

An Invisible Crisis



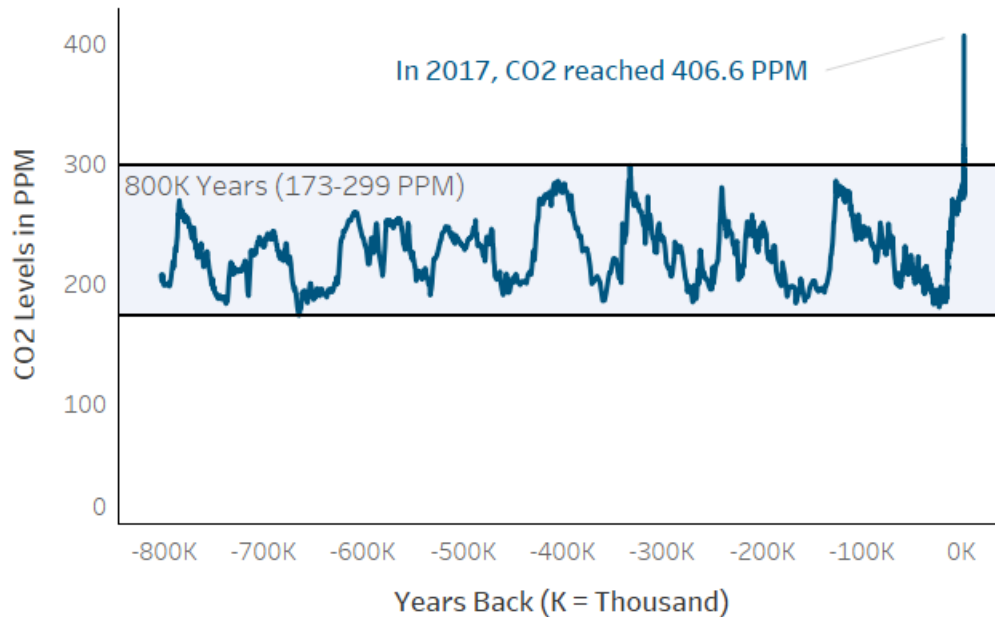
Image by William Bossen via [Unsplash](#)

One greenhouse gas stands out

You might wonder why greenhouse gases matter. It is a fair question. Greenhouse gases, as the name implies, are gases that trap heat from the sun. In high concentrations, these gases can negatively impact the climate by retaining more heat. This is commonly referred to as Climate Change.

Water vapor is a natural greenhouse gas but is not included in climate concerns due to its short life in the atmosphere due to precipitation. Other greenhouse gases that can remain for years or more are carbon dioxide, methane, nitrous oxide, and fluorinated gases. However, one greenhouse gas has seen significant increases in the atmosphere. That gas is carbon dioxide. How significant? For that answer, look at the graph below.

Historic Increase in Carbon Dioxide (CO₂) Concentrations:
Annual Average of Atmospheric CO₂ Levels in Parts Per Million (PPM)
Until 1905, CO₂ levels had not exceeded 299 PPM going back over 800,000 years.



Data Source: Our World in Data using data from NOAA/ESRL (2018)

So, what changed?

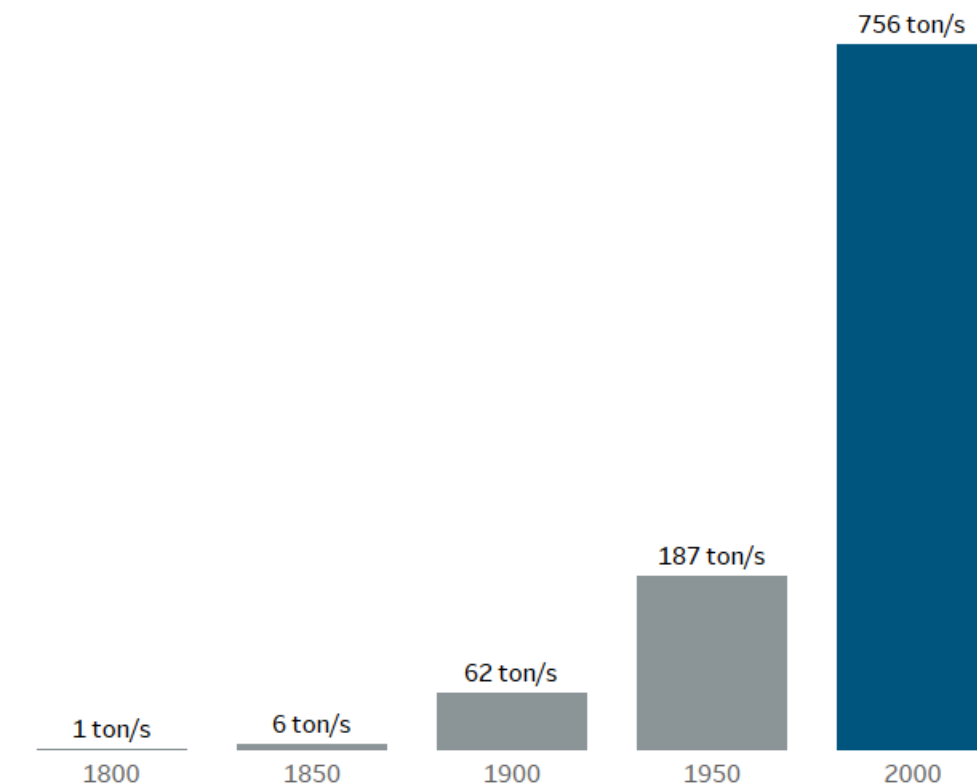


Image by ETA+ via [Unsplash](#)

We did. As advances in technology increased our dependence on fossil fuels, we released more carbon dioxide into the air. That trend increased over time. To give you an idea of how much, look at the next graph that shows per second carbon dioxide emissions for every 50 years from 1800 until 2000. The trend has only gotten worse since 2000.

Harm Done Each Second That We Wait:

Global Release of Carbon Dioxide (CO₂) in Metric Tons Per Second (ton/s)
Dramatic Increases from 1800 to 2000 result in 756 metric tons of CO₂ released per second by 2000.



Data Source: NASA Global Climate Change (n.d.)

Hold on, I thought climate experts were divided?

That is a common myth propagated by corporations and others with a vested interest in maintaining the status quo. A lot of money is made from burning fossil

fuels. In 2016, [John Cook](#) and others decided to look at data from several research studies on peer reviewed literature related to climate change. Depending on a few factors, their work showed a range of 90 to 97 percent consensus among climate experts on human caused Climate Change. I used data from the report to compose this graph.

Climate Experts Agree

A study of peer reviewed literature written by climate experts shows **95% consensus on Climate Change resulting from human causes.**



Data Source: IOPS Science (2016)

Ocean temperatures are rising!



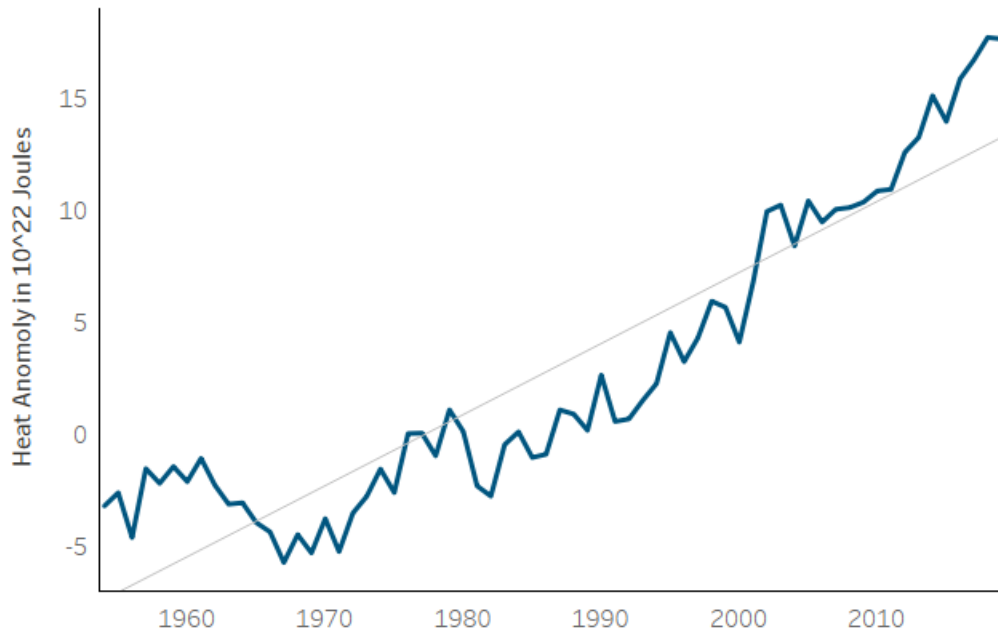
Image by Joseph Vary via [Unsplash](#)

Ocean water absorbs a lot of the heat caused by excess carbon dioxide. You might think that would be a good thing, but it is not. This results in melting polar ice and rising sea levels. We have already seen significant rises in ocean temperature and climate scientists are predicting far worse if we do not reduce carbon dioxide emissions drastically.

Upper Ocean Level Temperatures Increase:

Annual Average Heat Content Anomaly in 10^{22} Joules

Upper ocean levels are heating and have been for decades.



Data Source: EPA (2016)

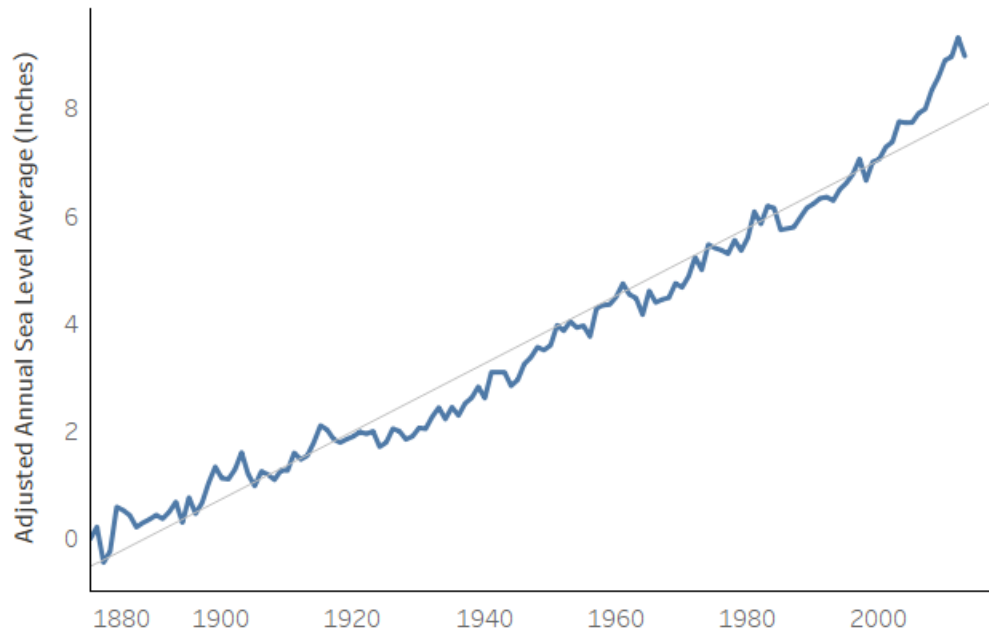
With rising ocean temperatures come rising sea levels

Coast lines across the world are impacted by rising water levels. Climate scientists predict worsening trends if we continue to emit carbon dioxide at current levels.

Rising Sea Levels:

Global Adjusted Annual Average Sea Level in Inches

Sea levels continue to rise and have for well over a century.



Data Source: EPA (2016)

Yet many still deny the impact. This photo highlights the irony.



Image by Dullhunk via [Creative Commons](#)

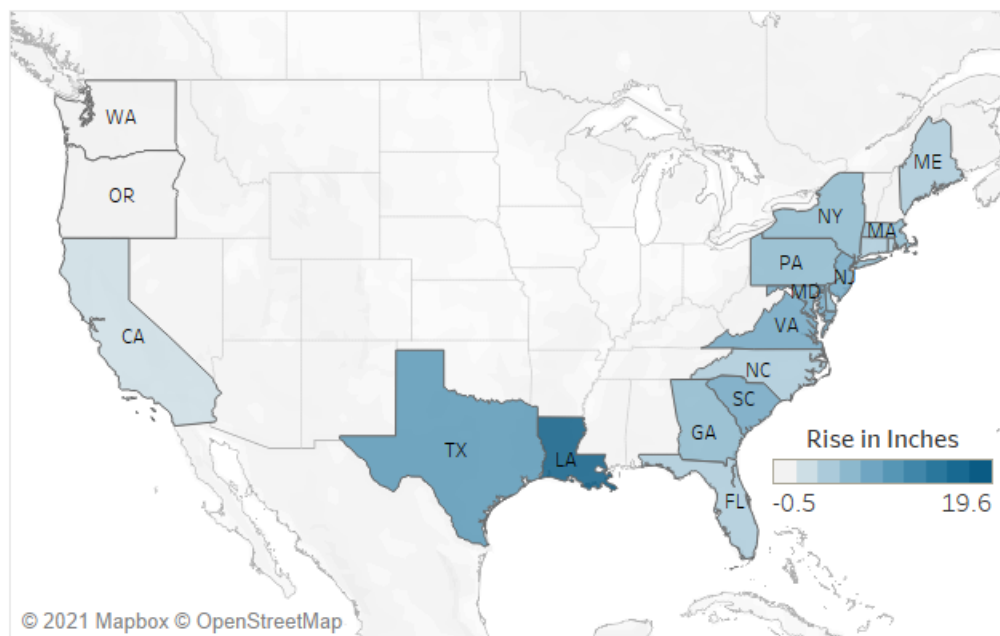
Lost coastal land in the United States

There are other signs. Coastal property is already being affected. Rising sea levels result in lost coastal habitat and impacts valuable property where many of us vacation and live. The map below shows areas already affected in the United States. Louisiana has experienced many problems due to lost wetlands that are now submerged. The [EPA](#) warns that this increases the likelihood of damage caused by hurricanes.

Continental US Average Coastal Sea Level Rise (1960-2015)

Data collected and averaged from coastal tide stations in inches.

Louisiana has seen close to a 20 inch coastal sea level rise.



Data Source: EPA (2016)

Arctic summer melts leave less habitat



Image by Annie Spratt via [Unsplash](#)

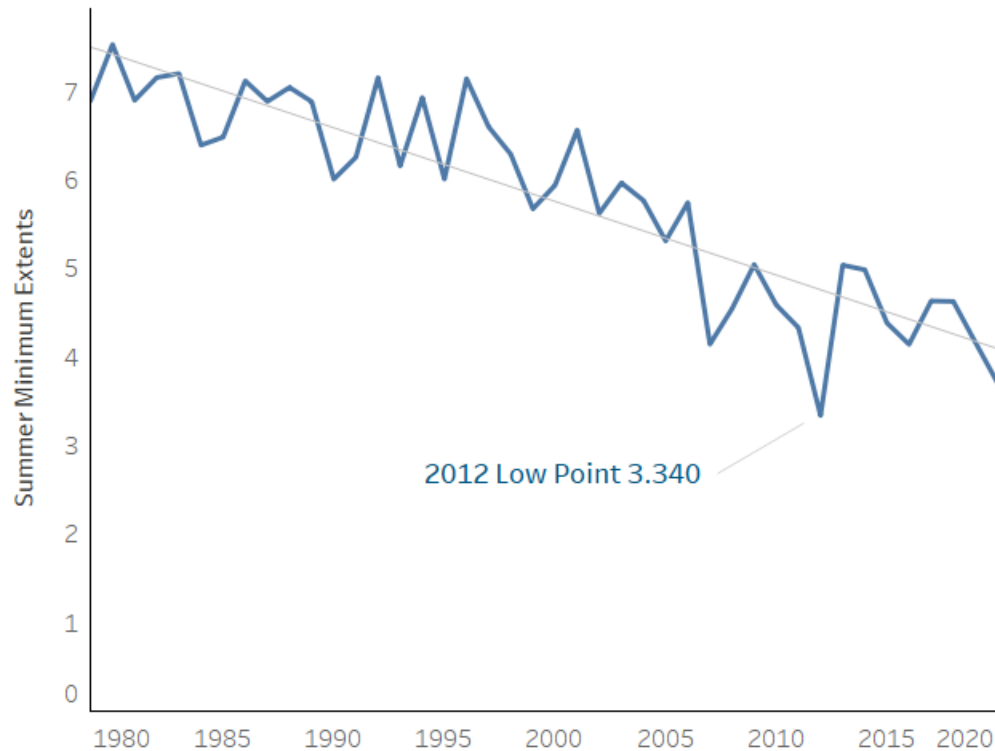
Some areas feel the impact sooner than others. Arctic species have bore the brunt of this crisis so far. According to several reports like the one from [Nature](#) in 2020, the polar bear may become extinct in the wild by 2100. The cause often cited is lost summer habitat due to Climate Change. Many other species are also at risk. The trend downward of Arctic ice coverage shown below looks bleak.

Diminishing Summer Arctic Ice Means Lost Habitat:

Annual Arctic Summer Ice Melt Minimum Extents

Extents = Millions of Square Miles Having at Least 15% Ice Coverage

In 2012, summer ice levels were less than half of previous peaks shown.



Data Source: National Snow and Ice Data Center (2020)

Where can we start?

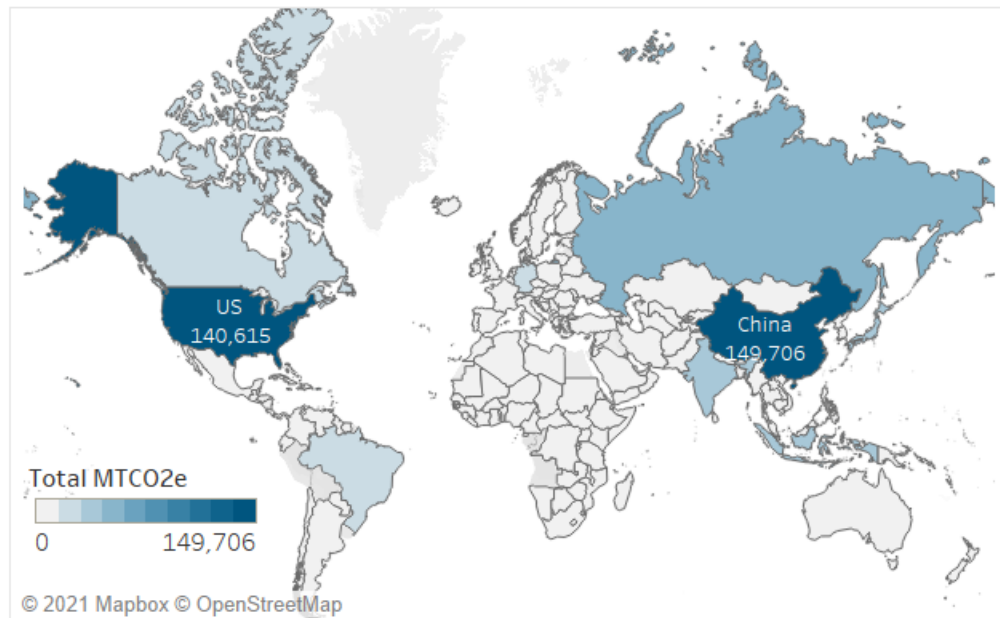
China and the United States are the worst emitters. The following geographic heatmap shows the weight of almost three decades of that history. Both countries have to do better. Leaders across the globe must commit to eliminating emissions by focusing on green technology and reducing dependence on fossil fuel. We cannot accept inaction.

China and the United States Emit the Most CO2 (1990-2017):

Carbon Dioxide (CO2) Total Emission Heatmap in MTCO2e

MTCO2e equals a million metric tons of carbon dioxide equivalent gas

Both nations must lower emissions!



Data Source: Climate Watch (2018)

Save the bears!

It would be unforgivable to let another species go extinct due to our actions, ourselves included. Reduce your emissions by purchasing fuel efficient vehicles, learn about your carbon footprint and contact your government leaders. Demand action on Climate Change! I want future generations to have more than photos of these magnificent creatures. Do you?



Image by Hans-Jurgen Mager via [Unsplash](#)

Sam Loyd

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