National Weather Service

What's New to Help You

MISSION

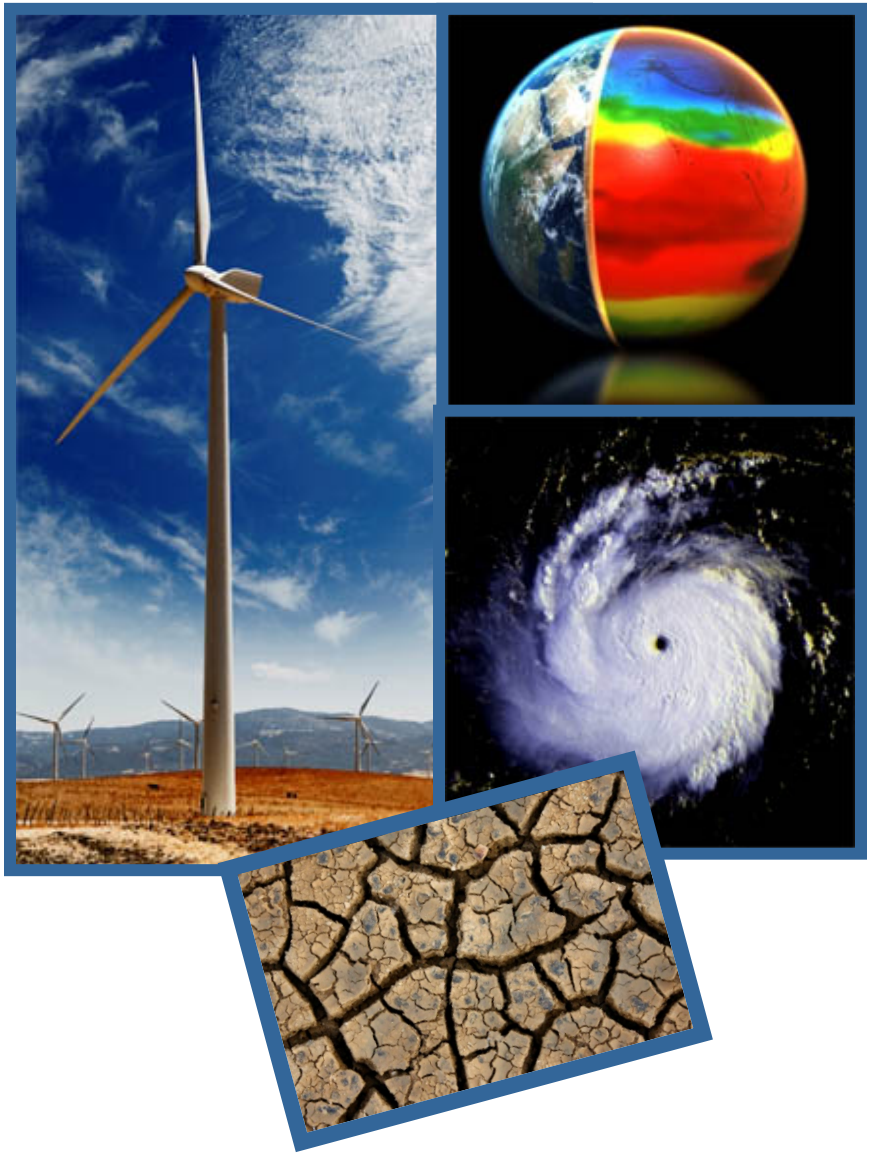
Provide weather, water, and climate data, forecasts and warnings

Protect life and property

Enhance national economy

VISION

A Weather-Ready Nation: Society is Prepared for and Responds to Weather-Dependent Events



Our Goal

- To provide more information to Emergency Managers to
  - Facilitate improved decision making
  - Elicit the proper public response during the most life-threatening weather events

So how are we trying to do that?

- Winter Initiatives
  - Snow Forecast Uncertainties and Intensities
- Summer Changes
  - SPC Outlooks
- Tropical / Hurricane – Storm Surge Updates
- New Webpages

Winter Weather “Experiments”

SNOWFALL = BIG IMPACTS

- School / government / business closures
- Airport shutdowns/delays
- Traffic accidents with injuries/fatalities
- Money plowing/treating roads
- Lost resources in traffic congestion
- Power outages/damage in strong storms

Weather Forecasts are Inherently Uncertain

- Chaotic Nature of the Atmosphere
- Deficiencies In Observations
- Uncertainties in Computer Simulations of Atmosphere

Demand for snowfall forecasts has escalated

- Society has become increasingly mobile
- High sensitivity to Winter Hazards
  - Highways Often Run Above Capacity in Fair Weather
  - Packed Schedules Leave Little Time For Delays

Accurate Forecasts Desired Days in Advance

But, as Lead Time *increases*, Certainty *decreases*

- We need to better communicate the range of possibilities
  - Find a balance between Lead Time and Certainty
- NWS constantly striving to provide:
  - The most accurate weather forecast
  - Relay our degree of uncertainty

Winter Weather "Experiments"

- Experimental projects designed to provide enhanced user information
- New York City Forecast Office
  - Snow Accumulation Potential
    - *In conjunction with other offices along I-95 Corridor provides uncertainty information in the form of a Range of Potential Snowfall*
- Buffalo Forecast Office
  - Snow Threat Graphics
    - *Designed to display areas with the greatest threat of heavy snowfall rate*

Winter Weather "Experiment"
New York City Forecast Office

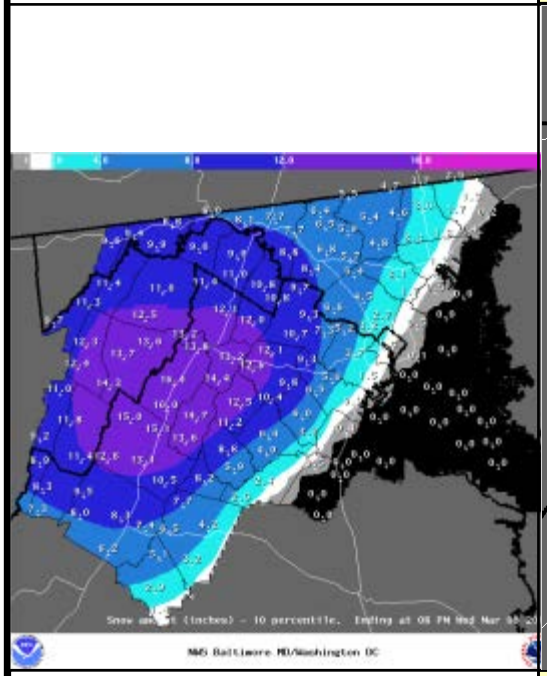
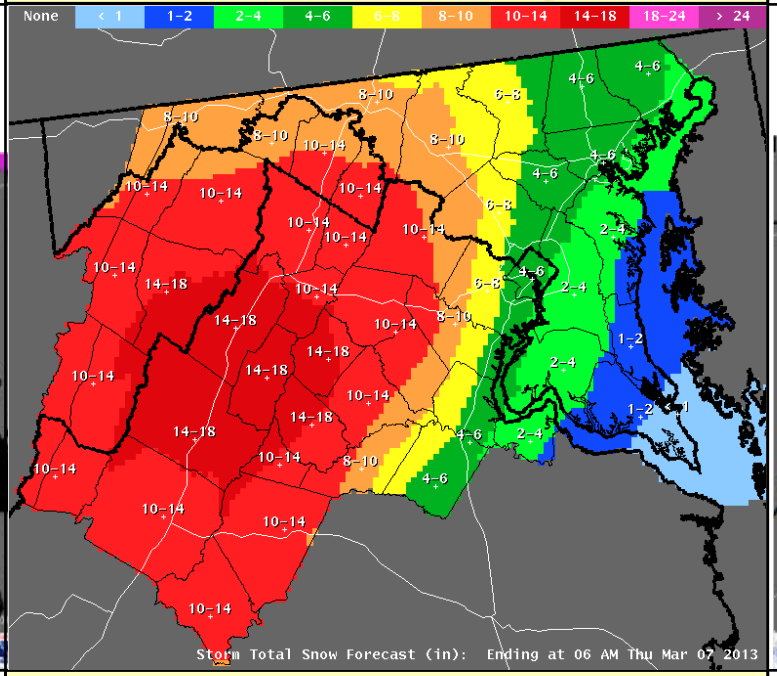
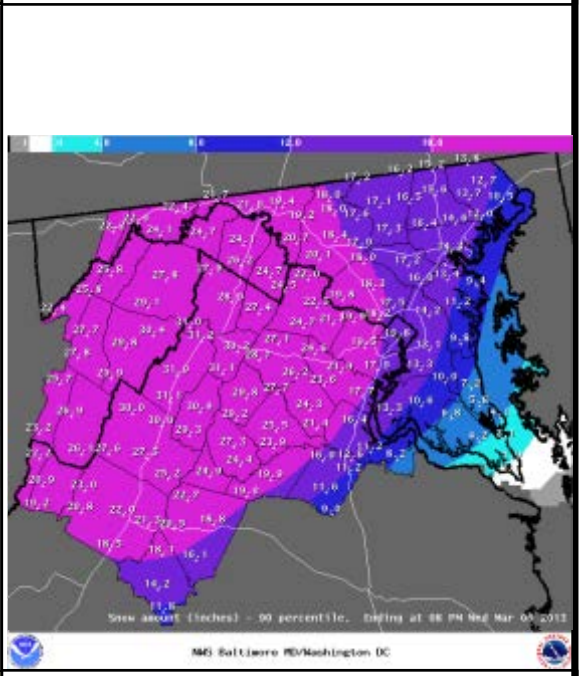
- Forecasting Snow in New York City and Long Island is Challenging
  - Appalachian Mountains
  - Urban Heat Island
  - Atlantic Ocean and Long Island Sound
    - Warmer Water
    - Coastal Fronts

- During a rain/snow event a 40-mile difference could impact almost 17 million people

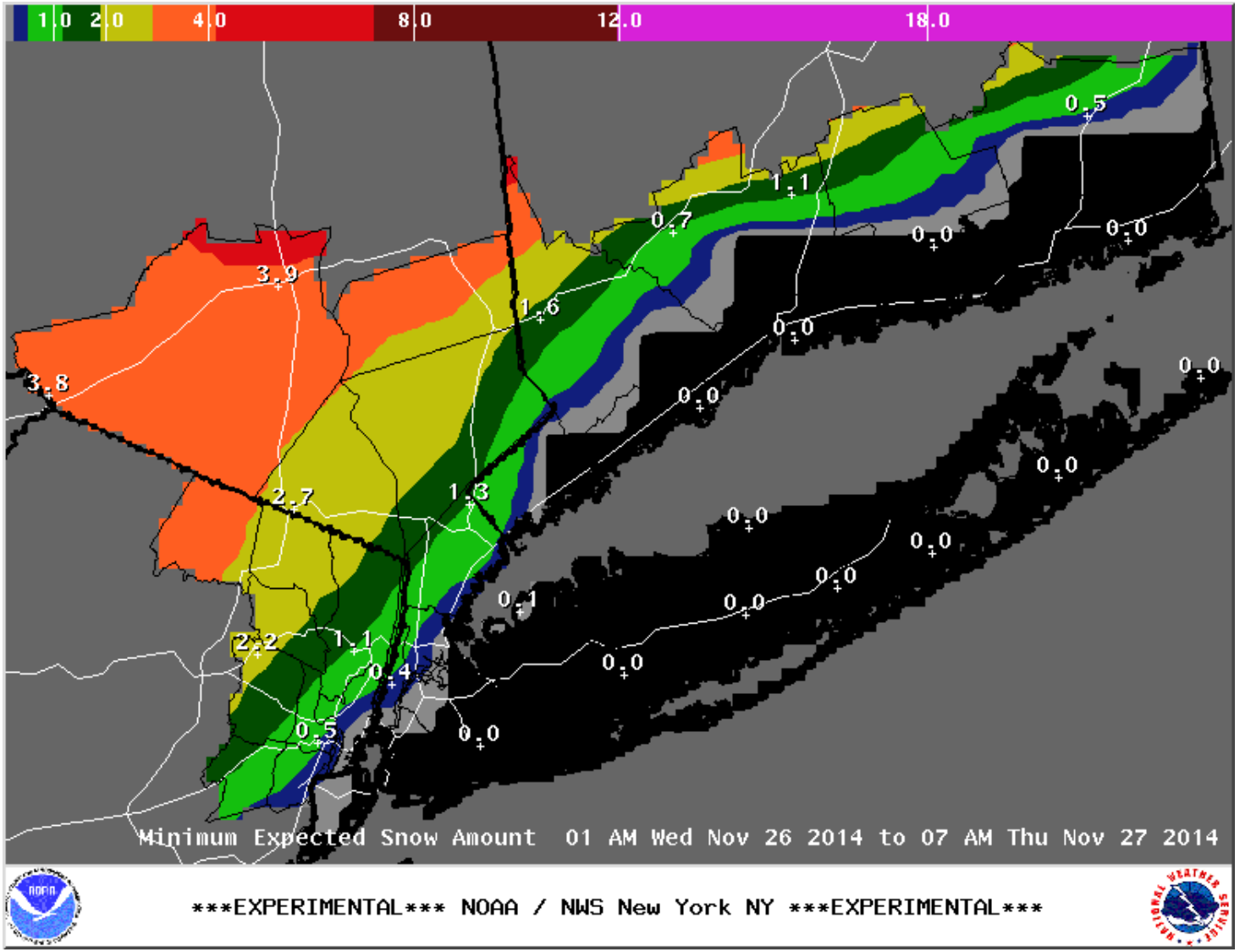
Winter Weather "Experiment"
New York City Forecast Office

- Available on the web: *http://www.weather.gov/okx/winter*

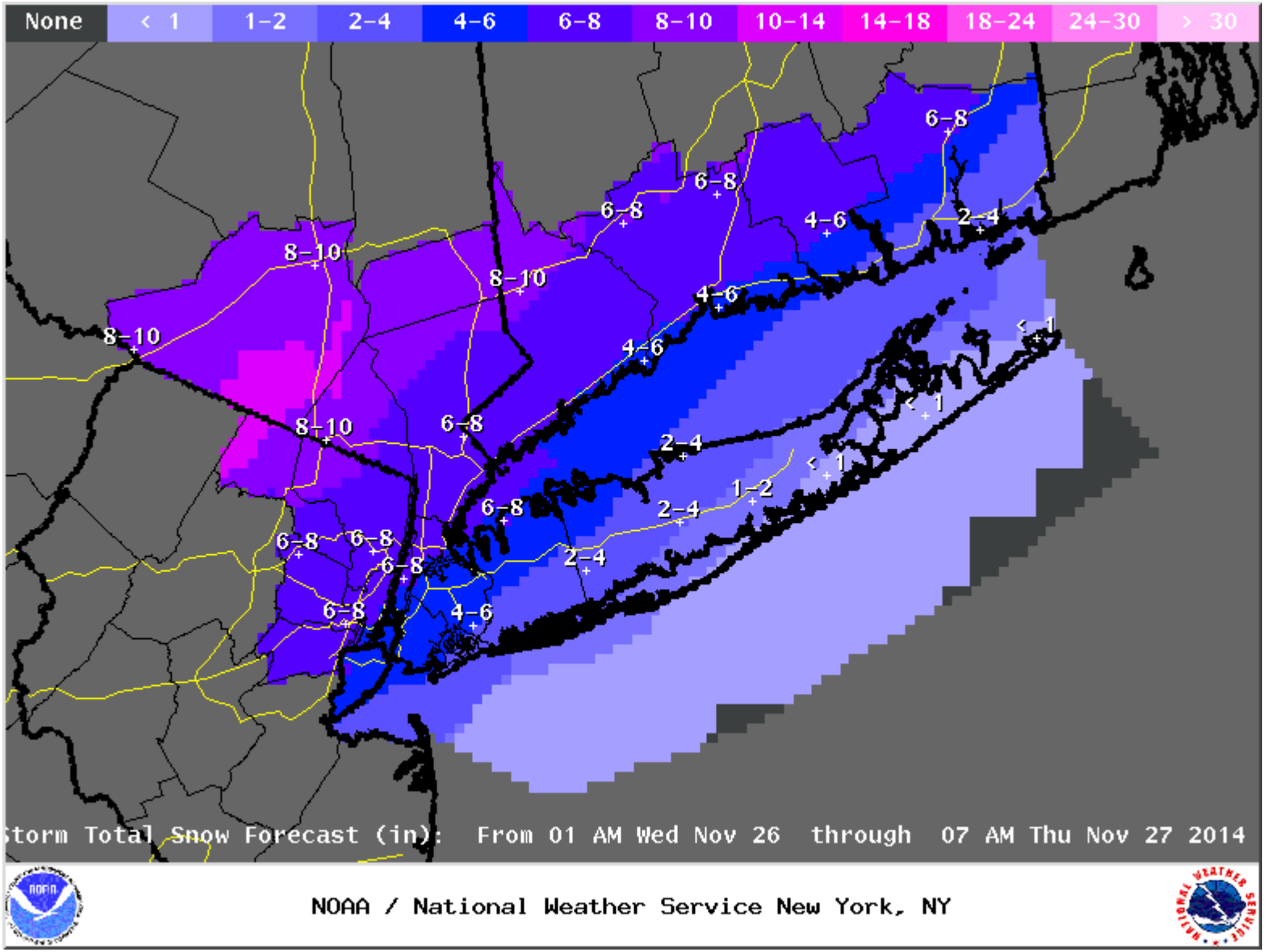
- Three New Products - Winter 2014-2015
  - Minimum / Most Likely / Maximum Snow
    - Issued prior to the storm
    - "Goal Posts" of Possibilities
    - "Official" NWS Forecast Is the Most Likely
  - Chance that Snow Will Be Greater Than...
    - 0.1", 1", 2", 4", 6", 8", 12" and 18"
  - Probability of Ranges Table
    - Several Locations for Each County

Minimum	Most Likely	Maximum
		
Expect at least this much	Official NWS Forecast	Potential for this much

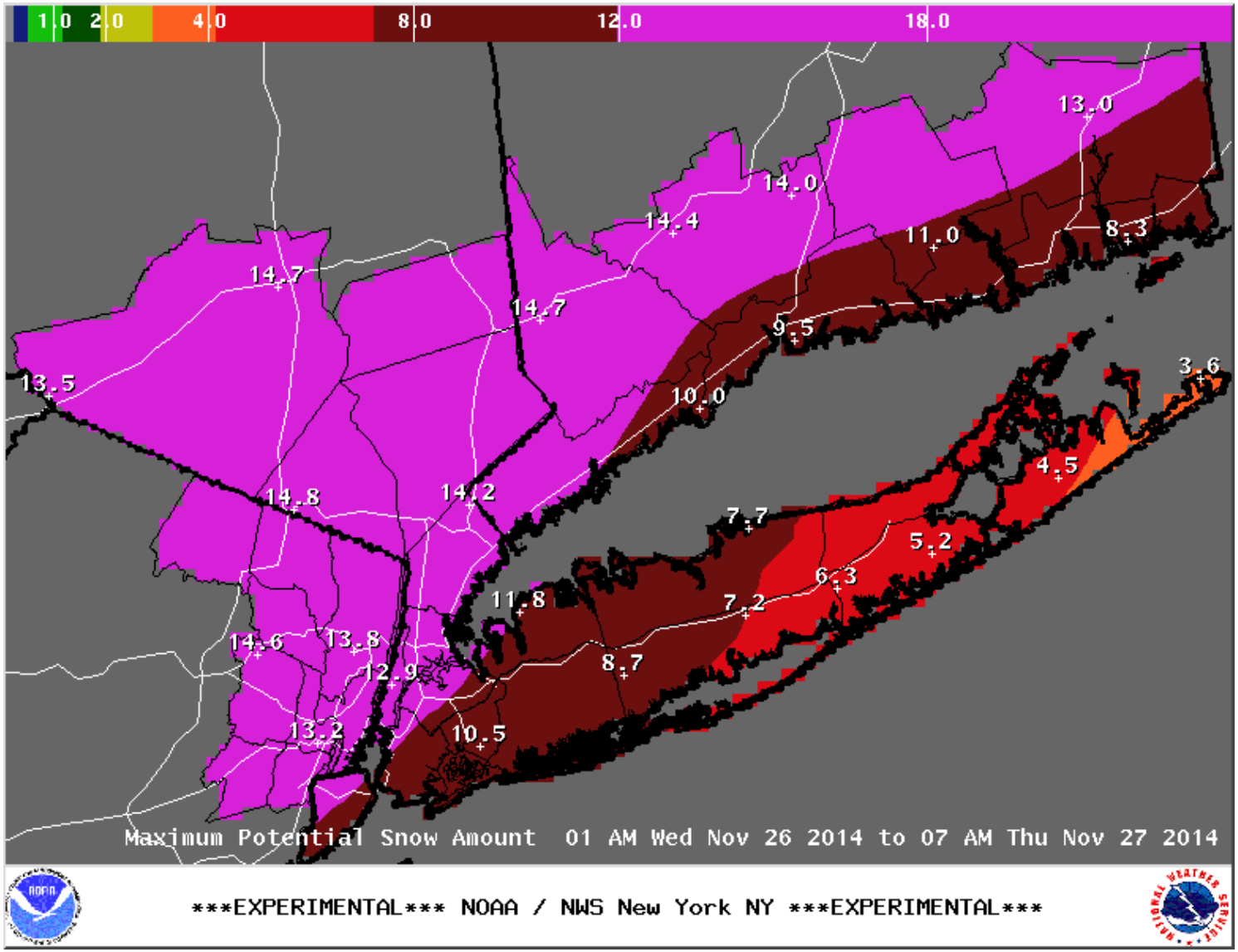
Minimum
Expect At Least This Much



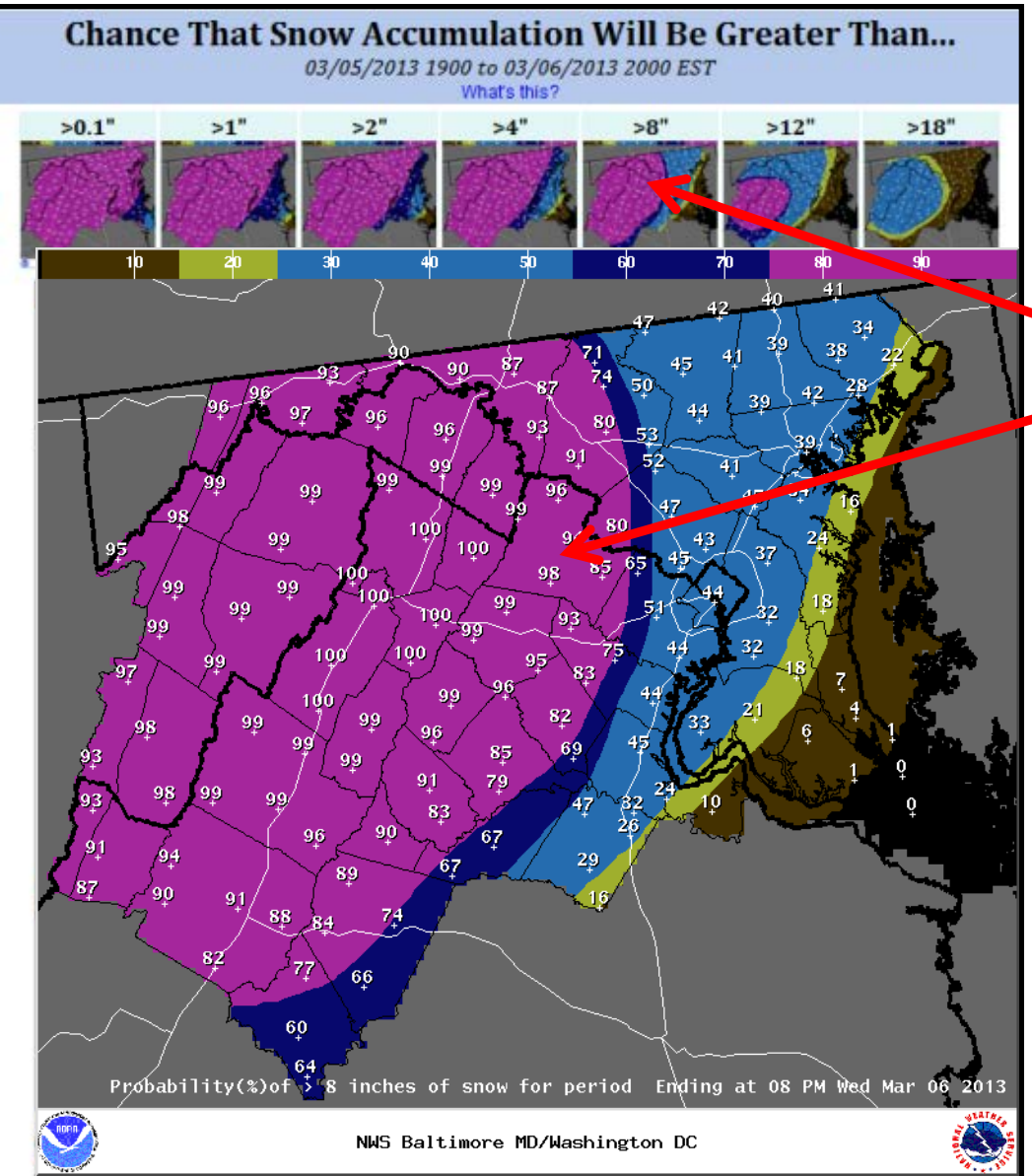
Snow – Most Likely
Storm Total "Official" Forecast



MAXIMUM
Worst Case Scenario



Exceedance Graphics



Mouse over desired amount and image appears on large screen

Table of Probabilistic Snowfall Accumulations

Can Select County/City for Local Towns

Defaults to regional table

Chance of Snow Accumulation Ranges

03/05/2013 1900 to 03/06/2013 2000 EST

County: Selected

Location	Min	Likely	Max	0"	T-1"	1-2"	2-4"	4-8"	8-12"	12-18"	>18"
Baltimore, MD	1	4-8	15	0%	9%	6%	17%	28%	21%	15%	4%
Bayard, WV	9	8-12	22	0%	0%	0%	1%	4%	47%	21%	27%
Charlottesville, VA	4	12-18	19	0%	6%	0%	4%	16%	25%	37%	12%
Frederick, MD	7	8-12	19	0%	0%	0%	1%	17%	38%	32%	12%
Fredericksburg, VA	0	4-8	14	11%	11%	6%	11%	25%	20%	13%	3%
Hagerstown, MD	8	8-12	19	0%	0%	0%	1%	13%	46%	26%	14%
Harrisonburg, VA	14	12-18	28	0%	0%	0%	0%	1%	6%	49%	44%
Leonardtown, MD	0	1-2	5	39%	3%	24%	20%	13%	1%	0%	0%
Martinsburg, WV	10	8-12	24	0%	0%	0%	0%	4%	50%	13%	33%
National Mall, DC	1	4-8	17	0%	9%	5%	11%	30%	19%	19%	7%
Staunton, VA	9	12-18	22	0%	0%	1%	0%	7%	19%	42%	31%
Winchester, VA	13	12-18	29	0%	0%	0%	0%	0%	6%	56%	38%

Location	Min	Likely	Max	0"	T-1"	1-2"	2-4"	4-8"	8-12"	12-18"	>18"
Baltimore, MD	1	4-8	15	0%	9%	6%	17%	28%	21%	15%	4%

Winter Weather “Experiment”
Buffalo Forecast Office

- NWS routinely produces snowfall amount forecasts

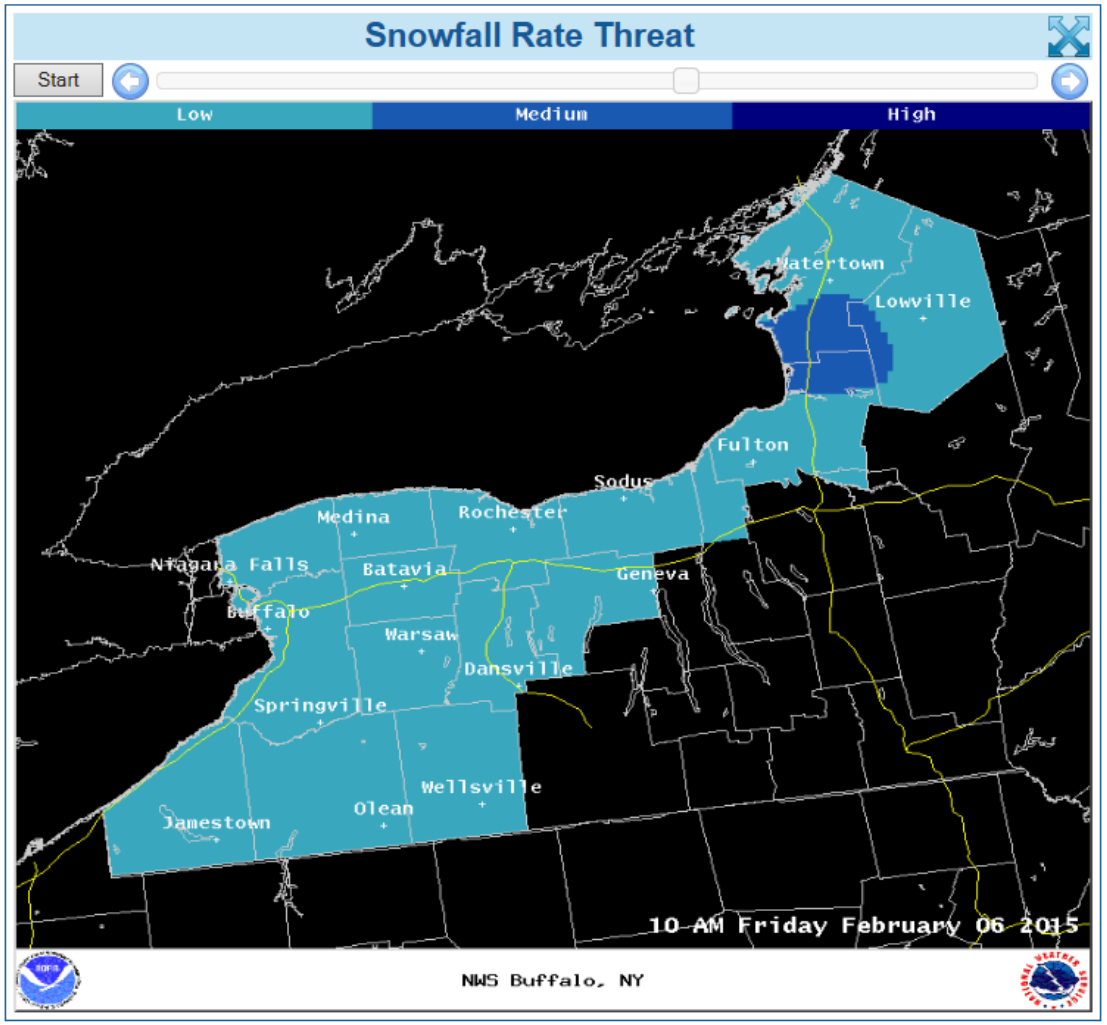
- However, other parameters can be as just a valuable
  - Rate of snowfall
  - Time of day

- “How can we graphically show where we think the threat of heaviest snowfall will occur and the forecast movement of lake effect snow bands?”

Winter Weather "Experiment"
Buffalo Forecast Office
http://www.weather.gov/buf/Snowfall_Rate_Threat_Loop

WFO Buffalo Areas of Greatest Snowfall Rate Threat Graphics

Graphical display of hourly snowfall rate threat for next 50 hours.



Winter Weather "Experiment"
Buffalo Forecast Office
http://www.weather.gov/buf/SnowfallRateThreatTiles

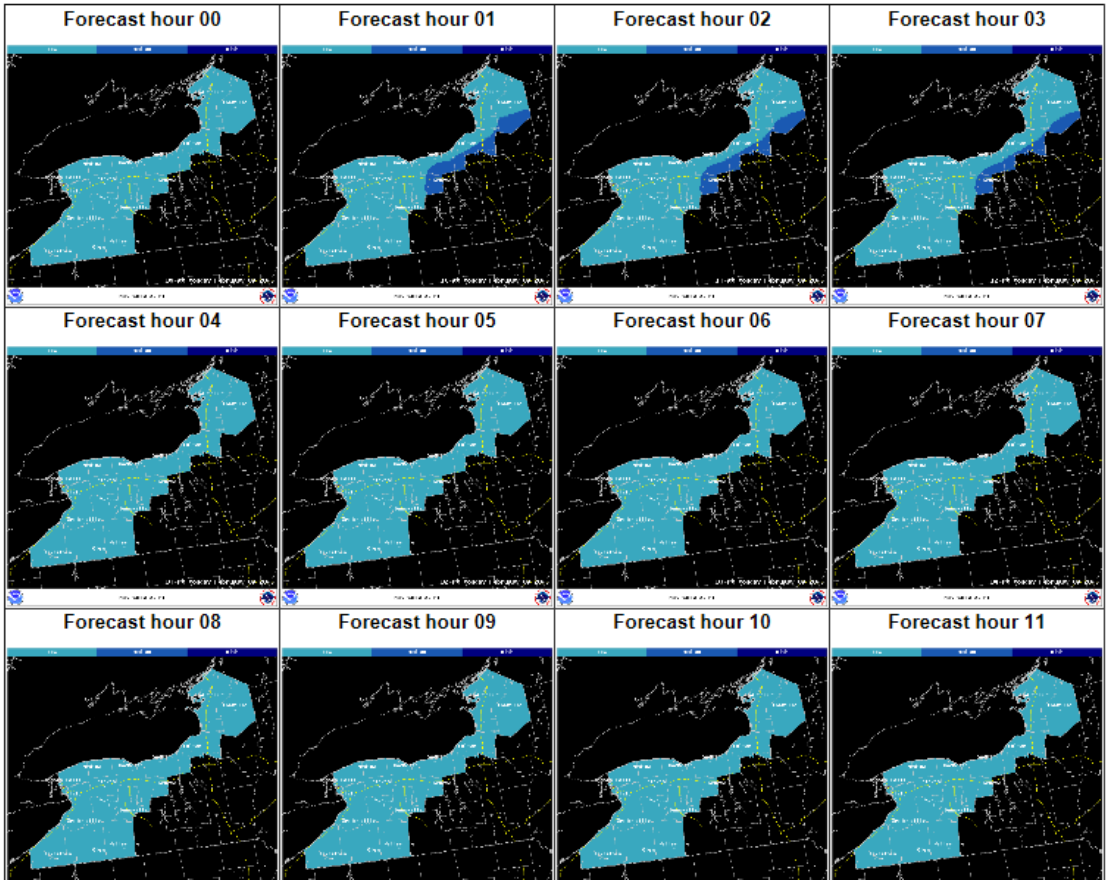
Snowfall Rate Tiles Display

Weather.gov > Buffalo, NY > Snowfall Rate Tiles Display

Buffalo, NY
Weather Forecast Office

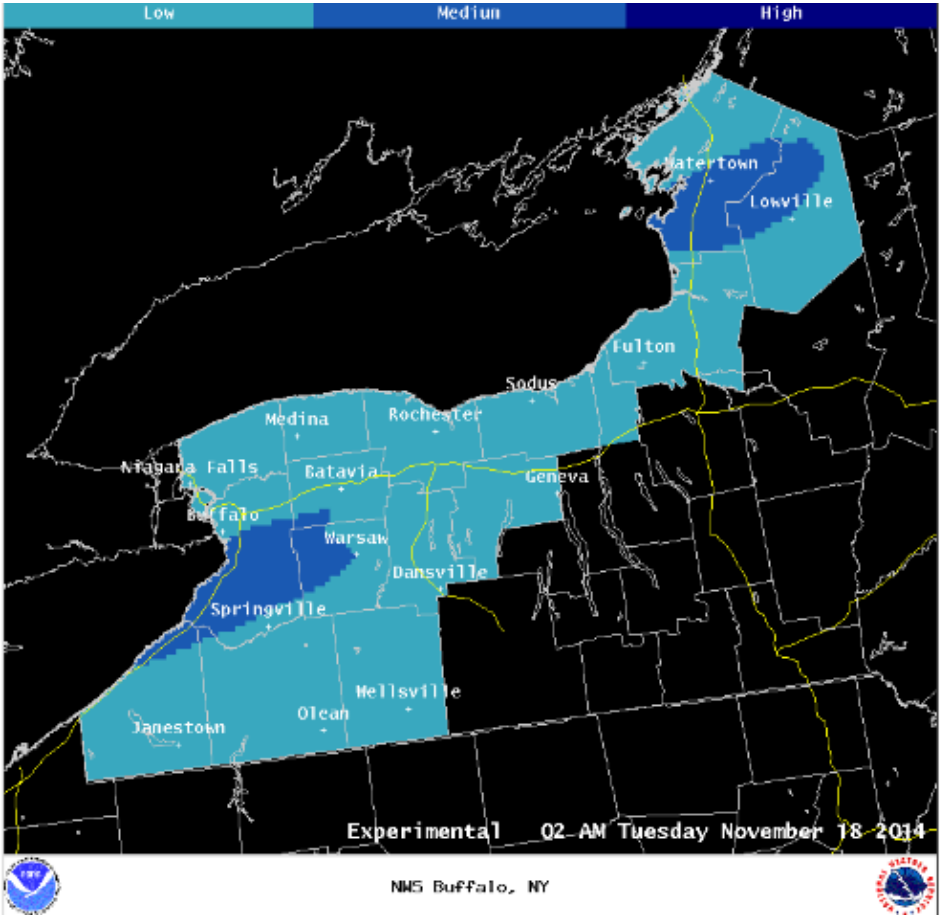
Current Hazards | Current Conditions | Radar | Forecasts | Rivers and Lakes | Climate and Past Weather | Local Programs

Click on Image to see full size image of that Forecast hour. Use browser's back button to get back to this page from the full size image.
Images are **BELOW** the Forecast hour text.

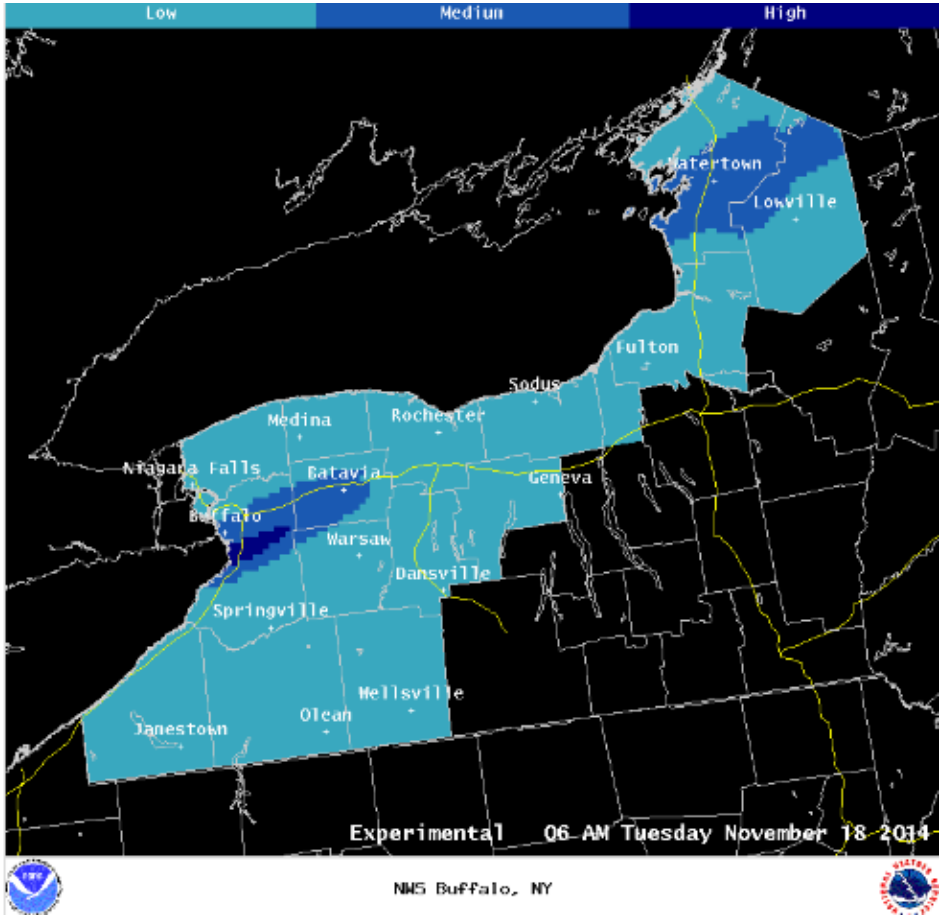


Winter Weather "Experiment"
Buffalo Forecast Office
http://www.weather.gov/buf/Snowfall_Rate_Threat_Loop

2AM Tuesday 11/18/2014



6AM Tuesday 11/18/2014



- Available in “News Headlines” during storms
- Always available

Severe Convective Weather

- Storm Prediction Center (SPC) in Norman OK issues watch and forecast products dealing with severe weather

- Risk communication is fundamentally linked to science-based threat probabilities
  - Drives communication intensity and decision support

- SPC issuing probabilistic forecasts since 1999
  - Day 1: Tornadoes, Hail and Damaging Winds
  - Day 2/3: All severe hazards combined

- Outlook probabilities
  - Chance of a severe event occurring with a 25 mile radius

SPC Days 1-3 Convective Outlook Changes

- SPC has revised **Day 1**, **Day 2**, and **Day 3** categorical severe weather outlooks to *better communicate risk and describe the likelihood of severe weather*

- This included the addition of <u>two</u> new categories for the SPC Convective Outlook

  3 outlook categories → 5 outlook categories

- Changes became effective October 22, 2014

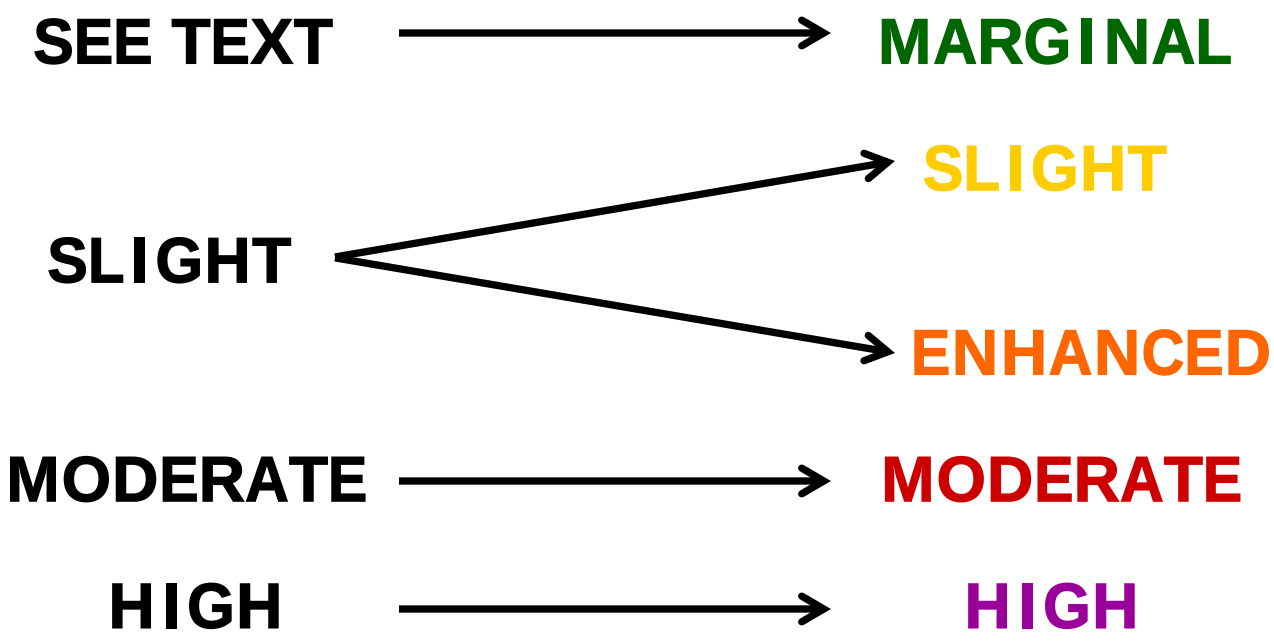
Rationale behind Changes

- **SLIGHT, MODERATE, HIGH** terminology has been used for 40 years. They have established understanding and these thresholds will essentially remain unchanged.

- Several years of customer feedback of the limitations of **SEE TEXT** and **SLIGHT** terminology

Day 1, Day 2, Day 3 Categorical Outlook Changes

*Increase risk categories to **5 levels** for Day 1 And Day 2 Outlooks*
*Increase risk categories to **4 levels** for Day 3 Outlook (High not forecast)*



Rationale behind Changes

- Addition of **ENHANCED** addresses the concerns about SLIGHT (both meaning and range)

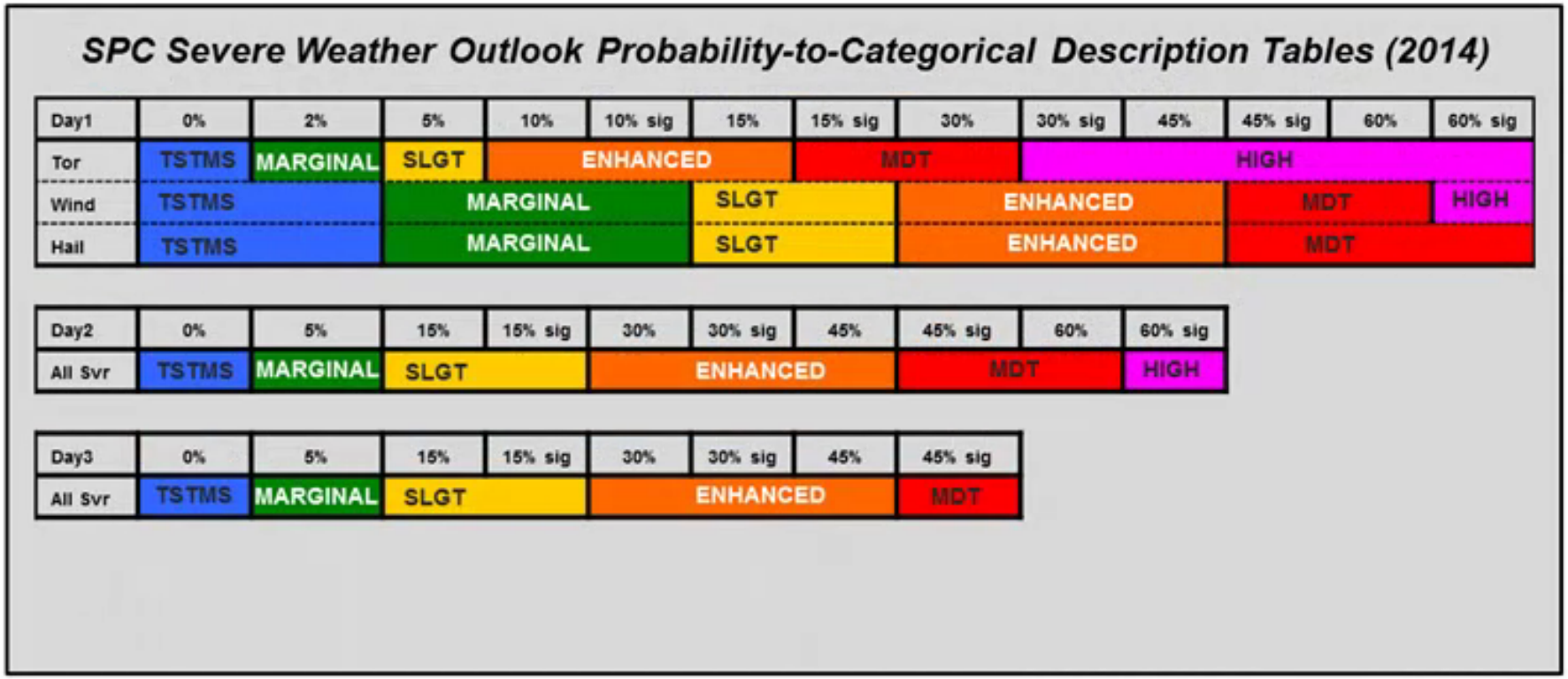
- Addition of numbers on the graphic legend aids in the interpretation (colors also important)

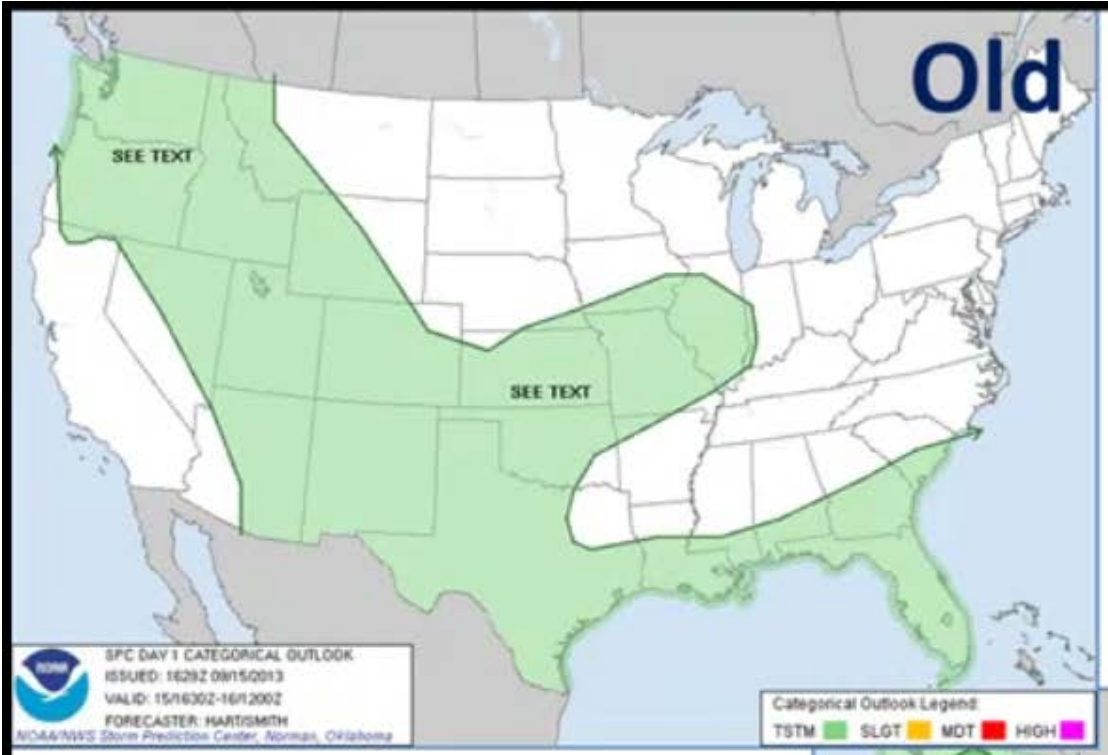
1 2 3 4 5

- Social science community was heavily engaged in the planning

Day 1, Day 2, Day 3 Outlook Changes

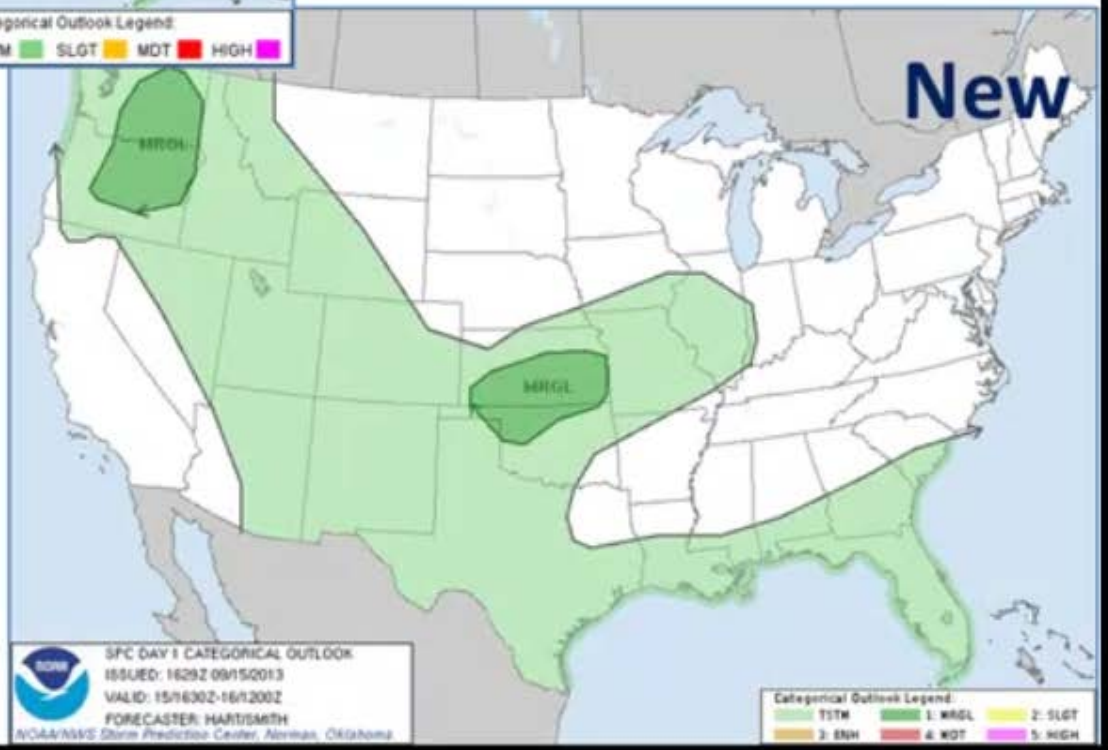
Increase risk categories to 5 levels for Days 1+2; 4 levels for Day 3 Outlook

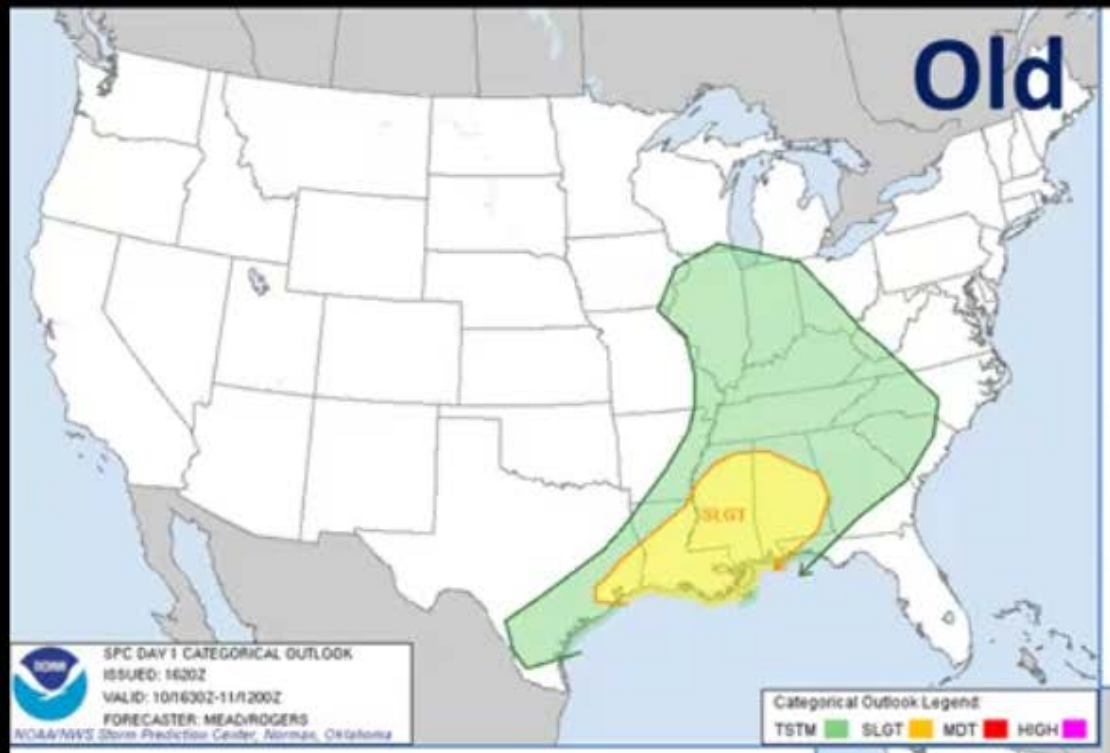




Example #1

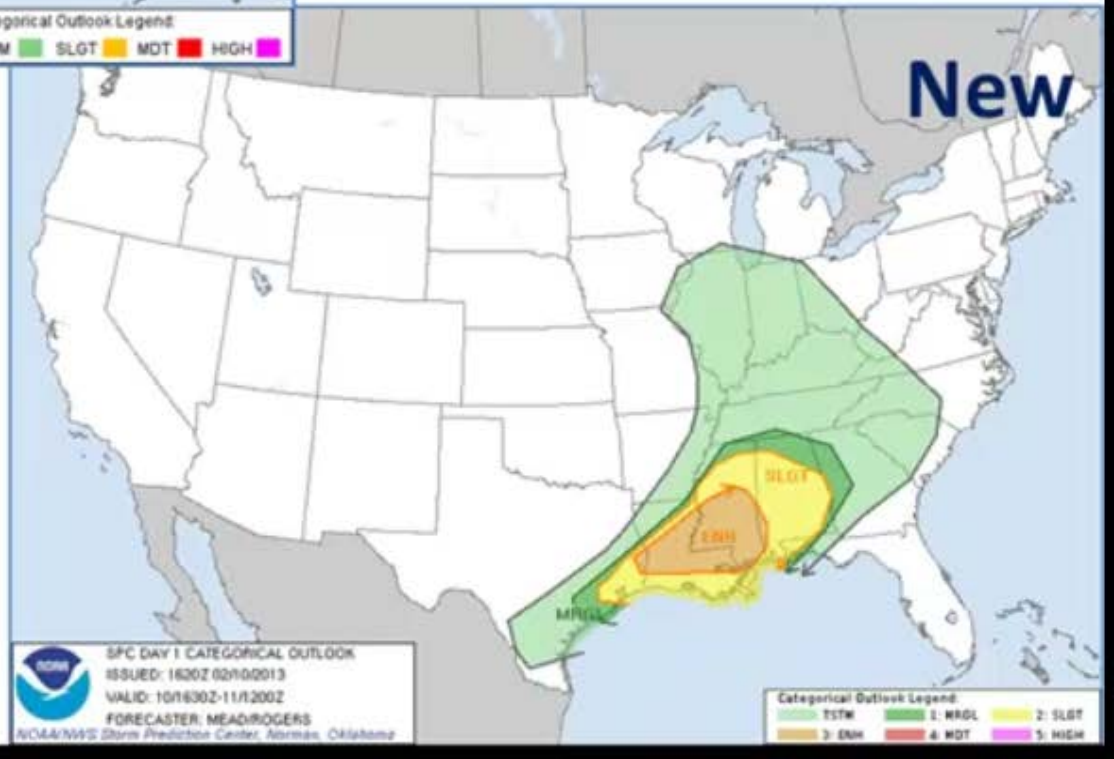
Marginal risk added

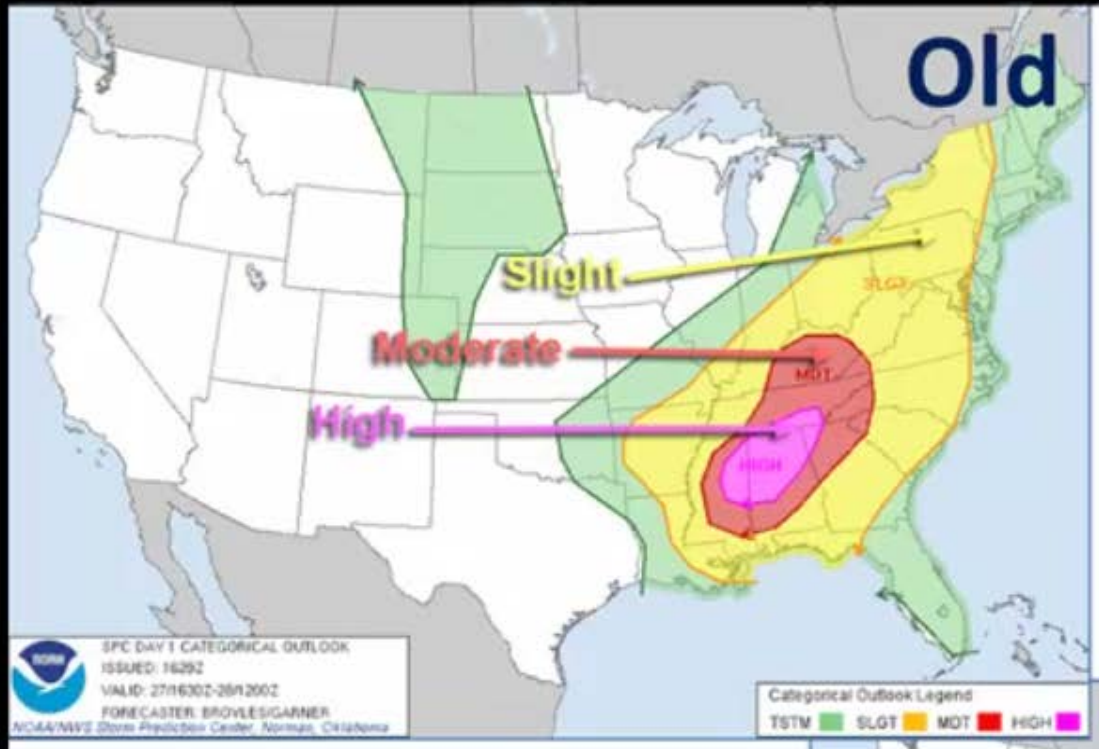




Example #2

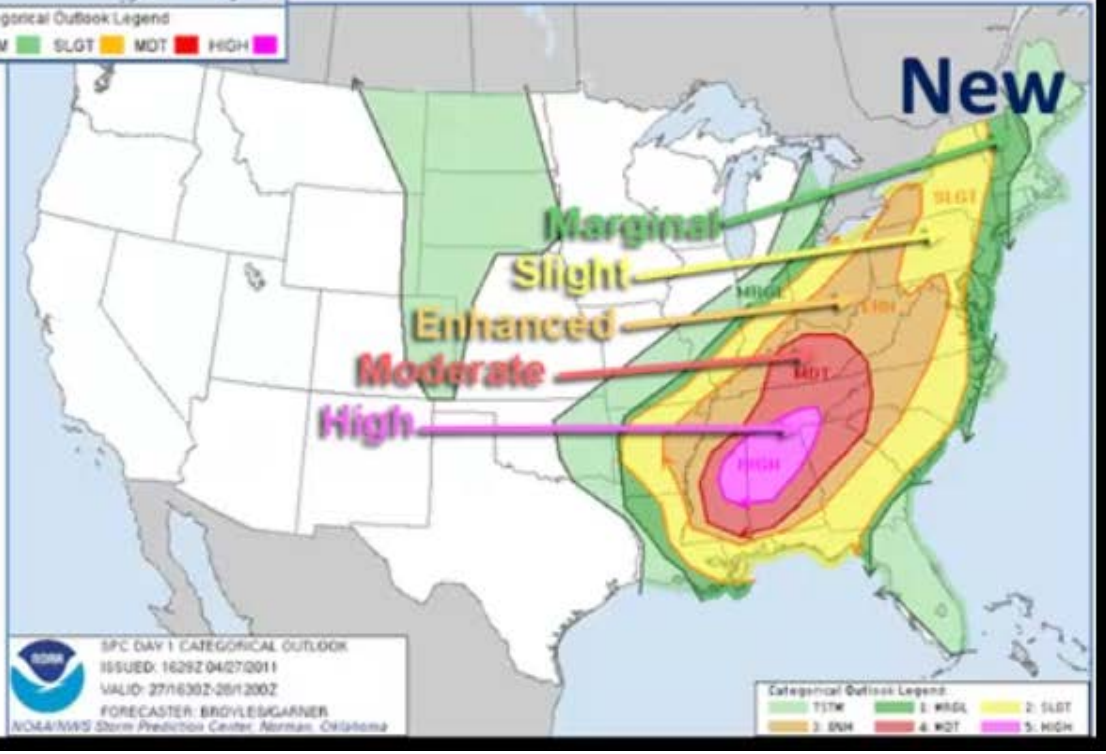
Marginal and
Enhanced
risks added





Example #3

High Risk
tornado outbreak
April 27, 2011



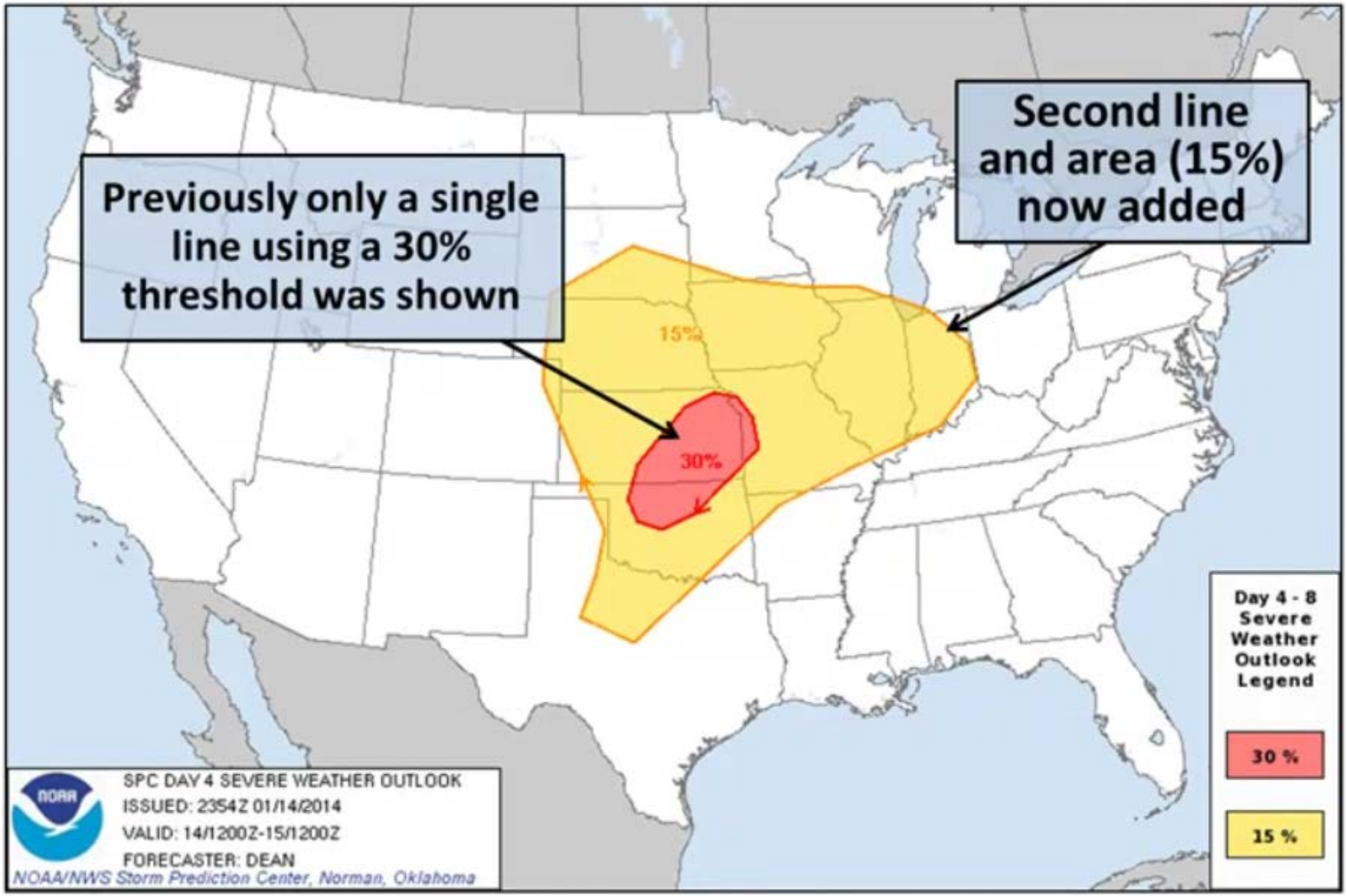
SPC Days 4-8 Convective Outlook Changes

- SPC has revised the **Days 4-8 categorical severe weather outlook** to better describe the likelihood of severe weather

- A **new forecast threshold category (15%)** has been added for Days 4-8

- Changes became effective on December 16, 2014

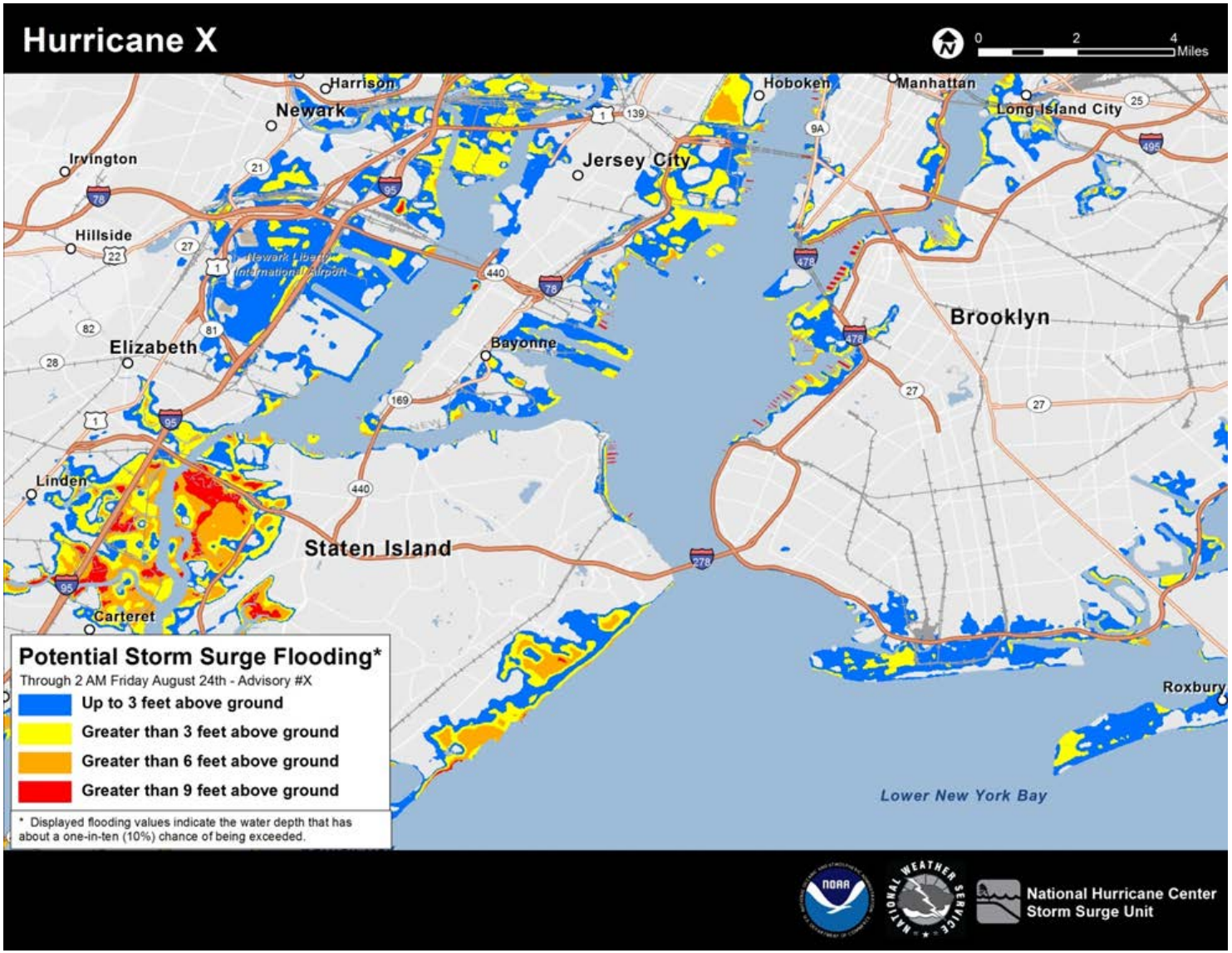
Day 4-8 Convective Outlook

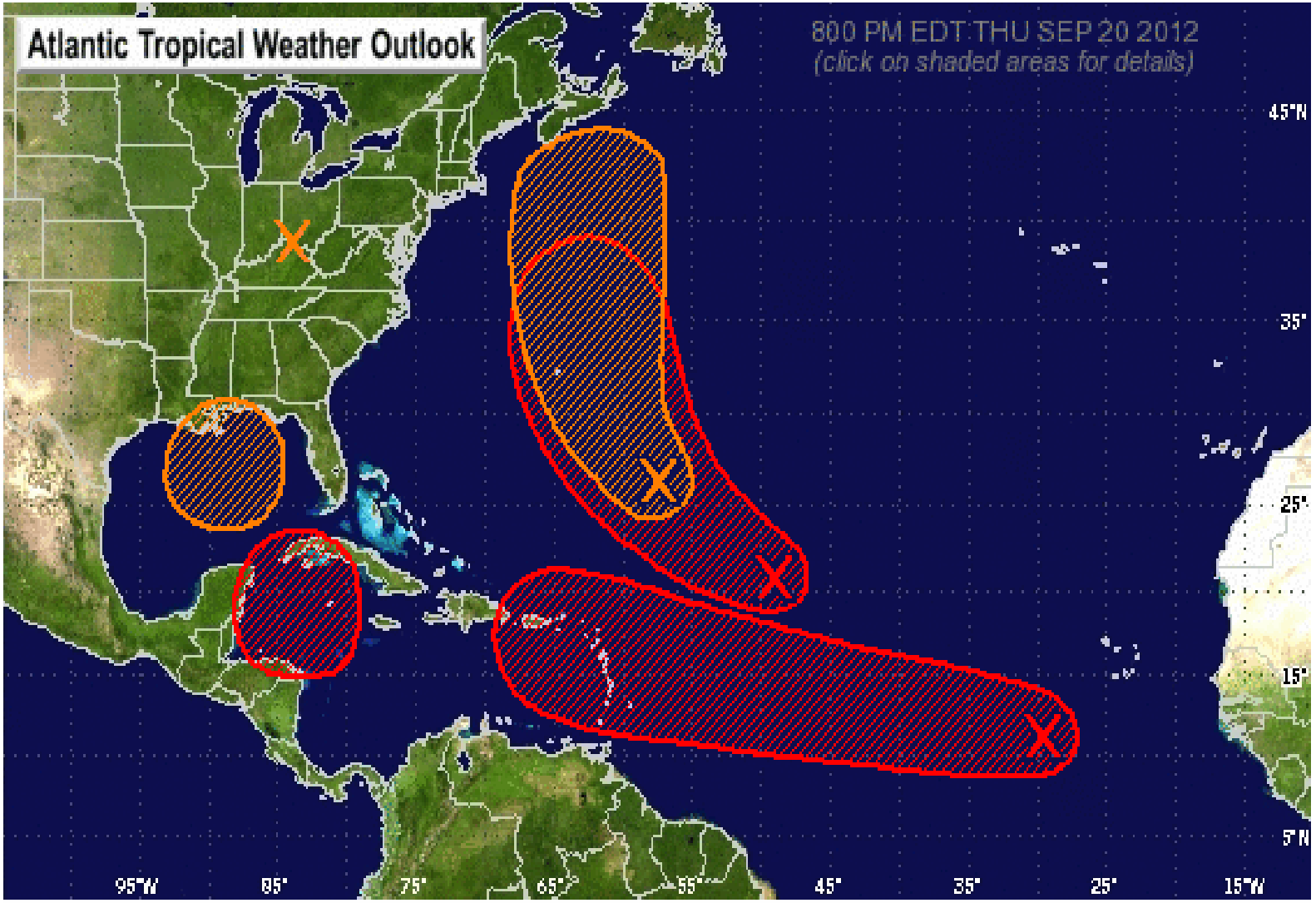


Tropical Weather

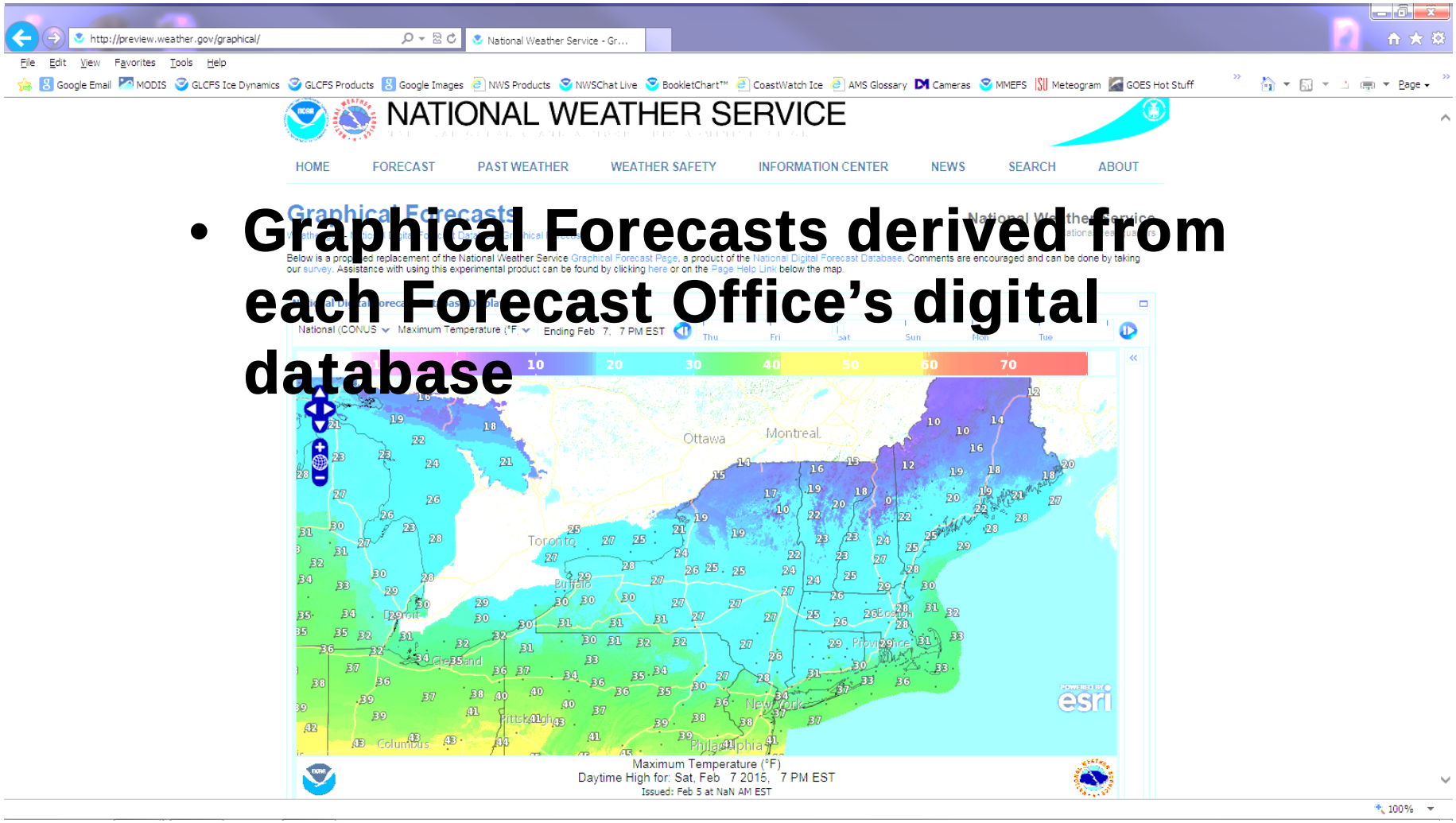
- NOAA's National Hurricane Center (NHC) implemented changes in 2014
  - Potential Storm Surge Flooding Map
    - Depicts the reasonable worst-case scenario for any individual location
    - Shows inundation levels that have a 10% chance of being exceeded
  - 5-day Graphical Tropical Weather Outlook
    - No longer uses hatched areas to denote locations of disturbances
- NHC Storm Surge Resources page

  http://www.nhc.noaa.gov/surge/resources.php


Hurricane X
0
2
4
Miles
Harrison
Newark
Irvington
Hillside
Elizabeth
Linden
Carteret
Jersey City
Hoboken
Manhattan
Long Island City
Bayonne
Brooklyn
Staten Island
Roxbury
Lower New York Bay
Potential Storm Surge Flooding*
Through 2 AM Friday August 24th - Advisory #X
Up to 3 feet above ground
Greater than 3 feet above ground
Greater than 6 feet above ground
Greater than 9 feet above ground
* Displayed flooding values indicate the water depth that has about a one-in-ten (10%) chance of being exceeded.
National Hurricane Center
Storm Surge Unit


Atlantic Tropical Weather Outlook
800 PM EDT THU SEP 20 2012
(click on shaded areas for details)
45°N
35°
25°
15°
5°N
95°W
85°
75°
65°
55°
45°
35°
25°
15°W
5-Day Tropical Cyclone Formation Potential:
Low < 30%
Medium 30-50%
High > 50%

http://preview.weather.gov/graphical

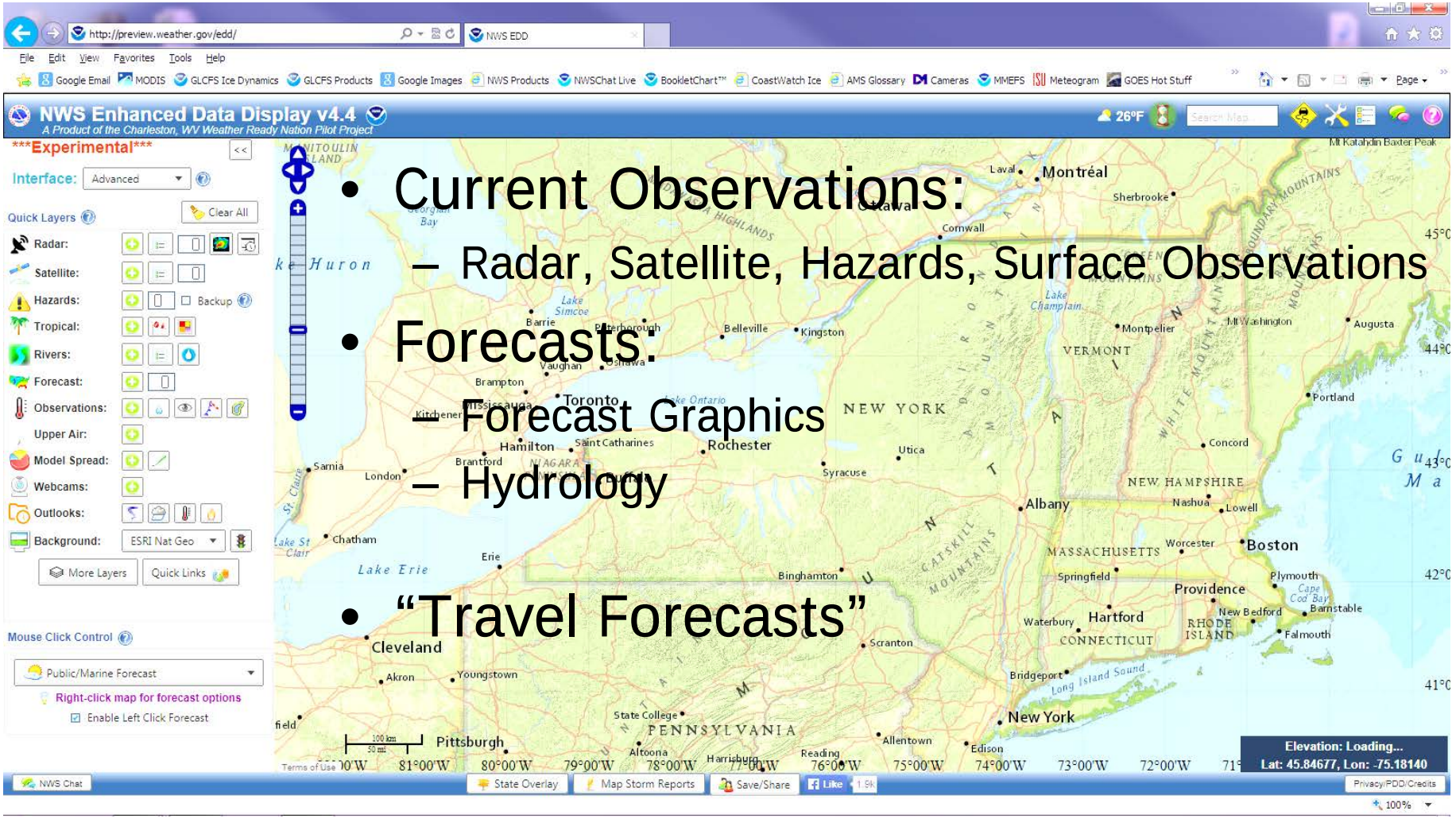


- **Graphical Forecasts derived from each Forecast Office's digital database**

- Forecasts – Temperature, Wind, Probability of Precipitation, Hazards, Precipitation Amounts – 6-hr and total, Snow amounts – 6-hr and total
- Marine – Wave Heights
- Fire Weather – Maximum/Minimum Relative Humidity
- Severe Weather – Convective Outlook, Severe Probabilities
- Tropical -- Wind Speed Probabilities

http://preview.weather.gov/graphical/?zoom=6&lat=43.01503&lon=-76.54531&layers=F000BTTTFTT&region=0&element=0&mxmz=false&barbs=false&subl=TFFFF&units=english&wunits=nautical&coords=latlon&tunits=localt

http://preview.weather.gov/edd



- Current Observations:
  - Radar, Satellite, Hazards, Surface Observations
- Forecasts:
  - Forecast Graphics
  - Hydrology
- "Travel Forecasts"

http://go.usa.gov/hegF