## San Francisco Bay Nutrient Strategy Support: Detailed Scope of Work

DRAFT

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## Exhibit A

**Proposed Scope of Work**

## Within the framework of SFBRWQCB and BACWA’s cooperative effort on nutrients in San Francisco Bay, this Scope of Work (SOW) will support on-going nutrient strategy development, and begin work on two sets of high priority projects. The SOW consists of 4 tasks:

## Task 1: Project Administration and Reporting

## Task 2: Coordination of Nutrient Strategy Development and Implementation

## Task 3: Numeric Models and Budgets: Suisun Bay and South Bay

## Task 4: Synthesis of Science Supporting Decisions on Regulation of Ammonium.

## This work will be carried out by the Aquatic Science Center (ASC) and the San Francisco Estuary Institute (SFEI) in collaboration with Southern California Coastal Waters Research Project (SCCWRP), and in cooperation with SFBRWQCB, BACWA, other regional stakeholders, and regional scientists.

**1. Tasks and Deliverables**

**Task 1. Project Administration and Reporting**

***Subtask 1.1 Project Administration***

SFEI will provide all technical and administrative services as needed for Agreement completion; monitor, supervise and review all work performed; and coordinate budgeting and scheduling to assure that the Agreement is completed within budget, and on schedule.

***Subtask 1.2 Project Reporting***

SFEI will invoice quarterly and submit quarterly progress reports by the twentieth (20th) of the month following the end of the calendar quarter (March, June, September, and December) and through regular communication with the Contract Manager.

*Subtask 1.2**Deliverables*

1.2.1 Quarterly written progress reports

**Task 2: Coordination of Nutrient Strategy Development and Implementation** Numerous organizations are either funding or actively engaged in nutrient-related work in the Bay-Delta Estuary (e.g., Region 2 Water Board, Region 5 Water Board, Interagency Ecological Program, United States Geological Survey, Romberg Tiburon Center, State and Federal Water Contractors, Delta Stewardship Council, BACWA, Bay Area Stormwater Management Agencies Association, Department of Water Resources). However, there is limited coordination among these efforts, and no overarching set of science or management goals, or a cohesive science plan, across Bay segments and into the Delta. A nutrient science and management strategy for the Bay-Delta Estuary is urgently needed so that work is carried out in a coherent, complementary, and prioritized fashion.

This purpose of this task is to coordinate the development of a nutrient strategy that has broad-base support among the stakeholders and regulators. The initial focus will be placed on the Bay-proper (west of and including Suisun Bay), however upstream factors that strongly influence Suisun and down-gradient Bay segments (e.g., nutrient loads, flow) will obviously remain a major consideration. This work will be divided into three subtasks.

***Subtask 2.1 - Form a stakeholder advisory committee and facilitate the review of strategy and other strategy-related work***

In 2010-2011, a SF Bay NNE stakeholder advisory group was created for the purposes of reviewing and advising on the literature review and data gaps analysis by McKee et al. (2011). Subtask 2-1 involves reconvening this core advisory group; reviewing the current organization and operating principles and participant list, and revising where necessary; and facilitating the review of the nutrient strategy and other detailed work element proposals, work plans, and products associated with the strategy.

A professional facilitator will be hired to lead SF Bay stakeholder advisory group meetings and work with stakeholders to achieve, to the extent possible, stakeholder consensus on the Strategy and Strategy work element proposals and products. Funding for facilitation has not been included in this budget and still needs to be secured. ASC will provide meeting support and logistics for these meetings.

Up to 4 stakeholder meetings will be held in 2012 to 1) agree on program organization and process; 2) vet drafts of the Nutrient Strategy; and 3) provide feedback and review of scopes of work, priorities, interim milestones and final products associated with specific work elements of the Strategy

SFEI/ASC will work with RB2, as requested, to ensure that documents, including agendas, meeting minutes and reports, will be made available to RB2 staff in a timely fashion so they can be posted on RB2’s website.

*Subtask 2.1 Deliverables*:

2.1.1 meeting agenda, powerpoint presentations and meeting summaries

***Subtask 2.2 Produce a Nutrient Strategy***

The purpose of this subtask is to produce a final Nutrient Strategy. The initial draft nutrient strategy (from September 2011) will serve as the baseline document for further strategy development. The nutrient strategy will describe management questions and goals, major work elements that address those questions/goals, tasks within each work element, and work plans or scopes of work. To the extent possible, a draft funding strategy will also be developed. Working drafts will be reviewed by the stakeholder advisory group. Based on feedback, a final nutrient strategy will be delivered. This "final" nutrient strategy should be considered a living document, in that it will need to be periodically updated. This subtask does not cover those subsequent updates.

*Subtask 2.2 Deliverables:*

2.2.1 Final nutrient strategy (November 2012)

***Subtask 2.3 Stakeholder Outreach and Coordination***

The purpose of this task is to conduct stakeholder outreach and communication to improve coordination and provide a clearinghouse for the dissemination of information. Two types of activities will be undertaken. First, meetings with relevant individuals or groups - such as program managers (e.g., IEP), stakeholder groups, or Water Board staff - will be held to identify priority projects, develop approaches to coordinate efforts, and strategize funding sources. Second, a website and related listserv will be created to serve as a clearinghouse for information (news, downloadable reports, links to related websites, calendar). The website will be updated based on feedback from stakeholders, and as needed with news, calendar additions, and key documents. Reports, scientific literature, and updates from nutrient work in other estuaries will be updated periodically (quarterly).

*Subtask 2.3 Deliverables:*

2.3.1 SF Bay Nutrient Website (April 2012)

## Task 3: Numeric models and budgets: Suisun Bay and South Bay

The purpose of this task is to develop and apply numeric biogeochemical models for Suisun Bay and South Bay. The overall goal of this work is to serve as an early step in modeling efforts to inform future model development and data collection.

The models will be used to quantitatively synthesize existing data; develop nutrient budgets; support evaluation of proposed indicators as part of the NNE; test appropriate management endpoints; determine how key processes should be modeled and assess the relative importance of and uncertainty related to those processes; and identifying major data gaps at an early stage to inform the monitoring program and the need for special studies. This work will include consideration of models that are already under development by USGS and SFSU-RTC, and those researchers will be involved as project advisors (USGS: J. Cloern, J. Kuwabara; SFSU-RTC: R. Dugdale, A. Parker, F. Wilkerson). This effort will also include a broader consideration of models being developed and research being conducted nationally. It should be emphasized that the model(s) developed and used in this task are not intended to be the final models that may ultimately be required for the Bay, which may be more complex and computationally intensive, but rather as scoping tools.

This is a 2-year project, beginning in the third quarter of 2012. Funds are being requested to support modeling activities beginning in 2012, and there is the expectation that funding will be continued through the first half of 2014.

A technical advisory group consisting of regional and national experts will be convened to develop a modeling study plan. A key task of this group will be to identify the main questions to be addressed through the modeling work, approaches for incorporating key processes into the model, and the appropriate model platform(s).

This task has three subtasks associated with it: 1) develop a study plan, 2) compile existing data and evaluate data quality, 3) develop simple box models, and 4) utilize the simple box models to test scenarios.

***Task 3.1 Develop a modeling study plan***

The purpose of this task is to develop a draft and final study plan for the project. The draft study plan will be developed in cooperation with a team of technical advisors and presented to the stakeholder advisory group for review and feedback. Options for model structure range from 1-2 boxes per Bay segment up to coupling a biogeochemical model with an existing 2-D hydrodynamic model within each segment (e.g., Uncles-Peterson model). The ultimate choice for model structure will be determined by the level of detail needed to address the main study questions and sufficiently capture physical forcings (tides, flow, salinity), and what is feasible within the constraints of time and budget. The final study plan will reflect suggested changes to the study plan from stakeholders input, if necessary and feasible.

*Task 3.1 Deliverables*:

3.1.1 Draft and final modeling study plan (June 2012)

***Task 3.2 Compile existing data***

The purpose of this task is to compile data required for modeling exercises, evaluate data quality, and house data in a project database. Data to be compiled will be enumerated in the final study plan. Some data is already available (e.g., from USGS, IEP, etc.) and can be readily assembled within the first several months of the project. However other data will needed to be incorporated in an on-going manner as it is acquired: for example, new and historic POTW effluent characterization data that becomes available over the next two years, and other load estimates developed through an RMP-funded project that wraps up in second quarter of 2013.

*Task 2.2 Deliverables:*

3.2.1 Initial electronic database of compiled study data (November 2012)

***Task 3.3 Develop and validate basic numeric models***

The purpose of this task is to develop basic numeric models for Suisun and South Bay, following the direction laid out in Task 3.1 The focus of this project will be on model development, as well as model calibration and validation.

*Task 2.3 Deliverables include:*

3.3.1 Biannual progress updates (beginning January 2013)

3.3.2 Chapter in draft and final technical report on model set up and validation (June 2014)

***Task 3.4 Use of numeric models to test scenarios***

The purpose of this task is to utilize the numeric models to test management or "Bay condition" scenarios. Scenarios to be evaluated will be identified through the conceptual model work element in the strategy, funded by the Regional Monitoring Program, and reviewed and refined through subsequent technical team and stakeholder feedback. Scenarios can be management scenarios (e.g. reduce nutrient loads, water flow, etc.) and/or "Bay condition" scenarios (e.g. reduced light attenuation, change in grazer abundance, etc.).

*Task 2.4. Deliverables:*

3.4.1 Draft list of scenarios to be evaluated (March 2013)

3.4.2 Chapter in final technical report describing results of scenario analysis (June 2014)

***Task 3.5 Draft and final technical reports***

The purpose of this task is to synthesize the work conducted in Tasks 3.2-3.4 as draft and final technical reports. The technical report will be produced in a draft that will be presented in oral form to stakeholders and subsequently in written form, with opportunity for written comments on the draft report.

The final report will address comments by stakeholders, to the extent that consensus on those comments can be achieved.

*Task 2.5 Deliverables*:

3.5.1 Draft technical report

3.5.2 Final technical report (June 2014)

## Task 4: Synthesis of Science Supporting Management Decisions in Suisun Bay

Several nutrient-related issues in Suisun Bay have recently been brought to the forefront by SFRWQCB staff due to time-sensitive considerations around the reissuance of the Central Contra Costa Sanitation District (CCCSD). The issues are related to

* the extent to which loads from CCSD and other discharges to Suisun Bay drive the spatial and temporal patterns in ammonium concentrations in different parts of Suisun Bay;
* the magnitude and timing of these concentrations relative to sensitive life states of copepods and diatom bloom dynamics, driven by concerns over potential ammonium toxicity to copepods and potential ammonium inhibition of diatom primary production;
* other sources of ammonium, e.g., sediment flux.

Several of the issues raised by the Regional Water Boards specific to Suisun Bay, and identified in the research framework that emerged from the CalFed Bay-Delta workshop[[1]](#footnote-1), are currently being explored in studies carried out through a SFRWQCB coordinated effort. Additional relevant studies are also being carried out through the Interagency Ecological Program as part of the Bay-Delta program, and studies sponsored by the State and Federal Water Contractors Agency. Some of these studies are on-going, and for others final syntheses have not yet been completed.

Four sub-tasks and sets of deliverables are proposed to address time-sensitive questions related to ammonium studies in Suisun Bay. Work on these deliverables will commence in 2012, but some will extend beyond 2012 as discussed below (and see Section 5 for schedule of deliverable due dates). Effort on these tasks that extends beyond 2012 has not yet been funded, and is not included in the budget. The goal of these studies is to enable SFRWQCB staff to make decisions about permit reissuance by 2016.

**Subtask 4.1 Synthesis Report and Study Plan**

The purpose of this subtask is to provide a brief synthesis report that summarizes existing knowledge related to beneficial use impairment from ammonium in Suisun Bay, describes recently completed or on-going studies (including SFRWQCB’s ongoing Suisun Bay study), and identifies additional studies needed to address persistent knowledge gaps. This report will build upon and update the research framework that resulted from the CalFed Bay-Delta workshop.

This task will also develop a study plan that articulates the key questions, scope and assumptions to undertake in Tasks 4.2-4.3 below. This study plan will be reviewed and commented on by the stakeholder advisory group and RB2 staff prior to beginning work on subsequent tasks. The study plan will propose a schedule for completion of additional studies identified and a schedule for completion of the deliverables identified in the work elements discussed below. It is anticipated that the study plan will be revisited annually as part of annual progress report submittal and adjustments will be recommended to RB2 staff. The study plan may also be adaptively managed as an element of the overall nutrient strategy.

*Task 4.1 Deliverables*

4.1.1 Draft synthesis report and study plan

4.1.2 Final synthesis report and study plan that incorporate, to the extent possible, stakeholder comments

**Task 4.2 Report on Assessment of Potential Effects on Diatoms and Copepods from Elevated Ammonium**

The second task will be a technical report that describes the life cycles of the diatoms and copepods shown, or suspected, to be adversely impacted by ammonium (e.g., feeding, reproduction, salinity tolerances, population dynamics, etc.); summarizes available information regarding the potential impacts of ammonium on these biological resources (e.g., toxicity and other adverse effects); explores the potential role of nutrients and other stressors in the system; and identifies remaining critical information gaps, and proposes studies to address these gaps. Work will commence on Task 4.2 in 2012, but deliverables are due in 2013, and additional funding will be required in 2013 to finalize this Task.

*Task 4.3 Deliverables*

4.2.1 Draft technical report

4.2.2 Final technical report that incorporates, to the extent possible, stakeholder comments

**Subtask 4.3 Suisun Bay Modeling**

A third work product will be a Suisun Bay model, provided that funding is available beyond 2012. Among questions that need to be explored through this effort include: the extent to which loads from CCCSD and DDSD, and other discharges, affect

ammonia/ammonium concentrations in different parts of Suisun Bay and over

different seasons, and the impact of other ammonium sources on ammonia/ammonium concentrations (e.g., including sediment flux and agricultural inputs). The efforts in Task 3.1, 3.2, 4.1 and 4.2, and the RMP funded conceptual model study, should further clarify key questions that need to be addressed through modeling, including nutrient dynamics within the system and linkages to biological endpoints. The model for Suisun Bay should ideally be consistent with the Bay‐Delta wide modeling plan.

The main deliverables for this task include a final Suisun Bay model (4.3.1) and a final Suisun Bay synthesis report (4.3.2). While several projects will be underway in 2012 that will provide valuable information to support eventual model development, funding has not been secured for Suisun Bay model development or application. Thus, this subtask and its deliverables are included here to indicate the path ahead, but they are not functionally part of this scope of work.

*Task 4.3 Deliverables*

4.3.1 Final Suisun Bay Model (February 2014)

4.3.2 Final Suisun Bay Synthesis Report (February 2016)2**. Schedule of Deliverables**

All dates assume an effective start date of February 1 2012, and may need to be adjusted depending on actual project start date.

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliverable** | | **Due Date** | **Estimated %complete in 2012** |
| 1.1.1 | Quarterly progress reports | Quarterly by 20th of January, April, July, and October | 100% |
| 2.1.1 | Stakeholder group meeting agendas, powerpoint presentations, and meeting summaries | Up to 4 meetings and materials in 2012 | 100% |
| 2.2.1 | Final nutrient strategy | November 2012 | 100% |
| 2.3.1 | SF Bay Nutrient Website | April 2012 | 100% |
| 3.1.1 | Study plan – Suisun and South Bay numeric models | June 2012 | 100% |
| 3.2.1 | Compile existing input data for numeric models | November 2012 | 100% |
| 3.3.1 | Biannual progress updates on numeric model work | Biannual beginning January 2013 | 25% |
| 3.3.2 | Model development and validation chapter in draft and final technical reports | April 2014 and June 2014 | 25% |
| 3.4.1 | Draft list of scenarios to be evaluated | March 2013 | 0% |
| 3.4.2 | Scenario testing chapter in draft and final modeling technical reports | April 2014 and June 2014 | 0% |
| 3.5.1 | Draft modeling technical report | April 2014 | 0% |
| 3.5.2 | Final modeling technical report | June 2014 | 0% |
| 4.1.1 | Draft Suisun study plan and synthesis report | September 2012 | 100% |
| 4.1.2 | Final Suisun study plan and synthesis report | December 2012 | 100% |
| 4.2.1 | Draft ammonium impacts technical report | April 2013 | 40% |
| 4.2.2 | Final ammonium impacts technical report | June 2013 | 40% |
| 4.3.1 | Final Suisun Bay model | February 2014 | 0% |
| 4.3.2 | Final Suisun Bay synthesis report | February 2016 | 0% |

**3. Budget**

The budget and schedule below are estimates and will be refined as needed. This funding is anticipated to be sufficient for the basic work effort associated with the 2012 deliverables. However it is expected that additional costs will arise in 2012 associated with the basic logistics of coordinating the strategy development and implementation. These include convening technical teams or technical experts to act either as advisors or as actual contributors to report preparation (travel, honarium or per diem), facilitation, and holding stakeholder meetings (lunches, refreshments).

Funding and schedules for work completed beyond 2012 will be agreed upon by the Regional Water Board, BACWA and other stakeholders.

|  |  |
| --- | --- |
|  | **2012 Funding** |
| Task #1 Project Administration | $30,000 |
|  |  |
| Task #2: Nutrient Strategy | $170,000 |
| Revised Nutrient Strategy |  |
| Website and Listserv |  |
| Coordination & Reporting[[2]](#footnote-2) |  |
|  |  |
| Task #3: Suisun and South Bay Box Models | $75,000[[3]](#footnote-3) |
| Box model study plan |  |
| Model data compilation |  |
| Model development, calibration, and validation |  |
|  |  |
| Task #4: Synthesis of Science, Suisun Bay | $75,000 |
| Suisun Bay study plan |  |
| Ammonium impacts technical report |  |
|  |  |
| **Total** | **$350,000** |

\*\*NOTE: Budget is still under development. Some funds that are under Task 2 are associated with my and other staff time will be actually be directed toward work in Tasks 3 and 4.

1. A Framework for Research Addressing the Role of Ammonia/Ammonium in the Sacramento-San Joaquin Delta and the San Francisco Bay Estuary Ecosystem

   <http://www.swrcb.ca.gov/centralvalley/water_issues/delta_water_quality/ambient_ammonia_concentrations/ammonia_mem.pdf> [↑](#footnote-ref-1)
2. Includes coordination for and reporting on the status of Task #2, #3, and #4 to the Regional Water Board and stakeholders. [↑](#footnote-ref-2)
3. $75k supports first 6 months of effort for this 2 yr task, which is 25% of its anticipated total cost through June 2014. [↑](#footnote-ref-3)