

# Are Sea Turtles Getting Smaller?

By Katrina Phillips

**R**esearch projects across the globe monitor sea turtle nesting beaches and collect information about numbers of nests and their fates over a breeding season. Many researchers also observe turtles as they lay their eggs, which offers a rare glimpse into the biology of animals that spend most of their lives at sea. In addition to tracking nest counts and hatching success, the projects have an opportunity to measure the sizes of mature female turtles.

Over time, a trend has emerged in multiple ocean basins and across species: sea turtles nesting now are smaller on average than those nesting in decades past. Although the causes and implications of smaller nesting turtles remain unclear, several long-term studies have found that smaller nesting sea turtles have indeed become more common over time, particularly within four of the seven sea turtle species:

- Loggerheads in Cabo Verde, South Africa, Turkey, and the United States
- Green turtles in Ascension Island (United Kingdom), Australia, Brazil, Seychelles, Turkey, and the United States
- Olive ridleys in Brazil and India
- Hawksbills on the Yucatán coast of Mexico

The observed size differences are a few centimeters or more among turtles that are more than half a meter in size, but those differences have potential impacts at the population scale.

## Why Does Size Matter?

Smaller turtles typically lay fewer eggs per clutch than do larger turtles. If the turtles nesting now are smaller than they were historically, they may have lower potential fitness over their lifetimes. A slight decrease in the number of eggs laid per turtle might not make much difference in stable or increasing populations, but for declining populations, even a small reduction in the numbers of eggs and potential hatchlings could lead to further depletion.

## The Causes Are Unclear

Locating where nesting female turtle sizes are decreasing will help researchers to identify the population-level causes that might lead to this trend. For instance, some of the sites where smaller nesting turtles are more common have also experienced recent increases in the number of nests laid per year. More small nesting females may be an indication of an influx of new recruits (new adult females joining the nesting population due to maturation or immigration) linked to population recovery. However, this is not the case at every site where smaller turtles have been observed.

Less positive possible causes for the trend could derive from a loss of larger females in the population from anthropogenic causes (overharvesting, bycatch, and so on) or from a reduction in the quality of foraging habitats, which could lead to slower growth rates among juveniles, to smaller juveniles over time, and subsequently to smaller mature animals. There may also be shifts in where nesting females migrate between nesting seasons, because some regions support larger turtles than do others. Given the broad distribution of the phenomenon worldwide, the reduction in nesting female size may also be linked to global climate change.

Ultimately, the answers are probably not one-size-fits-all, and different combinations of factors may be affecting each of the sites and populations. In addition, smaller turtles are likely nesting at many sites that have not yet been assessed or documented. As additional nesting beach projects examine the long-term datasets, the sea turtle research community will become better equipped to identify the common threads that such sites share and to learn more about what conservation measures may be needed to support the populations in the future. ●



An undergraduate intern measures a loggerhead after nesting in the Archie Carr National Wildlife Refuge, Florida, U.S.A., as part of the long-term research project led by the University of Central Florida Marine Turtle Research Group. Loggerheads and green turtles nesting in the refuge have decreased in average size since monitoring began in 1982. Image taken while conducting permitted research under FL-MTP 171 & 186. © Gustavo Stahelin