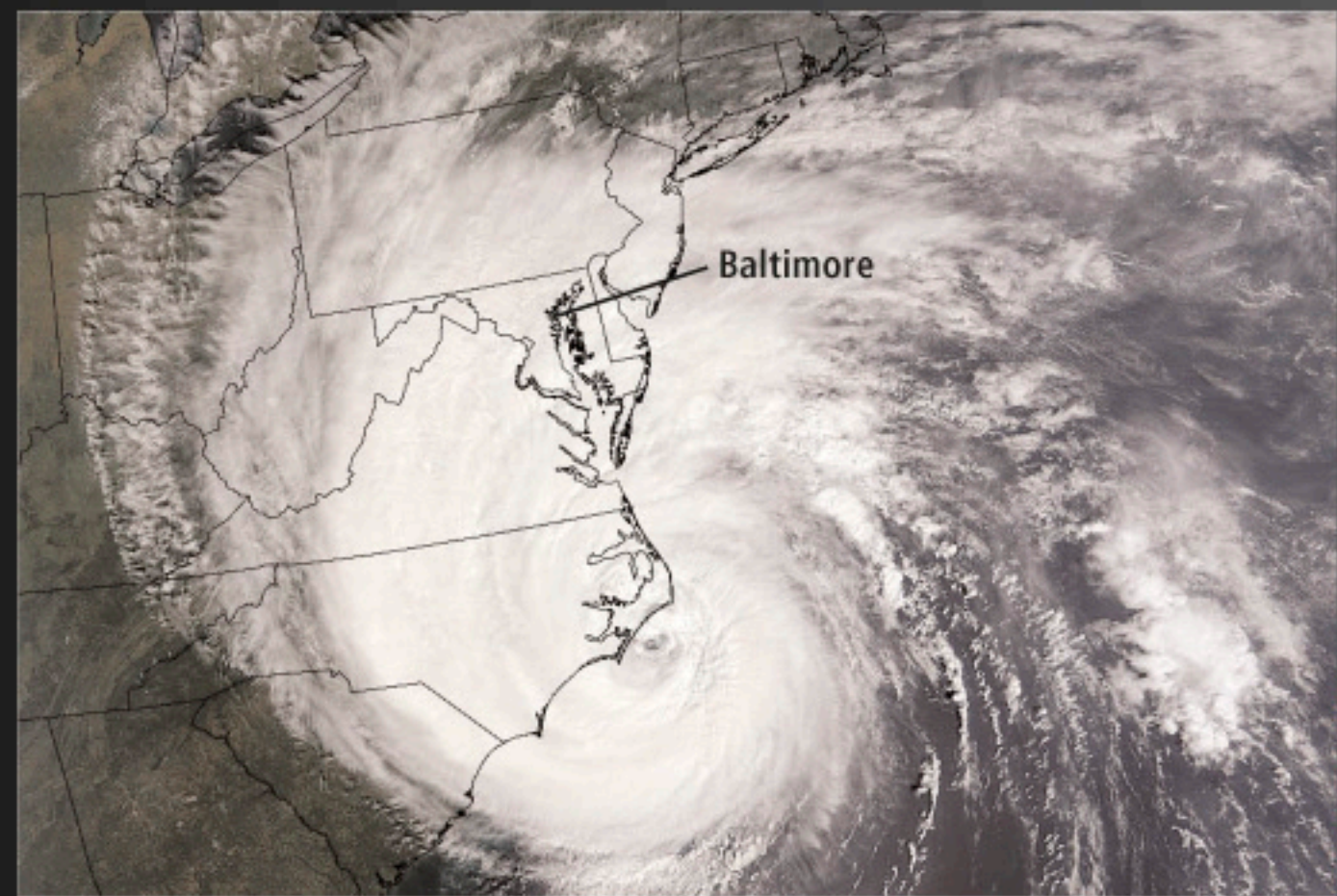


On Thursday, September 18, 2003

Hurricane Isabel,

a massive Category-2 storm, slammed into the east coast.



With its eye located just south of the Chesapeake Bay, Isabel's high winds and tidal surge caused widespread flooding, property damage and power outages from North Carolina to New York.

Downgraded to a tropical storm by the time it hit the Chesapeake, Isabel's winds nevertheless drove water and waves up the Bay, inundating roads, homes and businesses. The impact of the storm caught everyone—even many experts—by surprise.

Why did Isabel cause more damage than the typical tropical storm? Rising sea levels may be partly to blame. In the Chesapeake Bay, the rate of sea level rise is nearly twice the global average. If this continues, the region—already prone to coastal hazards, especially flooding and erosion—may become more and more vulnerable to storms like Isabel.

Hurricanes, tropical storms, nor'easters, floods and storm surges are natural events. They become disasters only when people, property and resources are put at risk.

If Isabel left devastation in its wake, the storm also taught us valuable lessons about how to prepare for these events—and where and how to build along the coast. In addition, Hurricane Isabel reminded us that our rapidly changing shores and waters demand that we act now to be ready for what risks the future might bring.



BALTIMORE

Fell's Point

RAIN & TIDE



Police on patrol, Inner Harbor



S. Ann and Thames Streets, Fell's Point



Cleanup, S. Ann Street



Eyewitness

Wes Robison, General Manager, Henderson's Wharf (former B&O Railroad tobacco warehouse built c.1890) Fell's Point

"THE REAL ADVENTURE started around 1:30 in the morning. The water outside was rising but everyone kept thinking, *this will pass, wait for high tide to recede.* By 2:30 a.m., however, we had 6 inches of water inside, by 3:30 we had 8 inches, by 4 in the morning we had 10 inches.

As it became obvious that the water was not going to recede, we moved all of our Inn guests upstairs, turned off the main power to the building and just waited it out. The storm became so intense that you did not want to go outside. And the water continued to rise, reaching two and a half to three feet around noon the next day.

It was about 10:30 the next morning when we began to evacuate people. Some left on foot through knee-deep water, others were taken out by boat. There was a woman staying with us whose daughter was scheduled to undergo serious surgery at Hopkins, so she was one of the first to go.

At about 3:30, the water suddenly began to recede. It took less than an hour for it to empty from the building and the streets. It truly was like you pulled the plug on a bathtub.

At the end of the day the repairs cost us about \$4.3 million. The entire first floor was stripped down to the concrete, the drywall was cut out up to about four feet, and we threw away virtually all the contents of the first floor. But we managed to make lemonade out of this particular lemon: During the renovation we added a significant number of



"The whole promenade along the building was lifting, and as it did, it was popping shutters off the wall."

upgrades that we probably wouldn't have otherwise done.

You can't raise the elevation of this building—we're still at six-foot six-inches. If we have a similar event (hopefully not for another hundred years), we're going to have a similar amount of damage, because there's really nothing you can do to stop that amount of water.

It was definitely more difficult for the individuals in Fell's Point who were affected than it was for businesses like ours.

Probably the saddest moment during the following couple of days was when people with basement apartments on Thames Street were putting their ruined belongings out on the street. People were coming around, going through their trash—and I saw a poor woman hollering at somebody, 'Leave that alone! That's my trash, that's my trash! You can't have that!'"



Fell Street

"I remember the weird, sickening sound of car alarms through the night—and then the muffled sound of the horns underwater."

— Denise Whitman, Associate Director, The Preservation Society, Fell's Point



Inner Harbor

When heavy rains and a wind-driven tide combine forces, the coastline—already vulnerable to the effects of sea level rise—takes the punch. Timing and terrain can make all the difference between minor damage and disaster.

During a hurricane, tropical storm or nor'easter, low pressure

and high winds swirling around the eye create a large, wide dome of water, or *storm surge*, topped by wind-whipped waves.

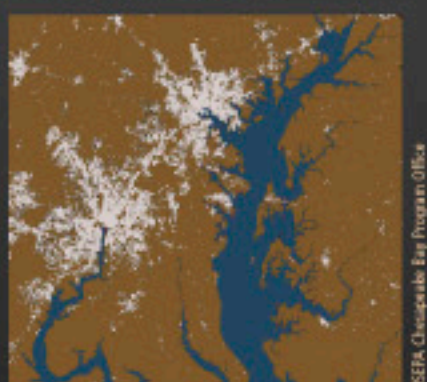
The surge combines with the normal tide, producing an elevated *storm tide*. If the surge comes at high tide, the greater the likelihood of severe coastal flooding.

Exposed lowlands covered with impervious (hard) surfaces are especially susceptible to flooding. Forests and farmland absorb rainfall, which then flows slowly through underground channels into streams. Developed areas, however, with "hardened" coastline—roads, sidewalks, buildings, rooftops and parking lots—prevent rain from soaking into the ground.

These hard surfaces shed water quickly. With nowhere to go, it backs up into streets, structures and sewers. Runoff—along with accumulated waste, pollutants and other debris—rushes directly into nearby waterways, eroding banks and streambeds and smothering aquatic life.

Between 1990 and 2000, impervious surfaces around the Chesapeake watershed increased by nearly 41 percent, or about 250,000 acres, with a concentration near the Bay. (Imagine covering an area more than twice the size of Shenandoah National Park with blacktop and shingles.)

At this rate, 1.1 million acres of hard surface will cover the Bay region by 2010—unless we plan now to identify potential hazards and limit harmful development. Only through sound land use and growth management will the Chesapeake's land, waters and people be less vulnerable to the inevitable forces of rain and tides.



Impervious surface, a growing threat to the Bay

Financial assistance provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration (NOAA). A production of the Maryland Coastal Zone Management Program, Department of Natural Resources pursuant to NOAA Award No. NA17OZ2337.

