



BY MARINA SCHAUFFLER

ENHANCING NATURAL PROTECTIONS AGAINST

RISING WATERS

Weeks after Hurricane Florence converted Wilmington, North Carolina—headquarters of the accredited North Carolina Coastal Land Trust—into an island, the stress of the storm’s aftermath was evident in the voice of Executive Director Camilla Herlevich. The land trust’s offices and most of its staff members’ homes escaped major damage, she said, and they had resumed work within days via phones and laptops while still evacuated at scattered sites. “My staff has been great,” she added, but “it’s really, really tiring.”

Hurricane Florence was a powerful and long-lived hurricane that caused severe damage in the Carolinas in September 2018, primarily as a result of freshwater flooding.

NC DEPARTMENT OF TRANSPORTATION

And that was before Hurricane Michael swept through, bringing more rain six weeks after Florence dumped up to 17 inches. Herlevich offered sobering words for other land trusts to heed: “Storms are coming,” she said, “and not just to Wilmington. You can get hit, too; you need to be cognizant of what you’re doing to enhance natural protections.”

Because a warmer atmosphere holds and releases more water, climate scientists project an increase in the frequency and intensity of heavy precipitation events in coming decades. A recent study in the journal *Nature* found the track speed of hurricanes in the North Atlantic—due to warmer ocean temperatures—has slowed roughly 20%, exacerbating flood risks.

Coastal communities are vulnerable to routine inundation from rising sea levels and to storm surge (which reached over 15 feet with Florence and Michael). Inland areas are experiencing flash floods in smaller rivers and creeks, prolonged flooding along major rivers and urban flooding, where intense development speeds the flow of water across the landscape.

A recent study¹ revealed that three times as many U.S. residents than previously thought are at risk of serious flooding. More than half the flood maps prepared by the Federal Emergency Management Agency (FEMA) have been found to be out-of-date or inaccurate,² leaving many communities ill-prepared.

But the good news, Herlevich noted, is that “land trusts have an important role to play.” Land trusts around the country are already working to protect the wetlands and vegetated floodplains that temper storm effects, to assess flood risks and to increase community resilience through planning and habitat restoration.

Soaking Up Floodwaters Naturally

Intact ecosystems help slow the flow of floodwaters, buying time for soils to absorb rainwater. A Harris County Flood Control District study on property protected by the accredited Katy Prairie Conservancy in Houston, Texas, for example, found that

prairie grasses absorb more than 8 inches of rainfall per hour compared to just half an inch for turf grass. “Prairie grasses are like a rainforest turned upside down,” explains Mary Anne Piacentini, KPC’s president and chief executive officer, “acting as a huge sponge with 12 to 18 feet of roots that can help absorb floodwaters and can also withstand drought.” Locally, she says, “people are starting to get it,” but there’s not yet widespread recognition nationally of the vital role native vegetation plays in minimizing flood damage and maintaining water quality.

Vermont has particular challenges with controlling floods due to its narrow river valleys, notes Siobhan Smith, vice president for conservation and stewardship at the accredited Vermont Land Trust. Its staff teaches landowners about the importance of creating a “meander belt,” a swath of undisturbed floodplain that lets the river channel move as needed. Since Hurricane Irene dumped 11 inches on the region in 2011, VLT has completed numerous “river corridor easements” to prevent shoreline armoring (the use of groins, jetties, offshore breakwaters, sea walls or other hardened beach structures on the shore to protect land from erosion).

Along low-lying coastlines, tidal marshes act as a buffer, lessening wave action up to 50% and reducing the economic damage from storms. A 2016 report by the accredited Nature Conservancy and Texas A&M³ identified open space as a key part of a flood-avoidance strategy in vulnerable Gulf Coast communities. That report identified the flooding risk Houston faced, realized months later when Hurricane Harvey dropped up to 60 inches of rain. “Harvey was a jolt,” acknowledges Jill Boullion, executive director of the accredited Bayou Land Conservancy in Houston. Since then, BLC has amplified its watershed education efforts, sharing science to help people understand “how natural lands can be part of the flood mitigation toolbox.”

Harvey inspired area land trusts, Boullion says, to see “they’d benefit from



Camilla Herlevich, executive director of North Carolina Coastal Land Trust, says that in the days after Hurricane Florence, “Manning Fulton Attorneys graciously provided an office, a land line, internet access, printers, coffee and warm hospitality for several days.” She’s seen here with attorney Will Morgan.

making the tent bigger,” forging ties with groups focused on equity and environmental justice. BLC joined discussions about public housing sites suffering from near-annual inundations, recognizing that the residents there are “working two to three jobs and relying on public transit; they can’t always advocate on their own behalf.” It became clear that “the public needed to know we were involved in floodplain protection,” Boullion says, and BLC revised its mission statement to read “We preserve land along streams for flood control, clean water and wildlife.”

Helping Watersheds Plan for Increased Inundation

On the anniversary of Harvey in August 2018, Houston voters overwhelmingly approved a \$2.5 billion bond funding at least 230 resilience-centered projects over the coming 15 years, some of them nature-based. Local land trusts had an active role laying the groundwork for that bond, submitting projects for consideration and meeting with numerous public officials. It was “crazy how much time it took,” Boullion recalls, characterizing the bond effort as “a ramp-up of everything we would normally do.” Piacentini seconds that sentiment;

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“An essential part of my work right now is responding to flooding.”

Conservation advocacy work will continue as flood resilience projects take form, and land trusts are gathering further data to demonstrate the value of protecting future riparian corridors—like a Headwaters to Baywaters initiative designed to conserve land from the headwaters of Cypress Creek to Galveston Bay. Piacentini had great success in the past persuading the local flood control district to purchase easements for

temporary conveyance of floodwaters, generating \$4 million to acquire protected lands, particularly those contiguous to preserves. But Harvey prompted renewed discussion of another reservoir that could drown lands already conserved. The public needs to understand that “land is not up for grabs just because it’s open space,” she says, and that “there are many, many natural solutions that ought to be evaluated and implemented. People are starting to understand the value of the prairie,” she adds, “but we’re still suffering from not having all the science and data to document what nature can do.”

At the accredited Lowcountry Land Trust in South Carolina, staff and volunteers are collaborating with a local Nature Conservancy scientist to gather data on ways to employ natural infrastructure that is less costly than seawalls in protecting vulnerable shorelines. The initiative has been “really great for

getting people engaged,” according to LLT’s director of science and stewardship, Lisa Shealy. More than 85 land trust volunteers have built two living shorelines from bagged oyster shells. The sites already show signs of significant marsh regeneration and will help scientists determine how best to deploy living shorelines in other settings. To encourage further use of green infrastructure, LLT is helping to facilitate efforts to streamline the state permitting process.

Many land trusts engaged in flood resiliency are collaborating not only with scientists but with new partners, such as public works directors, emergency preparedness staff and transportation officials. In working to restore tidal wetlands in San Francisco Bay that buffer against storm surge, Sonoma Land Trust (accredited) needs to coordinate with those managing highways and rail lines that “traverse what used to be marsh,” notes

Resources

Map from Federal Climate Assessment, chapter on precipitation change: <https://science2017.globalchange.gov/chapter/7>

Eastern Shore Land Conservancy’s resilience webpage and biweekly “Resilience Matters” newsletter offer examples of compelling community outreach that incorporates extensive discussion of flooding risks: www.eslc.org/resilience

Coastal Flood Exposure Mapper (available for the East Coast and Gulf of Mexico currently): www.coast.noaa.gov/digitalcoast/tools/flood-exposure.html

Green Infrastructure Options to Reduce Flooding: www.coast.noaa.gov/data/docs/digitalcoast/gi-econ.pdf

Green Infrastructure Effectiveness Database: www.coast.noaa.gov/digitalcoast/training/gi-database.html

CDC’s social vulnerability maps: <https://svi.cdc.gov>

U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov>



Lowcountry Land Trust has been working with South Carolina Oyster Restoration and Enhancement (a program of SC Department of Natural Resources) and the U.S. Fish and Wildlife Service to install oyster reefs—a living shoreline—at several different properties around Charleston County.

LOWCOUNTRY LAND TRUST



BILL BASS

Taken in February 2018 at Bayou Land Conservancy's Ashton Gardens Preserve on Cypress Creek in north Harris County, Texas, volunteers clear heavy debris from Hurricane Harvey.

SLT Baylands Program Manager Julian Meisler. SLT joined a larger, more diverse collaborative that can exert more clout in getting transportation planners to consider green infrastructure. Those discussions are easier, Meisler admits, in a state where agencies are mandated to factor climate change into new development plans. But even so, he says, “We know we won’t get anything without buy-in from a lot of people.”

Getting People Out of Harm’s Way

While most FEMA buyouts of “repetitive loss” properties currently happen through municipalities, land trusts could play a role helping communities break out of what has been dubbed the “flood, rebuild, repeat” cycle. Particularly in regions facing sea-level rise, municipalities urgently need help planning for inevitable change.

The accredited Eastern Shore Land Conservancy came to this realization early because it has always had “an expansive view of what the land trust could or should be in the community,” explains Brian Ambrette, ESLC’s director of strategic initiatives. It first focused its annual planning conference on sea-level rise in 2013, drawing a record 250 people. ESLC works in “a very red region of a blue state,” Ambrette notes, but has had success focusing community leaders on adaptation because people see “an existential threat in sea-level rise” and have already observed increased flooding and shoreline erosion.

Recognizing the shared climate threats and capacity limitations of local communities, ESLC began organizing a regional climate collaborative in 2016, with support from Antioch University’s Center for Climate Preparedness and Community Resilience. That effort drew together local participants, such as emergency managers, agency officials, university researchers and representatives of several nonprofits, creating what Ambrette calls “a lively ecosystem of folks” now engaged in mapping and information sharing. (The collaborative also provided “safety in numbers,” he says, for those who “didn’t have political cover themselves” to take action.)

Farther south in the Chesapeake Bay, a pilot project is underway that could offer hope to “communities where the infrastructure and tax base is built on soggy land,” suggests Mary-Carson Stiff, director of policy at the nonprofit Wetlands Watch and a board member of the new Living River Restoration Trust. She is working with two Virginia cities, Chesapeake and Norfolk, to provide enhanced financial incentives for people facing repeated flooding to voluntarily relocate.

Given that local governments can’t stretch FEMA grants further, and private landowners are finding it hard to sell vulnerable properties, there’s a clear need for new revenue streams. In Norfolk, Stiff explains, “A resilience point-based zoning ordinance now offers developers credit for specific actions that reduce risk” (such as more sustainable construction or funding

land conservation linked to a shoreline retreat strategy).

Stiff calls it a “Transfer of Risk” program (akin to Transfer of Development Rights programs), in which LRRT will receive checks for land conservation written by developers earning needed resilience points, and those funds will cover costs associated with a “rolling conservation easement” voluntarily placed on a high-flood-risk property. Property owners have an incentive to participate as they can benefit from favorable state tax credits, federal tax deductions and reduced property taxes.

“There are a lot of unknowns that make this pilot project exciting and important,” Stiff adds, but the goal is to emerge with a template for a rolling easement that triggers demolition of structures when needed and ecological restoration of the site. She’s coordinating with others across Virginia and the country to ensure methods developed as part of this project could be readily exported. Stiff is optimistic that this initiative could “revolutionize how communities approach adaptation, taking some of the political charge out of managed retreat,” and making it clear that “land conservation is a win-win for people.” 🍌

MARINA SCHAUFFLER IS A FREELANCE JOURNALIST AND EDITOR WHOSE WORK IS ONLINE AT WWW.NATURALCHOICES.COM.

ENDNOTES

- 1 [HTTP://IOPSCIENCE.IOP.ORG/ARTICLE/10.1088/1748-9326/AAAC65](http://IOPSCIENCE.IOP.ORG/ARTICLE/10.1088/1748-9326/AAAC65)
- 2 [HTTPS://WWW.NRDC.ORG/EXPERTS/JOEL-SCATA/FEMAS-OUTDATED-AND-BACKWARD-LOOKING-FLOOD-MAPS](https://WWW.NRDC.ORG/EXPERTS/JOEL-SCATA/FEMAS-OUTDATED-AND-BACKWARD-LOOKING-FLOOD-MAPS)
- 3 [HTTPS://WWW.CONSERVATIONGATEWAY.ORG/CONSERVATIONPRACTICES/MARINE/CRR/LIBRARY/DOCUMENTS/TNC_OPEN_SPACES_2016.PDF](https://WWW.CONSERVATIONGATEWAY.ORG/CONSERVATIONPRACTICES/MARINE/CRR/LIBRARY/DOCUMENTS/TNC_OPEN_SPACES_2016.PDF)