# New research reveals millions of buildings at risk from rising sea levels by 2100



Rising sea levels pose an alarming threat to global coastal infrastructure, with new research suggesting that over 100 million buildings could be submerged by 2100 if fossil fuel emissions are not rapidly curtailed. Scientists from McGill University in Montreal have conducted the first large-scale building-by-building assessment of sea level rise vulnerability, focusing on regions of the Global South—encompassing Africa, Southeast Asia, and Central and South America. Their study, which utilised detailed satellite imagery combined with elevation data, reveals that even a relatively modest rise in sea levels of 0.5 metres (1.6 feet) would flood approximately three million buildings in these vulnerable regions alone.

The research highlights the inevitability of some degree of flooding due to warming already set in motion by historic emissions, with sea levels projected to rise by at least 0.5 metres even in a best-case scenario aligned with the Paris Agreement's goals. Under this scenario, which assumes rapid emission reductions and net-zero targets by 2050, about five million buildings are expected to be below the high tide mark by century's end. More pessimistic projections warn that without urgent action to halt emissions, sea levels could rise by up to five metres (16 feet) or more, imperilling up to 45 million buildings just in the Global South. In an extreme, worst-case scenario of a 20-metre (65-foot) rise, this figure balloons to approximately 136 million buildings at risk of permanent inundation.

The implications extend far beyond the immediate loss of housing and commercial structures. Many of the affected buildings are located in densely populated urban areas and key ports critical for trade and food supplies. According to Professor Eric Galbraith, co-author of the study, the disruption of coastal infrastructure could wreak havoc on global economies and food systems, given society's heavy reliance on goods and fuels transported through vulnerable sea-level exposed facilities.

The threat is not confined to the Global South. United Kingdom coastal cities are also at significant risk, with areas such as Great Yarmouth and large portions of London predicted to fall below the high tide mark. Notably, tidal flooding in London could extend to suburbs as far south as Peckham and as far north as Barking. Other major UK cities including Liverpool, Cardiff, Bristol, Glasgow, Manchester, and Leeds could experience flooding that reaches their outskirts or central areas. Similarly, in continental Europe, vast stretches of England and nearly the entirety of the Netherlands might be submerged under extreme sea level scenarios.

These projections align with other global findings. For instance, a 2024 study in France estimates that over 450,000 homes could be impacted by coastal erosion by 2100, with economic damages running into tens of billions of euros. Across the Atlantic, data from the United States warns of significant risks to critical infrastructure assets like schools, government buildings, and homes along coasts in states such as California, Florida, and Louisiana, facing frequent flooding by 2050.

Beyond direct property loss, the economic consequences are profound. Climate Central’s 2022 analysis highlights the financial vulnerability of coastal tax parcels in the US, forecasting multi-billion-dollar tax losses by mid-century attributable to flooding-related submersion of properties. Such impacts underscore the urgent need for comprehensive urban planning, coastal defence strategies, and global cooperation to mitigate climate risks.

The urgency is further underscored by warnings from international leaders. In 2022, UN Secretary-General Antonio Guterres raised alarm at the UN Security Council about sea level rise threatening nearly 900 million people in low-lying coastal regions worldwide. He highlighted the unthinkable consequences of unchecked warming, including mass migrations, intensified resource competition, and the existential threats faced by vulnerable nations, including small island states.

McGill University's findings therefore add critical detail and scale to the global narrative on sea level rise. While the melting of polar ice caps and the thermal expansion of ocean waters were already recognised as key drivers, this new building-level risk assessment brings into sharp relief the human and infrastructural toll of rising seas. The researchers stress that even if international climate goals are met, sea levels will continue rising for centuries due to long-term inertia in the climate system. Professor Natalya Gomez, a co-author, reminds us that “sea level rise is a slow, but unstoppable consequence of warming” already impacting millions and poised to intensify unless fossil fuel use is dramatically curtailed.

The collective evidence from studies worldwide makes clear that addressing sea level rise demands urgent emission cuts alongside proactive planning to safeguard vulnerable populations, infrastructure, and economies. Without concerted action, the future will inevitably see millions of buildings flooded, whole cities reshaped by water, and widespread disruptions to life as we know it.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.dailymail.co.uk/sciencetech/article-15170219/Sea-level-100-MILLION-buildings.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://www.mcgill.ca/newsroom/channels/news/millions-buildings-risk-sea-level-rise-mcgill-led-study-finds-368163)
* Paragraph 2 – [[1]](https://www.dailymail.co.uk/sciencetech/article-15170219/Sea-level-100-MILLION-buildings.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://www.mcgill.ca/newsroom/channels/news/millions-buildings-risk-sea-level-rise-mcgill-led-study-finds-368163)
* Paragraph 3 – [[1]](https://www.dailymail.co.uk/sciencetech/article-15170219/Sea-level-100-MILLION-buildings.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://www.mcgill.ca/newsroom/channels/news/millions-buildings-risk-sea-level-rise-mcgill-led-study-finds-368163)
* Paragraph 4 – [[1]](https://www.dailymail.co.uk/sciencetech/article-15170219/Sea-level-100-MILLION-buildings.html?ns_mchannel=rss&ns_campaign=1490&ito=1490)
* Paragraph 5 – [[1]](https://www.dailymail.co.uk/sciencetech/article-15170219/Sea-level-100-MILLION-buildings.html?ns_mchannel=rss&ns_campaign=1490&ito=1490)
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* Paragraph 7 – [[6]](https://time.com/6212215/rising-seas-property-taxes-coastal-communities/)
* Paragraph 8 – [[7]](https://apnews.com/article/5df7986b2b27989acb729d4da17155f8)
* Paragraph 9 – [[1]](https://www.dailymail.co.uk/sciencetech/article-15170219/Sea-level-100-MILLION-buildings.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://www.mcgill.ca/newsroom/channels/news/millions-buildings-risk-sea-level-rise-mcgill-led-study-finds-368163)

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## Bibliography

1. <https://www.dailymail.co.uk/sciencetech/article-15170219/Sea-level-100-MILLION-buildings.html?ns_mchannel=rss&ns_campaign=1490&ito=1490> - Please view link - unable to able to access data
2. <https://www.mcgill.ca/newsroom/channels/news/millions-buildings-risk-sea-level-rise-mcgill-led-study-finds-368163> - A McGill University-led study published in npj Urban Sustainability reveals that if fossil fuel emissions are not rapidly reduced, over 100 million buildings across the Global South could face regular flooding due to sea level rise by 2100. The research, the first large-scale, building-by-building assessment of its kind, utilised detailed satellite maps and elevation data to estimate the number of buildings that would be inundated under various sea level rise scenarios. The study underscores the urgent need for comprehensive planning to address the impacts of climate change on coastal infrastructure.
3. <https://www.tandfonline.com/doi/abs/10.1080/09613218.2012.690953> - A 2012 study published in Building Research & Information assesses the impact of sea level rise on buildings in Norway by 2100. The research indicates that, considering isostatic uplift, sea levels in Norway could rise between 16 to 116 cm by 2100, depending on location and uncertainties. Approximately 110,000 buildings are situated less than 1 metre above normal sea level, including garages, houses, cabins, office buildings, hotels, and buildings for fishing and agriculture. The study highlights the potential economic, environmental, and social consequences, estimating constructional measures to buildings alone could cost up to €725 million.
4. <https://www.lemonde.fr/en/environment/article/2024/03/20/by-2100-coastal-erosion-will-have-affected-thousands-of-buildings-in-france_6639162_114.html> - A 2024 report by the French Centre for Studies and Expertise on Risks, the Environment, Mobility, and Urban Planning (CEREMA) forecasts that by 2100, coastal erosion will affect 506,200 hectares in France, including 41,200 hectares of urban areas and 450,000 homes. The financial impact is expected to be significant, with affected housing and business premises valued at €86 billion and €7,500 billion, respectively. The report underscores the need for French towns to adapt their urban planning and for authorities to seek solutions for erosion control and support for property owners.
5. <https://www.theguardian.com/environment/article/2024/jun/25/rising-sea-levels-flooding> - A 2024 study by the Union of Concerned Scientists (UCS) found that rising sea levels could disrupt the daily lives of millions of Americans by 2050, with hundreds of homes, schools, and government buildings facing frequent flooding. The study identified nearly 1,100 critical infrastructure assets at risk of monthly flooding by 2050, with the majority facing disruption every other week. Coastal communities in states like California, Florida, Louisiana, Maryland, Massachusetts, and New Jersey are particularly vulnerable, highlighting the urgent need for flood resilience measures.
6. <https://time.com/6212215/rising-seas-property-taxes-coastal-communities/> - A 2022 report by Climate Central highlights that rising sea levels pose a significant financial threat to coastal communities, with nearly 650,000 tax parcels totaling 4.4 million acres at risk of partial or full submersion in 30 years. By 2100, impacted parcels and buildings are expected to more than double, with potential tax losses of $5 billion to $7 billion by 2050 in states like Florida, Texas, and North Carolina. The report emphasizes the need for proactive measures and public discourse on property value and flood risks to mitigate the impending challenges.
7. <https://apnews.com/article/5df7986b2b27989acb729d4da17155f8> - In 2022, UN Secretary-General Antonio Guterres warned the UN Security Council about the accelerated rise in global sea levels, posing significant threats to nations such as Bangladesh, China, India, and the Netherlands. Nearly 900 million people in low-lying coastal areas are at acute risk. Even if global warming stays within the 1.5-degree Celsius limit, sea levels will rise considerably, endangering vulnerable countries, including many small island nations. Guterres emphasized the unthinkable consequences, including mass migrations and intensified competition for resources, urging nations to address climate change root causes and fulfill international commitments.