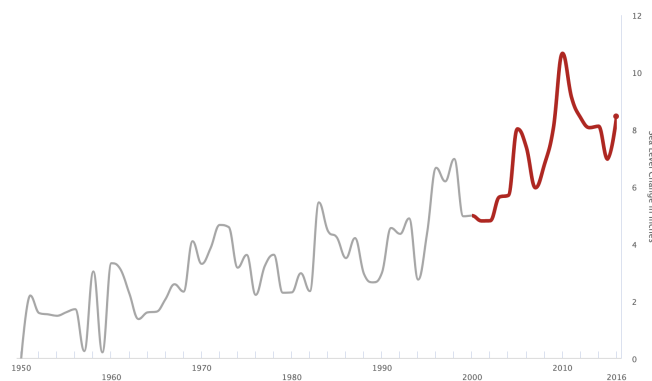


# SURING SEA: PROJECT REPORT

Topic Boston Sea Level Rise data

Source: <https://sealevelrise.org/states/massachusetts/>

- The sea level off Massachusetts' coast is up to 8 inches higher than it was in 1950
- This increase is mostly due to changes in ocean circulation and ice melt.
- Solutions can be complicated because although Massachusetts has coastal wetlands and beaches that protect communities and wildlife from flooding, these natural barriers are themselves at risk from sea level rise.
- The sea level around Boston, Massachusetts, has risen by 8 inches since 1950
- Its speed of rise has accelerated over the last ten years and it's now rising by about 1 inch every 8 years.
  - Scientists know this because the sea level is measured every 6 minutes using equipment like satellites, floating buoys off the coast, and tidal gauges to accurately measure the local sea level as it accelerates and changes.



- While there are four main causes of sea level rise in Massachusetts, changes in ocean circulation and ice melt<sup>3</sup> are the largest contributors.

- Because the rate of ice melt has been increasing significantly since 1992, and changes in ocean circulation are causing coastal storms such as Nor'easters to increase in frequency and intensity, Massachusetts is particularly vulnerable to sea level rise
- Unfortunately, slightly higher sea levels make hurricanes even more damaging. Just a few more inches of sea level rise allow a hurricane to push more water onto the land, even if the hurricane itself doesn't make landfall.
- Some cities have sufficient resources to deal with this problem while others do not. Massachusetts will need solutions at the individual, local, state, and federal levels to protect its coastal communities.

SOURCE:

<https://www.wbur.org/news/2021/06/15/boston-climate-change-sea-level-rise-numbers>

- Sea levels around Boston rise **1 inch** every eight years. The rate of rise is accelerating.
- Main Street in Charlestown is being raised by **2 feet** to protect more than 250 residents from sea-level rise.
- **3** of the top 5 U.S. cities with the most affordable housing vulnerable to coastal flooding are in Mass.: Revere, Boston and Quincy.
- Boston's sewers are designed to handle **5 inches** of rainfall every 24 hours. Any more and the system overflows.
  - \*Technically it's 5.15 inches, but we like nice, round numbers. And besides, we're trying to stick to a theme here!
- There were **7 days** of high tide flooding in 2019. By 2050, there may be up to 95 days.
- Boston's sea level may rise **40 inches** by the 2070s. If that happens, flooding across most of South Boston will occur at least once a year.

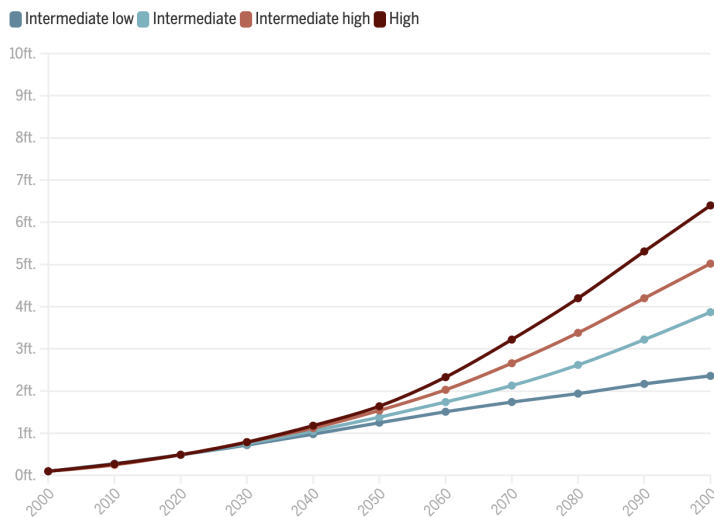
SOURCE :

<https://www.boston.com/news/local-news/2022/02/17/heres-what-rising-sea-levels-mean-for-boston-according-to-a-new-report/>

The interagency study, led by the National Oceanic and Atmospheric Administration, forecasts that by 2050, sea levels along US coastlines will be about a foot higher than they were in 2000. That increase will be even sharper in Boston and elsewhere in the Northeast: The region is likely to see 16 inches of sea level rise compared with 2000 levels.

#### When will 2ft. of sea level rise occur

Here is how much NOAA expects sea levels to rise at the Boston, MA tide gauge based on four different emissions scenarios (or levels of greenhouse gas emissions)



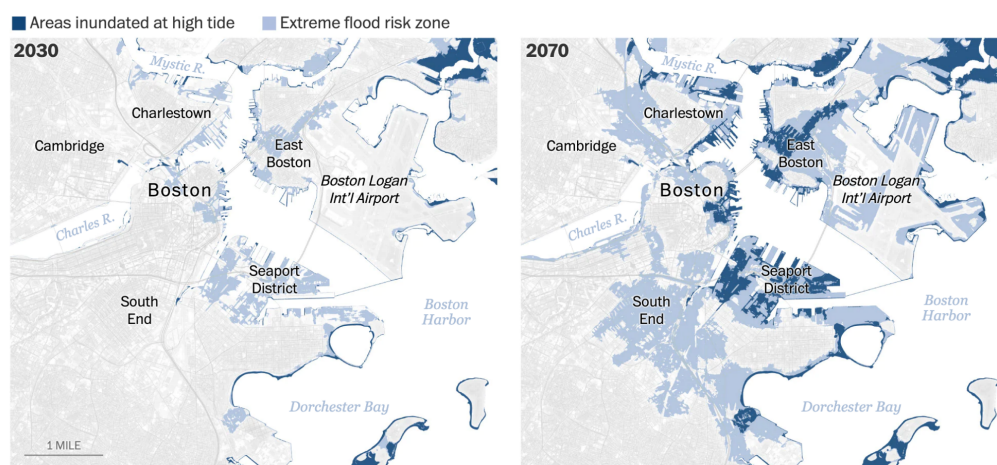
Source: NOAA • Based on projections for the Boston, MA tide gauge. • Ryan Huddle / Globe staff

- The report, which provides the most concrete national sea level projections to date, forecasts three to six days of moderate high tide flooding a year by 2050 in the Northeast, whereas the national average will be four days.
- Boston already experiences some of the worst high-tide flooding in the nation.
- Interactive map depicting what 1ft - 7ft of sea level rise looks like

SOURCE :

<https://www.washingtonpost.com/climate-solutions/2020/02/19/boston-prepares-rising-seas-climate-change/>

- Although Florida, Louisiana and the Carolinas are frequently associated with flooding, Boston was ranked the world's eighth most vulnerable to floods among 136 coastal cities by a 2013 study produced by the Organization for Economic Cooperation and Development.
- The sea that surrounds Boston crept up nine inches in the 20th century and is advancing ever faster toward the heart of the city.
- And as climate change accelerates, the pace of sea-level rise in Boston is expected to triple, adding eight inches over 2000 levels by 2030, according to a report commissioned by the city. The ocean might climb as much as three feet above 2013 levels by 2070, the report said.



"Extreme flood risk" refers to a 100-year flood, or a flood with a 1 percent annual chance of occurring.

Sources: Climate Ready Boston datasets via Analyze Boston; OpenStreetMap

- A surging sea could wreak havoc in a place where half the city is built on low-lying landfill. Among the vulnerable spots are commercial piers, Logan International Airport, low-income neighborhoods, the South End, the New England Aquarium and pricey apartment buildings in the newly redeveloped Seaport area. The effects are evident already; seawater at high tide has lapped up onto some streets even on days when the sun is shining.

- Even in a city that is trying to grapple with the problem, the challenge is enormous. Greenhouse gases are global, but the impact of climate change is local.
- Boston's low-income neighborhoods, where public housing projects were built on landfill, are particularly vulnerable to flooding. By the end of the century, a large part of the Dorchester neighborhood, which on its own would be the fourth-largest city in Massachusetts, could be underwater.
- The rise in sea levels has two main drivers: the melting of ice sheets in Greenland and Antarctica; and "thermal expansion," meaning that warm water has greater volume than cool water.
- The result will be a global sea-level rise of more than 10 inches by 2100 if the rise in global temperatures stays within the two degrees Celsius (3.6 degrees Fahrenheit) target set in the Paris accord, the international agreement signed in 2015.
- Other scenarios are more alarming. The Boston city government has a slide presentation with a bar chart representing a 7-foot, 4-inch rise in sea levels by 2100 if worldwide carbon emissions continue to climb. Next to the bar stands a drawing of former Boston Celtics basketball star Kevin Garnett, who is a few inches short of the 7-foot-4 mark.
- The forecast numbers all have substantial margins of error, but even the smallest sea-level rise is threatening.