SELC
SOUTHERN ENVIRONMENTAL LAW CENTER

As rising seas swamp South Carolina's shores, some coastal communities are left unprotected

A proposed $1.1 billion seawall bypasses marginalized Charleston neighborhoods and relies on outdated grey infrastructure. But there is an alternative: green, nature-based solutions can protect at-risk coastal communities.

Vural Elibol / Anadolu Agency via Getty Image

Bordered by a freeway and flanked by former industrial sites, the coastal community of Rosemont in Charleston, South Carolina, is home to generations of Black families. But as climate change raises sea levels and surrounding natural protections from storms have been removed for infrastructure projects, flooding has become a regular problem for the community.

It's not surprising that flooding is on the rise here—infrastructure in Rosemont has been neglected for decades. When storm drains and sidewalks were put in throughout the city of Charleston, Rosemont was bypassed. Decades of heavy industry left a legacy of pollution—two superfund cleanup sites lie within roughly half a mile of the community. A hurricane in 1989 destroyed the long dock that gave Rosemont residents access to the marsh and the water beyond—it still hasn't been replaced. And despite Rosemont's vulnerability to the impacts of climate change, a proposed $1.1 billion new Charleston seawall ends before the Rosemont community begins, leaving residents unprotected yet again.

Chris DeScherer, an attorney with the Southern Environmental Law Center (SELC), is concerned about the U.S. Army Corps of Engineers' plans. "They are proposing to build this wall around the most affluent part of Charleston," he says. "This is where the tourists come, the area with the highest market value. But the wall stops before Rosemont, and the Corps has not proposed other protections that would sufficiently protect the Rosemont community."

Residents worry about their risk. Cora Connor has lived in Rosemont for 23 years, raising her three children here. She says that since an adjacent freeway and the surrounding trees were demolished, flood water has regularly inundated her yard, lapping at her lowest porch step. Her 90-year-old neighbor sometimes can't leave the house due to the flooding surrounding it.

"There are so many issues here that need to be addressed," Connor says. "But no one wants to take responsibility. Rosemont is kind of the little neighborhood that's been forgotten."

Expensive infrastructure, vulnerable communities

Rosemont and the rest of the South Carolina coast have taken a climate-change-induced beating over the past decade. Beginning in 2015, the state's coast was hammered for five consecutive years by hurricanes, storm surges, and "rain bombs" that caused untold amounts of damage.

Flooding from a King Tide event in Charleston, South Carolina Lauren Petracca / Courtesy of Southern Environmental Law Center

The need to invest in protection against future storms and sea-level rise is clear. But the federal economic impact formula—used to assess which U.S. Army Corps of Engineers projects get funding—prioritizes areas with higher property values. Jenny Brennan, a science and policy analyst with SELC, explains that "the cost/benefit analysis is skewed towards the buildings that cost more money. It doesn't place value on people, history, or culture," she says. "Rosemont is a good example—if a community doesn't have a ton of fancy infrastructure, they're going to lose out on federal funding, compared to wealthy areas. It's a nationwide problem."

While vague "non-structural" flood control measures, such as home elevations or relocations, are part of the $1.1 billion seawall plan, it's unclear how much protection Rosemont will actually receive. "The proposed investment for Rosemont pales compared to what was offered for the more affluent areas," says Brennan.

The seawall project also raises other concerns. While it might protect against a major storm surge, experts who have analyzed the project have doubts about its capacity. "This is a very controversial, expensive project," says Jason Crowley, a program director at the South Carolina Coastal Conservation League. The seawall's maximum height of 12 feet is based on bridge clearances, not potential storm surge heights. "If Hurricane Hugo had been a direct hit, Charleston would have experienced a 20-foot storm surge," he adds

Crowley also is concerned about the seawall's safety. He says there's a risk that it could actually trap floodwaters in the city center, instead of protecting it. "Is that the most resilient thing? To build a wall and create a bathtub effect?" he asks. He also points out that the current design, which includes gates that would only close in the event of a storm surge, do nothing to protect against the "sunny day" or low-grade flooding that regularly creeps into Charleston and nearby communities like Rosemont, swamping roads and causing property damage. In some areas, he says, the seawall may even worsen that issue, deepening flood water rather than draining it.

A rising tide of concern

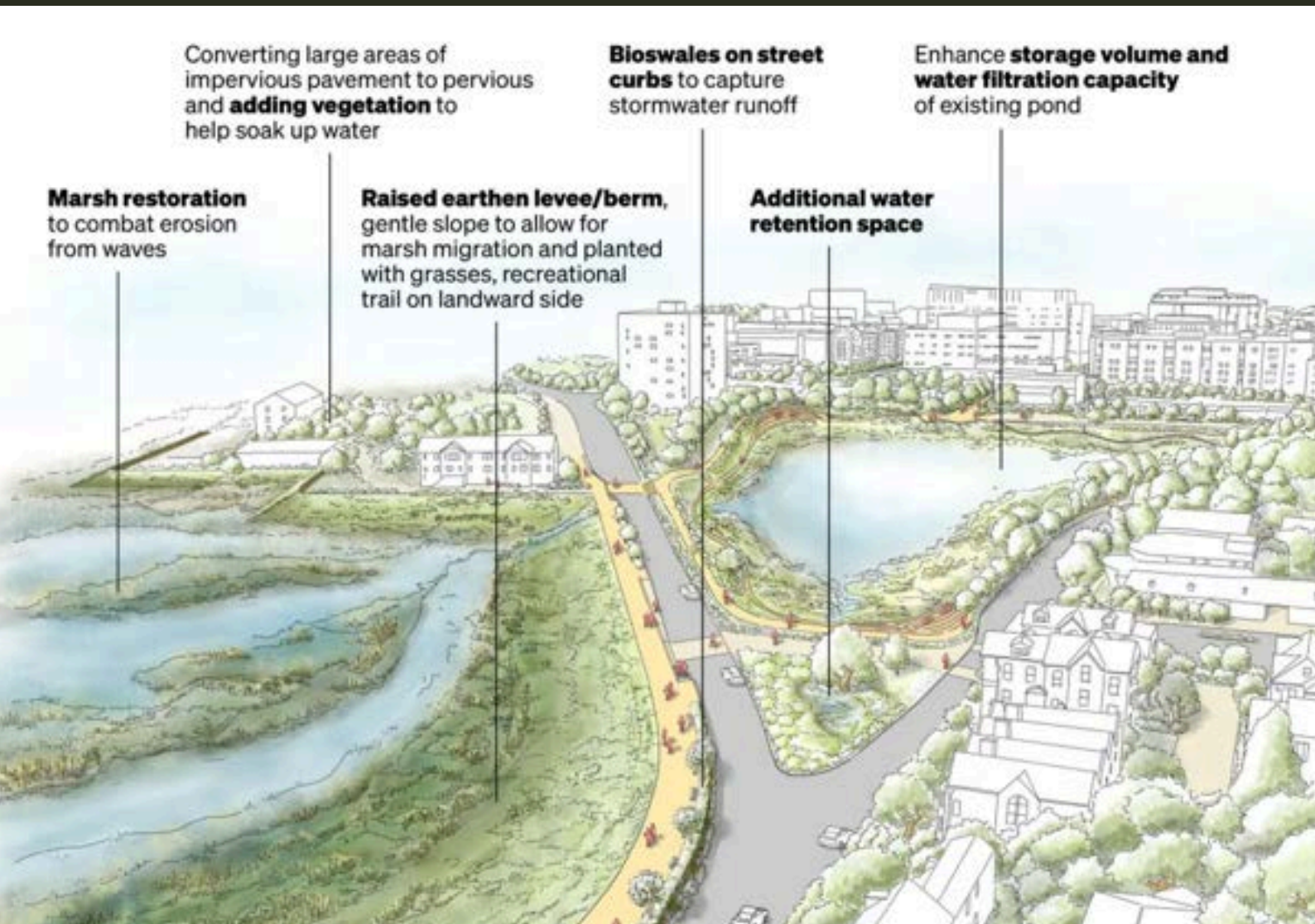
The Charleston seawall isn't the area's only major proposal designed without full consideration of South Carolina's rapidly changing climate. The Mark Clark highway extension, which would cost millions, will soon be underwater too. SELC's independent review found that portions of the newly built highway are expected to be inundated or surrounded by floodwaters. "With such an expensive project, the agencies evaluating it should consider climate change and sea-level rise," says SELC's DeScherer. "Otherwise, we'll be spending billions on new infrastructure that will become obsolete in a couple of decades."

Another potential Charleston County housing development, called Cainhoy, is in a location surrounded by water on three sides. The current plans will add thousands of new housing units there, 45% of which will lie in a floodplain. The project would also fill in nearly 200 acres of wetlands and put endangered species at risk. SELC has commissioned an engineering firm to design alternatives for building housing there, while minimizing flood risk.

To help the public learn more about the impacts of these types of projects, SELC recently released a new data-rich risk visualization and assessment tool—the Changing Coast website. It shows, for example, that Rosemont not only encompasses areas of high flood risk, but also is very high on the social vulnerability index—a potentially deadly combination, as 2005's Hurricane Katrina showed in New Orleans. The Changing Coast model also indicates that the Cainhoy project and Mark Clark highway extension are at risk of inundation or increased flooding with the expected sea rise of three or four feet within the next 70 years.

The green alternative

Tools like the Changing Coast website and the expert reports commissioned by SELC help visualize vulnerabilities and alternative solutions, including greener options for coastal climate change resilience. Traditionally, coastal flood protection has taken the form of rigid concrete seawalls and drainage systems, but a growing chorus of scientists and engineers are now emphasizing nature-based solutions.



These can take various forms, often with multi-faceted benefits that are missing from grey infrastructure. Plant-covered berms can offer seawall-like protection and double as parks or promenades, for example. Living breakwaters can both provide habitat for sea life and weaken the power of incoming waves. Marshes absorb flood water while also providing wildlife habitat. Solutions like these offer opportunities to create a layered and flexible approach to the unpredictable realities of climate change.

Indeed, one of the biggest benefits of natural solutions may be their adaptability. "Nature-based design is not one-and-done like a concrete seawall," says Crowley. "If you build a 12-foot wall and sea level rises faster than predicted, you have to take the wall out. Nature-based flood protections can adapt. You can layer onto them or elevate them over time."

Crowley also points out that nature-based solutions tend to be cheaper over their lifetime. They typically cost the same or less to install, and while green solutions sometimes require more frequent maintenance, it's less expensive than the maintenance for highly engineered grey infrastructure.
But while green solutions may have much more to offer, those potential benefits aren't currently included in the planning for many coastal resilience projects. "Building things like wetlands and oyster reefs is certainly better than lining everything with concrete," says Robert Young, a scientist who runs the program for developed shorelines at Western Carolina University. "But nature-based solutions don't work with the Corps of Engineers' computer models. So, they say, 'after everything is approved, we can add some green lipstick.'"

Growing smarter

While the potential for nature-based flood protection is being dismissed in some quarters, it resonates deeply with people living on the front lines of sea-level rise. "I was opposed to a seawall—I don't like the idea of a wall closing us in," says Rosemont's Connor. "I think they should dig deeper and see what other states have done with things like berms, oyster banks or plant materials that can thrive here and protect us. I want to see more green in my community."

SELC's DeScherer believes that the right approach is not to stop building infrastructure, but to design these interventions with community needs in mind. "We are not saying no to new projects and development, but we are saying that there are smarter ways to approach them," he says. "Cities like Charleston don't have to stop growing. With the right solutions, we can create coastal communities that are resilient to the impacts of climate change."

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