Question & Answers from November 12, 2020 Our Coastal Climate: Rising Waters in West Marin, part of EAC’s educational series on climate

The below Q&A was transcribed by EAC Legal and Policy Intern, Katherine Pond. EAC takes responsibility for any minor errors in transcription.

Q: The interventions you presented seem small-scale, the Netherlands has the most experience with ocean dikes, but these are huge projects put in place over hundreds of years. Could that approach work in California?

Dr. Lester: Well, that’s a good point about the scale of interventions. The large-scale interventions used right now in California are not necessarily sea walls, although some have been successful (O’Shaughnessy Seawall in San Francisco) -- the sand replenishment has been larger scale. Large inputs of sand have been happening regionally, like in San Diego. It’s an option in certain places. People have talked about a Netherlands-like intervention in San Francisco Bay, but they are generally not talking about it extensively in California -- we have enough conflict over small-scale interventions, to say nothing of a huge project that would close off a bay. It has been suggested to close off New York Harbor against the forces of the ocean. They have also talked about elevating the dike in Venice, Italy, which can be filled with air as needed. There are a lot of creative solutions still to be thought of, but our policy and regulatory system does not readily allow for such large-scale interventions. I recently did a piece with Gary Griggs (https://asbpa.org/publications/shore-and-beach/shore-beach-in-2020-vol-88/groins-sand-retention-and-the-future-of-southern-californias-beaches/, behind pay wall) and some others about the potential need to reconsider using groins, which are hard structures perpendicular to the coastline, as a way to retain sand. Even that gets a lot of pushback, because they are artificial interventions with the natural coastal processes, and they do have their environmental impacts. So, I think we need to start small if we’re going to be considering hard interventions. I’m a bit of a skeptic even on some of the living shoreline interventions because it’s physics -- each of these environments have physical parameters operating, and you can’t just assume that you can plop down a constructed dune in a particular place and it’s going to somehow save the shoreline from erosion, because physically it may just not work. I think it’s the nature of our coast coupled with the social systems that aren’t going to provide for those really huge interventions.

Q: Related to the question about piecemeal protection projects and managed retreat, are there plans being discussed on a statewide level for raising funds and massive public education for larger scale managed retreat?

Dr. Lester: Not necessarily managed retreat, but we have seen a lot of progress made on the funding front. First, just recognizing that, whatever you call it, we’re talking about a lot of money: to move a highway section a few miles is millions and millions of dollars. I believe there’s numbers in your Adaptation Plan for Marin that talk about how much it would cost to raise a highway around [Bolinas Lagoon], for example, and it’s something like
$[50] million.\textsuperscript{1} You start adding these costs up, and it’s massive for the state. We did have a bond measure being contemplated for this last sequence, but with COVID-19, all of the massive funding options were taken off the table in terms of their viability right now. But, we have seen more interest in recognizing that we’re going to need to find a way to pay for these things. In terms of managed retreat, I think it’s really important to ask ourselves who is benefiting, and how are the costs and benefits being distributed: who is winning and losing in any of these solutions? So, a lot of the managed retreat attention nationally and internationally has focused on cases where communities are being forcibly relocated. A justice question is being raised: how can we force communities to relocate themselves.

Also, the related climate refugee migration, where people are voluntarily relocating because wherever they’re from is increasingly underwater or something. A lot of attention is being paid to the social justice impacts of moving people out of these hazard areas -- in California, a lot of these areas we’re talking about (such as Del Mar, Stinson Beach, even Imperial Beach) are places that are not on the lower-scale of affluence. There is a lot of money involved. I don’t think we’re going to end up paying publicly to buy out all those properties and move them. I just don’t see that being politically feasible. You do have to ask, though, how are we going to pay for it? That example I gave in Broad Beach, in Malibu, those were the homeowners who started the Geological Hazard Abatement District, which is a governmental structure which can then assess a property tax to pay for whatever it is that you’re organizing for. In that case, they said they were going to pay an assessment to get a public beach replenishment project accomplished, with only the money from those homeowners. That seems much more viable to me than asking the homeowners to pay for some sort of protection scheme for a place like Malibu or to relocate residents. Markets are also going to play a big role, which we are seeing already as insurance companies are starting to respond to the new risks we’re facing. With the fires, it’s been more dramatic with companies not being willing to insure certain places anymore, especially those with repetitive losses. But, I think as the property markets start to move, which they have on the east coast, then you’ll start to see people move on their own based on their economic interests.

Q: Where can we see the maps of our own communities in the finest detail, so we can see what will happen to our own houses?

Dr. Befus: It will be on Our Coast, Our Future (OCOF) web viewer (https://data.pointblue.org/apps/ocof/cms/), that will be the best place. A tutorial for the OCOF web viewer can be found here (https://www.youtube.com/watch?v=hTgRks-GEr). Unfortunately, it’s in the works right now, but the groundwater feature [will] be included in the standard application starting in Summer 2021. For now, if you wanted to go back through this video (of the recorded event) and pause it on certain places to see if your home was in that area and look at it with a magnifying glass, that’s the option right now. It’s in the works, so you can go and look at this website through the lens of a certain sea level rise to see what it looks like for your property.

Update since the event: The data will also be hosted on Hazard Exposure and Reporting Analytics (HERA) - https://www.usgs.gov/apps/hera. Both will have similar maps, and HERA will have additional analyses added to the maps. More information on the CoSMoS-Groundwater project can be found here, https://www.usgs.gov/centers/pcmsc/science/cosmos-groundwater?qt-science_center_objects=0#qt-science_center_objects, which includes links to the original datasets, if people wanted to make their own maps.

Q: Can you speak more to the environmental hazards of flood walls especially with relation to marine species? Also, perhaps the ability to adapt to climate change via wetland restoration. Thank you.

Dr. Lester: I think this speaks to a larger point, which I want to underscore, which is that a lot of this attention to coastal hazards and sea level rise has been focused on threats to life and property and the cost to all our built environment, but I think it’s really important to consider the implications for the environment. We can protect development, but there are implications for our beaches and for our wetland resources. In terms of sea walls, when you build a sea wall and the beach eventually is inundated or lost, you lose all of the ecological value of that beach, too. We’re going to see impacts on the species that rely on the beach environment -- the invertebrates and then birds that rely on the invertebrates. You’ll see changes in the coastal habitats when we start building hard structures that can’t allow the system to migrate. Kevin raised this point about our topography and how it relates to the flow of water -- one of the reasons we lose all of these wetlands over the next hundred years is the topography of the land that tends to form our estuaries. Look at Bolinas Lagoon in Tomales Bay: where is the water going to go with those steep slopes? We tend to lose the marsh habitats in those areas just because of the physics of it. One of the strategies we’ll have to think about is identifying those places that are amenable to some kind of managed regression of the system -- where will the topography allow that to happen?

You’re seeing some of that now on the margins in San Francisco Bay because we filled so much of the Bay that we can pull back and allow the wetlands to restore themselves. We are also talking about adding sand around the margins to allow the wetlands to rebuild as the water rises. Alternatives have implications for the environment and for the public interests in those areas. Public access is going to be hugely impacted over time, so we’re going to have to ask ourselves if we want to pay to maintain some kind of public shoreline access amenity or if we’re going to spend our time protecting things in the way that they are. The state has started to recognize that public messaging is important. The Ocean Protection Council (OPC) just issued a grant for a media campaign to just start talking about the fact that sea level rise is happening. Managed retreat is still off in the future, but we need to start letting people know that it’s happening.

Definitions:

- **Managed Retreat** is the purposeful, coordinated, voluntary movement and transition of people, ecosystems, and infrastructure away from risks (such as flooding, sea level rise, wildfires, or drought) and vulnerable areas.\(^2\)
- **Groins** are structures perpendicular to the shoreline used to maintain beaches or restrict sediment transport. Groins are meant to capture sand transported by the longshore current; this depletes the sand supply to the beach area immediately down-drift of the structure.\(^3\)
- **Constructed dunes** are built with heavy equipment and then planted with vegetation to mimic the way natural dunes behave where the vegetation traps sand blown by the wind and stabilizes the dune.\(^4\)


\(^3\) [https://www.nps.gov/articles/groins-and-jetties.htm](https://www.nps.gov/articles/groins-and-jetties.htm)