

Advice to Council No: 14-03

Appendix B

Summary of the presentations:

Keynote

Ámparo Martínez Arroyo: If we're going to talk about reducing risk in coastal areas, we need to think about systemic measures to mitigate impacts.

1. We need to be thinking in terms of uplands watersheds that have an impact on our coastlines. Which are the watersheds that have the greatest impact?
2. Look specifically at the coastal systems, thinking of MPA connectivity for wildlife and carbon sink potential.
3. We need to map coastal impacts of climate change. In Mexico, we're lacking the right information but the information does exist. We could look at monitoring systems that would allow us to gather the information. Collaborative and coordinated monitoring would be great.
4. How can we ascertain the legal status of who can do what on the coasts?

Session 1: The Role of Blue Carbon Ecosystems in Climate Change Adaptation and Mitigation Strategies

Jorge Herrera: The southern Mexican coastline stores an enormous amount of carbon in mangroves as well as in seagrass. This area may have the densest coverage of either vegetative type in the entire country. The mangroves in the Yucatán store as much carbon as Mexico has emitted since 2009. Mangrove restoration is great not only for carbon issues but also for storm surge protection and other issues, and it could be a great adaptive mechanism. It would be great to have collaborative monitoring between Florida and the Yucatán, since they have very similar ecosystems.

Patrick Megonigal: The capacity for carbon storage in tidal wetlands increases with sea-level rise, and is much better on the coast than on land. Likewise, carbon capture by soils is much greater than by plants. Shrimp ponds and beaches and so forth reduce carbon storage capacity and that of salt marsh sediments is understudied. Soil cores are used to measure where the carbon is stored but the carbon is stored deeper than most people measure: not 5 centimeters, but more like 5 meters. We need more "fine grained" data if we want to bring coastal carbon into carbon markets. But how to measure and count the various parts of where carbon comes from, upstream and so forth?

Steve Emmett-Mattox: It's tough to find data of historic losses of coastal areas. The pace of restoration of tidal wetlands is 1% of the goal. We need to raise the profile of restoring the wetlands. We also need to set rules on how to get blue carbon into the markets. What counts should be: restoration, creation of tidal wetlands (when you move to salt marsh),

conservation/avoided loss. We need to figure out how can we further engage the private sector in the effort to restore and conserve blue carbon areas. We need to create standards and methodologies for accounting for and valuing carbon in the market.

Tom Wirth: IPCC has some guidelines concerning blue carbon calculations, though they have some deficiencies. However, it has responded to those deficiencies with a companion to VOI4: the 2013 supplement to the 2006 guidelines for wetlands. Wetlands in the past were only considered managed if you were raising or lowering the water levels. The new guidelines are more activities-based (forest management, extraction, drainage, rewetting, regeneration, aquaculture, etc.). In the US, incorporation of new guidance over a three- to five-year period depends on resources and support from outside organizations.

Gail Chmura: Variability in the depth of peat makes measuring and predicting the thickness and volume of the geomorphic context difficult. Volume of carbon storage and the area of coverage are not uniform. More science is needed! The age of lagoonal marshes is related to carbon capture capacity. If there is only 1 meter of depth measurement in Gulf of St. Lawrence, there might be an overestimation of how much carbon is there. We need better models to determine just how much blue carbon there is. Sea-level rise can damage peat as it submerges it below the water line. Canadian coasts present the best opportunities for preservation as they exhibit the least amount of “squeeze” from adjacent roads or other manmade structures that inhibit the potential growth of the wetlands. Eutrophication can cause nitrous releases that negate the carbon sink aspects of the marshes. Restoration of diked lands in Canada would achieve up to 46% of Canada’s pledged carbon capture total.

Israel Amezcua: The project seeks to take an integral approach to mangrove restoration in the south of Mexico in three pilot sites. The sites exhibit lots of variability in terms of environment, and legal and socio-economic status. We have to take into account each variable in order to increase the likelihood of success of the restoration project. For example, restoration can improve fishing. Agency jurisdiction over the restoration area is confusing and overlapping. It is important to consider: How to engage local communities in the search for these national and international blue carbon goals? How can we approach blue carbon in a comprehensive and integrated fashion in local areas? We need to take into account how people make a living in these areas, what is their social organization, what is their societal “blend” and how does it relate to blue carbon. And then on top of it there is the challenge to science!

Christine Hodson: The project involved three sites at which local communities restored seagrass beds. Then they used a simple protocol to determine what [amount of] carbon is stored in the seagrass. The project raised several important questions such as: What is the role of local communities in coastal blue carbon measurement and restoration? What benefit should calculation of blue carbon bring to local communities, especially to local, indigenous and marginalized communities?

Keeley O’Connell: The project involved core samples from 12 sites at three levels of integrity: natural, transitional and disturbed. Four restoration scenarios were calculated based on the core

sample results, the most ambitious of which conservatively calculates a recovery of over 50% of the historic loss.

Session 2: Challenges to Coastal Communities—Sea-level Rise

Amy Chester: We wanted to rebuild with partners after hurricane Sandy. The question was how to move to disaster preparedness instead of disaster risk, and how to ensure that federal reconstruction dollars went to the right places that would create resilience rather than the potential for more destruction in the future. We used the tragedy to rebuild together, more efficiently. We engaged in collective design, creating design teams to work on local projects, sometimes with hundreds of people. We created stakeholder groups, thinking through who were the people who needed to be at the table. We asked for, collected, and selected winning proposals, such as: living breakwaters, Hunt’s Point lifelines and others, to fund with federal reconstruction monies.

Porfirio Álvarez Torres: We created a network of information- and data-sharing among dozens of universities and government agencies, all focused on the Gulf of Mexico. The network collects and shares data, training, equipment and policy briefs that help to illuminate, mitigate and adapt to the threats, challenges and risks in coastal areas. Topics include coastal erosion, storm and storm surge data, pollution, hypoxia and marine debris, awareness raising, protection, and land and marine use planning, among others. Establishment of oceanic observation systems is critical. Future needs include: promote the adaptation of a policy framework that seeks national ocean policy implementation as well as regional development watersheds and coastal areas integration; more research and operational systems to understand climate effects (precipitation, sea-level rise, extreme weather, etc.); establish better communication between science and policy makers; create sister sanctuaries in MPAs; create a trinational cooperative group for monitoring oceans and coastal areas (could use the joint Mexican-European “Mexican Integrated Coastal and Ocean Observing System”—MexICOOS).

Jean-Pierre Savard: Climate models simulations show that the Canadian Arctic will experience a strong rise in winter temperature (between 5° and 10°C). This rate of change in temperature is also happening in Hudson Bay and surrounding waters. This is one of the highest warming rates in the world for comparable latitudes. The summer and winter precipitations will increase everywhere in the Arctic, but especially in Nunavik and over Hudson Bay. The greatest increase in winter and fall precipitation by 2050 will occur above Hudson Bay, where the highest density of storm centers in Canada is found, particularly during the fall and early winter. Climate change will delay ice formation and increase the number and duration of these storms on Hudson Bay. The storms circulating throughout the region of Hudson Bay and Nunavik are accompanied by large surges (non-tidal, but high levels) and large waves that are observed on the northeastern shore of Hudson Bay.

Paul Cough: EPA has released risk-based assessment tool that can be informative and shared in multiple areas and among various organizations. The tool includes a vulnerability assessment as well as an action plan. Taken together, these comprise a climate adaptation strategy. The tool includes a consequence/probability matrix for risk evaluation, from which one can develop an action plan and a monitoring and review plan. The tool helps actors prioritize actions to help decide how to channel limited resources.

António Baptista: Coastal areas represent an outsized portion of the US and global economy. Yet, these areas are the most vulnerable to climate change and sea-level rise, the impacts of which are not well understood or accurately predicted. In response to the dearth of data and knowledge about the effects of CC on the Columbia River, the National Science Foundation Science and Technology Center for Coastal Margin Observation and Prediction has created a “collaboratory”—a data-rich collaborative environment. This collaboratory brings users together to create a cyber-infrastructure to create modeling systems and to gather and share data thorough observational networks. Models show that sea-level rise could cause significant intrusion of salinity into the Columbia River. We’ve joined a global partnership to better understand carbon and nitrogen cycles in estuaries. The CEC should support the collaboratory model.

Session 3: Challenges to Coastal Communities— Impacts of Ocean Acidification on Indigenous and Local Communities

Christine Woodward: This presentation is about the Samish Indian Nation and the impact on their coastal communities. Climate change, rising sea levels, and ocean acidification are changing their way of life through such impacts as reduction in eelgrass, coastal erosion, wasting disease in shellfish, reduced fishing production, loss of medicinal plants. The long-term view and goal is to work toward conserving and restoring these communities in a spirit of collaboration. In so doing, the Samish are working not just to restore, enhance and preserve the physical natural resources, but also to assist in the preservation, growth and recognition of a rich culture for future generations.

Jorge Torre: This was a presentation on the collaboration between scientists and local fishing communities on participatory marine monitoring of various species. The community participation creates engagement around environmental conservation and livelihood objectives and issues. Community divers monitor 11 marine protected areas (MPAs) in the Midriff Islands region (e.g., San Pedro Martír Island Biosphere Reserve and near Natividad Island). The collaborations foster pride—not only in those who participate but also for the school-age children who watch their mothers and fathers head off to the sea for the monitoring efforts. Through these efforts, acidification effects have been observed and monitored in MPAs and other ecologically and commercially important areas.

Duane Smith: The increasing acidity of the Arctic Ocean is affecting the indigenous peoples and communities in Alaska, Arctic Canada, Russia, and Greenland. The Inuit Circumpolar Council advocates for the rights of Inuit peoples and their communities. Given the reliance on marine species for nutrition, ocean acidification is a severe threat to the food security of Arctic populations. Other consequent health impacts are also of great concern. The Arctic Ocean is more vulnerable to ocean acidification than other water bodies because the colder water can absorb more CO₂, which leads to increased acidification. In addition, as the sea ice melts, the increased freshwater input reduces buffering capacity, the reduced sea ice area increases the amount of open ocean and thus of CO₂ absorption, and the marine ecosystem features a shorter, more simplified food chain. Given the gravity of the impacts of ocean acidification to Inuit populations, countries must work to reduce the CO₂ emissions that are the root of the problem. More research is needed to understand acidification processes in the Arctic and their impacts.

Bill Dewey: Shellfish production in various Washington State shellfish farms was suffering and no one knew why. There was panic until we figured out the problem: acidification of the ocean waters. Healthy and unhealthy oyster larvae were studied. We reacted quickly: ramping up monitoring and research, expanding larvae production capacity at Kona, Hawaii, USA, treating hatchery rearing water, and breeding oysters resistant to ocean acidification. The governor of Washington State has taken a very proactive stance on this. He has an environmental sensitivity but more importantly, he realizes the potential impacts of ocean acidification on the economy and employment of a major Washington State industry. It's likely that other shellfish producers are experiencing similar phenomena in their areas. They could benefit from what we've learned.