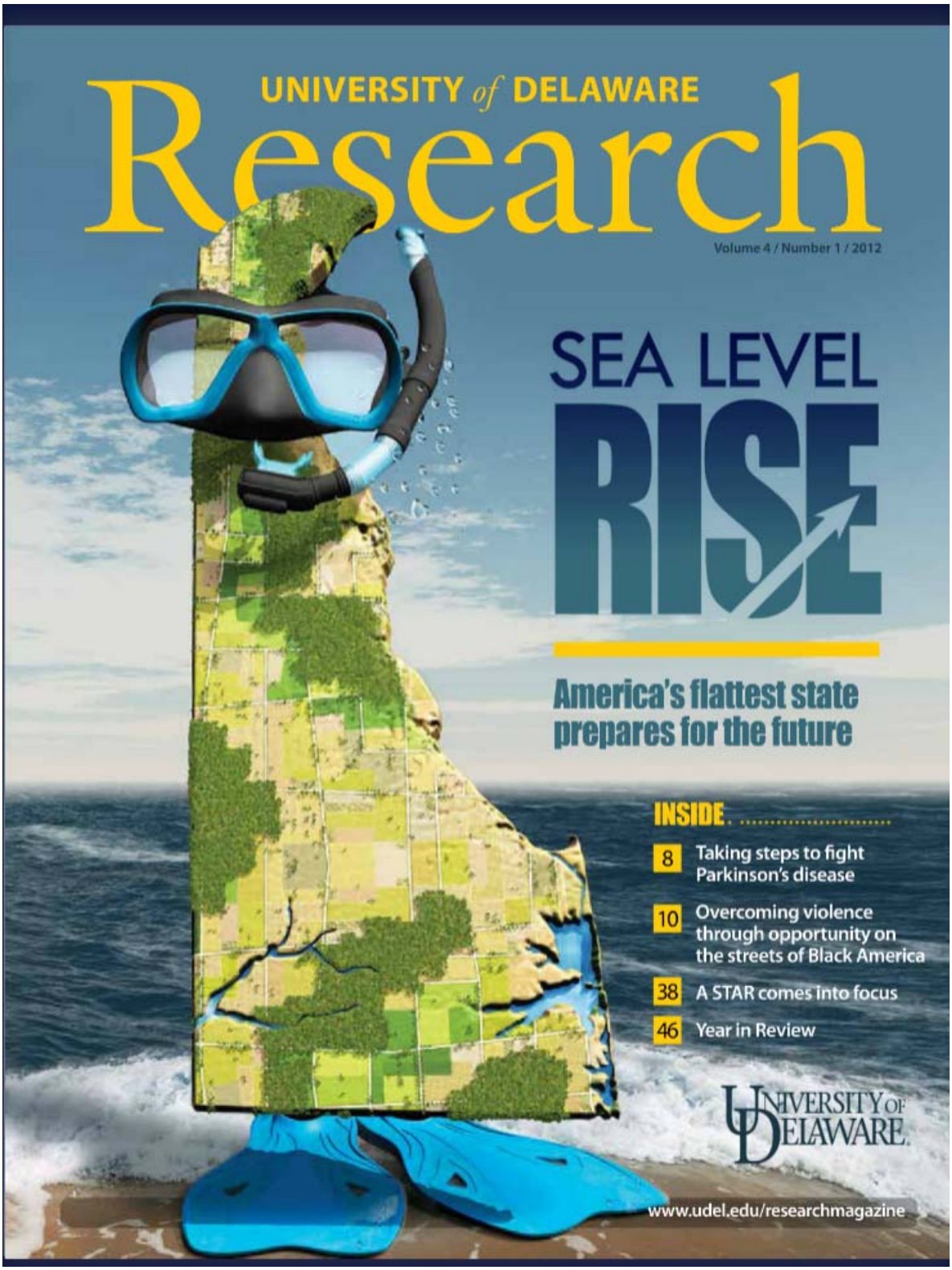
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SPECIAL SECTION

# SEA LEVEL RISE

## America's flattest state prepares for the future

Although the Delaware coast lost sizable swaths of sandy beach, and some homes were swamped, the state largely dodged a demon named Sandy in October, as the freak storm saved its hardest punches for the New Jersey and New York coasts.

Yet the superstorm's path of destruction along the East Coast has raised new questions and concerns about climate change, extreme weather, rising seas and what may lie ahead—a "new normal"—as UD's Gerald Kauffman refers to it.

### RISING CONCERNS

**By the end of this century, 8 to 11 percent of Delaware could be underwater based on the state's sea level rise planning scenarios of 0.5 meters (1.6 feet) and 1.5 meters (4.9 feet), respectively.**

SOURCE: Delaware Department of Natural Resources and Environmental Control

### DELAWARE AT A GLANCE

**1ST**

Delaware is called the "First State" for being the first to ratify the Constitution, but it also ranks "first in flatness." Delaware has the lowest mean elevation of all the U.S. states, at 60 feet. Its elevation ranges from sea level at the ocean beaches to nearly 448 feet above sea level on Ebright Road, near the Pennsylvania state line.

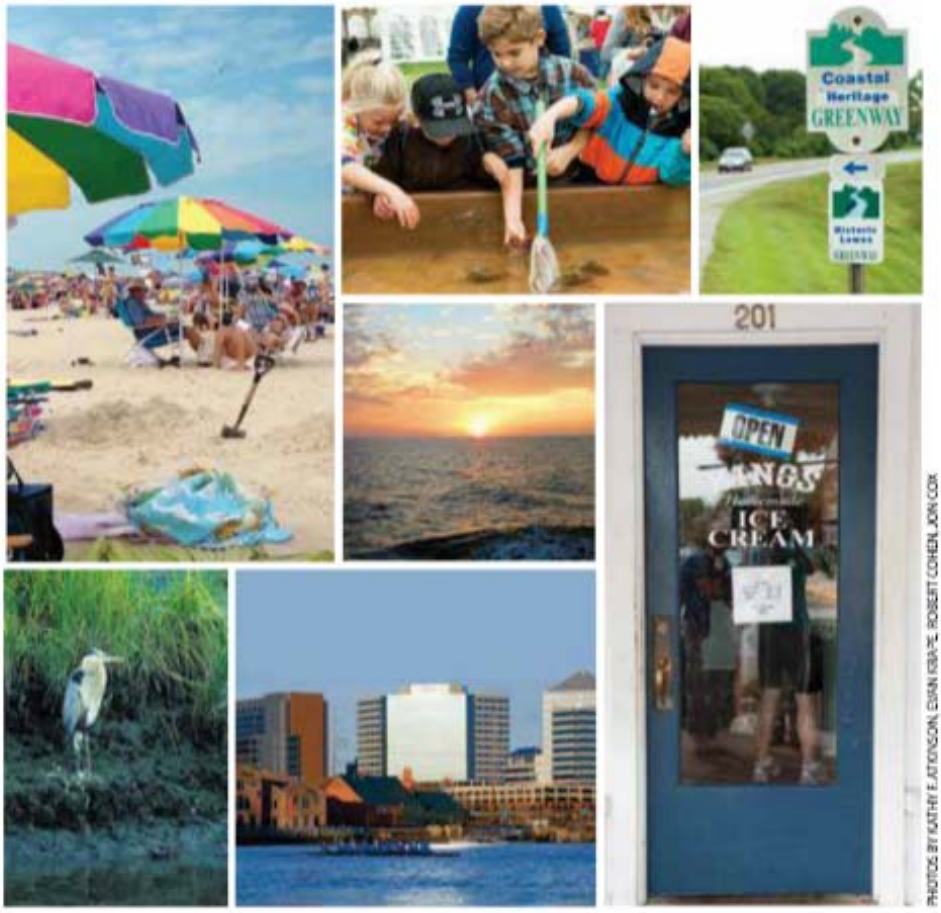
**2ND**

Delaware ranks as the second smallest state in size, with a total area of 1,982 square miles. The state is 96 miles long and ranges from 9 to 35 miles wide.

**Hotspot**

Delaware lies within a sea level rise "hotspot" where sea levels could rise faster and higher than elsewhere due to a combination of rising seas and sinking land. Sea level rise at Bowers Beach, Del., is climbing at a rate faster than anywhere else on the Atlantic coast.

**SOURCES:** *Delaware Department of Natural Resources and Environmental Control, Delaware Geological Survey, U.S. Geological Survey*




PHOTOS BY KATHY F. ATKINSON, EVAN KRAPE, ROBERT COHEN, JON COX

## A "new normal"

Is Hurricane Sandy the latest harbinger of climate change? Scientists point out that it is nearly impossible to associate a single meteorological event to climate change.

But what scientists do know, says Kauffman, who directs the Water Resources Agency at UD, is that sea levels have risen about 13 inches along the Delaware coast in the past century and continue to rise. The East Coast is a world hotspot for rising sea levels, and higher seas will only compound the impacts of future storms.

Kauffman is among several UD representatives who serve on the Climate Change Vulnerability Steering Committee convened by the Delaware Department of Natural Resources and Environmental Control (DNREC). Other UD faculty are on a state committee that has assessed Delaware's vulnerability to sea level rise. That assessment, released by DNREC in September, will guide adaptation strategies.

Delaware, the lowest state in elevation in the U.S., is standing tall in preparing for sea level rise. According to the state's vulnerability assessment, 8 to 11 percent of Delaware could be underwater by 2100. Those percentages are based on sea level rise scenarios ranging from the conservative to the more aggressive, of 0.5 to 1.5 meters (1.6 to 4.9 feet), respectively. In either scenario, at stake would be acres of beach and marsh and thousands of homes in communities that give the state its character.

"Delaware has been the envy of other states for mobilizing to identify the risks and plan for the future," Kauffman says.

"Sea level rise will affect everyone—not just communities preparing for storms," he warns. "It will affect what we pay in taxes, where and how we build our homes and highways, the places we work, our food and water, the wildlife around us and the recreation services we enjoy."

What research is UD bringing to bear on such issues? Read on.

SEA LEVEL RISE
HUMAN IMPACTS

# Preparing for a "new normal"

*by Tracey Bryant*

When you live in the flattest U.S. state, in a "geological hotspot" that's sinking, where the sea has already risen a little over a foot in the past century and is predicted to keep on rising, "it loads the dice when storms occur," says Gerald Kauffman.

Kauffman, director of the Water Resources Agency, and associate scientist Andrew Homsey, both based at UD's Institute for Public Administration, recently published a report on the 331 square miles, or 17 percent of Delaware's land mass, that lies within the 100-year floodplain.

Based on recent FEMA flood insurance studies and other data, they found that more than 18,000 structures exist in this area:

- 2,431 in New Castle County,
- 1,853 in Kent County and
- 13,760 in Sussex County.

The watersheds with the most structures in the 100-year floodplain include the Christina River in New Castle County (1,007 structures); St. Jones River in Kent County (567 structures); and Indian River Bay in Sussex County (3,856 structures).

Also, approximately 621 road miles lie in this floodplain:

- 128 miles in New Castle County,
- 75 miles in Kent County and
- 418 miles in Sussex County.

Watersheds with the most road miles in the floodplain include the Christina River in New Castle County (44 miles), the Murderkill in Kent County (16 miles) and Indian River Bay (106 miles) in Sussex.

With sea level rise comes increased flood risks to residents living in these areas. After massive flooding of the Glenville subdivision along Red Clay Creek near Stanton, from Tropical Storm Henri in 2003, state and local government bought out the homes, and the community was abandoned.

For public safety in the face of sea level rise, Kauffman, who is a member of the state's Climate Change Vulnerability Steering Committee, advises strengthening building codes by instituting new permissible standards moving up from the 100- to 500-year floodplain, as well as beefing up the size and height requirements for infrastructure such as roads, dams and bridges.

Kauffman points out that climate change and rising seas already are affecting the ebb and flow of daily life in Delaware, toward a "new normal."

"School districts are reconfiguring their bus routes for portions of Route 9 that typically flood during a storm," he says. "People call us about how much warmer their drinking water is in summer, and blue crabs have been as far north as Delaware racetrack."

WEB EXTRA

Find out where you live in Delaware's floodplain on the Water Resource Agency's interactive map.

KATHY F. ATKINSON

***Gerald Kauffman,** director of the Water Resources Agency at UD, prepares to measure the height of the water surface in White Clay Creek near Newark.*