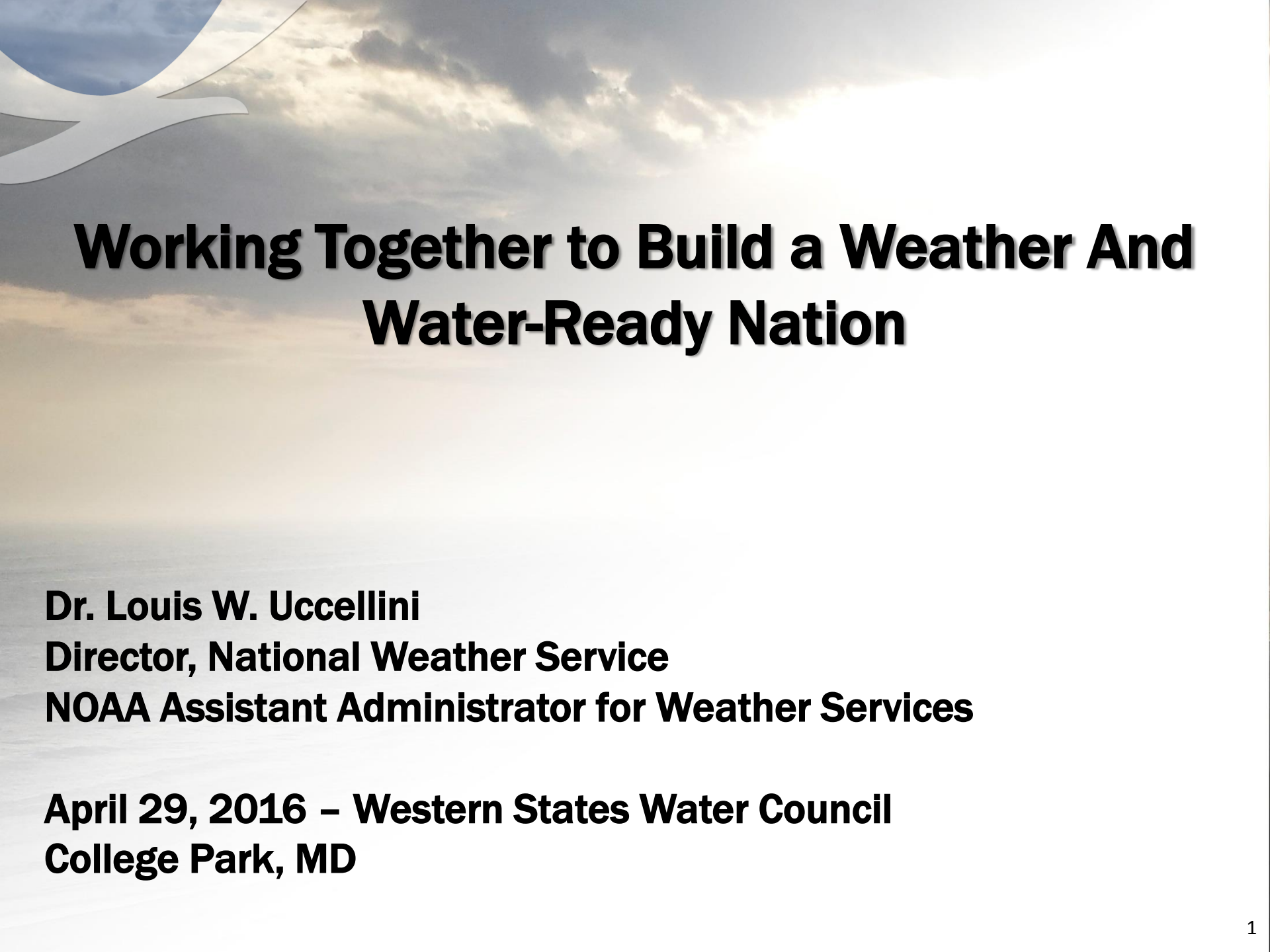




Working Together to Build a Weather And Water-Ready Nation

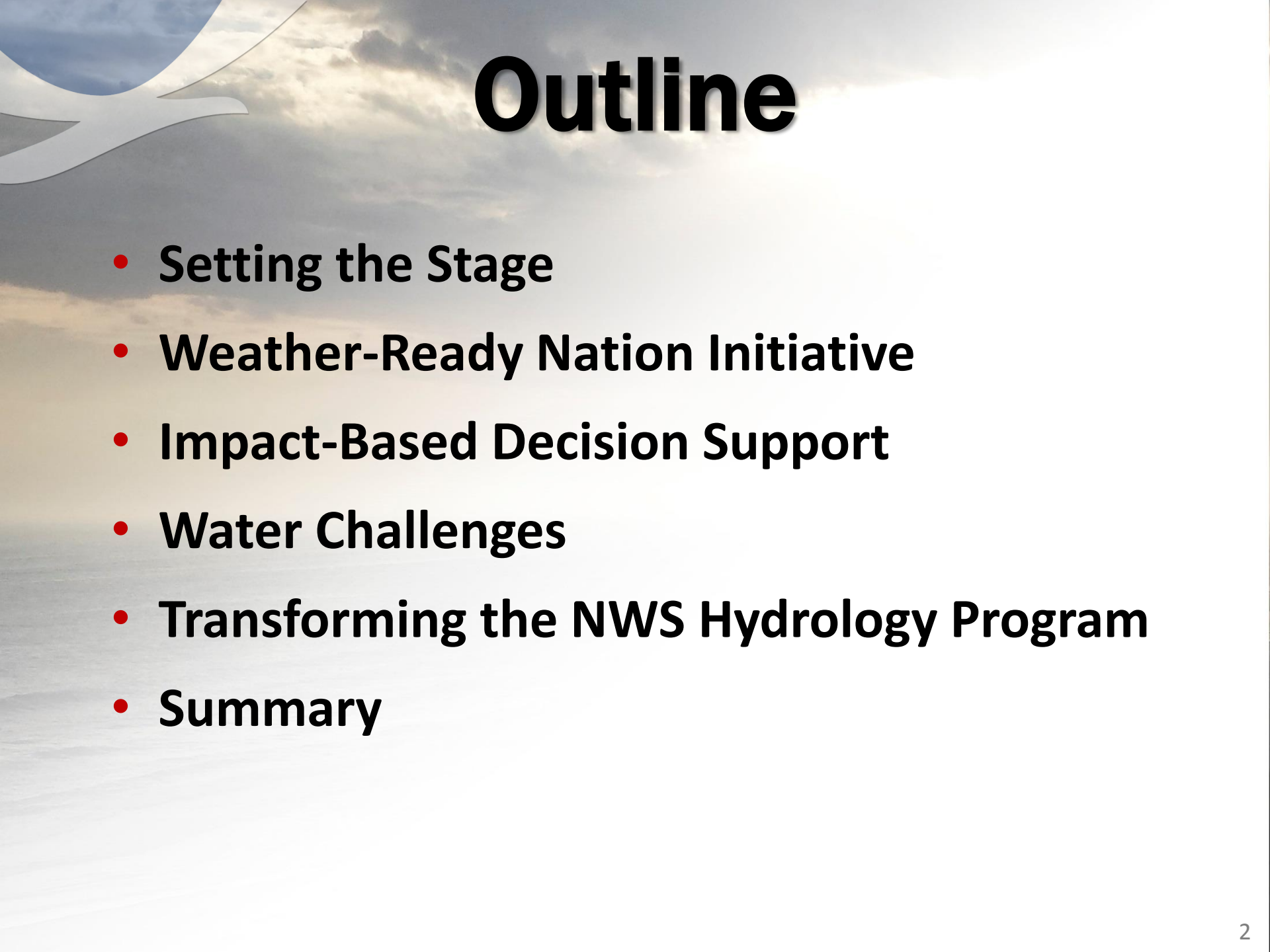
Dr. Louis W. Uccellini

Director, National Weather Service

NOAA Assistant Administrator for Weather Services

April 29, 2016 – Western States Water Council

College Park, MD



Outline

- **Setting the Stage**
- **Weather-Ready Nation Initiative**
- **Impact-Based Decision Support**
- **Water Challenges**
- **Transforming the NWS Hydrology Program**
- **Summary**

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



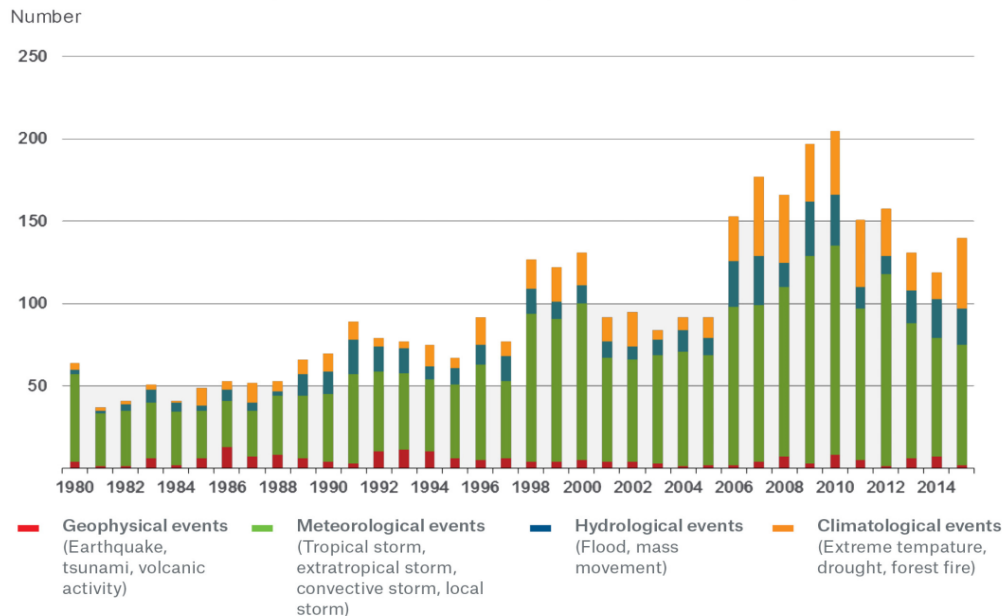
5,000 Floods

Munich Re NatCatSERVICE

Loss events in the U.S. 1980 – 2015

Number of events* *Excludes last week of December 2015

Munich RE 



© 2016 Münchener Rückversicherungs-Gesellschaft, Geo Risks Research – As at January 2016

Increasing Vulnerability

- Increasing population
- More infrastructure at risk
- Signs of sea level rise
- Improved forecasts of extreme events 4-8 days in advance
- Connecting forecasts to decision-makers is basis for building a Weather-Ready Nation

NWS Strategic Outcome: A Weather & Water-Ready Nation

Becoming a Weather-Ready Nation is about building community resiliency in the face of increasing vulnerability to extreme weather, water and climate events

“Ready, Responsive, Resilient”

- **Requires NWS to produce:**
 - *Better forecasts and warnings*
 - *Consistent products and services*
 - *Actionable environmental intelligence*
- **NWS needs to address the “last mile” that connects forecast to critical national, state and location decisions**
 - *Provide Impact-based Decision Support Services (IDSS)*
 - *Deliver through multiple and reliable dissemination pathways*
 - *Work with partners, including embedding NWS in Emergency Operations Centers and incorporating Social Sciences, to gain public’s needed response*



Involves entire US Weather, Water and Climate Enterprise WORKING TOGETHER to achieve national preparedness for weather, climate and water events

Realizing Intrinsic Value

Intrinsic Value is realized through providing Impact-Based Decision Support Services (IDSS)

Generating forecasts and warnings + Connecting those forecasts/warnings with impacts = **IDSS**



The best
hydrometeorological
forecasting in the
world

Practice, practice,
practice!



Develop
relationships/
know partner
needs



Embed



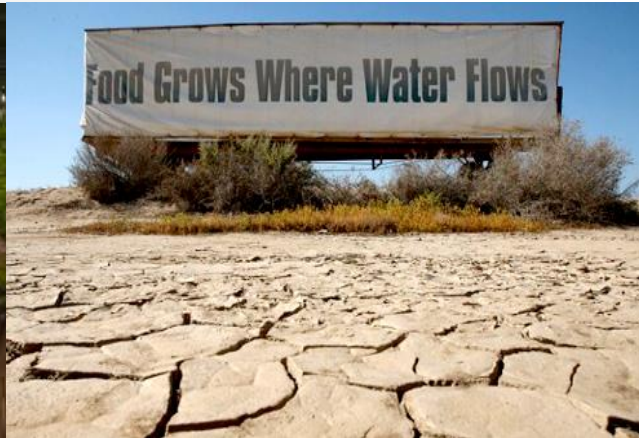
Trust



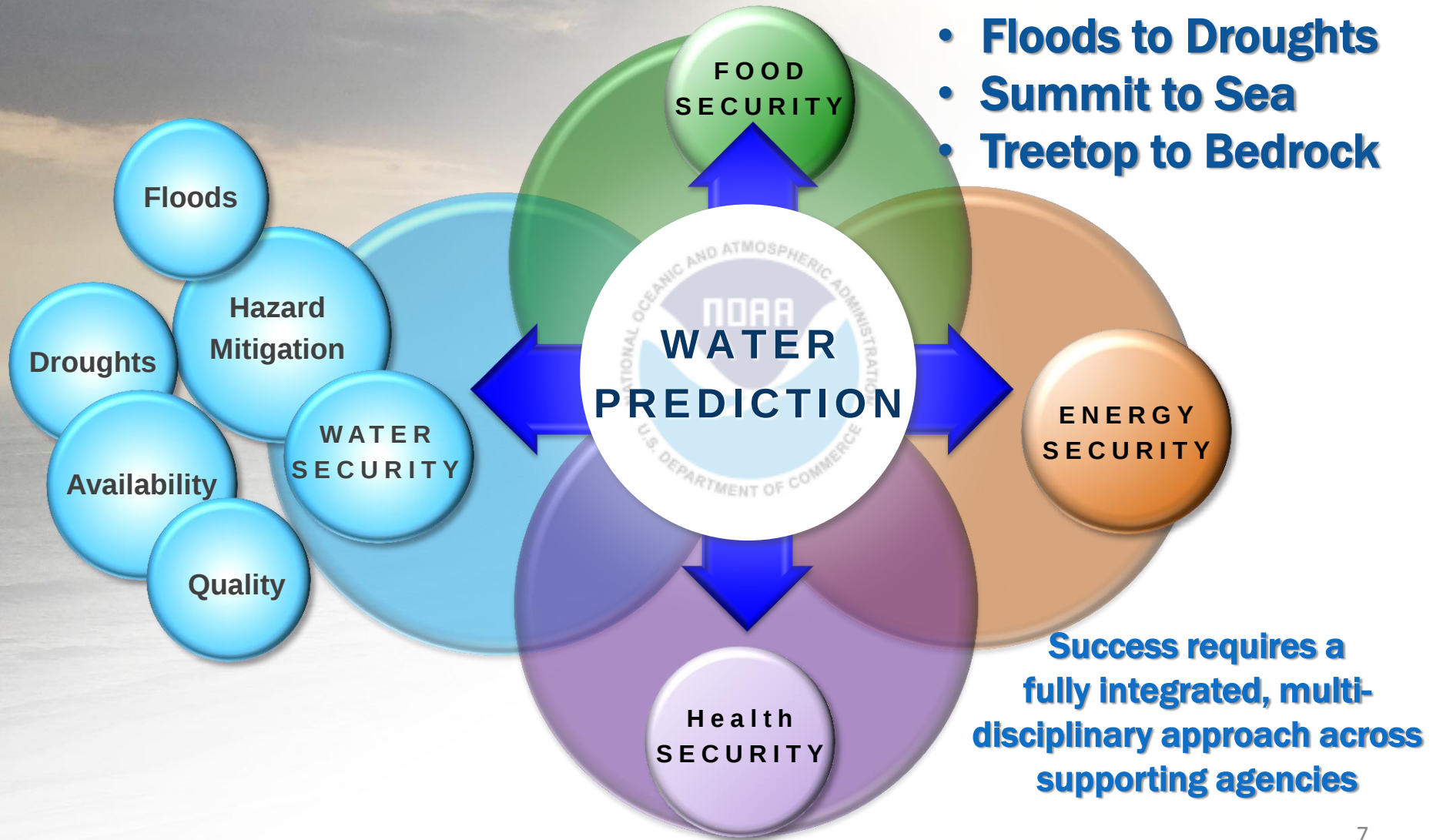
“Ready, Responsive, Resilient”

Interrelated Grand Challenges

- Too Much Water – e.g., Southeast Flooding
- Too Little Water – e.g., Western Drought
- Water Quality – e.g., Harmful Algal Blooms



The Growing Importance of Integrated Water Prediction



NOAA Projects Targeted Toward Improve the ISI Prediction Building Blocks

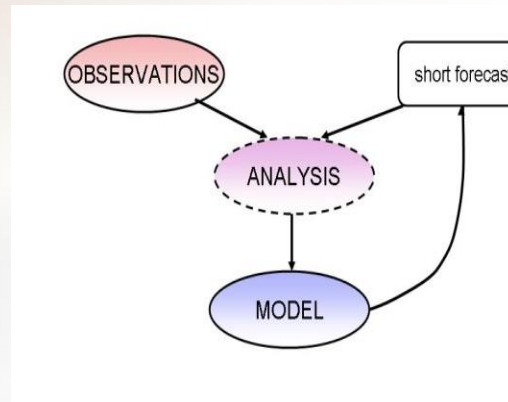
Enhance Observational Networks



- Sustain Ocean Buoys
- JASON Altimetry
- GOES-R
- JPSS

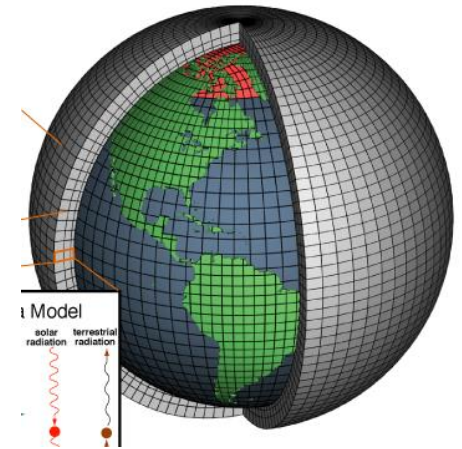


Upgrade Data Assimilation Systems



- 4D-Hybrid Atmosphere
- ENKF-based Ocean Assimilation
- Assimilation of Salinity

Reduce model errors through improved dynamics and physics



- NGGPS Dynamic Core
- NGGPS Physics
- Week 3-4

National Water Center

University of Alabama – Tuscaloosa, AL



VISION: Scientific excellence and innovation driving water prediction to support decisions for a water resilient nation

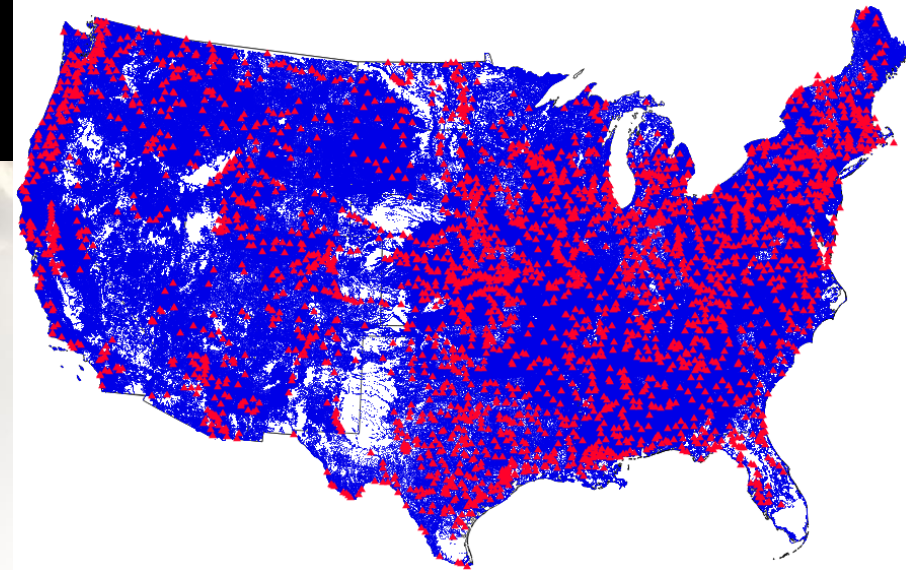
BENEFITS:

- State-of-the science modeling for global to street level predictions (*from 6,000 forecast locations to 2.7 million stream reaches*)
- Operations Center to establish common operating picture within NOAA and among water agencies; decision support for floods to droughts (*flood mapping to street level*)
- Proving ground to accelerate research to operations; partnerships with research communities (*e.g. CHUASI, National Flash Flood Interoperability Experiment*)
- Data integration and service backup

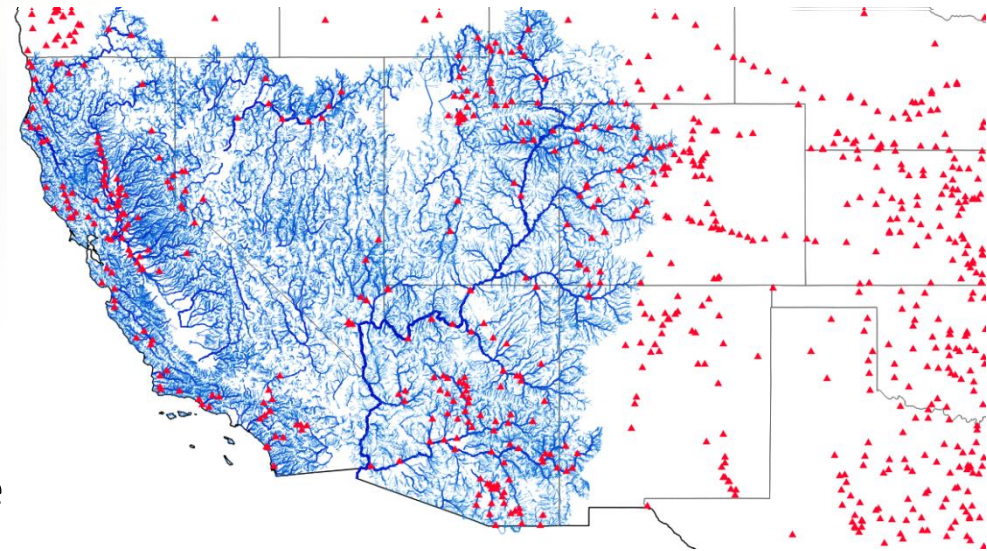
National Water Model (NWM)

IOC Experimental Output (FY16)

- **Hydrologic Output**
 - River channel discharge and velocity at 2.7 million river reaches
 - Surface water depth and subsurface flow (250 m CONUS+ grid)
- **Land Surface Output**
 - 1km CONUS+ grid
 - Soil and snow pack states
 - Energy and water fluxes
- **Data Services**
 - Public-facing NWC website
 - Data feed to River Forecast Center
 - NOMADS data service



Current NWS AHPS locations (red)
NWM output locations (blue)

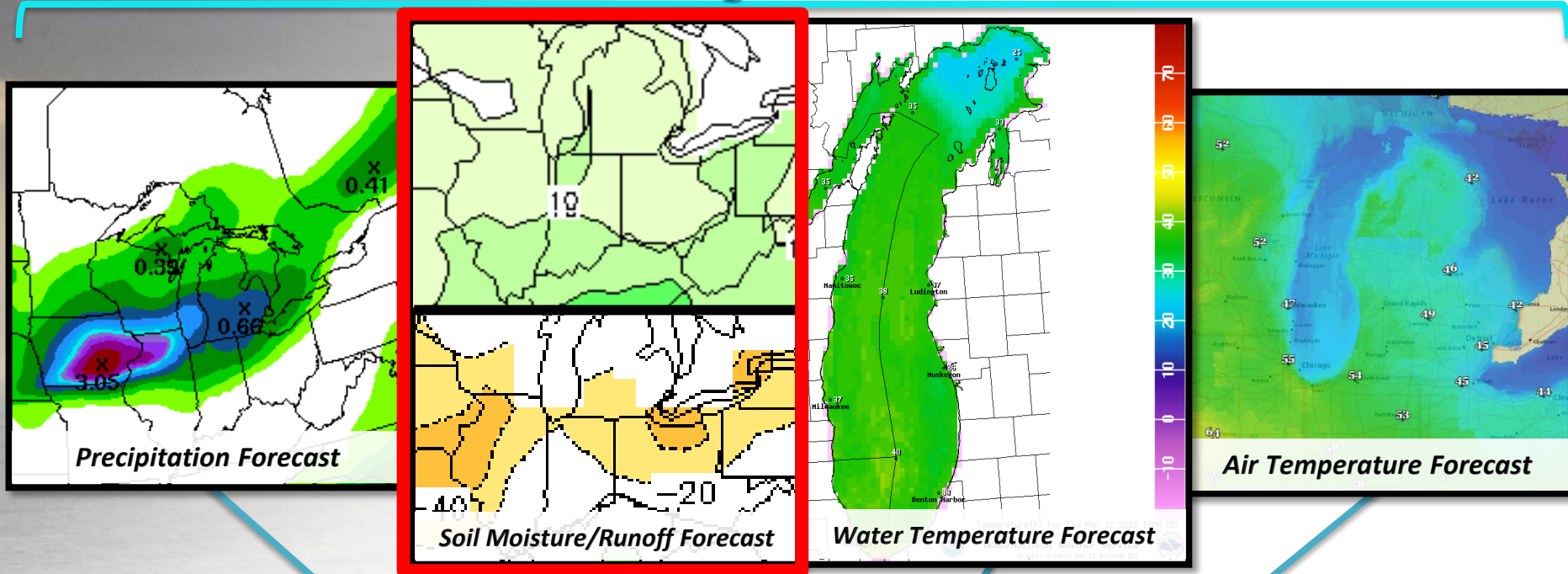


Current NWS River Forecast Points (triangles)
Overlaid with NWM Stream Reaches

Taking Prediction to the Next Level

with NOS, OAR, NMFS, NESDIS

Existing Products



HAB

Hypoxia

Vibrio

Beach Quality

Health Vectors

Summary

- Building a Weather-Ready Nation: **“Ready – Responsive – Resilient”**
- NAPA NWS Review: Great strategic plan -- ***“Can’t do it alone”***
- Poised to extend “Weather-Ready” to “Water-Ready” , transforming the NWS Hydrology Program from observations to forecasts/warnings to Decision Support Services
- Challenges lie ahead to advance Impact-Based Decision Support Services (physical and social sciences)
 - Improve weather and water forecasts/warnings
 - Better quantify and communicate forecast uncertainty to convey risk
 - Map forecasts to infrastructure to better inform key decision makers
 - Address shifting risk preferences among all decision makers

Save lives and mitigate property losses