

THE GREAT NORTHEASTER OF 1962:

DELAWARE'S STORM OF THE CENTURY

("The 1962 Storm" Poster and
Educational brochure)

LOAN COPY ONLY

Delaware's The Great Northeaster of 1962: **STORM** *of the* **CENTURY**



Photo: Norman Kozlov



The coastal storm of record in Delaware struck on March 6-8, 1962. Never again have storm tides reached such high levels, and no storm since 1962 has resulted in as much destruction to life and property along Delaware Bay, the Inland Bays, or Delaware's Atlantic Coast.

100 Powerful Impacts of the Storm

Property Damage

The Great Storm of March 6-8, 1962, hit with little warning and without historic precedent. Lasting through five high tides and generating waves as high as 20-40 feet, this formidable force of nature pushed the Atlantic Ocean onto the Delaware coast with a fury. The onslaught of waves and tidal action weakened and undermined even the most permanent shoreline structures, resulting in structural damage and collapse.

Forty years ago, development along the Delaware coast was relatively sparse by today's standards. Beachfront cottages, many at ground level on concrete block foundations, were built without the expectancy of huge waves washing completely over barrier beaches. The unusually high wind-driven tides carried the breaking waves inland to reach buildings and structures that ordinarily would be beyond the reach of the surf. Boardwalks, houses, and other structures were destroyed on sites where they had been safe for 60-80 years.

Prior to March 1962, few individuals could have imagined the extent of damage and destruction resulting from flooding, undermining and toppling of shorefront properties and public facilities. In Delaware alone, private and public property



damage estimates exceeded \$70 million, personal property losses were estimated at \$20 million, and additional damages were incurred by the agricultural industry and others through disruption of electrical service and normal activities.

Beaches & Dunes

As storm waves swept over the beach and dunes, sand was moved from the ocean to the bays. Huge waves eroded the beaches, pounded the shore, and flattened the dunes, continuously battering coastal areas for three days. The length of the storm caused unprecedented destruction of the beaches and dunes. Sand that had been held in beach and dune systems surged landward with the encroaching storm surf. The storm washed vast quantities of sand inland, depositing sand on highways and in and around homes. In many cases, the deposits of sand averaged 3-4 feet in depth, and some deposits were as high as 6 feet. One of the first major efforts after the storm was to remove sand from roadways and yards so that normal functions could be resumed.



How much did it cost? (1982 dollars)

Public & private property damage:	~ \$60,000,000
Cost to repair beach & dune:	~ \$20,000,000
Personal property losses:	~ \$20,000,000

Widespread Devastation

What is remembered most about this storm is the tragic loss of life, the destruction of the homes and businesses, and roadways buried under tons and tons of sand. The magnitude and severity of the damage inflicted by the sea was accomplished by several forces: overwash and breakthrough, erosion and undermining, and tidal flooding.

Most of the oceanfront dune system from Cape Henlopen to the Maryland line was flattened. The most catastrophic damage resulted from the sea breaking over the dunes and through the barrier island, completely obliterating everything in its path: homes, utilities, roads, and vehicles.

Another type of damage was caused by the severe erosion and loss of beaches and protective dunes. As the beaches eroded, rows of houses were undermined and collapsed. The high tides and continuous pounding of the waves caused extensive flooding in communities, with water levels rising from 3 to 6 feet above street level.

Many communities along the Kent and Sussex shores of Delaware Bay from Pickering Beach to Lewes, reported floodwater depths exceeding 4.5 feet. Damages to beaches and dunes were extensive in these areas, and homes were washed away. Communities fronting the Inland Bays' shorelines suffered similar damages. Oak Orchard recorded 2-3 feet of floodwaters, with waves up to 4 feet rolling across Rehoboth Bay.



Photo: Norman Rossiter

Along the Atlantic Coast, the boardwalks in Bethany and Rehoboth were pulverized. Buildings that had fronted on the sea for over a half-century were demolished. A total of 1,932 homes sustained damage from widespread tidal flooding in Dewey Beach, Bethany Beach, and Fenwick Island. Wave action destroyed 28 of 29 oceanfront homes in Bethany, as well as every oceanfront home in South Bethany.

The ocean swept straight through to the bay in Dewey, South Bethany, and Fenwick, and the undeveloped lands in-between them suffered similar fates. Ocean waves carried sand and debris with them as they traveled down the streets and through yards. The state highway paralleling the shoreline was rendered impassable because of flooding, breaching, and deposited sand.

The cost of recovery was unlike anything the state had experienced before. Private property loss, much of it uninsured, and public infrastructure costs were at a record high. Additional costs of the storm include casualties suffered by power companies, telephone and telegraph companies, gas companies, water and sewage treatment companies, and the costs of debris removal, costs of combating health hazards, evacuation and relief to flood victims, losses to oyster grounds and clam beds, and policing to prevent looting.



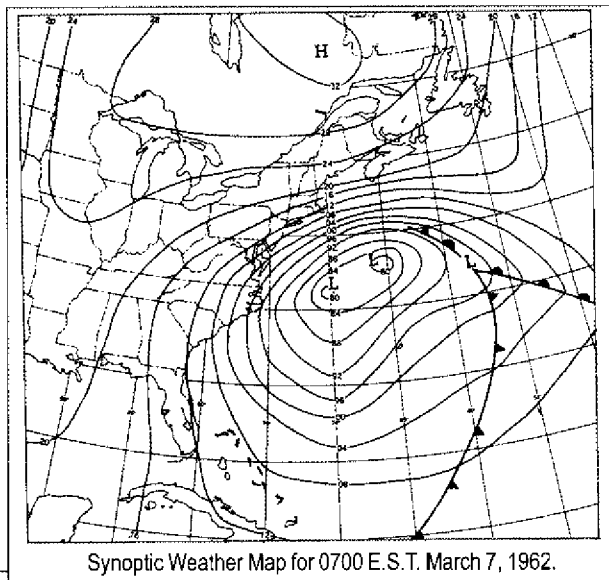
Comparing the 1992 and 1998 Northeasters with the 1962 Storm

Date	Duration of Northeaster	Tide Heights (maximum)	Wind Speeds	Wave Heights
March 6-8, 1962	3 days (5 high tides)	+9.49 ft	60 mph	30-40 ft (offshore)
January 4, 1992	1 day (1 high tide)	+9.02 ft	50 mph	20 ft (offshore)
January 27-29, 1998	3 days (4 high tides)	+8.95 ft	60 mph	25 ft (offshore)

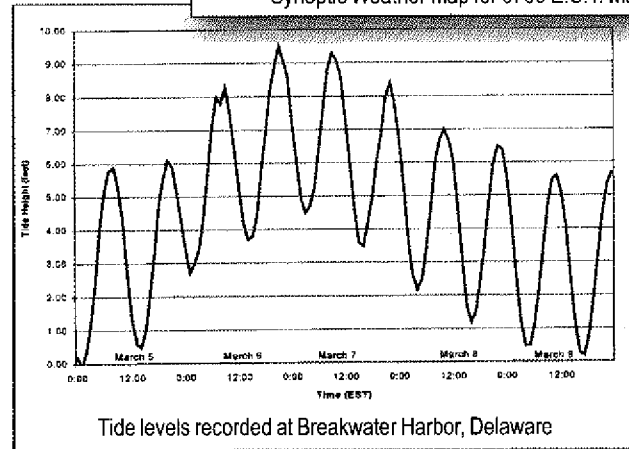
(Data from Delaware Geological Survey storm report summary)

A Rare Meteorological Event

The slow-moving late winter coastal storm of March 6-8, 1962, was unusual in its development, composition, and behavior. Two low-pressure systems formed off the U.S. East Coast, held in place by a high-pressure system that was stationary over eastern Canada. The high-pressure system stalled the forward movement of the coastal storm, resulting in the generation of record-setting winds, waves and tides. The funneling of wind between the Canadian high and the East Coast low produced winds of 60 miles per hour that blew across 1,000 miles of open North Atlantic waters before striking the Atlantic seaboard. At the time of the storm, there were no wave recording instruments in the ocean as there are today. Estimates of deep water waves off the Delaware coast were reported to be 40 feet in height, and waves intersecting the coast in the Delaware's surf zone reached heights estimated between 20 and 30 feet.



Synoptic Weather Map for 0700 E.S.T. March 7, 1962.



Tide levels recorded at Breakwater Harbor, Delaware

Tide data courtesy Delaware Geological Survey.

Steady winds of gale force (35-45 mph) from the northeast, with gusts up to 70 mph, resulted in a continuously elevated tidal water level (storm surge) of 3-5 feet above normal. The magnitude of the waves and tides produced by this rare meteorological event was further amplified because these tides were exceptionally high lunar (or spring) tides. In fact, the high tide on March 6, 1962, remains the highest ever recorded at Breakwater Harbor at the mouth of Delaware Bay.

The exceptionally high tides accompanying this storm occurred in many places for 4 to 5 successive high tides. The most damaging effects of this storm were likely due to the momentum and duration of high water and winds. The persistence of this storm generated exceptionally strong northeast winds and raised spring tides to record levels. The combination of high winds, waves, and tides created mountainous seas, which pounded savagely at Delaware's shore, changing the face of the coastline.



2002

What if a similar storm were to strike today?

Would we have the same problems now as we did then?

The answer is YES in some respects and NO in others. Probably the biggest concern is the increase in development and population along our coastline.

Threats to Property and Infrastructure

Although there are more housing units along Delaware coast now compared to 1962, it is important to remember that engineering knowledge, building construction practices, and building code implementation have all improved greatly during the last four decades. For example, minimum base flood elevation requirements have been established, and homes are no longer built on concrete block or slab foundations in flood zones.

Along the Atlantic Coast, these regulations and construction practices would reduce property damage from waves, tide, and current flow as well as minimize the impacts of still water flooding along Delaware Bay shore and Delaware's Inland Bays.

~ 68 housing units

~ 573 housing units



1968

1997

The Toll in Human Lives

Seven people in Delaware perished during the March 1962 storm. If that same storm occurred today, would lives still be at risk? The population along the coast has increased greatly in the 40 years since the storm, but today's residents are much more aware of the associated risks and better prepared for storms of this magnitude. Storm warning systems are far better than those of 1962, and structures are built to be much more resistant to storms.

The key is a sensible response by the public to warnings when they are issued. Also, it is important to recognize that communication channels and technology have continued to improve.

Coastal storms will always pose a threat to Delaware's communities along the ocean, bay, and tidal tributary shorelines. As recently as 1992 and 1998, severe northeasters wreaked havoc along the coast. Risk can be minimized through increased awareness, preparation, and preparedness.



THE 1962 STORM

Commemorating the 40th Anniversary of

Delaware's Coastal Storm of the Century



