

We Have Entered The Era Of 'Global Boiling'—Marine Wildlife, Ecosystems, And Economies Are Being Devastated



01-27-2025 ~ *Marine heat waves are causing record-breaking ocean temperatures that kill animals and impact ocean-based industries.*

The [ocean absorbs 90 percent of the excess heat](#) generated by burning fossil fuels and deforestation. Climate change caused by greenhouse gas emissions is the primary driver of long-term global warming. Today, humanity is officially in uncharted waters. According to the Copernicus Climate Change Service, in February 2024, the average global sea surface temperature (SST) reached 21.06 degrees Celsius, the [highest level ever recorded](#) by the service. The previous record of 20.98 degrees Celsius was set in August 2023.

Overall, 2023 saw [record-breaking marine temperatures](#), and the likely culprit is human-caused climate change. The extraordinarily high sea surface temperatures recorded in 2023 provide a frightening glimpse into the planet's future. A [study](#) by researchers at the University of Reading and Imperial College London, published in March 2024 in the Bulletin of the American Meteorological Society, found that temperatures in the top 100 meters of ocean basins around the world have steadily increased since 1980. The Atlantic basin, in particular, has experienced substantial heat amplification since 2016.

They [concluded](#) that extreme sea surface temperatures in the North Atlantic during 2023 “lie at the fringe of the expected mean climate change for a global surface-air temperature warming level (GWL)” of 1.5 degrees Celsius and closer to the average of 3.0 degrees Celsius GWL. If this scenario is attained globally, it would have [catastrophic consequences](#), including the eventual collapse of ice

caps. This would lead to an uncontrollable rising sea level that would consume low-lying cities and contaminate water sources with seawater worldwide.

Marine heat waves are also a factor in extreme weather events, as the energy of warm surface water leads to hurricane formation. In August 2023, [Hurricane Idalia](#), sitting over unusually warm surface water in the Gulf of Mexico, intensified quickly. It strengthened from 80 mph winds to a Category 3 storm, gaining 40 mph in less than 24 hours. The warm water was like rocket fuel for the approaching storm.

The year 2024 did not see much relief from the heat. In August 2024, the Arctic Ocean's mean sea surface temperatures—a critical measure of the intensity of the ice-albedo feedback cycle during a summer sea-ice melt season—were between [2 and 4 degrees Celsius warmer](#) than mean values in most Arctic Ocean marginal seas in August of any year between 1991 and 2020, according to the National Oceanic and Atmospheric Administration. We have entered a new era of elevated marine temperatures, which is of great concern.

According to Mercator Ocean International, a nonprofit scientific research organization based in Toulouse, France, the monthly mean sea surface temperature in the Mediterranean Sea reached [26.42 degrees Celsius](#) in September 2024, a record high that surpassed the previous records set in 2020 and 2022. At a global level, September 2024 was the second-warmest month on record (after August 2023), with a sea surface monthly mean temperature of [20.87 degrees Celsius](#).

Impact on Marine Wildlife

Extreme heat in the oceans devastates coral reefs, which thrive in a narrow range of temperatures. [Warm water](#) is best for corals and their symbiotic algae, ideally between 23 and 29 degrees Celsius. If it gets much hotter, the algae that coexist with and provide food for the tiny coral polyps will be expelled, and the corals will bleach. Corals can die if the ocean water doesn't cool quickly or if bleaching events happen repeatedly. Between 1950 and 2021, the ocean reefs have [lost half of their capacity to provide ecosystem services](#).

Ocean temperatures of 38 degrees Celsius in the Florida Keys could harm coral and cause problems for all marine life, as evidenced by previous marine heat waves.

The so-called “[Blob](#),” a persistent marine heat wave in the northeast Pacific Ocean from 2014 to 2016, caused a [chain of events](#) that upended entire aquatic ecosystems. It greatly impacted organisms, large and small, throughout the food chain. [High surface temperatures caused](#) krill populations to decline, and a harmful algal bloom spread in shellfish from Alaska to Southern California, shutting down the clam industry.

In February 2024, researchers from the National Oceanic and Atmospheric Administration completed a mission to assess the impact of the 2023 marine heat wave on corals in the Florida Keys Marine Sanctuary. Their [preliminary findings](#) are worrisome. The scientists found extreme heat killed nearly 80 percent of the approximately 1,500 staghorn coral (*Acropora cervicornis*), which provide critical habitat for a host of other marine life.

“The findings from this assessment are critical to understanding the impacts to corals throughout the Florida Keys following the unprecedented marine heat wave,” [said](#) Sarah Fangman, the Florida Keys National Marine Sanctuary superintendent. “They also offer a glimpse into coral’s future in a warming world. When the ecosystem experiences significant stress in this way, it underscores the urgency for implementing updates to our regulations, like the [Restoration Blueprint](#), which addresses multiple threats that will give nature a chance to hold on.”

In recent years, extreme heat has forced wildlife to feed closer to shore, [entangling whales in fishing gear](#) and [stranding](#) thousands of California sea lions. Tens of thousands of [seabirds have also died](#) due to extreme temperatures.

Impact on Fisheries

Heat waves have also caused fishery disasters, [affecting populations of sardines](#)—a key feeder fish for larger marine species—and causing the collapse of select salmon and cod fisheries.

Between 2014 and 2016, the marine region along the Pacific coastline of the Baja California Peninsula in Mexico experienced an unprecedented period of intense and prolonged marine heatwaves that impacted local marine ecosystems. A team of scientists from Stanford University published a [study](#) in Nature in November 2024 in which they calculated that during this period of elevated sea temperatures, lobster, sea urchin, and sea cucumber fisheries suffered a 15 to 58

percent decrease in aggregate landings, particularly impacting small-scale fisheries.

“In the face of extreme environmental shocks such as marine heatwaves, small-scale fisheries operating near biogeographic transition zones are among the most vulnerable,” [they write](#).

The Era of Global Boiling

Warmer ocean temperatures have long-term impacts on the environment. This includes a reduction in the ability of the ocean to take up carbon dioxide. Warm water holds less gas, including carbon dioxide—the most important greenhouse gas—than cool water. So, as the ocean warms, less heat-trapping gas is removed from the air, and more stays in the atmosphere. It’s a vicious cycle: as the ocean warms, less carbon dioxide is absorbed, and more remains in the air, which causes the planet to heat up even more.

Marine heat waves are parallel to heat waves on land, as evidenced by 2023’s record-setting terrestrial heat waves in the [southeastern United States](#), [Southern Europe](#), and [China](#). Studies of these heat waves reveal that they would have been “[virtually impossible](#)” without human-caused climate change. In July 2023, United Nations Secretary-General António Guterres [declared](#), “The era of global warming has ended; the era of global boiling has arrived.”

Still, there is some good news. In 2022, the Inflation Reduction Act was passed, which directs [\\$369 billion in investments](#) toward modernizing the U.S. energy system. This includes reducing climate pollution by 40 percent below 2005 levels by 2030. While this is not enough, it’s an essential first step.

When we first recognized climate change as a serious concern [many decades ago](#), there were no clear solutions or answers to the enormous challenges that climate scientists projected. However, with the [falling cost of solar and wind energy](#), better [battery storage](#), and crucial [gains in energy efficiency](#), viable solutions that are much [less expensive than burning fossil fuels are available](#).

Exceptionally warm global waters will not disappear. However, we can avoid the worst impacts of climate change and even hotter water temperatures by taking rapid action to strengthen local, state, and national climate policy initiatives.

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