A Blooming Battle Over Red Tide

By MIKE SALINERO The Tampa Tribune

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TAMPA - A University of Miami professor is causing a stir in Florida's scientific community with his theory that red tide is getting worse and that humans are to blame.

Larry Brand, a marine biologist, says he has scientific research to back up his theory. He claims there's been a 15-fold increase in the abundance of the toxic algae since the 1950s, and that no natural causes can explain such a change.

"There is no evidence that any of those natural causes have increased 15-fold," Brand said. "What has increased that much? The obvious one is people and all those associated human activities such as sewage, fertilizer and agricultural runoff."

His theory rings true to environmentalists who think the state is reluctant to blame man-made causes.

But state scientists say the data that Brand used for his hypothesis was flawed. And while they don't rule out pollution as a factor in recurring red tide events, they say the scientific proof is not there.

As we near another red tide season, which traditionally runs from August to March, Florida's political and business leaders are increasingly anxious for scientists to find a way to control the noxious algae. Red tide costs Florida's coastal economy $50 million a year, according to some estimates, and is devastating to fish and wildlife.

Red tide is a microscopic plant that scientists call Karenia brevis. It occurs naturally in the Gulf of Mexico and feeds on nutrients, such as phosphorus and nitrogen.

Red tide blooms kill fish and wildlife and can cause breathing problems for people.

Red tide has been confirmed or suspected in at least one calendar month every year since 195 when the state started collecting data. In recent years, however, red tides seem to be starting earlier and lasting longer, with devastating results.

In 2005, red tide lasted from January to mid-December and caused a 2,200-square-mile dead zone on the bottom of the Gulf of Mexico from Tarpon Springs to Sarasota. The cost to the economy was estimated as high as $240 million, according to the National Oceanic and Atmospheric Administration.

Red tide reappeared last year and, though not as widespread as the 2005 event, killed millions fish and 62 endangered manatees.

Brand says the public perception that red tide is getting worse is true, and he has proof.

Using state water-sampling records, Brand compared the average number of red tide cells in a liter of water throughout the 1950s with the 1990s. He says he found a 15-fold increase.

Brand blames increasing nutrient pollution as Florida's population grew from 2.7 million people i 1950 to 16 million in 2000.

He also says it is no coincidence that the devastating 2005 red tide event followed a year when four hurricanes crisscrossed Florida.

The storms dumped as much as 27 inches of rain, swelling Lake Okeechobee. State water managers, to prevent flooding and to protect the dike surrounding the lake, dumped excess wat into the Caloosahatchee River, which flows west to Fort Myers. The water was polluted with nutrients from dairy and sugar farms.

Brian Lapointe, senior scientist at the Harbor Branch Oceanographic Institution in Fort Pierce, agrees with Brand that flushing the nutrient-rich water from Okeechobee contributed to red tide the next year.

Lapointe also blames the high nutrient outflows from the river for the red drift algae, nontoxic seaweed that has been piling up on beaches from Sanibel to Bradenton.

"The water that flushed out the Caloosahatchee and St. Lucie rivers by the 2004 hurricanes wa 11.5 percent nitrogen," Lapointe said, "about like sewage."

'We Can't Say Yes Or No'

State researchers dispute Brand's and Lapointe's conclusions.

Two University of Florida statisticians reviewed the same state data that Brand used in his hypothesis. They found that the water sampling locations were too scattered and the timing of t sampling was too inconsistent to support a finding that red tide is increasing.

"They were saying that, from those sets of data, you couldn't say that [red tide] is getting worse not," said Gary Kirkpatrick, manager of the phytoplankton ecology program at Mote Marine Laboratory in Sarasota.

"The perception is it's getting worse," Kirkpatrick said. "Unfortunately, in a scientific sense, we can't say yes or no."

Nutrients Occur Differently

Scientists also say Brand's theory about nutrient sources is oversimplified. While they agree tha Karenia brevis needs nutrients to grow, those nutrients occur in many different forms.

For instance, phosphorus and nitrogen can be organic, derived from living matter, or inorganic.

A large source of phosphorus in near-shore water is phosphate, a naturally occurring mineral found in huge deposits in south and central Florida.

Scientists also suspect that the presence of a bacterium called Trichodesmium in Gulf waters ca be a precursor to red tide.

Trichodesmium absorbs iron from dust blown to the Gulf from the Sahara in North Africa. The bacterium turns the iron into nitrogen, and then secretes it into the water where it can feed red tide.

"In a nutshell, it's not just the amount of nutrients that indicates what blooms are out there," saic Cynthia Heil, lead red tide researcher at the state Fish and Wildlife Research Institute in St. Petersburg. "It's the form. Organic or inorganic, whether it has carbon or not, and also the ratio the different nutrients."

Determining Cause Is 'Complicated'

Scientists such as Heil and Kirkpatrick are not ruling out increased incidences of red tide, nor ar they denying a human connection. They just say the science is not there to give a definitive yes or no to either question.

Mote spokeswoman Nadine Slimak said the molecular structure of a Karenia brevis cell is more complex than a human cell. Finding the cause of red tide blooms is "probably as complicated as understanding the causes of cancer," she said.

Environmentalists, who support Brand, say the state doesn't want to declare a definitive link between worsening red tides and nutrient runoff because the sources of the pollution include some of Florida's most powerful lobbies, including agriculture and developers.

"I think the state's problem with seeing the obvious is they're looking through the political glass and it's obscuring their view," said Linda Young, Florida director of the Clean Water Network. "The developers are fighting this because they don't want any limits on the amount of sewage w can dump in our water, wetlands that can be filled or the lands we can dump fertilizer on."

Scientist: Springs Fueled Blooms

Frank Muller-Karger, an oceanographer at the University of South Florida College of Marine Science, thinks rain from the 2004 hurricanes percolated into the aquifer, and pushed nutrient-laden water out into the Gulf through underground springs.

Muller-Karger stressed that his idea has not been proven, but he suspects the springs, along wi polluted rivers and Trichodesmium, play a part in fueling red tide blooms.

Whether the explosion in Florida's population is making the problem worse, however, cannot be proven with current science, he said.

"I don't think that the scientific data is there yet to conclude that we have aggravated the frequency of red tide," he said.

Brand, however, stands by his research. He said his paper was peer-reviewed and published in scientific journal, "Harmful Algae."

"There are all kinds of games being played," he said. "It's obvious it's a political thing."