



**San Francisco Bay Regional CHARG: Coastal Hazards Adaptation Resiliency Group
December 13, 2016 Adaptation Strategies Working Group Action Items + Meeting Minutes**

Participants

NAME	ORGANIZATION	NAME	ORGANIZATION
Anthony Primer	City of Union City	Ken Schreiber	Land Use Planning Services, Inc.
Buzz Berger	Rail Pros, Inc.	Lauma Willis (Jurkevics)	Department of Water Resources
Chris Choo	County of Marin	Liang Xu	Santa Clara Valley Water District
Chuck Anderson	Schaaf & Wheeler	Liv Herdman	US Geological Survey
Dale Kerper	DHI Water & Environment	Mark Seedall	Contra Costa Water District
Dan Matthies	Wood Rodgers, Inc.	Maya Hayden	Point Blue Conservation Science
Elizabeth Murray	USACE	Paula Scalingi	Bay Area Center for Regional Disaster Resilience
Gerald Kierman	Bay Area Center for Regional Disaster Resilience	Rohin Saleh	Alameda County Flood Control District
Jean Toilliez	ESA	Simon Fowell	UC Berkeley
Kathy Schaeffer		Sybil Hatch	Convey

Introduction

At the CHARG October 24, 2016, working group meeting, Rohin Saleh outlined a concept for a new study in which GIS and LIDAR data are used along the San Francisco Bay water/land interface to help define the limits of local, sub-regional, and regional flooding scenarios, based on water level. For example, there are a number of local (hot-spot) projects that will need to be implemented to protect shorelines at current or near-term water levels. As sea level rises, however, more shoreline is vulnerable and property owners will need to start considering impacts to/from neighboring properties, and plan accordingly.

The purpose of this meeting is to discuss a project that would identify those “trigger points” (i.e. water levels) at which local flooding becomes sub-regional and sub-regional flooding becomes a regional issue. The results of the study will help provide guidance to cities and counties when planning their shoreline adaptation strategies. The results will also offer a more meaningful interpretation of which sea level rise projection curves should be used for which situations.

Discussions on General Approach

- Sea level rise adaptation projects are being triggering around the Bay in response to the release of new FEMA guidelines. Guidelines governing regional impact of projects must be established for classifying projects as having local, sub-regional, or regional impacts. The Bay Area needs to address and plan for longer-term sea level rise adaptation than covered by FEMA's guidelines; projects should be positioned accordingly.

- As one example, Marin County is in the middle of a countywide vulnerability study and is looking at the benefit of repairing over creating protection systems; that will make a difference in considering impact via regional modeling and determining what solutions are feasible, including future adaptation and lifespan.
- Jurisdictions or property owners responding to FEMA maps might not be considering sea level rise adaptation, assuming that problem is being dealt with elsewhere. How will local jurisdictions be induced to plan for or respond to sea level rise, when there is immediate problem presented by the new FEMA map and guidelines? FEMA becomes a project trigger due to pressure generated by funding opportunities.
- BCDC's plan will be an adaptation plan and will not necessarily address the FEMA floodplains; it may revert to jurisdictions but will start forming a coherent protection plan for specifically vulnerable areas. "Weak links" identified in the BCDC vulnerability studies can be addressed, but local jurisdictions have no guidance on what water level (incorporate sea level rise projections? design only to accommodate FEMA floodplains?) to use for those local projects.
- Sea level rise is a main topic in the State Climate Action Team's coastal and ocean working group (via the Governor's Office of Planning and Research). Sea level rise will be integrated in to the general plan process. Coastal Commission and BCDC, led by the Ocean Protection Council, will provide guidance to local agencies. Not sure whether the group is looking at the San Francisco Bay specifically.

Discussions on Definitions of Regional, Sub-regional, and Local

- Definitions of the categories (local, sub-regional, and regional) would be helpful in determining response. It will be important to be flexible about projects happening on a small scale, but critical to define boundaries that determine what makes a small local project become a sub-regional concern. For example, as soon as a project crosses into another jurisdiction it's no longer local. Similarly, if the project impacts another area (for example, triggers flooding in another area), then the project is no longer local. There is currently no mechanism, however, that forces an entity to evaluate those impacts.
- May want to consider a watershed/topography/geography framework rather than a geopolitical (city/county boundary) framework. A starting point might be the smallest area (topographically based) that constitutes a coherent response or protection area. There may be a long reach of low ground across several entities that would always be considered a sub-regional "group." Conversely, many cities and counties have - or are developing - sea level rise mitigation plans and have land use authority. Ownership should be with agencies, cities, and jurisdictions as opposed to a topographic or geographic perspective because most cities have has a floodplain manager with control over development. Currently, there are no mechanisms or guidelines in place that determine whether cities will work together on multi-jurisdictional projects, or what would trigger a sub-regional response to sea level rise. Possible to model appropriate behaviors.
- The Louisiana Coastal Plan uses four general criteria for planning principles: cost efficiency, completeness (whether a project can function on its own), and acceptability (including impacts to other entities), and effectiveness (at reducing flood risk). A self-standing project with minimal to no impacts could be considered a "local" project, for example.
- The cumulative effect is problematic. Each small local project may be within a "local" threshold, but combined with other projects, could have a wider impact. The county or some entity needs to periodically run a Bay model with approved projects to see potential cumulative impacts. BCDC's regulatory permitting process may be a way to ensure this happens regularly.
- Santa Clara Valley Water District divided its shoreline into eleven independent reaches from creek to creek, because its creeks have levees or other protection from 100-year flooding. SCVWD modeled

inundation areas at 1-, 3-, and 5-foot sea level rise and tried to determine how to factor those results into project design. In the end, SCVWD assumed a 2-foot sea level rise by 2070, and included that in the EIR impacts assessment.

Discussions on Modeling

- Using one model is key, rather than jumping from one to another. Desirable to use a model housed by an entity that can commit to keeping it regularly updated and adjusted for changing actual conditions based on an established prototype.
- CoSMoS (USGS model) could be used to evaluate the impact from one project to flooding elsewhere in the Bay, and look at relative importance of various locations. There is quite a variation in locations which makes it hard to test for every project's impact. CoSMoS is adapted to run on smaller boundary areas. The model is not currently integrated with riverine flooding models, but USGS is working on this.
- Suggest possible crowd-sourcing so that people can do their own impacts analysis, for example, developing an online portal (for example, Google could host a simulation) where people could enter their projects and see what impacts it will have – a real time simulation. ACFCO does not believe that we are yet at that level of sophistication; this would be a complicated and costly task with no identifiable end-game. Simon Fowell/UC Berkeley built an economic impact model for City of Alameda that identifies impact by individual property. Similar efforts might influence people to consider sea level rise due to personal financial risk.

Discussions on Modeling Boundaries

- Current inundation modeling is typically unrestrained by boundary conditions: as sea level rises, water is allowed to flood anywhere it naturally goes. Suggest that jurisdictions “draw a line in the sand” around areas that must not be flooded, and characterize infrastructure in such a way that communities can see the impact possibilities. This would, in effect, establish a “no retreat zone” as a starting point and, conversely, identify areas it doesn't make economic sense to protect.
- Land use plans are important in identifying where development versus open land exists - and could be used to help define the model boundary conditions - but there are no agreed-upon criteria for identifying crucial areas. Plan Bay Area may have done a land use exercise like this already. Alternatively, the region's major transportation infrastructure could be used as a boundary: I-880, highway 101, El Camino Real, as examples, or major rail lines. SFEI has landscape management units called “cells” that could be used to define the model boundaries. Similarly, per Executive Order 13960, the federal investment boundaries might help define model boundaries.
- The Bay Area regional models range in scope from within the Golden Gate north to the Carquinez Strait. They do not include the Pacific Ocean. May want to consider the areas past the Carquinez Strait to include power plant and refineries because of potential impacts to critical infrastructure. The Delta is an adjacent area to be concerned about, but adds a level of complexity in terms of land and vested interests. Cumulative San Francisco Bay adaptation projects may eventually impact water levels in the Delta.
- The defined upper limit of sea level rise that the Bay Area is expected to anticipate is up to nine feet. The BCDC “2100 adaptable” is a good model to follow.

Next Steps

- Prepare a two-page summary or white paper for BCDC that identifies specific recommendations for regional modeling needed to evaluate the current and cumulative impacts of new projects and

hydrodynamic variables (water levels, change in shape of Bay caused by sedimentation and vegetation, bathymetry, etc.). Include discussion of how (and why) this model would be used by local and regional entities.

- Consult land use maps, transportation maps, and other resources to identify and define potential model boundaries. USGS may be able to do some modeling simulations to start to understand the inundation zones from a restrained system. From those inundation zones, the group can start to see which areas might naturally be local versus sub-regional or regional.
- Plan to give a presentation to the BCDC commissioners about the technical aspects of sea level rise that CHARG has been considering, what the working group has been considering, and what it needs from BCDC.