondes that measure water temperature, specific conductance, turbidity, pH, dissolved oxygen (DO), fluorescence of "total" chlorophyll (fCHL), as well as a sensor that measures nitrate (Table 1). These stations are serviced approximately monthly, and at the same time interval discrete water samples are collected to validate and calibrate these instruments (e.g., chlorophyll-a, nitrate) as well as to collect samples for laboratory analyses (e.g., phosphorus, ammonium, dissolved organic nitrogen, phytoplankton identification and enumeration) (Table 2). Most stations report flow, water velocity, and stage, allowing for calculation of constituent fluxes.

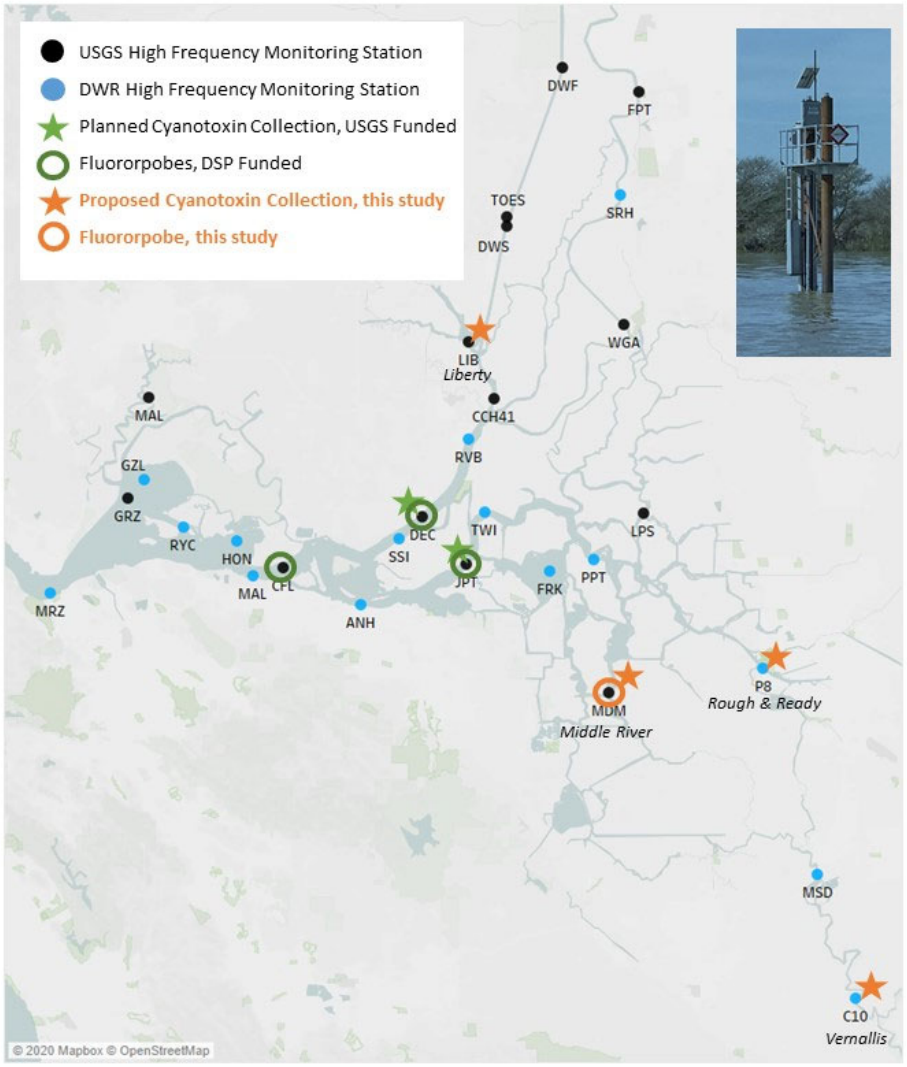

Figure 2: Map of the Delta showing locations of USGS (black circles) and DWR (blue circles) continuous monitoring stations. Orange stars indicate the four stations where cyanotoxin monitoring is being proposed under this study and the orange circle indicates where the fluoroprobe will be deployed. Green stars and green circles indicate where cyanotoxin and fluoroprobe efforts are planned under studies funded by the USGS and the Delta Science Program, respectively.

Table 2. List of parameters determined approximately monthly at the four proposed monitoring stations (Vernalis, Rough and Ready, Middle River, Liberty Island). Funding from this proposal will cover cyanotoxin analysis for 18 sampling dates (4 sites, 18 dates, plus replicates and blanks), as well as analyses of other parameters that are not covered by other efforts.

Parameter	Approx. # Samples ($ this study)	*Approx. # Samples ($ other)*	Information Provided
Nitrate (NO3-N) (μM) **Nitrite (NO2-N)** (μM)	27	*53*	nitrogen as nitrate available for biological uptake; laboratory measurement to verify and calibrate in-situ data, increases due to nitrification or new inputs, decreases due to uptake and denitrification
Ammonium (μM)	27	*53*	nitrogen as ammonium available for biological uptake; tracer of wastewater source; shown to impact phytoplankton abundance, species composition, and primary production; increases due to mineralization or inputs decreases due to nitrification and uptake
Total Dissolved Nitrogen (TDN) (μM)	27	*53*	total nitrogen in the dissolved phase used to track the total N budget
Dissolved Organic Nitrogen (DON) (μM)	27	*53*	includes only the dissolved organic nitrogen fraction, used to track the total N budget; tracer of water source: Calculated as TDN-NO3-NO2-NH4
soluble reactive phosphate (SRP, PO4) (μM)	27	*53*	required nutrient for phytoplankton; has been shown to be inhibitory at high concentrations; tracer of water source
Chlorophyll-*a* & Phaeophytin (mg L^{-1})	--	*53*	laboratory measurements to verify and calibrate in-situ fCHLA data; phaeophytin to chlorophyll-a ratio provides information about algal growth versus senescence; tracer of water source
Phytoplankton Enumeration (cells L-1 and cm3 L-1 by species)	27	*53*	microscope analysis for phytoplankton species identification, counts and biovolume; provides information about phytoplankton abundance and species composition; identifies whether the phytoplankton pool is made up of beneficial or harmful species; indicator of nutritional quality of the phytoplankton pool
Picocyanobaceria (cells L^{-1} and cm^3 L^{-1})	27	*53*	epifluorescence analysis that identifies picocyanobacteria (< 2 microns); identifies fraction of the phytoplankton pool that is made up of small cyanobacteria that are believed to be less favorable to the health of the food web
Cyanotoxins Whole Water (μg L^{-1}) SPATTs (ng g^{-1} day^{-1})	 88 88	--	**LCMS-MS** analysis for the detection of Anabaenopeptins, Anatoxin-a, BMAA, Cylindrospermopsin, Microcystins, Nodularins, and Saxitoxin
Cyanotoxins Whole Water (μg L^{-1}) SPATTs (ng g^{-1} day^{-1})	 20 20	--	**ELISA** analysis for the detection of microcystins, anatoxins, cylindrospermopsins, and saxitoxins

Study Objectives

To provide a more comprehensive picture of the seasonal variation of HABs and their associated toxins in the Delta, this collaborative study between the USGS and CDWR would collect a full year of year-round measurements of cyanotoxins at four stations in the Delta that already have existing, robust monitoring programs.

Relevance to RMP Management Questions

The information gathered will provide important information to help stakeholders engaged in the Delta Nutrient Research Plan to determine whether nutrient concentrations and future management of nutrient concentrations could affect the initiation, duration, and source of harmful algal bloom species and toxins in the Delta. Simultaneous collection of nutrients, phytoplankton and cyanotoxin information along with other water quality parameters (temperature, specific conductance, DO, pH) also will allow researchers to investigate how the suite of conditions along with nutrient concentrations contribute to HABs. The objectives of the project and how the information will be used relative to the RMP's high-level management questions are summarized in Table 3.

Table 3. Study objectives and questions relevant to RMP management questions.

Core Management Question	Study Objectives/Questions
Status & Trends Is there a problem or are there signs of a problem? a. Is water quality currently, or trending towards, adversely affecting beneficial uses of the Delta? b. Which constituents may be impairing beneficial uses in subregions of the Delta? c. Are trends similar or different across different subregions of the Delta?	**How do harmful algal blooms and cyanotoxin concentrations vary spatially and temporally year-round?** **How are ambient concentrations and trends in HABs and cyanotoxins affected by variability in water quality conditions, particularly nutrients?** Collect cyanotoxin data and associated phytoplankton and water quality variables year-round from 4 additional stations from fall 2020 to fall 2021 to enhance an existing sampling program for HABs. Year-round surveys will enable a more comprehensive assessment of the variation of HABs and cyanotoxins and how they are impacted by water quality conditions, including nutrient concentration.
Sources, Pathways, Loadings, and Processes Which sources and processes are most important to understand and quantify? a. Which sources, pathways, loadings, and processes (e.g., transformations, bioaccumulation) contribute most to identified problems? b. What is the magnitude of each source and/or pathway (e.g., municipal wastewater, atmospheric deposition)? c. What are the magnitudes of internal sources and/or pathways (e.g. benthic flux) and sinks in the Delta?	**Which areas of the Delta are cyanotoxins produced and how are they transported?** **Which sources and levels of nutrients are more closely linked to HAB and toxin formation?** Provide online access to data and spatial and temporal trend plots of nutrient concentrations, associated water quality conditions, phytoplankton abundance and cyanotoxins for managers and scientists.

Core Management Question	Study Objectives/Questions
Forecasting scenarios a. How do ambient water quality conditions respond to different management scenarios b. What constituent loads can the Delta assimilate without impairment of beneficial uses? c. What is the likelihood that the Delta will be water quality-impaired in the future?	**Are cyanotoxin concentrations linked with nutrient concentrations, forms and ratios?** **How will changes to nutrient inputs to the Delta (e.g., WWTP upgrades) affect the development of HABs and cyanotoxins?** Identifying current linkages between environmental drivers (nutrients, flow, temperature) on HAB formation, initiation, and duration will assist modeling and targeted data analyses.
Effectiveness Tracking a. Are water quality conditions improving as a result of management actions such that beneficial uses will be met? b. Are loadings changing as a result of management actions?	Data collected by this study can be used to determine whether cyanotoxins are at concentrations of concern in the Delta and will help managers develop future monitoring programs. Data collected by this study will help us understand where cyanotoxins are produced and how they are transported in the Delta.

Study Approach

Cyanotoxins

We will measure the presence of cyanotoxins with Solid Phase Adsorption Toxin Tracking (SPATT) samplers (Figure 3) and with discrete whole water sample collection at four locations: (1) Middle River at Middle River (MDM; USGS), (2) Liberty Island (LIB; USGS), (3) Vernalis (C10; DWR), and (4) Rough and Ready (P8; DWR). All stations measure flow and are equipped with YSI EXOs (water temperature, specific conductance, turbidity, pH, dissolved oxygen, chlorophyll-a/BGA). These stations also have a SUNA nitrate analyzer, except Rough and Ready (Table 1).

Previous studies suggest that cyanotoxin concentrations in the Delta are higher in the summer and fall and lower in the winter and spring, thus we will collect samples approximately every 4 weeks (monthly) in the winter and spring, and approximately every 2 weeks in the summer and fall, for a total of 18 sample dates at each of the four stations. Monthly (12 per year) water samples are collected at these stations under existing USGS and DWR programs, so additional samples for nutrients, phytoplankton enumeration, and picoplankton counts only are needed under this study for the 6 additional sampling dates (Table 2).

SPATT samples: The use of SPATT samplers has recently been refined as a monitoring tool to compliment traditional discrete sampling programs by providing a time-integrated indicator of dissolved toxin presence (Lane et al., 2010; Kudela, 2011; Howard et al., 2017; Kudela, 2017, Peacock et al., 2018; Roue and others, 2018). SPATT samplers will be constructed in the USGS laboratory following methods described in Howard and others (2018). SPATTs will be deployed adjacent to sonde measurements. Each SPATT will be deployed for approximately two weeks; when one sampler is removed from the station a new one will immediately be deployed in its place. SPATT bags will be placed in ziplock bags, placed immediately on dry ice in the field, kept frozen (-80° C), and then sent to the laboratory (BSA Environmental Services) for extraction and analysis. All (100%) SPATTs will undergo analysis via the method of liquid chromatography with tandem mass spectrometry (LCMS-MS) for the detection of cyanotoxins listed in Table 2. Upon review of LCMS-MS data – a subset of samples (~20%) will be selected for analysis via the method of enzyme-linked

immunosorbent assay (ELISA), which is limited to the detection of four cyanotoxins (Table 2). Cyanotoxin methods of analysis differ by state and federal entities – analyses of SPATTs from this study using both analytical methods allow for data and method comparability across different HABs-funded studies.

Figure 3: Photo showing the planned system for deploying SPATT at fixed locations.

Discrete water samples: In addition to collecting SPATTs, we will collect discrete whole water samples concurrent with the removal/placement of SPATTs (approx.18 times per year), which is concurrent with sample collection for analytes listed in Table 2. Whole water samples will be placed immediately on dry ice in the field, kept frozen (-80° C), and then sent to the laboratory (BSA Environmental Services) for analysis. All (100%) whole water samples will undergo analysis via LCMS-MS and – upon review of LCMS-MS data – a subset of samples (~20%) will be selected for analysis via ELISA. Again, analysis of discrete water samples from this study using both analytical methods allows for data and method comparability across different HABs-funded studies.

The goal of implementing SPATT into this proposed study is as a monitoring tool to provide a robust, comprehensive approach to determining toxin patterns and dynamics within the Delta that traditional water grab samples alone can miss. We are very much aware of all the confounding factors that make SPATT cyanotoxin collection challenging to interpret compared to whole water samples, particularly because relating cyanotoxin data obtained from SPATT samplers to a health advisory threshold is not straightforward. The study objective is <u>not</u> to relate SPATT results to human health regulations, but rather to use SPATT as a separate, complementary sampling tool with water grabs to elucidate the prevalence of toxins and to capture ephemeral events that water grab samples can miss. That is why we are collecting SPATT only in conjunction with the more traditional whole water method, which is more easily applicable to health advisories.

These data will complement data collected using the same approaches (whole water and SPATT samples; LCMS-MS and ELISA) at several other stations (likely Decker Island and Jersey Point, Figure 2) in the Delta funded by another USGS Study.

Fluoroprobe deployment at MDM station

The bbe Fluoroprobe is an in situ fluorometer that measures four classes of phytoplankton – cyanobacteria, diatoms, green algae, and cryptophytes. Under a study funded by the DSP's Operation Baseline 2.0 Initiative, the USGS is deploying bbe Fluoroprobes at three stations located in the northern portion of the Delta (e.g., Decker Island, Jersey Point, Grizzly Bay; Figure 2). Using this approach, data are collected every 15 minutes. With funding included in this proposal, a fourth fluoroprobe will be installed at Middle River (MDM); this station is located in the South Delta where HABs are commonly observed. CDWR is also considering adding a fluoroprobe at their Vernalis station during this time period. Fluoroprobe data will be made publicly available on NWIS. These data would leverage the information already being collected at MDM – and allow us to see if cyanotoxin data can be predicted from changes in the phytoplankton community structure.

Method Details

Sample collection, processing and storage

Whole water and SPATT sample collection for cyanotoxins by the USGS and CDWR will follow the methods described above. At the USGS stations, sample collection and processing for other parameters will be conducted according to surface-water methods described in the National Field Manual (U.S. Geological Survey, 2006) following the CAWSC Quality Assurance Project Plan (QAPP) (Etheridge and Egler, 2017) as described in Bergamaschi et al., 2020. For the CDWR stations, sample collection and processing will follow CDWR's Standard Methods (APHA 2012). Continuous and discrete data from the two USGS stations will be processed, reviewed, approved, and stored in the USGS National Water Information System (NWIS), a federally funded and publicly accessible database. Continuous and discrete data from the two DWR stations will be processed, reviewed, approved, and stored in the State of California Data Exchange (CDEC) system. Records related to field equipment (i.e. calibration logs, field notes) will be archived along with data review and processing records on an internal server at the completion of the project.

Sample Analysis

Samples collected by USGS for nutrient analyses (total and dissolved forms of nitrogen (nitrite, nitrate, ammonium, organic nitrogen) and phosphorus (phosphate) will be submitted to the USGS National Water Quality Laboratory (NWQL; Lakewood, CO). Samples collected by DWR for nutrient analyses will be submitted to Bryte Chemical Laboratory (California Department of Water Resources). Microscopic enumeration of phytoplankton, direct quantification of the picocyanobacterial abundances using epifluorescence microscopy (EFM), and cyanotoxin concentrations using ELISA and LCMS-MS will be submitted to BSA Environmental Services (BSA; Beachwood, OH) and also be made publicly available.

Quality Assurance/Quality Control

Sampling will follow USGS and DWR quality assurance protocols for blanks and replicates. Additional quality-control checks will be implemented to assess whether data quality objectives are being met. A minimum of one QC sample (e.g. blank, replicate) will be collected every 10 samples. Quality control data will be inspected by the project chief as it becomes available. If any data indicates that quality objectives are not being met, staff will consult with the lab to determine if the failure is most likely due to field or laboratory procedures/methods. If it is determined that field

methods are the likely cause, the project chief will work with sampling personnel to ensure that field protocols are being followed and if any additional protocols need to be implemented. If it is determined that laboratory procedures are the likely cause, the project chief will work with NWQL personnel to ensure that proper procedures are being implemented. Any changes to procedures will be documented. Details can be found in the QAPP (version 5.2) associated with 2018 mapping surveys.

Project Timeline and Deliverables

- **Project Start-End Dates: December, 1 2020 – December 31, 2022.**
- Samples collection (whole water and SPATT) will occur over a 12-month period, starting in early 2021.
- A fluoroprobe will be deployed at the MDM station as soon as equipment is purchased and assembled: the target date for deployment is April 2021.Data will be collected through 2021.
- Cyanotoxin data will be made available within 6 months following data collection and analysis via the USGS and CDWR database systems, or upon request. These data will also be made available using online visualization tools

  (e.g., https://tableau.usgs.gov/views/Bay_Delta_Portal/Portal?:embed=yes)
- Fluoroprobe data will be made available in real time via the USGS NWIS (https://waterdata.usgs.gov/nwis).
- Results will be reported to the Delta RMP, local conferences (e.g. Bay Delta, IEP), and upon request.
- A report that describes the approach and methods, summarizes any issues or lessons learned that occurred during data collection, provides tabular and/or graphical summaries of the spatial and temporal patterns in the data, evaluates the data quality, and relates study findings to the Delta RMP management questions will be provided at the end of the agreement. The report will also include comparison between the whole water and SPATT data and between the LCMS-MS and ELISA data.
- We anticipate data from this study along with other relevant data collected by the USGS and DWR will be incorporated into a journal article, IEP Newsletter article, and/or USGS report.

Budget

The total amount requested from ASC/the Delta RMP is **$117,632.79.**

This will cover USGS staff time and associated costs (e.g., boats, vehicles, fuel, supplies, instrument costs, travel chlorophyll and nutrient analyses, phytoplankton enumeration). ASC/the Delta RMP will cover the costs associated with cyanotoxin analyses directly.

In Kind Contributions: Well over $750,000 (over $150,000 per station) in annual cost sharing will be provided by the USGS and DWR to support monthly field visits (staff time, boats, vehicles, fuel, sampling equipment), analytical costs associated with samples listed in Table 2 that are collected monthly at these stations, and collection of in situ continuous monitoring data at the four stations.

Cooperator Funds	$117,632.79
USGS Match	$22,995.00
Total	$140,627.79

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Project Description:
Cyanobacteria harmful algal blooms (CHABs) are a rising ecological issue in the Delta. Some locations are more prone to CHABs, but it is unclear where CHABs originate. This study is focused on the knowledge gap of understanding where blooms of the common CHAB genus, *Microcystis*, originate in the Delta. The project's primary hypothesis is that there are specific areas, where flows and tidal velocity are low, that contain high concentrations of benthic resting cells (*Microcystis* cells that overwinter at the sediment surface). These benthic resting cells ultimately recruit to the water column, grow into blooms at sites of overwintering, and are transported elsewhere in the Delta. We predict that areas where CHABs are frequently observed and have higher flows and tidal velocities have relatively low-to-no benthic resting populations due to physical export from the system.

Data Reporting

Duration: November 1, 2020 to December 31, 2021

Deliverables:

Robertson-Bryan Inc prepare and submit Progress Reports with each invoice. Prepare final project report.

Deliverables	Timeline
Progress Reports	Due with each invoice
Final Report	December 31, 2021

Exhibit B: Budget

Robertson-Bryan Inc. (Ellen Preece) Budget

Activity	Hours	Rate ($)	Sub-total ($)
Project Management	25	214	5,350.00
Project Reporting and Deliverables	94.25	214	20,169.50
Travel			40.50
Total SEP Funds			**$25,560.00**

Project Description:

Microcystis blooms are observed annually throughout the SFE Delta system during the summer and fall months. However, we hypothesize that most the cells observed throughout the system ultimately get flushed out and that the majority of the *Microcystis* cells observed within the system primarily originate in only a few incubator sites. In order to test this hypothesis, sediment samples will be collected by the Central Valley Regional Water Quality Control Board, from nine different sites. These samples will be collected at the end of fall to establish the starting concentration of benthic *Microcystis* cells heading into the winter. Lateral transects (7 sediment samples per sampling site) to assess site heterogeneity. The same process will be repeated in May to assess *Microcystis* abundance heading into the bloom season. The expectation is that there will be significant losses to the seed banks at each site due to death and physical export due to resuspension and flushing during the wet winter months. What remains in the spring serves as the upcoming summer's bloom material. Water and sediment samples will be collected from one location within each sampling site early in the summer (2X-June and 2X-July) to gauge when *Microcystis* blooms first occur and how rapidly they grow into a bloom.

Each set of samples will be delivered to Bend Genetics where total and toxigenic *Microcystis* will be analyzed from the sediment samples and from water column samples collected during the summer. Additionally, total microcystin will be analyzed in the water column samples by enzyme linked immunosorbent assay method (ELISA).

Sampling Plan:

- *Winter/Spring*: 2 events (estimated November 2020 and March 2021) *x* 9 sites *x* 5 sediment samples per site = 90 samples
- *Summer*: 4 events 2 events in June 2021 and 2 events in July 2021) *x* 9 sites *x* one water and one sediment sample per site = 72 samples
- *QA/QC samples:* For each event, an additional 7% of samples will be collected for field and laboratory QA/QC purposes.

Data Reporting:

Bend Genetics will provide laboratory analysis reports to SFEI. Cyanotoxin reports will also be provided to the State Water Board FHAB program for placement into CEDEN. Bend Genetics and other project collaborators will coordinate with the Surface Water Ambient Monitoring Program Information Management and Quality Assurance Center (SWAMP IQ) to determine the optimal SWAMP compatible format and reporting requirements for genetic data.

Duration: 11/1/2020 – 12/31/2021

Deliverables:

Bend Genetics LLC will send quarterly data reports to SFEI and the project collaborators (Co-PI Ellen Preece and Co-PI Janis Cooke). Bend Genetics will work in conjunction with the project collaborators to generate a draft final report which will be provided to SFEI and the Delta RMP Nutrients Subcommittee during Q4 2021 with enough to time receive comments and create a final report by the project termination date of 12/31/2021. The draft final report will include QA/QC results, description of methods, field and laboratory results, and conclusions from this work.

Exhibit B: Budget

Bend Genetics, LLC (Dr. Tim Otten) Budget

Activity	Units	Price ($)	Sub-total
T. Otten, co-principal investigator (Project management & reporting)	50 hours	186	$9,30.00
Laboratory Analyses (includes sample processing, analyses of Microcystis DNA and toxins, microscope identification and photos, and sample archiving)	~164	($5-105; varies by analysis)	$24,948.00
Total SEP Funds			**$34,248.00**

The project is supported by additional funds that will be separately provided and managed by the Water Boards. The final project report provided to the Delta RRMP will include outcomes and results provided by the additional funding. Sources and purposes of additional funds are:

- $5,500 (estimated) from the Central Valley Regional Water Quality Control Board of in-kind services for sample collection
- $20,000 from the State Water Resources Control Board FHAB Program for Bend Genetics' laboratory analysis services.

United States Department of the Interior

U.S. GEOLOGICAL SURVEY

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December 10, 2020

Jen Hunt, Senior Project Manager
Aquatic Science Center
4911 Central Avenue
Richmond, California 94804

Dear Ms. Hunt:

This letter confirms discussions between our respective staffs, concerning an amendment to the project entitled: "Technical Support for the Delta Regional Monitoring Program", between the Aquatic Science Center (ASC) and the U.S. Geological Survey (USGS). This amendment will add a total of $170,229 ($26,049 USGS and $144,180 ASC) and extend the end date of the agreement to December 31, 2021.

The purpose of this Amendment is to provide funding for the collection of 32 environmental water samples and associated quality control water samples from sites within the Sacramento-San Joaquin Delta. Eight environmental water samples will be collected during each of 4 sampling events scheduled to take place between March 1st and September 30, 2021. Funding is also provided for the analysis of these samples for current-use pesticides by the USGS Organic Chemistry Research Laboratory and copper, dissolved organic carbon, and particulate organic carbon by the USGS National Water Quality Laboratory.

Enclosed is a partially signed copy of Joint Funding Agreements (JFA) 15WSCA600035762, Amendment 5, by the USGS for your approval. If you are in agreement with this proposed program, please sign and return one fully executed copy to Victoria Wu via e-mail at vwu@usgs.gov. The USGS is required to have an agreement in place prior to any work being performed on a project.

If you have any questions concerning this program, please contact James Orlando, in our Sacramento Office at (916) 278-3271. If you have any administrative questions, please contact Victoria Wu, in our Sacramento Office, at (916) 278-3034.

Sincerely,

Eric G. Reichard
Director, USGS California Water Science Center Enclosures: