



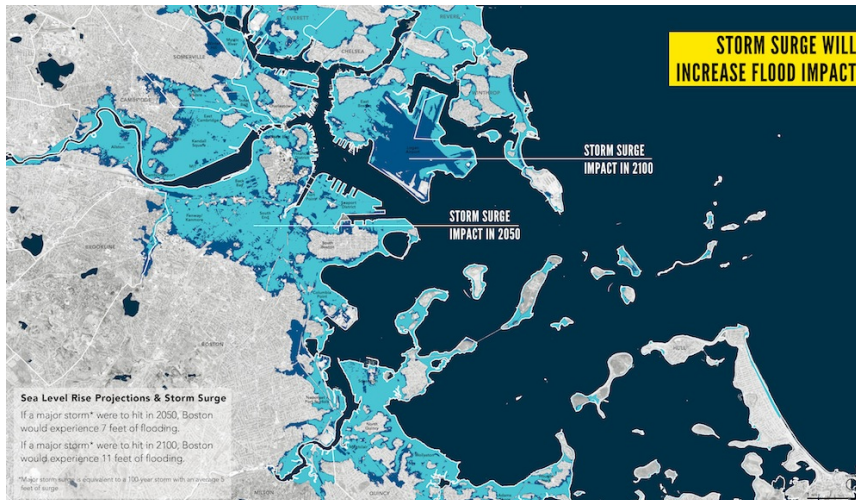
Case Study: Boston Sea Level Rise

Part 1- Sea Level Rise

Ocean levels are getting higher as a result of climate change. This is attributed to melting polar ice caps and the thermal expansion of water as it gets warmer. The Intergovernmental Panel on Climate Change (IPCC) estimates a sea level increase of 11-38 cm by the year 2100. Sea level rise has become a prominent problem for coastal cities around the world. Around 40% of people around the world live on the coast, which encompasses around 200 million people. The city of Boston with its active downtown waterfront is one city that is extremely vulnerable to the effects sea level rise. Of particular concern is the effect of storm surges in combination with sea level rise. This can be exacerbated by especially high tides, called king tides.



Photo Credit: New England Aquarium



Gigapan virtual tour of Boston King Tide:

<http://northeastern.edu/helmuthlab/longwharf.html>

Questions:

1. Using the diagram above and the virtual tour link, what areas are vulnerable to sea level rise in the city of Boston?
2. What are 1-2 solutions you would propose to prevent sea level rise from affecting these areas?

Part 2- Responses to Sea Level Rise

They are many proposed responses to sea level rise for urban cities that fall into three categories: keep water out, living with water, and managed retreat:

- *Keep Water Out*





- This plan involves building man-made barriers or using natural flood protection to prevent coastal flooding. This could mean installing a massive lock, erecting seawall or even restoring wetlands.
- *Living with water*
 - This plan accommodates rising sea levels by allowing water into city spaces. This means elevating roads and buildings above water levels, waterproofing electrical and transportation infrastructures, and building floating or floodable development.
- *Managed Retreat*
 - Drastic managed retreat involves completely relocating vulnerable structures and neighborhoods, while less-intensive measures include prohibiting development in vulnerable zones and offering incentives for residents businesses to relocate on their own.

Questions:

1. What are the strengths and weaknesses of each of the proposed plans? Think about the economic, environmental and social implications.
2. If you were a single parent living right by the coast, which plan would you choose and why? How would your opinion change if you were a taxpayer living in the center of the state who is worried about increased taxes to build proposed barriers?

Marine Science Center Researchers Studying Sea Level Rise



Dr. Brian Helmuth

Helmuth works both in the Department of Marine and Environmental Sciences and School of Public Policy and Urban Affairs at Northeastern. His research and teaching focuses on predicting the likely ecological impacts of climate change on coastal ecosystems, and on the development of products that are scientifically accurate, understandable, and useful by a diverse array of stakeholders. He also develops tools based on virtual reality environments that help people to understand how climate change will affect their lives and those of others around the planet.



Dr. Steven Scyphers

Scyphers is a professor in the Department of Marine and Environmental Sciences. He studies coastal development, fisheries management, and climate adaptation. His research is problem-and-solution focused and strives to develop strategies for sustaining both coastal ecosystems and societies. He routinely works with diverse teams of natural and social scientists, engineers, practitioners, and stakeholders. Research in his lab focuses on understanding and enhancing the sustainability of coastal ecosystems and societies.