

Reports: Cities Need to Plan Now for Flooding From Sea-Level Rise

In the aftermath of perhaps the worst flood in U.S. history, there has been ample debate about whether climate change caused or intensified Hurricane Harvey, which inundated Houston last summer. What appears certain, however, is that flooding of American cities will be increasingly commonplace, due to gradual sea-level rise caused by climate change.

A month before Hurricane Harvey hit Texas, the Union of Concerned Scientists published “When Rising Seas Hit Home,” which examines the timeline for and number of communities that are likely to be “chronically inundated” due to sea-level rise. Chronic inundation occurs when 10 percent or more of a community’s land (excluding wetlands and land protected by federal levees) is flooded at least 26 times per year. In these towns, gradual sea-level rise takes a serious toll that eventually “makes normal routines impossible,” according to the report. For example, homes may be flooded, commutes to work hindered, and properties devalued.

The report examines three scenarios — low, intermediate and high sea-level rise. The scenarios are dependent in part on the degree of global emission reductions, but the report nevertheless recognizes that “for many hundreds of communities increased flooding is inevitable and adaptation is now essential.”

Under the “moderate” sea-level rise scenario, UCS predicts that by 2035, about 170 communities will experience chronic inundation — double the number today. Most of these are in Louisiana and Maryland, where land subsidence is increasing the rate of rise. Within 45 years, more than 270 coastal communities

could be chronically inundated, including many that to date rarely, if ever, are subject to flooding. By the close of the century, close to 490 communities — and 40 percent of all East and Gulf Coast oceanfront communities — are predicted to be chronically inundated.

The numbers are even more jarring under the “high” scenario. The report estimates that by the close of the century the number of chronically inundated communities could jump to 670 and the percent of East and Gulf oceanfront communities to 60 percent. In addition, a growing number of West Coast communities and more than 50 heavily populated areas, such as Oakland, Miami, and four of New York’s five boroughs, could face chronic inundation.

Another recent study by Buchanan and others published in *Environmental Research Letters* similarly found that flood frequency will “amplify” as a result of sea-level rise and is anticipated to be “one of the most economically damaging impacts of climate change for many coastal locations.” The researchers predict by 2050 “a median 40-fold increase . . . in the expected annual number of local 100-year floods at tide-gauge locations” along the American coast. The study notes that some locations will have a higher frequency of “historically preceded” floods, while others may have increases in lower frequency, “historically unprecedented” types of floods.

Both studies emphasize the critical importance of planning for increased flooding. Buchanan explains that coastal communities can plan for resiliency if they understand how flood levels will change. The UCS report authors put the options for coastal cities and towns in stark terms: defend, accommodate, or retreat.

**For coastal cities
“increased flooding
is inevitable and
adaptation essential”**



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Specifically, UCS asserts that coastal communities “from Maine to Washington State will be forced to make difficult choices about whether and how much to invest in flooded areas versus when to retreat from them.” For example, efforts to “defend” include measures to reduce erosion and storm surge, such as building gray and green infrastructure projects (e.g., sea walls and wetlands), whereas “accommodation” entails managing flood waters through measures such as elevated infrastructure and using large-scale pumps. In particular, cities should plan now for infrastructure projects that can take years to plan and construct, let alone finance.

Sea-level rise also will have notable effects on non-coastal communities, as populations retreat from the coasts and relocate. A recent study by Hauer, et al., in *Nature Climate Change* estimates that 13.1 million Americans eventually will relocate due to sea-level rise and that Atlanta, Houston, and Phoenix are top destinations. These and other cities, particularly those already challenged by population growth, will need to plan for the migration. And it is ironic, of course, that Houston, which last year experienced the worst flood in American history, is one of those primary destinations.

Simply put, now is the time for coastal and interior cities to prepare for the inevitable floods of water and affected populations that will result from rising sea levels.