

# Scientists analyze Hurricane Ike's effects on waterways, fish contamination

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A long-term environmental research project being conducted at the University of Houston may offer important information about the effects of Hurricane Ike on pollution levels and help regulators determine whether existing fish-consumption advisories remain appropriate.

With this year's storm season under way, the UH engineering team's project is entering a new phase as participants collect and analyze fresh samples from Galveston Bay and related waterways.

Cullen College of Engineering professor Hanadi Rifai, who has studied [pollution](#) in Houston-area bodies of water in partnership with both state and federal authorities since 2001, is leading the team.

"Our work with the Galveston Bay system started in the early '90s with funding from the EPA Galveston Bay National Estuary Program," said Rifai, whose team helped write the first "State of the Bay" report identifying the environmental challenges facing the estuary.

"We have since focused on POPs, or persistent organic pollutants, which include dioxins and polychlorinated biphenyls, or PCBs. We have a unique opportunity this year to study the effect of Hurricane Ike on these pollutants, particularly in the water and sediment of the estuary, so we are gathering a one-of-its-kind data set for the 'after' condition that we can compare to our pre-Ike 2008 data set," Rifai said. "The results will be enlightening from an environmental impact perspective of

hurricanes on natural resources such as Galveston Bay."

As part of the Environmental Protection Agency's Total Maximum Daily Load Program, the team has been creating sophisticated models to help determine how much pollution a body of water is taking in and where that pollution is coming from. The team has upwards of 50 monitoring sites, Rifai said, and it looks for pollutants in sediment, water and tissue.

"The EPA has asked the states to come up with water bodies that do not meet Clean Water Act standards and with ways to address the problem," Rifai said. "For the first few years, we looked at dioxins, and now we're also looking at PCBs in every body of water in the Houston metro area, all the way to upper Galveston Bay. We're focused on past and current industrial pollutants."

Dioxins are primarily byproducts resulting from paper mills, industrial waste incineration and water purification processes, but they also result from natural sources like forest fires in much smaller quantities. Rifai said her team believes the majority of dioxins found locally today are from historical sources.

Meanwhile, PCBs, whose manufacture was banned in 1979, long were used as coolants and lubricants in electrical transformers and capacitors. Why they persist today in local waterways and seafood remains something of a mystery, Rifai said.

"Now, what we find with the PCBs, and what's got people worried, is, if indeed it's historical from before the ban, you would see it in the sediment," she explained. "But, we're actually seeing the patterns have shifted, as if there are some new sources of PCBs. Since the 1990s, we've had so much growth and industrial activity kicking back up that there might be some new material coming in."

What those new sources are remains unclear, Rifai said, and materials that were manufactured with PCBs before the ban may still be in use.

"Historically with PCBs, if you've made a million transformers, you didn't have to destroy them. You use them up till they die," she said, adding that many outdated transformers were ruined by Hurricane Ike.

In July 2008, the Texas Department of State Health Services issued an advisory for Galveston Bay, Chocolate Bay, East Bay, West Bay, Trinity Bay and contiguous waters, saying consumers should limit intake of spotted seatrout, also known as speckled trout, and gafttop catfish to no more than one 8-ounce meal a month. Furthermore, children, women who are nursing, pregnant or who may become pregnant are to have none. Long-term consumption of both dioxins and PCBs is believed to cause numerous health effects, including cancer.

"The problem is that these compounds are what is called 'bioaccumulative.' Once they get in the food chain, they accumulate - you cannot synthesize them," Rifai said. "A lot of the impacts of those compounds are subtle. They might be neurologic; they might be developmental. They're the kinds of things that do not show up for quite a while."

The inclusion of new species in the advisories, Rifai said, has many implications, because commercial and recreational fishing is a \$100-plus million industry annually. But, when her team was asked by the Texas Commission on Environmental Quality to do its own assessment of the state health department findings last year, the results were what Rifai expected.

"We told them that we thought the data was valid. We actually merged it with our data, and it was very consistent with what we see," she said.

"We looked carefully at what was done, and, at the end of the day, I

wasn't surprised."

While the industrial history of Houston is amazing, Rifai said, residents and officials are dealing with the repercussions of it now and will continue to for a long time, especially in coastal communities.

"You have to balance the protection of the resource with the need for development and growth," she said. "You also have to think about areas really vulnerable to these extreme events, like hurricanes."

She notes, however, that industrial partners have been critically important to her team's work.

"I'll tell you, industry in this area has come a long way. They really realize that they live in a community, ought to give back to the community and ought to work with the community. What's good for the water is going to be good for everyone around the water."

Source: University of Houston ([news](#) : [web](#))

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