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Nearly 200,000 homes in NC are at risk from tropical winds. Is yours one of them?

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Nearly 200,000 households in the eastern half of North Carolina may be living in manufactured homes that weren't designed for the winds a powerful hurricane could bring, because federal wind zone maps that govern manufactured housing are decades out of date.

Safety experts say the industry has resisted updating the maps, which are based on data from the 1970s and use a wind metric the National Weather Service abandoned more than 20 years ago. Updating the maps – to reflect the stronger winds that come farther inland – could more than double the number of North Carolina counties where manufactured houses would have to be built stronger and anchored more securely to withstand the high winds that come with tropical storms. Newer maps also indicate several counties along the coast are likely to receive more powerful winds than the existing maps show.

Manufacturers say that there is no evidence the change is needed and that the cost of conforming to higher wind standards – from about $500 to $2,000 for a new single-wide home, plus increased installation expenses – would push many buyers out of the market for an affordable home.

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Rick Mendlen, structural engineer with HUD

North Carolina is the third-biggest manufactured-housing market in the country, behind Florida and Texas. U.S. census data show that in 2015, manufactured housing made up nearly 13 percent of occupied homes across the state.

The U.S. Department of Housing and Urban Development is the agency that oversees manufactured housing, and its wind zone maps determine how heavily the homes must be braced for the communities where they will be installed. Changes to the map would have to go through HUD's Manufactured Housing Consensus Committee, which set up a task force to consider the issue in 2008. According to minutes of its meetings, the task force disbanded in 2012 without updating the maps, to the frustration of some of the members.

"Unfortunately, they did some cost analysis and at the end, the cost analysis didn't seem to support the view [that there was a need] to actually upgrade the standards," said Rick Mendlen, a structural engineer who has worked for HUD since 1975.

James Bowden thinks it might be time for regulators to take another look.

Bowden is in the process of cleaning up what remains of a manufactured home that was lifted from its moorings and rolled upside-down late on the night of May 29 when a 90 mph wind blew through northern Sampson County. His wife's grandmother, Brenda Smith, was in it at the time.

Smith, 64, suffered cuts and bruises but escaped more serious injury when she and her dog were thrown out of the home as it rolled.

"By the grace of God, I'm still here," Smith said the morning after the storm, after picking through the wreckage to retrieve a few belongings.

Bowden, 31, said he bought the 1997 model home from his uncle four or five years ago. His uncle, now deceased, had bought the home used and paid to have it installed on a piece of land on Basstown Road, north of Clinton.

Bowden and his wife were living in the home when their son was born two years ago. The family had moved into a nearby site-built house just a week before the May 29 storm hit. Smith had moved into the manufactured home and planned to stay there.

WE RECOMMEND THAT CONSUMERS BUY THE HIGHEST-RATED HOME THEY CAN AFFORD. IF YOU CAN GO TO A ZONE III, DO IT. IF YOU CAN'T AFFORD A ZONE III, GET A ZONE II. ZONE 1S, WE DON'T PARTICULARLY LIKE.

Timothy Reinhold, senior vice president for research and engineering at the Insurance Institute for Business and Home Safety

The home was one of at least four in the area that rolled over that night, including one that landed on top of a car, according to the National Weather Service in Raleigh, whose meteorologists said the event was an outbreak of powerful straight-line winds. Damage extended over a 5-mile area, with winds reaching up to 90 mph, the weather service said. There were no fatalities, but at least a dozen people were injured.

Manufactured homes in Sampson County require no extra structural bracing or anchoring systems because the HUD wind zone maps do not place the county in a zone that's expected to receive high winds.

While the event was not associated with a tropical storm, it was a reminder of the damage that powerful wind can do to manufactured homes.

Changes followed Andrew

HUD began regulating manufactured houses – once called mobile homes or trailers – after Congress passed the National Manufactured Housing Construction Safety Standards Act of 1974. The agency enforces standards directly or through state agencies, such as the Department of Insurance in North Carolina. HUD inspects factories and retailer lots, regulates installation and resolves disputes over defects. HUD collects a fee for each home built and authorizes a label to be placed on homes that meet HUD standards. It can pursue civil or criminal action for violations.

HUD added wind standards to its regulations in 1980. Then Hurricane Andrew, with its 135-155 mph wind gusts, hit south Florida in August 1992 and forced those to be rewritten. Dade County officials said at the time that the storm destroyed about 11 percent of conventional homes in the county and 97 percent of manufactured homes.

Timothy Reinhold was at the American Association of Wind Engineering at the time and helped write a report on the devastation.

"The report said, 'If you keep building manufactured housing the way you have been doing it, you have to consider it expendable,' " said Reinhold, now senior vice president for research and engineering at the Insurance Institute for Business and Home Safety. The Tampa-based institute is an independent, nonprofit research group supported solely by property insurers.

In response to the losses, HUD came out in 1994 with maps that divide the country into three wind zones. Most of the country is in Zone I, where

manufactured homes must be designed to withstand certain wind loads that push against the sides of the structure or try to lift it. There are no wind speeds associated with Zone I, but manufacturers' websites say that when properly built, installed and maintained, Zone 1 manufactured homes can withstand sustained winds of at least 70 mph.

In Zone II, homes must be engineered to withstand winds up to 100 mph. Zone III homes must be designed for winds up to 110 mph, with additional strengthening required for those within 1,500 feet of the coast. HUD also specifies support and anchoring systems for each zone, with higher zones requiring more supports and more anchors, placed closer together.

Factors such as topography and soil type can affect the equation, and certain lenders, such as the FHA and VA, have additional requirements.

Homes designed for Zones II and III can be placed in Zone 1. Homes designed for lower zones cannot be placed in higher zones.

Based on testing the Insurance Institute for Business and Home Safety has done, Reinhold said, he would feel as safe living in a manufactured home built and installed to HUD's Zone III standards as he would in any site-built home.

"We recommend that consumers buy the highest-rated home they can afford. If you can go to a Zone III, do it," Reinhold said. "If you can't afford a Zone III, get a Zone II. Zone 1s, we don't particularly like."

Larger danger zone

HUD's map for manufactured housing is designed to protect primarily against winds from tropical storms and hurricanes, using historical data to determine the probability of such winds in the future. This year's Atlantic hurricane season, which started June 1 and runs through Nov. 30, is expected to be about average, with 12 named storms, including five hurricanes, at least three of them Category 3 with winds of more than 110 mph.

Though hurricanes spawn tornadoes, neither HUD's map nor those for site-built homes account for tornadoes, which are regarded as so unpredictable and violent that no design can effectively protect against a direct hit.

But there are major differences between HUD's maps for manufactured housing and those used for site-built homes.

When they were drawn, HUD's maps relied on National Weather Service devices that measured wind speed by the "fastest mile," the standard at the time. Those devices were replaced by ones that measure wind speed in 3-second gusts. Since

1995, the weather service has used the 3-second measurement, and codes for site-built homes switched to it.

The Federal Emergency Management Agency, which tries to reduce the loss of life and property to natural disasters, also has offered a wind map for manufactured housing. It closely resembles those for site-built housing and uses the 3-second gust measurement.

“The 3-second gust is a more useful measure,” said Matt Eastin, an associate professor in the Department of Geography and Earth Sciences at UNC-Charlotte. “The technology has improved and we now have better sensors.”

Eastin analyzed weather service storm data from 1950 to 2003 and concluded that North Carolina is likely to see slightly fewer tropical storms and hurricanes make landfall in the future, but they will be stronger and cause more damage.

In North Carolina, the bigger difference in the maps is this: HUD’s map, drawn using data collected four decades ago, puts only the easternmost 19 of the state’s 100 counties into Zone II or Zone III, where manufactured houses must be designed to withstand tropical-storm-force winds. Every other county is in Zone I.

Maps in the state’s residential building code, which applies to site-built housing and has been updated several times since the HUD maps were drawn, show tropical-storm-force winds are likely to reach 100 miles farther west than the HUD maps show. In those newer maps, 47 counties are zoned for winds of at least 90 mph as measured in a 3-second gust. That’s 28 more counties than HUD includes in Zones II and III, where such winds are expected.

According to census data, the 28 counties included in the state residential building code wind zone map – and left out of HUD’s wind regulations for manufactured housing – have an estimated 198,380 manufactured houses in which more than half a million people live.

Wake County, which has more than 14,000 manufactured homes, is one of those.

In September 1996, Hurricane Fran made landfall near Southport and tracked all the way to Garner before its eye fell apart. According to the weather service, Fran’s wind gusts were measured at 100 mph in Greenville, 81 mph in Goldsboro and 79 mph in Fayetteville and Raleigh, all in Zone I counties on HUD’s map. Fran’s winds approached or exceeded the winds that manufacturers say homes in those counties will withstand.

There were not widespread failures of manufactured homes in the path of Fran’s inland trek. Brad Lovin, executive director of the N.C. Manufactured Housing

Institute, the industry trade group in the state, said there is no indication that properly installed and maintained manufactured homes do not perform well under current regulations. Updating the maps would require a petitioner to go before HUD's 21-member Manufactured Housing Consensus Committee, which would have to vote to approve the changes.

Joe Sadler, who administers HUD's manufactured housing program for the N.C. Department of Insurance, is a member of the consensus committee. The issue has not been brought to the committee during the three years Sadler has served on it.

Updating HUD's map and requiring that homes be engineered to a higher wind standard in more counties would only increase costs for consumers, many of whom Lovin said could not afford it. U.S. government data show that in February, the average price of a new single-wide manufactured home sold in the South was $48,400, and for a double-wide, $87,300.

There is a certain amount of risk in any structure, Lovin said.

"In a catastrophic weather event, even some of the wealthiest people couldn't afford what it would take to keep you truly safe," he said, "unless you were in the ground in a fortified bunker."

The home that blew over in Sampson County on May 29 as Brenda Smith stood looking out her kitchen window was no bunker, but a 20-year-old three-bedroom single-wide. Bowden, her grandson-in-law, can't say whether the house had been properly installed. When it went belly-up, he said, there were anchors hanging from it like spaghetti strands, and others still in the ground.

HUD classifies Sampson as a Zone I county. If the HUD map were updated, Sampson likely would move into Zone II, based on current data indicating the county can expect storm gusts of up to 110 mph. If that happened, new manufactured homes placed in the county would have to be built stronger and be anchored better than most of those there now.

Once he finishes hauling the home to the landfill, Bowden said he expects to be done with manufactured homes, of which Sampson County has an estimated 9,668.

"And I know what my wife's grandmother would say," Bowden said. "She'll never live in another one."