

Flint, Michigan lead crisis should have buried the city in water bottles. So, why didn't it?

December 4 2018, by Kayla Wiles



Through discovering how emergency response groups successfully recycled millions of bottles during the Flint lead crisis, Purdue University researchers recommend several ways that the same could be accomplished with advanced planning for future drinking water disasters. Credit: Michigan Department of Environmental Quality photo/Matt Flechter

One hundred thousand residents of Flint, Michigan could only use water from bottles or filters during a years-long lead contamination crisis, which started when the city switched to a new drinking water source in 2014.

As part of a class assignment that grew into a [case study](#), Purdue University researchers found that during the first three weeks of the disaster alone, anywhere from 31 to 100 million bottles were generated as [waste](#). This means that Flint should have been buried in plastic by the time the crisis ended in 2017.

But it wasn't. Through investigating why not, the researchers suggest ways to plan for waste so that figuring out what to do with it during the crisis doesn't slow down an [emergency response](#), including those for drinking [water](#) disasters caused by hurricanes or flooding.

"The last thing you want to do during a crisis is add to the burden of the communities. And with so many people rushing to provide bottled water to Flint, we definitely had a waste problem that we needed to resolve quickly," said Matt Flechter, the recycling market development specialist for the Michigan Department of Environmental Quality (MDEQ), one of the organizations interviewed for this study.

The study and its recommendations, published in the journal *Resources, Conservation and Recycling*, are the result of conversations with several organizations who were on the frontlines during the Flint lead crisis, including MDEQ, the City of Flint, Republic Services, Inc. and Schupan Recycling. The researchers did not seek or receive external funding for this work.

"When you shut down an entire water system and provide emergency water, there is a whole lot of waste generated. Where does it all go?" said Andrew Whelton, Purdue associate professor of civil engineering and environmental and ecological engineering, who led the study.

"It turns out that no one had looked at the waste associated with providing emergency drinking water long-term, until we investigated the Flint incident," he said.

During the time that the Flint lead crisis was taking place, Tianqi Wang, a master's student in civil engineering, and Jooho Kim, a doctoral student in construction engineering and [management](#), wanted to calculate how much waste the crisis was generating as part of an in-class activity for a solid and hazardous waste management course taught by Whelton.

They were shocked to find that the millions of water bottles would have overwhelmed the city's waste management system.

Key to Flint's successful waste hauling, the researchers later discovered, were [community organizations](#) and [government agencies](#) who established sites around the community to distribute donated water bottles and filters, and pick up or drop off waste. They also helped residents to know about these services through local TV, social media and websites, newspapers and flyers.

But the process would need to be smoother for future crises.

"Waste management wasn't built into the emergency response at all, so what we did was more reactionary than planned-out," Flechter said.

Planning it out could possibly buy more time for other aspects of an emergency response, such as evaluating which households aren't getting enough safe water.

Therefore, as part of their study, Purdue researchers recommended several ways for incorporating waste management into an emergency response plan. These include pre-identifying the roles of waste management organizations, setting up a procedure for estimating and documenting emergency water supply materials entering and exiting a community, determining where water should be distributed in advance, drafting public notifications about waste management activities and making the data on this emergency response publicly available so that people can conduct more case studies on the best possible strategies.

Unfortunately, it could be a while before waste management makes it into plans throughout the U.S.

"Drinking water is considered a critical lifeline, but federal [emergency](#) management doctrine has no clearly defined mission that is specific to supporting response and recovery," said Kevin Morley, the federal relations manager for the American Water Works Association (AWWA). In 2017, AWWA testified to Congress on this matter and the impact on effective coordination and communications.

Even though federal organizations—including the Centers for Disease Control and Prevention, the Environmental Protection Agency and the Federal Emergency Management Agency—provide guidelines for estimating how much water a person needs when a disaster strikes, the focus for waste removal is typically on large debris, such as tree limbs and building materials during a hurricane.

"In order for waste management protocols—like for bottled water if that's the temporary solution—to be considered appropriately, there needs to be a clear water mission in the National Response Framework," Morley said. "Then information sharing and coordination associated with the need can more effectively be considered as part of the overall response effort and demands on local waste management infrastructure."

Still, the organizations who informed this study have already found its recommendations useful for water quality incidents in other communities across Michigan.

"It's nice to have clear action steps and know which questions to bring up early. This way, we're looking at the existing recycling infrastructure from the get-go and know how those bottles should be managed," Flechter said.

More information: Tianqi Wang et al, Management of plastic bottle and filter waste during the large-scale Flint Michigan lead contaminated drinking water incident, *Resources, Conservation and Recycling* (2018). [DOI: 10.1016/j.resconrec.2018.08.021](https://doi.org/10.1016/j.resconrec.2018.08.021)

Provided by Purdue University

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