

## Bay Area Ecosystems Climate Change Consortium

Thursday, April 26, 2012, 10:00 am - 2:00 pm

Conference room, 11th Floor, California State Coastal Conservancy  
1330 Broadway, Oakland, California 94612

### Meeting Summary

---

#### Attendees:

Joy Albertson, *US Fish and Wildlife Service*  
Sara Allen, *National Park Service* (via teleconference)  
Julie Beagle, *San Francisco Estuary Institute*  
Erin Beller, *San Francisco Estuary Institute*  
Maria Brown, *Gulf of the Farallones National Marine Sanctuary*  
Bill Brostoff, *US Army Corps of Engineers* (via teleconference)  
Louis Blumberg, *The Nature Conservancy*  
Erin Chappell, *Department of Water Resources*  
Ellie Cohen, *PRBO Conservation Science*  
Deanne DiPietro, *Sonoma Ecology Center* (via teleconference)  
Matt Gerhart, *CA State Coastal Conservancy*  
Wendy Goodfriend, *Bay Conservation and Development Commission* (via teleconference)  
Letitia Grenier, *BAECCC*  
Robin Grossinger, *San Francisco Estuary Institute*  
Andrew Gunther, *BAECCC Executive Coordinator*  
Daphne Hatch, *National Park Service* (via teleconference)  
Kelley Higgason, *Gulf of the Farallones National Marine Sanctuary*  
John Klochak, *US Fish and Wildlife Service*  
Jaime Kooser, *SF Bay National Estuarine Research Reserve*  
Marilyn Latta, *CA State Coastal Conservancy*  
David Loeb, *Bay Nature Institute*  
Jeremy Lowe, *ESA/PWA*  
Lisa Micheli, *Pepperwood Foundation*  
Nadine Peterson, *CA State Coastal Conservancy*  
Cynthia Powell, *California Invasive Plant Council*  
Marina Psaros, *SF Bay National Estuarine Research Reserve* (via teleconference)  
Bruce Riordan, *Joint Policy Committee*  
Falk Schuetzenmeister, *California Invasive Plant Council*  
Christina Sloop, *SF Bay Joint Venture*  
Katherine Smetak, *Center for Ecosystem Management and Restoration*  
Caitlin Sweeney, *San Francisco Estuary Project*  
David Thomson, *San Francisco Bay Bird Observatory*

## **1. Introduction of participants and their BAECCC-related projects.**

Participants introduced themselves and the interests of their organization in BAECCC. Matt Gerhart provided the information for the “Go-to-meeting” for those on the teleconference.

## **2. Review agenda**

No new items were added to the agenda.

Deanne DiPietro announced that the California Conservation Commons is hosting a workshop to guide the San Francisco Bay Area Conservation Commons effort on May 4<sup>th</sup>, 2012 from 10 am to 3 pm at PRBO Conservation Science. An invitation to the workshop was sent to the BAECCC Google group.

## **3. Policy updates**

### **a. Coastal Conservancy SLR guidance**

Nadine Peterson announced that the Coastal Conservancy recently created a sea level rise [guidance document](#) that provides step-by-step instructions for assessing potential impacts and vulnerabilities for proposed projects along the shoreline. The guidance document will be updated based on recommendations from the National Academy of Sciences West Coast Sea Level Rise Report, which is expected to be released in June 2012.

### **b. California Natural Resources Agency climate adaption guide**

Louis Blumberg noted that the California Natural Resources Agency has released a public review draft of the [California Climate Adaption Policy Guide](#), a tool for local planners to integrate climate change into climate action plans. Comments will be accepted through the middle of May.

### **c. SF Bay Sentinel Site designation by NOAA**

Maria Brown provided a brief overview of the [NOAA sentinel site program](#), an effort to implement a place-based, issue-driven, collaborative approach to climate change adaptation. The program seeks to use existing structures and resources to inform climate change planning and to improve partnership and coordination among these entities. Information gathered at the regional scale can then be brought to the national level. The initial focus of the program is sea level rise and coastal inundation, and the San Francisco Bay was designated as one of five sentinel sites in the country.

The structure of the San Francisco Bay Sentinel Site Cooperative is in the process of being defined. The structure will be driven by the issue around which the cooperative is centralized. Sea level rise was the first topic picked, but any water- or weather-based climate-change related topic can be chosen.

The cooperative will be headed by a coordination committee whose role will be to improve local coordination and communication among groups, serve as a liaison between other sentinel site cooperatives, leverage resources, and handle bureaucratic requirements. Maria noted the significant overlap of the objectives of the sentinel site program and BAECCC, and suggested that BAECCC could serve as the Sentinel Site Cooperative.

Maria provided examples of some of the benefits of sentinel site designation, including: improved access to data and information, products and tools, and models that NOAA provides; improved funding for research, as NOAA will focus funding and technical expertise on sentinel sites; and assistance with bureaucratic requirements. The cooperative essentially provides a forum in which to advocate for requests.

Maria noted that there are many potential partners for the cooperative and suggested partnering with current BAECCC partners to start.

#### **4. Relevant pending proposals and opportunities**

A pre-proposal by Fraser Shilling of UC Davis and others to expand the [California Roadkill Observation System](#) into a wildlife observation network was submitted to the Landscape Conservation Cooperative (LCC). The project calls for the installation of a large-scale, Bay Area-wide array of wildlife cameras. The proposal was declined but is expected to resurface. It will be sent to Andy for ideas on potential funding sources.

Deanne DiPietro noted that a pre-proposal the California Conservation Commons submitted to the LCC entitled “California Climate Commons” was accepted and that a full proposal will be submitted. The purpose of the proposed project is to consolidate climate information for the entire LCC area (California wide). A [prototype](#) of the project is available via the Conservation Commons website.

Andy noted that a pre-proposal submitted by BAECCC, SFEI, and PRBO to develop a regionally coordinated monitoring framework for climate change was declined by the LCC. He will be contacting LCC staff to get learn why the pre-proposal was not successful.

Louis Blumberg announced that the Nature Conservancy (TNC), along with a group of partners submitted a proposal to the NRCS for a study on carbon sequestration in managed wetlands in the Delta. The groups seek funding to establish two farm-scale demonstration projects that will examine the role of creating managed wetlands from farm land to re-establish native vegetation, reverse subsidence by accreting peat soils and sequester carbon. The multi benefit project will also provide new wildlife habitat and help reduce the risk of flooding.

Louis also noted that TNC submitted a pre-proposal to the LCC to develop a web-based tool to help land managers adapt to climate change by modifying their conservation plans, and that this pre-proposal was accepted.

#### **5. Baylands Ecosystem Habitat Goals Update**

Letitia Grenier reported on the progress of the Baylands Ecosystem Habitat Goals Technical Update. This two-year project is just beginning, and seeks to synthesize existing scientific knowledge on regional climate change effects on the Baylands to develop recommendations to increase their resiliency (retain their essential structure and function).

This project will focus on the ecological value of baylands, *i.e.*, their ability to support wildlife and other ecosystem services, in a changing climate (particularly in the face of sea level rise). Focal topics will include: persistence of tidal marshes and mudflats, to be evaluated using marsh accretion models; shoreline migration, to be evaluated using marsh migration models; and head of tide resiliency, for which the evaluation will focus on habitat connectivity and exchange of materials at creek mouths. Letitia noted that the upland ecotone, which was not a focal topic in the original study, will now be considered as marshes will be squeezed up against the uplands. In addition, the project will address the ability of wetlands to sequester carbon and will also likely address the impact of acidification of Bay waters on baylands habitats.

Letitia briefly summarized what this project would and would not involve:

- 1) The restoration goals of the original report will not be revised, although the information gathered can be assessed to see if changes need to be made.
- 2) The goals update is not intended to be a policy document; it will be a technical resource that can inform future management decisions. The report will include a section about how agencies are using the original goals report to help structure management decisions.
- 3) This project will not include a big public involvement effort, but the scientific community will be involved throughout. There will be a public outreach component at the end. Public outreach will be focused on local governments, water utilities, and flood control districts to make sure they are aware of the report's findings.
- 4) No new fieldwork will be conducted for this project, but information from current fieldwork will be used.

Letitia noted that this project will rely on groups of local scientists to help develop the content. An independent science review panel will be convened to provide overall scientific oversight and review.

The first steering committee meeting has already taken place. The first facilitated workshop will be held on June 6<sup>th</sup>, 2012. Letitia noted that she would send out a draft list of invitees to the BAECCC Google group and requested that people contact her ([letitia@letitia.org](mailto:letitia@letitia.org)) with suggestions for additional participants.

## **6. Project updates**

### **a. Our Coast Our Future**

Kelley Higgason reported on the status of the *Our Coast Our Future* (OCOF) project, a stakeholder driven process to provide Bay Area natural resource managers with online tools to help plan for sea level rise and increased storminess. Kelly noted that a [workshop](#) to provide a

forum to learn about existing sea level rise projects in the San Francisco Bay and to look at existing tools to help shape the OCOF decision support tool would be held on May 23<sup>rd</sup>. A Save the Date was sent to the BAECCC Google group.

OCOF began in 2010 with a focus on the outer coast, and additional funds were secured in 2011 to expand the project area into San Francisco Bay and provide increased technical assistance and support for users. With this expansion, the project area now covers all 9 Bay Area counties. A prototype for the outer coast decision support tool is in development and a focus group will meet on May 15<sup>th</sup> to test the tool and provide feedback. A final version of the outer coast tool is expected by fall of 2012, with the addition of the Bay tool by summer 2014.

Kelley noted that managers would be able to use the OCOF decision support tools to obtain physical and biological data and information for use in planning, such as for future restoration sites. The USGS is creating the underlying model that provides sea level rise and storm surge scenarios, with projected elevations provided in 25 cm increments. Inundation maps will give projections that account for wave heights, land movement, and erosion, and information on wildlife impacts (including salinity incursion) and critical infrastructure that might be affected can be overlain. An advisory group for the Bay will be convened to identify the management issues upon which the tool outputs and capabilities will focus.

## **b. Living Shorelines**

Marilyn Latta provided an overview of the San Francisco Bay Living Shorelines Near Shore Linkages project, a multi-objective multi-habitat pilot restoration project focused on the subtidal Baylands ecotone. The goal of the project is to evaluate the effectiveness of natural bank stabilization and habitat restoration techniques (in place of sea walls and rip rap) to reinforce the shoreline, minimize coastal erosion, maintain coastal processes, and improve habitat on the lower wetland edge.

The pilot project uses native oyster and eelgrass restoration to buffer the shoreline edge at two half-acre sites in San Rafael and Hayward. The oyster and eelgrass restoration will occur together at each site due to the synergistic interaction of the species (*i.e.*, oysters filter water and make more light for eelgrass). Two different methods of eelgrass restoration and five types of oyster substrate will be used in the experimental treatments. Monitoring of physical processes, water quality, bathymetry, eelgrass habitat, oyster reefs, and avian, fish, and invertebrate species will be conducted for five years following implementation to evaluate habitat enhancements under the different treatments.

Marilyn noted that even oyster shell is considered fill and impacts of implementing this type of restoration will also be evaluated. She emphasized that this phase of the project is experimental, and before moving forward with a large-scale project it is necessary to understand what does and does not work for restoration. There is a heavy focus on monitoring in this phase.

A stakeholder meeting will be held May 24<sup>th</sup>, 2012. Permits are expected by the end of May and the oyster component of the experiment will be implemented in June and July 2012, followed by

eelgrass planting in July and August. This project is currently funded for two years, but proposals are being prepared to extend funding to five years. A goal of the project is to share preliminary findings in annual updates.

### **c. JPC Climate and Energy Resilience Project**

Bruce Riordan described four updates to the Joint Policy Committee Bay Area Climate and Energy Resilience project:

1. A web-published report summarizing Bay Area climate change adaptation impacts and vulnerabilities, potential adaptation strategies, and potential stakeholders will be available June 1st. The report is based on existing documents and some newly collected data.
2. A workshop will be held June 7<sup>th</sup> to foster advanced thinking on key climate change challenges in the region and how to shape a Bay Area collaborative and state program.
3. A set of briefings will be held with regional leaders from different sectors, with the intent of creating a unified, positive and compelling story useful to a number of different groups about what we are trying to achieve and what the future of the Bay Area looks like. Bruce noted that this project seeks to mainstream scientific findings into the planning processes.
4. The JPC is pursuing planning grants from foundations with the purpose of integrating the goals of future regional prosperity and adapting to climate change. Bruce noted that a cross section of “key players” from foundations, universities, and business groups in the region can be brought together around the theme that climate change resilience planning is not only an environmental issue but is essential to the economic future of the Bay Area.

### **d. Ecotone restoration and protection decision support system**

John Klochak described a USFWS project to develop a pilot-scale salt marsh-upland ecotone identification, restoration and protection prioritization tool. The salt marsh-upland ecotone was selected for study because it is important to a variety of sensitive species but is one of the least understood bayland habitats. Given the landward marsh migration expected with climate change, the salt marsh-upland ecotone has become a high priority in the USFWS Tidal Marsh Ecosystem Recovery Plan.

The pilot project will focus on portions of Santa Clara and Alameda counties where historical vegetation has been mapped. The project will define the ecotone in terms of biotic/abiotic characteristics (elevation, adjacent habitats, vegetation, soils, etc.). The current ecotone will be mapped using a combination of existing data sources, aerial photos and satellite imagery, and ground truthing and will be translated into a series of GIS layers.

Protection and restoration prioritization protocols will be developed from measures of habitat quality, level of existing protection, known stressors and threats, identified needs, and other factors. John noted that prioritizing for restoration would be challenging, as many sites in the

project area consist of levees and restoration would require creating an ecotone at the edge of the bay.

Christina Sloop noted that there is a lot of interest in taking the project to the next level-- to the North Bay and ideally all around the bay.

## **7. Presentations**

### **a. Shoreline resilience studies in San Francisco Bay**

Robin Grossinger of the San Francisco Estuary Institute presented preliminary findings for the Historical Ecotone Project, which is focused on mapping historical tidal-terrestrial ecotones in the South Bay to inform marsh buffer acquisition and restoration as part of a decision support system in development by the USFWS.

Robin described shorelines as being comprised of a “foreshore” region—the area of tidal marsh transition to mud flat/low water, and a “backshore” region—the area of transition from tidal marsh to upland habitat. The Historical Ecotone Project is focused on the backshore region. Robin noted that the tidal-terrestrial ecotone is a critical zone for estuarine transgression and may be the biggest missing piece of the tidal marsh system.

Little information is available about what historical San Francisco Bay ecotones actually looked like. Robin noted that we tend to think of the ecotone as small weedy area, but it was probably much more than that. The ecotone project seeks to answer the following questions: 1) What estuarine and terrestrial habitat types comprised the South Bay ecotone; and 2) How broad was the estuarine-terrestrial ecotone along the South Bay?

Through an analysis of historical maps, the project team was able to put together a picture of the landscape circa 1850. Preliminary findings indicate that the South Bay historical ecotone was characterized by the following habitat transitions: seasonal wetland-tidal marsh (69%); grassland (riparian)-tidal marsh (18%); grassland (hillslope)-tidal marsh (10%); willow thicket-tidal marsh (2%), and perennial freshwater-tidal marsh (1%).

Next steps in the project, which are not yet funded, would explore the ecological functions each of these habitat types provided and identify opportunities for restoration. A set of conceptual models describing what slope, soils, and hydrology would be necessary to create the desired ecotones will be developed. The project will also be extended to the North and Central Bay.

Julie Beagle of the San Francisco Estuary Institute presented preliminary findings from the Shoreline Change study, which is focused on producing the first sub-regional assessment of short- and long-term rates of marsh erosion and progradation (lateral increase in extent) by analyzing change in shorelines over time in the North Bay. This analysis evaluates the “foreshore” region of the shoreline and is a pilot project.

This study seeks to answer the following questions: what are the lateral direction and rates of change of the shoreline over the short and long term; and what are the patterns and implications of these trends for shoreline resilience?

Julie noted that extensive development since 1850 has resulted in major alteration to the shoreline, including significant loss of tidal marshes in the study area and changes due to increased sediment delivery from hydraulic mining. Change to the shoreline has also occurred over the short term, over the period 1993 to 2010, due to factors such as bay fill and construction of groynes and breakwaters. There is increasing concern about marsh erosion due to a deficit of sediment supply and deposition. Information from this study will help inform efforts to determine where marshes can persist or migrate in the face of sea level rise.

Julie gave an overview of the methodology used in the study. A variety of data sources, including Digital Orthophoto Quarter Quads, aerial imagery from the National Agriculture Imagery Program (NAIP) and from SFEI, and Bing maps were used to analyze 1894, 1994, 2010 shorelines. Field validation was conducted to determine where to draw the lines for transition zones. Field studies revealed that a distinction had to be made between low, very new marsh and harder, more established edges. The project seeks to create a repeatable process for mapping marsh edges, and a decision tree for how to define marsh edges within the GIS context that uses four classes of shoreline has been developed and is in technical review.

Preliminary findings indicate a very dynamic shoreline. There has been a wide variation in the amount of marsh erosion and progradation since the 1990s around the bay margin. For example, a portion of the shoreline south of the Novato Creek mouth shows erosion of up to three meters per year over the past 16 years, while the Highway 37 marsh is rapidly prograding. Creek mouths appear to be prograding and erosion is occurring up against levees.

Once the digitized shorelines are complete, they will be analyzed using the Digital Shoreline Analysis System (DSAS), a tool developed by the USGS to evaluate distances and rates of change between shorelines. The DSAS tool will be used to create a net erosion output for the entire North Bay and will be used to determine if erosion is occurring chronically or episodically. Trends of shoreline change with regard to wind and wave energy will also be evaluated.

The mapping methodology will be complete and the shoreline digitized by spring 2012 and the DSAS analysis will occur in summer 2012. The products from this project are expected to be available in 2013.

## **8. Management questions and research priorities for climate change and the baylands**

San Francisco Bay Joint Venture (SFBJV) science coordinator Dr. Christina Sloop presented on the progress of phase II of the SFBJV Monitoring and Evaluation Plan, focused on wetland ecosystems, including SF Bay & outer coast estuary habitats, riparian creeks and streams and seasonal wetlands. The Joint Venture science working group is currently developing a framework for monitoring SF Bay tidal marsh habitats. This regionally coordinated framework will assess the status and trends of target ecosystems and species, and vulnerability to threats,



and will evaluate the effectiveness of conservation delivery and management efforts by SFBJV partners. The partnership is ultimately interested in evaluating change over time and assessing whether conservation and management strategies work to inform conservation planning and decision making.

Christina noted that there is a need to conduct a sub-regional (South Bay, Central Bay, San Pablo Bay, and Suisun Bay) landscape-scale analysis of tidal marsh systems and that a classification for the suite of tidal marsh systems, including fully tidal, muted tidal, managed, and newly created, slowly evolving restored marshes (created by opening up levees in the last decade), must be considered in the development of indicators and conservation objectives.

The projected climate change effects her project will evaluate include: sea level rise; increased frequency and intensity of storms; changing precipitation rates and associated river discharge/flooding patterns; changes in spring/summer salinity patterns and surface water temperatures; and increased air temperatures.

Of particular concern to managers in the near term (before 2050) are extreme climate events that will have impacts on sediment dynamics and marsh sustainability and the combined impacts of storm frequency and sea level rise on target avian species. Christina noted that identifying the quantity and quality of high tide refugia is a critical need.

In the long term (2050-2100), uncertainty about climate change threats to tidal marsh function increases. Christina noted that managers are concerned that available data from other regions may not be appropriate for making local management decisions. She provided a summary of the types of local-scale projections managers need to determine where resources should be allocated, including: rates and levels of sea level rise; tidal marsh elevation changes and transgression; “hot spots” of suspended sediment concentration; salinity regime and associated vegetation changes; vulnerability of evolving marshes in subsided baylands; potential for marsh systems to migrate inland; and target species vulnerability, status and distribution.

Immediate research needs include an evaluation of localized vulnerability of target wildlife to extreme storms and tides, including related impacts from changes in predation and nesting success. Also important is identifying regions with adequate suspended sediment to implement tidal marsh restoration, and assessing the cost to restore subsided areas where sediment augmentation is required. Also identified as priorities are devising a method for assessing shoreline resilience to sea level rise and extreme storms and devising management options for boosting resilience.

Christina noted that in order to be successful in the long-term we must determine what we want San Francisco Bay to look like post 2050 and develop and implement a regional adaptive plan now, otherwise opportunities to keep up with sea level rise and buffer other climate change impacts will be lost.

## **9. Review of action items, other business**

Andy reminded everybody that the next BAECCC meeting will be June 28<sup>th</sup>, and that it will focus on terrestrial habitats.

### **10. Adjourn**

The meeting was adjourned at 2:00.