

Red tide scientist's lonely stance is attracting some supporters

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In the alternative universe of Florida red tide research, the devil wears, not Prada, but off-brand jeans and a shirt that recalls '60s madras plaid.

He is tall and thin -- another writer once described him as resembling "a lone pine" -- with long, narrow hands that riff through stacks of scientific data like he's playing jazz.

He is called Larry Brand, and what he has done to make his name a curse to some scientists and bureaucrats and policy-makers is use his pianist's fingers to point at a reason for the increasingly noxious blooms the lower Gulf Coast has lately suffered.

Over the past 30 years, what used to be an occasional pest has become a regular menace.

Red tide blooms occur more or less annually now, big ones, lasting as long as two years.

These blooms produce a toxin that is one of the most lethal substances known to man, as powerful as the South American poison curare.

The toxin has been known to kill fish, turtles, dolphins, manatees and dogs. It creates huge dead zones on the Gulf floor; ruins vacations with fumes that make the eyes sting and the throat scratchy; and possibly poses a long-term human health threat by accumulating in the body.

In a nutshell -- which is where some of his harshest critics might suggest his ideas belong -- Brand says red tide is getting worse in Southwest Florida because industry and development are dumping nitrogen, the principal ingredient of fertilizer, onto the land and flushing it into Florida's rivers and streams, which eventually carry it out to the Gulf.

His position has made him a hero to many, including the Sierra Club, the environmental advocacy organization that has used Brand's research to pressure the state and its scientists to more directly confront the role of nitrogen runoff in feeding red tide blooms.

But it has hardly endeared him to industry and development, especially Florida's fertilizer-dependent, \$6 billion farming industry -- especially Big Sugar, which Brand suggests caused much of the excess runoff by draining the Everglades for its cane fields.

Nor are his conclusions popular with the Florida red tide research establishment, including scientists for the state's Fish and Wildlife Research Institute and Mote Marine Laboratory, two of the biggest players in the red tide summit beginning Monday at Mote in Sarasota.

The politics of red tide

Sponsored by the National Oceanic and Atmospheric Administration, a division of the Department of Commerce, the four-day symposium will bring together about 70 scientists for interdisciplinary discussions of the state of red tide research.

At a time of growing criticism for Florida's -- and Mote's -- perceived response to the algal blooms, the conference can be viewed as an effort to address public concerns about red tide by providing testimony from various experts that serious work is under way and progress is being made.

Brand, who plans to attend, believes real progress is not possible without acknowledging the connection between so-called "nutrient runoff" and the increasing severity of red tide.

Scientists at Mote and FWRI, on the other hand, question whether red tide is getting worse. And they insist that there remains no conclusive evidence of a link to nitrogen runoff.

Brand's reaction is a kind of post-doctoral variant on "Oh, please," complete with rolling eyes.

"I mean, it's a plant," he says of red tide. "Fertilizer, which is mostly nitrogen and phosphorous, makes plants grow. Isn't it obvious?"

Not to many of his colleagues. Largely dependent, as he is, on grant money from the state and federal governments, Brand implies they continue to reject his ideas more because of the economic implications than for his conclusions.

In the last 10 years, he has seen his research publicly attacked, his grants decline, his lab space diminish, and some of his equipment destroyed -- all, he says, because of his theories on nitrogen runoff.

It's not about science, it's about politics, he says, in a rapid-fire tenor that carries trace amounts of native Texan twang.

"The politics right now are really bad."

Odors of sea salt and rising damp compete for dominance in Brand's windowless lab on the campus of the University of Miami's Rosenstiel School of Marine and Atmospheric Science.

The roof leaks, and the door sticks open sometimes, which can bring in raccoons to join the resident multitude of cockroaches.

An array of crammed-full shelves and tanks and tables define narrow aisles for Brand and his two research assistants, down from six to eight before he got involved with red tide, back when his lab was three times its present size.

"Science is messy," says Brand, who is 54 and has been a lab rat more or less since high school in Houston.

He graduated from the University of Texas, went east for a doctorate from MIT/Woods Hole Oceanographic Institution, and took a faculty position in 1981 at Miami. There, he received grant support for his research into the anti-cancer properties of algae, for example, among other projects.

In 1995, the National Oceanic and Atmospheric Administration gave him some money to study algal blooms in Florida Bay at the base of the peninsula, where the water was increasingly murky and the sea grasses were dying.

Various kinds of algae were flourishing in the bay, and even the most benign sort of these single-cell organisms, in great masses, can consume so much oxygen that there's not enough left for anything else.

Brand's research suggested that an excess of nitrogen was working its way down through the Everglades into the bay, where it was feeding the blooms.

The source of this nitrogen, he said, was runoff from the ancient, nutrient-rich soil along the southern rim of Lake Okeechobee -- land drained to accommodate the Cuban sugar industry after the Castro Revolution in 1959.

Florida and its sugar industry were preoccupied in the late 1990s by a federal lawsuit charging that runoff from the cane fields was destroying Everglades National Park.

But the pollutant the two parties finally agreed to correct, in the \$10 billion Comprehensive Everglades Restoration Plan that ended the lawsuit in 2000, was excess phosphorous.

This is when science began to get really messy for Brand.

By throwing a new pollutant in the mix, nitrogen, far more difficult to remove from runoff than phosphorous, Brand's research was seen by some as a threat to the laboriously worked-out restoration plan.

Amid criticism from the plan's supporters, and others, his funding requests for further grants to study the relationship between nitrogen runoff and algal blooms in Florida Bay were rejected again and again, Brand says.

His lab space was drastically cut back, he says. And his relationship deteriorated in other ways as well with the University of Miami -- which, he notes, has benefited from the generous support of its board member Alfonso Fanjul Jr., scion of the most powerful sugar family in pre-Castro Cuba and today among the biggest cane growers on Lake Okeechobee.

With its associations to most high-profile national intrigues from the Kennedy assassination to the Watergate break-in, Miami is nutrient-rich soil for all manner of conspiracy theories. Brand's got his own, and doesn't shy away from admitting it.

"In a sense," he says, "scientists are supposed to be" conspiracists.

"We use the word hypothesis, but really what that is is a conspiracy theory. How do different phenomena conspire to create a red tide bloom? You pull this thread and that thread, and some of them can be pretty crazy, but you keep at it, and at some point certain connections start to make sense."

Looking for evidence

Brand is by no means the first scientist to connect nitrogen runoff to algal blooms, toxic and otherwise. Harvard biologist Lewis Agassiz beat him to it by a good 125 years.

From the naturally rich soil of the sugar cane fields, to fertilizer-enhanced farms and golf courses and cemeteries and front lawns, nitrogen inevitably makes its way into Florida's fresh waters, where it feeds the growth of various kinds of algae. No one denies that.

And some of that nitrogen almost certainly ends up in the Gulf, home of *karenia brevis*, the alga that causes toxic blooms along the Florida west coast -- although there is some debate over how much makes it that far.

Mote scientist Kellie Dixon and FWRI's Cindy Heil, among others, believe that most of the nitrogen may be absorbed before it gets to salt water.

Wherever it ends up, too much nitrogen, too much pollution-rich runoff of any kind, is potentially harmful. No disagreement there.

Where Brand takes a sharp turn away from his colleagues is in the area of evidence that runoff directly contributes to red tide.

Dixon and Heil, to name two among many, say he doesn't have any.

Brand says he's got all he needs -- and he got it from FWRI, which got some of it from Mote.

"They've had it all the time," he says, cheerfully, of the inch-thick stack of charts and tables that is the neatest thing in his helter-skelter office.

"They just didn't bother to look at it."

This is the sort of statement any research scientist would find provocative, to say the least, and the folks at Mote and FWRI audibly bristle at the suggestion that they have missed any opportunity to draw a suitable conclusion from the 20 million or so "data points" of their ongoing red tide research.

Brand's statistical analysis of state records, which shows an increase over 50 years in red tide episodes and in nutrient content of the inshore Gulf, is essentially meaningless, they say.

"The data he's working with is unsuited to the statistical purpose" he's using it for, says Dixon, whose assessment is shared by a University of Florida statistical team that FWRI asked to review the methods of Brand's analysis.

"Larry Brand is an excellent scientist, and what he's doing has focused attention on red tide, which is not a bad thing," says Heil. "But he's a biologist -- as I am -- not a statistician."

The man who heads the phytoplankton ecology group at Mote, Gary Fitzpatrick, heartily rejects Brand's approach to statistical interpretation. "It's not that easy," he says.

"Proof is extraordinarily difficult to come by."

Relaxed in his leaky lab on a recent day of pounding rain -- just the sort of day that flushes nutrient-rich runoff into the Gulf -- Brand waves away a decade worth of such criticism.

"You reach a point where, how much proof do you need?" he says.

"There is no absolute proof. There never is. I mean, look at global warming. If you want absolute proof, you would have to take two replicate earths, and blast one of them with greenhouse gases, and then wait.

"It gets a little silly."

That "lone pine" image prepares a first-time visitor for someone bitter and cynical, but Brand seems neither.

He thinks of himself as a "pretty normal" guy, he says, if more solitary than most. Unmarried, he spends weekends working on his house or neglecting his yard. He listens to lots of kinds of music at home, even country and western from time to time. He eats meat, though not a lot of it. He even uses sugar -- though not, if he can avoid it, the Fanjul family's Crystal brand.

Among his friends, who tend not to be other scientists, Brand says he is known as "an easy guy to get along with."

He is perhaps easier to get along with now, however, than at the height of the conflict over his research.

He says he has come to terms with the fact that reaction from funding sources to his position on nitrogen and red tide has meant "there is science I will never be able to do now. I've accepted that."

Brand sees evidence that the tide, so to speak, is finally beginning to turn in favor of his truth.

He even sees developing support in Florida, where several counties have sought to control the type and amount of fertilizers used.

The governments of China and Japan have begun to take steps to control agricultural and municipal runoff as a means of mitigating their red tide problems. Scientists in Oregon have identified runoff from coastal development as a factor in red tide blooms there.

His own research into the nitrogen-red tide connection on Florida's lower Gulf Coast has been successfully peer-reviewed by a scientific journal, *Harmful Algae*.

Publication, the ultimate indicator of credibility in his universe, is pending.

From Larry Brand's point of view, at least, the lone pine is just waiting for the rest of the forest to grow in around him.