Bay Area Ecosystems Climate Change Consortium
Thursday, June 28th, 2012, 10:00 am - 2:00 pm
Conference room, 26th Floor, Bay Conservation and Development Commission
50 California St, San Francisco, California 94111

Meeting Summary

Attendees:
David Ackerly, *UC Berkeley*
Joy Albertson, *US Fish and Wildlife Service*
Whitney Albright, *California Department of Fish and Game*
Adrien Baudrimont, *SFEP*
Maria Brown, *Gulf of the Farallones National Marine Sanctuary*
Louis Blumberg, *The Nature Conservancy*
Bill Brostoff, *US Army Corps of Engineers* (via teleconference)
Annie Burke, *Bay Area Open Space Council*
Laura Castellini, *NPS-GGNRA*
Rebecca Fris, *US Fish and Wildlife Service* (via teleconference)
Matt Gerhart, *CA State Coastal Conservancy*
Wendy Goodfriend, *Bay Conservation and Development Commission*
Andrew Gunther, *BAECCC Executive Coordinator*
Kelley Higgason, *Gulf of the Farallones National Marine Sanctuary*
Gary Knoblock, *Gordon and Betty Moore Foundation* (via teleconference)
Jaime Kooser, *SF Bay National Estuarine Research Reserve*
David Loeb, *Bay Nature Institute*
Lisa Micheli, *Pepperwood Foundation*
Sara Moore, *Sonoma State University*
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* (via teleconference)
Nat Seavy (standing in for Ellie Cohen), *PRBO Conservation Science*
Nancy Schaefer, *Land Conservation Services*
Katherine Smetak, *Center for Ecosystem Management and Restoration*
Caroline Warner, *San Francisco Bay Joint Venture*
Gerry Wheaton, *NOAA*

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

Participants introduced themselves and the interests of their organization in BAECCC. Andy Gunther circulated BAECCC's new fact sheet. David Lowe announced that the new issue of *Bay Nature* includes an article on climate change featuring lessons learned from Mount Hamilton as well as a special section on the habitats of the Point Reyes National Seashore in celebration of the park's 50th anniversary.

2. Review agenda

No new items were added to the agenda. Nat Seavy noted that Ellie Cohen would be unable to attend the meeting.

3. Presentations

Translating Climate Science to Action

Kirk Klausmeyer of The Nature Conservancy presented a simplified approach for land managers to translate climate change science into management actions. Getting land managers to think about potential future climate change impacts presents a challenge because managers must often focus on addressing immediate, acute threats that affect population viability. Kirk noted that an effective climate change planning process would be simple, easy to understand, and related to conservation actions that managers are currently employing.

Kirk provided an overview of a recent study by the Nature Conservancy entitled *Landscape-scale Indicators of Biodiversity's Vulnerability to Climate Change* as an example of a climate change planning process that managers could easily employ. The study demonstrated how to use climate impacts data and landscape-scale vulnerability assessments to create action plans. The study's main assumptions were:

- Assessing vulnerability for all species in an area is uncertain and costly—it is necessary to focus on a higher level (*i.e.* the landscape scale);
- Landscape characteristics influence resilience of many species—there are microclimates, coastal proximity, north facing slopes, riparian corridors, seeps and springs, that plants and animals can take advantage of;
- Ecosystems will be stressed if climatic conditions exceed historical extremes; and
- Habitat loss and fragmentation will increase species vulnerability to climate change—species have endured climate change in past, but having to endure barriers such as crossroads and subdivisions increases stress.

The study's first step was to develop a map depicting future projections of "climate stress" across the state of California. The map layer was created using a composite of several variables, including projections for maximum summer and winter temperatures and annual precipitation. The stress rating (low to high) for a given area was determined based on the number of climate models that were outside the historical range of variability. Next, landscape resilience was evaluated for the entire state by mapping together features in the landscape—including topographic diversity, elevation gradients, riparian corridors, distance to the coast, and distance to water—that could provide refuge to species. Areas of habitat loss and fragmentation were then evaluated.

This information was then combined into one index for adaptation action based on level of vulnerability to which land managers could quickly refer. In areas of low vulnerability, no change in management actions would need to occur. In areas of moderate vulnerability, the management action(s) would focus on the main element causing vulnerability to the landscape and might consist of creating wildlife corridors or restoring habitat. In areas of high vulnerability, it may be necessary to reassess goals and take an action such as facilitating habitat

transitions from one species to another. Kirk noted that the model framework could be applied to the subwatershed or property level.

Kirk briefly summarized the results of applying this method of adaptation planning to the Mount Hamilton range. Results indicated that the interior of the range has great resilience due to the network of protected areas that creates a buffer around San Jose, and that current management actions could be employed to minimize threats. Projected climate stress in the area surrounding Gilroy and Hollister was slightly higher and management actions would involve restoring and connecting habitat, with a focus on re-establishing the riparian corridor along the Pajaro River.

Kirk noted that many questions remain, including: how to engage busy and stressed land managers; how best to reassess goals for areas of high projected stress; and how to apply the model framework to an aquatic setting.

4. Group Discussion: "Climate Smart Conservation Workshop"

The discussion provided an opportunity for a wide-ranging review of issues related to designing and conducting the workshop. General topic areas included suggestions for the workshop structure and process, challenges that the workshop must address, and specific "climate smart" actions already being implemented that could be highlighted as case studies.

Challenges that must be Addressed by Workshop
It was noted that translating "climate smart principles" into "climate smart actions" will be very challenging. Individual landowners/agencies face different regulatory and management incentives and requirements, operate at different spatial and temporal scales, and have varying planning and implementation processes that are at different stages of execution. The workshop will need to provide a broad array of information in different forms to be widely meaningful, while being sensitive to the experience of many managers that there is "too much information" in relation to climate change and not enough authoritative guidance on how this information can be applied.

A key challenge is to help managers identify indicators that can be monitored, and threshold or benchmark values for these indicators that should trigger actions. This likely requires new monitoring, and maybe new science, to understand what is "climate smart."
It was also noted that the workshop should help attendees with the concern about whether they have the time to learn about being "climate smart" and the time to apply what they've learned in their management geography.

Suggestions for Workshop Structure
A suggested format that arose from the discussion was to introduce "climate smart" principles, describe some existing strategies, and then use case studies of implementation to provide examples of being "climate smart" in the context of planning. Participants did not see a need to review climate change impacts in any detail, and Rebecca Fris indicated that a soon to be released survey of natural resource managers conducted by the LCC supports this focus on "what can be done" rather than "what will happen."

Existing principles that could be presented include those developed by The Nature Conservancy, the Resources Legacy Foundation, and possible material from the revised California Climate Adaptation Plan that is currently in review (participants felt principles should be presented for purposes of information and setting the stage at the workshop, but not discussed/reviewed). Available strategies that could be presented include those from the Gulf of the Farallones National Marine Sanctuary, The Nature Conservancy, and the National Park Service (NPS "toolkit").

Participants also suggested that BAECCC should be very clear at the beginning of workshop design regarding the intended audience for the workshop so that these people can be kept in mind as the workshop structure is devised.

Given the challenge noted above of managers feeling overwhelmed by the amount of climate change information and the task of considering this new problem, it was suggested that the workshop structure be formulated as integrating climate change into one's existing planning/management process. Climate change presents uncertainty, but so do many other factors that planners have been addressing for years. In this way, it is just a new factor to consider rather than an entirely new process, although considering climate change may require information not currently available to individual managers.

Suggestions for Workshop Process
In keeping with the idea of climate change as part of one's existing planning process, participants thought that it would be possible to present the case studies as parts of an "adaptation planning process," possibly using the process presented on the ART website (scope and organize, assess, plan, implement & monitor).

Marina noted that the NERR has conducted trainings for local governments, and their workshop process could be very valuable for BAECCC to consider. In particular, she stressed the importance of having the case studies presented in a consistent format, as this makes it easier for the attendees to engage with several such studies over the course of the day. It was noted that case studies don't have to be local to be effective (*e.g.*, the installation of moveable bathrooms on Assateague Island, N.C., by the National Park Service).

It was also suggested that potential attendees be surveyed ahead of time to determine what they are interested in. The workshop process should also provide opportunities for give and take with attendees, not just speaking at them, and the chance for peer-to-peer information sharing. Bringing scientists to hear/discuss gaps in knowledge that managers need to be addressed also would be valuable, as this is a more effective method of identifying these gaps than having managers posit them in the absence of give and take with scientists.

Specific Adaption Actions Identified
During the discussion several specific examples came up of organizations taking actions (or modifying existing actions) specifically to prepare for climate change. These include:
STRAW is planting different species in its existing re-vegetation program to develop riparian ecosystems that include species adapted to projected future conditions.

National Park Service has altered existing restoration projects in consideration of projected sea level rise, including Giacomini wetland restoration in Tomales Bay and the movable bathrooms on Assateague Island, N.C.

Gulf of the Farallones National Marine Sanctuary is planning shipping lanes based on expected ecological changes driven by future climate

Caroline Warner indicated that SFBJV has several stories of actions planned or taken that are understood to be beneficial in light of climate change even if that was not the original impetus

5. Policy Updates

a. California Climate Adaptation Plan

Nadine Peterson reported on the progress of the 2012 California Climate Adaptation Strategy, the first update to the 2009 Climate Adaptation Strategy. The report will include chapters on agriculture, biodiversity, forestry, land use and infrastructure, public health, transportation, energy, emergency preparedness, fresh water, and ocean and coastal resources, and will provide both sector-specific and cross-sector adaptation strategies. The Coastal Conservancy is involved in the project through the through the OPC, which is a member of the Coastal and Ocean Resources working group.

Nadine noted that because there has been a significant broadening of our understanding of climate change impacts in the past few years, the 2012 update will focus less on background information than did the 2009 report. Rather than repeat the science, the update will focus on how to implement adaptation strategies. The update will emphasize crosscutting solutions and challenges, identify interdisciplinary research needs, and call for increased monitoring. It will include information on extreme events and local populations. The update will also highlight accomplishments to date, and Nadine requested that people provide her with examples of success stories and photos if available.

The individual chapters are being reviewed internally by the authoring agencies and will be available for public review in July. A draft of the full report will be released for public comment in the fall, most likely in November, with the goal of having a revised report by the end of 2012.

Nadine noted that an amendment to CEQA is being drafted to require that climate change be addressed in CEQA analyses. She added that The Nature Conservancy is working on legislation to allow the Coastal Conservancy to focus on adaptation strategies.

b. National Research Council Sea Level Rise study

Nadine Peterson provided a brief summary of the National Research Council's report *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future (2012)*, which was prepared in response to California Executive Order S-13-08. The report describes the severity of projected of sea level rise impacts along California's coast, providing single projections as well as the range for the years 2030, 2050, and 2100. Although projections were based on the IPCC's fourth report, which did not factor in ice melting or permafrost, the study's

findings suggest a serious sea level rise problem, with the most dramatic increase in relative sea level expected south of Cape Mendocino. The report's key findings are available online.

Nadine noted that a recommendation to use the range of projections for planning purposes would not take away from the risk assessment approach. Because the range given was very broad, it will still be necessary to perform risk assessments when deciding what actions to take. She noted that wetlands in California would likely keep up with sea level rise up to a certain point, but by the year 2100, surviving wetlands would need to have a good local sediment supply.

Andy noted that subregional studies on sea level rise, such as the recent study for North Carolina to Massachusetts, will illustrate how differences in sea level rise impacts in different parts of the country.

6. Department of Fish and Game Climate Adaptation Activities

Whitney Albright provided an update on the activities of the DFG Climate Science Program. Key elements of the program include: 1) creating and maintaining partnerships; 2) integrating climate change into DFG programs and policies; and 3) developing products and projects that meet DFG's conservation objectives.

Whitney noted that the program has had great success with national, regional, and statewide coordination and collaboration and has recently begun focusing on improving integration of climate change into DFG programs. As part of this process, the Climate Science Program's website was recently restructured to improve communication of its activities to DFG staff and partners. New tools and resources available on the website include: the stakeholder page, which includes meeting presentations and program documents (*e.g*. the outline for the Biodiversity sector of the CAS); the vulnerability assessment resource center, a "living website" that will be continually updated with natural resource vulnerability assessments specific to fish, wildlife, and habitats; and the climate change case studies page, which highlights DFG's efforts to integrate climate change planning into new and ongoing projects and programs.

In addition, an online climate science training course will be made available to DFG staff and partners in September. The program will include a series of monthly lectures.

The DFG has been designated as the lead for the Biodiversity Sector chapter of the 2012 update to the California Climate Adaptation Strategy. Partners were convened on May 31st to provide input on the initial draft outline of the chapter. A draft chapter will be made available for comment in July and will be updated based on input and circulated again in August.

The DFG is also working to integrate climate change into the State Wildlife Action Plan (SWAP) update, which is to be completed by 2015. The Climate Science Program developed a SWAP climate working group to inform the process. Materials will be posted online on the new SWAP webpage.

7. Project Updates

a. Our Coast Our Future

Kelley Higgason reported on the status of the Our Coast Our Future (OCOF) project. At a sea level rise adaptation planning workshop held in May, OCOF held interactive breakout sessions to enhance development of the OCOF decision support tool. The workshop was well attended, with 80 participants. Presentations from the workshop are available on the PRBO website. A summary report is in preparation and will be posted to the website. Another meeting to inform development of the outer coast decision support tool will be held in August.

For the outer coast element of the project, the Digital Elevation Model (DEM) of the north-central coast is now available. The high resolution DEM for the San Francisco Bay is expected from the USGS in 2013. Version 1 of the outer coast decision support tool will be available in fall 2012 and training workshops will be held in the winter, after which the tool will be expanded to include rest of the San Francisco Bay Area. It is expected that this process will take two years to complete.

b. Flood Control 2.0

Brenda Goeden reported on the status of the Flood Control 2.0 project. BCDC, in collaboration with SFEI and others, received a $1.6 million water quality improvement award. The project will focus on developing efficient methods of transporting the coarse-grained fraction of sediment that gets trapped in flood control channels to areas where it can enhance beneficial uses. The historical ecology of streams and shorelines will be evaluated and flood control types will be classified to apply different techniques of sediment transport. Pilot projects will occur in Novato Creek, San Francisquito Creek, and Walnut Creek and are in various phases of development.

The project will include a national forum to help vet the program. An analysis will be performed to see if it is economically feasible to move the sediment. A guidance document to help promote realignment projects will be developed, and regulatory policies and laws that govern flood control will be evaluated and potentially revised to streamline the process.

c. JPC Climate and Energy Resilience Project

Bruce Riordan reported on the activity of the Bay Area Climate and Resilience project. He noted that three papers were in draft, including: an annotated bibliography of 150 resources on climate impacts research; a summary of key projects and stakeholders that are addressing various climate change topics in the Bay Area; and an educational document on climate change impacts geared toward people from outside the environmental field.

A workshop was held on June 7th in which stakeholders from different sectors in the region developed an 18-month roadmap to help move the region forward on climate change adaptation. The roadmap outlines three key actions: 1) establish a coordinated structure in the region for adaptation; 2) identify and agree on how to mainstream across planning processes; 3) find viable funding for implementation projects.

Bruce noted that the JPC would spend six months working with interested groups to find out what would help BAECCC move forward. They will help identify groups BAECCC would benefit from connecting with and determine how the JPC could help BAECCC's efforts by meeting with various groups.

The JPC formed an unofficial four-region (San Francisco, Los Angeles, San Diego, and Sacramento) alliance of metropolitan climate adaptation efforts. The alliance will hold a two-day meeting in August to develop ideas on how to improve state-regional adaptation coordination.

d. WeedMapper tool from the CA Invasive Plant Council

Cynthia Powell of the California Invasive Plant Council (Cal-IPC) provided a brief description of WeedMapper, a statewide invasive plant mapping tool created by Cal-IPC in collaboration with Cal Flora. WeedMapper was created with the goals of increasing invasive plant management effectiveness, setting management priorities at the landscape level, tracking progress, and justifying funding.

The tool allows the user to view invasive species distribution by USGS quad and obtain information on points of occurrence, species abundance (low, medium, high) and trend (spreading, managed/spreading, managed/decreasing). A regional report can be generated for a species of interest and used to determine the appropriate management action (eradication, containment, surveillance). A suitability map that compares current species distribution with projected distribution in the year 2050 can be generated to help inform management decisions.

WeedMapper allows the user to view information on the data source and leave a comment or add new information. Cynthia noted that the tool relies on data contributors to maintain information.

8. Relevant pending proposals and opportunities

Gerry Wheaton of NOAA Tri-Office (Coast Survey, Geodetic Survey, Center for Operational Oceanographic Products) described the NOAA Hydrographic Collaborative. Their goal is to expand the use of data and information products currently used by the marine navigation community to a broader group of users including the climate change community.

David Lowe noted that the next *Bay Nature* series would focus on climate change management opportunities outside of the Golden Gate are and requested ideas for contributions.

9. Adjourn

The meeting was adjourned at 2 pm. Andy noted that the next meeting would be held on September 27, 2012, and that meetings are also scheduled for January 31, 2013, and April 25, 2013.