



## Bay Area Ecosystems Climate Change Consortium

**Wednesday, June 29, 2011, 10:00 am - 2:00 pm**  
Conference room, Bay Conservation and Development Commission  
50 California Street, 26<sup>th</sup> Floor, San Francisco, California 94111

### Meeting Summary

---

#### Attendees:

Ellie Cohen, *PRBO Conservation Science*  
Andrew Gunther, *BAECCC Executive Coordinator*  
Kelley Higgason, *Gulf of the Farallones National Marine Sanctuary (via Teleconference)*  
Maria Brown, *Gulf of the Farallones National Marine Sanctuary*  
Sara Moore, *UC Santa Cruz*  
Marilyn Latta, *CA State Coastal Conservancy*  
Sarah Allen, *National Park Service*  
Steve Schwarzbach, *US Geological Survey*  
Wendy Goodfriend, *Bay Conservation and Development Commission*  
Beth Huning, *SF Bay Joint Venture*  
Lisa Micheli, *Pepperwood Foundation*

Heather Kerkering, *Central/Northern California Ocean Observing System (via Teleconference)*  
Bruce Riordan, *Joint Policy Committee*  
Daphne Hatch, *Golden Gate National Recreation Area (via teleconference)*  
Erin Chappell, *Department of Water Resources (via teleconference)*  
Deanne DiPietro, *Sonoma Ecology Center*  
Bettina Ring, *Bay Area Open Space Council*  
Robin Grossinger, *San Francisco Estuary Institute*  
David Loeb, *Bay Nature Institute*  
Will Travis, *Bay Conservation and Development Commission*

#### 1. Welcome/Introductions

The meeting was convened at 10:10 AM

#### 2. Review agenda

An update from Beth Huning regarding San Francisco Bay Joint Venture Monitoring and Evaluation Program was added to the updates section of the agenda. Andy noted that Kelley Higgason and Amber Paris would be joining the meeting via teleconference around 11 AM to provide updates. Deanne DiPietro offered to provide a brief update about the Adaptation Commons project recently funded by the LCC if time allowed.

## **Information Items**

### 3. Policy Updates

Andy reported that the Steering Committee unanimously elected Ellie Cohen to serve as their Chair to assist the Executive Coordinator with developing agendas for meetings of the Steering Committee.

Andy then briefly reviewed the draft policy for identifying BAECCC-affiliated projects that was attached to the agenda. There were not comments on the policy, and Andy requested that if BAECCC participants had further thoughts on the matter they should provide comments to him via email.

### 4. State of the Estuary Conference

Andy provided a brief history of the BAECCC sessions to be held at the State of the Estuary Conference, noting that the organizing committee for the conference wanted a bit more focus on the Bay and less on upland and ocean habitats as originally proposed by BAECCC. There will be two sessions on Climate Driven Ecological Change and Its Management Implications that will be held on the afternoon of September 20<sup>th</sup>. Andy described the program, which should be available soon on the conference [website](#). Robin noted that there will also be a session on resilient watersheds with scientists from around the West speaking on how watersheds have responded to climate change in the past and what that can tell us about being resilient to future climatic changes.

### 5. Program updates

#### a. The Living Shoreline Project (M. Latta)

Marilyn first described the Subtidal Habitat Goals project, completed in 2010, which includes recommendations for habitat connectivity and shoreline softening via Living Shorelines approaches. The Subtidal Habitat Goals project was jointly sponsored by the Conservancy, NOAA, BCDC, and SFEP, with 75 other participating entities. The project seeks a net improvement of subtidal habitat function in the Bay; with the habitat types examined being submerged aquatic vegetation (focus on eelgrass), shellfish (focus on the native oyster), macroalgal communities, rocky substrate, soft bottom substrate (sand and mud/shell mix considered separately), and artificial structures (more information, including guiding principles and conceptual models, is available at the [website](#)). After implementation of projects in the coming decade, the plan is to conduct a review of the Project in 2020.

The project considered climate change in its planning, and Marilyn noted that Science Advisor Dr. Wim Kimmerer prepared an assessment climate change impacts for their report ([Appendix 2-2; Report on Climate and Other Long-term Changes Likely to Affect the Future of Subtidal Habitats](#)). The Living Shorelines Project is currently under development by the Conservancy, and will be testing methods to restore/enhance the boundary between the subtidal and the intertidal at three locations in the estuary with one goal being to improve the capacity of these regions to respond to climate change (particularly sea level rise and related physical changes). The study sites will be at Corte Madera Ecological Reserve, Eden Landing Ecological Reserve, and the Eastshore State Park, where the subtidal region will be enhanced through use of eelgrass plantings and planting of substrate for native oysters. These “shoreline softening” approaches have been utilized on the east coast for over two decades. The goal of these pilot

projects will be to assess whether oyster and eelgrass structures can have a positive benefit to sediment stabilization, wave attenuation, and protecting the adjacent shoreline edge from erosion. The project will set up replicated treatments to answer questions of scale, permitting feasibility, and suitability to local environment conditions. Each site will have a robust monitoring component to evaluate site responses to the manipulations.

Ellie asked if the project was considering acidification, as she noted some studies suggesting that acidification might be more pronounced in estuaries than in the ocean. Marilyn noted that pH may be included in the final monitoring design, and that there is a SFBNERR proposal to investigate how pH changes will impact native oysters.

Andy suggested as they are selecting sites that are under active intertidal and supratidal restoration, they should consider how these activities might influence their study plots, as a key goal will be to generalize from their study plots to the rest of the estuary.

Heather Kerkering noted that the California Current Acidification Network (C-CAN) is getting organized, and a workshop is occurring in Southern California on July 6-7 with the goal of developing a roadmap for integrating ocean acidification observing activities on the US West Coast that ensures balanced participation of academic, governmental, and commercial stakeholders. She indicated this network includes the aquaculture industry. This network grew out of a [workshop](#) in the impact of ocean acidification on shellfish held in 2010. She also noted that NOAA has recently developed an [Ocean Acidification Research Plan](#).

#### b. Adapting to Rising Tides (W. Goodfriend)

Wendy gave a brief overview of the [Adapting to Rising Tides](#) (ART) project. The goal of ART is to explore how shoreline communities can become more resilient in the face of sea level rise. The study area is Emeryville to Union City, and they are evaluating vulnerability for 12 asset categories for five climate change impacts (new inundation, wave/levee overtopping, groundwater elevation, salinity intrusion, tidal flooding). They hope to provide a process that others can reuse or refine for their own vulnerability assessment. BCDC is working with AECOM to develop higher resolution inundation maps that include the extent and depth of flooding, some inclusion of wind/wave effects, and shoreline protection structures (may or may not be levees). Wendy noted that many vulnerability assessments the project team has examined have not been as transparent and rigorous as is the goal for ART.

The project will examine two sea level rise scenarios: a mid-Century scenario that will likely be an extreme event scenario including the impact of a 100-year storm plus wind and wave effects, and end of century scenario that will likely be the new high tide. They are using the USGS Trim2D model outputs in combination with the FEMA MIKE 21 SF Bay model, neither of which resolve changes in geomorphology, to develop revised and refined inundation maps for the study area.

Once the vulnerability assessment phase is complete, the ART project team and the working group will examine adaptation strategies and options. The goal is to include not only options for physical changes such as shoreline armoring, but also economic and governance options that would promote resilience.

Steve Schwarzbach noted the importance of modeling future extreme events, as it is likely many of the most important impacts will be associated with these events. He suggested that a presentation at a future

BAECCC meeting by USGS of the results of their [ARkStorm scenario](#) regarding a major storm (10 feet of rain) and its impact on California. Wendy also noted that BCDC is conducting the Corte Madera Innovative Wetland Adaptation Project, and suggested this should be part of an update at a subsequent BAECCC meeting.

c. Dept. of Fish and Game Climate Change program (A. Paris)

Unfortunately, Amber Paris was delayed and unable to join the teleconference. Presentation of an update from the Department of Fish and Game regarding their climate change activities will be rescheduled for the September BAECCC meeting.

d. PACE Fellow (K. Higgason)

Kelley noted that USGS and Gulf of the Farallones National Marine Sanctuary (GFNMS) prepared a joint proposal to the University Corporation for Atmospheric Research (UCAR) to host a Postdocs Applying Climate Expertise (PACE) Fellow, and the proposal was approved. After reviewing several applications, Dr. Benét Duncan was selected to conduct the project that will identify physical and biological climate change indicators for the Gulf of the Farallones region and develop a subsequent monitoring plan. Due to issues related to the federal budget, it has been unclear if funding would be available for the two-year fellowship. It now appears that funding has been secured through NOAA's Climate Program Office and National Climatic Data Center, and Dr. Duncan will be starting her project on September 27 (she will be located at the GFNMS offices and co-mentored by GFNMS and USGS).

e. Our Coast Our Future (K. Higgason)

Kelley reported that the Our Coast Our Future (OCOF) Coastal Manager Scoping Workshops have been scheduled for August 23<sup>rd</sup> and 25<sup>th</sup> and a Save the Date notice has been distributed. The goal of these workshops is to solicit management information needs for an online decision support tool to plan for and respond to sea level rise and storm hazards from Half Moon Bay to Bodega Head. A detailed announcement with online RSVP instructions will come out in late July. USGS is planning to have their new 2-m horizontal resolution digital elevation model available for the outer coast by the time of the workshops, including fine resolution nested models for Tomales Bay, Drake's Estero, Bolinas Lagoon, Muir Beach, Ocean Beach, Linda Mar Beach, and Pillar Point Harbor.

f. Beth Huning, San Francisco Bay Joint Venture

Beth Huning made a brief presentation regarding the Monitoring and Evaluation plan being prepared by the San Francisco Bay Joint Venture (SFBJV) under the direction of Dr. Christina Sloop. Once completed, the plan will become a key element of the SFBJV implementation plan. The SFBJV is planning to integrate the Baylands Habitat Goals update into the Monitoring and Evaluation plan.

The SFBJV has sought the input of a wide array of interested parties, including holding a specific workshop regarding climate change. High priorities that have been identified for monitoring based on stakeholder input include habitat quantity and quality, and protection of key species.

A draft plan was reviewed at a workshop in May (50 participants), and a public review draft will be available in August for comments. Those interested in reviewing the draft plan should contact Dr. Sloop ([csloop@sjbayjv.org](mailto:csloop@sjbayjv.org)) by July 15 (the review period will be August 1-17).

## 6. Fundraising

### a. SFBNERR Sea Level Rise Proposal (K. Higgason)

Kelley reported that the San Francisco Bay Estuarine Research Reserve has requested a full proposal for a project that would expand Our Coast Our Future inside San Francisco Bay. This proposal would bring Patrick Barnard's sea level rise modeling work inside San Francisco Bay, and allow more extensive assistance to users of web-based planning tool that is presently underdevelopment. The full proposal is due on July 14.

## 7. Determine dates for future BAECCC meeting dates for 2011-12 (A. Gunther)

The Steering Committee recommended that general BAECCC meetings be held on the following dates:

September 28, 2011

January 26, 2012

April 26, 2012

June 28, 2012

Andy asked if anybody knew of conflicts with these dates, such as professional conferences that would draw many BAECCC participants. As none were noted, the above dates are now the established schedule for BAECCC meetings.

## 8. Lisa Micheli, Executive Director, Pepperwood Foundation

### *A Research Framework for Bay Area Conservation and Climate Adaptation*

Lisa Micheli presented the initial results of analyses conducted by the Terrestrial Biodiversity Climate Change Collaborative (TBC3; formerly known as the "Ackerly Group"). Their conceptual research framework is to examine projections of climate and future hydrology to project vegetation cover, habitat structure, and species distributions.

This work is utilizing the downscaling products of Lorraine and Al Flint of USGS, who now have temperature and precipitation data from 1896 to the present on a 270m grid. These data demonstrate an average temperature increase of 1.6 - 4°C in the Bay area over the last 30 years. They have also downscaled to this grid projections for temperature and precipitation to 2100 from two climate models, the Parallel Climate Model (PCM) of National Center for Atmospheric Research and the Department of Energy and the CM2.1 model from NOAA's Geophysical Fluid Dynamics Laboratory (GFDL). They looked at two IPCC scenarios (A1 [business as usual] and B1 [mitigated emissions]), and linked their downscaled projections to a hydrological model (Basin Characterization Model).

The PCM model tends to project a somewhat drier future for the North Bay counties, while the GFDL model projects a somewhat wetter future compared to present conditions. Their interesting findings

include: (1) there is more uncertainty in future precipitation than future temperature, (2) models predict reduced early and late season runoff in the future, (3) even under the wetter future (GDFL model), watersheds in the region get drier because of warmer temperatures and longer periods of time between larger rainfall events, (4) this leads to climatic water deficit (the amount of additional water that would have evapotranspired if it had been available; a measure of drought stress) that increases faster than temperature, and may control distribution of plant communities, and (5) this implies higher irrigation requirements with changes in the type of crops grown.

#### 9. Bruce Riordan, Joint Policy Committee

Bruce Riordan described an eight-month project recently approved by the [Joint Policy Committee](#) (Association of Bay Area Governments, Metropolitan Transportation Commission, Bay Area Air Quality Management District, Bay Conservation and Development Commission) to take the first steps for a Bay Area Climate and Energy Resilience Strategy.

This project seeks to have leaders in the region (business, government, foundation, and not-for profit) understand (1) key climate change impacts now and future, (2) why planning needs to happen now to protect public health and support economic development, and (3) options for funding and developing Bay Area resilience strategies.

The project will be implemented in five phases. First, there will be a summary of Bay Area climate impacts. Bruce stressed this will call upon already completed analyses, not be a research project on its own, and he fully expects the work of BAECCC participants will be highly valuable. The second step will be to identify existing players and collaborations in the various sectors. BAECCC will be a critically important partner in this stage. The third step will be to identify potential adaptation strategies, again calling on analysis already completed by State of California, National Academy of Sciences, SPUR ([Climate Change Hits Home](#)) and other organizations.

The fourth step is to identify required resources and decision-making structures, and this will be a key focus for the project. How can the necessary decisions be made, and who makes them? This analysis will start by examining structures and resources used by New York City, Chicago, London and others that have undertaken adaptation planning. The project will then look at existing state, regional and local planning processes, including examining how to plan resilience for human and natural systems together. Once again, Bruce indicated that he expects BAECCC will be a key player in these discussions.

The last step is to bring this information to a diverse group of Bay Area leaders and engage them in discussing the issues. To this end the report will prepare compelling stories that will draw in regional leaders and their constituents.

Will Travis noted that it is essential to tell the story of climate change and ecosystem change in a way that is accessible and meaningful to the audience. Andy noted that a key early communication product for BAECCC will be an analysis of ecosystem goods and services provided by the Bay and the potential impact of climate change on these services.

#### 10. Adjourn

The meeting was adjourned at 2:05 PM.