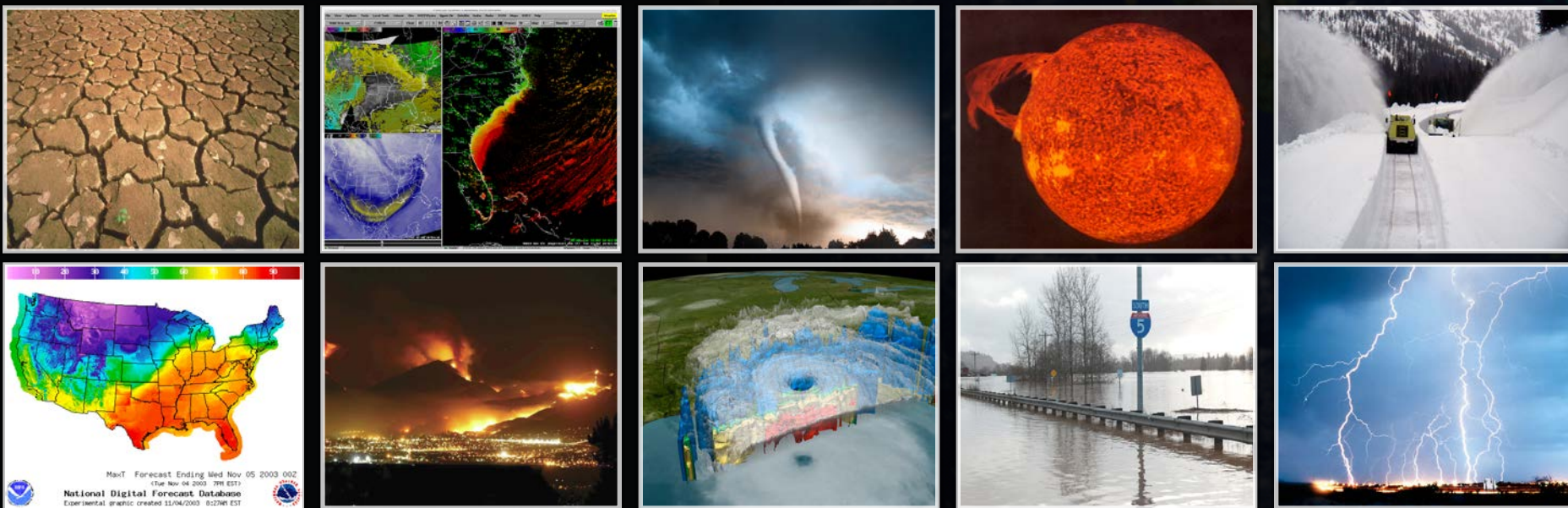


# Building a Weather-Ready Nation



**Dr. Louis W. Uccellini**

Director, National Weather Service

NOAA Assistant Administrator for Weather Services

**23 March 2015 – WGNE**



# Increase in Extreme Events

## “Average” Year and Trends in the U.S.



**650 Deaths**  
**\$15B in Losses**



**26,000 Severe**  
**Thunderstorms**



**6 Atlantic Basin**  
**Hurricanes**



**1,300 Tornadoes**



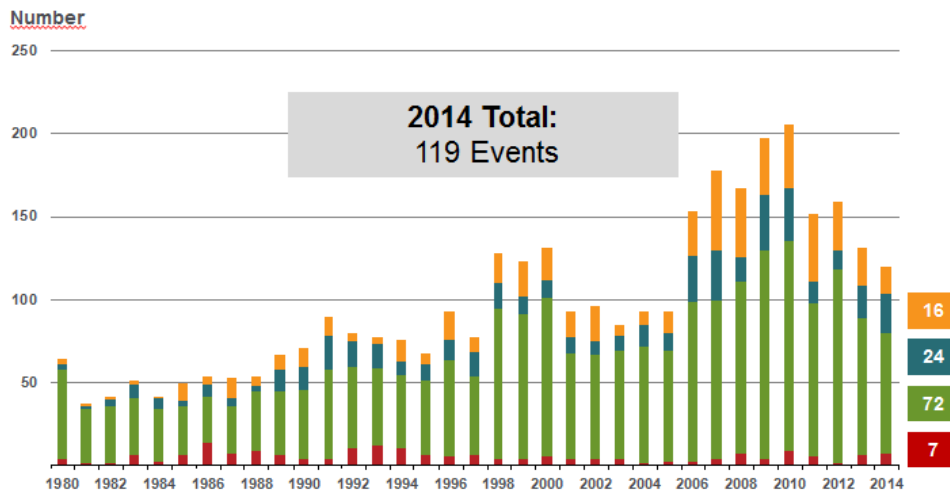
**5,000 Floods**

US Natural Catastrophe Update

Loss events in the US 1980 – 2014

Number of events

Munich RE



Source: Geo Risks Research, NatCatSERVICE

© 2015 Munich Re

### Increasing vulnerability

- Increasing population
- More infrastructure at risk

- Improved forecasts of extreme events 4-8 days in advance

- Need to take these forecasts to the next level for effective decision support



# NWS Strategic Outcome: A Weather-Ready Nation

Becoming a Weather-Ready Nation is about building **community resiliency** in the face of increasing vulnerability to extreme weather

***“Ready, Responsive, Resilient”***

## REQUIRES NWS TO:

- Fully Integrate our Field Structure:
  - Better Forecasts and Warnings
  - Ensure Consistent Products and Services
- Provide Impact-based Decision Support Services (IDSS)
- Deliver through Multiple and Reliable Dissemination Pathways
- Work with Partners to *gain needed response*; includes embedding NWS in Emergency Operations Centers

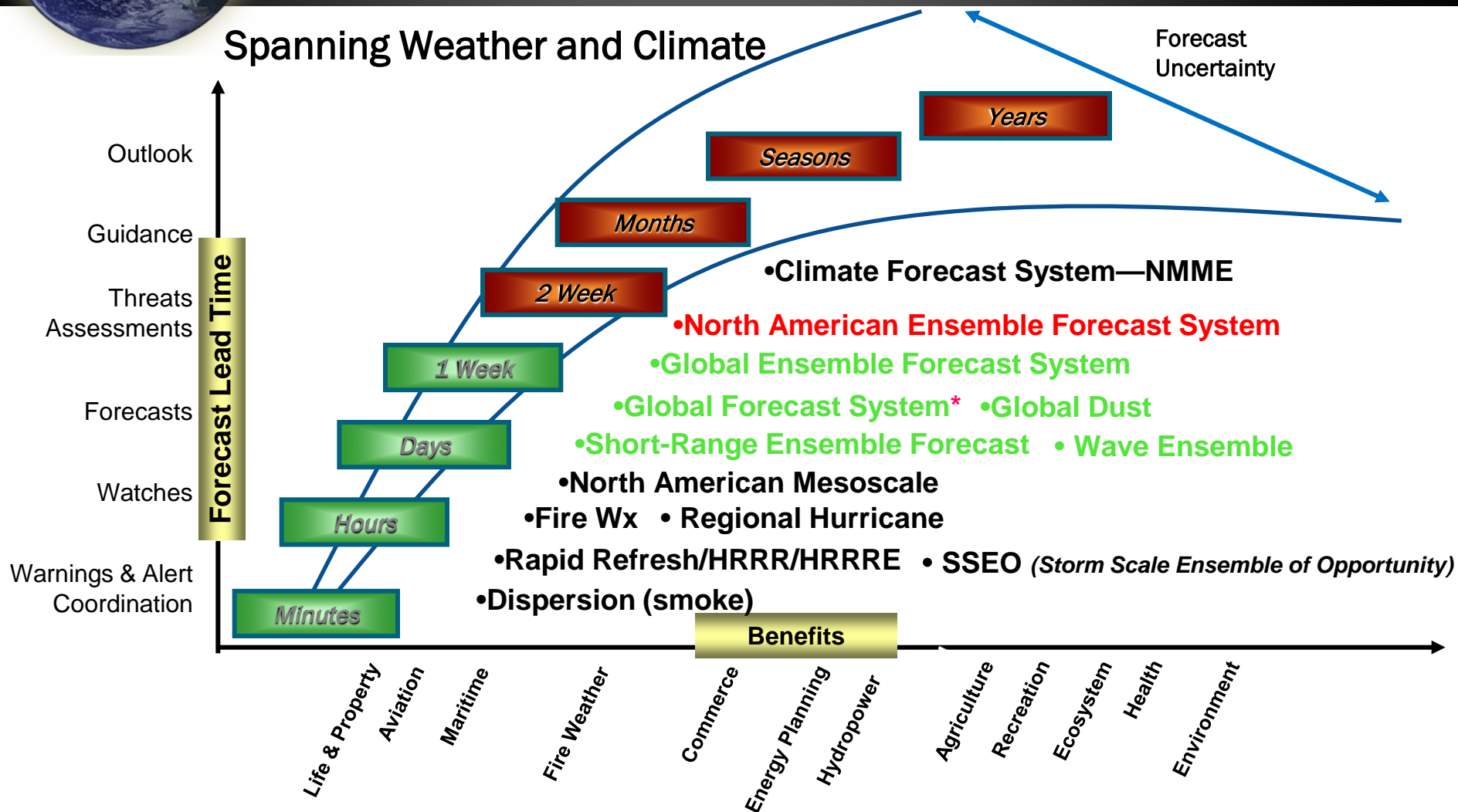


***Involves entire Weather Enterprise WORKING TOGETHER  
to achieve far-reaching national preparedness for extreme weather events***





# Seamless Suite of Forecasts Increasingly Based on Multi-Model Ensembles



\*Dec 2015 - 13km out to 10 days



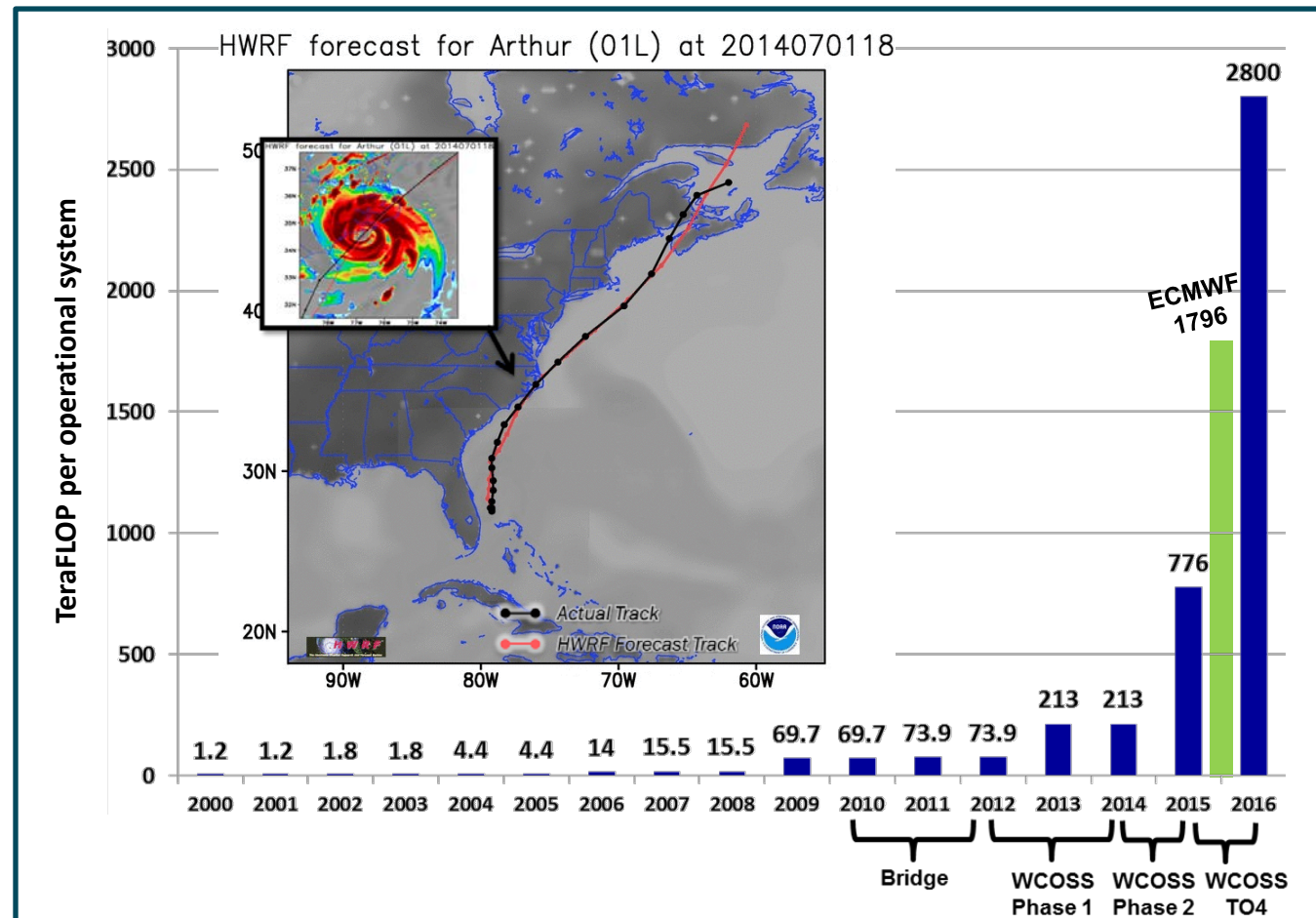


# Current Status of Supercomputer

Increased HPC capacity to 2.8petaFLOPs (for primary and backup, respectively  
– for a total of 5.6 PF) by the end of CY 2015.

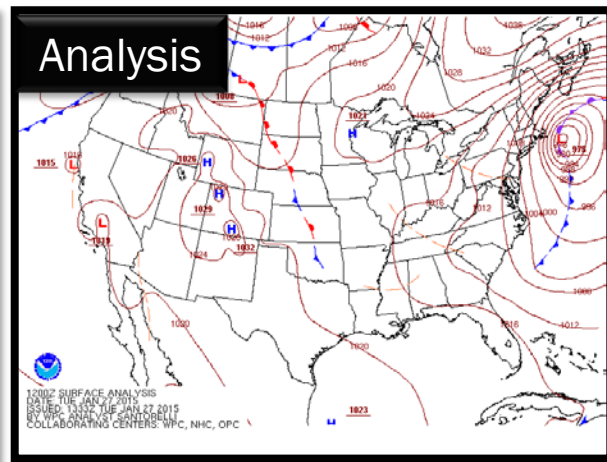
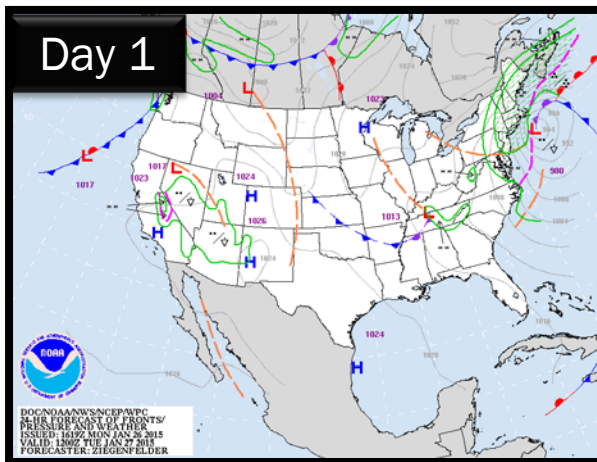
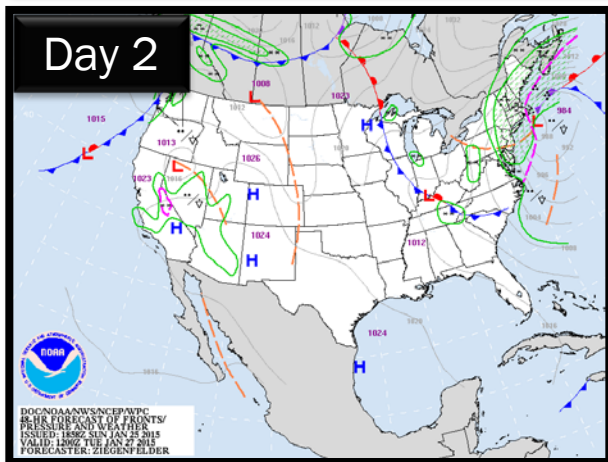
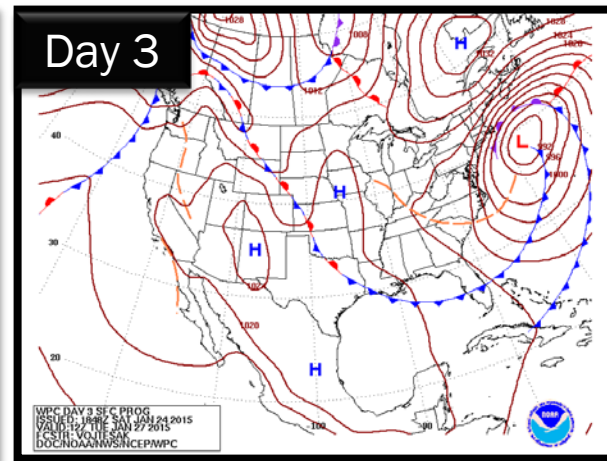
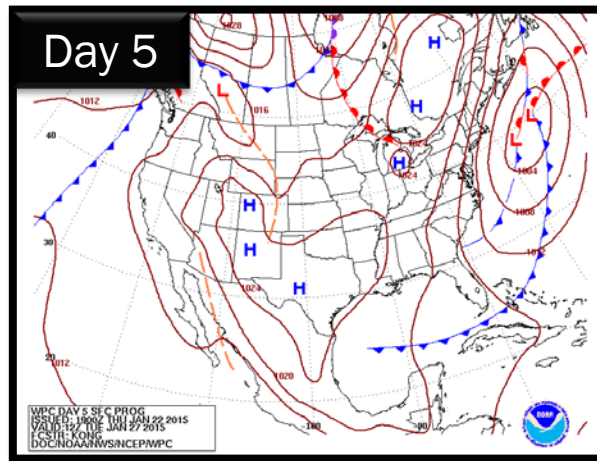
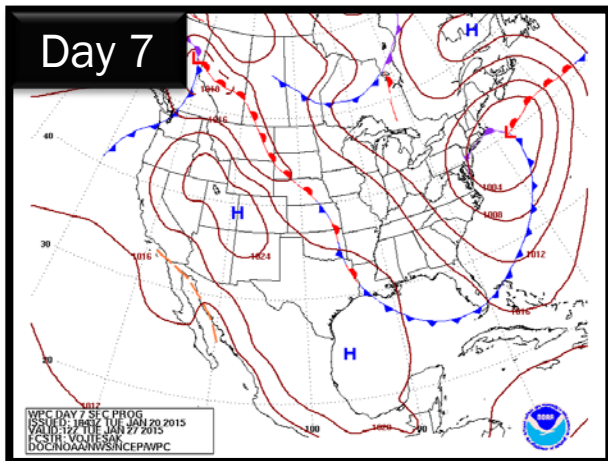
## Key Milestones:

- May 2014: 3km HWRF (Hurricane-Weather Research & Forecasting) model upgraded – best hurricane model in the world.
- Sept 2014: High-Resolution Rapid Refresh (HRRR) operational – 3km every hr.
- Jan 2015: Global Forecast System (GFS) upgraded – 13km out to 10d.
- Upcoming Model Upgrades:
  - HWRF
  - SREF
  - GEFS
  - DA/GFS/4D ENKF
  - HRRR (HRRRe)





# January 25-28, 2015 Blizzard: Forecasting the Storm Days in Advance



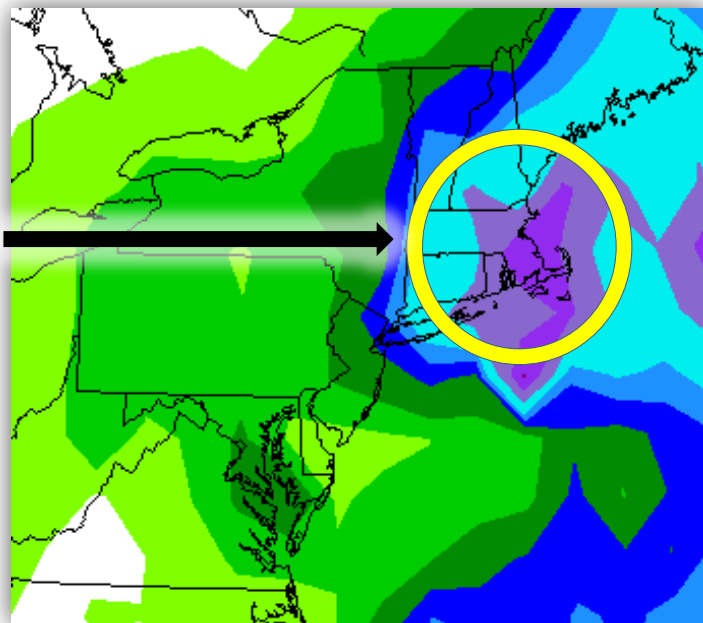




# January 2015 Blizzard Precipitation Forecasts

7AM GFS from Sun Jan 25

GFS very  
accurate &  
consistent  
signal farther  
east.



## Precipitation Forecast

NYC - 0.60 "

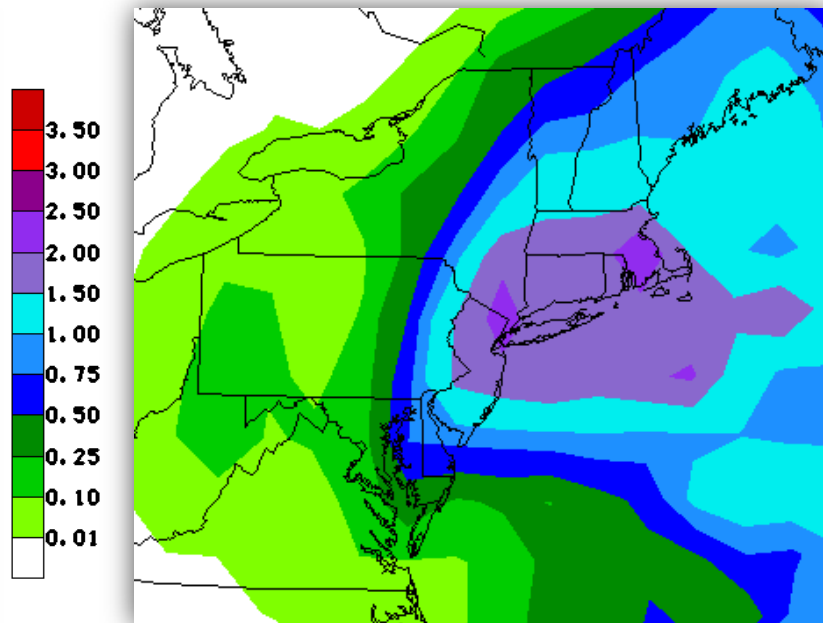
BOS - 2.00"

## Snow Forecast\*

NYC ~ 7.2 "

BOS ~ 24"

7AM ECMWF from Sun Jan 25



## Precipitation Forecast

NYC - 2.10 "

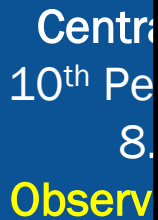
BOS - 2.00"

## Snow Forecast\*

NYC ~ 25.2 "

BOS ~ 24"

**Actual Observed Snowfall: NYC 9.8" BOS 24.6"**







# New Challenge

## **Evolving How We Measure Success**

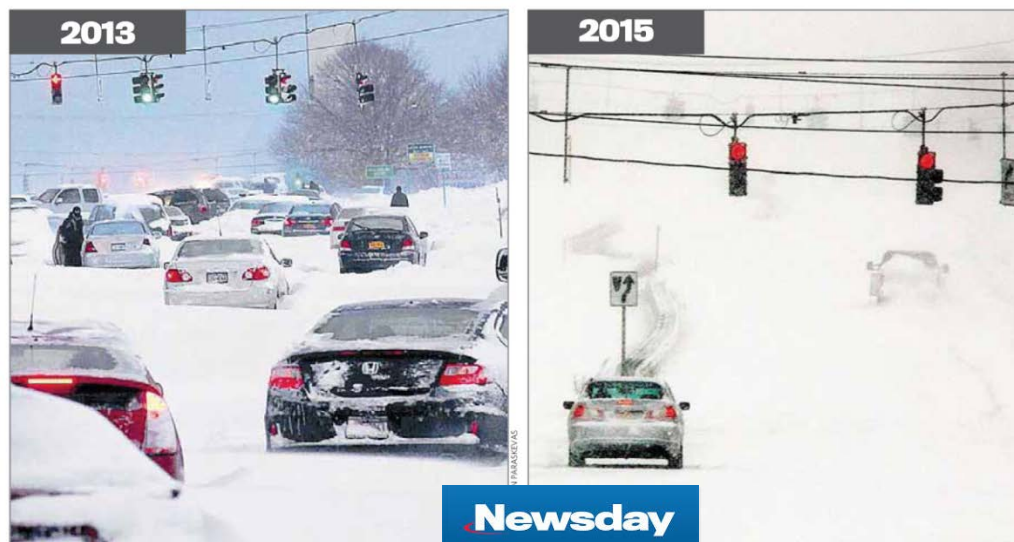
***Moving Beyond Traditional Forecast Metrics To Assess Socioeconomic Impacts***

*The NWS forecast is just that, a “forecast”, and we need to be prepared to respond to incidents based on the best available information. The most important aspect of this event is that people responded, and lives were saved. Although some areas didn’t receive the forecast impacts, there are other areas in southern New England that felt the brunt of this nor’easter.*

**- Craig Fugate, FEMA Administrator**

Joe Esposito @JoeEspoNYC · 19h  
.[@NWSNewYorkNY](#) Thanks for your hard work w/ a difficult forecast. Only missed us by inches on a map. We prepped for the worst. Glad we did.

### **STRANDED IN 2013, SAFE IN 2015**



**ROUTE 347, LAKE GROVE:** Two years ago, a major storm left drivers stranded for hours on this and other roads. But for this week’s storm, Gov. Andrew M. Cuomo imposed a travel ban at 11 p.m. Monday throughout Long Island, and the roads remained clear.



# Summary

## Building a Weather-Ready Nation/Globe

- Making progress in IDSS but we need a better understanding of the human factors as we extend forecast & warnings to a full IDSS paradigm – Social Science!
- Successful IDSS requires – improved forecast/warning with decreased uncertainty
  - Multi-Model Ensembles applied across all scales from climate to mesoscale are now the basis for making this happen -> Congratulations THORPEX

# THANK YOU!



National Weather Service