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“Already underwater”: Strawbery Banke adapts to climate change to preserve history

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This article is the second installment of a two-part series about New Hampshire communities on the frontlines of climate change.

Water enters the buildings from above and below, buildings Rodney Rowland is charged with preserving. Climate change has made his job at the Strawbery Banke Museum more difficult, filling the basement of some of the buildings with 16 to 24 inches of water for much of the winter, when especially high tides called king tides are common.

“Our basements on all of these buildings are six to eight feet below grade,” Rowland said. That creates a lot of problems. Among them: mold, mildew, deteriorated mortar, wood rot, and crumbling foundation stones.

Part 1: 'We're the Titanic': Effects of climate change already changing life on Seacoast

“It’s rapid decay because of the influence of water all the time,” said Rowland.

In the span of just a lifetime, the problem has gotten much worse: A resident who lived in one of the buildings in the 1950s told Rowland the basement had been damp then, but he could use it for storage. That would be unthinkable now.

Flooding like this challenges the museum’s ability to preserve the region’s history and raises questions about how to prepare for the future. And while the Seacoast is particularly vulnerable to climate change, the rest of the state faces these questions, too.

The 2022 New Hampshire Climate Assessment, published in July, showed that the impacts of climate change are already here: from flooding to drought, extreme storms, less snowfall and the spread of invasive species and pests.

“It’s not a future problem,” said Mary Stampone, state climatologist and lead author of the report. “It’s happening now.”

The state has gotten hotter and wetter, the report found by looking at data from 1901 through 2020. Storms are becoming more extreme with more rainfall during a single storm, which makes flooding more common.

What water remembers

Strawbery Banke’s 10-acre campus in Portsmouth is home to 32 historic buildings, the oldest dating back to 1695. Rainstorms already flooding on the central lawn, which pools with water when there are heavy rains. The city’s stormwater system is underneath that lawn, where a storm drain deposits water into the Piscataqua River. But that system can’t drain stormwater at high tide, when the outflow pipe into the river is underwater.

2021 story: Strawbery Banke's historic homes threatened by sea level rise

To adapt, the museum recently elevated one of the building’s bulkheads, which had been creating a waterfall, Rowland said. “The water would just cascade down the basement steps and into the cellar. We lost the furnace at least once from just feet of water,” he said.

Now, the water can pool around the bulkhead without entering the basement. But water can also enter the buildings from below, as high tides push groundwater higher up toward the surface of the ground. Stampone, the climatologist, said sea level rise has caused saltwater to encroach on the groundwater table farther inland, affecting water quality along coastal areas.

Some residents have tested their water quality and found bacteria that could be a hazard for human health.

When the museum’s basements flood they fill with brackish water – a combination of fresh and salt water.

The museum is a natural low point in the area’s watershed. The surrounding hills funnel water from neighboring houses and streets into the low flat lawn where it collects. The site’s history provides another key to understanding its flooding challenges today.

Before the arrival of European settlers, the lawn was actually a waterway connected to the Piscataqua. Abenaki people used the area as a summer camp, where they came seasonally to fish and hunt. By the 1700s, settlers had developed docks to unload goods from ocean trade

had fallen into disuse, as more goods were transported by train than ship, and the state's economy had shifted away from Portsmouth. The town saw Puddle Dock as a hazard and decided to fill it in, turning water to land.

"That has certainly aggravated our situation when it comes to water," Rowland said. The water's natural outlet to the river and sea has been shut off.

"That's why we like to say water has a memory," he said. "Where water once was it will fill up again."

Preservation and loss

The sea level is projected to continue rising, and the 2022 Climate Assessment found that extreme rain will intensify, exacerbating flooding.

That will have a serious impact on regional infrastructure. A March 2022 study by the Rockingham Planning Commission found that out of 22 roads studied, 15 could be impassible due to future sea level rise.

But Rowland said retreat is not on the table for Strawbery Banke. The museum is telling the history of a specific place and that would be lost in relocating, he said.

Instead, the museum is looking at options to adapt to the changing climate. That approach incurs other losses.

In 2012, the museum removed a basement kitchen from a house built in 1790 because a brick chimney was soaking tidal water from the basement and carrying it into the first floor of the house. The bottom few feet of the chimney were replaced with a granite block since granite doesn't wick water.

"We lost this piece of history which was called a summer kitchen. They actually did their cooking down in the basement during the hot summer months. It was a beautiful huge hearth with a crane. That's gone. Now, there's just this concrete block," said Rowland.

He expects that the basements of other buildings will be lost entirely, like the Shapley-Drisco House, built in 1795. The house would be lifted and then set down on a concrete pad, a process he expects to cost hundreds of thousands of dollars.

The museum is already fundraising as a part of its capital campaign to pay for some of these updates.

Staff members are working with an architect and landscape architect to look at creative ways to buy themselves more time. That could mean redesigning the asphalt parking lot so it could absorb some rainwater or using the lawn as a living shoreline, stabilizing the coastal area by using plants, stones, and sand fill to prevent erosion and absorb water. It's a strategy that would involve working with the water and its memory instead of against it.

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