Hurricane Season

June 1 – November 30
What’s the concern?

All tropical systems passing within 125nm of central Maryland since 1950
Mid-Atlantic Hurricanes

Greatest Risk: August 15 to October 15

However...

- June (Agnes 1972)
- July (Bertha 1996)
- November (Gordon 1994)
Hurricane

• Meaning?

• First thing most think of is *WIND*
  • *One of the biggest problems for safety*

• Dates to Spanish exploration of the Americas.
  • Caribbean word for “God of the *Storm*”

* A *storm* has SEVERAL threats!
The 4 Threats

• Inland Flooding
• Tidal Flooding
• Winds \(<-\) Saffir-Simpson Wind Scale
• Tornadoes

* Each storm has its own mix of these 4 threats

* YOUR threats will depend on this AND where you are
The 4 Threats

• Hurricane or Remnant, threats are same...
The 4 Threats

- Hurricane or Remnant, threats are same...

- **Flooding** from Torrential Rain
The 4 Threats

• Hurricane or Remnant, threats are same...

• Flooding from Torrential Rain

• **Tidal Flooding** from Surge
The 4 Threats

- Hurricane or Remnant, threats are same...
- Flooding from Torrential Rain
- Tidal Flooding from Surge
- Tornados
The 4 Threats

• Hurricane or Remnant, threats are same...

• Flooding from Torrential Rain

• Tidal Flooding from Surge

• Tornados

• Winds
The 4 Threats

- **Flooding** from Torrential Rain
  - Probably the most underrated threat, yet often biggest issue
  - 1-2 FEET of rain can fall
    - An average rainstorm is <1”
The 4 Threats

• **Flooding** from Torrential Rain

The biggest inland killer

*Often from:*
  • Driving into flooded areas
  • Kids playing w/ swollen streams
Flooding
The 4 Threats

- **Tidal Flooding** from Surge

The most deadly threat for:
- those along tidal shores
- watch track S or W of you

*Think of surge like a slower tsunami*
The 4 Threats

- **Tornados**

Many do not realize it, but hurricanes can produce tornado outbreaks upon landfall.

Affects targeted areas.
Remnants of Ivan produced the worst Mid Atlantic tornado outbreak (35 tornadoes) in recent history (Sept 17, 2004).

• Tornado production can occur for days after landfall

• Any time of day/night
The 4 Threats

- **Winds**
  - Typically one of the biggest threats near the landfall region
  - The main threat for mariners
  - Wind speeds usually decrease dramatically after landfall
  - Can have wind gusts above 200 mph
# High Winds

## Saffir-Simpson Wind Scale

<table>
<thead>
<tr>
<th>Category</th>
<th>Winds</th>
<th>Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tropical Depression</td>
<td>Less than 39 mph</td>
<td></td>
</tr>
<tr>
<td>Tropical Storm</td>
<td>39-73 mph</td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>74-95 mph</td>
<td>Minimal</td>
</tr>
<tr>
<td>Two</td>
<td>96-110 mph</td>
<td>Moderate</td>
</tr>
<tr>
<td>Three</td>
<td>111-130 mph</td>
<td>Major</td>
</tr>
<tr>
<td>Four</td>
<td>131-155 mph</td>
<td>Extensive</td>
</tr>
<tr>
<td>Five</td>
<td>Greater than 155 mph</td>
<td>Catastrophic</td>
</tr>
</tbody>
</table>

Most common for the Mid Atlantic

BUT since we get fewer, LESS wind causes MORE damage!
The 4 Threats

- Hurricane or Remnant, threats are same...
- Flooding from Torrential Rain
- Tidal Flooding from Surge
- Tornados
- Winds

Which one(s) will impact you & how bad?

Depends on:
* storm’s “personality”
* your particular area!
National Weather Service

_NWS National Hurricane Center_
Miami, FL
Forecasts the *track*
Forecasts the *intensity*
All tropical cyclones around North America!

_NWS Forecast Office_
Sterling, VA
Forecasts the *impacts*
Forecast the *threats*
For everyone in our local area

Building has 10-inch thick walls made from 3000 cubic yards of concrete, reinforced with 45 miles of steel reinforcing rods

We work together!
To decide where & when to issue WATCHES & WARNINGS
2015 Atlantic Hurricane Season Outlook

Named storms: 6 – 11
Hurricanes: 3 – 6
Major hurricanes: 0 – 2

Outlook probability

- Below-normal season 70%
- Near-normal 20%
- Above-normal 10%

Be prepared: Visit hurricanes.gov and follow @NWS and @NHC_Atlantic on Twitter

Averages are 12, 6, & 3
New for 2015 & Trends

• More
  • GIS
  • Range of Possibilities; Probabilities of ‘x’ happening
  • Not Just Weather, but Impacts
  • Graphics
  • Duration of Forecast
  • Mixed-Case Text From NHC

• Less
  • Focus on “it will follow this line, with this weather expected”
  • Text products
  • Static Images
Tropical Storm Andrea

Issued: 5 A.M. Fri 6/7/13

Reflects forecast at 5 A.M. Friday
Most updated forecast always at weather.gov
Impacts from Andrea
Baltimore/Washington Region

Threat Window (Fri morning – Fri night)

Issued: 9 A.M. Fri 6/7/13
NWS Baltimore/Washington

Range of Threat
Window of possibilities will narrow as we near event, with added detail

Most Likely Impacts

Heavy Rain (moving in this morning through midnight)
• Flash Flood Watch: E of the Blue Ridge/Catoctins 6 am - 10 pm
  * 2 - 4” E of the Blue Ridge/Catoctins (Heaviest I-95 and east)
    + Flooding likely in I-95 Corridor from Fredericksburg VA to Baltimore
  * 0.5 - 1.5” W of the Blue Ridge/Catoctins
• Heaviest Rainfall: 2 pm to 10 pm Friday

Gusty Winds for Calvert & St. Mary’s Co. MD
• Up to 35 mph Calvert & St. Mary’s Co. MD
  * 25 MPH or less Elsewhere
  * Gale Warning on Bay & Potomac Around Their Confluence

Minor Tidal Flooding
• Along Bay & for D.C./Alexandria (1-2’ surge thru eve)
  * Coastal Flood Advisory for A.M. Tide (D.C./Alexandria & N Bay)

High Impact Scenario
Western Track or Stronger Storm

Heavy Rain w/ flooding (Fri/Fri night):
  * 4-6” I-95 Corridor and East
  * 2-4” W of I-95 Corridor

Gusty winds (along Bay counties):
  * 40 mph gusts
  * A few downed trees/power lines

Isolated Tornado (S MD)

Gales on entire Bay

Tidal Flooding:
  * Moderate for Bay & Lwr Potomc (2-3’ surge)
  * Minor along mid/upr Potomac (1-2’ surge)

Low Impact Scenario
Eastern Track or Weaker Storm

Rain
  * 1-2” Blue Ridge and east
  * Less than 1” west of the Blue Ridge

Reflects forecast at 9 A.M. Friday
Most updated forecast always at weather.gov
New for 2015

- Communicating Storm Surge Danger:
  - Tidal waters rising up and taking low lying areas
  - Biggest killer for areas 15' above sea level and lower
New for 2015

**Communicating Storm Surge Danger:**

1) Storm Surge Watches & Warnings

- **Storm Surge Watch - Potential**
- **Storm Surge Warning - Expectation**
New for 2015

- Communicating Storm Surge Danger:
  - Previously:
    - Threat was talked about within Hurricane Warning
  - New for 2015:
    - Alerting public for the **most likely** area of life threatening storm surge with Storm Surge Watch & Warning

- Storm Surge Watch - Potential
- Storm Surge Warning - Expectation
Important Note:

- **Different area than Hurricane Watch/Warning area (wind)**

**Storm Surge Watch:**
Potential for life threatening surge

**Storm Surge Warning:**
Expect life threatening surge
New for 2015

- Communicating Storm Surge Danger:

2) Potential Storm Surge Flooding Map
New for 2015

- **Communicating Storm Surge Danger:**
  - Previously:
    - Threat described in text
  - **New for 2015:**
    - **Showing** people where flooding will reach
  - **Potential** Storm Surge Flooding
New for 2015

- Communicating Storm Surge Danger:
  - **Potential** Storm Surge Flooding
  - THIS
  - IS NOT
  - EXPECTED FLOODING
  - THIS IS
  - REASONABLE WORST CASE
New for 2015

- **Communicating Storm Surge Danger:**
  - **Potential** Storm Surge Flooding
  - **THIS IS**
  - **REASONABLE WORST CASE**
  - Begin with issuance of Hurricane/TS watches/warnings
  - **Best used by EMs for:** evacuation decisions who is at risk?
  - **Not to answer** “Will my area flood?”
New for 2015

- **Communicating Storm Surge Danger:**
  - **Potential** Storm Surge Flooding
  - THIS IS
  - REASONABLE WORST CASE
  - Different than…
    - surge watch/warnings &
    - surge expectation still described in our text products.
      - which are most likely
Summing Up

• New for Communicating Threat #1 of 4:
  
  • Storm Surge Watch & Warnings
    • *Akin to other W & W’s*
    • Where life-threatening conditions are expected (warning) potential of (watch)
    • Easier for public

• Potential Storm Surge Flooding Map
  • *Akin to “Max Potential Snow”*
  • Where & How High surge could reach w/ worst case track/conditions
  • Needs public explanation to use
Graphical NHC Outlooks

- Thru 5 days
- Initial Position X
- Expected Movement / Threat Area
Hour-by-Hour Forecast
Social Media

US National Weather Service Baltimore/Washington

Facebook: @NWS_BaltWash
<table>
<thead>
<tr>
<th>Warning Type</th>
<th>WEA Message</th>
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<tbody>
<tr>
<td>Tsunami Warning</td>
<td>Tsunami danger on the coast. Go to high ground or move inland. Check local media. –NWS</td>
</tr>
<tr>
<td>Tornado Warning</td>
<td>Tornado Warning in this area til hh:mm tzT. Take shelter now. Check local media. –NWS</td>
</tr>
<tr>
<td>Extreme Wind Warning</td>
<td>Extreme Wind Warning this area til hh:mm tzT ddd. Take shelter. –NWS</td>
</tr>
<tr>
<td>Flash Flood Warning</td>
<td>Flash Flood Warning this area til hh:mm tzT. Avoid flooded areas. Check local media. -NWS</td>
</tr>
<tr>
<td>Hurricane Warning</td>
<td>Hurricane Warning this area til hh:mm tzT ddd. Check local media and authorities. –NWS</td>
</tr>
<tr>
<td>Typhoon Warning</td>
<td>Typhoon Warning this area til hh:mm tzT ddd. Check local media and authorities. -NWS</td>
</tr>
<tr>
<td>Dust Storm Warning</td>
<td>Dust Storm Warning in this area til hh:mm tzT ddd. Avoid travel. Check local media. -NWS</td>
</tr>
</tbody>
</table>
Summary

• **Full information set** = *(Most likely / The forecast) + (Best & Worst case scenarios)*

• **Greatest Risk here is mid Aug – mid Oct**

• **4 Threats**
  • Flooding
  • Tidal Flooding
  • Wind
  • Tornadoes

• **Forecast Offices + NHC = NWS team**
Weather Disasters will come...

If everyone...
  ...gets advance notice
  ...knows what to do & acts
  ...is prepared

...we will truly be a Weather-Ready Nation!