

Why Does Temperature Matter to Sea Turtles?

What is climate change? What is happening to planet Earth? How does it show?

Deserts are expanding, heatwaves and wildfires are becoming more frequent. Higher temperatures also cause more intense storms and other extreme weather. And how does it affect sea turtles?

The increasing number of tropical storms and hurricanes significantly reduces the success of hatching. Nests are flooded, hatchlings can't overcome the flooded path to the sea. Rising temperatures cause the sand on beaches to become too hot. This is worsened by plastics and microplastics, which increase the temperature of the sand! When turtles hatch on hot sand (above 33°C), they can burn the soft underside of their shell, where they are attached to the yolk sac, from which they drew nutrients before hatching.

The sex of sea turtles is determined by the temperature at which they develop. If the temperature is below 29°C, mostly males hatch. The hotter the sand, the more females hatch from the eggs. If the temperature exceeds 33°C for a long time, all the hatchlings are female, or the eggs don't survive the heat. The ideal temperature for an equal number of male and female hatchlings is 29.2°C. As the Earth warms, so do the beaches, and males are becoming increasingly rare. What will happen if males disappear?

Sea turtles have existed for 110 million years. They have always managed to adapt, and they are trying to adapt even today. You can learn how to (not) help them in this video:

See: https://www.youtube.com/watch?v=DN3le3I_NSM&t=4s

Temperature Changes Also Affect Food Availability

What do sea turtles eat? How is their food influenced by climate?

Although sea turtles mostly depend on water temperature, changes in ocean temperature can also affect the availability of their food. The leatherback turtle primarily feeds on seagrass and algae. Its diet depends on the accessibility of food sources. That means it will occur where there is access to seagrass.

What else do sea turtles eat? And what food can they mistake for something else?

There are a total of seven species of sea turtles in the world. The largest turtle, the leatherback, shares its diet with the Australian flatback turtle – jellyfish. But turtles often mistake plastic bags for jellyfish, which in the water appear to be a favourite food. (<https://www.youtube.com/watch?v=PA66nEJYaAU>)

The hawksbill turtle eats sponges, sea anemones, and sometimes shrimp (other turtles may eat soft-bodied animals, small crabs, jellyfish, anchovies, and planktonic zooplankton).

So what can we do to help?

We must protect the natural habitat of sea turtles – the oceans (from pollution) and land areas (from the loss of nesting beaches and light pollution from towns and villages).

We can also prevent the illegal collection of eggs and the killing of females on beaches, as well as reduce accidental capture during fishing and turtle deaths caused by boats. Education and involving local residents in turtle conservation is crucial – for example, by promoting ecotourism, which doesn't harm nature but rather helps it (with long-term benefits outweighing short-term gains from egg poaching or turtle hunting). In many places, conservation is succeeding, and local people are becoming proud defenders of these endangered species.

Hawksbill Turtles = Underwater Architects of Coral Reefs

What do you imagine when you hear "architect of a coral reef"? What are coral reefs made of? What are corals? Why are they important?

Coral reefs are home to a vast number of animals – from colorful fish, sea urchins, octopuses, turtles, shrimp, to various crustaceans. Around half a billion people depend on coral reefs for their livelihood. They form a natural barrier that protects densely populated coastlines from storms and tidal waves from the open ocean.

There are two main factors causing coral bleaching: rising ocean temperatures and ocean acidification. Most corals thrive in water temperatures between 23–29°C. Higher temperatures stress the corals and cause coral bleaching – they lose their color. That doesn't mean the coral is dead. If it only lasts a short time, the corals can recover (which can take years or even decades). However, if it lasts longer, it can lead to the death of the entire coral reef. So if the temperature remains too high, the coral may die. Other stressors such as polluted water or unnatural amounts of light also contribute to coral death.

What is ocean acidification and how does it affect corals?

Normal seawater has a pH of about 8.2 – which makes it slightly alkaline. The increasing concentration of carbon dioxide in the atmosphere causes more CO₂ to dissolve in seawater, lowering its pH.

For corals, this makes it harder to form their skeletons and slows their growth or regeneration after bleaching (a lower pH means fewer ions for building calcium carbonate skeletons).

So far, the largest global bleaching event occurred between 2014 and 2017. It affected 38% of coral reefs worldwide. The U.S. National Oceanic and Atmospheric Administration (NOAA) monitors coral temperatures and bleaching. You can check current reef health data at their site. The link provides data from 2020 to March 2021:

<https://faktaoklimatu.cz/explainery/vymirani-koralovych-utesu>

Why are hawksbill turtles called coral reef architects?

Hawksbill turtles feed on sponges that grow on coral reefs. By regulating sponge growth, they influence the composition, structure, and biodiversity of these ecosystems and help keep reefs healthy.

“Beaches are disappearing, and we have nowhere to lay our eggs,” say the turtles

What is erosion? How does it affect sea turtles? Why is it happening?

Due to global climate change, sea levels are rising, causing the shrinking or disappearance of small islands that are suitable for turtle nesting. Global warming is not only responsible for higher temperatures. Rising sea levels also cause erosion, flooding, and even washed-away nests.

Erosion (a natural process) is caused by wind, flowing water, ice, and snow. In the picture, we see that strong waves are eroding the island, carrying away the sand, and the beach is gradually disappearing.

Another issue is coastal development, including the construction of hotels, homes, and resorts. As coastal regions develop rapidly, turtles have fewer quiet and undisturbed spaces for laying eggs.

Sea turtles lay their eggs at night and prefer dark beaches, without artificial light from street lamps or buildings. However, light pollution from nearby towns and villages disorients the hatchlings, who, instead of heading toward the moonlight reflecting off the sea surface, are drawn to artificial lights. Hatchlings often head in the wrong direction—towards land instead of the ocean—and die.

HOPE – A short 8.5-minute film about a turtle hatchling’s first minutes after birth. Learn how they overcome challenges like pollution:

<https://www.youtube.com/watch?v=1P3ZgLOy-w8>

Why do leatherback turtles migrate north?

The leatherback turtle (*Dermochelys coriacea*) is the only representative of its genus. Unlike other sea turtles, its shell is not made of hard bony plates but is covered with a tough layer of skin. This type of shell is likely adapted for deep diving, allowing the turtle to hunt its primary food source—jellyfish—even in high-pressure environments.

The leatherback turtle dives very deep; in fact, it holds the record as the deepest-diving reptile in the world (1,230 meters!). It is also the largest sea turtle, measuring over two meters long and weighing around 800 kilograms.

Rising ocean temperatures may help expand the leatherback's range. This turtle inhabits the widest distribution of all sea turtles and, indeed, of all reptiles. It inhabits all the world's oceans, yet it is still critically endangered. Due to global warming, its natural range has significantly expanded. In summer, water temperatures as far north as the Atlantic can reach 15°C, and sightings of leatherbacks in areas like southern Ireland—once a rare occurrence—are now more common. In these locations, the turtles feed but do not nest.

A short video showing leatherbacks feeding:

<https://www.youtube.com/shorts/PBxuRzNIQVI>