NWS Participation in the National ESPC

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NWS AA
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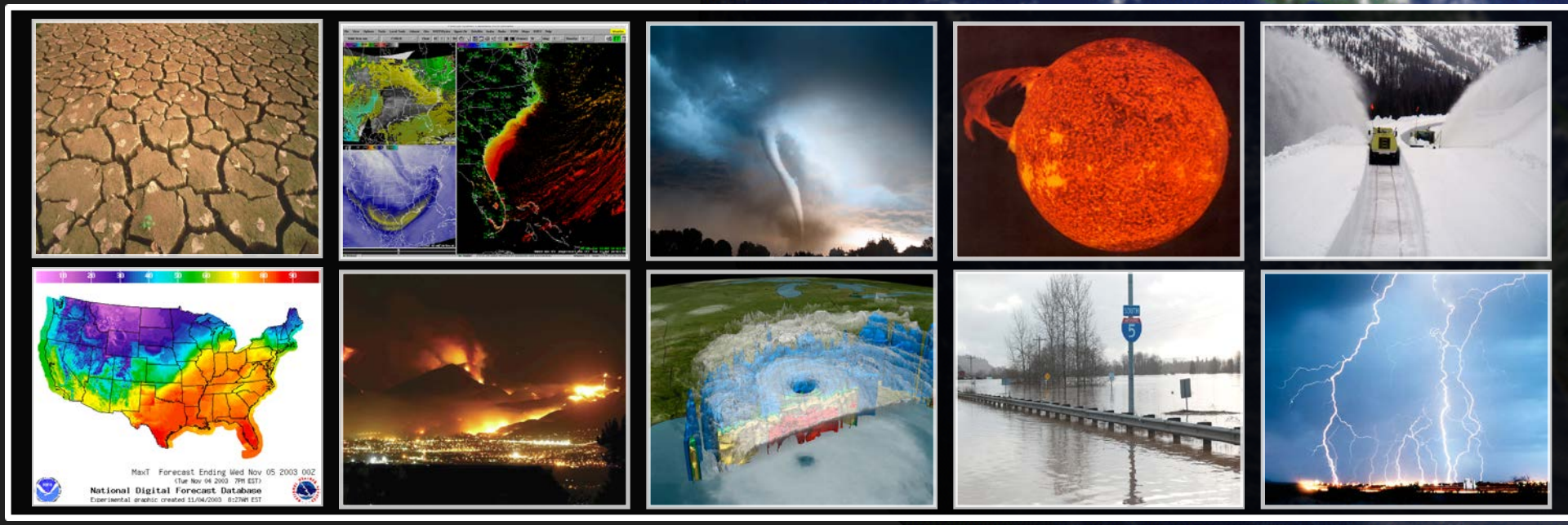


Outline

- Strategic Imperative: Building a Weather-Ready Nation
- Model Basis for Meeting NWS Mission
  - Earth System Models
  - Multi-model Ensembles
- Importance of ESPC to NWS
- Leaning Forward to Engage Research and Operational Communities

NWS Mission

- Broad – protection of lives and property
  - From space weather to high seas "from the sun to the sea"
  - From climate to extended weather forecasts and warnings for extreme events
- Science-based Service Agency
- Success depends on:
  - Science/technology-based improvements
  - Enhanced forecast capabilities
  - Forecasters delivering Impact-based Decision Support Services

Strategic Imperative:
Building a Weather-Ready Nation

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, water and climate events

"Ready, Responsive, Resilient"

REQUIRES NWS TO:

- Fully integrate our field structure to produce:
  - *Better forecasts and warnings*
  - *Consistent products and services*
  - *Actionable environmental intelligence*
- 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 and incorporating Social Sciences

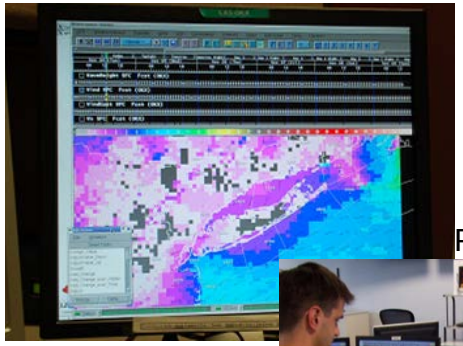
We have 2200 WRN Ambassadors

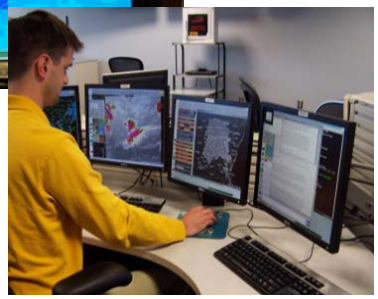
Involves entire US Weather, Water and Climate Enterprise WORKING TOGETHER to achieve far-reaching national preparedness for weather events

Evolving to Build a Weather-Ready Nation

Evolving is a journey … not a destination!

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

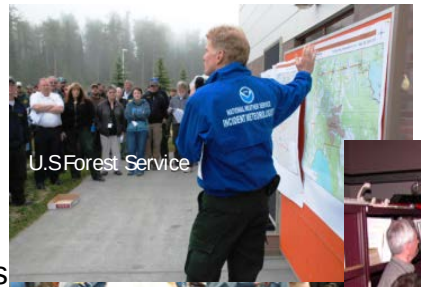




Forecast and Warning Products

PRACTICE, PRACTICE, PRACTICE

Personal relationships

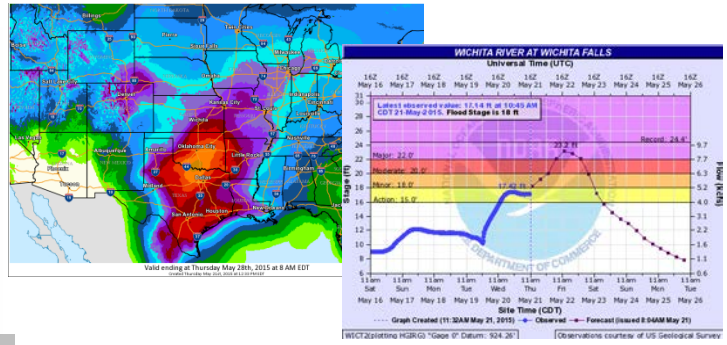


Impact-based Decision Support Services

Major cultural shift as seen by OWA review

Extending Decision Support Services

Heavy Rain and Flooding Example



FEMA Prepositions recovery assets

Headlined moderate, significant risks 8 days in advance

State & local Emergency Managers prepare local communities

Excellent collaboration among NWS weather & water forecasters

State & local authorities harden priority assets & respond to event

Provided on-site decision support service to FEMA, state, local emergency ops centers

Days to Event

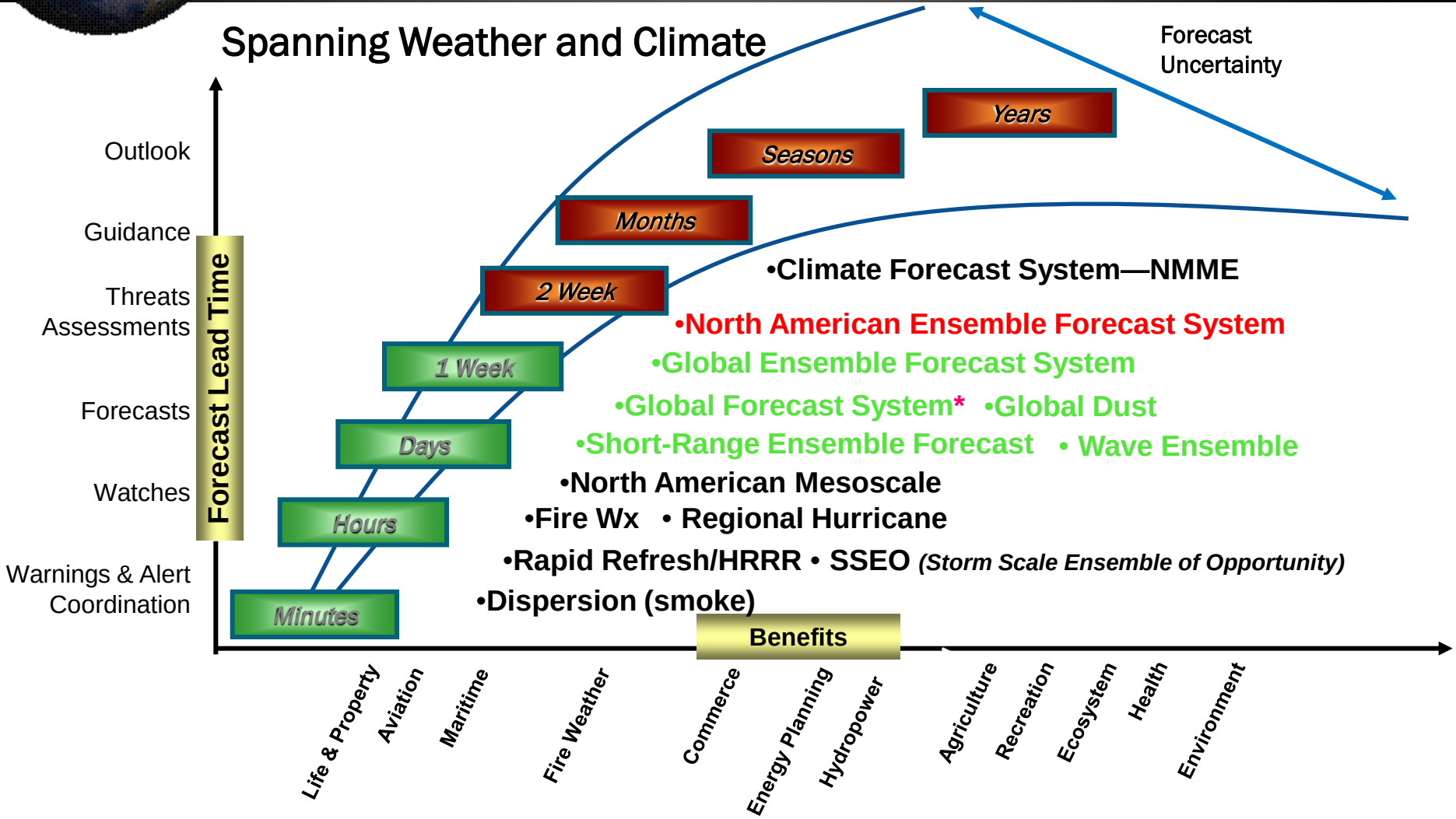
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | *Event*

Providing impact based decision support services must account for "shifting risk preferences" and related options.

Model Basis for Meeting NWS Mission

- Earth System Models
- Multi-model Ensembles

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



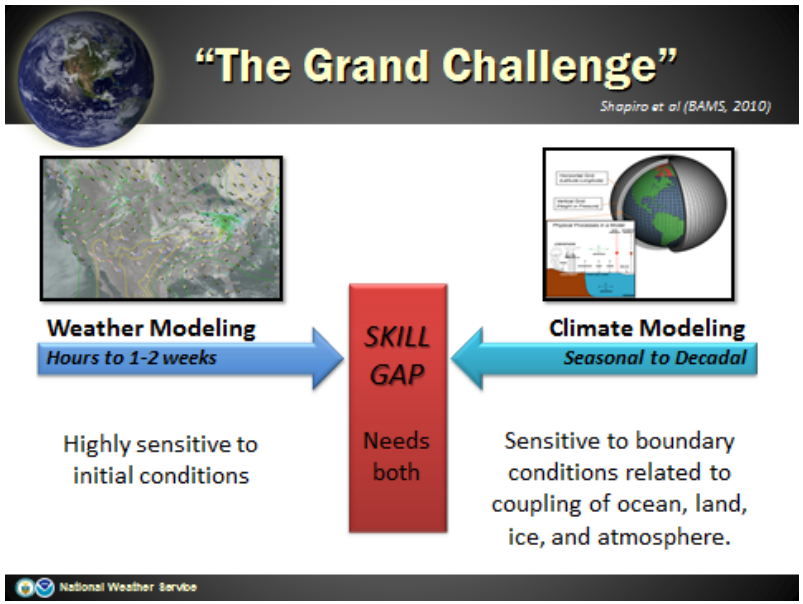
Importance of the ESPC

Why is ESPC Important?

- Building a Weather-Ready Nation is a remarkable goal
  - NAPA: "…can't accomplish it alone"
- Have to build off our ongoing collaboration with scientific and operational communities
  - Operational Ocean/Ocean DA, Ice Models from NOPP/Navy
  - LDAS/NOAH (led by NASA GSFC)
  - New 4D ENKF Hybrid Data Assimilation; GEFS-NAEFS (led by THORPEX-based science team)
  - Community approach to assimilate satellite data through JCSDA
  - New water/river model – WRF Hydro to be implemented in FY 16
  - Space weather models derived entirely from academic communities
- Need to pull these community-based efforts within Next Generation Global Prediction System – NOAA's component of the National ESPC effort

Why is ESPC Important?

- Scientific benefits: Ability to address WMO "Grand Challenge" described in BAMS (2010) which served as a basis for spinning up the ESPC



- Concurrently: UMAC review of the NWS model suite - Simplify NWS model suite while addressing ongoing mission requirements and Grand Challenge with a "unified" modeling approach
- The National ESPC provides the opportunity for the NWS to attain this goal through a partnership with the larger research and operational communities

Leaning Forward to Engage Research and Operational Communities

The National ESPC: Coordinating the Giant

- Adopting common model architecture (ESMF)
- Multi-model ensembles (e.g. NMME, NUOPC, NAEFS) implemented with ESPC operational members and international research teams (THORPEX)
- Combining resources and investment across multiple agencies to embrace operational prediction
- Quantifying predictive uncertainty to address the Grand Challenge
- Working together, we can accelerate coupled air-ocean-land-ice-global model development through the Next Generation Global Prediction System (NGGPS)
- NGGPS Status:
  - Down selected two dynamic core for consideration
  - NWS providing $3.5 million in grant money to outside communities (call for proposals is out)

The NWS and the National ESPC: Our Commitment

The NWS remains committed to the National ESPC to advance our model suite through this important community effort.

THANK YOU!

Increase in Extreme Events

"Average" Year and Trends in the U.S.

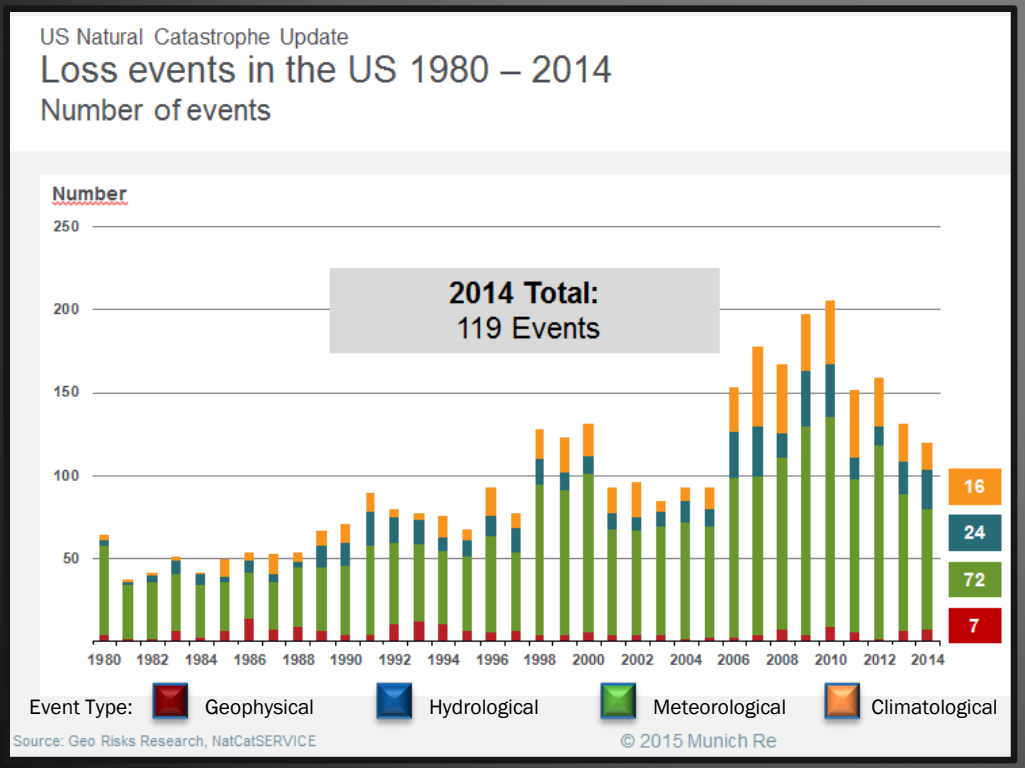
650 Deaths
$15B in Losses

26,000 Severe Thunderstorms

6 Atlantic Basin Hurricanes

1,300 Tornadoes

5,000 Floods



- Increasing population
- Increasing vulnerability
- More infrastructure at risk
- Signs of climate change

- Improved forecasts of extreme events 4-8 days in advance
- Need to take these forecasts to the next level for effective decision support