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MARINE ENVIRONMENT

Dolphins are looking healthier in Volusia, Brevard section of Indian River Lagoon

Recent assessment part of long-term study

By [Dinah Voyles Pulver](#)

dinah.pulver@news-jrnl.com

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Things may be looking up for bottlenose dolphins in the northern end of the Indian River Lagoon.

A team of experienced researchers who just concluded a two-week long health assessment of bottlenose dolphins in southern Volusia and northern Brevard counties say the results and related scientific analysis will take months, but their initial, anecdotal observations found positive signs.

"On the whole, the animals we looked at appeared to be in pretty good shape," said Greg Bossart, chief veterinary officer and senior vice president at Georgia Aquarium.

"The animals were typically very robust," said Bossart, who has studied dolphins in the lagoon for more than a decade. "I didn't see any really thin animals that would indicate something is going on."

That's good news for the dolphins and for researchers trying to determine why more than 200 dolphins died in the lagoon system, which also includes Mosquito Lagoon in Volusia County, during an unusual mortality event between 2012 and 2014. Dolphins in the region also were hit by a measles-like morbillivirus that killed hundreds of dolphins along the Atlantic Coast of the United States.

A team of 60-70 researchers from a dozen agencies, non-profit organizations and educational institutions assisted with the two-week dolphin Health and Environmental Risk Assessment in early July. They conducted full or partial evaluations on 36 dolphins, Bossart said, gathering "a tremendous amount of data."

The analysis and tests on the data and samples they collected this summer will continue to flow in over the next year, said Patricia Fair, a co-investigator with Bossart and John Reif with Colorado State University.

"We take myriad samples of blood and skin and blubber, all kinds of data that we send off to the lab," said Fair, a scientific research physiologist with the National Oceanic and Atmospheric Administration's National Ocean Service.

The assessment is part of a much longer study of dolphin health in the Lagoon that



Wildlife researchers working with the Georgia Aquarium and its Field Station at Marineland hold a bottlenose dolphin in the northern end of the Indian River Lagoon. Georgia Aquarium and its partners spent two weeks in early July performing full or partial health assessments on about three dozen dolphins in the Lagoon. This photo was taken under NOAA National Marine Fisheries Service permit number 14352-03. Photo provided by Georgia Aquarium/Addison Hill

began at Harbor Branch Oceanographic Institute in 2003. In total, they've examined more than 350 animals.

Before they started, Fair said researchers were only using photos to glean information about the dolphins' health.

"We've been able to capture the animals and do health exams similar to what you and I get when we go to the doctors, and probably more comprehensive than what we get," she said. "We've been able to document so much about their health, from emerging diseases, antibiotic resistance, bacteria immune function and dysfunction and the contaminants they carry, including contaminants from long ago and the newer, emerging contaminants as well."

As part of the study, the scientists also have studied the health of dolphins in Charleston, South Carolina, so the health of the two dolphin populations can be compared, yielding even more information about the animals, said Fair. For example, the South Carolina dolphins had higher level of contaminants while the Lagoon dolphins had higher levels of mercury. Fewer than half the dolphins in the two study areas — the Indian River Lagoon and Charleston, SC — are considered healthy.

"We would never have been able to get that information from photos," she said. "We've learned a tremendous amount about their health," and have published nearly 90 journal articles and papers on their work.

The study began simply to evaluate the dolphins, but over time it became a study using the dolphins as overall indicators of ecosystem health, Bossart said.

"The beauty of this study — which you don't have in most studies — and the reason why the dolphins are such good sentinels, is they spend most of their lives in the Lagoon," he said. "We can go look at the same animals over time."

For example, he said they've been able to observe how the dolphins recover from bites from sharks or other predators.

The dolphins are sentinels, not only for environmental health, but also for the health of humans who live along the 156-mile lagoon system, said Bossart. The scientists' mercury studies led to research that found higher levels of mercury in fishermen along the Lagoon.

They've evaluated dolphins along the length of the Lagoon, but Bossart said this summer they wanted to focus on dolphins in the northern lagoon because of the dolphin deaths.

NOAA was interested in seeing if the morbillivirus was lingering in the dolphins. So far, said Bossart, all those tests have been negative.

He is particularly interested in the dolphins' immune systems. In a study of sexually transmitted, virus-related tumors on some dolphins, they found that in some of the animals, the tumors seemed to disappear, suggesting the dolphins "were able to mount an immune response that kind of eliminates the tumor," he said. "That's fascinating from a dolphin standpoint and from a population standpoint."

Understanding dolphin health is important because it reveals important information about the health of the aquatic environment, said Bossart, and carries implications for the bigger picture.

"The health of the oceans is inextricably linked to human health which we conveniently forget sometimes," Bossart said. Aquatic environments like the Indian River Lagoon system are the "lungs" of the planet, he said. "We are starting to

witness lung pathology which we need to address for our own good as well as for the good of the dolphins and other organisms.

The link between dolphins and human health is one of the concepts behind the proposed Georgia Aquarium One Ocean, One Health Research Institute. Bossart said the institute would focus research on the growing "One Health" movement, a collaborative effort among health science professionals in human medicine, veterinary medicine, environmental, wildlife and public health. Exploring the connections between health and the environment could help protect current and future generations, he said.

The researchers hope to secure a third five-year permit from NOAA to continue their dolphin assessment in the Lagoon system, said Bossart. He's also considering looking at dolphins in the coastal basin along Flagler County, where dolphin populations have not been as intensely studied.

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