

# MASSACHUSETTS AFFORDABLE HOUSING AT RISK: THREATS FROM COASTAL FLOODS AND SEA LEVEL RISE

Affordable housing serves as a lifeline for individuals and families struggling financially across the United States. Analysis conducted by scientists at Climate Central and published in [Environmental Research Letters](#) looks at the risk of coastal flooding to affordable housing—both subsidized and market-driven—as sea levels rise. They found that more than 7,600 units are currently exposed to at least one “coastal flood risk event” in a typical year, and more than 24,500 units may be so threatened by 2050.

**Massachusetts’s affordable housing stock is the 3rd most vulnerable in the nation in terms of units at risk of future coastal flooding.** Climate Central analyzed current and future risk under a high-carbon emissions scenario and found:



Massachusetts currently has **1,530 units** (0.6%) of its affordable housing stock threatened by coastal flooding, the 3rd highest number of such units in the nation.



**4 cities** in Massachusetts ranked among the top 20 cities nationwide with the most affordable housing units at risk in 2050.



In 2050, **4,818** units could be exposed to coastal flooding, or 2% of Massachusetts' affordable housing stock.



Boston currently has an average **609 units** exposed. In 2050, **3,042 units** in Boston are expected to be at risk per year, a **400% increase**.

**Vulnerability of Existing Affordable Housing Supply by 2050**

City (National Rank)	Average # of units exposed per year by 2050	% Increase in units exposed 2000 vs 2050	% of affordable housing supply exposed in 2050	% of units that are subsidized	Units with 4 or more flood-risk events per year in 2050
<i>Boston (3)</i>	3,042	400%	4%	89%	407
<i>Quincy (6)</i>	668	31%	12%	64%	511
<i>Cambridge (8)</i>	510	1278%	8%	67%	0
<i>Revere (15)</i>	266	0%	24%	100%	266





## WHAT YOU NEED TO KNOW

- Coastal flooding has risen sharply in recent decades and is expected to increase. This flooding includes **extreme event floods** (associated with hurricanes or other heavy-precipitation events) as well as floods not associated with weather, known as **tidal, nuisance, or sunny day flooding**.
- Nationwide, affordable housing is an increasingly scarce resource, with only 35 affordable rental units available for every 100 extremely low-income renters—a national shortfall of over 7 million units that impacts all 50 largest metropolitan areas.
- Affordable housing is more vulnerable to flooding, as it tends to be older and of poorer quality than other housing, and is rarely equipped with resilience-enhancing features (such as off-grid energy, backflow prevention valves, and flood-proofing).

## TERMINOLOGY

A **coastal flood-risk event** at a building is defined as when local coastal water levels rise higher than the lowest point of the building's ground elevation. Different combinations of tides, storm surges, and sea level rise drive these water levels. An event is counted only when a building is hydrologically connected to the coast at the water level achieved; in other words, barriers such as ridges or levees are not known to protect the building at that water level.

Whether a flood actually occurs also depends on other factors, including how high the water gets, how long it stays high, how close the building is to the coast, how rough the terrain is, and meteorological details such as wind strength and direction and amount of rainfall, if any, and how far inland floodwaters reach during a particular high tide or storm.

**Subsidized affordable housing stock** data used in this analysis comes from a comprehensive dataset of federally subsidized affordable housing buildings as of November 2018. Those data were collected through the [National Housing Preservation Database](#), managed by the Public and Affordable Housing Research Corporation and the National Low Income Housing Coalition and analyzed by the [National Housing Trust \(NHT\)](#). Naturally occurring affordable housing includes apartments or houses that rent at levels below the local median market rent rates without subsidies, and was identified through the national [CoStar Building Rating System](#), which rates commercial real estate properties.

## METHODOLOGY

Each affordable housing building's footprint was assessed for the annual probability of experiencing at least one coastal flood risk event in a given year. Sea level rise projections were based on [Kopp et. al 2014](#), and coastal flood risk statistics were based on [Tebaldi et. al 2012](#). These structure probabilities were added together to estimate the total expected annual exposure at zip code, city, county, and state levels. For more detail, see the [paper online](#). To explore affordable housing vulnerability given a range of sea level rise projections and storm surge events, see the [online tool](#) at [coastal.climatecentral.org](#).

*[Climate Central](#) is an independent organization of leading scientists and journalists researching and reporting the facts about our changing climate and its impact on the public. Climate Central's [Program on Sea Level Rise](#) provides accurate, clear, and granular information about sea level rise and coastal flood hazards both locally and globally, today and tomorrow. We offer user-friendly maps and tools, datasets, and high-quality visual presentations.*