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Minnesota farmer battles Gulf 'dead zone'



By John D. Sutter, CNN

Filed under: [Innovation](#)

STORY HIGHLIGHTS

- A 'dead zone' forms in the Gulf of Mexico each summer
- The zone is void of oxygen and kills marine life; it's the size of New Jersey
- It is caused in part by fertilizer application throughout the Midwest
- One farmer is trying to help the Gulf from Minnesota

Windom, Minnesota (CNN) -- Within moments of meeting Tony Thompson, you can tell he sees the world from a different tilt.

His frayed shirt pocket is stuffed so full of notes that it's ripping at the seams. Hairy eyebrows spring off his face like grasshopper antennae. There's a purple prairie clover stuck in the dash of his van, a bird book below the radio.

He says bizarre, eco-minded things like "I want to be a chloroplast."

So maybe it should come as no surprise that this wild-haired, icy-eyed farmer in southwest Minnesota is among the first people at this latitude to make an important intellectual leap:

He sees people who live and work near the Gulf of Mexico as his neighbors -- even though they're 1,200 miles away.

Further, he's changing the way he farms in order to protect them.

Scientists have recorded one of the largest "dead zones" in the Gulf's history this year. This oxygen-sapped area -- [currently about the size of New Jersey](#) -- is caused in large part by fertilizer that funnels into the ocean from Midwestern farms, since [more than 40 percent of the land in the United States](#) drains into the Gulf.

[The fertilizer kicks off a chain reaction of biological processes](#) that, in the end, drains the water of oxygen and kills fish, shrimp and other marine creatures that can't swim away.

This year, the BP oil spill may make matters worse. The coast is already strapped for cash, and some scientists fear cumulative effects of the environmental stress.

Thompson, 54, whose family built a house on this farmland in 1878, doesn't want to contribute to any of this.

"I'd much rather eat wild Gulf shrimp than farmed shrimp, and I know that my efforts may seem insignificant, but I think we can have sustainable fishing in the Gulf and corn production in the Mississippi [River] watershed," he said.

"I think we should all be saying, 'We must have both.' "

But, as he well knows, cleaning up the Gulf from the Midwest will require continental changes.

Suicidal shrimp

As summer approaches and the Louisiana air gets hot and wet, Dean Blanchard says, he can tell that the dead zone is forming because shrimp leap onto the beach.

"They pretty much commit suicide," he says.

Blanchard, who owns a large-scale seafood wholesaling business in Grand Isle, Louisiana, says he never saw that phenomenon until six or seven years ago.

Scientists [first recorded an oxygen-dead zone in the Gulf in 1972](#). Since then, the size of this underwater coffin has fluctuated, but it is growing. In 2009, the dead zone smothered an area of about 3,000 square miles. This year, it is more than twice as big -- and is the fifth largest on record, according to the National Oceanic and Atmospheric Administration, which monitors the area.

The longer the phenomenon persists, the weaker the Gulf ecosystem becomes, said Rob Magnien, director of the [Center for Sponsored Coastal Ocean Research](#) at NOAA.

"If the area grows large enough, the consequence is, at some point, we'll reach a tipping point where some of our major commercial and recreational species [of fish, shrimp and oysters] would be severely affected," he said.

No one knows for sure when the Gulf will cross that threshold, but the wait may not be long, Magnien said. Early testing indicates that the ocean ecosystem is already under intense stress: It takes less fertilizer pollution today, for example, to produce a large dead zone in the Gulf than it did several years ago.

That's a sign that the dead zone will continue to grow unless fertilizer levels are cut drastically.

In the meantime, people in the Gulf seafood industry, like Blanchard, say they have to work around the dead zone each summer. Blanchard says he loses up to \$250,000 of his \$35 million total revenue per year because of the phenomenon.

And shrimpers may not be able to avoid the zone forever.

"They avoid the dead zone areas and are able to catch shrimp in other areas, but at some point, the zone is going to grow to a size where they can't reach the shrimp anymore or they simply have insufficient habitat to maintain a robust population," Magnien said.

Blanchard says the Gulf has become "the cesspool of the nation" because "everything comes down to us."

"If you s--- in the river, then you s--- down here," he said. "They send us all the garbage; it comes down the river to us."

Neighbors by water

Thompson, the Minnesota farmer, has never been to Louisiana.

And Blanchard, the Louisiana seafood businessman, has never been to Minnesota. "It's too cold up there," he said.

But their paths crossed last summer, when Thompson was organizing a community event at his 3,000-acre property, Willow Lake Farm.

He wanted his Minnesota neighbors to meet a person who was affected by their fertilizer use and water management.

"We're all in this together," he said.

He also wanted to eat some delicious Louisiana shrimp. So, out of the blue, he called Blanchard and invited him to visit.

Blanchard didn't attend. But he did send his shrimp north for the event, and Thompson used that food as an entree into talk about the dead zone.

Blanchard is not angry at farmers in the Midwest, he said. But he is furious about the situation.

"I'm mad at the government, that they don't make them use different kinds of [chemicals on their farms]. Somebody's got to be smart enough in this country to invent something that can do the job they need up there -- and not ruin the Gulf," he said.

"The government ought to have a team of scientists working on that. How bad are they going to let it get before somebody stops it?"

The government has started to look for solutions but hasn't made a notable dent in the problem.

The entire Mississippi River watershed must reduce its output of two key fertilizer pollutants -- nitrogen and phosphorus -- by 45 percent to get the dead zone down to a manageable size, says a [2008 report from the U.S. Environmental Protection Agency](#).

If those cuts happened, the dead zone still would be nearly twice the size of Rhode Island.

A new way of farming

Thompson was driving a tractor across his parents' farm in 1989 when he cracked.

Maybe it was the heat. Maybe it was the deafening roar of the engine.

Mostly it was because he felt the way he was farming -- tilling over the soil -- was destroying the environment.

"I just hated it," he said. "It seemed impossibly destructive."

That night, he scratched this entry in his personal journal: "Never grow up to be a farmer."

But time passed. And Thompson realized that it was just this method of farming that he hated. His intense frustration helped mold his view

that the land, water and air are inextricably tied and that the actions of one farmer can be felt thousands of miles away.

He vowed to become a different kind of farmer.

With the help of an environmentally minded neighbor and his brother, Thompson etched out his vision on a large sheet of butcher paper, which he spread out on a kitchen table.

He didn't want to till the land anymore, which he saw as a contributor to erosion and phosphorus runoff. He would apply "the softest touch on the land" possible, he said.

After struggling to explain this idea to bankers, Thompson finally got a loan to fund his vision. He put it into practice first on a small section of the family property, which he leased from his dad.

The changes worked. Yields went up. And, in Thompson's view, the local environment became healthier, too. Missing critters like the meadow jumping mouse returned to the farm. The water became clearer. All of this eased his conscience.

He started to love the farm again.

"Here, I know all of my neighbors," he said. "This is where I make my living. This is where my ancestors made their living. I'm not interested in fouling my nest."

'A long way away'

For many, fouling the Gulf's nest is another story.

It's relatively easy to convince farmers to adopt environmentally friendly practices if they can see the effects nearby, said Gary Sands, an associate professor of bioproducts and biosystems engineering at the University of Minnesota, who teaches farmers about the environment.

But it's hard to sell changes that deal with the Gulf's dead zone.

"They agree there is a problem, but they're just so separate -- so far away -- from what's going on in the Gulf," he said of the farmers.

Scientists largely have figured out what farmers need to do to lessen their impact on the dead zone, said David Mulla, a founding fellow and soil scientist at the [University of Minnesota's Institute on the Environment](#).

To be effective in tackling the Gulf's problems, however, Mulla said, the new techniques have to be applied across the entire Midwest.

Right now, however, only voluntary pilot projects exist. And at best, with widespread adoption of these techniques, he said, the U.S. would reach its targets for shrinking the dead zone in 25 years.

Still, Mulla said, the efforts of one can make a difference.

He's seen that happen before.

When the state started pushing farmers to leave some of their land wild along the banks of streams to act as a buffer, no one seemed interested in taking valuable land out of production.

Then one farmer broke.

"Eventually, we got one farmer who agreed to do it, and -- [snap] -- just like that, everyone followed."

Farm filter

Walk to the bottom of a field of alfalfa on Thompson's farm, and you can see the start of Mulla's one-farmer theory in action.

The green field, bursting with purple flowers this time of year, slopes toward a small body of water called Fish Lake, where Thompson grew up swimming and where he can't help but snorkel from time to time, he says.

He planted alfalfa here specifically to buffer that lake from nutrients. Alfalfa is a "very greedy plant," he says, so it sucks up most of the water and fertilizer before it can get away.

But he's going further than that.

Just before the field gives way to a thicket of oak trees and then the water, a small metal box is stuck in the ground.

It's not much to look at, but that box -- and another like it -- is the visible component of an underground "bioreactor." It eats nitrates out of the water before they hit the lake.

Water is piped through a subterranean block of woodchips that's roughly the size of a blue whale. This slows the water down long enough for bacteria to start a process called nitrification, in which liquid nitrates from the fertilized water turn to harmless gas.

From there, the water trickles into Fish Lake and the Watonwan, Minnesota and Mississippi rivers before spilling into the salty Gulf.

On that journey, it slithers past Minneapolis, Minnesota; St. Louis, Missouri; Memphis, Tennessee; and finally New Orleans, Louisiana. You might think that, on such a long and winding journey, pollutants would somehow make their way out of the river, but scientists say that when liquid nitrates jump onto this one-way conveyor belt, they don't look back until they've made it all the way to the ocean.

Thompson installed the woodchip bioreactor two years ago at a cost of \$6,600, and most of that was paid through a university grant, he said. Another nitrogen-reduction project on a different field cost him \$70,000. He paid that sum, he said, because that groundwater control system stands to increase his farm's productivity, too.

Both of those systems are rather effective, Mulla said. The drainage system removes up to half of the ocean-harming nutrients; his bioreactor is capable of pulling 50 to 80 percent all of the nitrates out of the water under optimal conditions, said Sands, also from the University of Minnesota.

Thompson also says he monitors his fertilizer applications down "to the gnat's eyelash" in order to reduce the amount of nitrate that enters the watershed.

"We don't want to waste any nitrogen," he said.

Thompson says it's his responsibility to "send the best water possible downstream." He doesn't have the money to do everything he would like. But he's optimistic about the situation improving in the long term.

"My job is to be a farmer, and I'm very committed to being the best farmer I can be," he said. "I know to be a farmer I'm going to make a mess, and there are going to be mistakes, but my job is just to do a better job than I did last year."

He hopes the idea spreads, one farmer at a time.

Links referenced within this article

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currently about the size of New Jersey

http://www.noaa.gov/stories/2010/20100809_deadzone.html

more than 40 percent of the land in the United States

<http://water.usgs.gov/nasqan/docs/missfact/images/fig01.gif>

The fertilizer kicks off a chain reaction of biological processes

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first recorded an oxygen-dead zone in the Gulf in 1972

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