

**Fairhaven/Finn Town Sea Level Rise Workshop**  
**Samoa Women's Club**  
**August 14, 2018**

**Speaker Presentations**

*Aldaron Laird, Environmental Planner, Trinity Associates* – introductory remarks (Virginia Bass unable to attend)

The Coastal Commission provided grant funding to the County to prepare a sea level rise vulnerability assessment for areas around Humboldt Bay. The workshop goal is to communicate the findings of the assessment related to sea level rise. Fairhaven/Finn Town photographs and aerial photos overlaid with various sea level rise scenarios were presented as slides, and there were printed aerial photos showing inundation levels and graphs as displays.

Workshop roadmap:

Why plan for sea level rise?

When will sea level rise impact us?

How will sea level rise impact us?

Where will sea level rise impact us?

What can be done about sea level rise impacts?

Who will lead the way and address sea level rise impacts?

*Aldaron Laird* – Presentation.

Humboldt Bay sea level rise projections – We have the highest rate of sea level rise on the West Coast here on Humboldt Bay. Over the last century, we have experienced 18 inches of relative sea level rise. About half is due to thermal expansion of ocean water, and half is due subsidence related to our position along the Cascadia subduction zone. The tidal inundation data used for the assessment is specific to Humboldt Bay. Models are based on local conditions and sea level rise in half-meter intervals. Historical tide gauge data for the past 40 years on the north spit shows about 0.8 feet of rise in sea level.

What's expected in Fairhaven? There is no waterfront development or shoreline structures in Fairhaven. For this unprotected sandy shoreline, exposed to wave induced erosion, the area will likely experience increased frequency of inundation within 25 years in low-lying areas, but the shoreline still remains intact. Areas that currently experience occasional inundation will likely be flooded monthly in 25 years, and daily in 50 years. Eventually, low-lying areas will be flooded as groundwater rises. The high projection for sea level rise is 1.6 feet in 25 years with monthly inundation, and 3.3 feet in 50 years with daily inundation projected.

The purpose of the sea level rise workshops is to convey vulnerability information to owners and residents so they can plan and participate in developing adaptation strategies. One strategy is to protect existing structures and residential developments as long as possible. For example, a dike could be constructed to prevent inundation of Fairhaven, about ¾ mile long, at an approximate cost of \$1.25

million. Fairhaven also has the opportunity of potentially relocating to a higher elevation further from the bay shoreline, though that vacant land is in private ownership.

*Michael Richardson, Humboldt County Supervising Planner* – Started by qualifying the sea level rise predictions by saying that projections may not be accurate as far as timing; the level of certainty is not that good. It is possible that the timeline might accelerate or slow down. The Humboldt Bay Area Plan is silent at present about sea level rise, but the next iteration will contain policies and suggested adaptations. The County’s initial draft of sea level rise policies is called the Sea Level Rise Adaptation Policy Framework. It contains general policies regarding what to protect as well as strategies to do so. Making the Policy Framework more specific is one purpose of the sea level rise workshops. Michael talked about county/coastal commission interaction, and about some of the partner agencies that will be involved in sea level rise adaptation projects. He discussed the County’s sea level rise adaptive capacity and the strategy for going forward to develop it.

*John Miller, Humboldt County Senior Planner* – Tsunami awareness and planning will be developed concurrent with sea level rise planning. New maps and guidance are forthcoming, and will be used for tsunami safety planning. Ultimately, land use designations will reflect the best, newest predictive information. The upshot: development policies will be affected by updated tsunami information; some development will be restricted. The current outdated Humboldt Bay Area Plan was developed in 1982 and relates to 1970’s tsunami inundation modeling, which is now equivalent to a high tide.

*Melissa Kraemer, Supervising Analyst, California Coastal Commission North Coast District Office* – Seventy-six counties and cities on the coast are going through this same sea level rise planning process. The mission of the Coastal Commission is to protect coastal resources, and they would like to work with the County to update its local coastal program to incorporate coastal resource protection. Melissa talked about what constitutes development for coastal development permit purposes, noting development is broadly defined.

The Coastal Commission has a hierarchy of preferred adaptation strategies. These are, from most favored to least: (1) avoid siting in the hazard area; (2) design for the hazard; (3) managed retreat; (4) soft or natural protection (barriers including living shorelines); and (5) build barriers (hard protection). Hard protections like seawalls can lead to the loss of sand and access to the beach, and coastal access is the Commission’s top priority. Hard protection is also not practical in the long term, because there can still be vulnerabilities like groundwater intrusion.

## **Public Comments** (about 25 people present)

*PC = public commenter; AL = Aldaron Laird; MK = Melissa Kramer; MR = Michael Richardson  
LS = Lisa Shikany*

*PC1:* As to building a barrier in Fairhaven, it would be good, but what does it do about groundwater rise?

*AL:* Explains how freshwater is pushed up with saltwater intrusion. Groundwater rise depends on how deep the groundwater is in relation to sea level, and on the type of substrate (sand in the case of Fairhaven, or mud/silt elsewhere). The groundwater table is less than three feet deep around most of

Humboldt Bay. Barriers will not address rising groundwater. Ultimately, all the culverts and storm drains will need to be elevated, but that would result in backwater flooding.

*PC1:* Then, do we need groundwater mapping for the Fairhaven area?

*AL:* Yes, it hasn't been done. Need soil composition and depth to groundwater. The issue will need to be addressed in specific locations because all soil types are different.

*PC2:* Will the tsunami sirens be replaced or fixed so they work?

Troy Nicolini, NOAA: Provided the current status of the sirens. Samoa's is functional, but Fairhaven and Finn Town's are nonfunctional. We are currently seeking a grant to fix this.

*PC3:* There is a living shoreline currently at oyster beach, which is eroding and is now falling into the Bay. Are there other options?

*MK:* Discussion of history of erosion and barrier types. The type of shoreline and channel depth dictate living shoreline type.

*AL:* Low gradient areas and salt marsh are best for living shorelines. Deep areas and navigation channels, like off the coast of Fairhaven, are not conducive to establishing salt marsh to dissipate wave energy. If the community was relocated to a higher elevation further away from the shoreline, we could create salt marsh where Fairhaven is now.

*PC4:* Projections tend to show accelerating sea level rise with each new update of data, 11 feet by 2100. Do the models used for this assessment take that into account?

*AL:* The assessment used the latest data available at the time, plus Humboldt Bay local conditions. Maps and projections center around the amount of sea level rise as opposed to the time a certain level of sea level rise would be reached. So even though the dates when certain sea levels are reached may change, the effects are correct. Sea level rise exceeding 3 feet will have little additional impact; in other words, all low-lying areas will already be affected. After that, river levels will rise, upstream in the estuaries. New projections are available as they are released.

*MK:* New projections for the most extreme case are double the projections we are using here, 11 feet by 2100.

*PC5:* What about Manila?

*AL:* He projects there is very little vulnerable land around Manila with 3.3 feet sea level rise. Approximately 99% of Manila (and Samoa) would not be impacted, and sewer treatment facilities are high enough in elevation.

*PC6:* What will be the impact of sea level rise on eelgrass?

*AL:* We used existing LIDAR maps and ran scenarios where the dikes were compromised. Eelgrass areas will expand as sea level increases. First, salt marsh will get squeezed out, then mud flats, while areas of eelgrass and open water expand.

*PC7:* Weather, rain frequency and flooding are also changing. Are those effects built into the model?

*AL:* He recognizes the impact, but it's hard to model. When modeling 2 meters of sea level rise, the Mad River migrates into the Humboldt Bay, bringing more sediment into the bay. Commenters ask about and discussed the possibility of the spits being washed out, which would change the whole configuration of the Bay.

*PC8:* Will sea level continue to rise, or will it stop, level off or decline?

*AL:* Projections say it will continue to rise, based on projected CO2 emissions and the amount of heat absorbed by the ocean. The rate of change may increase, if the present trend continues. It's not going to stop at 2100, so when developing new infrastructure, we must consider how long it's going to be around. For example, if you rebuild highway 101 around Arcata Bay, should you build a bridge to allow water underneath? Caltrans will need to be thinking much further ahead.

*PC9:* Considering jetty erosion and sediment deposits, will there be a wave energy effect on the south jetty and is it likely to change the Bay?

*AL:* Does not know how sediment circulation is likely to change. Others are studying that.

*PC10:* Is it possible to use dredge spoils to armor shorelines around the Bay?

*AL:* Theoretically yes, but the current practice is to deposit it out to sea. A million cubic yards of sand per year are removed this way, but there is no way to dewater or convey the sand to where it would need to be used at this point.

*PC11:* Since we have the highest rate of sea level rise in the state, shouldn't we consider keeping that sediment in the system?

*MK:* They are looking at using dredged sand to replenish and nourish beaches in the North Spit area. The Coastal Commission would like to get the Army Corps to do that.

*PC12:* CSD member asked if we should be considering a brand-new sewer system if the life span is so short due to sea level rise.

*AL:* Engineers should look at that question. 50 years is not a long time for a sewer system. Bonding may become an issue.

*PC13:* Comment on dredging – they do it in Ventura. She says she has seen it.

*AL:* The wildlife refuge tried to get sand from the Army Corps; they say they don't have the equipment to dredge and deposit on the shore.

*PC14:* That's not true. They have a suction dredge to do it right now.

*AL:* But it is not used in Humboldt Bay; if it was located here we could use the dredged sand from the navigation channels.

*PC15:* Pulp mills used to do it, shipped it out to sea.

*PC16:* CSD member asked what would happen with septic systems when sea level rises. Some of his neighbors have cesspools. How much of a problem is that going to be if we get flooded?

*AL:* Not good, worse than it is now. Salt water will interfere with bio function of the septic systems.

*PC17:* We have to think about contaminated sites in the area, and the possibility of pollutants leaching into the water with flooding. Should we look at relocating homes before sea level rise impacts contaminated sites and homes?

*AL:* Contaminants should be removed before inundation happens. Old mill sites and gas storage sites are mapped, but maybe not old leach fields.

*MK:* In the Big Lagoon area, a 50' bluff disappeared in one storm event, and some houses were threatened. The County red-tagged the houses for removal to mitigate the hazards. Land was purchased by the County and there was also some FEMA money. That could happen in this case.

*AL:* We must remember to look at regional infrastructure, like the PG&E power plant and Highway 101 as well as Fairhaven itself. No use protecting the houses if all services are out.

*PC18:* What about sea level rise impacts insurance and home loans?

*AL:* Insurance companies are well aware of sea level rise and are protecting themselves accordingly. This has been a major issue in Florida, with expensive coastal properties losing value with sea level rise and flooding.

*MK:* As it works now, if structures are damaged by flood, insurance requires rebuilding using adaptation strategies.

*AL:* This is a brand new phenomenon. The sea level rise zones weren't mapped five years ago, so lots of property owners purchased without knowing their property was at risk.

*LS:* Made a comparison with California fire insurance. Recent fires are changing the rules and market.

*PC19:* Person mentioned the King Salmon/Fields Landing workshop in which a person lost his homeowner's insurance after a flood claim.

*PC20:* Commented that incident was likely due to the mold problems related to water damage.

*AL:* He would like to see the state adopt official sea level rise hazard maps. Models are available.

*MK:* No maps exist at the moment, but numbers (elevations) are available.

*PC21:* Person asked where she can find the Manila sea level rise information.

*LS:* Call her and she'll help direct the person where to find it online.

*AL:* That data is publicly available online on the County website, as part of the Humboldt Bay Area Plan Vulnerability Assessment

*PC22:* It's going to take a lot of funding to address sea level rise. What would help get that money flowing? What about writing congress members?

*AL:* He thinks the state will be the biggest source of funding.

*MK:* Some funding is available from other sources.

*AL:* We will be competing with many other places for funding. We are a little further ahead of the curve in relation to other communities, in that we've completed our vulnerability assessments and modeling, and we're already updating local coastal programs. This puts us in a good position for funding allocations.

*PC23:* He thinks a logical funding source is a carbon tax.

*PC24:* How about a salt-water treatment plant, or selling our freshwater

*AL:* We tried selling our freshwater, it was too expensive. Desalination is cheaper.

**End of meeting**