

Core Pathways Gallery Submission

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Climate change and the local environment:

Since the start of the industrial revolution and ensuing great acceleration in the 20th century, the globe has seen rapid technological and industrial development, but not without a cost. By analyzing the increase in fossil fuel production and carbon dioxide emissions as a result of recent human development, it has been proven that global temperatures are rising and bringing with them devastating consequences. The cause of this global temperature increase is climate change, and the mechanism is the greenhouse effect.

In the case of Fairfield County, CT, researchers at The Climate Explorer and Climate Central have observed a gradual increase in temperature due to an increase in heat trapping gasses such as carbon. What they have also observed, is that as global temperature increases cause polar ice caps melts, sea levels of course rise. Based on their statistical models which have taken past growth rates of greenhouse gas emission to predict future emissions, they show that currently both temperature and sea levels will continue to rise drastically. If greenhouse gas emissions maintain their current rate of growth, temperatures in Fairfield County will rise by almost 4 degrees Celsius by 2100. Taking this prediction and using it to predict sea level rises, Climate Central models with a high degree of certainty that sea levels will rise by almost 30 feet. Ultimately, Fairfield County is at great risk to have much of its coastline completely submerged.

How we know:

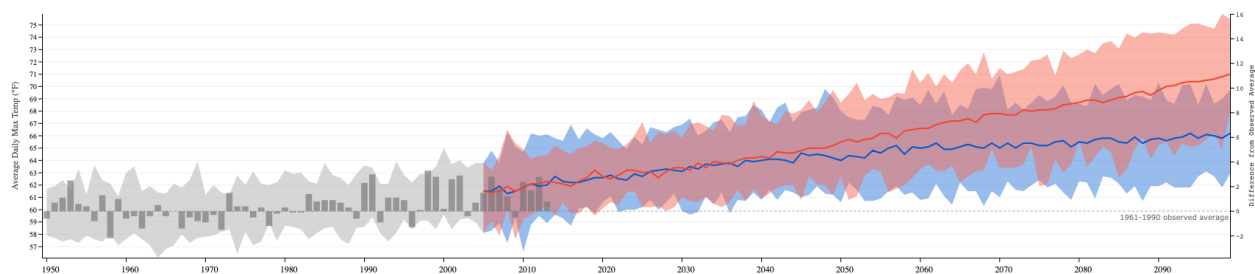


Figure 1: Graph displaying the past and predicted upward trend of the average daily maximum temperature (F) from the 1950s to 2100. Source: The Climate Explorer

Based on the blue and red trend lines on the right side of the graph, there is a clear upward trend for average daily temperatures due to greenhouse gas emissions. The blue band shows predictions based on a future in which humans stop increasing global emissions of heat trapping gasses by 2040 and then dramatically reduce them by 2100. The blue line represents the weighted mean of the projections. The red band shows projections on future heat in which global emissions of heat trapping gasses continue to increase at their current rate until 2100. The red line again represents the weighted mean of the projections. These projections were made based on historical data from the left side of the graph in which we have already observed average

daily temperatures based on annual changes in heat trapping gas emissions. Based on these predictions, if the current rate of emission remains unchanged, the daily average temperatures in Fairfield County will jump from an average of 62.9 to 70.4 degrees Fahrenheit.

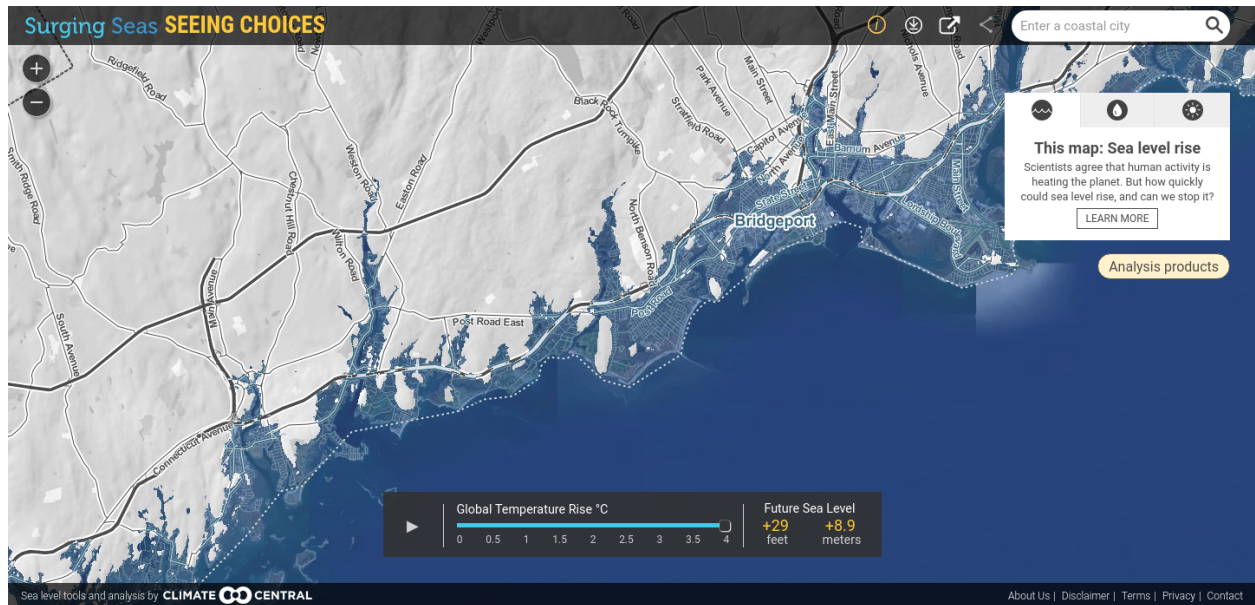


Figure 2: *Map showing the areas of land in Fairfield and Bridgeport CT underwater resulting from a 29-foot rise in sea level caused by a 4-degree Celsius global temperature increase. *
Source: Climate Central

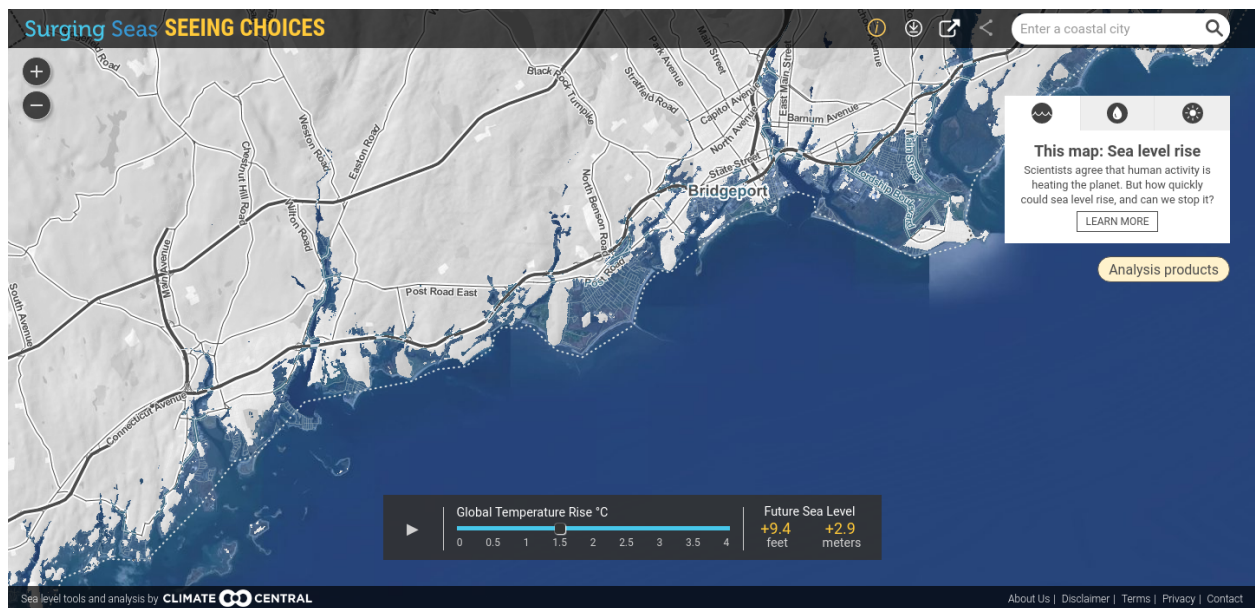


Figure 3: *Map showing the areas of land in Fairfield and Bridgeport CT underwater resulting from a 9.4-foot rise in sea level caused by a 1.5-degree Celsius global temperature increase. *
Source: Climate Central

In Figure 1 predicting average temperature rises in Fairfield County as a result of different trends in growth rates of greenhouse gas emission there were two potential outcomes. If emissions continue at their current rate, Fairfield County will see an average daily temperature increase from 62.9 degrees Fahrenheit to 70.4 degrees Fahrenheit, a difference of about 7 degrees Fahrenheit or roughly 4 degrees Celsius. If humans stop increasing the rate of heat trapping gas emissions by 2040 and drastically decrease them by 2100, Fairfield County will see an average daily temperature increase from 62.9 degrees Fahrenheit to 65.9 degrees Fahrenheit. A difference of 3 degrees Fahrenheit or roughly 1.5 degrees Celsius. The resulting increase in sea levels on the coast of Fairfield County due to the average daily temperature rises would either be 29 feet or 9.4 feet respectively. The graphs depict the areas of current land that will be submerged should sea levels rise to these two levels as a result of climate change.

Human consequences:

If global fossil fuel emission trends do not reverse significantly in the coming decades Fairfield County is at an extreme risk for the consequences that follow rising sea levels. Before the mapped areas are submerged completely, over 35,000 thousand properties are at risk of significant damage due to increased coastal flooding. This flooding will cause severe damage to the county's economy, mainly harming its real estate market. The total home value at risk in Fairfield County due to increased flooding by 2050 well exceeds \$2,000,000,000.

Because of the over 60% of Fairfield County residents than live in the coastal area and the 31% who work in these areas, CT has already begun many measures to create more resilience and adaptations to the inevitable rise in sea levels. At the University of Connecticut's Institute for Resilience and Climate Adaptation (CIRCA) researchers work towards the goal of advancing resilience and sustainability along Connecticut's coastline. One of the projects they highlight is the ongoing restoration of coastal marshlands to better absorb the effects of rising sea levels. Another project highlighted is the high-resolution coastal forecasting and living shorelines approaches which seek to better predict potential floods and give potential solutions to those living in at risk areas. Ultimately, whether humans can significantly alter their greenhouse gas emissions or not, Fairfield County residents need to prepare to adapt to a near future of rising sea levels and devastating floods.

Read more:

[Connecticut Institute for Resilience and Climate Adaptation.](#)

[Connecticut Department of Energy and Environmental Protection, Sea Level Rise.](#)

[Climate Central, Surging Seas Risk Finder.](#)