



South Bay Salt Pond Restoration Project

Restoring the Wild Heart of the South Bay

To: South Bay Salt Pond Restoration Project Team

From: Center for Collaborative Policy

Re: Outcomes from the February 2, 2010 Science Technical Advisory Committee Meeting

Background: The Science Technical Advisory Committee met on Tuesday, February 2, 2010 from 9 a.m. to 5 p.m. at the Elihu M. Harris State Office Building in Oakland. The TAC has been convened to provide guidance to the South Bay Salt Pond Restoration Project Science Program and other state and federal landowner restoration projects, and to fulfill water quality certification requirements.

Meeting Attendance: Attachment 1 lists meeting participants.

Meeting Materials: In advance of the meeting, TAC members were provided access to reference documents for the breakout sessions. At the meeting, TAC members received the meeting agenda, draft charter, Adaptive Management Plan summary table and a table of Project key uncertainties.

Substantive Meeting Outcomes:

1. Welcome, Agenda and Self-Introductions

Laura Valoppi, Lead Scientist, welcomed TAC members and the audience, led introductions and reviewed the agenda. The meeting agenda included:

- Review and discussion of draft TAC charter
- Overview of Phase 1 actions and applied studies
- Key uncertainties from the Adaptive Management Plan and current applied studies
- Breakout sessions on three key topics: mercury, targets/triggers, and water quality
- Reports from breakout groups
- Wrap up and next steps

2. Review and Adopt TAC Charter

Laura Valoppi reviewed the draft charter for the Science Technical Advisory Committee and sought input.

Comments and suggestions for revisions were as follows:

Overall Project Goal

Technical expertise is also needed for potential landowner restoration projects at Bair Island and other lands outside of the Salt Pond Project boundaries. The Goal could be expanded to the South Bay as a whole, or language added that the work of the TAC will inform other projects outside the Salt Pond Project boundaries as well.

Purpose

Another purpose of the Science Program is to inform the public, so language could be added that this purpose will be achieved through publicizing of TAC work on the South Bay Salt Pond website.

TAC Composition

This section could also mention experts from academia.

Another potential member is John Callaway, who is knowledgeable about wetland processes and wetland ecology.

There was discussion about the role of RWQCB members on the TAC. Because the TAC recommendations will go to the RWQCB, there is a need for the TAC to be independent from the Board. If more members of the RWQCB are interested in participating, perhaps another venue could be established for Science Program/RWQCB information exchange. The TAC is a requirement of the RWQCB order, and RWQCB members see value in participating in the TAC in case there is need to clarify the content and requirements of the order.

Role/Responsibilities

A category should be created so that the TAC has a role in informing design. Other large restoration projects capture design guidelines and lessons learned to inform future work and other restoration projects.

Decision-making

As the TAC meets only annually, the Project website could be used to solicit TAC input on a more frequent basis.

Reporting

Designate recipients to include the South Bay Salt Pond Project Management Team and to the appropriate Project land manager (USFWS, DFG). The work of the TAC would also inform the RWQCB and the Army Corps of Engineers.

Meeting Type and Frequency

Information Sharing: It would be helpful to time the TAC meeting to build on information developed at conferences and other sessions. For example, the timing of this meeting, after the SFEI mercury event and a dredge used event, is helpful and facilitates lessons learned. Perhaps the TAC meeting could be timed after the State of the Estuary

conference, or TAC work could be presented there and at the biennial Science Symposium.

Action

The TAC members gave a “thumbs up” to the charter with the proposed revisions. The draft charter will be revised in response to suggestions and will be distributed to TAC members for adoption.

3. Overview of Phase 1 Actions and Applied Studies

John Krause of the Department of Fish and Game and Eric Mruz of the US Fish and Wildlife Service reviewed the status of Phase 1 restoration and public access project design and construction. Mendel Stewart of USFWS reviewed past and planned restoration at Bair Island. Project Lead Scientist Laura Valoppi reviewed current applied and directed studies.

Questions/Comments:

Q: Can you provide an overview of existing and future funding for science?

A: Last year, funding for RFP studies was more than \$1 million, money provided by the Resources Legacy Fund that had been left over from funds allocated for land purchase. Major funding for future studies has not yet been identified. USGS allocated \$500,000 for studies in fiscal year 2009 and \$1 million in fiscal year 2010.

4. Key Uncertainties from the Adaptive Management Plan and Phase 1 Studies

Laura Valoppi reviewed a matrix of key uncertainties from the Adaptive Management Plan and applied studies underway to address those uncertainties. Discussion occurred on the following topics:

Water Quality

Comment: Concern was raised that there is no analysis of water quality monitoring data on benthic organisms in sloughs.

Response: Jan Thompson's research involves taking cones in mudflats. In addition, the USGS is doing chlorophyll and nutrient, but not phytoplankton, analysis.

Harbor Seals

Q: It would seem important to study harbor seals in Mowry Slough if boating access is increasing.

A: Boating access is not increasing, except at Eden Landing. No studies are planned at this time to look at the impact of trails on harbor seals.

A: Kathy Fox of San Francisco State University did a Bair Island harbor seal study this.

Monitoring to Confirm Intended Outcomes

Q: Is there any monitoring to confirm if restoration outcomes are as intended, or if there are impacts due to design or construction? Is there a feedback loop so that the model the design is based on is adjusted for future projects? Can the projects deliver the water that the design intended?

A: It's important to take into consideration what is practical. It's difficult, because often the managers need to be there physically to manage the process, and that is not always feasible. It's important that we keep very good records of what we do so that that information can be applied back.

During discussion of this issue, the following points were raised:

- It will be important to get information on water depth to inform bird studies (as built and as managed)
- Management feasibility needs to be looked at carefully during the design phase
- It would be helpful to monitor water depth and velocity on a frequent or continuous basis after projects are implemented.
- Is there any way to strengthen the connection between management and science?
- Asking about a monitoring feedback loop is very prescient. The Project struggles for money to fund the most critical studies. There are a lot of pieces that are not pulled together as a whole.
- It will be critical to make the data available in an accessible way to facilitate its integration.
- Given the length of the project, it will be important that the data is in a format that can be used for a long time.
- The Doren paper on ecological indicators and the Everglades in the reference documents, which discusses a green, yellow, red light approach, was mentioned as a simple way to communicate outcomes.
- It will be important to develop the right base measurement for a tide gauges so the tidal datums are consistent.
- The Project is working with the Army Corps of Engineers to get permanent tide gauges at Alviso and Coyote Creek.
- There is a huge amount of grunt work needed to pull data together. The choice is to do it once or for each project to do it individually. It might be preferable to allocate funding to do fundamental data crunching.
- SFEI spends 15% of its budget on data management.
- USFWS might possibly have access to climate change money to look at inventory and monitoring of parameters at the Refuges.

5. Breakout Sessions

I. Mercury Breakout Session

Attendees

Josh Ackerman (USGS)

Jay Davis (SFEI)

Letitia Grenier (SFEI)

Shin-Roei Lee (RWQCB)

Susanne von Rosenberg (Gaia Consulting)

Facilitator – Ariel Ambruster (CCP)

Note-taker – Lisa Hunt (URS)

Question for Breakout Group Discussion:

- **What adaptive management/applied studies options should the project explore as we move forward with Phase 1 restoration actions?**

Background Information:

Adaptive Management Plan Targets:

- Levels of Hg in sentinel species do not show significant increases over baseline conditions
- Levels of Hg in sentinel species are not higher in target restoration habitats than in existing habitats

Applied Study Questions (From Table of Key Uncertainties and Phase 1 Studies):

- Will tidal habitat restoration and associated channel scour increase MeHg levels in marsh and bay-associated sentinel species?
- Will pond management increase MeHg levels in ponds and pond-associated sentinel species?

Key Issues

Recommendation from the Group:

- Establish Mercury Monitoring Program
 - Needs to be done ASAP
 - Needs to be holistic and comprehensive
 - Developed by a panel of local, national, international experts
- Studies within Mercury Monitoring Program:
 1. Ambient/long term/annual monitoring at fixed locations
 - To determine background
 2. Understanding natural variation in Hg and environmental correlates
 - Requires large-scale study among ponds to determine factors influencing MeHg bioaccumulation (such as salinity)
 3. Monitor specific management actions
 - To identify impacts caused by Project actions within Project area, such as SF2, A8, A6, and A16/A17
 4. Establish management toolbox through deliberate and carefully designed experiments
 - Experimentally manage or create wetlands to test MeHg bioaccumulation outcomes to guide future management actions
 5. Characterize project impacts to South Bay Ecosystems
 - Biota
 - Mass budget/balance to characterize total loads
 - Toxic effects to wildlife (such as waterbirds already at high risk to MeHg exposure)

Other Key Points:

- The overarching question is how to design marshes and ponds to minimize bioaccumulation of Hg, and which management actions lead to mercury increases. The key uncertainty is how to design the Project to improve conditions (or less than or equal to current state).

- Need to consider multiple spatial scales, individual ponds, the Project and the South Bay.
- It will be important to coordinate with other programs, particularly RMP, to avoid redundancy and integrate data collection. Before starting any study, both programs need to talk to each other. Coordination hasn't happened on studies that have already been undertaken.
- A long-term approach is needed for a 50-year project.
- There needs to be a holistic monitoring approach that includes annual baseline monitoring at fixed locations.
- The Project needs an expert group to design the monitoring program. There needs to be a serious effort to get the annual monitoring design right, as this will be a long term program.
- Coordinated data management is very important, with a consistent format.
- The Project is already missing many opportunities to gain information – ponds are being breached with little or no monitoring, such as A6. We need to take advantage of natural experiments.
- Studies seeking information on best management approaches could use a matrix of different design/management options, including:
 - 3 levels of salinity
 - Depths – diving ducks, dabbling ducks, shorebirds
 - Hydrology – dry/flow through systems that flush out
- The studies would also need to consider starting point, the long transition period of 20-50 years, as well as the end point of the management action.
- The program designers need to determine minimum data needs and drill down from there. Biosentinel monitoring is most cost-effective.
- The Project should monitor as many actions as possible – this is necessary for adaptive management.
- There needs to be a synthesis of research from all programs.
- Mercury science is highly dynamic and there are constant surprises. Scientists are not currently at a point where we can predict Hg behavior in these systems – we may get there in 10-20 years with data collection.
- Scientists need to understand not just MeHg production, but also bioaccumulation, demethylation, etc.
- The Project should consider interaction with upland habitats in a targeted study, but this has lower priority than studies assessing exposure in more sensitive species.

II. Targets & Triggers Breakout Session

Attendees

Joy Albertson (USFWS – wildlife)

Gordon Becker (CEMAR – fish)

Giselle Block (USFWS)

Kristin Byrd (USGS – physical science)

Judy Drexler (USGS – wetland ecologist)

Brian Halstead (USGS – wildlife and stats)

Meg Marriott (USFWS – wildlife)
Andree Greenberg (RWQCB)
John Kraus (DFG)
Roger Leventhal (Far West Engineering)
Dave Schoellhamer (USGS – sediment transport)
Renee Spenst (Ducks Unlimited – biologist)
Cheryl Strong (USFWS – wildlife)
Michelle Orr (Phillip Williams & Associates)
Julian Wood (PRBO)
Facilitator – Austin McNerny (Center for Collaborative Policy)
Note-taker – Rebecca Verity (URS)

Questions for Breakout Group Discussion:

- **Should numeric quantitative management triggers and restoration targets be developed?**
- **If so, for which category of project objectives?**
- **What process is recommended to develop such triggers and targets?**

Key Issues

Major conclusions drawn from the conversation include:

- The adaptive management table generally contains reasonable quantitative targets relative to a baseline.
- Certain parameters (such as pickleweed growth) can be used as targets for measuring more than one restoration objective (such as sediment accumulation, vegetative cover and habitat development). We should look for economies such as these.
- The goal of “no significant decrease” appears to address statistical significance, but there could be situations in which a change might not be statistically significant, but ecologically significant. This should be considered when developing specific targets.
- Baseline should be defined for each parameter, and it should be clearly stated whether baseline is a preexisting condition onsite or an existing condition at an appropriate reference site.
- Triggers should be ranked or sorted. Those that would produce an immediate management response (such as a fish kill) should be prioritized, and management actions delineated.
- Species with numeric targets tied to their recovery plan should have incremental targets over a particular time frame identified.
- Triggers could have stepped up responses, or nodes with multiple potential management options, such as, if you reached DO trigger, you monitor further, if you exceed by a little you study, if you exceed by a lot you take some action.
- Ensure that a loop is created to get on-the-ground information from plant managers, so actions can be taken quickly.
- **Sediment:** Numeric targets should be used.

- **Flood Protection:** USACE and other flood-related agencies have risk and other models. The output of those models should be used as numerical management triggers.
- **Water Quality:** Consider impacts not only to area where management action occurs, but also downstream/at adjacent areas.
- **Algae:**
 - Algae may have a visual rather than numeric target, with a threshold as to whether it can be viewed via satellite imagery, but possible numeric targets might be chlorophyll or percent cover.
 - Nuisance and invasive algae are more urgent than native algae.
 - Best sources for this topic are Tara, Jim, and Robert Schlipf at Water Board
- **Tidal Marsh Habitat Establishment:**
 - The target should be a continuous increase in biomass. No trigger identified. Quantification may be needed for vascular plants and algae, separately. Clarify a scale (example: multiple ponds) and a timeline for expected vegetation increases (example: 20% cover in 5-10 years).
 - Add tidal marsh transition ecotones to the list of parameters to be monitored. Appearance of particular invasive plants should be a high priority actionable qualitative trigger.
 - Clarify how timelines will work with this objective.
 - Reference sites will be important for evaluating this objective.
 - Consider scale of trigger: one pond or a wider area? The lens needs to allow for a large enough view to take in many interrelated factors.
- **Salt Marsh Harvest Mouse:** Incremental targets/triggers need to be developed.
- **Salmonid** targets and triggers should be related to quality habitat parameters, such as presence of escape cover, is this a high growth rate habitat, rather than specific numbers of fish. Fish numbers are dependent on factors outside the control of this project.
- **Public Access** should have multiple types of targets and triggers. Identified issues include: 1. Number of visitors; 2. Quality of visitor experience; 3. Quality of outreach program (do schools know about us); 4. Effects of visitors on the environment (nesting success, erosion, devegetation, littering). All of these need different targets and triggers, and are interrelated.
- **Vector Control:** Targets and triggers should be set in coordination with the mosquito control districts.
- **Next Steps:**
 - The table could easily have ecological indicators. Perhaps the next big objective should be put in those indicators and evaluate where we have information gaps.
 - Need to develop draft numerical targets within the next six months, in advance of starting construction, so there is clear direction on what needs to be monitored.
 - A first step may be setting up a geo database to closely track data over time.

III. Water Quality Breakout Session

Attendees

Arriana Brand (USGS)
Brenda Buxton (Coastal Conservancy, attending on behalf of John Bourgeois)
Melisa Helton (FWS, observer)
Eric Mruz (FWS)
Tara Schraga (USGS)
Robert Schlipf (RWQCB)
Greg Shellenberger (USGS)
Joe Stagg (FWS bio intern)
Laura Valoppi (USGS) and John Krause (DFG) sat in for several minutes
Facilitator – Mary Selkirk (CCP)
Note-taker – Fan Lau (URS)

Key Issues

Questions for Breakout Group Discussion:

Questions 1 and 2: How should data be analyzed? Do you recommend any changes to the WQ monitoring program?

Overall Comments:

- There has been no funding for data analysis/interpretation, only collection
- Important to distinguish between monitoring and directed studies
- Important to assess value of continuous monitoring vs. spot monitoring
- Two goals that may not mesh that need to be linked more closely:
 - Meeting permit requirements
 - Answering science questions

Recommendation from the Group:

Applied or Directed studies should look at or involve the following:

- Is pond water affecting DO?
- Determine oxygen balance (sources/sinks)
- Primary production and effect on birds
- What management actions can change that balance?
- Hydraulic experiments, e.g. making flow unidirectional
- Use 2008 study as a guide, focus monitoring and studies down to 1 or 2 ponds instead of spreading efforts/resources across 3 ponds
- Continue with Kuwabara proposal
- Incorporate some of Tara's data
- Hire someone to interpret/analyze existing data from the past 2 years
 - A 1-year postdoc, e.g., Mendenhall
 - Expertise in water quality, lower trophic level biology, and/or algal dynamics (possibly someone from Tiburon)
 - Look at primary production: getting more to the processes, where are the big sources and sinks; where is the balance of oxygen going so that we know what to focus on in terms of management? Is it SOD, BOD, some big oxygen generator in the middle of the pond?
 - Analyze patterns

- Determine what data are useful; this can help determine what monitoring to conduct next
- Need funding by USGS or other means

Next step: The annual report will include 2 or 3 recommendations on focused data analysis/studies and very rough cost estimates, and a time frame in which they could possibly be carried out this summer – narrowing the ponds under consideration, but broadening the data analysis. Tara will participate in a call with Eric and Robert to start to define the parameters of focused studies.

Question 3: Reconsider DO objective?

- Not practical – it’s an extensive basin planning process, not a permitting process
- Not the issue – should focus rather on determining causal issues and effects of pond management

Data gaps:

- Benthic flora and fauna
- Water column zooplankton and planktivorous fish
- Ecological value of managed ponds

Management triggers:

- Increase or decrease in residence time
- Comment: How fast is fast?

Other concerns:

- How much are uplands causing low DO in sloughs?

Looking ahead:

- Studies recommended above will move the science in a direction of better understanding the ecological implications of water quality issues in managed ponds
- We can start to answer this now by looking at SF2

6. Reports from Breakout Sessions

I. Mercury Breakout Session

Letitia Grenier outlined the mercury breakout group's recommendations to convene a national panel of experts to establish a Project mercury monitoring program. The program should be comprehensive and last the length of the Project. She noted that the first step should be to carefully define what questions need to be answered. It will be important to develop a standardized data format and data management. In addition, it will be important to coordinate with the Regional Monitoring Program (RMP) and other regional efforts, particularly when looking at Project impacts in the region. Another breakout session member, Susanne von Rosenberg, said a systematic approach, instead of an ad hoc (project-by-project) approach, is needed – resources cannot be prioritized unless there is a comprehensive design.

Next Steps:

- The Science Program should talk to the TAC to nominate members to be on the national committee to design the monitoring plan. People should be brought in from the RMP, CALFED, the Water Board and possibly the U.S. Army Corps of Engineers, in conjunction with national mercury experts. The RMP's spatial coverage is the open water of the Bay, rather than wetlands.
- Members of the mercury subgroup would be interested in meeting again very soon.

During TAC discussion, the following points were raised:

- Q: If we are monitoring biosentinels, what about the processes? What are your targets so you know what's good, bad and ugly?
- A: For a lot of these habitats and species, we will not have a number. The question is stated as "Does the Project make things worse?" It does not necessarily need to be compared to a threshold; it can be a before/after comparison. The magnitude of the difference relative to ambient levels is what is important. If we start to see a high bioaccumulation in certain species and don't have data on the significance, then we could do a study on what that means. Take a hierarchical approach, and don't spend money if it is not needed. First determine no net harm, and then toxic effects.

II. Targets & Triggers Breakout Session

Austin McNerny explained that the group's task was to review each objective in the adaptive management summary table and identify if it should have a target. Some objectives already have a very specific target, while others are more vague. It will be important to clearly identify what would constitute a significant change, and the main task is to review the existing data to quantify or define the baseline. In addition, a decision needs to be made on whether a change would trigger a management action.

Next Steps

- Update the table within the next six months. For example, steelhead fish counts are not a good idea – instead, look at habitat.
- Focus on sediment, habitat and water quality objectives to identify specific triggers, as much work has already been completed on these categories.
- Phase actions depending on the severity of outcomes.
- Rely on the qualitative/subjective experience that the PMT has.
- The Targets and Triggers subgroup could continue discussion via e-mail, but not necessarily in person.

During TAC discussion, the following point was raised:

- Use a pilot indicator. If we see that we are not meeting our goals, perhaps we are not collecting the data needed to evaluate whether we're meeting those goals.

III. Water Quality Breakout Session

Mary Selkirk outlined the breakout group's recommendations on a specific plan for water quality-related applied or directed studies. The group was asked to look at how existing

data should be analyzed, whether any changes to the water quality monitoring program should occur, and if the South Bay sloughs dissolved oxygen objective should be reconsidered. Recommendations include:

- The group recommended that resources be pooled in order to hire a water quality expert to analyze existing data and look for patterns. One option would be to use a postdoc for a year. Group members suggested that directed studies be performed to increase understanding of the oxygen budget, including sources and sinks. Once there is more understanding, use 2008 study data to focus on studying one or two ponds instead of spreading efforts on multiple ponds.
- Use a lower trophic level ecologist to look at primary production and how it is affecting birds and what they are eating.
- Data gaps include benthic flora and fauna, water column zooplankton and planktivorous fish
- The group decided that it would not be practical to look at redoing the dissolved oxygen objective in the permit, as it would involve EPA and a Basin Plan amendment. It might be better to look at physical processes limiting dissolved oxygen.

8. Wrap Up and Next Steps

Laura Valoppi thanked the participants for their work.

She sought and received confirmation from TAC members that they supported the annual meeting schedule.

In about a week, TAC members will receive an online survey seeking their feedback on the meeting, and their thoughts on emergent issues for the Science Program to consider.

Attachment 1: February 2, 2010 Meeting Attendance

Name	Organization/Affiliation
Josh Ackerman	USGS
Joy Albertson	USFWS
Ariel Ambruster	CCP
Gordon Becker	CEMAR
Giselle Block	USFWS
Arriana Brand	USGS
Brenda Buxton	State Coastal Conservancy
Kristin Byrd	USGS
Jay Davis	SFEI
Max Delaney	BCDC
Judy Drexler	USGS
Andree Greenberg	RWQCB
Letitia Grenier	SFEI
Brian Halstead	USGS
Melisa Helton	USFWS
Lisa Hunt	URS
John Krause	DFG
Fan Lau	URS
Shin-Roei Lee	RWQCB
Roger Leventhal	Farwest Restoration Engineering
Meg Marriott	USFWS
Austin McInerny	CCP
Eric Mruz	USFWS
Michelle Orr	PWA
Robert Schlipf	RWQCB
Dave Schoellhamer	USGS
Tara Schraga	USGS
Mary Selkirk	Center for Collaborative Policy
Gregg Shellenberger	USGS
Renee Spent	Ducks Unlimited
Joe Stagg	USFWS
Mendel Stewart	USFWS
Cheryl Strong	USFWS
Lynne Trulio	SFSU
Laura Valoppi	USGS
Rebecca Verity	URS
Susanne von Rosenberg	Gaia Consulting Inc.
Julian Wood	PRBO