

Question: How Will Rising Sea Levels Affect Coastal Residents and US Public Policy?

Sea-level rise(s) (SLR) is seen as a future threat, but it is occurring now in most coastal regions across the world. Thus, SLR should affect not only long-term planning in coastal regions but also emergency preparedness. The problem's inevitability, irrevocability, uncertain future, geographic heterogeneity, potential lethality, and its ability to alter long-term infrastructure development plans create unique challenges for the decision making processes. Indonesia announced last year plans to move its capital out of Jakarta, a city with 10 million, sinking and severally threatened by the increase in sea level. Future emissions, and the polar ice sheet's responses to these emissions, will lead to variable outcomes in future SLR in the United States and globally. The variability of outcomes leads to difficulty for scientists projecting the future.

However, recent United States government-funded scientific groups contributing to the Fourth National Climate Assessment Report (which is the scientific document that informed H.Res. 109), including the US Federal Interagency Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Task Force, have made recent advancements in understanding the future of SLR. These advancements have included predicting a more scientifically plausible future, including realistic but high-end scenarios, and developing regional SLR predictions that incorporate the effects of ocean dynamics and physics instead of the global mean sea-level rise projection, which is too uniform. In the past five years, scientists have also further improved their understanding of the likelihood of different future SLR scenarios by creating probability distributions based on possible future greenhouse gas emission levels.

As increased severity and frequency of coastal flooding is an early indicator and most imminent consequence of SLR, most public policy measures are related to flood mitigation,

recovery efforts, and insurance. The problem is already severe: over the last two decades, the frequency of high-tide floods rose by 50 percent; and since 2000, floods resulted in more than \$800 billion in losses. When coastal communities were formed, before the effects of climate change, developers considered where there were historically high tides and added additional space to avoid infrastructure and residents from being affected by coastal flooding. However, high tides have gotten even higher, and once-in-one-hundred-year floods now occur once in a decade. Furthermore, a storm is no longer needed to create significant flooding.

Current flood mitigation regulations in the United States are not strong enough. Although the national flood insurance program has been adjusted in recent years to reflect increased coastal area flooding risks due to climate change, FEMA (the Federal Emergency Management Agency), the agency that dispurses flood mitigation assistance grants and regulates flood insurance, only considers current flood risk. In addition, FFRMS (the Federal Flood Management Standard) was an executive order passed in 2015 by the Obama administration to address the growing threat of flood damage. Federally funded infrastructure projects were required by the order to be built outside the area with high-flood risk. If not possible, projects had to be secured to withstand a higher degree of flooding than conventional practices require. However, the Trump administration repealed the executive order in August 2017. The revocation means that federally funded roads, schools, seaports, and waste facility management plants will be ill-equipped to withstand inevitable flooding. As a result, Americans who work, travel, and live in coastal areas and the federal government will experience significant capital, social, and human losses.

As a response to the executive order, two governmental agencies proposed building changes, which were eventually not implemented due to Trump's revocation of the executive

order. One of the agencies, the Department of Housing and Urban Development (HUD), proposed higher elevation requirements for new or significantly renovated HUD-funded infrastructure located inside a once-in-100-year flood range. For nonessential infrastructures, such as affordable housing, the HUD proposal would have a mandated infrastructure built two feet above the 100-year flood range height. For essential infrastructures such as hospitals and nursing homes, the elevation requirement would have been three feet or more above the height. More than 11,000 public housing units funded by HUD are located in the 100-year floodplain.

Before the executive order and after the order's revocation, the height of the 100-year flood is and was the usual standard for federally funded projects, even if this is not the official policy. FEMA's information that they provide for flood insurance rates is also the primary source for discerning the height of the once-in-100-year flood. However, almost two-thirds of these maps are either outdated or inaccurate. Poor mapping negatively affects local building requirements and plans for federally-funded infrastructure and local homeowners who are being screwed out of fair coverage. In addition, in 2020, the New York Times reported that data from independent research revealed that about twice as many properties are vulnerable to flood damage than are reported by existing FEMA data. For example, FEMA maps show that just 0.03% of Chicago properties are within once-in-100-year flood zones. However, new and more accurate data not used by the government or for flood insurance purposes indicates that almost 13% of Chicago properties are within the flood zones. Similarly, in Port Charlotte, Florida, FEMA estimated that 33% of properties were located within flood zones; however, the new data indicates this figure is closer to 80%. Nevertheless, FEMA's 2021 budget request significantly reduced funding for flood risk mapping.

Furthermore, the United States has no adaptation plan for coastal SLR. Without adaptation, global flood damage is expected to account for 4% of the world's GDP. Protection against coastal flooding is economically beneficial for 13% of the world's coastlines, accounting for 90% of the global coastal population. As of 2020, the United States is the only country belonging to the United Nations' Organization for Economic Cooperation and Development (OECD) that does not have a centralized adaptation plan for SLR risk management, except for New Zealand, which is in the process of developing one. No adaptation plan or a faulty one can cause: increased reliance on unsafe infrastructure, political pressure to build in flood-prone areas, and an increased cost to homeowners and taxpayers as flood damage becomes too frequent and severe to be covered by flood insurance. Additionally, the United States has no economic incentives for risk reduction, no dedicated federal funding for local governments to aid in risk reduction or funding for household-level preemptive protection measures (currently local governments must compete for FEMA's scarce flood mitigation assistance grants), as well as no specific measures for evaluating current policy.

The OECD recommends three strategies for managing coastal flooding risks: "reduce the likelihood of the hazard," "reduce vulnerability," and "reduce exposure."

A recommended measure for "reduce the likelihood of the hazard" is building physical defenses, such as sea walls. An example of current practice within the United States is that in the aftermath of Hurricane Katrina, the federal, local, and state governments combined \$20 billion on building 350 miles of physical defenses against hurricanes, such as levees and floodwalls.

However, experts argue that this is not enough and that New Orleans is under existential threat. When I was in New Orleans and toured the levees, there were visible cracks in the levees,

and I was able to jump under them at some points. Drawbacks against physical defenses include displacement of coastal recreation activities, the potential for failure in the future, and high maintenance costs. The OECD also recommends the restoration of dunes or traditional vegetation. Benefits include preserving tourism and reducing erosion, and it is easy to modify as the situation worsens. However, in the long term, effectiveness is expected to decrease with increased SLR.

OECD recommended measures to “reduce vulnerability” include changing building standards, encouraging families and landlords to use proactive measures to protect themselves against storm and flooding risks, and instituting an emergency management agency. As stated before, the FFRMS was repealed, there is no federal funding for household-level preemptive protection measures, and FEMA’s flood maps are inaccurate. Additionally, FEMA has been notoriously awful at responding to natural disasters, especially events that affect mostly disenfranchised populations such as Hurricane Katrina, Hurricane Irma, and Hurricane Maria. The United States has a long way to go in all these measures and benefits include: mitigating the loss of life, raising awareness. These policy suggestions are more comfortable and cheaper to implement than the other two of OECD’s strategies.

Recommendations to “reduce exposure” are the most disheartening; however, they are inevitable and necessary for saving countless lives. The OECD recommends halting new development in high-risk areas and relocating people and critical infrastructure located in risk-zones. These measures are expensive as they require current residents’ compensation and will be against public opinion unless the threats become life-threatening daily. Newtok, a small village in western Alaska home to the indigenous Yup’ik people, is losing 70 feet of coastline every year, and the village’s school and airport are predicted to be inoperable by 2023. The

village is building a new village further inland, and it took the indigenous community 17 years to raise the total funds needed. Thankfully, the village is in the process of relocation and plans to be relocated by 2023 fully. This will be the first community in the United States to be relocated due to climate change.

Policy Endorsements and Recommendation

- Pass S.1276/H.R. 2462 - Flood Mapping Modernization and Homeowner Empowerment Pilot Program Act of 2019
- President Biden should pass the Federal Flood Management Standard as an executive order, just as former President Obama did in 2015
- Create a comprehensive SLR risk-management policy plan based on the Fourth National Climate Assessment Report, US Federal Interagency Sea Level Rise and Coastal Flood Hazard Scenarios and Tools Task Force findings and, and OECD recommendations.
- Create a task force to evaluate FEMA's responses to natural disasters that primarily affect socioeconomically disadvantaged communities
- Create a federal agency responsible for aiding in the relocation of communities permanently destroyed due to SLRs.

Works Cited

ABA Article Calls for a Federal Flood Protection Standard (2020, April 14).

<https://www.nrdc.org/experts/joel-scata/aba-article-calls-federal-flood-protection-standard>

Can't 'See' Sea Level Rise? You're Looking in the Wrong Place – Climate Change: Vital Signs of the Planet. (2020, May 13)

<https://climate.nasa.gov/blog/2974/cant-see-sea-level-rise-youre-looking-in-the-wrong-place/>

Earls, M. (2019, December 14). *Alaska's Coastal Communities Face a Growing Climate Threat*. Scientific American.

<https://www.scientificamerican.com/article/alaskas-coastal-communities-face-a-growing-climate-threat/>.

Federal Emergency Management Agency (n.d.). *Flood Mitigation Assistance (FMA) Grant*.

<https://www.fema.gov/grants/mitigation/floods>

Flood Mapping Modernization and Homeowner Empowerment Pilot Program Act,

S.1276/H.R.2462, 116th Cong. (2019).

<https://www.congress.gov/bill/116th-congress/senate-bill/1276/related-bills>

John A. Hall, Christopher P. Weaver, Jayantha Obeysekera, Mark Crowell, Radley M. Horton, Robert E. Kopp, John Marburger, Douglas C. Marcy, Adam Parris, William V. Sweet, William C. Veatch & Kathleen D. White (2019) *Rising Sea Levels: Helping Decision-Makers Confront the Inevitable*, *Coastal Management*, 47:2, 127-150, DOI: 10.1080/08920753.2019.1551012

OECD (2019) *Responding to Rising Seas: OECD Country Approaches to Tackling Coastal Risks*, OECD Publishing. <https://doi.org/10.1787/9789264312487-en>

Recognizing the duty of the Federal Government to create a Green New Deal, H.Res.109, 116th Cong. (2019). <https://www.congress.gov/bill/116th-congress/house-resolution/109>

Scata, Joel (2020) *Rising Tide Lifts All Damage Costs: The Need for a Federal Flood Protection Standard Natural Resources & Environment* Volume 34, Number 4, Spring 2020 Com. American Bar Association

Schwartz, J., & Schleifstein, M. (2018, February 24). *Fortified but Still in Peril, New Orleans Braces for Its Future*. New York Times.

<https://www.nytimes.com/interactive/2018/02/24/us/new-orleans-flood-walls-hurricanes.html>.

Sullivan, L., & Schwartz, E. (2018, July 13). *FEMA Report Acknowledges Failures In Puerto Rico Disaster Response*. NPR.

<https://www.npr.org/2018/07/13/628861808/fema-report-acknowledges-failures-in-puerto-rico-disaster-response>.

Sweet, W.V., R. Horton, R.E. Kopp, A.N. LeGrande, and A. Romanou (2017) *Sea level rise*. In: *Climate Science Special Report: Fourth National Climate Assessment*, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 333-363, doi: 10.7930/J0VM49F2.