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Sea Level Rising and Its Impact on NYC

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Abstract

Climate change is not only about the rising temperatures, which is usually the most discussed topic in news, but it also involves other Earth sciences; like hydrology, oceanography and other parts of meteorology. In our poster we are focusing on sea level rising and its impact on NYC, and how people could mitigate and adapt to it.

Causes of Seal Level Rising

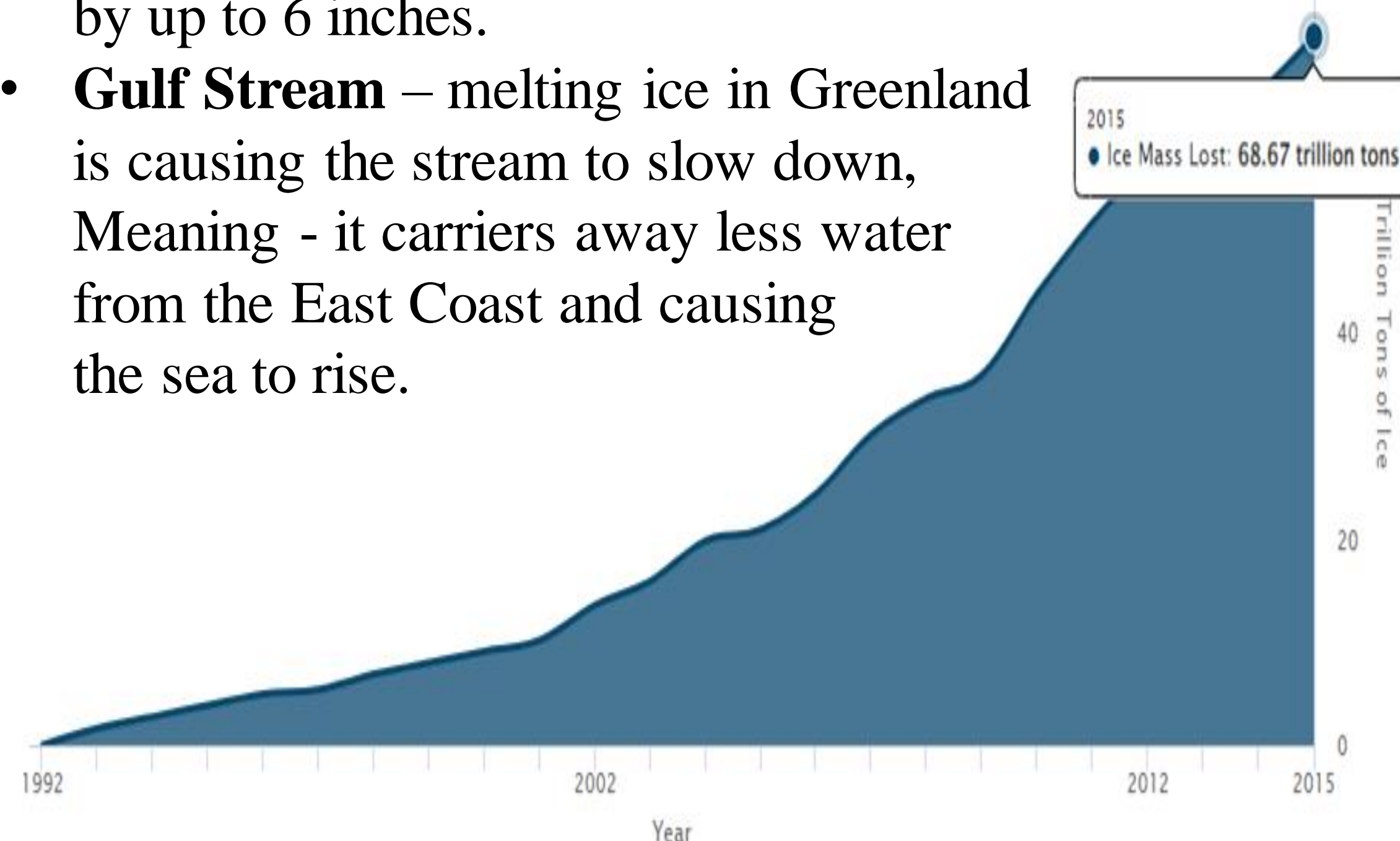
There are many reasons why sea level rises, but major causes are considered to be:

- **Melting glaciers and ice sheets** - melting ice in Antarctica and Greenland contributes the most.



A glacier stream in Greenland. (Joughin, 2020)

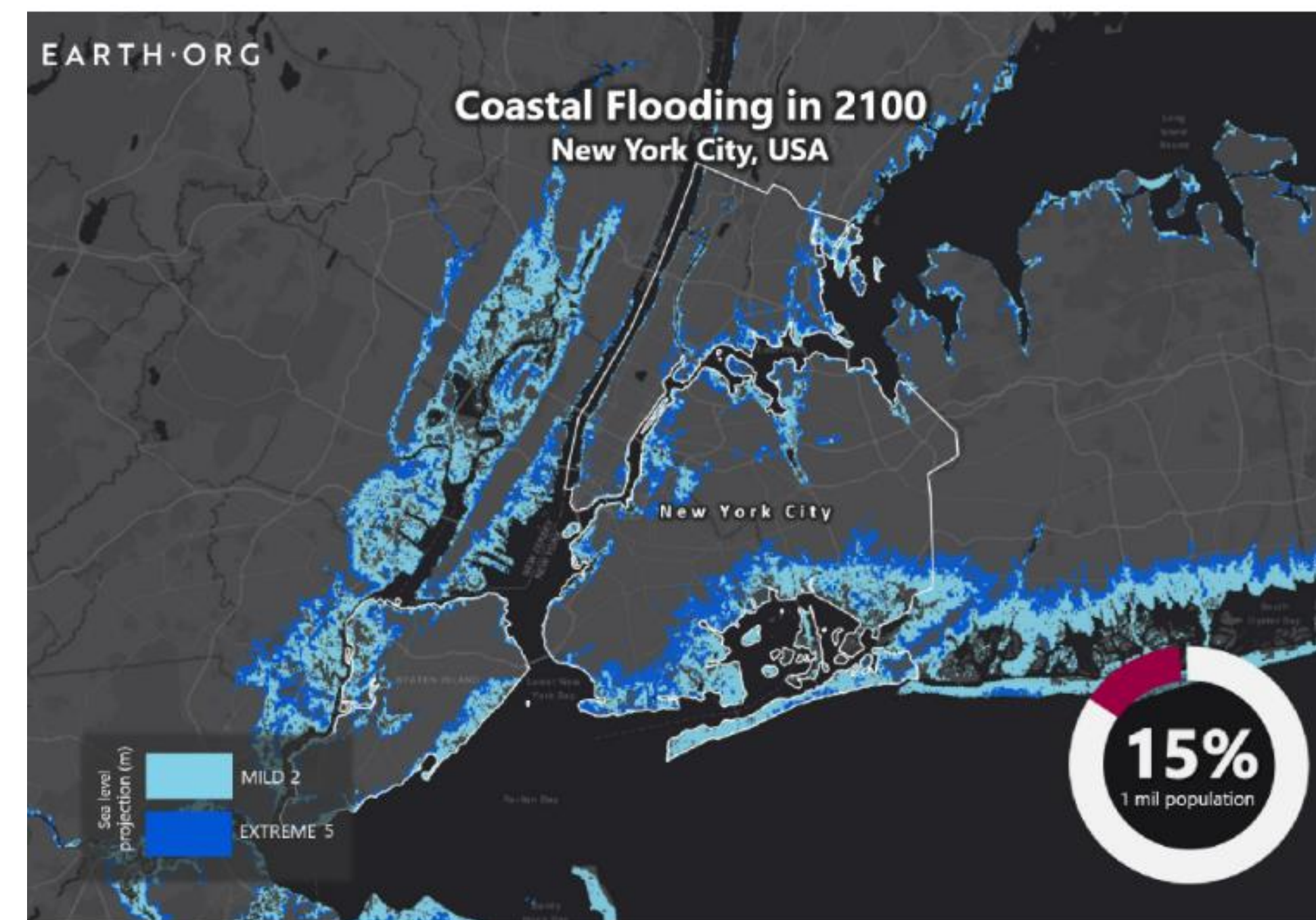
- **Ocean warming** – increasing the ocean surface temperature by only 1.2°F can cause the sea level rise by up to 6 inches.
- **Gulf Stream** – melting ice in Greenland is causing the stream to slow down, Meaning - it carries away less water from the East Coast and causing the sea to rise.



Antarctica's and Greenland's ice melt between 1992 and 2015 (Sea Level Rise. (2022)).

Impact of Sea Level Rising on NYC

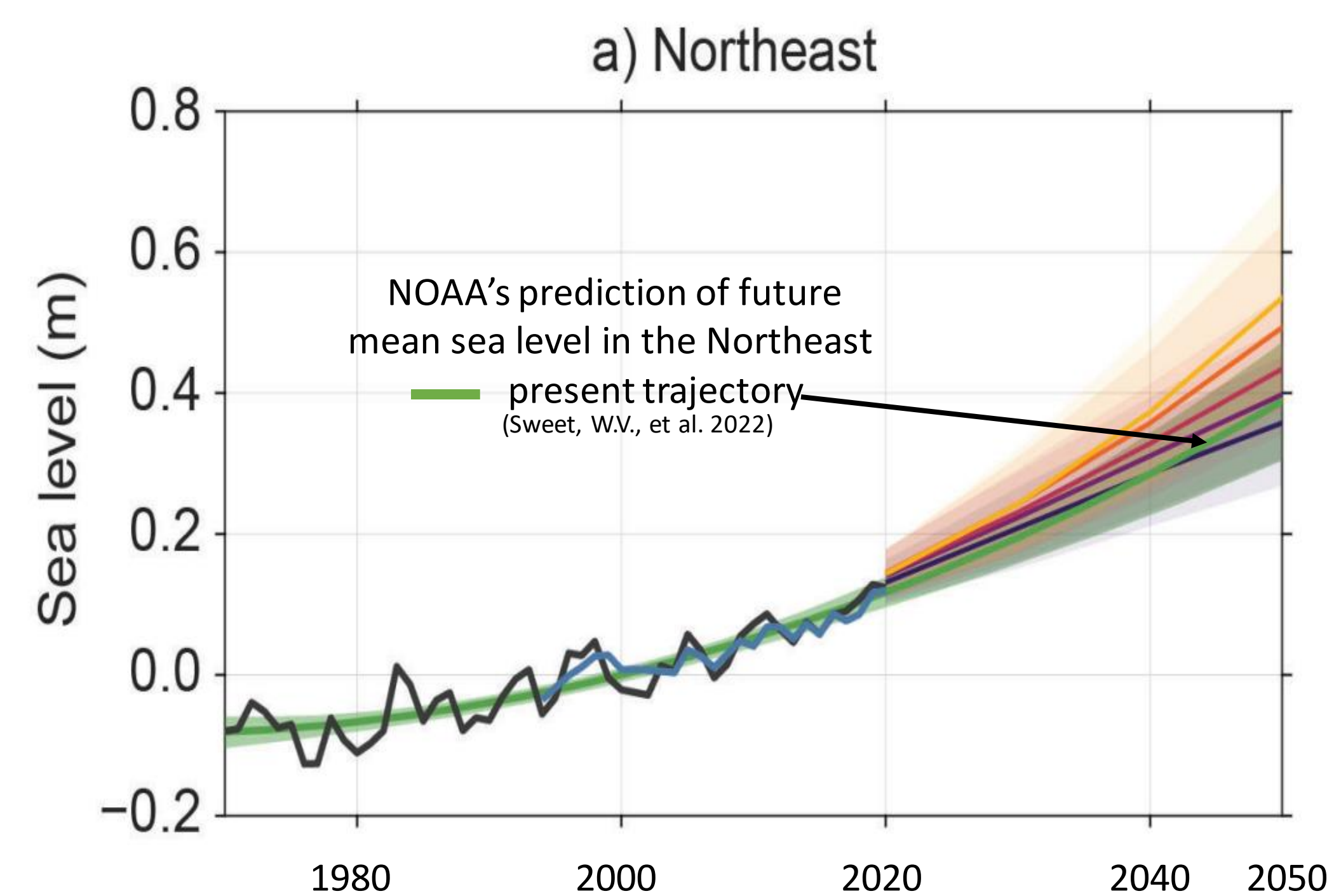
- SLR with warmer oceans is expecting to negatively impact NYC in many forms, more often, and with a stronger punch.
- Many NYC neighborhoods are experiencing to be under water more often because of higher tides, bigger-storms surges, land erosions and coastal floodings.
- Many parts of NYC might be uninhabitable by 2100



This picture shows how much seas could rise during major flooding by 2100 (Mulhern, 2020)

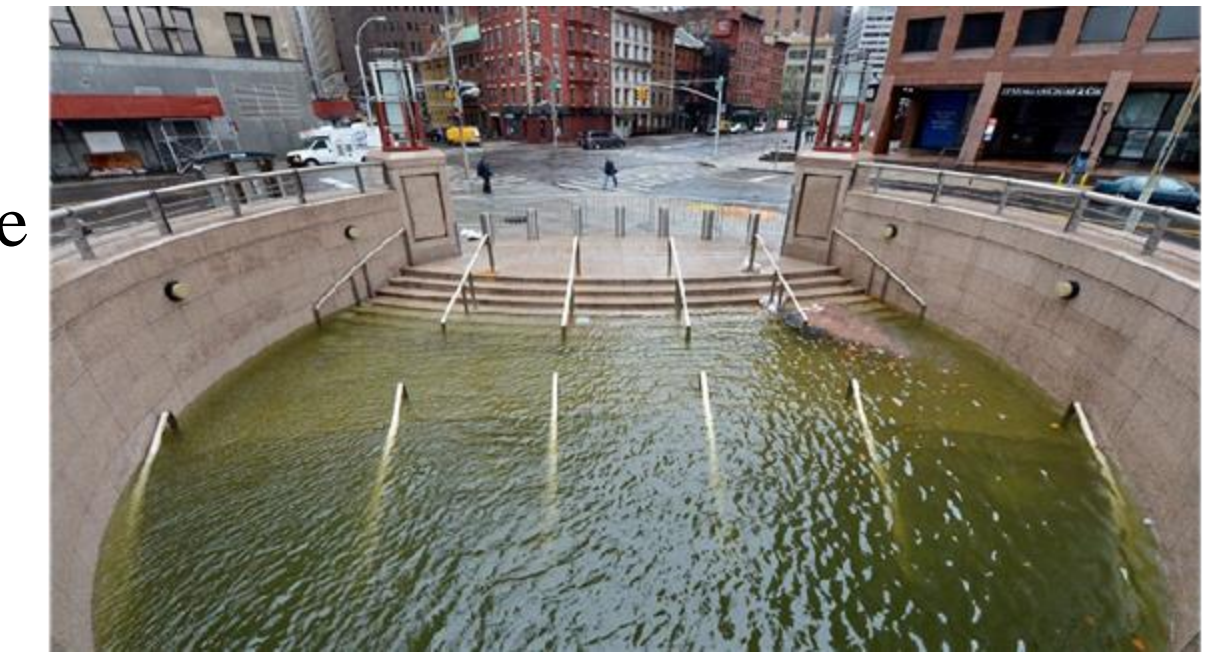
Prediction

Sea level does not rise equally everywhere on the planet, and because of that future predictions of SLR in NYC estimates the sea to rise by up to 40cm (16 inches) by 2050.



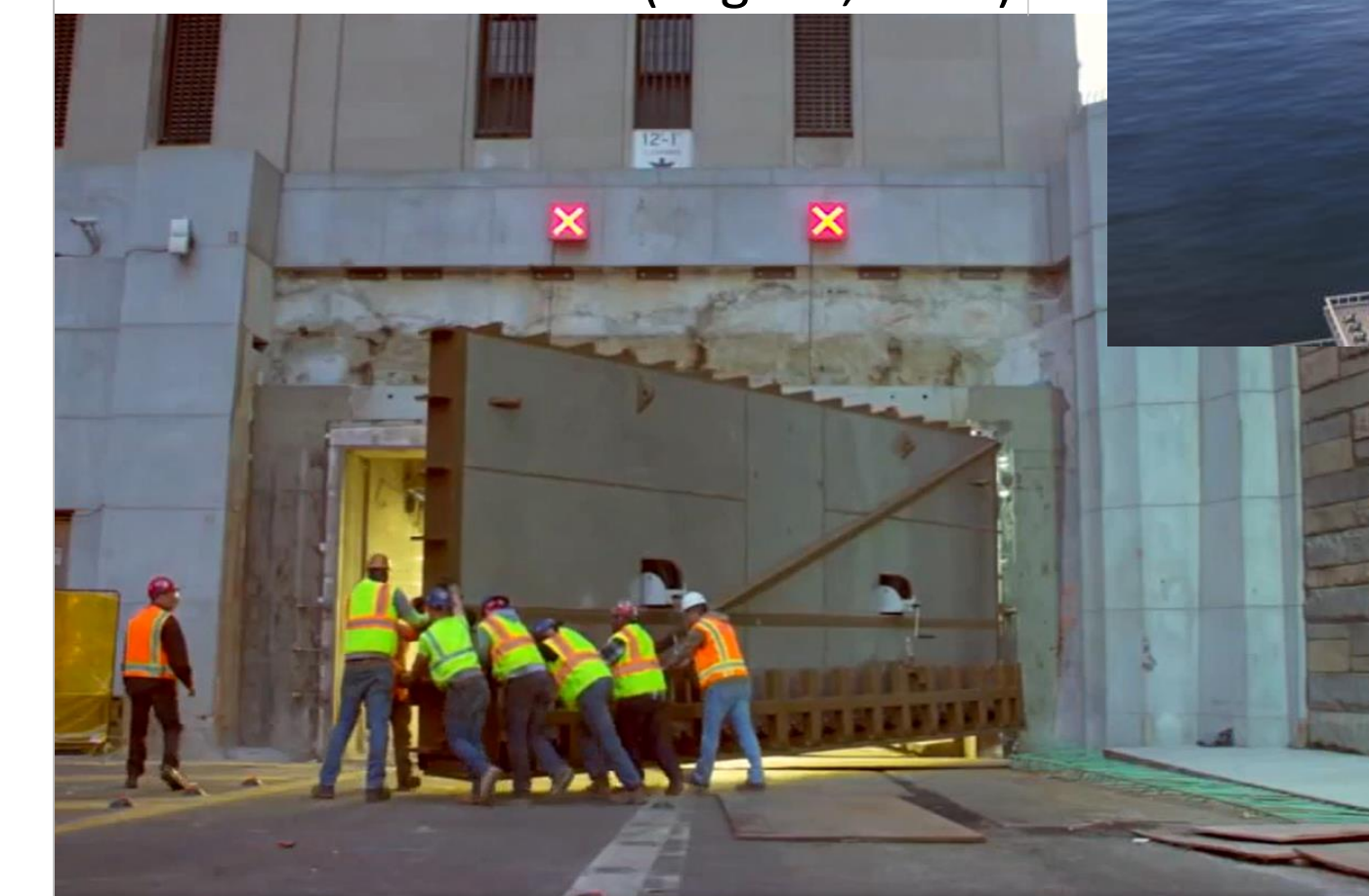
Mitigation and Adaptation to SLR in NYC

- While countries are trying to reduce greenhouse gases' (GHG) emissions, it would still take centuries to lower the GHG even if we stopped producing these gases right now
- Coastal cities like NYC needs to start preparing for higher seas now, because oceans will continue rising for many decades, or maybe even for centuries,
- There are many ways NYC can prepare for higher sea levels, for example; by building retractable water-tight gates and barriers, by raising the elevation of the land, by raising embankments like dikes and levees, or restoring and constructing wetlands, beaches or barrier islands
- Adaptation to SLR is not only about building protection, but also about changing how the areas near the shore are being used, for example; limiting of construction of new residential buildings.



Flooding in New York City as a result of Hurricane Sandy: Credit: Daily Telegraph

Tunnel flood door test (Pagano, 2017)



Lower Manhattan waterfront resiliency project (NYC Mayor's Office of Climate Resiliency)

Conclusion

We know that Sea level rising is due to Global Warming, and the current trajectory shows that NYC coastline will be 40 cm higher in the next 25 years. Sea rise level is directly affected by glacier melting, ocean warming and Gulf Stream. Even though NYC is already preparing for it, it still should be more proactive in ways to adapt with the prediction of future disasters.

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