

RMP Special Study Proposal: Bay Sediment Conceptual Understanding and Monitoring Strategy

Summary: In fall 2016, the RMP provided \$50,000 toward an EPA-funded project titled *Healthy Watersheds Resilient Baylands* (HWRB). The RMP funds are for the development of a sediment monitoring strategy for addressing key data gaps related to the transport of sediment to and within the Bay. Since developing the scope of work for the HWRB project, there has been a growing focus on sediment monitoring in the Bay that has led to a reevaluation of the necessary components of the sediment monitoring strategy development effort. Specifically, there needs to be a conceptual understanding of Bay sediment dynamics that can be used to develop monitoring and modeling priorities. There also needs to be close coordination with the newly-formed RMP Sediment Workgroup and other regional efforts focused on Bay sediment monitoring, and a stand-alone sediment monitoring strategy that is available for use by the RMP and other partner organizations sooner than the completion of the HWRB project. There should also be a presentation of the sediment monitoring strategy to the RMP Sediment Workgroup and key stakeholders. This funding request is for budget to support these additional project components.

Estimated Cost: \$77,600 (bringing the total RMP contribution to \$127,600)

Oversight Group: RMP Sediment Workgroup

Proposed by: Scott Dusterhoff, Letitia Grenier, Lester McKee, and Jeremy Lowe (SFEI)

Proposed Deliverables and Timeline

Deliverable	Due Date
Workshop to develop the Conceptual Understanding of Bay Sediment Dynamics	October 2018
Draft Conceptual Understanding and Draft Regional Sediment Monitoring Strategy Framework	February 2019
Expert Review of the Draft Conceptual Understanding and Sediment Monitoring Strategy Framework	March 2019
WG Meeting to Present the Draft Conceptual Understanding of Bay Sediment Dynamics and Sediment Monitoring Strategy	May 2019
Final Conceptual Understanding of Bay Sediment Dynamics and Sediment Monitoring Strategy	August 2019
Presentation of Conceptual Understanding and Strategy to RMP Sediment Workgroup	October 2019

Background

In fall 2016, SFEI and several partner agencies were awarded an EPA San Francisco Bay Water Quality Improvement Fund grant for a project titled *Healthy Watersheds Resilient Baylands* (HWRB). This project includes the development of a regional sediment strategy that will contain a sediment monitoring strategy for addressing key data gaps related to the transport of sediment to and within the Bay. In 2017, the RMP provided \$50,000 in matching funds to help support the development of the sediment monitoring strategy, which is planned to be a chapter in the regional sediment strategy report that will be released by early 2020.

Since developing the scope of work for the HWRB project, there has been a growing focus on sediment monitoring in the Bay that has led to a reevaluation of the necessary components of the sediment monitoring strategy development effort. For example, the RMP recently formed a Sediment Workgroup that will need the strategy soon to help guide monitoring and modeling priorities for the coming decade and will need to be closely involved in the strategy development. In addition, there are now several other regional efforts addressing sediment monitoring strategies (e.g., Wetlands Regional Monitoring Program, Bay Restoration Authority, BCDC Sediment Strategy) that the project team will need to coordinate with as part of strategy development.

Key to the development of the sediment monitoring strategy will be a conceptual understanding of Bay sediment processes that reflects the state of our knowledge. Such an understanding will help the project team identify the key gaps in our knowledge of key sediment management considerations, such as the rates and amounts of sediment delivery, transport, and deposition within the Bay. The identified knowledge gaps will then help guide the monitoring and modeling priorities within the monitoring strategy. There are existing conceptual models for sediment dynamics in the Bay (Ogden Beeman and Associates and Krone, 1992; Schoellhamer et al., 2005; Perry et al., 2015), but they focus on certain elements of the Bay sediment story (e.g., sand transport, sediment dynamics for a single subembayment) or were developed decades ago and need to be revisited. The goal of this effort will be to integrate the information in these existing conceptual models and update our conceptual understanding of baywide sediment processes with recent monitoring data and modeling results.

This funding request is for budget to support:

- the development of a conceptual understanding of Bay sediment dynamics
- additional coordination time with key partners
- a stand-alone monitoring strategy report that will be available by the next RMP Sediment Workgroup meeting
- presentations of the strategy upon completion to promote its adoption by as many agencies as possible.

This request for a second phase of funding for the sediment monitoring strategy in 2019 is in the RMP's Multi-Year Plan.

Study Objectives and Applicable RMP Management Questions

The study will provide information essential in setting long-term priorities for monitoring and modeling sediment delivery to and transport/deposition within San Francisco Bay. The objectives of the project and how the information will be used are shown in Table 1 relative to the management questions of the RMP Sediment Workgroup.

Table 1. Study objectives and questions relevant to RMP management questions.

Management Question	Study Objective	Example Information Application
1) What are acceptable levels of chemicals in sediment for placement in the Bay, baylands, or restoration projects?		
2) Are there effects on fish, benthic species, and submerged habitats from dredging or placement of sediment?		
3) What are the sources, sinks, pathways, and loadings of sediment and sediment-bound contaminants to and within the Bay and subembayments?	Reach consensus on a conceptual understanding of sediment sources, sinks, and transport in San Francisco Bay and its subembayments.	The RMP Sediment WG will use the conceptual understanding to put project ideas into context.
4) How much sediment is passively reaching tidal marshes and restoration projects and how could the amounts be increased by management actions?	Develop a sediment monitoring strategy that helps fill data gaps related to the sources, particle sizes, and amounts of sediment delivered to and transported within the Bay	The Sediment Workgroup can use the monitoring strategy to prioritize investments in new monitoring and modeling activities
5) What are the concentrations of suspended sediment in the Estuary and its segments?		

Approach

The scope of work for the Healthy Watersheds Resilient Baylands Project was developed in 2016. Since that time, interest in sediment monitoring and management has increased. The number of interested parties has grown. The scope of the regional sediment monitoring strategy has also increased along with the need for it be prepared earlier. Therefore, the following tasks are needed to meet expectations of stakeholders:

- A conceptual understanding of Bay sediment dynamics for identifying knowledge gaps and helping prioritize sediment monitoring and modeling efforts
- Increased coordination among stakeholders
- Time to expand the scope and accelerate the schedule of the monitoring strategy.

- A second Workgroup meeting in fall 2019 to present the final monitoring strategy.

These tasks are described in more detail below.

A. Conceptual understanding of Bay sediment dynamics

There are no funds in the HWRB project budget for developing a conceptual understanding of Bay sediment dynamics, yet such an understanding is essential for developing a monitoring strategy that addresses key knowledge gaps. The requested funds will address this need. The conceptual understanding will be an annotated map-based graphic describing sources and pathways of sediment within the Bay. The development effort will be collaborative, happening in large part during a 1-day workshop that will include SFEI scientists, USGS scientists, academic and industry experts, and RMP Sediment Workgroup members. The conceptual understanding will address current and potential future conditions with climate change and will be built to address specific RMP questions related to long-term sediment management. The conceptual understanding will update and expand upon the many existing conceptual models of Bay sediment dynamics, including those in the recent 2013 *Marine Geology* special issue. The process of developing the conceptual understanding will result in a list of gaps in our understanding of sediment dynamics, which will be essential for developing the prioritized list of monitoring and modeling recommendations at the core of the monitoring strategy.

B. Coordination with regional partners

Currently, there are limited funds in the project budget for coordination with regional partners involved in regional sediment monitoring strategy development and the RMP Sediment Workgroup. The requested funds will be used in part to pay for meeting with SFEP staff managing the Wetlands Regional Monitoring Program, BCDC staff leading the development of regional monitoring recommendations as part of an overall sediment strategy, staff at the Restoration Authority involved with developing monitoring activities associated with restoration projects. The funds will also support coordination between the RMP Sediment Workgroup and the Healthy Watersheds Resilient Baylands Project.

C. Expanded sediment monitoring strategy document, available earlier

Currently, there are project funds available for the sediment monitoring strategy to be a short chapter in the full regional sediment strategy synthesis report, which is scheduled to be released in early 2020. However, the RMP Sediment Workgroup needs guidance on priorities for monitoring and modeling for the next meeting in May 2019. The requested funds will be used to help pay for the development of a more detailed, stand-alone sediment monitoring strategy document that includes the conceptual understanding of sediment dynamics. An initial step in the process will be to develop a draft framework that will be reviewed by technical experts in early spring 2019 to ensure that it is on the right track. A complete draft will be available for review by the RMP Sediment Workgroup and other key regional partners at the May 2019 Workgroup meeting. This draft will help guide the Workgroup decisions for funding in 2020. The final strategy document will be completed by September 2019. Because of this investment, the Sediment Workgroup will have a draft strategy for planning one

year earlier than previously planned.

D. Second Workgroup meeting for monitoring strategy presentation

There are currently no project funds available to present the final sediment monitoring strategy to the RMP Sediment Workgroup and key regional partners. Yet, communication of the strategy will be critical for its implementation because the RMP funding will not be sufficient to cover all recommended monitoring activities. The requested funds will be used for a Workgroup meeting at SFEI where the project team will present the conceptual understanding of Bay sediment dynamics and the sediment monitoring strategy. The presentation will occur in October 2019 after the release of the final monitoring strategy.

Budget

The following budget represents estimated costs for this proposed special study (Table 2).

Table 2. Proposed Budget.

Expense	Estimated SFEI Hours	Estimated Cost
Task A: Conceptual Understanding	80	\$15,000
Task B: Coordination with Partners	56	\$5,100
Task C: Stand-Alone Strategy Document	280	\$38,000
Task D: Second WG Meeting	60	\$7,500
Subcontracts	--	\$10,000
Direct Costs	--	\$2,000
Grand Total	476	\$77,600

Budget Justification

The majority of the time will be for Lester McKee, Scott Dusterhoff, Letitia Grenier, and Steve Hagerty to have meetings with key partners, coordinate the workshop, compile the detailed sediment monitoring strategy document, and coordinate the final presentation. Senior scientists serving as advisors for the Health Watersheds-Resilient Baylands project will also be involved to ensure consistency with the larger project. There are also subcontract and direct costs budgets to pay for participation by technical experts.

Reporting

The final report will be reviewed by the RMP Sediment Workgroup and Technical Review Committee. It will be published by SFEI as a Healthy Watersheds Resilient Baylands-RMP joint-funded report.

References

Ogden Beeman and Associates and Ray B. Krone and Associates, 1992. Sediment budget study for San Francisco Bay: Final Report prepared for the San Francisco District, U.S. Army Corps of Engineers.

Perry, H., Lyndon, A., Soumoy, P., and Goeden, B., 2015. San Francisco Bay sediment: Challenges and opportunities. Poster presented to the 12th Biennial State of the San Francisco Estuary Conference - Sept. 17-18, 2015, Oakland Marriott City Center, Oakland, CA.

Schoellhamer, D.H, Lionberger, M.A., Jaffe, B.E., Ganju, N.K., Wright, S.A., and Shellenbarger, G.G., 2005. Bay Sediment Budget: Sediment Accounting 101. In San Francisco Estuary Institute (SFEI), 2005. "The Pulse of the Estuary: Monitoring and Managing Water Quality in the San Francisco Estuary". SFEI Contribution 411. San Francisco Estuary Institute, Oakland, CA. pp 58-63.