The "Cell from Hell" Is Back in North Carolina Estuaries

Two menhaden fish among 300,000 dead in recent weeks in the Neuse and Pamlico Rivers of North
Carolina's estuaries. The large red and bleeding sores are typical of the *Pfiesteria* dinoflagellate which
can be either an algae plant or amoeba animal, depending upon environmental conditions.
In its amoeba form, it likes to eat fish. Photograph © 2000 by Rick Dove.

July 9, 2000 New Bern, North Carolina - In southeastern Europe the past several days, temperatures above 100 degrees in many places - and up to 113 degrees in the Turkey and Romania region - have killed at least 38 people. Strong winds from the Sahara desert began blowing on Friday causing hundreds of fires in Greece, Italy and Croatia. And this is only the first of July. What happens in August and September?

That same question is being asked by environmentalists and river keepers in North Carolina in one of the warmest springs on record in which the dreaded Pfiesteria dinoflagellate is killing fish in the Neuse and Pamlico River estuaries again by the hundreds of thousands. Pfiesteria was not known until the early 1990s when massive kills filled the Pamlico and Neuse Rivers with millions of fish covered by large, red bleeding sores. The water around the dead animals turned a bizarre maroon-brown and fishermen reported dizziness, disorientation and open sores on their own arms after crabbing in those rivers.

Eventually, Dr. JoAnn Burkholder, an aquatic botanist at North Carolina State University, got samples of water and fish to her lab to study. She and a lab colleague also became dizzy, disoriented and unable to speak or walk. What she was looking at under her microscope is what *The New York Times* described on August 27, 1996 as the "cell from hell" - a dinoflagellate that can transform from a plant algae into an amoeba animal that loves to feed off fish and gives off an aerosol that is very dangerous to breathe. One scientist studying the *Pfiesteria* creature said that when it transforms, it is like grass rising up to eat sheep in a pasture.

A few of the fifteen forms that *Pfiesteria piscicida* can take in its dinoflagellate life cycle from plant to animal and back.

Photomicrographs by JoAnn Burkholder, Ph. D., North Carolina State University Aquatic Botany Laboratory, Raleigh.

This weekend, I talked with the Neuse River Keeper who recently was appointed by Robert F. Kennedy, Jr. to be a representative of the National Water Keeper Alliance which licenses River Keepers throughout North America. Rick Dove has lived and worked on the Neuse River in North Carolina all his life. He is very concerned as one of the warmest springs on record has warmed up the waters to perfect feeding conditions for *Pfiesteria*.

Interview:

Rick Dove, Representative, National Water Keeper Alliance and former River Keeper for the Neuse River, North Carolina, New Bern, North Carolina: Between the Pamlico and the Neuse Rivers recently approximately 300,000 fish have died. Most of those fish, including those swimming around in the waters now, have open bleeding sores all over their body which is characteristic of *Pfiesteria*.

Typical Pfiesteria sores in fish where the dinoflagellate in its amoeba stage consumes fish flesh.
Tissue samples are now in laboratories for analysis and to confirm if Pfiesteria is the definite culprit.
Photograph © 2000 by Rick Dove.

YOU'RE SAYING THAT 300,000 HAVE DIED ALREADY AND WE'RE ONLY IN THE FIRST WEEK OF JULY?

That's correct. You know, this year Pfiesteria appears to have turned on early and we've seen more fish deaths for this point in time than we've ever seen before very early. And of course the concern is that these fish aren't dying from just low oxygen. We're seeing those sores on their body. It takes a little time for us to get absolute confirmation from Dr. Burkholder and the lab that Pfiesteria is absolutely the cause of the fish kill. It takes weeks for that to happen. But I can tell you based on my experience for more than ten years now is what I'm seeing out there has me convinced that Pfiesteria is at work right now and that's not good so far as public health is concerned.

WHAT PERCENTAGE OF THE MENHADEN AND OTHER FISH YOU'VE BEEN LOOKING AT IN THE RIVER SEEM TO HAVE THESE OPEN RED SORES?

That's a good question. Earlier, we had a few small fish kills where there were no sores on the fish and we were relatively certain they were due to low oxygen in the water. But, here recently over the last few weeks when these fish are dying, we're seeing sores on the fish upwards to 90%. So, it's overwhelming that these sores are present.

IF THIS IS THIS BAD BY THE FIRST WEEK OF JULY AND THE WARMEST WEEKS ARE AHEAD OF US, DO YOU THINK THIS COULD END UP BEING A PFIESTERIA KILL SEASON COMPARABLE TO THE LATE 1980S OR EARLY 1990S?

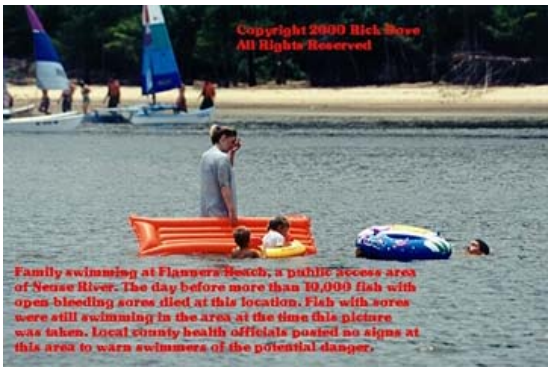
It could, Linda. One of the things we are really scared about is what happened after Floyd, in Floyd and after Floyd. When Floyd hit down here, it delivered an awesome amount of polluted water. You could see it moving down the middle of the river: hog waste, human waste, toxins, sediments. And because the Tar-Pamlico and the Neuse where most of these fish die with Pfiesteria because it's dammed in by the Outer Banks, these pollutants don't flush out of here, even with a flood not that much gets out from what I'm told by scientists. So, these pollutants settle out here. We have been really afraid because we knew these pollutants got delivered and we didn't know what Mother Nature was going to do with them this summer.

Well, the summer has started early and the fish kills have started early and all these are not good signs. But predicting what Mother Nature will do is a business for fools because Mother Nature will prove you wrong more times than not. So, what we've been saying all along is that everything is in place for this to be a bad year, but we're going to have to wait for Mother Nature to say and so far it seems like she is saying, 'Look out, boy, I'm coming!'

WHAT IS THE STATE OF NORTH CAROLINA DOING IN TERMS OF WARNING THE PUBLIC ABOUT THE WATER?

That's a very good question. We've got a very good Health Director in North Carolina now. His name is Dr. Dennis McBride. If I could give him sainthood, I would. I think he's a spectacular guy. And he has done everything he can from Raleigh which is about 150 miles up the river here. He's done everything he can to post health warnings and to tell people if you see dead or dying fish or fish with sores not only get out of the water, get out of the area. But for the most part, he has had to leave the individual control of bodies of water to local health directors over which he has no control because that's the way it's set up in North Carolina. He doesn't direct the local health directors in the counties.

I can tell you here in Craven County our local health director has done very little. If he's done anything, I don't know what it is but he hasn't done anything I can see. I've complained bitterly about it. One day we had a fish kill with 90% of the fish had sores. This was at Flanner's Beach. It's a public access beach off the forest right on the Neuse River. The next day I came back and catching fish in the river with sores. I saw some dying. And there were people in the water, parents, with children as young as 2 and 3 years old in the water. And when I went up to them and asked them if there were any signs on the beach, had they read the paper because there had been some news coverage. And they said they hadn't seen the news but there were no signs on the beach and nobody was there to tell them they shouldn't be in the water.



Family swimming at Flanners Beach on the Neuse River in North Carolina the day after 10,000 fish with open bleeding sores died right where the family is playing. No warning signs
were posted by local county health officials of the *Pfiesteria* danger. Photograph © 2000 by Rick Dove.

One of the world's most prestigious medical journals, *The Lancet*, has covered a report of the Maryland doctors and scientists who worked on this for Governor Glenn Denning in Maryland when he sent his doctors down to the Pocomo to take a look at this and whether there were any impacts to human health as a result of Pfiesteria, they found that there was. And they published their report in *The Lancet* which is an incredible feat. That publication accepts only very good peer-reviewed work.

And I'll tell you something else that's concerning is earlier everybody thought the health impacts from *Pfiesteria* were reversible and would go away very quickly. More and more, they are finding there are residual effects that hang on for along time. And I have actually seen that here in a number of people who have gotten sick over the years likely from the exposure to *Pfiesteria*.

HAVE YOU HAD ANY OF THAT COFFEE BROWN STAIN ON THE RIVERS YET? OR IS IT TOO EARLY?

Oh, we have. And I've seen colors I have NEVER seen before. I actually have photographs of the river right here where my office is turning red. I mean really a bright red!

December 14, 1999, Neuse River at New Bern, North Carolina turned bright red from some kind of algae and chemical pollution. Photograph © 1999 by Rick Dove.

This happened about two or three months after (Hurricane) Floyd went through here. And then, I've seen the typical colors of brown and maroon that we see when *Pfiesteria* outbreaks are beginning or in progress. As I was coming up here earlier today, knowing that you were going to call, I looked out over the river and it was a maroon color. It was flat out there today. And I would not be surprised here fairly soon to see another major kill on the Neuse itself.

Brown foam and maroon-brown colored water often occur when *Pfiesteria* is in its toxic stage that seeks out fish and marine animals to eat. Photograph © 2000 by Rick

THAT CHANGE IN COLOR IS RELATED DIRECTLY TO THE TRANSFORMATION IN THE DINOFLAGELLATE FROM ITS PLANT VERSION TO ITS ANIMAL VERSION?

Dr. Burkholder thinks it's not related to that so much as it is the attack on the fish. When it begins to go after the fish and open up the bleeding sores and the fish get the sores and have this biological decomposition that begins, even in some cases while the fish are still swimming, then you begin to see that.

FROM THE BLOOD...

Yeah, and just the fish, even those that are alive, just beginning to rot. So, I think there is probably a number of reasons why this water turns the color it does. Some of it may be related directly to the Pfiesteria. Then indirectly to the fish as a direct of getting hit. And then there could be a lot of other things happening that I and the scientists don't understand yet to cause the water colors.

We know the algae when they bloom, that some of them have colors in them. They can turn a river anywhere from like a red tide, red, - I've seen the river here turn the color of Florida orange juice. I really have. I have videotape back to 1993 and 1994 where you would take a glass or sample bottle of water from the river and hold it up to a glass of orange juice and they were the same color!

THAT WAS SOME KIND OF AN ORANGE ALGAE?

It was. We know that. And it was a harmless algae, but it was a sign of too much nutrients being in the water. It was a winter bloom and it happened in the months of December, January and February. And Dr. Burkholder came down and studied it and other scientists studied it, and it didn't turn out to be harmful, but it certainly was a sign. The river was telling us something then.

RIGHT, BECAUSE ANY TIME THAT ALGAE CAN PROLIFERATE REGARDLESS OF WHETHER IT'S RED, BROWN, PFIESTERIA OR ANY OTHER COLOR, IT MEANS THAT THE CONDITIONS ARE THERE FOR THE ALGAE TO BLOOM WHICH IS TAKING OXYGEN FROM THE WATER WHICH CAN THEN KILL THE FISH.

That's correct. And most of these things, these algae, they are all natural in Nature, but what we're looking at is them out of balance with Nature. And that's what happens with a river like the Neuse or the Pamlico. You could probably pick any river in the country where people are using that river as a dumping ground for industrial waste, domestic waste, and just over-development. What happens is that a river gets out of balance and then it can't cope within the bounds of itself. The river, for example the Neuse. It took Mother Nature two million years to make this river and put her in balance. In the last 50 years, mostly in the last 25 years, we have just totally upset that balance. And now we see Pfiesteria and this vegetative growth that clogs whole creeks and we see fish dying and see people getting sores and getting sick. I don't think we should be surprised about that.

IF THE SPRINGS CONTINUE TO BE WARM AND WARMER EACH YEAR, HOW BAD, RICK, COULD ALL THIS GET?

You know, you pose a very good question. I think it could get very bad. I think that global warming is a result of our actions as human beings and what we've done to the environment. There are others out there who want to attribute it from a cycle or from activities of man we know we've got it. We know the ice

poles are melting. We know the oceans are getting warmer. We know because of that, the storms are getting greater. But now because of all the pollution we've put out there, all these nutrients and everything, as these waters begin to warm, we have created the fire necessary to cook the brew. And we should not now be surprised when bad things begin to happen to the animals and the people because Nature is going to have a tough time coping with what's happening here. And I don't know that we as people are going to be ready for this.

A lot of people say to me, Rick, it's a wonderful thing you are doing and the other keepers are doing for Nature. That's a mistake. This isn't about doing this for Nature. Mother Nature can take care of herself. And heal herself, even if it means she has to take out some or all of us if she wanted to. She could, just to heal herself. What this is about even your coverage of the stories here about what's going on what this is about is an effort for people to save themselves and their children. Mother Nature makes the rules, makes the laws. We need to figure out how to exist within those rules. We're darn fools most of the time because we think we can make our own rules and make Mother Nature just adapt to us. That doesn't work and I think that's what we're going to see as these waters and air temperatures are getting warmer."

More Information:

For an excellent book about the discovery of the *Pfiesteria* dinoflagellate and the pioneering research of
Dr. JoAnn Burkholder at North Carolina State University, see:

And the Waters Turned to Blood
© 1997 by Rodney Barker
Simon & Schuster

Websites:

http://www.neuseriver.com/

http://www.pfiesteria.org/

http://www.neuseriver.org/

http://www.hogwatch.org/

Credits

Privacy Policy | Terms & Conditions
Refund Policy