

From: ajregister@yahoo.com
To: [Lemos, June](#)
Cc: [Peters, Lindy](#); [Norvell, Bernie](#)
Subject: Tsunami Work Group Agenda Item 21-038 for City Council Meeting of 2/8/21
Date: Thursday, February 4, 2021 8:40:54 PM

Dear June:

Regarding the received report, I would like to make of record the following:

- I. In preparing for tsunamis, the ability of the fleet at Noyo Harbor to evacuate may save many ships/boats even though the harbor's infrastructure may suffer loss.

Tsunamis travel at about 500 mph. Our sister city Otsuchi is about 4700 miles away (<https://www.google.com/search?q=distance+from+fort+bragg%2C+ca+to+otsuchi%2C+japan>), which is about 9 hours. The tsunami warning network (<https://tsunami.gov/>) may give our coast several hours of warning, but such warning can come at any time and can be seen as completely unexpected.

Similar calculations can be done for Alaska/the Aleutians and Chile.

I propose that evacuation drills for the Noyo fleet be considered so that bottlenecks and other obstacle can be discovered and addressed as there is no substitute for real world exercises. When a tsunami hits, there will be limited time to safely evacuate. The Coast Guard may have some resources to help with such an exercise and when a tsunami actually occurs.

It may be that evacuating the fleet 3 miles offshore would ensure their safe and complete survival. Or, it may be another distance, but I don't think it would be too far out.

In any case, such drills would seem to better prepare the fleet for recovery after the tsunami and damage to the harbor would have less impact as evacuated craft would not be shackled to the harbor by debris waiting for excavation/dredging/removal.

In conducting such drills, I recommend one that is scheduled in advance under good conditions and one that is not under the worst conditions. For the unscheduled one, a certain week could be set aside during which such a drill could occur and notice given.

Success would require a high degree of participation and I don't know how to make that happen. Maybe some financial motivation via insurance companies could occur with lower premiums for those who lower the risk of loss for such companies.

- II. Updating the inundation maps will probably not result in significant changes due to the geologic nature of the events involved. However, some important revisions may occur for at risk areas/structures.

Below is a list of links I made in July 2019 regarding such online maps. Please note that Table 1 at the bottom of these maps indicate the source by which the tsunami effects are gauged.

<https://www.google.com/search?q=map+tsunami+mendocino&oq=map+tsunami+mendocino>
<https://www.conservation.ca.gov/cgs/tsunami/maps/mendocino>
https://www.conservation.ca.gov/cgs/Documents/Tsunami/Maps/Tsunami_Inundation_Mendocino_Quad_Mendocino.pdf
https://www.conservation.ca.gov/cgs/Documents/Tsunami/Maps/Tsunami_Inundation_FortBragg_Quad_Mendocino.pdf
https://www.conservation.ca.gov/cgs/Documents/Tsunami/Maps/Tsunami_Inundation_Inglennook_Quad_Mendocino.pdf

My thanks to the staff and council of the city for seeking to make Fort Bragg safer, more survivable, and more sustainable.

Best Regards,

Andrew Jordan
Fort Bragg, CA

From: [George](#)
To: [Lemos, June](#)
Subject: Tsunamis bring it all together. A comment on Agenda item 8A.
Date: Sunday, February 7, 2021 4:56:06 PM
Attachments: [Tsunami Inundation FortBragg Quad Mendocino.pdf](#)

Hello June,

Once again, please forward this to all the FB Council members. And thanks, June, for all the ways you are keeping our community connected.

Honorable council members,

For years now, many of us in the Fort Bragg community have been making the connections between Earthquake, Tsunami and sea level rise–SLR. I'm sure you all have read or heard that SLR is happening far faster than was previously thought. It is good that our tsunami maps are being up-dated, yet it appears the the info for our coast may be way out of date. I followed the links to the website and found this tsunami inundation map:

Any discussion of tsunami must include proactive planning, such as the suggestions made by Andrew Jorden in public comment. Tsunamis will come and they will be far larger than the one we experienced a few years back. The sea level will be higher than any assumptions this map is based upon. The crappy old beach berm will be overwhelmed. Toxic ponds 6 & 7 will be inundated. The north wall of the mill pond will be undermined and perhaps taken out. All the dioxins, heavy metals and toxic petroleum products will swirl around, polluting the ocean and even our own drinking water supply.

This agenda item begs the question: How well are we preparing for the environmental challenges we know are coming?

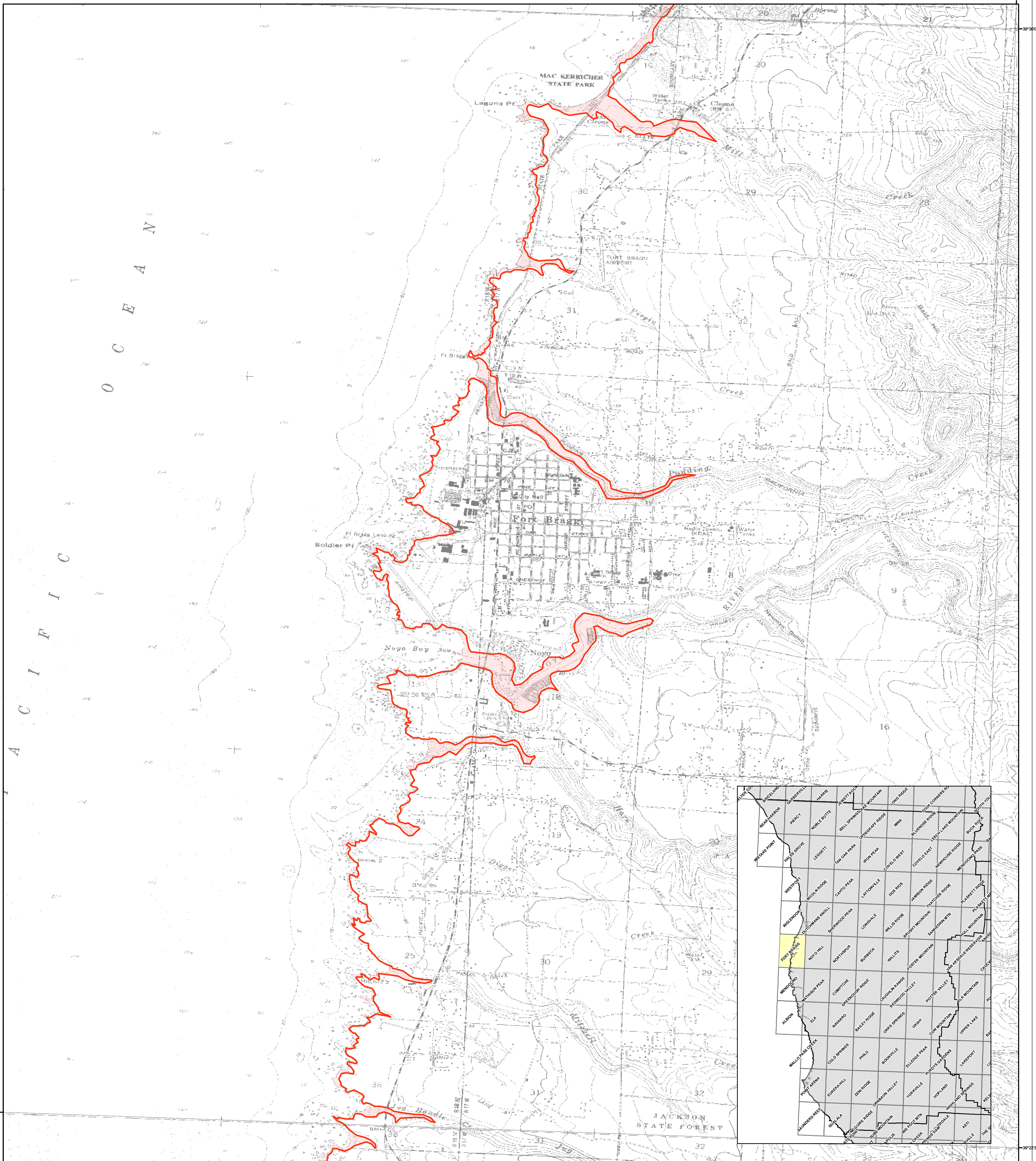
Do we have a regional response planned even though the Harbor is in the county, but not in the city?

The RAP for the rest of OU-E remains a chance for the CC to insist that we cannot leave in place the toxic legacy of G-P.

Thanks for this opportunity to comment, rather more broadly, on this tsunami update. As in all things environmental it is all connected.

And thanks for all you do to keep our community moving forward,

George Reinhardt



METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

References:

- Intermap Technologies, Inc., 2003, Intermap product handbook and quick start guide: Intermap NEXTmap document on 5-meter resolution data, 112 p.
- Lander, J.F., Lockridge, P.A., and Kozuch, M.J., 1993, Tsunamis Affecting the West Coast of the United States 1806-1992: National Geophysical Data Center Key to Geophysical Record Documentation No. 29, NOAA, NESDIS, NGDC, 242 p.
- National Atmospheric and Oceanic Administration (NOAA), 2004, Interferometric Synthetic Aperture Radar (ISAR) Digital Elevation Models from GeoSAR platform (EarthData): 3-meter resolution data.
- Titov, V.V., and Gonzalez, F.I., 1997, Implementation and Testing of the Method of Tsunami Splitting (MOST): NOAA Technical Memorandum ERL PMEL - 112, 11 p.
- Titov, V.V., and Synolakis, C.E., 1998, Numerical modeling of tidal wave runup: Journal of Waterways, Port, Coastal and Ocean Engineering, ASCE, 124 (4), pp 157-171.
- U.S. Geological Survey, 1993, Digital Elevation Models: National Mapping Program, Technical Instructions, Data Users Guide 5, 49 p.

TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of Mendocino
FORT BRAGG QUADRANGLE

June 1, 2009

SCALE 1:24,000

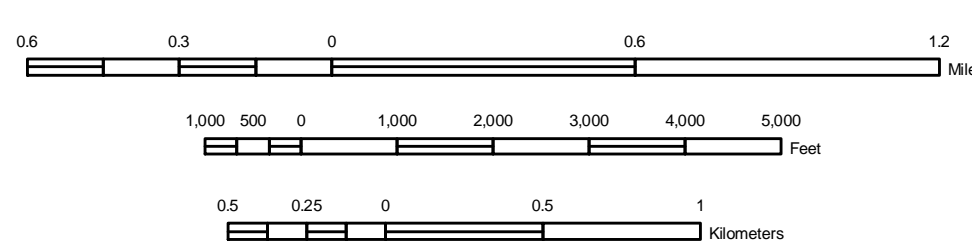


Table 1: Tsunami sources modeled for the Mendocino County coastline.

Sources (M = moment magnitude used in modeled event)	Areas of Inundation Map Coverage and Sources Used		
	Shelter Cove	Mendocino	Point Arena
Cascadia Subduction Zone-south segment, narrow rupture (M8.4)	X	X	
Cascadia Subduction Zone-south segment, wide rupture (M8.5)	X	X	X
Cascadia Subduction Zone-south segment and Little Salmon Fault #2 (M8.5)	X	X	
Central Aleutians Subduction Zone #1 (M8.9)	X	X	X
Central Aleutians Subduction Zone #2 (M8.9)	X	X	X
Central Aleutians Subduction Zone #3 (M9.2)	X	X	X
1964 Alaska Earthquake (M9.2)	X	X	X
Japan Subduction Zone #2 (M8.8)	X	X	
Kuril Islands Subduction Zone #2 (M8.8)	X	X	
Kuril Islands Subduction Zone #3 (M8.8)	X	X	
Kuril Islands Subduction Zone #4 (M8.8)	X	X	
Marianas Subduction Zone (M8.6)	X	X	X

MAP EXPLANATION

- Tsunami Inundation Line
- Tsunami Inundation Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to assist cities and counties in identifying their tsunami hazard. It is intended for local jurisdictional, coastal evacuation planning uses only. This map, and the information presented herein, is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose.

The inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami runup from a number of extreme, yet realistic, tsunami sources. Tsunamis are rare events; due to a lack of known occurrences in the historical record, this map includes no information about the probability of any tsunami affecting any area within a specific period of time.

Please refer to the following websites for additional information on the construction and/or intended use of the tsunami inundation map:

State of California Emergency Management Agency, Earthquake and Tsunami Program:
<http://www.oes.ca.gov/WebPage/oeswebsite.nsf/Content/B1EC51BA215931768825741F005E8D80?OpenDocument>

University of Southern California - Tsunami Research Center:
<http://www.usc.edu/dept/tsunamis/2005/index.php>

State of California Geological Survey Tsunami Information:
http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/index.htm

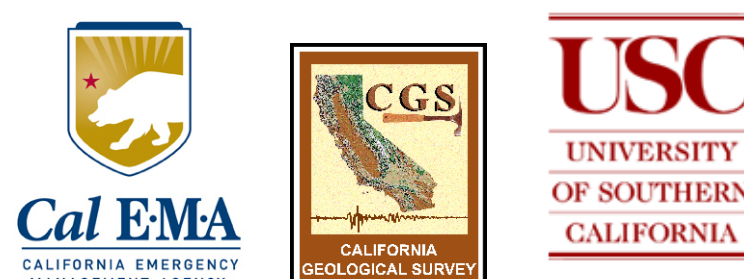
National Oceanic and Atmospheric Administration (NOAA) (MOST model):
<http://mtr.pmel.noaa.gov/time/background/models.html>

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the State of California nor USC shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.



From: noreply@granicusideas.com
To: [Lemos, June](#)
Subject: New eComment for City Council - Via Video Conference - AMENDED
Date: Monday, February 8, 2021 5:01:18 AM

[SpeakUp](#)

New eComment for City Council - Via Video Conference - AMENDED

Gabriel Maroney submitted a new eComment.

Meeting: City Council - Via Video Conference - AMENDED

Item: 8A. 21-038 Receive Report from Redwood Coast Tsunami Work Group, California Geological Survey and California Governor's Office of Emergency Services California Tsunami Program Representatives on Tsunami Hazard Updates and Consider Adoption of City Council Resolution Adopting Updated Tsunami Hazard Maps

eComment: Ideally local efforts would act as a beacon and paragon to be emulated in discovering the next generation of scientific breakthroughs to set trends in modeling. Working directly with foundations like the National Oceanic and Atmospheric Administration, State Universities, local colleges, and marine science groups to develop local programs, research centers, and observation outposts.

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From: [Gabriel Maroney](#)
To: [Lemos, June](#)
Cc: [Norvell, Bernie](#); [Morsell-Haye, Jessica](#); [Peters, Lindy](#); [Albin-Smith, Tess](#); [Miller, Tabatha](#); [Lee, Will \(Personal\)](#)
Subject: Regarding Conduct of Business 8A. 21-038
Date: Monday, February 8, 2021 4:31:50 AM
Attachments: [SLR.pages](#)

Good Morning June!

I am submitting comments (attached) for 8A.

Thank you,
Gabriel

**Regarding Conduct of Business 8A. 21-038:
To consider a resolution recognizing the necessity of updated tsunami
inundation maps and adopting them for local use.**

Dear Honorable Fort Bragg Council Members,

I greatly appreciate attention given to this venue as it has direct influence on our community's safety and future viability. Although updating tsunami inundation maps is a sound and important action, it is frankly a small element in comparison to the totality of actionable opportunities in preparation for disaster and adaptive coastal response systems. In short, it can be an invaluable step, yet this step is insufficient alone...as we know; The council might also extend effort further to make sure what is updated be the best and most up to date mapping and available state of sciences related; such as the map George Reinhardt forwarded to the council in due diligence. Further, it may be imperative to solicit collaboration and feedback from the Noyo Harbor Commission and other effected property owners within expanded tsunami zones, including how to implement the updated information; also because it has the potential to limit development further and also has the inherent ability to ensure enhanced future safety.

I recall the Council's affirmation to be self reliant and visionary, being that this region can be similar to an island and therefore anticipate, plan, and engender local enduring sustainability across critically essential community needs. Because of this I encourage the Council to prioritize developing multi-institutional committees that support and seek a robust build up in Natural Science and Ecosystem Analysis. A simple example of this is the potential Noyo Harbor, City, and County Ad Hoc committee that could also include education institutions and citizen research/science advisory positions to review intel and correspond with intelligence agencies. An investment in attempts to extend communication and develop the Nexus between these governmental bodies and other associated institutions will aid to traverse opportunities in addressing sea level rise, emergency preparedness, tsunamis, and the evolution of response. Directly put, **WE** (our coastal region) should be at the

vanguard of researching and providing analysis and data to the community at large (and globally) when it comes to this critical infrastructure. Ideally local efforts would act as a beacon and paragon to be emulated in discovering the next generation of scientific breakthroughs to set trends in modeling. Working directly with foundations like the National Oceanic and Atmospheric Administration, State Universities, local colleges, and marine science groups to develop local programs, research centers, and observation outposts to undertake a long term commitment to prepare and instill proper safety protocols to sufficiently armor the public against disasters such as tsunamis that could strike at any moment. Current systems are far behind and not only need to catch up to a modern understanding, but also lead and act as the tip of the spear of oceanic modeling.

Thank you for your contemplation, time, and consideration.

Essentially,
Gabriel Quinn Maroney



From: [Jenny Shattuck](#)
To: [Lemos, June](#)
Subject: Tsunami
Date: Monday, February 8, 2021 7:17:02 PM

This report was great and I truly hope it brings to light the very real need to restore our airstrip on the millsite. OES has said we will be on our own for months should a major emergency happen, as highly populated areas will need and be focus of reaources. Having somewhere between bridges to land in an emergency, given that it isnt destroyed, will be essential. Be it for supplies, staging area etc.

Thank you,
Jenny Shattuck