

Climate-Smart Adaptation Working Group of the North-Central California Coast and Ocean Meeting Notes

May 27, 2015

Oakland, CA

Meeting Objectives

- Provide initial feedback on proposed scenarios from a management perspective
- Determine the specifics of the group's adaptation planning process, including structure and organization of recommendations
- Based on vulnerability information, develop issue statements and management goals for focal habitats (beaches/dunes, rocky intertidal, estuaries)
- Discuss the implications of the proposed scenarios for the vulnerabilities and management goals of focal habitats

Climate Scenario Strawman Update (Sam)

- At last working group meeting (April 2015), working group developed 12 climate scenarios. Working group participants found it challenging to select important/uncertain climate drivers for the 3 selected habitats (beaches/dunes, estuaries, rocky intertidal).
 - Challenge: Difficulty delineating assumptions vs. drivers
 - Drivers: create scenario (e.g., precipitation, wind, upwelling)
 - Assumptions: can represent a big change, but are constant across each scenario (e.g., sea level rise – it will rise in all scenarios).
 - Once working group develops main scenarios and key impacts, they can then ask: how do SLR and OA play into or alter impacts? What other drivers (e.g., non-climate stressors) affect climate trends?
 - Ocean Acidification: after the April 2015 workshop, one reviewer questioned whether OA should be included as an assumption in the future scenarios. Are OA trends clear enough? Will OA be regionally important enough?
 - Working group member responses:
 - OA will be seen and this study region will feel the effects. There will be an increase in OA due to increasing atmospheric CO₂, but rate of OA increase may be variable and degree of OA may change under different scenarios.
 - Colder water doesn't take as much CO₂ as warmer water
 - OA occurs 2 ways:
 - from land processes/runoff that change input (more important in SoCal)
 - through changes in upwelling (the Northern Pacific has high CO₂; this water is upwelled in our study region, so OA may increase as upwelling is enhanced)

- As you move from shoreline to offshore, variability in OA trends decreases. Coastal waters are very dynamic – hard to predict OA trends and effects.
 - For more information on OA, see Dick Feely’s work
 - Clarification: working group is NOT managing the drivers of each scenario (e.g., runoff, upwelling); working group goal is to manage *within* these different scenarios. The drivers (e.g., wind, precipitation) are out of our control.
 - Correct line of thinking: given a scenario, what would your management priorities be?
- After the April 2015 meeting, working group tasked planning committee with narrowing down scenarios to bring back to the group. Within the original 12 scenarios (drivers: upwelling, wind, and precipitation), there was plenty of overlap. Planning committee goal was to narrow down to 4 distinct scenarios with 2 axes.
 - Planning committee evaluated impacts and decided to label the 2 axes as nutrient richness and erosion. They sent to experts for review, but experts stated that these axes may not adequately reflect the future/may have too much overlap.
 - John Largier proposed new axes: runoff and upwelling. These axes incorporate the nutrients/erosion components originally identified by planning committee and provide distinct scenarios.
 - For definitions of components within runoff and upwelling axes, see slides in scenario strawman update presentation (on working group support page).
- Based on these axes, working group members came up with titles for the 4 scenarios and possible headlines (based on new interactions + previously generated headlines

SAMPLE SCENARIOS

<p>“Cold and Dry”</p> <p>Strong Upwelling</p> <ul style="list-style-type: none">▪ Headlines:<ul style="list-style-type: none">○ La Niña○ Big Drought○ Chilly summers○ Poor for salmonids (reproduction, cooler ocean temperatures may buffer slightly)○ Recreation opportunities abound (except for winter surf)○ Good mammal foraging opportunities, unless upwelling is too extreme	<p>“High Energy All Year”</p> <ul style="list-style-type: none">▪ A little misleading – not necessarily all year. Lots of storms in winter, very foggy in summer.▪ Headlines<ul style="list-style-type: none">○ Deadliest Catch○ See Houston, TX○ Hazardous recreation conditions○ Erosion could threaten haulouts
<p>“Warm and Calm”</p> <p>Weak Runoff</p> <ul style="list-style-type: none">▪ Headlines:<ul style="list-style-type: none">○ Sunny and stale○ Toxic blooms○ Bad for salmonids (reproduction)○ Toxic recreation (estuaries)○ Great but crowded beach days○ Reduced cliff erosion	<p>“Stratification and Plumes”</p> <p>Strong Runoff</p> <ul style="list-style-type: none">▪ Headlines:<ul style="list-style-type: none">○ Homeless and hungry – starving seal populations○ Beach loss

- Scenario Planning Discussion:
 - Temporal analogs: John Largier suggested considering the center of the axes as current day, and to use past analogs to describe some of these scenarios. However, planning committee encourages participants to push further/think outside historical records because climate change will bring about future states with no current analog.
 - Even this year, we are experiencing high variability. Moving from “warm and calm” to “stratification and plumes” (El Niño)
 - Within each scenario, working group members can try to capture current trend to help identify decision/action points
 - Spatial analogs: Can also use spatial analog to think about what scenarios will look like - will region shift to be more similar to southern California? Pacific Northwest?
 - Variability: will have extremes within each scenario. Can’t plan for everything, but identifying robust adaptation strategies that work across different scenarios

with different extremes will allow working group to address extremes the best of our ability.

- Can identify “mean states” within each scenario, and then describe variability from that mean as a way of thinking about potential variability
- Visual tool: a “Ridgeline to Reef” schematic for the sanctuary that broadly describes how climate changes affect the study region would be helpful for developing adaptation strategies.
- Ways of thinking about scenario planning:
 - For scenario planning, you don’t need all the nitty-gritty scientific details. It is a tool that allows you to look at 4 plausible futures, the general impacts/storylines to focal resources under each scenario, and to identify what management options cross those scenarios.
 - Even with uncertainty, there are some changes we are pretty sure will occur. Scenario planning can help you identify common management issues that need to be addressed, and ID no-regrets strategies that work across all scenarios.
 - Scenario planning is just one tool – there are many others, including vulnerability assessments. Using a combination allows you to develop robust adaptation strategies.
 - Our scenario planning process has tried to capture the biggest impacts (bookends), but in a dynamic world, other axes/drivers may become more important with time. This is an iterative process – you can do it over and over again to make sure that your current management aligns with potential future scenarios.
 - You can use scenario planning within your own organization: you can identify key trigger points, and do this over and over as new information becomes available.
- The following working group members volunteered to help flesh out scenarios between May 2015 and the next working group meeting in Fall 2015: Debbi, Joel, Andy, Brenna

Adaptation 101 Presentation (Lara)

This presentation was recorded (see working group support page). Notes here reflect discussion after the presentation.

- Non-climate stressors + adaptation washing: as you evaluate whether your current management actions are appropriate given a changing climate, do not be lured into a false security. Some of your management actions may be appropriate, but that doesn’t mean that you are not vulnerable to climate change and that there aren’t other things you can do to reduce the vulnerability of your resources.
- Evaluation and Monitoring (both of adaptation strategy effectiveness and of climate change impacts to resources) is incorporated in the evaluation step of the Adaptation Ladder of Engagement. But monitoring and communication ideally occur across the whole process.
 - What funding is there for monitoring? State Ocean Council has just started process to create database to track ocean- and climate-related work. Public

comments available until late August. Looking for feedback on how to track various climate work (spatially and temporally).

- Later in the working group process, participants will identify the resources currently available/used for monitoring and/or how current monitoring frameworks can be adapted to inform adaptation
- Adaptation action is imperative, and it's important to avoid paralysis due to uncertainty. Planning efforts/documents will have to be revisited as we have more information, but in the interim and given the information we currently have, we should be able to identify near- and mid-term implementation projects. We can learn from these projects and adapt.
- Protecting space in a changing world – do we need to look south and ask what is coming north into our area?
 - You can – adaptive management allows you to plan for these different events.
 - Threatened and endangered species are challenging to manage as they migrate, but migration could be a positive impact of climate change (e.g., new habitat creation for T/E species from southern regions)
 - Would be beneficial to catalogue how are things are changing, and use that to inform management (an example of how monitoring and evaluation should be incorporated into the entire adaptation process)
- Sharing – any discussion on how this work can be repeated or replicated in Monterey Bay NMS?
 - There are plans to replicate this process in other West Coast sanctuaries.
 - For GFNMS, as we move forward with implementation, there are plans to communicate with Monterey Bay and Cordell NMS, but this outreach could be more explicit.
 - There is also interest in from other NMS. GFNMS hopes to share process and lessons learned.
- California USFWS will soon be updating their State Wildlife Action Plan (USFWS); this will include a VA that incorporates coastal species. Could be useful in future adaptation efforts.

Focal Habitat Issue Statements and Management Goals Report-Back

Also see worksheets on working group support page

- No volunteers for rocky intertidal habitat. Sara and Kelley to organize rocky intertidal evaluation outside of regular working group meetings.

Beaches/Dunes

- Habitat Issue Statement #1: Beaches/dunes may decrease in extent due to SLR, wave action, sediment supply changes, and development blocking migration. Keystone species adversely affected include snowy plover, dune grass/vegetation, shorebirds, and marine mammals.
 - Management implications:
 - Limit development and encourage retreat
 - Restore and augment sediment supply

- Restore dunes by removing invasives, planting dune grass
 - Reduce recreation
 - Monitor for erosion and size/population of sensitive species
 - Monitor location of shoreline
 - Monitor (landscape-scale) dunes and beaches
- Management goals: Maintain functional stability
 - Prioritize places with critical habitat and species
 - Identify retreat areas
 - Enhance sediment supply to vulnerable areas
- Habitat Issue Statement #2: beach and dune habitat is degraded by direct human disturbance. Animals are attracted by human food. Fewer beaches + more people = higher exposure to recreation impacts.
 - Management implications:
 - Increase education
 - Limit access and encourage alternate activities
 - Monitor visitation
 - Management goal: Maintain access to resilient habitats with minimal impact

Cliffs

- Habitat Issue Statement: cliffs become more dynamic (shorter development times for cliff communities and closer proximity to human disturbance)
 - Management implications:
 - Decrease development
 - Managed retreat
 - Encourage sediment
 - Reduce people hazard by managing access
 - Management goal: Protect existing cliff habitat from further degradation

Estuaries

- Focused on Tomales Bay and Bolinas Lagoon
- Habitat Issue Statement: change in habitat diversity and components due to changes in sedimentation, hydrology (SLR, salinity, storms), legacy land-use effects & current land use practices (roads, construction, water diversion)
 - Gain/loss trends for this habitat are unclear and site specific
 - Management implications:
 - Enhance monitoring – sediment and hydrologic change impacts to community makeup, better understanding of coastal processes that balance sediment and inundation
 - Limit coastal armoring and development
 - Manage coastal retreat
 - Identify if ocean sediment is due to natural processes or due to structures (e.g., jetty)
 - Remediation: reduce uplands sources of sediment in watersheds of concern
 - Sediment management: provide enough to sustain estuaries, but not too much

Process feedback:

- Participants felt like habitat issue statement/management goals and implications process was pretty straightforward. Worksheets helped participants think through the process, and ideas generated will help with next steps in adaptation planning.
 - Important to start thinking about areas to prioritize action. Eric Hartge has lots of spatial information that can be used if we need a spatial component as part of recommendations. Sara to follow up.
- Participants discussed the importance of enhancing information exchange/sharing knowledge. Important to have local to regional scale integration regarding ecological processes, information, and data
 - Participants listed literature that group should review prior to actual adaptation planning. Sara asked all participants to send her other papers for circulation.
 - E.g., Bolinas Lagoon – professional white paper

Adaptation Beginnings

Adaptation strategies and actions table (*on working group support page*)

- Participants generally liked the table, said it would be an incredibly useful resource.
- Asked if it was possible to give more detailed examples for each action (answer: yes) and to link with case studies or relevant literature (answer: yes).
 - EcoAdapt to update table during summer and have ready for participants to use during next working group meeting
 - May be able to leverage Cal Climate Commons to do this

Adaptation cross-walking for each of the habitats (linking management goals/implications with scenarios)

- Estuaries:
 - Key management vulnerability: not a lot of data for folks working at the local level – need to know more
 - Potential actions:
 - Need to identify assets at risk (mapping with immediate-term and long-term risk)
 - Need original model (Cosmos/Oakhoff) → USGS
 - Need new or updated data on geomorphological process, or best available judgment offerings for specific areas of the coastline
 - Monitor and detect change and identify triggers
 - E.g., Snowy plover – when population hits certain levels, take action (predator control, disturbance management, education, habitat enhancement, remove invasive beach grass)
 - Adaptive management experiment/opportunity
 - Vulnerability and management options in different scenarios:

- “High energy all year” scenario: Snowy plover more vulnerable (smaller habitat due to erosion), but may have less recreational disturbance due to unfavorable recreation conditions
 - Maybe prioritize managed retreat, habitat restoration, education, and zoning changes
 - “Warm and calm” scenario – maybe prioritize education and roping habitat (to reduce recreational impact), and triage (prioritize highly impacted recreation areas)
 - Across all scenarios, restoring habitat came up as a no-regrets action for snowy plover
- Cliffs:
 - Key management goal: protect existing cliffs from degradation
 - Management Options:
 - Rope off cliffs
 - Managing runoff from development (enhance green infrastructure)
 - Change regulation/zoning policies (cliff-side buffers)
 - Enhance sediment supply (river supply/dam removal, beach nourishment, ACE dredge disposal)
 - Reduce recreation/livestock trampling
 - Management options in different scenarios:
 - Cold/Dry: manage access (ropes!), consider sediment management
 - Warm/Calm: manage access, consider sediment management
 - High energy all year: more important to manage runoff, manage development, consider sediment management
 - Stratification: more important to manage runoff, consider sediment management, manage development
 - Across all scenarios, considering sediment management came up as a no-regrets action for cliff habitats

VISUAL – Management actions under different scenarios

Management actions are in blue, those that occur across all scenarios are marked with asterisk

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Structure and Organization of Management Recommendations

- Group decided to organize recommendations by habitat type, then analyze different scenarios within each habitat type.
 - If possible, participants would like to stay in current habitat groups, but have opportunity to peer-review other habitat types
 - Peer-Review process: participants would like to compare management recommendations for each habitat in different scenarios to look for commonalities, examine whether certain strategies benefit or negatively affect other habitats, and to find opportunities for leveraging resources/combining management actions for multiple benefits.
- Sub-grouping recommendations:
 - Participants decided to try and group recommendations by time horizon (near, mid, long), and to incorporate site-specific (spatial) recommendations where possible
 - Either by site (e.g., Bolinas lagoon) or spatial groupings (e.g., urban/rural)
 - Thinking about strategies in terms of resilience, resistance and response is more useful as a thought exercise than as a way of formally presenting/organizing recommendations
 - Can also attempt to address ecosystem services within each habitat
- Feasibility assessment for management recommendations – may be best for working group to develop the *questions* that regional groups can ask to assess feasibility of management actions for their area, rather than attempt to assess the regional feasibility of developed management recommendations. The study region is highly variable, so giving a one-time assessment of feasibility wouldn't serve or incorporate regional diversity.
- Participants stated they would like more experts to inform some of the recommendation-making and to evaluate spatial variation/feasibility
 - Local groups (e.g., Sonoma county)
 - State representatives
 - Maps

Close Out and Next Steps

- Next working group meeting will likely be in early September.
- Depending on pace of group, will likely have 2-3 meetings after that as well. Goal is to have recommendations ready for February Sanctuary Advisory Council meeting if working group can't make November meeting deadline.
- Since working group will be on a summer break, planning committee will hold an interim webinar before next meeting to make sure all participants are on the same page and ready to hit the ground running at next meeting.