

Sea turtle nesting deaths are on the rise as hot dry summer comes to an end

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The South Florida heat is causing more sea turtles to die in their nests, with this year's dry scorching summer prompting embryo deaths to more than double, researchers say.

The [nesting season](#) runs from March 1 to Oct. 31 each year, and sees three species of [sea turtles](#)—the green, loggerhead and massive leatherback turtles—digging holes along Florida beaches to lay their eggs.

Female turtles typically dig nests every 11 days or so, dropping around 110 eggs per nest. The hatchling emerge two months later and make their way to the ocean.

"In general, this has been a good year in terms of numbers of nests laid," said Jeanette Wyneken, who studies the impact of climate on [sea turtle nests](#) as part of her role as director of Florida Atlantic University's Marine Lab. Her data comes from nesting sites up and down the southeast coast of Florida.

"Potential production is good—there are a lot of adult turtles laying multiple nests," she said. But hatching success (the proportion of eggs that hatch) and emergence success (the proportion of hatchlings that get out of the nest) has been quite low.

"Our normal loggerhead and green turtle emergence success is somewhere between 78 and 80 percent," she said. "We aren't even close to that this year. Last I checked, we were down around 50 to 54 percent. And that did not include most of September."

"We had an awful lot of nests that didn't even produce 10 hatchlings. They should be producing 80 to 110 or so."

Wyneken said that in spring, hatching success started off really well, and got worse and worse as the season went on. The low loggerhead hatching, the species they use as a baseline, started in July and August, she said. (That means they were laid in mid-to-late May). "The few nests we did see in August were not robust."

That lack of nest success parallels exceptionally hot dry conditions this summer. U.S. drought monitor maps indicate coastal South Florida was "abnormally dry" for most of August and September, prior to Hurricane Ian.

Dryness equals death

The near-drought conditions of the summer of 2022 derail turtle nesting success for several reasons, Wyneken said.

Firstly, as with sand castles, slightly damp sand holds its shape. The egg chamber that mothers dig, which can be 2 to 5 feet deep, has near vertical walls that collapse if the sand is dry. "It's rough on any eggs that do get deposited because they are being put into a hot dry environment," Wyneken said.

Secondly, sea turtle eggs are "parchment shelled," meaning the shells are flexible and absorb needed moisture from both the sand and from fluids the mother leaves behind, Wyneken said.

If the sand is dry, that moisture does not absorb into the egg. "The embryo starts life dehydrated," Wyneken said.

The dry egg can lead to deformities in the embryos.

Fortunately, females nest five or six times a summer, so if one month is dry and hot, another might be just right. "I describe it as 'don't put all your eggs in one basket.' By spreading over time and space, then the animals have a better chance," Wyneken said.

Previous hot years also have been tough on embryos. Nest mortality was high in 2015, 2016 and 2017.

Emily Turlow works with Jeanette Wyneken, and has been studying leatherback turtle nests for the past two years. "This season I found more late-stage [incubation] death, and that our nests spent more time above critical temperatures than they did last season." She believes they died because of the persistent hot weather.

In 2021, she found leatherback's median hatch success rate to be 73%. This season it was 39%.

Justin Perrault, director of research at the Loggerhead Marinelife Center in Juno Beach, monitors nests on a 9.5-mile stretch of beach. He and his team monitored 18,132 sea turtle nests this year, the third-highest count since they started standardized monitoring in the early 1990s.

"Despite having all of those nests, we actually had the lowest reproductive success that we've ever seen for some of our turtles on our beaches," he said. "Oftentimes when you get these really hot and dry years, you see these low levels of reproductive output. Perrault explained that the embryos can only tolerate so much heat before development starts to go awry."

One bright note on the season was they weighed 30 leatherbacks this year on beach, and the largest was a gargantuan 1,200 pounds. "Yeah, a big, big animal," he said.

David Anderson, the sea turtle conservation coordinator at Gumbo Limbo Nature Preserve, monitors five miles of beach along Boca Raton. He echoes Perrault's take on the summer.

"Normally, a good nest would have 80% or 90% of eggs hatching," he said. "Last year, 77% of our eggs hatched. Preliminary data crunching this year looks like only about 55%, probably because we experienced a really hot dry portion of summer."

Weather trends

According to NOAA, the average July precipitation at their West Palm Beach weather station is 5.63 inches, but 2022 saw 2 inches.

The normal average July temperature is 83.1 F, but 2022 had a spike to 85.4 F, with several days at or above 93 F, the threshold over which eggs start to deteriorate. In August, rain data was not available, but the normal temperature average jumped to 85.6 F in 2022, with 11 days reaching at or above 93 F. For September, the average jumped from 81.9 F to 82.7 F.

Warming trends are part of a larger pattern in South Florida.

Research from the National Oceanic and Atmospheric Association indicates that the average annual temperature in Broward County since 1980 has gradually risen from 74.2 degrees to 76.7 degrees, and Environmental Protection Agency data shows that the rate of temperature change since 1901 in coastal South Florida is 2.82 degrees per century.

If these trends continue, Florida's turtle nests could be jeopardized.

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