

World's most complete health analysis of nesting sea turtles conducted in Florida

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An adult female green sea turtle nesting on Juno Beach, Florida. Credit: Jennifer Reilly

While it's only about a 10-kilometer stretch, Juno Beach is home to one of the largest aggregations of nesting green sea turtles (*Chelonia mydas*) in Florida and is one of the highest-density nesting beaches in the state. Although this high-profile turtle population has routinely been monitored for nest counts since 1989, an in-depth health assessment of these turtles has never been conducted.

Researchers from Florida Atlantic University's Harbor Branch Oceanographic Institute and Loggerhead Marinelifelife Center have conducted the most comprehensive health assessment for a green turtle rookery in the world to date. Findings from the study provide critical insights into various aspects of physiology, biology, and herpesvirus epidemiology of this nesting population and are especially timely as the world observes "Sea Turtle Day."

Results, recently published in the journal *Endangered Species Research*, are hopeful for this population of [green sea turtles](#) in southeastern Florida and offer important data on the profile of health for future comparative investigations.

"Effective conservation measures cannot take place unless the animals we are trying to protect are healthy," said Annie Page-Karjian, D.V.M., Ph.D., lead author, assistant research professor and clinical veterinarian at FAU's Harbor Branch. "Chronological and longitudinal studies of biology, physiology, and overall health in both free-ranging and captive populations are critical for supporting large-scale efforts to promote sea turtle population recovery."

A total of 4,343 green turtle nests were documented on Juno Beach in 2017, which was the busiest nesting year on record for this beach. For the study, researchers collected blood samples from 60 female green [turtles](#) that nested on Juno Beach in 2017. They evaluated a broad suite of biological and health data, including measures of reproductive

success, morphometrics, hematology, plasma chemistry, plasma protein fractions, haptoglobin, corticosterone, and measures of oxidative stress, antioxidative capacity, and innate immunity. They also tested for two herpesviruses of green turtles, ChHV5 and ChHV6, which are implicated in fibro-papillomatosis (FP) and respiratory and skin disease, respectively. FP is a debilitating disease of sea turtles characterized by neoplastic growths on the skin, shell, and/or internal organs.

Results showed that all 60 turtles included in the study were in good body condition with no external FP tumors. Five of the 60 turtles (8 percent) tested positive for ChHV5 and all turtles were negative for ChHV6. Of the 41 turtles tested for antibodies to ChHV5 and ChHV6, 29 percent and 15 percent tested positive, respectively, and 10 percent tested positive for antibodies to both viruses. Notably, there were no statistically significant differences between health variables for nesting turtles that tested positive for ChHV5 DNA versus those that tested negative; and also no differences between turtles that tested positive for ChHV5 or ChHV6 antibodies and those that did not. Findings from the study suggest that these viruses are endemically stable in Florida's adult green sea turtles.

Researchers differentiated between previous viral infection versus recent infection/reactivation, and evaluated the results alongside health analytes to understand whether either infection state was associated with detectable physiological changes.

"The fitness of the turtles examined for this study is likely representative of the health of the ecosystems in which they forage and the oceanic corridors through which they migrate," said Page-Karjian. "As human activities continue to affect sea turtle population recovery, these comprehensive baseline data from our study will provide a valuable resource for evaluating the impacts of various stressors such as habitat degradation on the population over time and will help inform wildlife

and environmental policy management."

Green turtles are the second most common sea turtle species to nest on the coast of Florida, after loggerhead turtles (*Caretta caretta*). Sea turtles are considered to be sentinel species of environmental health, whereby sea turtle health is thought to reflect the health of the ecosystems they inhabit. Thus, examining sea turtle health is an important component of any coastal ecosystem health survey that includes sea turtle developmental, foraging, and/or nesting habitat(s).

Conservation threats to sea turtles in Florida are numerous, and include habitat encroachment and pollution, illegal harvesting, artificial beach lighting and coastal armoring, and human interactions such as entanglement, hook ingestion, and boat strike trauma. Diseases, including FP, also directly threaten sea turtle conservation.

More information: A Page-Karjian et al, Comprehensive health assessment of green turtles *Chelonia mydas* nesting in southeastern Florida, USA, *Endangered Species Research* (2020). [DOI: 10.3354/esr01036](https://doi.org/10.3354/esr01036)

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