

Hurricane Preparedness Briefing

Presented by

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New York, NY Office

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Who Are We?

- DOC - Department of Commerce
- NOAA – National Oceanic & Atmospheric Administration
- NWS – National Weather Service



NWS Mission

- Save Lives
- Minimize Property Damage
- Enhance the National Economy

Through the Issuance of Accurate and Timely Warnings, Advisories, Watches, and Outlooks

Local Service Area



Population: ~ 18.6 Million

Let's Talk Hurricanes!

- What is a hurricane?
- Have we had any?
- What are the major threats?
- What is the outlook for the coming season?

What is a Hurricane?

A hurricane is a tropical cyclone.

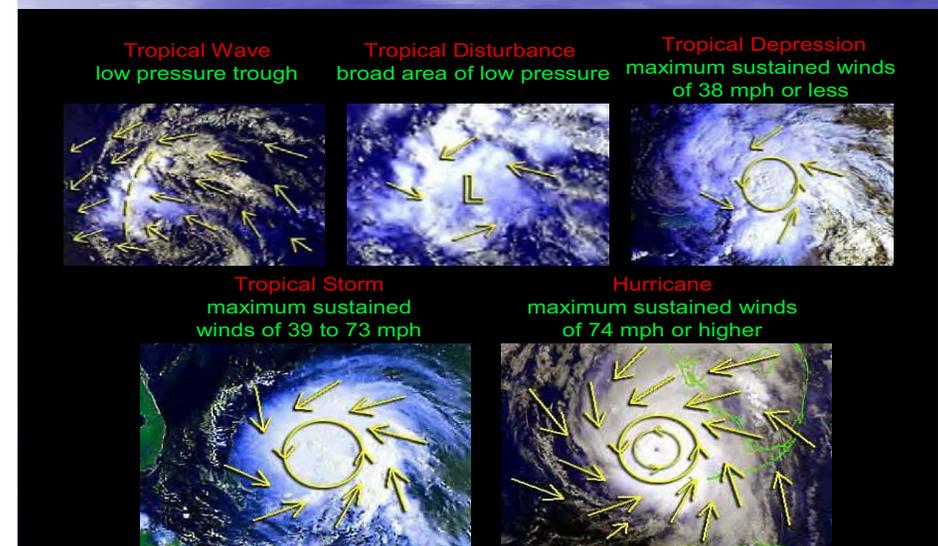
A cyclone is the general term for all circulating low pressure systems over tropical waters. In the Northern Hemisphere, cyclones circulate **counterclockwise**.



Necessary Ingredients

- **Warm Tropical Waters**
 - *Sea surface layer (top 46 m; 150 ft) temps above 27 degrees Celsius/80 degrees Fahrenheit*
- **Tropical Wave**
 - *Seedling storms for initiation*
- **High Pressure Aloft**
 - *Focuses thunderstorm development*
- **Weak Vertical Wind Shear**
 - *Allows deep/tall convection*

Hurricane Life Cycle



Fiercest Part of a Hurricane

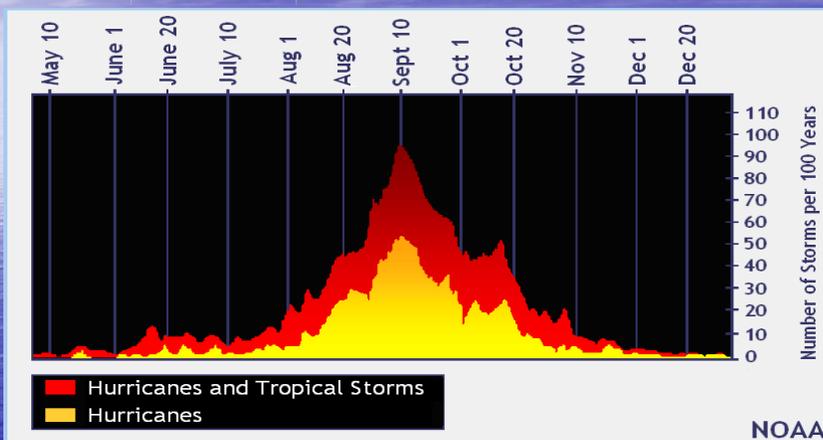


The fiercest and most dangerous part of a hurricane is in the 50 to 75 mile wide region surrounding the eye of the hurricane.

Saffir-Simpson Hurricane Intensity Scale

Scale	Sustained Winds(mph)	Damage	Examples
1	74-95	Minimal	Florence 1977 (LA) Charley 1986 (FL)
2	96-110	Moderate	Kate 1985 (FL Panhandle) Bob 1991 (RI) Frances 2004 (FL)
3	111-130	Extensive	Alicia 1983 (N TX) Emily 1993 (NC) Ivan 2004 (Gulf Coast) Jeanne 2004 (FL)
4	131-155	Extreme	Hugo 1989 (SC) Charley 2004 (FL)
5	>155	Catastrophic	Camille 1969 (LA/MS) Labor Day 1935 (FL Keys) Andrew 1992 (S FL)

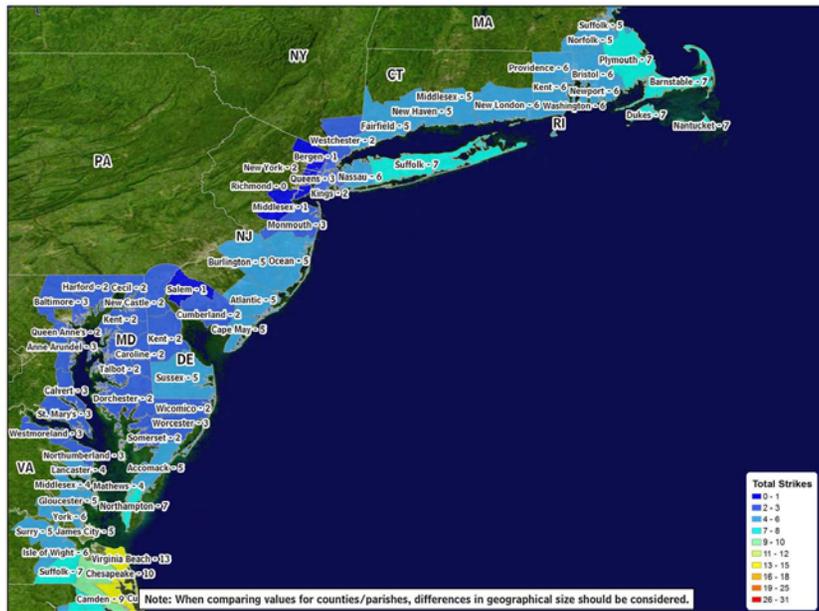
Atlantic Hurricane Season June 1 – November 30



Hurricane History

Data since 1949 in the Pacific, 1851 in the Atlantic

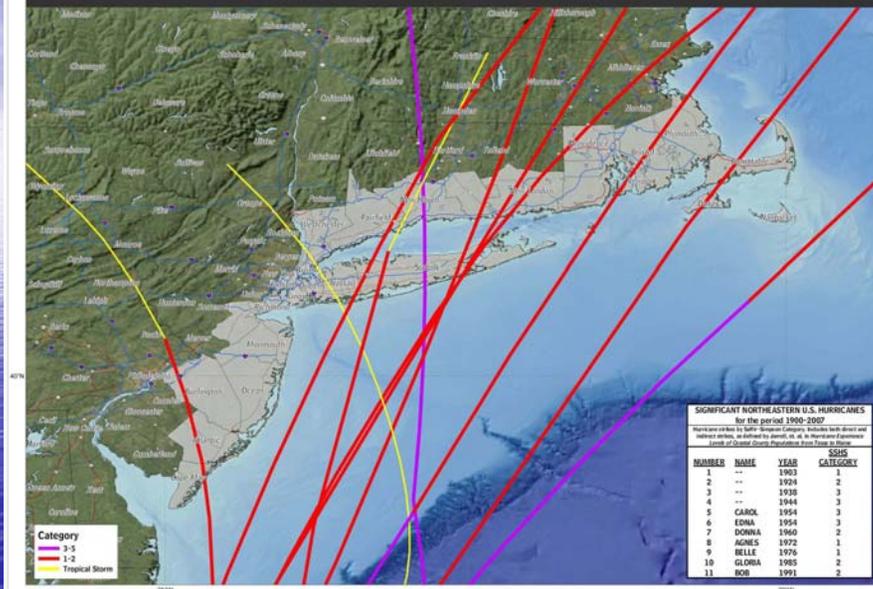




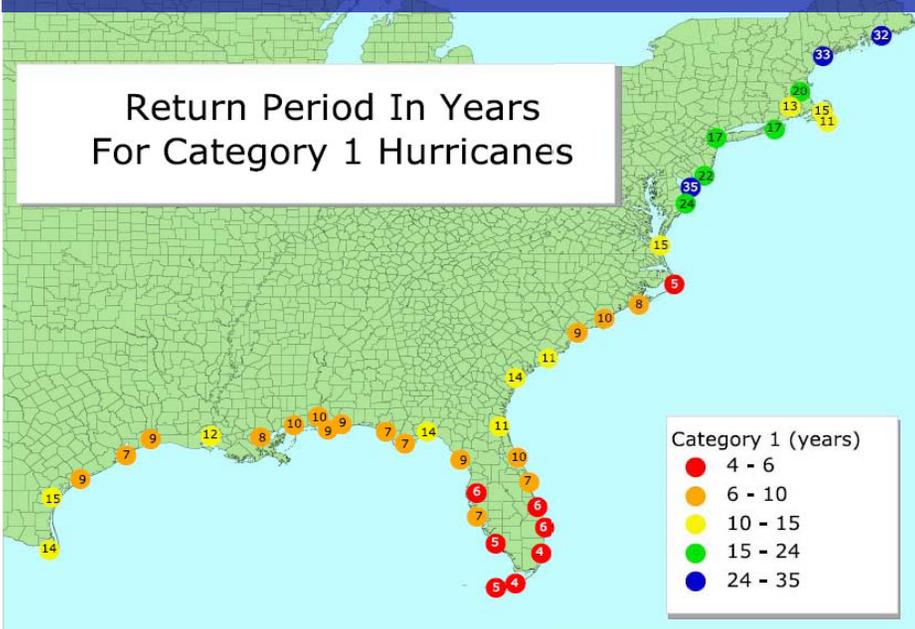
Total number of hurricane strikes by counties/parishes, 1900-2007

Data from NWS NHC 46: Hurricane Experience Levels of Coastal County Populations from Texas to Maine. Jerry D. Jarrell, Paul J. Hebert, and Max Mayfield. August, 1992, with updates.

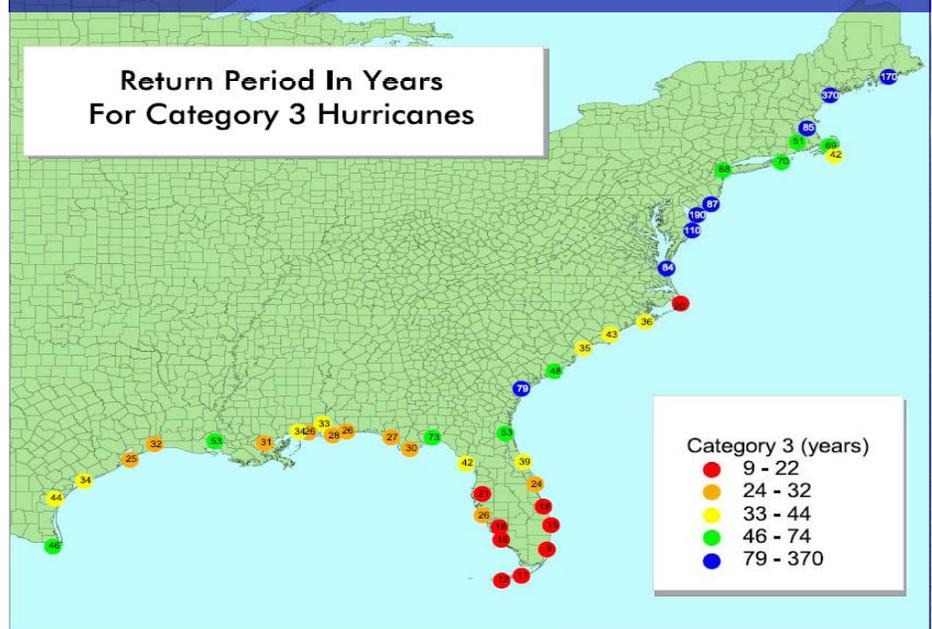
Significant Northeastern U.S. Hurricanes, 1900-2007



United States Hurricane Return Periods



United States Hurricane Return Periods



Climatology

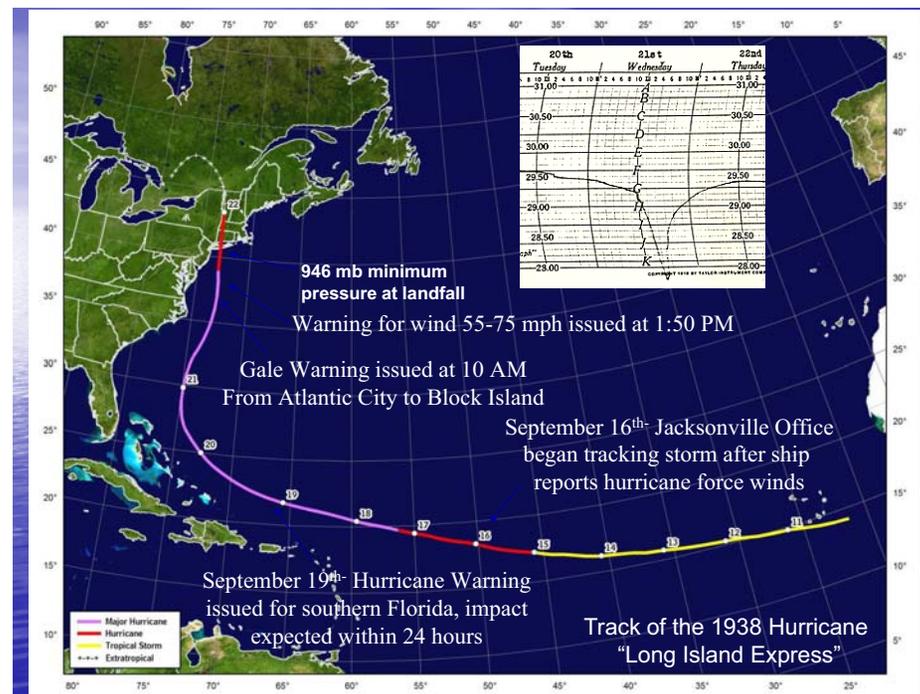
- Impacted by Tropical Storm every 4 years and Hurricane every 17 years

- Average Track: NNE

- Average Speed: 30-35 mph

Hurricane approaching NC can reach the NJ/NY Coast in LESS THAN 10 hours!

Remember Gloria?



What Happened in NYC?

- Highest **wind gusts**:

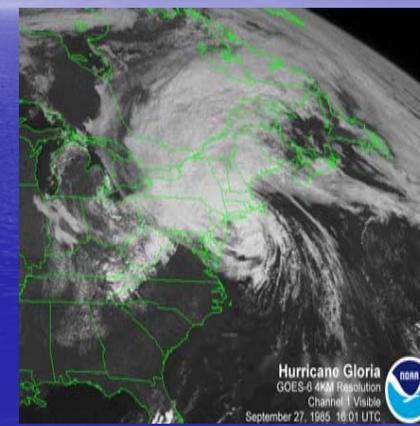
Central Park – 60 MPH (@30 ft)

Daily News Bldg – 90 MPH (@500 ft)

Empire State Bldg – est. 120 mph (@1250 ft)

Battery – 80 mph and sustained @70 mph (@30 ft)

Hurricane Gloria Sep 27, 1985



Hurricane **Watch/Warning** Issued by National Hurricane Center

- **Watch** – Issued when there is a **CHANCE** that wind speeds will reach at least 74 mph within 48 hours; starting point for many precautionary actions, including evacuations
- **Warning** – Issued when hurricane force winds are **LIKELY** within 36 hours; evacuations and final preparations are underway

Hurricane Hazards

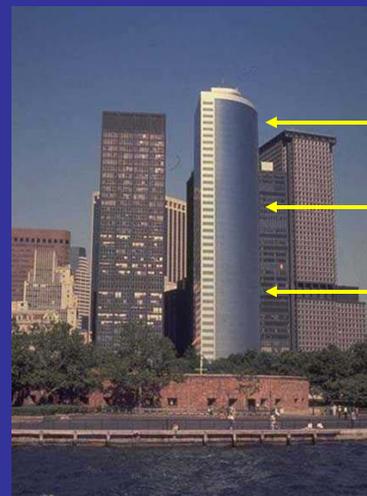
- **Highest Winds** – Area to right of Storm Track
- **Tornadoes** – Area to right of Storm Track
- **Highest Storm Surges** – Area to N and right of Storm Track
- **Flooding Rains** – Area to left of Storm Track

Metro New York Hurricane Transportation Study *Key Findings*



Extreme winds associated with an approaching hurricane will have major impacts on the operation of high-level bridges and high-rise buildings

Impact of Hurricane Wind Pressures at Various Altitudes



100% GREATER AT 350 FEET

70% GREATER AT 200 FEET

50% GREATER AT 140 FEET

High-Rise Buildings at The Battery

Source:

“Minimum Design Loads for
Buildings and Other Structures”
ASCE 7-88, July 1990



Hurricane Wilma – the next day!

Hurricane Categories and Estimated Electric System Damage and Restoration Time

Storm Type	Winds (miles per hour)	Estimated Outages (thousand)	Estimated Restoration (days)
Tropical	39 to 73	100 to 250	1 to 3
Cat-1 Hurricane	74 to 95	250 to 500	3 to 6
Cat-2 Hurricane	96 to 110	500 to 750	10 to 15
Cat-3 Hurricane	111 to 130	750 to 1,000	15 to 30
Cat-4 Hurricane	131 to 155	1,000 plus	30 plus

Flooding

- ◆ Tropical cyclones produce on average 6 to 12 inches of rain
- ◆ Inland flooding is a major cause of tropical cyclone-related fatalities over the past 30 years
- ◆ The risk from flooding depends on a number of factors:
 - Storm speed
 - Storm interactions with other weather systems
 - Terrain
 - Ground saturation



Hurricane Floyd

Of the 56 people who perished, 50 drowned due to inland flooding

Total Precipitation (inches) from Hurricane Floyd
September 13 - 17, 1999

Isohyets drawn for 1, 2, 4, 6, 12, & 18 inches

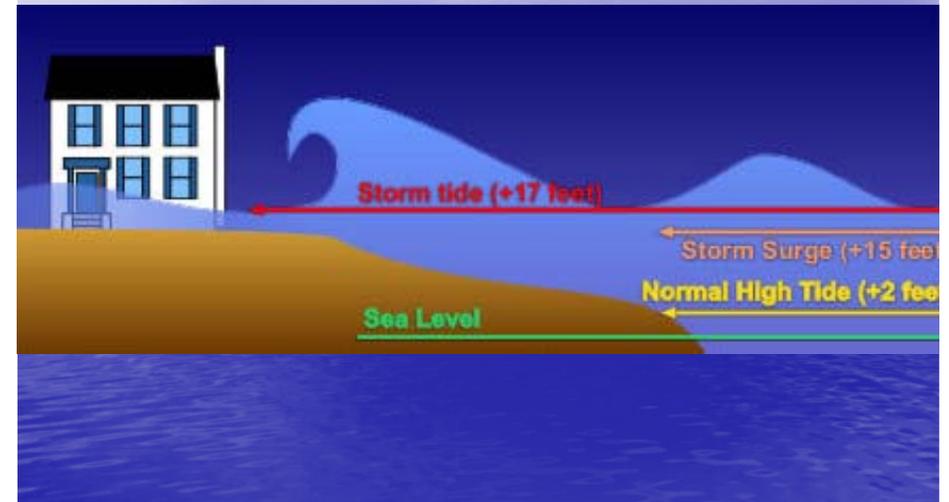
CLIMATE PREDICTION CENTER

Based on reports from the River Forecast Centers, regional Weather Service Forecast Offices, the SCAN network, and the WyoData Center.

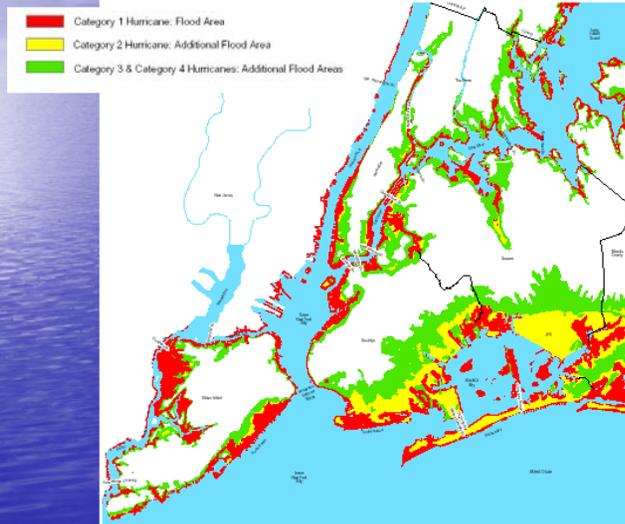
Storm Surge

- It is the abnormal rise in water caused by the wind and pressure forces of a hurricane.
- Through history this had been the greatest hazard from the hurricane and has been the greatest cause of fatalities, although this is changing.

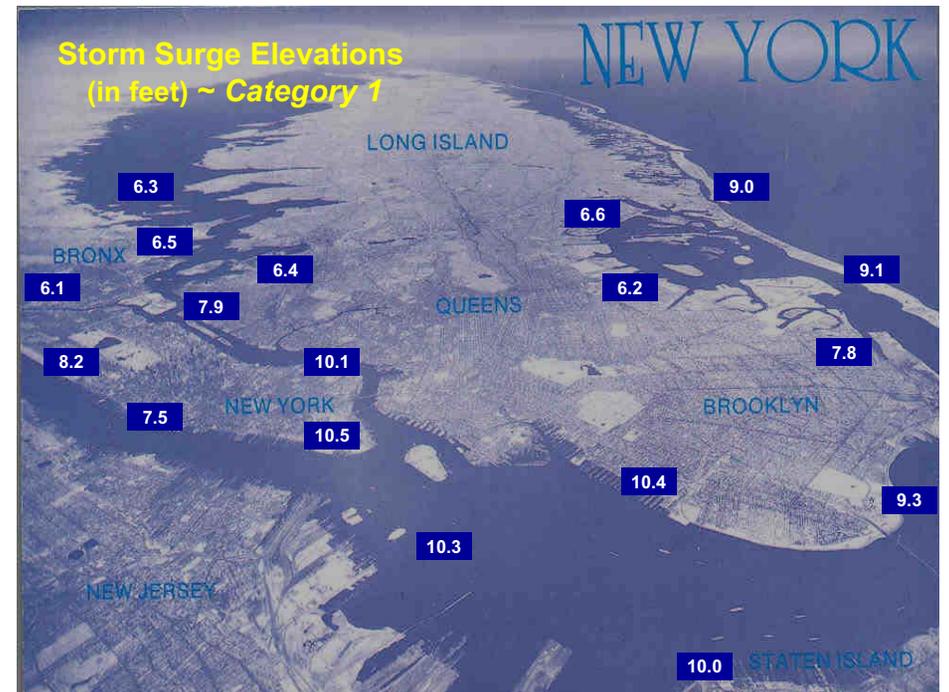
Tropical Cyclone Storm Surge

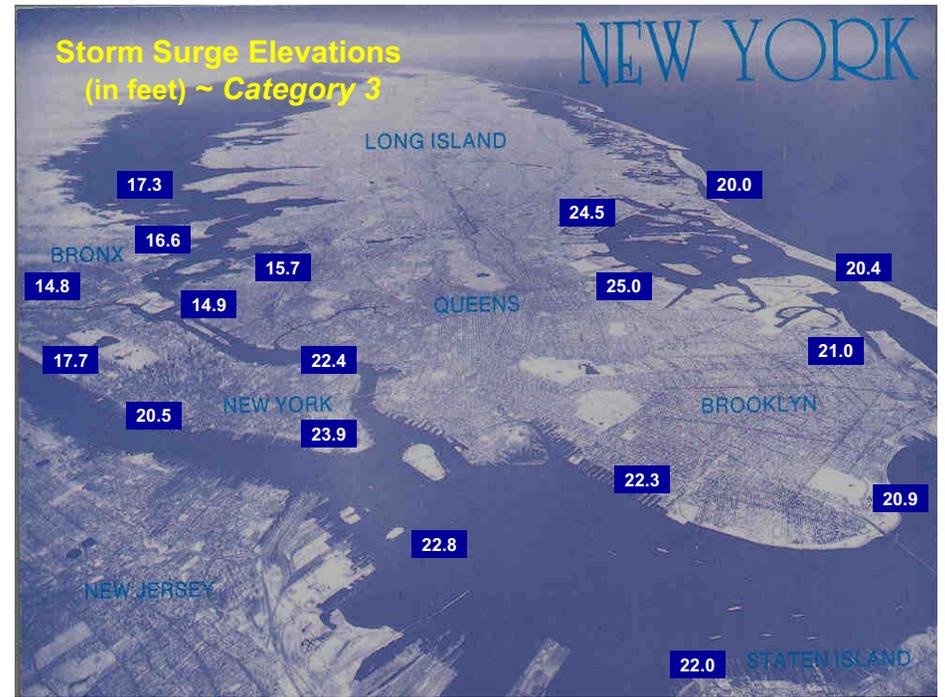
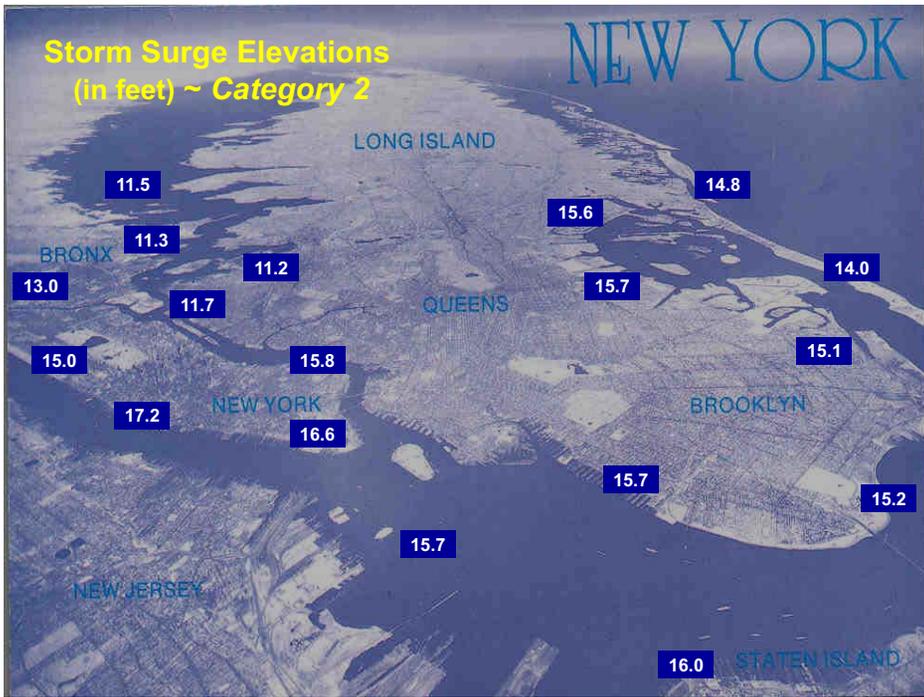


All Five Boroughs Vulnerable to Storm Surge



Storm Surge Elevations (in feet) ~ Category 1







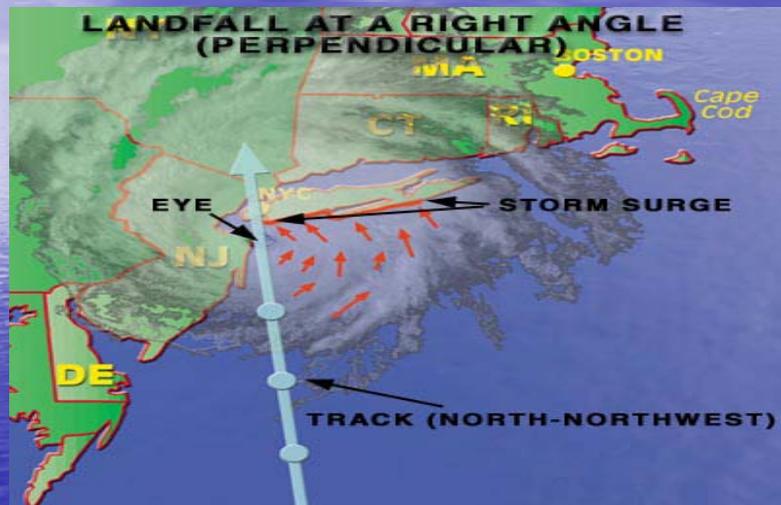
Similar to the underground rail and transit systems, several of the City's underground roadway tunnels are also extremely susceptible to storm surge inundation



Critical Elevations:

Manhattan Entrance	8.6 feet (NGVD)
Manhattan Blower Building Floor	13.6 feet (NGVD)
Governor's Island Blower Building Floor	12.6 feet (NGVD)
Brooklyn Toll Plaza @ Hamilton Avenue	11.6 feet (NGVD)

Worst Case Scenario



NWS New York, NY Service...

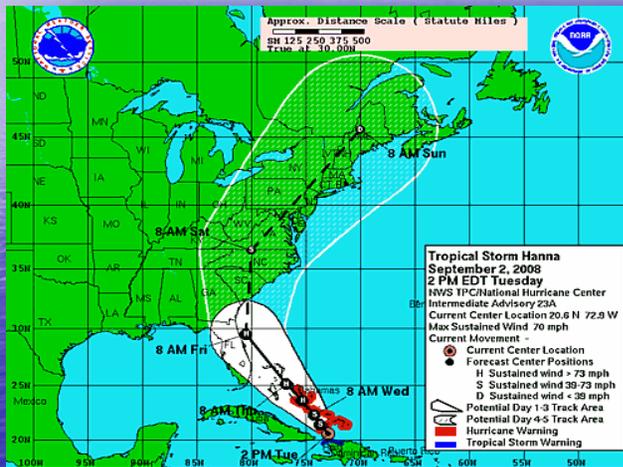
- Provide Warnings, Watches, Advisories, Observations, and all other "LOCAL" Info

...Before the Storm...

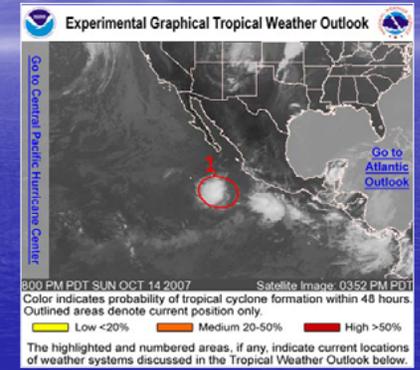
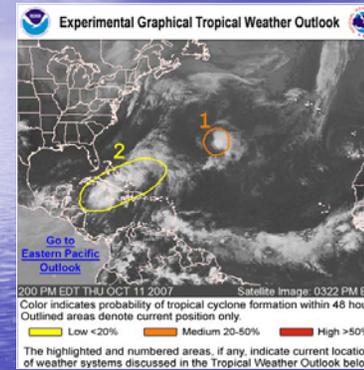
- Coastal Flood Watches and Warnings
- Flood Watches and Warnings
- Severe Thunderstorm/Tornado Warnings
- Special Marine Warnings

- Brief Emergency Managers

NHC Graphic Product Forecast Error Cone Tropical Storm Hanna 9/6-7/08



Graphical Tropical Weather Outlook



- GTWO issued 4-times daily
- New issuance times for both text and graphical products
- Atlantic text and graphical TWO issuance times will be 2 am, 8 am, 2 pm, 8 pm EDT which becomes one hour earlier during EST.

Monitoring the Storm NWS New York, NY Services...

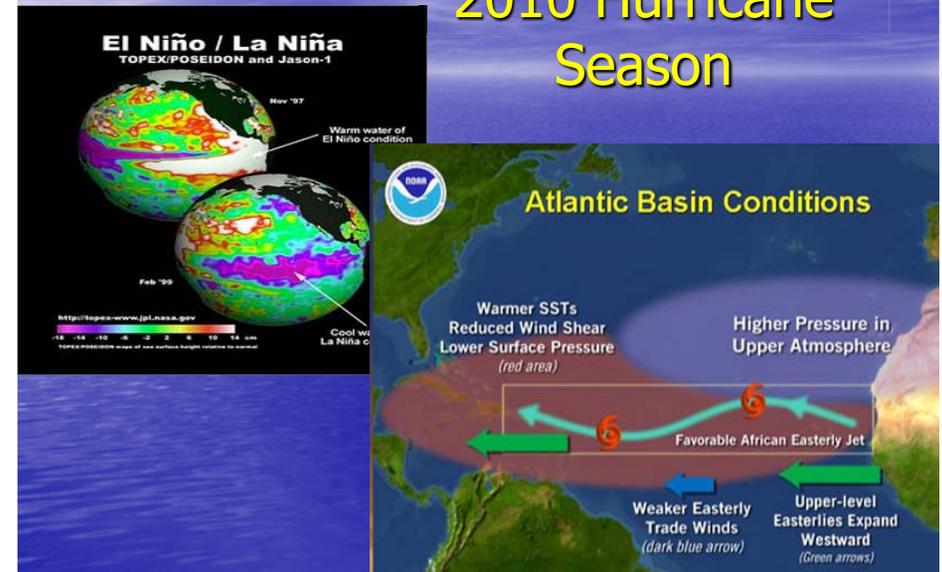
- The Web – <http://www.weather.gov/nyc>
- Hurricane Local Statement (HLS)
- **New Web Graphic Hurricane Local Statement**
- Separate Conference Calls with Emergency Managers

...But, you ask,
will 2010
be a busy season? ...

Hurricane Seasonal Forecasts by NOAA's Climate Prediction Center

- Provides GENERAL information on the number and intensity of tropical cyclones
- SPECIFIC track forecasts UNAVAILABLE
- NORMAL is 11 Tropical Storms, 6 Hurricanes, and 2 Major Hurricanes

Factors affecting the 2010 Hurricane Season



Factors affecting the 2010 Hurricane Season

- El Nino is waning... trending to La Nina
- Improving conditions in the Atlantic basin

Numbers are NOT Important!

- It only takes ONE Hurricane to make it a BIG Season
- PREPARE!
PREPARE!
PREPARE!

