What's causing the worst die-off of manatees? Starvation from Florida ecosystem collapse

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Manatee deaths reported in the past half-century include nearly 5,000 from boat strikes, water structures and red tides.

Across that span of mortalities tied to human activities, there has never been a die-off as gruesome as from December through May, when 677 carcasses were counted along Florida's east coast. Half were in Brevard County's portion of the Indian River, a coastal lagoon in biological collapse from pollution.

Partly because of the pandemic, necropsies were not done on two-thirds of the dead in Brevard. But by February, authorities had learned that winter cold was not the culprit. They knew from manatees' contorted bodies and from finding nearly no seagrass in the lagoon they were dying of malnutrition.

Widely beloved as irresistibly cuddly, manatees are among Florida's strongest, hardiest creatures, able to heal from vicious propeller wounds.

Death by starvation is as inhumane as any of the assaults Florida has inflicted on manatees. Caretakers said suffering lasted months. Many lost nearly half of their weight. While still alive, bones pierced thinning skin and, remarkable to veterinarians, heart, liver and other organs were liquifying.

To survive, the animals consumed their fat and muscle. They lost buoyancy and, becoming too exhausted to swim, could no longer raise their heads for air.

An untold number survived, but emaciated. Experts fear their poor health will slow the species' reproduction for years.

Of rescue efforts for 80 manatees, a task requiring 10 personnel for each animal, many were too far gone: seven died during rescue and eight died in intensive care. So far, 37 have been revived and put back in the wild.

Here are four takeaways from the die-off, which threatens to repeat

itself, according to authorities, who lack experience, quick solutions or even a plan for some of the challenges ahead.

Martine de Wit, a veterinarian with the Florida Fish and Wildlife Conservation Commission, has determined many specific causes of manatee deaths often with painstaking examination. The root cause behind the hundreds that starved, she said, is plainly "an ecosystem in trouble."

Bottle babies

Jon Peterson, who oversees rescued wildlife at SeaWorld Orlando, said raising an orphaned manatee baby, or neonate, for release back into the wild takes three years.

"I'm going to spend probably somewhere around $600,000 on every neonate that comes in," Peterson said.

From December through May, 19 orphans were brought to care facilities, with 13—or nearly three times the average number—from the state's east coast.

"We will bottle-feed every three hours for the first year," Peterson said. "We will start giving them a little bit of lettuce at about month three. At about a year, we start transitioning, we get them out in our exhibit, where we literally go hands-off."

As Peterson spoke, two SeaWorld caregivers fed a pair of orphans, a male and a female rescued in May. Each was consuming about 40 ounces of formula—a concoction of oils, vitamins and nutrients but not true milk—daily. It takes a month for babies to learn to drink from a bottle.

There are 18 public and private organizations that share in the cost and

effort of rescuing and caring for manatees. Of that partnership, four provide acute care: Jacksonville Zoo, Miami Seaquarium, SeaWorld and ZooTampa. They are at maximum capacity.

A manatee stricken by red tide or hit by a boat may take several months to recover.

"Do you know how long it takes us to rehab a starving animal?" Peterson said. "I'm going to put you at six to seven months worth of work to get them back up and maybe a year, depending on how quickly I get them."

Some have come in at 800 pounds. They should weigh 1,400 to 1,600 pounds. It takes weeks to stabilize them, using high-level medical skills. If all goes well, they will begin to gain about 10 to 20 pounds a week.

"They have been eating their body from the inside, trying to stay alive because there is no food. I don't know if it hurts them because I'm not a manatee but I can tell you that if you haven't eaten for a week or two weeks, there is pain," Peterson said.

Peterson pointed out an adult female rescued Aug. 1 from the Indian River near Titusville.

She was breathing rapidly, stationary and listing to one side. "She's so heavy with no fat in her that she can't float easily," Peterson said.

The tank she was in has an adjustable floor that was raised to hold the manatee in shallow water, enabling her to tilt her head back to breathe.

Peterson said when the manatee was brought in, bones of her pectoral fins had broken through what had been tough skin. That was from pushing off the lagoon bottom to get to the surface to breathe.

"That doesn't happen in a day or two," Peterson said. "That's weeks of rubbing and tearing from trying to push up."

"A manatee has the ability to survive what most all other animals would never survive. Tougher than a dolphin all day long. Tougher than turtles. Tougher than most of the birds," Peterson said. "Their ability to work through stress and not crash is unbelievable."

He estimated the Titusville manatee had a 40 percent chance of living.

Seagrass famine

Lauren Hall is one of Florida's top researchers of seagrasses. She is from the St. Johns River Water Management District and oversees monitoring and mapping of seagrass in the Indian River.

In early August, she took an Orlando Sentinel reporter in a boat to an area of the lagoon four miles east of Titusville and a half-mile from wetlands buffering Kennedy Space Center.

Hall and her crew took the same reporter to the same spot six years ago.

At that time, the Indian River already had suffered convulsions of seagrass losses. But the seagrass there in 2015 still offered a carpet of green for grazing manatees.

In the recent outing, Hall set out with a snorkel and mask in a practiced search for seagrass under a few feet of water.

What she found is the nexus of everything wrong with the lagoon.

Through the lens of a mask in lightly clouded waters, the lagoon floor largely resembled desert sands.

Here and there, Hall pointed out shoots of seagrass as thick as eyelashes, inches long and dark green. She found a modest rebound of seaweed called Caulerpa, which can anchor the lagoon's sandy bottom as a precursor for the return of seagrass.

Hall was encouraged by the seagrass she found, though it might have equated to 1 percent of natural coverage. "We're seeing those patches every 5 to 7 meters. Now it just needs to fill in the gaps."

For decades, the lagoon has been afflicted by the usual Florida maladies: urban storm water, agricultural runoff, lawn and farm fertilizers, too many septic tanks and leaky sewer systems.

Brevard's share of lagoon gets no ocean tidal flushing. Pollution draining to the Indian River stays there.

By the start of this century, the abuse was exacting an alarming price.

The pollution spawned massive, intermittent and unpredictable outbreaks of microscopic algae, which darkened the water and cast lethal shade on seagrass and seaweed.

Larry Williams, the U.S. Fish and Wildlife Service's ecological director in Florida, fears an ominous turn.

"There's the idea of an ecological shift to an alternative steady state. And what they mean is that the prior ecology was a clear-water system where sunlight could get down through the water and get to the seagrass," Williams said.

"In other parts of the world, they've seen systems like that shift to a new, steady state of murky water dominated by algae," he said. "Some of the scientists say that what we are seeing right now is the flickering

transition to that new, steady state."

In the past decade, nearly 58% of seagrass beds—or 46,000 acres—has vanished from the Indian River Lagoon. Remaining beds contain about 10% of the original amount of seagrass.

Hall and other water district staffers track changes in seagrass by following a strict routine of returning to the same transects, or straight lines from shore into deeper waters.

There are 97 transects in the lagoon as long as 1,400 meters, depending on the extent of seagrass. The transect where Hall snorkeled had extended to 1,100 meters.

"If we were to give the transect a length now, we would call it zero," Hall said after returning to the boat.

$5 billion repair

Chuck Jacoby, a St. Johns water district scientist who accompanied Hall, said millions of dollars from many agencies and levels of government have begun to underwrite lagoon restoration.

But with the time-consuming planning and execution that go with restoration projects, there is Florida's environmental axiom: easy to break and difficult to repair. "People are hammering as hard as they can," Jacoby said.

In all, a campaign to revive clear water, lush seagrass, rich oyster and clam beds, and thriving populations of sea turtles and manatees, won't be as epic as remaking the Everglades—described as the world's biggest nature fix—but it could be in the same league.

Duane De Freese is executive director of the Indian River Lagoon National Estuary Program, a collaboration of federal, state, county and other stakeholders.

The lagoon, from ribbon-thin to miles wide and extending 150 miles from New Smyrna Beach to Jupiter, is repairable, he said.

Doing so will require an estimated $5 billion and 20 years or more, De Freese said.

"We need to focus hard on the plumbing," De Freese said. "Septic, storm water, both urban storm water and the larger, stormwater regional projects." Replanting seagrass, oysters and clams would accelerate restoration, he said.

"We are in a well-directed, running start," De Freeze said. "But we have a long race to run."

Winter fears

There is little reason to think that another die-off couldn't occur again this winter, said Patrick Rose, executive director of Save the Manatee Club.

"We've got to have a better idea of how the animals are doing," he said. "There's too much uncertainty."

Manatees dispersed widely during summer months but it's likely many will return to the Indian River in Brevard.

The reason is warm-water discharges from the Florida Power & Light Co. generating station just south of Titusville along the lagoon.

During winter, manatees are drawn to warm waters of power plants or springs. The FPL plant is the only such source along Brevard's share of the lagoon.

"I think the record there is about 2,500 manatees," said Gil McRae, director of the Florida Fish and Wildlife Research Institute. "That also is an area that has experienced significant seagrass decline."

Planning for the tools and techniques to prevent another die-off, McRae said, will require "dozens and dozens of partners. "

Rose said drones may help in assessing manatees, as would capturing some animals for a health check, although that may be risky for those in poor shape.

Knowing manatee health would address two concerns: the size of the rescue response that may be required this winter and whether to attempt a problematic mass feeding of manatees.

The logistics of feeding manatees would be staggering, Rose said, including for sources of lettuce or aquatic grasses and the transport required. Feeding them may change behavior, and not in a good way.

"You wouldn't ever want to get into a situation where you are doing this annually for years," Rose said.

Larger issues include whether the U.S. Fish and Wildlife Service should reinstate manatees as endangered, which the Save the Manatee Club supports. The agency controversially put the species under a less dire status of threatened in 2017.

In turn, Rose said, the wildlife service should push the U.S. Environmental Protection Agency to impose more stringent pollution

rules for the Indian River as essential for ensuring that a $5 billion restoration succeeds.

"If that can be done for $5 billion, then that's a bargain," Rose said. "It's an investment we can't afford not to make."