

As climate change brings more natural disasters, debris piles up—increasing health risks

March 22 2022, by Kyle Bagenstose



Credit: Pixabay/CC0 Public Domain

When Hurricane Katrina bore down on New Orleans in the summer of 2005, many residents in Versailles, a Vietnamese-American community

in the east of the city, faced disaster for the second time.

Decades earlier, elders in Versailles escaped to New Orleans as the Vietnam War ended with the fall of Saigon. Slowly, the community began to assimilate: Families opened restaurants and businesses, moved from public housing to home ownership, and children embraced English and American culture.

As the skies cleared from Katrina, many homes in Versailles still stood, and residents were among the first to return to New Orleans. But that's when a new threat to the community emerged.

Then-mayor Ray Nagin opened an emergency [landfill](#) just east of the community to handle debris from the storm. Throughout the city, there was enough to cover more than 4,000 football fields, stacked 10 feet high to the goalposts. Trucks began rolling in ton after ton of it into the new landfill.

Thousands of residents and environmentalists publicly protested. The movement culminated with hundreds of people packing the courtroom of U.S. District Judge Carl Barbier, who ordered the landfill to cease operating in August 2006.

Lang Le, now a community advocate in Versailles who was then in her 30s, was among those in court that day. "The (landfill attorney's) side was, 'Oh the community doesn't care,'" Le recalled. "And the judge said, 'If they don't have any care, then why are they here today?'"

That was the end of the landfill, but only the beginning of a much larger problem.

The controversy in Versailles marked the opening chapter of an era in which increasingly intense natural disasters, many amplified by climate

change, are striking the U.S. and exposing dangerous vulnerabilities in how the nation cleans up after floods, fires, and storms.

Following disasters, experts say, a lack of government planning often leaves millions of tons of potentially hazardous debris to be swiftly buried in unlined landfills, angering and potentially endangering nearby communities. Even when disposed of correctly, disaster debris takes up landfill space that is already at a premium in many places. Federal data also shows the billions of dollars in average annual cost for debris removal is higher than ever.

"Climate change is supercharging the increasing frequency and intensity of certain types of extreme weather that lead to billion-dollar disasters," said Adam Smith, a climatologist with the National Oceanic and Atmospheric Administration. "Most notably the rise in vulnerability to drought, lengthening wildfire seasons in the western states, and the potential for extremely heavy rainfall across the eastern states."

Examples of how such disasters leave mountains of debris have popped up in virtually every region of the country.

In California, the trucking in of wildfire debris to the Napa Valley has some residents worried it could contaminate groundwater and harm the region's famous vineyards.

Debris from Tropical Storm Ida last year ate into the lifespans of landfills in the Northeast, a region where space is already running out after centuries of piling up everyday household waste.

In North Carolina, storm surges wrought by 2018's Hurricane Florence and similar storms left behind millions of dead livestock carcasses. Along Florida's Gulf Coast, storms have pushed large amounts of debris into small landfills, generating noxious odors to those living nearby.

Across each disaster, experts see potential risks. Debris cleanup is often handled by local or county governments. If no plan exists or it's not properly executed, potentially hazardous waste can be mixed with more benign debris.

Often, such materials then end up in "construction and demolition" landfills, which are not regulated by the U.S. Environmental Protection Agency and in many states are not even required to have liners separating them from the earth. Studies have documented groundwater contamination from such sites and experts say airborne risks also exist.

And, studies show, such landfills are often located in vulnerable, rural areas. Communities near construction and debris landfills have disproportionately high numbers of minority and lower income residents and female-headed households, according to research conducted by Laura McKinney, a sociology professor at Tulane University, and Ryan Thomson, a sociology professor at Auburn University.

"Rural people typically have less access to resources, broadband access, and general amenities. There's general poverty," McKinney said. "On top of that, their communities are then also burdened by these unwanted land uses that take away from the natural capital, beauty, and potential for those areas."

A primary solution, experts say, is better planning by state and local governments. But compounding the problem, the [federal government](#) in 2019 eliminated a program designed to incentivize such plans, just as the need became increasingly apparent. McKinney said it leaves many public officials unprepared when disaster strikes.

"What is common is very little peacetime planning," McKinney said. "Unfortunately, governments are stretched thin and typically they deal with crises as they come up."

That leaves officials often choosing the cheapest and quickest disposal options, experts say. Even still, evidence shows that as climate change drives up the number of costly disasters, cities and counties are struggling to pay for cleanup.

Data from the Federal Emergency Management Agency shows it has paid out more than a billion dollars in each of the past four years to directly assist communities with debris cleanup costs, the first time that's happened, even after adjusting for inflation.

"FEMA has seen a significant overall increase in expenditures for disaster-related damages in the past four years, including for debris-related work," the agency wrote in a statement to USA TODAY. "That is driven by a combination of mega-disasters (Hurricanes Harvey, Irma and Maria) in 2017 with some of the most complex disaster recoveries in history, and an increased rate of presidentially declared disasters as a result of climate change."

Debris dangers

California's Napa County—where median household income approaches \$100,000—is a very different place than eastern New Orleans.

But they share one thing in common: controversy over trash.

In October 2017, the Tubbs and Atlas wildfires struck Napa County and other nearby California communities, killing more than two dozen people, destroying thousands of structures, and leaving hundreds of millions of dollars of cleanup costs. The Tubbs Fire proved the most destructive in state history, until surpassed by the Camp Fire in 2018.

Some debris from the Tubbs Fire went to Clover Flat, a 100-acre municipal waste landfill in the eastern hills of the Napa Valley near the

city of St. Helena. After potentially contaminated water was found leaking from the landfill the following year, St. Helena Mayor Geoff Ellsworth spoke out against the landfill, which he believes poses a danger to the valley's groundwater and world-renowned vineyards.

"It's very hard to get information about what's going in there and what's in the fire waste," Ellsworth, who emphasized he was speaking individually and not on behalf of the city, told USA TODAY. "It's a great concern when you bring things in from an emergency."

The risk of contamination in post-disaster debris is a concern experts share. In a 2017 report, the Congressional Research Service identified debris as "one of the greatest challenges" to community recovery after a disaster.

Disaster debris can include asbestos, lead, household chemicals, and other potentially hazardous wastes, according to the EPA. If a plan is not in place to separate them from regular debris, the hazardous materials can be sent to landfills not equipped to contain them. The risk is higher after disasters, when officials will often waive environmental regulations.

Disaster debris will often wind up in unlined construction and demolition landfills, where even common building materials like concrete and treated wood, which can contain arsenic, pose a risk, said Timothy Townsend, a professor of environmental engineering at the University of Florida.

In a study of 91 unlined construction and demolition landfills in Florida, Townsend and his colleagues found evidence that groundwater "routinely" exceeded regulatory limits for numerous pollutants or water quality indicators, but rarely at a level of concern to human health.

However, the study did not separately examine landfills impacted by disaster debris, which Townsend said presents an additional level of concern.

"If you're all of the sudden mixing materials that probably shouldn't end up going into an unlined landfill, then there's probably going to be some effect on groundwater," Townsend said.

Disaster debris can present problems beyond water contamination, Townsend added. Once wet, gypsum in drywall creates noxious odors, which has rankled residents near landfills in Southwest Florida and the state's panhandle following hurricanes. If improperly managed, disaster debris also presents a fire risk, particularly when stored in haphazard staging areas and left exposed to wind.

"There were several cases in Florida where they just shoved stuff in a landfill and it wasn't really operating as well as it needed to and it ended up having a fire," Townsend said.

Even when successfully disposed of, debris can also overwhelm existing landfills. Studies show natural disasters can generate enough debris from a community to account for five to 15 years' worth of typical waste. That can also drive up costs.

In California, the 2018 Camp Fire created an estimated \$2 billion in debris clearance costs, increasing daily disposal rates by as much as 10 times at some landfills.

The exact extent to which [climate change](#) is driving up these disaster debris issues across the country is difficult to ascertain; no central database tracks the amount disposed of nationally. But FEMA provides financial assistance to communities nationwide that do not have the capacity to clear debris themselves.

In a four-year period ending in 2017, FEMA granted a total of \$1.6 billion to communities for debris cleanup, or 7% of all disaster relief expenditures. In the four years since, that amount increased to \$6 billion, and 13% of all expenditures.

Planning is pivotal

Adapting to a world with more disasters and more debris is crucial, experts say, but there's little evidence of robust preparations across the country.

The EPA released a report this month with recommendations on how to separate waste, where to temporarily store it, and where to dispose of it. A primary recommendation is securing contractual agreements with landfills or other operators to take debris after an event.

To incentivize more debris management plans, Congress in 2011 enabled FEMA to offer a 2% increase in federal cost share for cleanup to towns that created them.

But FEMA phased out the program in 2019, after finding no evidence the [debris](#) was being removed faster and that communities struggled to identify contractors in advance to respond after a disaster. Even still, the agency recommends developing such plans.

Experts say the availability of adequate landfill space remains a key limitation even in well-prepared areas. Dakota Young, the 27-year-old mayor of Princeton, Kentucky, learned that lesson firsthand last year.

On a Friday night in December, Young watched as one of the worst tornadoes in state history tracked toward his city. Emergency responders received word it struck a subdivision on the edge of town, and Young, also a volunteer firefighter, headed to the scene that night.

"It was absolute and utter devastation," Young recalled. "Every now and then there'd be lightning flash and you can make out some jagged shapes, and try to remember whose house that had been."

Miraculously, no one was killed. But about 65 homes had to be demolished, and about the same number suffered significant damage.

With just a single landfill in Princeton's Caldwell County, the city made a deal with a private country club in the impacted area to use portions of its golf course for a burn area and an impromptu landfill.

Young said the use of the golf course helped the city recover quickly and cost effectively. The course plans to replant the site and continue as normal.

The mayor is also not sure the city could have done much more to prepare. Even if an agreement with a landfill could have been reached in advance, the cost would have been a tough sell—and Young doubts it would have held up in the aftermath of a tornado that struck other Kentucky communities even worse.

"That really forced us to start thinking outside the box," he said.

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Citation: As climate change brings more natural disasters, debris piles up—increasing health risks (2022, March 22) retrieved 5 May 2024 from <https://phys.org/news/2022-03-climate-natural-disasters-debris-piles.html>

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