



**By Mike Maciag**

Photographs by David Kidd

# RISKY WATERS

Everyone knows it's a bad idea to build new development on flood-prone land. So why do we keep doing it?



**Houses in the floodplain  
on South Carolina's  
Johns Island**





here are signs of development seemingly everywhere on Johns Island, at the edge of Charleston, S.C. Traffic on and off the island routinely backs up. Balloons and arrows posted on utility poles direct motorists to open houses. Signs advertise single-family homes from the low \$200s, a bargain compared to those a short drive away in central Charleston.

At 84 square miles, it's one of the 10 largest islands in the contiguous United States. But until recently, it has been sparsely populated. Now crews are clearing land to make way for sprawling subdivisions. The island's population has doubled in the past two decades to nearly 20,000, with much more growth expected as thousands of new homes go on the market.

Some of the residents of Johns Island are encouraged by the development; others are unhappy with the prospect of substantial change. But all of them are aware of what has happened nearby, in the West Ashley area of the city, just across the Stono River. West Ashley offers a cautionary tale of floodplain development. Decades ago, the Federal Emergency Management Agency (FEMA) misjudged how a certain creek basin functioned, so homes were built where officials now say they shouldn't have been. Floods devastated West Ashley subdivisions in each of the past three years, most recently during Hurricane Irma in 2017. It's a dire scenario that local officials are trying to avoid on low-lying Johns Island as development accelerates.

What is happening in South Carolina is not an isolated case. Many vulnerable areas of the country are seeing significant residential and commercial development despite the long-term flood



Forested areas of Johns Island are cleared to make way for new housing developments.



Floodplains cover much of the Charleston region's landscape.

risks. *Governing* analyzed the latest U.S. Census Bureau survey data using a methodology from the New York University Furman Center to estimate the population living in FEMA-designated 100-year floodplains. Nationally, the number of Americans living in these high-risk areas in 2016 climbed 14 percent compared to those living in the same neighborhoods in 2000. That's actually faster than in areas outside of flood zones, where the population increased 13 percent. "The nation is spending billions every year to move people into flood-prone areas and keep people living in flood-prone areas," says Rob Moore of the Natural Resources Defense Council. "We've gotten exactly what we paid for."

Indeed, construction is permitted in Charleston and other floodplains across the country, provided it meets regulations mostly set by state and local governments. For its part, the federal government certainly doesn't discourage development. Rules under the National Flood Insurance Program are limited and don't account for sea-level rise. Additionally, the Trump administration has proposed rolling back some rules, which could pave the way for more development. It's happening despite a slew of recent studies warning of greater risks than previously estimated resulting from sea-level rise in areas like those off the South Carolina coast.

This is a crucial time for the future of Johns Island, as nearly 4,300 new housing units have been approved for development. The Charleston City Council has passed a temporary building moratorium for the area around the creek basin in West Ashley and is considering doing the same for Johns Island. A petition from



island residents calls for the city to cease residential permitting for two years. “It’s leading to a healthy discussion and [there are] some tough decisions on the horizon as to whether development is allowed in a 100-year floodplain or not,” says Charleston Mayor John Tecklenburg. “Or, if it’s going to be allowed, will it have extra special requirements that other areas wouldn’t have?”

Historically, Johns Island was an unincorporated part of Charleston County, much of it farmland. Today, although some of the island has been brought into the city, most of it remains rural and ripe for development, offering large parcels unavailable elsewhere in Charleston. Much of the housing has been concentrated along the island’s higher ridges; low-lying forests act as a sort of sponge, absorbing water during floods. But increased development is threatening those forests, as trees are being cut down and more of the land is being covered with impermeable surfaces.

Charleston Councilman Marvin Wagner hears concerns from residents that all the new development will make parts of the island more vulnerable to flooding. Once skeptical of climate change, Wagner says his views evolved after seeing flooding firsthand on residents’ properties in his district. “They’re making an awful lot of noise,” Wagner says of these residents. “But I don’t mind, because their worst dreams can come true.”

Much of the island’s zoning was approved in the 1990s, before the region started getting hit with frequent flooding events. The city could modify zoning for previously approved parcels, but doing so would likely open it up to costly legal challenges. The

Charleston Home Builders Association opposes development moratoriums and new zoning restrictions that effectively devalue properties, warning that broader zoning changes could yield unintended consequences.

But it’s not flooding that Johns Island residents complain about most these days. It’s the inability of the island’s limited infrastructure to handle the increasingly heavy traffic on and off of it. Wagner has fought for the extension of an interstate highway onto Johns Island for years, and Gov. Henry McMaster has backed funding for the project. Some worry, however, that this construction could exacerbate flooding risks, and city officials acknowledge it could lead to even more new development on the island.

**N**ationally, much of the development that’s taken place in floodplains is a consequence of federal regulations that do little to discourage construction in flood-prone areas. Larry Larson, director emeritus of the Association of State Floodplain Managers, sees it as a system of perverse incentives. Regardless of whether states take any steps to discourage risky developments, they still receive generous disaster relief assistance when devastation occurs. The federal government typically pays for about three-quarters of disaster assistance and over 90 percent after the most destructive storms. “They need to create some incentives





**Stephen Julka,  
Charleston's floodplain  
manager, is developing a  
new strategy to reduce  
flooding risks.**

for states and locals to do the right thing,” Larson says. “Right now, it’s going in the other direction.” Just 10 days before Hurricane Harvey made landfall in Texas last year, President Trump signed an executive order nullifying an Obama-era rule that required federal agencies to build public infrastructure at higher elevations and factor in climate science when constructing in floodplains. More recently, the Environmental Protection Agency finalized a proposal to replace the Waters of the United States rule, scaling back the definition of federally protected waterways and effectively weakening the mitigation banking system. The move is expected to increase development of wetland areas.

But FEMA does encourage localities to adopt tighter regulatory standards by providing flood insurance discounts through the Community Rating System. To receive the discounts, several local governments have adopted more stringent requirements. Nashville, for example, which suffered a devastating flood in 2010, now requires structures to be built an additional four feet above designated flood levels. In this and other ways, while flood insurance is a federal program, much of the authority lies with local governments. A handful of localities elsewhere have put a stop to development in flood-prone areas altogether. In Milwaukee County, Wis., only a third as many homes and businesses sit in the 100-year floodplain as was the case two decades ago. The Milwaukee Metropolitan Sewerage District has acquired many of these properties over the years and invested in green infrastructure projects, with a goal of eliminating all homes from the floodplain by 2035.

That’s hardly the norm, however. In fact, nearly all states recorded net population gains across their FEMA-designated floodplains in recent years. Much of this was a result of more Americans moving South, with Florida and Texas collectively accounting for over half the national population growth in floodplains since 2000. *Governing’s* calculations also identified many floodplain neighborhoods where growth far outpaced that of less flood-prone areas within the same county. In Hudson County, N.J., the population living in the current flood zone rose about 55 percent over the past two decades, while the rest of the county experienced only a slight increase.

Mounting evidence further suggests that the overall breadth and severity of flooding risks have been understated. One study published in the journal *Environmental Research Letters* earlier this year estimated that three times as many Americans lived in 100-year floodplains as those identified using FEMA maps, which guide local land use regulations and flood insurance premiums. The maps are widely considered to be inadequate. Most notably, they don’t account for future sea-level rise. Some communities’ maps were last updated over a decade ago. And while the standard 100-year floodplain designation is supposed to identify areas with a 1 percent chance of flooding in any given year, many regions are experiencing far more frequent flooding. A study published in *Risk Analysis* found that in some places, more than half of the properties sustaining flood damage were actually located outside designated FEMA flood zones.


Local economic development and tax revenue concerns are major considerations whenever a city rebuilds following a flood, or whenever its maps are revised. Localities often resist any attempts to cede additional ground to FEMA’s flood zones,





**Shadowmoss, a subdivision in West Ashley, has experienced frequent flooding, most recently during Hurricane Irma.**





**“Today, it’s the traffic,” Charleston Mayor John Tecklenburg says of residents’ concerns. “You give me three or four feet of sea-level rise decades from now, then it flips.”**

sometimes holding up the process for years. New York City challenged a FEMA proposal that dramatically increased the area of the city in flood zones following Hurricane Sandy in 2012. The two sides reached an agreement in 2016 to create two sets of maps. “Almost every place where a developing urban area intersects a floodplain, there are local pressures, typically economic and political, to find a way to add additional development to the floodplain,” says Nicholas Pinter, a professor at the University of California, Davis. “It’s a steady drumbeat.”

Part of the reason is the influence of developers who lobby to get projects approved or to obtain a variance from flood ordinances. Sometimes elected officials buck the technical advice of agency staff. The Charleston County Council, for example, has approved requests to rezone several Johns Island properties to allow for higher density development against recommendations of county staff. Other times, homes or entire subdivisions are permitted even though they are in violation of building elevation requirements or other rules.

When a disaster hits, homeowners often secure assistance to rebuild, but their chances of finding money to instead relocate are slim. An analysis by the Natural Resources Defense Council found that for every \$100 FEMA has spent to rebuild homes since 2000, it has allocated only \$1.72 to move people and buy out their properties. “We need to start making it easier for people to move out of these vulnerable areas,” says Moore, who wrote the report. “They will eventually become less desirable to live in, with lower property values and lower taxes for cities.”

One area that Charleston officials hope to get residents out of is Shadowmoss, a subdivision in West Ashley. Drainage problems have been apparent there since shortly after development accelerated in the 1980s and 1990s. Nearly a year after Hurricane Irma, the waterline is still visible on some of the vacant homes. “This is ground zero for what has gone wrong,” says Stephen Julka, Charleston’s floodplain manager. “It’s an example of development happening with not enough information.”

The city of Charleston has started closing on its first round of property buyouts in Shadowmoss with the intention of eventually converting the space into a floodplain park. A FEMA grant program can fund up to 75 percent of costs for homes to be demolished or moved, but is used sparingly: It has covered about 6,000 buyouts nationally since fiscal year 2010.

A temporary moratorium has halted development in the neighborhood and other flood-prone West Ashley communities. It’s given the city time to conduct a series of studies and formulate a new strategy. Staffers are, for instance, running draft stormwater regulations through simulated models to see how they’d affect future developments and surrounding housing. Eventually, Julka says, they can begin applying the new approach in other parts of the city, tweaking it as needed.

On Johns Island, one of the most vocal opponents of additional development is Phil Dustan, a College of Charleston ecologist who has studied the island’s topography. He says some houses on the island are already sinking, septic systems are failing and

foundations are cracking as a result of all the new construction. Further developments could potentially alter longstanding drainage patterns. Retention ponds designed to limit runoff are common throughout the island and other parts of the low country. They don't, however, hold as much water as large forested areas or wetlands cleared to make way for new neighborhoods. "The natural plumbing of the land is being destroyed," says Dustan, an island resident. "So, come the flood or rains, there's going to be a man-made problem that's going to be far greater than it would be if it was just natural."

Longtime island resident Barbara Busey watched for months as crews cleared 30 acres of land behind her home and brought in truckloads of dirt. She says she's now noticing four to five inches of standing water in her driveway and pools of water in an adjacent property following routine rains, despite being in one of the higher elevation areas of the island. "This never happened before these developments came in," Busey says. "I've got the McNeighborhood on one side and the mansions going in back of me."

Busey's home was unscathed by Hurricane Hugo in 1989, and she's lived through other major storms over her 35 years on the island. But now she fears she's vulnerable after the loss of the thick forests surrounding her home. "It's just a little old cement block island house, but it's all I have," she says. "I'm scared I'm going to lose it."

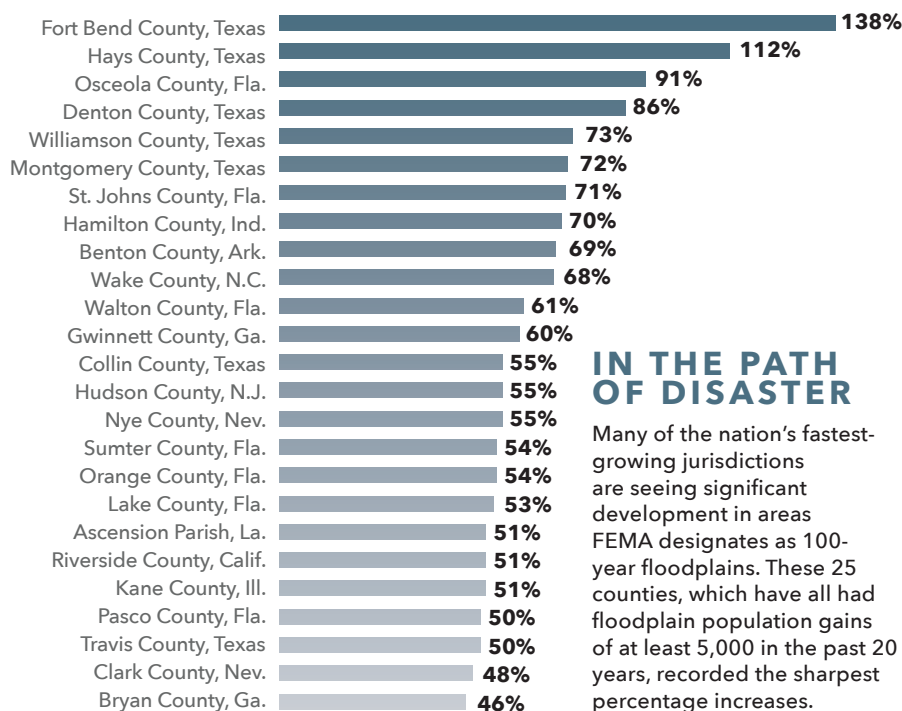
On a large map, members of the Johns Island Community Association have circled developments they consider problematic. "This is a big issue now and it's only going to get worse," says Lisa Vandiver, an ecologist who resides on the island. "Moving forward, we have to look at the system as a whole and do zoning accordingly."

Officials in the region are starting to embrace the idea that they'll need to collaborate more closely. "Watersheds don't know jurisdictional boundaries; however, regulatory framework does," says Kinsey Holton, Charleston's stormwater program manager. Many properties on the island annexed into the city surround unincorporated county parcels. A study reviewing South Carolina's flooding identified uncoordinated planning decisions by multiple jurisdictions as a factor hindering the overall integrity of watersheds.

Both the Charleston Home Builders Association and the island's community association agree the best solution would be a unified, interconnected drainage plan for the entire island rather than one that has developers accounting only for their individual properties. Such a comprehensive drainage system has worked well on nearby Daniel Island, which hasn't flooded. Pulling off the same approach on Johns Island could prove difficult, though, as at least six major developers would need to agree to a plan covering a larger island that's already partially developed. "It's not going to be easy," says Patrick Arnold, who heads the Home Builders

Association. "But for the long term, they would have a draining system that neither burdens the municipality nor the developers responsible for it." For its part, the city's Public Service Department says it would support a master planning effort.

As in other places, the local ordinances that are in effect right now typically can't prevent adverse effects on surrounding homes. Charleston County is considering new rules that would require projects to handle not only current waterflow from upstream, but additional future runoff expected to result as upstream areas are developed. Still, they don't want to overburden developers. "The reality of regulatory programs is that if you protect 100 percent of probabilities, you're overregulating," says Carl Simmons, Charleston County's building inspections director.



## IN THE PATH OF DISASTER

Many of the nation's fastest-growing jurisdictions are seeing significant development in areas FEMA designates as 100-year floodplains. These 25 counties, which have all had floodplain population gains of at least 5,000 in the past 20 years, recorded the sharpest percentage increases.

### FLOODPLAIN POPULATION CHANGE SINCE 2000

SOURCE: GOVERNING CALCULATIONS OF 2000 U.S. CENSUS AND 2016 FIVE-YEAR AMERICAN COMMUNITY SURVEY TRACT-LEVEL DATA

The next few years of development on Johns Island and the decisions made to regulate it will carry ramifications for decades to come. But the underlying geographical reality is not going to change. Most of Charleston lies in a floodplain. Mayor Tecklenburg says there's a realization that the city is not going to build or pump its way out of the situation. "You've got to correct some of the sins of the past, prepare for the future and have this culture that we're ready to deal with water when we encounter it," he says.

Julka, the floodplain manager, puts it more bluntly. "It really is a land use issue," he says. "If you continue to allow development in a floodplain, you can have the strongest stormwater standards, but even with the strictest standards, you're still putting people in a floodplain." **G**

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