

# The Washington Post

## When the flash flood came, this Tennessee school was overwhelmed

Thousands of schools in the U.S. are vulnerable to extreme weather events and earthquakes

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By Kay Nolan



*A calendar in a kindergarten room at Waverly Elementary School indicates that pupils had attended until Aug. 20. The next day, the school was flooded. (Vivian Spencer)*

Vivian Spencer, an elementary school principal in Waverly, Tenn., watched helplessly from atop her gymnasium's bleachers as floodwaters rose several feet high around her on Aug. 21.

Spencer, along with her daughter and two more adults stranded with them, placed calls for help on social media before losing electrical power and cellphone service. Three hours later, friends rescued them by boat. Even then, swift currents and chunks of pavement loosened by the floodwaters struck and almost capsized the vessel.

Still, it could have been worse.

None of Waverly Elementary School's 485 students in prekindergarten through third grade were there when the torrential rain dumped 17 inches in several hours, because it happened on a Saturday morning. The same could be said next door, where the district's middle school that has some 600 students also rapidly filled with water.



Spencer, who was just over two weeks into the new school year, says she is haunted by what could have been an unspeakable tragedy.

“It’s a fact that I could barely save myself and my 19-year-old daughter, so it’s a recurring thought that if it had been a school day, what would have happened? There’s no way we could have saved that many children,” she said.



*A police officer breaks glass in the Waverly Elementary School door as he helps four adults escape to a boat on Aug. 21. (Vivian Spencer)*

Waverly Elementary is not a special case. Hundreds of thousands of schools across the United States are likely at risk for collapse or extreme damage in the event of natural disasters, such as earthquakes or severe storms, said Lori Peek, a sociologist and director of the [Natural Hazards Center](#), a National Science Foundation project based at the University of Colorado at Boulder. At least 6,000 schools are in high-risk flood hazard areas.

Because children are required to spend many hours in schools, the public often assumes they are safe, Peek said, adding that schools are often designated as shelters and reunification sites during emergencies.



*The walls in this prekindergarten room at Waverly Elementary School show that floodwaters rose higher than children's heads. (Vivian Spencer)*

Peek is among a team of engineers, scientists and educators who put together a comprehensive, downloadable [resource book](#) on school structural safety for the Federal Emergency Management Agency to share with school administrators. The book, published in 2017, provides mitigation suggestions and preventive measures, along with ways to apply for funding. It also emphasizes the need to develop evacuation plans during an emergency, as well as a plan to relocate classes, should a school become unusable. In addition to floods and earthquakes, the book provides guidance on preparedness for hurricanes, tornadoes, tsunamis, high winds and other hazards.

The team also prepared training sessions and webinars available to schools to help them identify potential hazards in their vicinities and structural weaknesses in their buildings.

Michael Mahoney, a senior geophysicist at FEMA whose wife is a teacher, helped spearhead the project. He was deployed with FEMA in 1989 to South Carolina after Hurricane Hugo struck.

“One high school was being used as an evacuation shelter, but they had misidentified the elevation of the school, and it flooded,” said Mahoney. “You had people inside the school thinking they were safe, but in fact they were subject to inundation flooding.”

Spencer had rushed to Waverly Elementary, along with her daughter, Lottie, hoping to quickly scoop up supplies and furnishings and put them on high shelves. The school has had two previous floods, in May 2010 and February 2019, and Spencer hoped to salvage things “like books and those nice carpets that the children sit on that cost so much.”

A teacher, Bobbie Jo Scholes, and her husband, Alan, showed up to help.

After the previous floods, when up to four inches of water spread through the school, flood-resistant doors had been installed and furniture was propped up on small wheels. But this time, within minutes of the group’s arrival, deep water came crashing in, and the four were unable to exit through the doors. They headed for the gym and climbed to the top of the bleachers.

“In some parts of my building, we got, like, seven feet of water,” said Spencer. “The lowest amount of water anywhere in the building was at least three feet.”

Maintenance workers that morning tried to retrieve sandbags kept in a shed behind the school — in case another flood happened — but their truck was swamped in the rushing water, forcing them to swim to safety.

All three floods at Waverly Elementary occurred on a Saturday, but Spencer said parents are not taking any more chances. “They say we have to build a new school on higher ground or they won’t send their kids back.”

For now, Spencer hopes her students can share space with another school in the county, perhaps with each group attending half-days.

She did not have a previously arranged relocation plan, so unlikely had it seemed that this area near the Tennessee River — beloved for its scenic beauty and its fishing, hunting and boating opportunities — would ever see such devastation.



***Vivian Spencer, her daughter and two other adults were rescued from bleachers after Waverly Elementary School was inundated with floodwaters on Aug. 21. (Vivian Spencer)***

Peek, the Natural Hazards Center director, said many school districts underestimate potential danger. More than 1,500 print copies of the FEMA guide have been requested, and some 5,000 copies have been downloaded online, but interest waned during the 2020 pandemic.

Color-coded maps in the FEMA guide show which areas of the United States are vulnerable to various natural disasters. FEMA's online [flood map](#) shows Waverly schools in a high-risk flood zone.

Many schools across the country are also vulnerable to earthquakes, says Ayse Hortacsu, an engineer with the [Applied Technology Council](#), a California-based nonprofit for the structural engineering field. She helped produce the FEMA book and has developed training on how to fortify schools against earthquakes.

She noted that there are pockets of high-seismic risk near Memphis and in South Carolina, as well as in many Eastern states. “Also, buildings are older in the East and Central U.S., compared with California,” she said.

California incorporated stronger building codes after the [Long Beach Earthquake](#) in 1933, which destroyed 70 schools and damaged 50 more. Mahoney noted, however, that in other Western states, such as Washington and Utah, “a significant number” of schools are constructed on unreinforced masonry, such as bricks or concrete blocks without steel reinforcement.

“They are very susceptible to collapse in an earthquake, yet there’s a seismic hazard present,” he said.

The guide describes how to apply for funding to retrofit floor-to-wall connections in schools with unreinforced foundations.

Hortacsu has made earthquake safety her life’s passion after a devastating [earthquake](#) in 1999 struck her native Turkey, damaging 22 elementary schools and 21 secondary schools beyond repair. She contributed a list of preventive measures that all schools can take. It includes securing bookcases so they do not fall in a way that injures people or blocks exits, securing ceiling light fixtures and making sure flammable substances in chemistry labs cannot spill and cause fires.

In its appendix, the FEMA guide also addresses wildfires by urging schools to create perimeters around schools that are free of combustible materials, and to strengthen evacuation training.

*Kay Nolan is a journalist based in Milwaukee, where she has covered public policy, education, business, health care and breaking news as a correspondent for The Washington Post, the New York Times, Christian Science Monitor, WisPolitics.com and more. She is a former reporter and multiplatform copy editor for the Milwaukee Journal Sentinel.*