In one Wisconsin village, half the tested wells have high nitrate levels. Pets have died. People are sick. They blame it on the water.

Renee Hickman, Wausau Daily Herald

Updated 41 minutes ago

Correction: Lisa Anderson of Nelsonville says her well water has tested at 9.69 parts per million, close to the Environmental Protection Agency's limit for nitrates in drinking water of 10 ppm. The results of the test were incorrect in a previous version of this story.

NELSONVILLE – When Katy Bailey saw her house in 2012, it was love at first sight.

"We actually moved on a whim," Bailey says. "There was an open house and we went to go check it out and just the second I walked in, I knew that we were home."

The house is in Nelsonville, a community of around 155 people in Portage County, about 14 miles east of Stevens Point.

Nelsonville's cluster of historic homes and a main street sit along the poetically named Tomorrow River, looking remarkably similar to photos of the town from the early 20th century.

For Bailey and her husband, Bobby, both 32, it seemed like a dream to raise a family in a place where neighbors know one another well and children race their bikes safely through the middle of the village center.

But the water that runs beneath the village would come to interfere with that dream. All over Nelsonville, tests of private wells are turning up dangerously high levels of a chemical that studies have linked to serious health problems.

For years, the Baileys thought they were safe from those chemicals. When they moved into their home, their well water tested just below a nitrate level that the Environmental Protection Agency considers potentially hazardous.

The EPA set the limit of nitrates [1] in drinking water at 10 parts per million, or 10 milligrams per liter. It's a tiny amount, too small to see without a microscope, but the nitrates can react with molecules in the body over time to form compounds that are known to cause cancer, according to the National Cancer Institute.

It can also cause "blue baby syndrome" [2] or infant methemoglobinemia — a potentially deadly condition where a baby's skin turns blue because there isn't enough oxygen in the blood.

The Baileys' water initially tested at 7 ppm and they weren't worried. Katy and Bobby are from Wisconsin Rapids, where drinking water comes from a municipal system, and they were unfamiliar with the safety issues nitrate-contaminated water could pose.

"We were very naive," Bailey said.

A Wisconsin-wide problem that could be worse than it looks

Forty percent of Wisconsinites get their water from private wells, many in rural areas, according the state Department of Health Services. Unlike water derived from community water systems, these wells are not subject to regulation by the EPA.

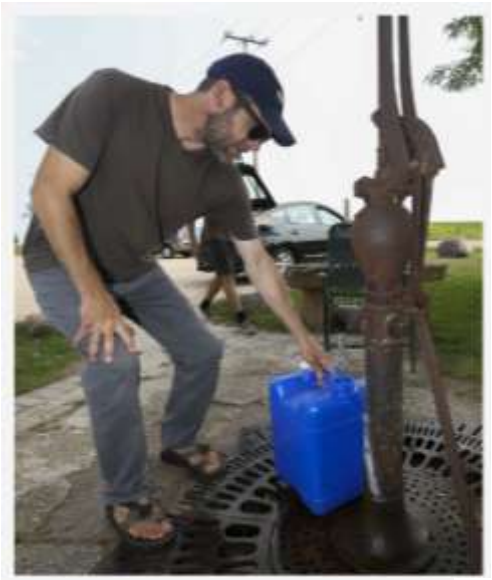
In effect, the EPA can tell people drinking from private wells that their water is unsafe, but the agency can't order that anything be done about it.

While many are safe, private wells are more vulnerable to contamination by nitrates, which are water-soluble molecules formed when a nitrogen-rich source comes into contact with oxygen. Nitrogen fertilizers, such as those commonly used in agriculture, are one source, as are home septic systems and lawn fertilizers.

Passing through the soil, the nitrates often end up in groundwater, from which rural wells are primarily filled.

According to a report from the Wisconsin Groundwater Coordinating Council to the state legislature, 10% of Wisconsin's private wells exceed nitrate levels of 10 ppm.

In Nelsonville, more than half of the wells that have been tested are considered undrinkable because their nitrates are above that level, said Lisa Anderson, a village resident who has until recently headed up the community's Groundwater Protection Committee.



Tarion O'Carroll, of Nelsonville, fills jugs of water from an artesian well in Lind on Aug. 24. O'Carroll says he travels the one-hour round trip to Lind on a weekly basis to fill up jugs of safe drinking water after his family's well tested at dangerously high levels of nitrates in the water. Tork Mason/USA TODAY NETWORK-

The village began conducting widespread testing in 2018, when Portage County offered an opportunity to evaluate samples from the community, Anderson said. When a significant number of the samples returned high nitrate levels, residents persuaded the county to test further.

Nelsonville has around 77 wells, Anderson says, and 52 residents agreed to have their wells tested and to share the results. From that group, 28 wells tested above safe levels.

That doesn't mean the remaining wells are safe.

The EPA set the safety limit for nitrates in drinking water in 1962. But new research has increasingly shown a correlation between ill health effects and lower concentrations of nitrates in drinking water, said Kara Nell, a professor of chemistry and environmental health at the University of Minnesota-Morris.

"A lot of scientists are finding that there are health concerns at like, 10 times lower than our legal limit right now," Nell said.

Nell, whose own research focuses on the true dangers of nitrate pollution, says those effects can include birth defects and low birth weight in infants, miscarriages in pregnant women, and thyroid problems and colorectal cancer in adults.

It's new research, she said, and the connection between the nitrates and the health problems isn't always clear.

"When nitrate comes into your body, it has to undergo further chemical reactions to potentially be something that could hurt you. So it has to be under just the right conditions," Nell said.

Despite the emergence of such research, the Trump administration in 2018 suspended a re-evaluation of the 10 ppm standard and blocked the Obama-era Waters of the United States rule that, among other things, would have limited the use of chemical fertilizers by farmers.

Anderson says the water at her home has tested at 9.69 ppm, close to the EPA's limit for nitrates in drinking water, and she says she and her husband have neighbors whose water has tested at much higher levels. She worries about the future since their neighbors' nitrate levels have fluctuated so much.

Anderson said she and her husband have lived in the village for decades in a family home with no thought of ever leaving until the safety of the water became a problem.

"(We) always thought that we would retire here," she said. "But sometimes, you know, you just really question if we should do that."

For other families, the high nitrate level in their personal wells has meant traveling to other towns for a clean water source.

Tarion O'Carroll, Nelsonville resident

"I'd love to be able to drink out of my own tap. It's not like I enjoy the drive."

Tarion O'Carroll's well has recently returned nitrate levels of up to 19 ppm. O'Carroll and his wife, Stacy, and children Sam and Maggie drink water from the nearby town of Lind, where he fills up jugs of water on a weekly basis from a spring that he says has been tested and is safe.

O'Carroll says he often runs into his neighbors from Nelsonville when he goes to get refills at the old Lind Center Town Hall, about half an hour from home by car.

"My story is not unique," he said.

"I'd love to be able to drink out of my own tap. It's not like I enjoy the drive."

It started with the cats

When the community started testing wells in 2018, the Baileys realized they had a problem. Their water has tested at above 10 ppm multiple times, and despite several expensive improvements to their water system, they began to experience health issues they believe may be connected to the nitrates.

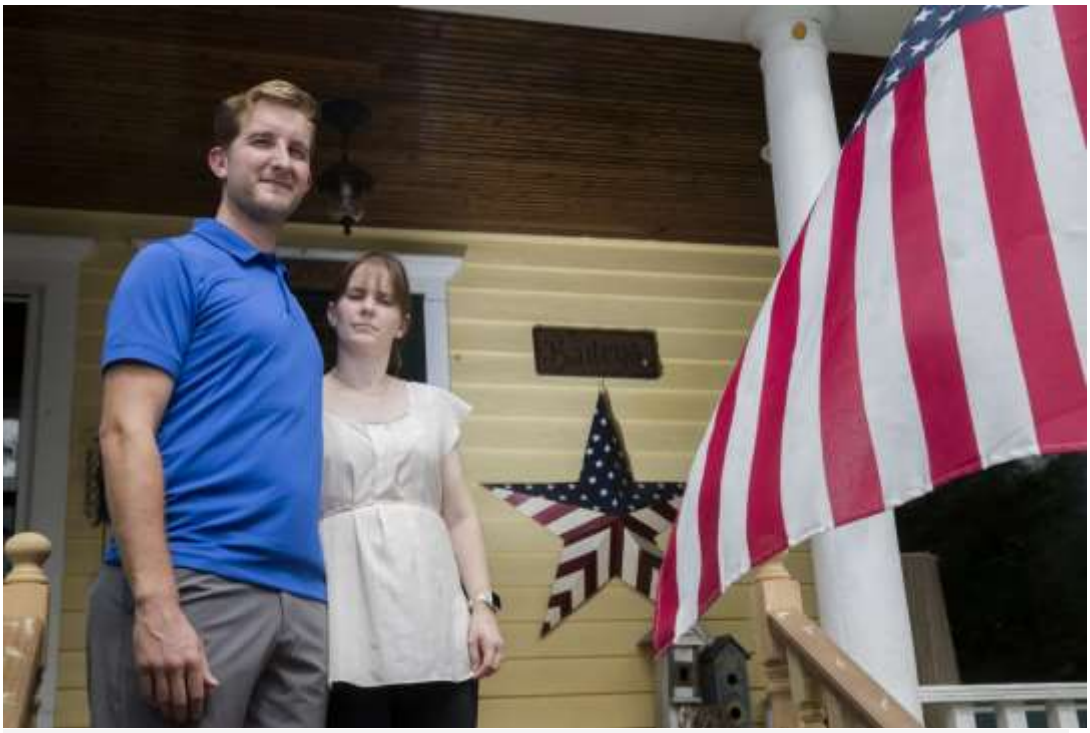
"We went from 7 to 14 (ppm)," Katy Bailey said, and they sometimes saw spikes into the 20s. "That was in a couple of years' span."

In February 2019, the Baileys suddenly lost Franklin, one of their two young cats. "I still get teary talking about it," she said. The cat was "you know, our first baby together."

She had taken Franklin to the emergency vet because he seemed ill. The vets sedated the cat to take an X-ray, which revealed a tumor. "He never came out of the sedation so we ended up having to put him to sleep," Bailey said.

In November 2019, the Baileys lost their second cat, Beans. He had been having stomach problems that the couple were treating with antibiotics, seemingly with success, until a sudden decline, which the vet concluded was gastrointestinal cancer. The Baileys decided to have him euthanized.

When they tested their water again after the deaths of Franklin and Beans in January, the Baileys' nitrates had spiked to 22. Bailey, her husband and the two cats had all been drinking highly contaminated water.



Bobby and Katy Bailey pose for a portrait on Aug. 24 at their home in Nelsonville. More than half of the private wells tested in the village, including the Baileys', have turned up dangerously high levels of nitrate contamination in the water. Tork Mason/USA Today NETWORK-Wisconsin

Seeing the dramatic increase in their nitrate numbers pushed the Baileys to install a reverse osmosis system, which filters contaminants out of water by forcing it though a partially permeable membrane.

That caused an initial dip in the nitrate levels of their treated water, but, by February 2020, Bailey said the levels were back up to 10 ppm, leading them to install an additional filter.

Nitrate levels then dropped to 2.9 ppm, but had climbed back up to 9.4 ppm when the water was tested again in July of this year, she said.

The combined cost of the reverse osmosis system and a water softener was about $3,500, Bailey said.

In the meantime, the Baileys have developed thyroid problems, and Katy said she suffered a miscarriage.

While neither can be definitively connected to the nitrate contamination, the health problems the Baileys experienced are consistent with problems seen by other people who have been exposed to nitrates, said Nell, the Minnesota researcher.

Among those issues, she said, are cancers of the digestive system and birth defects.

Bailey and her husband are no longer drinking water from her house's well. Instead they are traveling, like the O'Carrolls, to Lind for their water.

Proud farmer becomes a target of concern

The Baileys, the Andersons and other Nelsonville families with high nitrate levels think the problem stems from one of their neighbors.

Gordondale Farms is a dairy operation about a mile from Nelsonville. Its calf enclosures can be viewed from the side of the road on the way into town along State 161.

Kyle Gordon, Gordondale Farms

“We love cows and calves and corn and farming, and I still think we have the greatest job in the world.”

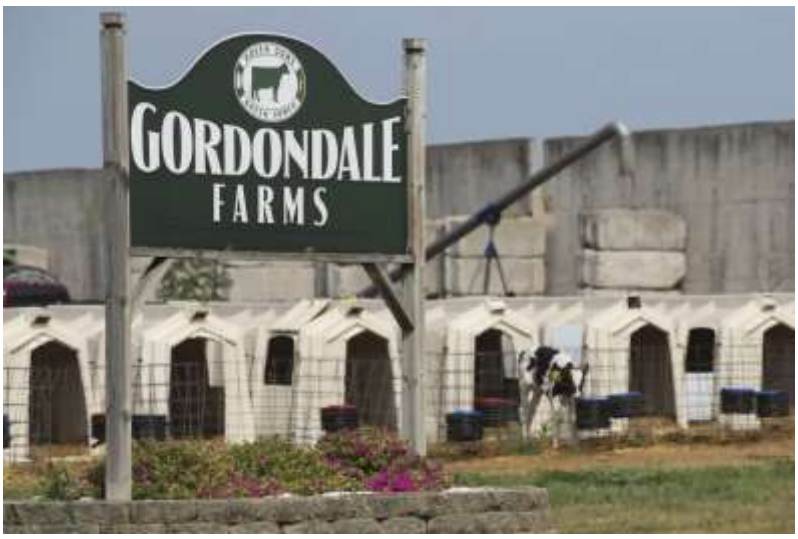
Kyle Gordon, who took over the farm from his father, Gil, says it's been in the area since 1901. One day, he hopes to pass the farm on to his own son, Austin, who is 26.

"When I came home from college in 1989, I decided that in order to be a dairyman and to stay in business, we needed to expand," Gordon said. "We love cows and calves and corn and farming, and I still think we have the greatest job in the world."

He's proud that the agriculture industry helps to make sure people all over the world are fed, even though farming has become a harder way to make a living.

Less than a decade ago, Wisconsin boasted over 10,000 dairy farms — mostly smaller operations. But as dairy prices have plummeted, smaller farms are rapidly going out of business, while larger dairy businesses have taken up a greater and greater share of the industry.

Called concentrated animal feeding operations, or CAFOs, farms with 700 or more dairy cattle qualify for this label. Gordondale Farms has 2,160 animals, with plans to expand, according to its most recent Department of Natural Resources permit. Some operations in central Wisconsin have up to 6,000 animals.

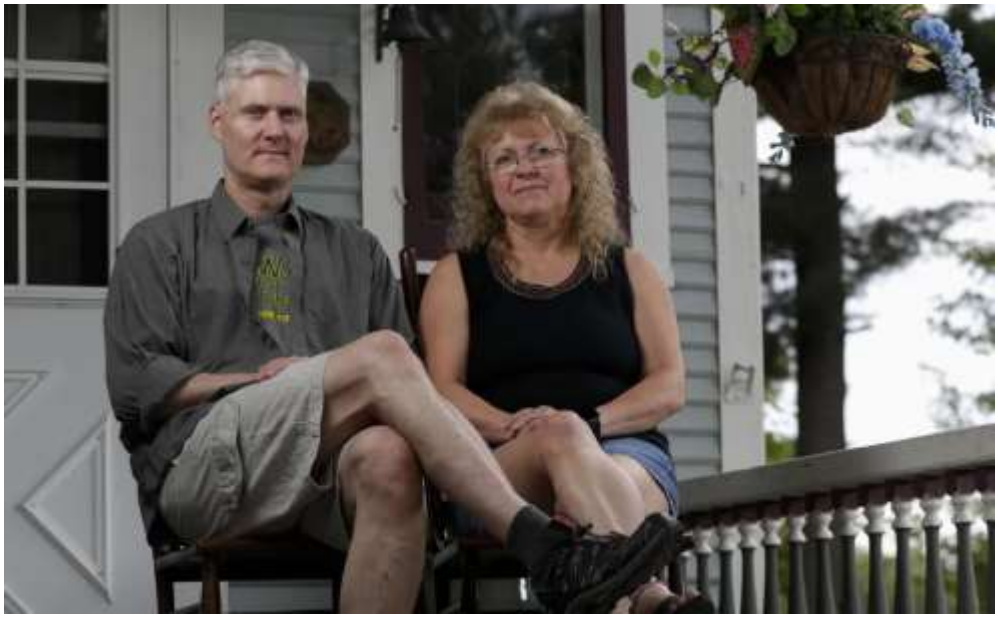


Residents of Nelsonville believe Gordondale Farms, pictured on Aug. 24, could be the source of increased nitrate contamination in their water. Kyle Gordon, who operates the farm, says he has taken steps to mitigate the flow of nitrates from his farm to nearby groundwater. He also says it’s possible the village’s septic systems and smaller farms in the area could be contributing to the problem.Tork Mason/USA Today NETWORK-Wisconsin

Those mega farms are increasingly the target of nitrate concerns, simply because of the sheer volume of waste they discharge. According to research by Cornell University, a farm of 500 cows can produce as much daily waste as South Milwaukee, a city of about 20,000.

Nelsonville and other rural communities in central Wisconsin are within the Central Sands region, whose sandy soil is more susceptible to the leaching of nitrates through the soil and into groundwater supplies.

"(Nitrate is) the most pervasive contaminant we have in the state," said George Kraft, a professor of water resources and director of the Center for Watershed Science and Education at the University of Wisconsin-Stevens Point.



Tor and Lisa Anderson. Photo by Tork Mason/USA TODAY NETWORK-Wisconsin

That contamination is following a steady upward trend, a trend Kraft blames on an increase in farmers growing crops that take more nitrogen, and the profit increase many farmers find in using more and more nitrogen-based fertilizer. The growth of CAFOs has compounded the problem, he said.

Gordon said he has taken steps already to mitigate the flow of nitrates from his farm to nearby groundwater. He has planted alfalfa, which is thought to reduce the need for nitrogen fertilizer application by reducing nitrogen leeching and runoff, and possibly decreasing the excess nitrogen that is cycling on farms.

But, he said, he needs more time to see the results of his efforts. He believes the village's septic systems are responsible for some of the high nitrate levels found in its wells. He also thinks it's possible that other, smaller farms in the area could be contributing to the problem as well.

Anderson said the village has tried various mechanisms to address the contamination. One has been campaigning to stop the DNR from renewing Gordondale's animal waste discharge permit, which certifies that the farm is following state regulations.

But in August, the DNR approved the permit renewal. Gordondale Farms had met every legal requirement to obtain the permit and was doing nothing against regulations in its waste disposal, said Tyler Dix, a representative from the DNR.

The village's Groundwater Protection Committee had explored the possibility of creating a local ordinance regarding land use practices at the farm, Anderson said. But she says residents were told by a county conservationist that they had to look at whether there might be problems with their septic systems first.

Kraft said the kind of nitrate levels seen in the Nelsonville wells could not be attributed to septic systems alone.

Lisa Anderson, Nelsonville resident

“... We need this to change at the state level. We need legislation that takes groundwater quality into consideration.”

For now, the residents of Nelsonville have petitioned the DNR to reconsider the factors used to determine whether Nelsonville's waste discharge permit would be renewed.

The six petitioners want monitoring wells to be included as part of Gordondale's waste water discharge permit, which Anderson said would provide the DNR with the information it needs to enforce better land management practices at the farm.

Testing of the wells in the area also revealed the presence of atrazine, a chemical found in agricultural runoff, which Anderson said indicates that the contamination does indeed originate at the farm.

Without the ability to enact a local ordinance, she said, "What recourse do we have? They're not doing anything illegal. We need this to change at the state level. We need legislation that takes groundwater quality into consideration."

Baby's death leads to testing, and a lawsuit

In the state Legislature, there has, in fact, been a growing recognition that nitrates in Wisconsin's well water are a problem that needs to be addressed.

State Rep. Katrina Shankland, a Stevens Point Democrat who represents Nelsonville, has taken a particular interest in the issue.

"We know that nitrate has significant public health issues and there’s been research recently that shows that it’s a pressing issue for all the public, not just children and babies and women who are pregnant," Shankland said.

She calls nitrate contamination "a public health crisis.”

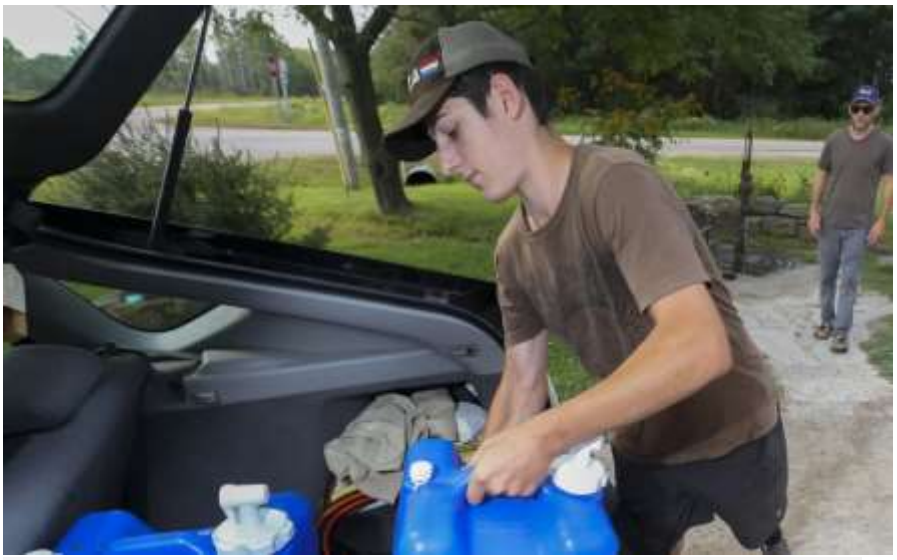
Shankland headed up a task force with state Rep. Todd Novak, a Dodgeville Republican, to look into the issue further, holding 14 public forums throughout the state.

"I think it was like 2,500 miles," Shankland said of the trips. "From Racine, to Menominee, to Tomahawk and Superior, Madison, Green Bay, Stevens Point, La Crosse ... everywhere."

She and Novak followed that trip with a package of 10 bills aimed at dealing with the crisis — legislation that Shankland calls "building blocks," not a complete solution.

The bills add incentives for farmers to reduce nitrogen application, mitigation for contaminated water, well-testing programs and data collection, and help for families with failed septic systems.

Although those bills passed the state Assembly prior to the outbreak of the COVID-19 pandemic, the legislation is among many bills that have not come up for a vote in the state Senate. Republican lawmakers who control the state Legislature have not convened a floor session since April.



Sam O'Carroll, of Nelsonville, loads jugs of water from an artesian well in Lind into the back of a car on Aug. 24. Sam's dad, Tarion O'Carroll, says the family travels to Lind on a weekly basis to fill up jugs of safe drinking water after the family's well tested at dangerously high levels of nitrates in the water. Tork Mason/USA TODAY

Anderson said she and others in Nelsonville don't want money from Gordondale and have no plans to sue them, but that's the path pursued by 81 plaintiffs who own property near Central Sands Dairy in the northeast corner of Juneau County. They allege that Central Sands Dairy knowingly contaminated groundwater and private well systems and endangered neighbors for at least a decade without warning them.

The path to that lawsuit began in 2017 when Celina Stewart, a young mother in the city of Nekoosa, lost an infant daughter to blue baby syndrome — an event that led nearby communities to begin well-water testing which found widespread contamination.

The suit was filed in January 2019 in Juneau County court, but a trial date has not yet been set.

Deep roots not so easily removed

Gordon is keen to point out the measures he has taken around his farm focused on other aspects of sustainability, including installing an anaerobic manure digester to reduce methane emissions that contribute to climate change.

He believes his farm is being unfairly targeted by his Nelsonville neighbors.

"They say their goal is better water," he said, but their goal of having better water might "simply stop a farm from existing.'"

The farm has deep roots in the area, and Gordon wants it to survive, but other residents also have deep roots in the Nelsonville community.

"Our house was built in 1909 by my husband's great-great uncle," Lisa Anderson said. That same great-great-uncle also helped found the Nelsonville State Bank in the early 1900s with his brothers; the brick building that once housed the bank still stands at the center of town.

Sitting outside on a back patio adorned with her art and sculptures, Lisa Anderson pointed to other neighbors. "On this side it was his relative that was one of the original trustees when they turned Nelsonville into a village," she said. "At any rate we have people who have deep connections here, some since the beginning of the town."

People like the Andersons also see a bright future. In recent years, a coffee roastery, Ruby Coffee, opened in Nelsonville, as have an art and gift shop, a concrete provider and other small businesses. Residents are optimistic about the modest growth the area has seen and its potential to attract young families like the Baileys.

But Katy Bailey wonders how long her family can keep making the one-hour round trip to fetch safe water from Lind.

Katy Bailey, Nelsonville resident

“I thought this is where I would be forever. And now I question if that would be a smart move.”

Before the COVID-19 pandemic hit, she said, she and Bobby were seriously considering moving and had a few potential buyers come to look at their home.

One couple who looked at the house said, "We love the house but the nitrates are too scary," Bailey said.

She said she doesn't want to move. She loves the community that surrounds her family in Nelsonville.

"I thought this is where I would be forever," Bailey said. "And now I question if that would be a smart move."

RENEE HICKMAN covers rural and small-town community issues for the USA TODAY NETWORK – Wisconsin through a fellowship from Report for America, a national service program that places emerging reporters in local newsrooms to cover underreported stories. She has covered local government for the Unified Newspaper Group in Verona, Wisconsin, after completing a Fulbright Fellowship to Ukraine, where she researched and reported on local journalism. Hickman has also covered agriculture, foreign affairs and other topics while freelancing and interning at the NBC News Political Unit and Bloomberg BNA. In 2018, she graduated with a master’s degree in journalism from the University of Missouri, where she worked as a research assistant at Investigative Reporters and Editors, was awarded a scholarship from the White House Correspondents’ Association, and won the school’s O.O. McIntyre Writing Award.

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Footnotes

[1] nitrates

> A compound made up of nitrogen and oxygen that’s formed when nitrogen from ammonia or other sources combines with oxygen in water.

[2] "blue baby syndrome"

> A potentially deadly condition caused when nitrates are converted to nitrites in the body after being consumed. The nitrites react with hemoglobin in the red blood cells to form methemoglobin, affecting the blood's ability to carry enough oxygen to the cells of the body. The reduced oxygen causes the skin around the mouth, hands and

feet to become blue or grey. It can also cause trouble breathing, vomiting, diarrhea, lethargy, an increase in the production of saliva, loss of consciousness and seizures.

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