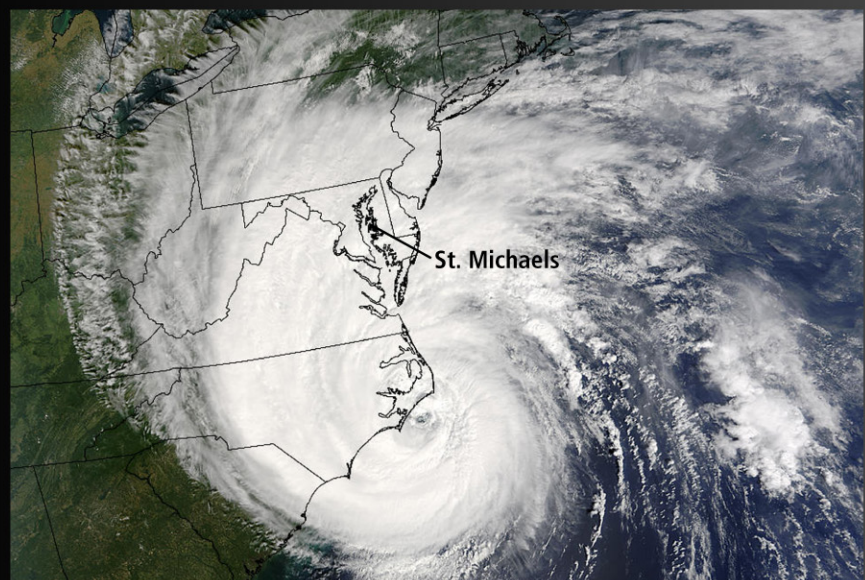


On Thursday, September 18, 2003

Hurricane Isabel,

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



ST. MICHAELS

Chesapeake Bay Maritime Museum

SEA LEVEL RISE

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 even 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.



Skipjack, Chesapeake Bay Maritime Museum

"Water's got a lot of force. People don't think how much force it's got. It's got a lot!"



Son David North surfing on debris

"Hazel came maybe four inches above dock level. This was four feet! Hazel had higher winds, but not nearly the height of water."



Museum shop

"I'd never seen the tide in the shop before, but it was in here this time—two foot deep!"



Eyewitness
Capt. Dink Daffin, Owner, Daffin Marine; and Volunteer, St. Michaels Volunteer Fire Department

"THEY COME BEATING ON MY DOOR about 5:30 in the morning, said we had a water rescue in Sherwood. We pulled the boat right to the house—the water was about four foot, five foot deep—and unloaded the dogs and the cats and the bird and the two people from the upstairs.

We come back to St. Michaels and the water was all the way up to Main Street in some places. And all the power boxes for the marina were underwater. You could see the smoke coming out of them. We rode by

and hollered up there to the guys, 'Don't go in the water 'cause everything's hot! Everything's still hot on the dock!'

When Agnes hit in '72, I remember the waves were running in the harbor real hard and breaking over the street, hitting us in the chest. But this time it didn't do that. The wind was just off enough that it didn't make the seas come in the harbor. It all depends where the hurricane's coming into the Bay—on the right side or left side."

Eyewitness
Judge John C. North II



"IT WAS AN ENORMOUSLY HIGH TIDE. I have lived here all my life and I've been through several hurricanes, but this was a tide of a totally different magnitude. We went to bed that night thinking that the worst was passed—and we woke up the next morning and the tide was over everything and the docks had disappeared. *Everything* was underwater.

The wind came from right out there, out of the southeast, across a four- or five-mile fetch, and it tore

one dock apart, leaving only the pilings and the cross members.

And the tide carved out a great hunk of land, about a 30-foot hunk. It came over our bulkhead, which was faced with riprap, and the water got behind the bulkhead and riprap and washed it all out, creating a great hollow here, and all that debris from the south dock filled up this hollow.

Ultimately, I took all the nails out of the broken bits and pieces, sorted them out as best I could, and nailed them back together and rebuilt that dock. We only had to use one or two new planks. And I'm not sure that they all came from us—I think we have some of the neighbors' docks as well in the mix."

Eyewitness
Mark Adams, Superintendent, Construction and Maintenance, Chesapeake Bay Maritime Museum



Mark Adams

"WE WERE TRYING TO FIGURE out the storm and we weren't getting a lot of information. They were talking about how fast it was and what the winds were, but they weren't talking about where it was going.

The only time was when they showed on TV the tracks of different storms. The storm of '33 and Hazel were close to the same track—and they were storms that really hurt this area. Their model showed Isabel

taking a similar track. And I said, if they flooded us so bad, why isn't this one gonna do it? That's when I decided I was gonna pull my boat and just get rid of that worry.

So if I ever see that track again, I'm gonna pay attention to it, 'cause '33 was the one that floated houses off the foundation on Hooper's Island. They had dredge boats in the woods and workboats everywhere. And Hazel was the same way. So that was the one thing I thought: that we were gonna get it."



Police rescue

Sea level in the Chesapeake Bay rose about one foot during the last century—but scientists predict a rise of two to three feet over the next 100 years. Why this increase in the rate of sea level rise?

Rising waters result from a combination of global climate change and local land subsidence, or sinking.

Current trends show that warming air and ocean temperatures result in the thermal expansion of seawater and an increase in water volume from melting glaciers and ice sheets.

During the last ice age, the weight of the glaciers just north of the Bay pushed the earth's crust down, causing the crust around the present-day Chesapeake to lift (think of a seesaw). As the glaciers retreated northward, this uplifted crust began to subside—and it continues to sink.

In addition, surface and underlying layers of soil, sand and clay compact over time, lowering the land. Higher water and lower land mean more coastal flooding, shoreline erosion and inundation of wetlands.

How does rising sea level affect coastal areas? The effects are dramatic and wide-ranging: Bay islands are disappearing, cliffs are eroding, low-lying farmlands are turning into wetlands, and wetlands to ponds. Saltwater intrusion is contaminating groundwater, while higher water tables mean problems for developers and property owners.

Sea level rise is inevitable. With a rate nearly double the global average, though, the Chesapeake will feel the effects more than other regions. Add to this ongoing development pressures along the coastline, and the potential for disaster increases.

While we can't stop sea level rise, experts are working hard to make coastal areas less vulnerable through education and changes in technology, data collection and policy.

