

ENVIRONMENT

The mystery of male sea turtles in Florida: There may be fewer but does it matter?

BY SARAH LOFTUS

JUNE 19, 2020 06:00 AM , UPDATED 18 MINUTES AGO



Peter Iacono, left, and David Roache, part of Kristen Hart's U.S. Geological Survey research group, catch a loggerhead turtle in fall 2019 off Key West. Such turtle wrangling is only allowed for scientists with state and federal permits with protocols to protect the animals from harm.



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Scientists tracked a point on a map from their computers at home this spring,


witnessing it travel up the southeast coast of Florida. The point represented a male sea turtle, and the tracks provided a glimpse into its mysterious life. Males don't return to beaches like females do, so researchers know relatively little about them.

But with fewer male hatchlings emerging from nests over the past few decades, researchers are now studying male sea turtles with more urgency. Hotter beaches have led to female-dominated hatchlings, since temperature influences whether a sea turtle will be born male or female.

No one knows exactly how a dwindling supply of males will affect these threatened and endangered species living off the Florida coast. Researchers are performing paternity tests on hatchlings and sticking tracking devices on turtles to figure out how many males are mating and how to better protect them. Summer is the heart of nesting season and baby turtles incubating in Florida sand right now may help scientists determine how an imbalance of males and females will impact future populations.

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Paternity tests on hatchlings can estimate the ratio of male to female turtles that are creating the next generation. This ratio doesn't reflect the actual proportion of males in the ocean, since some turtles may not mate every year, but it's a start.

“We know a lot about females because they come to the beach. We know a lot about hatchlings because they're adorable,” said Jacob Lasala, a postdoctoral research fellow within the Sea Turtle Conservation and Research Program at Mote Marine Laboratory and Aquarium in Sarasota. Research hasn't focused much on males because it's difficult and expensive to find them in the ocean. Lasala studies elusive males without going to sea by running paternity tests on the hatchlings they've fathered.

So far, he's found that more males are still breeding than females, at least for loggerhead turtles in Southwest Florida. One female may mate with multiple males in a season. Since females can store sperm, one nest can produce hatchlings from different fathers.

Between 2013 and 2015, Lasala tested hatchlings from 54 loggerhead turtle nests on Sanibel Island. Most nests had hatchlings from [multiple different fathers](#). There were about two to three father turtles for every mother on average.

In 2016, he saw that most of the 16 mothers whose nests he tested were

actually [monogamous that season](#). There were about one to two fathers for every mother. The decrease in fathers isn't necessarily concerning though. Lasala says the change is likely because of different behaviors between the turtles, such as warding off an unwanted mate.

His results are a baseline. To really understand if fewer male hatchlings mean fewer breeding males, researchers will need to continue paternity tests over time and compare the results. Lasala plans to conduct paternity tests again this year on Casey Key, a barrier island south of Sarasota, and would like to expand to other locations in the future. He's also performed paternity tests on green turtles and leatherbacks on the east coast of Florida, and the results could be available by the end of the year.

A BREEDING CRISIS?

While there appear to be sufficient breeding male sea turtles for now, the risk to future populations is still unclear but clearly a concern. Sea turtles are already facing threats from sea level rise, fishing net entanglement, harmful algae blooms, plastic pollution and tumor-causing disease.

“We don't know what the ratio would have to be for the population to crash,” said Lasala about the male to female adult ratio, especially since females can store sperm after mating. Still, more males contributing to the gene pool is better in general.

Just south of the mainland along Florida's trailing string of islands, a smaller population of turtles could potentially have fewer breeding males.



A loggerhead sea turtle hatchling makes its way into the ocean. Researchers have found that rising temperatures in the sand where turtles nest is producing a higher ratio of female hatchlings. Now, scientists are trying to figure out what that means for the future of rare turtles. Lynne Sladky *AP*

“We might be in a critical scenario right now and we don’t even know it,” said Kristen Hart, research ecologist at the Wetland and Aquatic Research Center with the U.S. Geological Survey in Davie. She researches turtles in more remote protected areas like the [Dry Tortugas](#).

Hart wants to perform paternity tests on eggs that would otherwise be washed out to sea. Just this May she witnessed nests disappear in the Dry Tortugas on East Key, a sandy spit of land the size of a few football fields.

“We marked it off, we took the GPS locations. And the next night, that nest was gone because the beach was gone.” Rising tides, shifting sands, and

storms can wipe away a turtle's eggs, literally overnight.

Combining methods like paternity tests with satellite tracking can help researchers gather more insightful information like where the males are going and when. Some scientists are even scouting male turtles in the ocean to equip them with tracking devices.

“You've got to have a boat, and you've got to have the skills to jump off the boat and grab the turtle and get it on the boat. It's not easy,” said Hart.

She and her team perform what's called the rodeo technique to wrangle 300-pound turtles onboard, only after securing all necessary federal and state permits. The team completes something like a veterinarian check-up with the efficiency of a NASCAR pit crew, as Hart describes it. Part of their routine involves cleaning a spot on the turtle's shell to attach a satellite tag they can track from their computers.

Over the past decade her team has glued tags on 40 males, a high number compared to other studies. The group includes greens, loggerheads, hawksbills and Kemp's ridleys, four of the five sea turtle species that live around Florida. They were found in the Florida Keys National Marine Sanctuary, Dry Tortugas National Park, the northern Gulf of Mexico and Buck Island Reef National Monument in the U.S. Virgin Islands.

Tagging a male turtle is cause for excitement, since little is known about their movement towards females and food. The tags last roughly a year or shorter, but some have kept tracking for four years, said Hart.

A male loggerhead she caught last fall in Key West swam over 200 miles up the coast to Delray Beach this spring. He arrived back to Key West in May. Another turtle from the Keys swam towards Mexico. Others didn't migrate at all.

“If we can start to piece together when and where mating might occur, that would be amazing,” said Hart. That knowledge could help with designing temporary protective measures. Migrating out of marine protected areas across the high seas or through heavy boat traffic is risky, she said.

On the mainland, Mote’s Sea Turtle Conservation and Research Program has been sticking satellite tags on [released male loggerheads](#) after they’ve recovered from injuries or sickness.

SOME STAY, SOME ROAM

Another sizeable group of [29 male loggerheads](#) was tagged over a decade ago around Port Canaveral, a popular area and breeding site for loggerheads. Tracking revealed [where the males went](#) after breeding.

“About half of the animals that we captured stayed in Canaveral,” said Michael Arendt, assistant marine scientist with the South Carolina Department of Natural Resources Marine Resources Division. “And then you have this other group of males that went all over the place, all the way up to the panhandle of Florida to New Jersey.”

Similar to Hart’s work, the Port Canaveral study can identify when and where male turtles may need additional protection. The study contributed to the [loggerhead critical habitat map](#) on the U.S. Atlantic and Gulf coasts, announced in 2014 by the National Marine Fisheries Service and U.S. Fish and Wildlife Service.

Arendt’s research team has also been [monitoring sea turtles](#) along the coast between St. Augustine and central South Carolina. They’ve encountered roughly 2500 loggerheads over the past twenty years. There were about two juvenile females for every juvenile male — but an equal amount of female and male adults. Only about one out of ten turtles were adults, since

surviving to adulthood is quite a feat for a sea turtle.

Arendt said there doesn't appear to be a trend of declining male adults, but he'd like another ten years of data to be sure.

"It's going to be difficult to know when we've reached some threshold of males that we don't have," said Hart. "We're still at the basics for a lot of stuff."

Sarah Loftus is a [Mass Media Fellow](#) with the American Association for the Advancement of Science, sponsored by the Heising-Simons Foundation.



Kristen Hart alongside a green turtle outfitted with a satellite tag in December 2019 in Key West by a U.S. Geological Survey research team. Capturing protected sea turtles is allowed only for research with state and federal permits.

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