

NOAA National Weather Service

101 Presentation

Building a Weather-Ready Nation

(Name and title of speaker)



October 2011

2011: A Year of Extremes

~600 Fatalities

\$50 Billion in Economic Losses



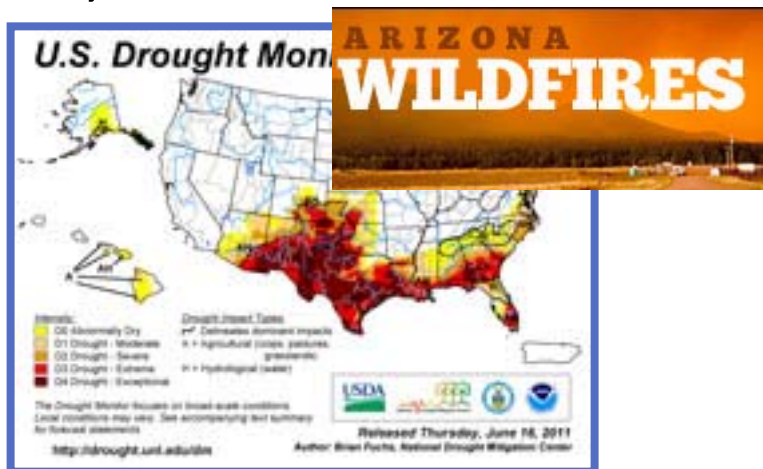
**546 Fatalities from
1,748 Tornadoes**



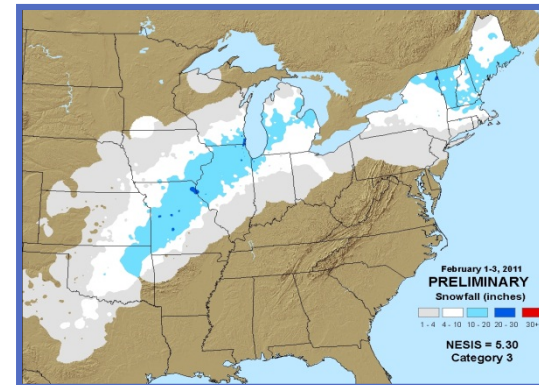
Historic U.S. Floods



Pacific Tsunami



6 Million Acres Burned



Devastating Blizzards



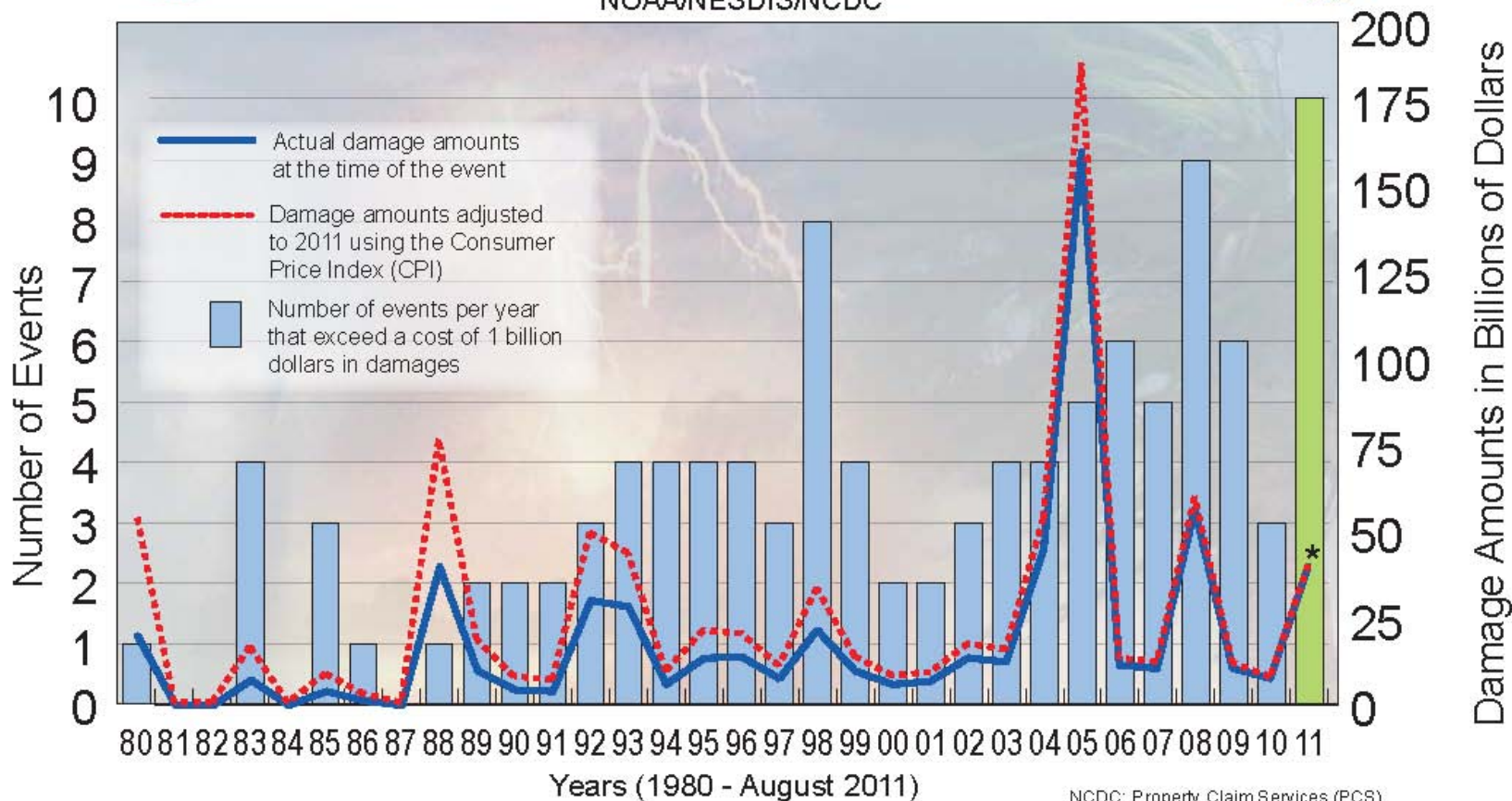
2011: A Year of Extremes



Billion Dollar U.S. Weather/Climate Disasters 1980 - August 2011



NOAA/NESDIS/NCDC



NCDC; Property Claim Services (PCS)

* This damage amount does not take into account the losses from Hurricane Irene

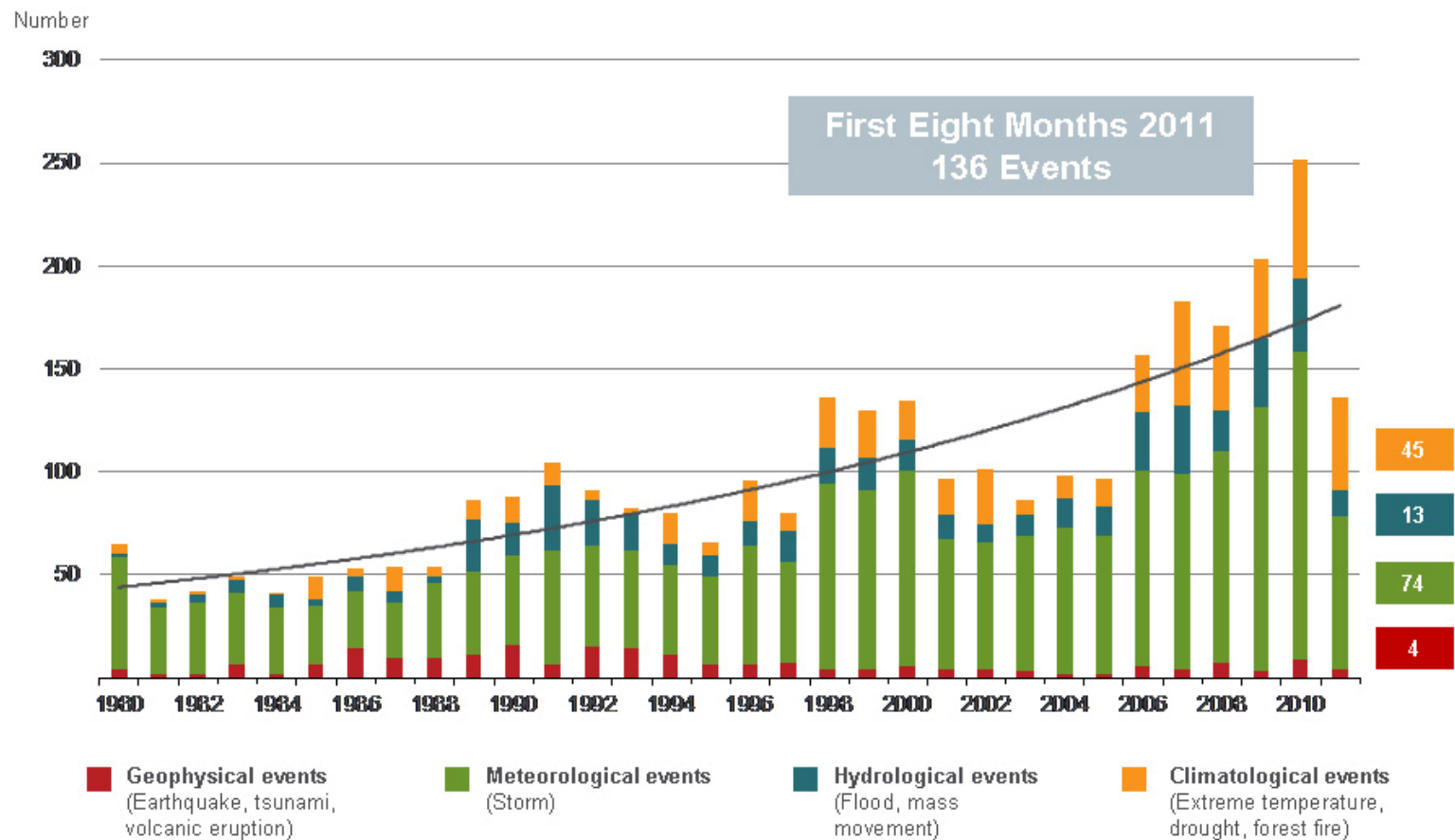
A Changing World

Increased Vulnerability to High-Impact Weather

NatCatSERVICE

Natural Disasters in the United States, 1980 – 2011

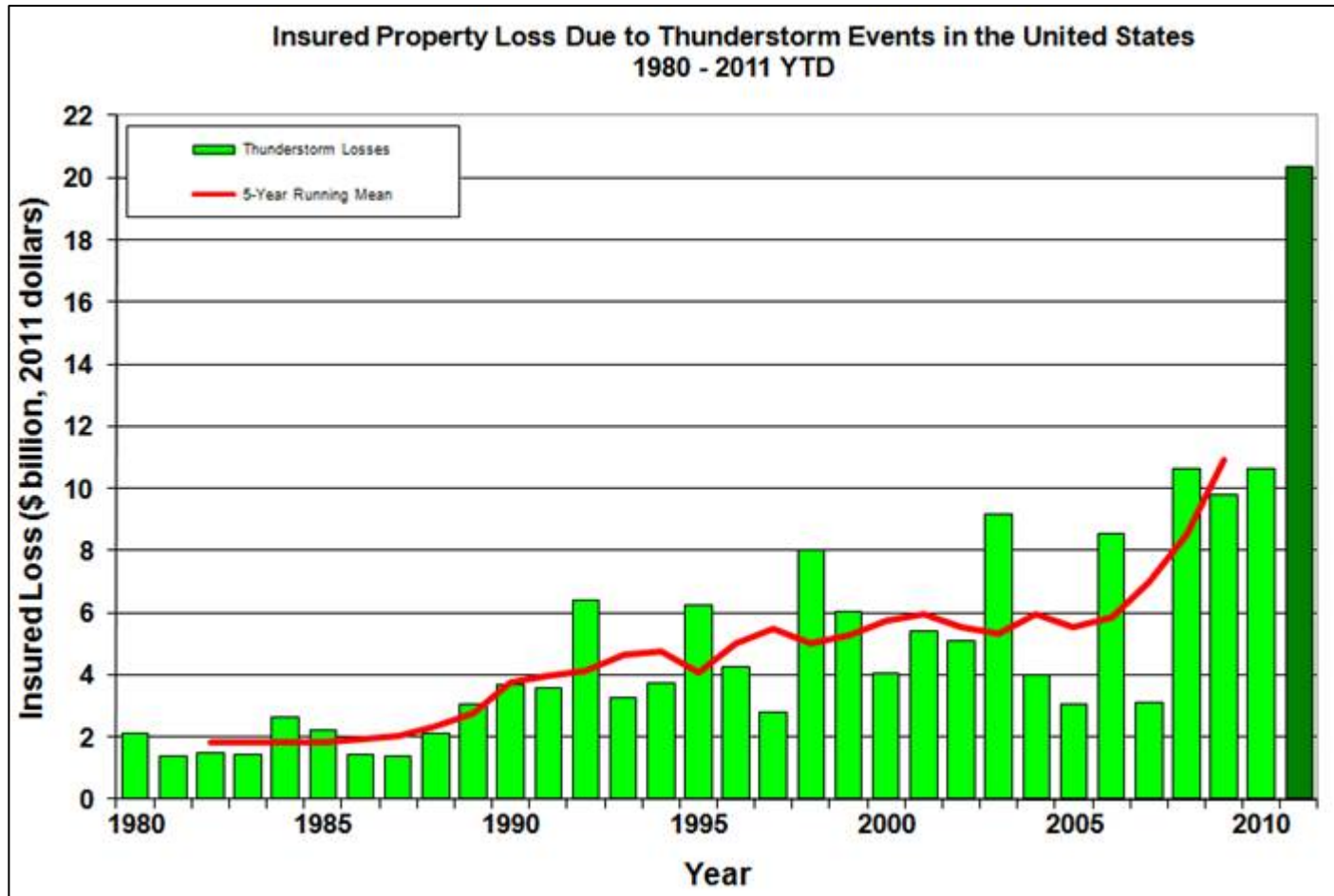
Number of Events (Annual Totals 1980 – 2010 vs. First Eight Months 2011)



U.S. Thunderstorm Loss Trends

Annual Totals 1980 – 2010 vs. First Half 2011

Average thunderstorm losses have increased fivefold since 1980.



2011 Historic Tornado Year

➤ May 22, Joplin EF-5 tornado

- *151 fatalities*
- *Deadliest single tornado since modern record keeping began in 1950*
- *7th deadliest in U.S. history*

➤ Early Warning

- *Outlooks: 5 days before*
- *Watches: Hours before*
- *Warnings: 24 minutes*

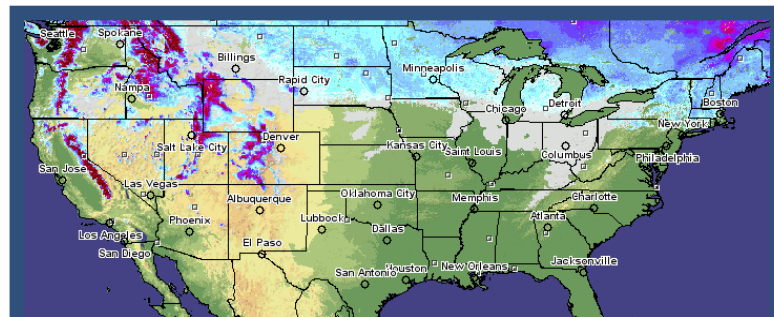


2011 EF-5 Tornadoes

Date	Location	Death Toll	Path Length
April 27, 2011	Smithville, MS - Shottsville, AL	22	75 miles (121 km)
April 27, 2011	Hackleburg, AL - Huntland, TN	71	132 miles (212 km)
April 27, 2011	Philadelphia, Mississippi	3	29 miles (47 km)
April 27, 2011	Rainsville, Alabama	26	33.8 miles (54.4 km)
May 22, 2011	Joplin, Missouri	158	22.1 miles (35.6 km)
May 24, 2011	Calumet - El Reno - Guthrie, Oklahoma	9	65 miles (105 km)

2011 Historic Flooding Year

- Major - to - record flooding
- Severe impact on Agriculture, Infrastructure, Navigation, Transportation and Economy
- Estimates upwards of \$10-Billion in losses from Mississippi alone



Widespread Snow Cover – through Mid-March

North Central U.S. Spring Flood Risk



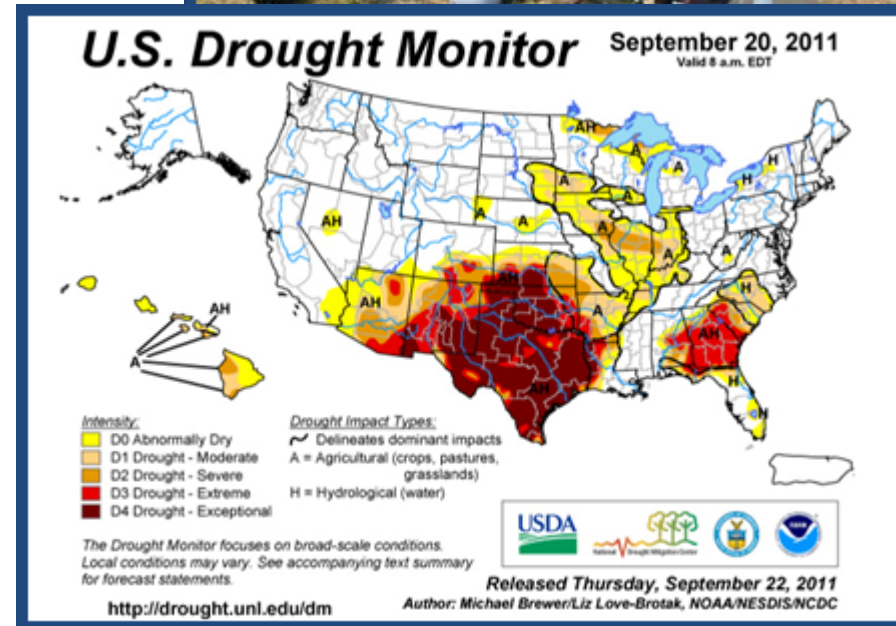
2011 Red River / Missouri River / Mississippi River

- **Wet Winter/Spring**
- **NWS Outlooks & Forecasts**
 - *What/When/To Whom*
 - **Jan-Feb: Briefings highlighted threat of major spring floods**
 - **May-June: Weekly outlooks**
 - **3-5 Days: Warnings**
 - *Communities Alerted to Prepare:*
 - **Evacuations, spillways opened, levies breached**



2011 Drought & Wildfires

- Exceptional drought widespread in TX, OK, NM, KS
- Wildfires have claimed 6.3M acres so far in 2011
- NWS Support
 - *Outlooks: Increased drought*
 - *Watches: 5-7 days*
 - *Red Flag Warnings*
 - *IMET deployments*



NWS Vision & Mission

Vision

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

Mission

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

- **Protect life and property**
- **Enhance national economy**



NWS Organization

LEADERSHIP

Assistant Administrator
for Weather Services
Dr. John "Jack" L. Hayes

Deputy Assistant
Administrator
for Weather Services
Laura K. Furgione

LEADERSHIP/HQ STAFF OFFICES

Chief Information
Officer
Iftikhar Jamil

Chief Financial/
Administrative Officer
Robert J. Byrd

Climate, Water, &
Weather Services
David Caldwell

International Activities
**Courtney Draggon
(Acting)**

Strategic Planning
and Policy
Dr. Edward Johnson

Hydrologic
Development
Gary Carter

Operational
Systems
Mark Paese

Science &
Technology
Don Berchoff

EEO & Diversity
Management
Charly Wells

REGIONAL OFFICES

Eastern Region
**Micky Brown
(Acting)**

Central Region
**Lynn P.
Maximuk**

Southern
Region
Bill Proenza

Western Region
Vickie L. Nadolski

Alaska Region
Dr. Frank Kelly

Pacific Region
Ralph J. LaDouce

NATIONAL CENTERS

National Centers for
Environmental Prediction
Dr. Louis W. Uccellini

Environmental
Modeling Center
Dr. Stephen Lord

Hydrometeorological
Prediction Center
Dr. James Hoke

Storm Prediction
Center
Russ Schneider

National Hurricane
Center
Bill Read

Ocean Prediction
Center
Dr. Ming Ji

Climate Prediction
Center
Dr. R.W. Higgins

NCEP Central
Operations
Ben Kyger

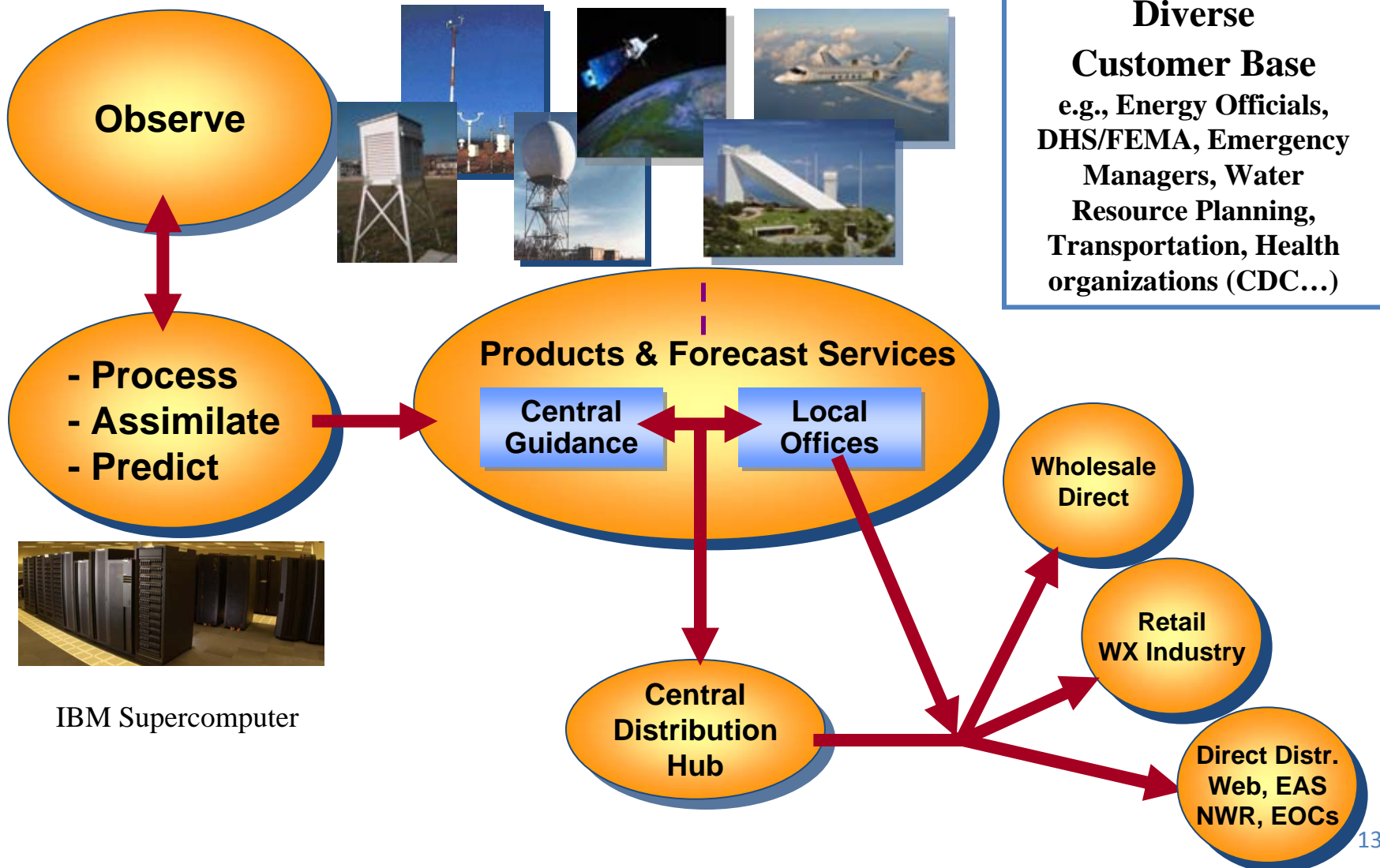
Space Weather
Prediction Center
Dr. Tom Bogdan

Aviation Weather
Center
Robert Maxson



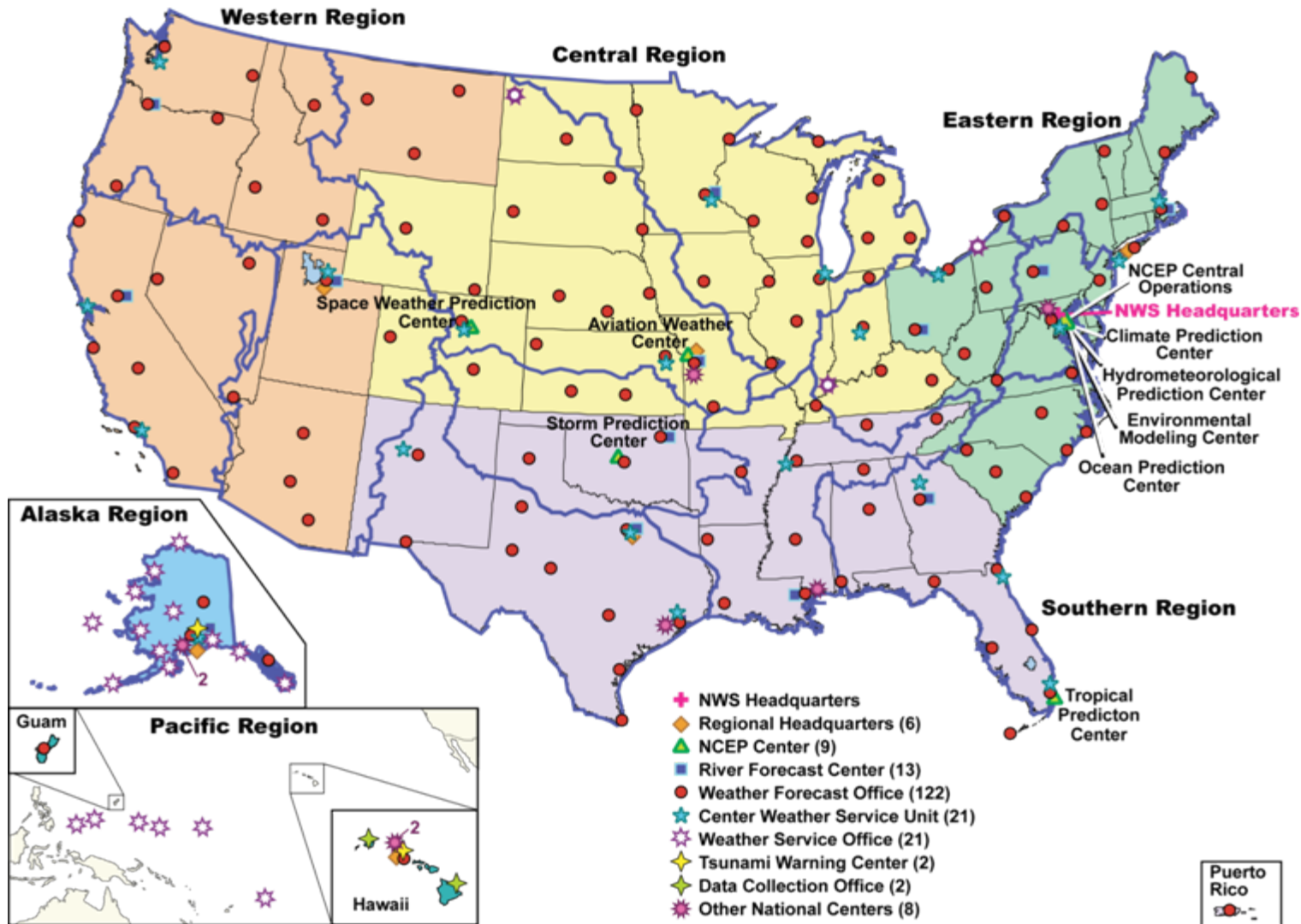
NWS Operations

How We Predict and Protect



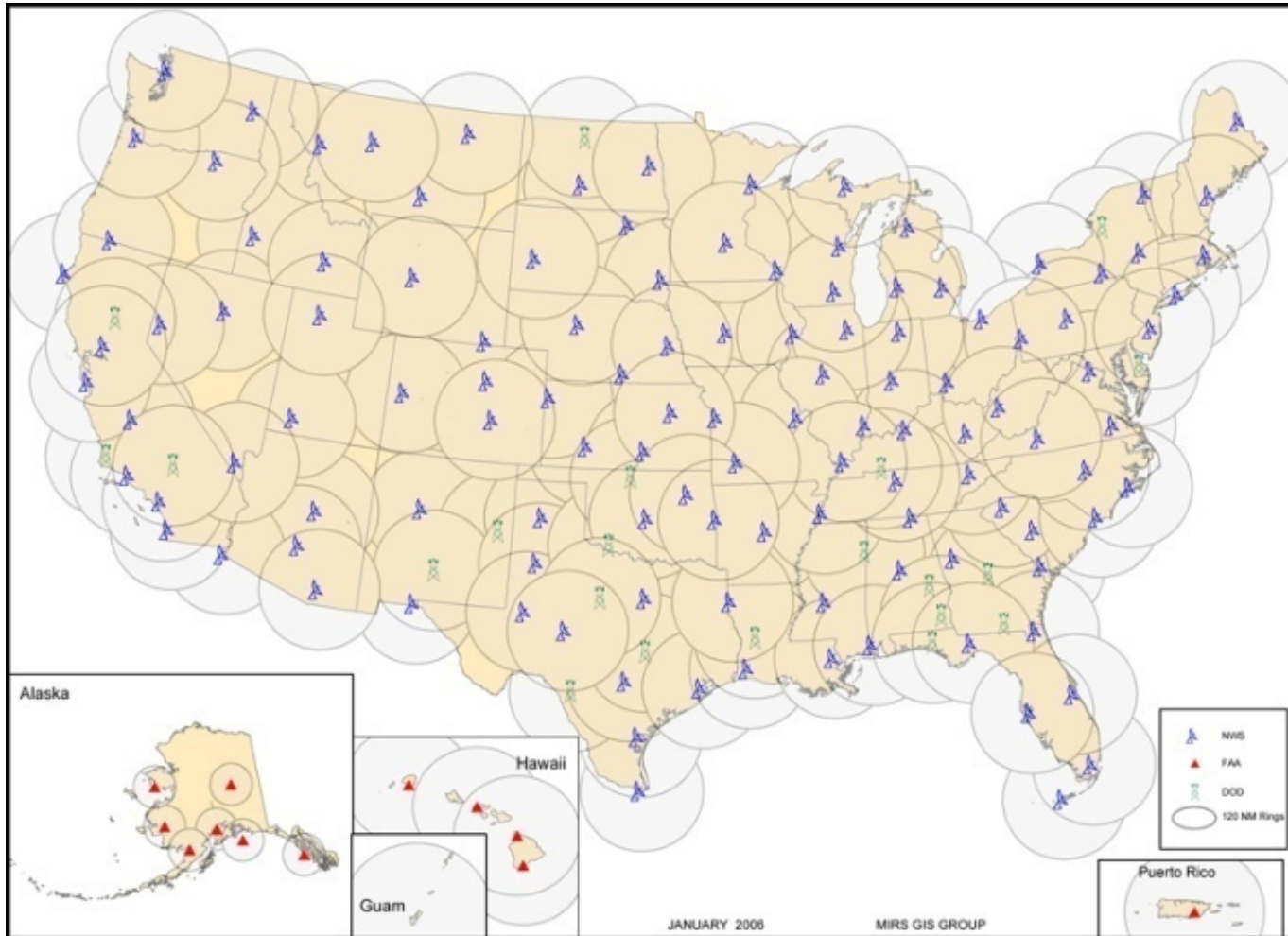
NWS Operations

Weather Forecast Office Community Presence



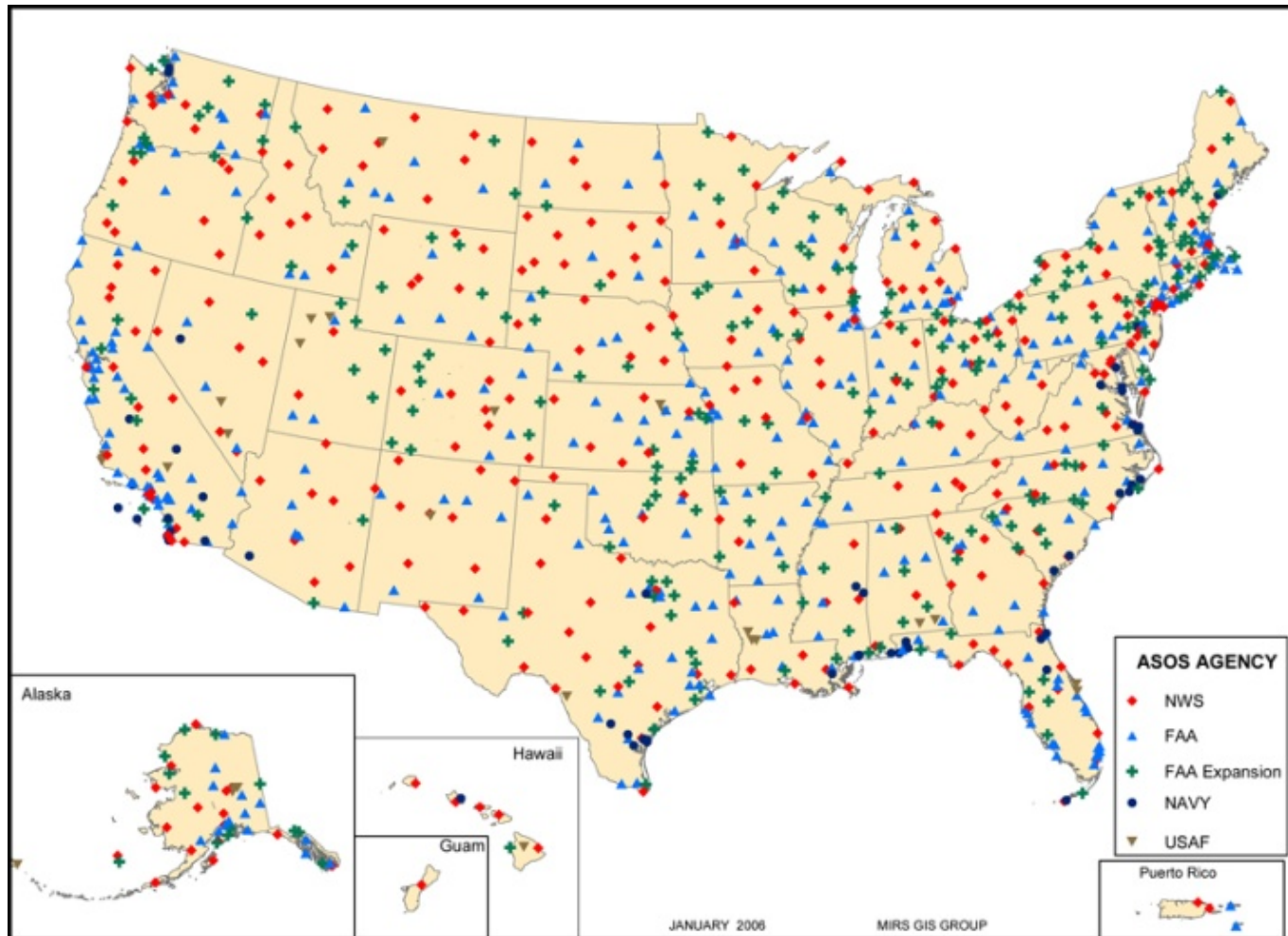
NWS Observations

Doppler Radars



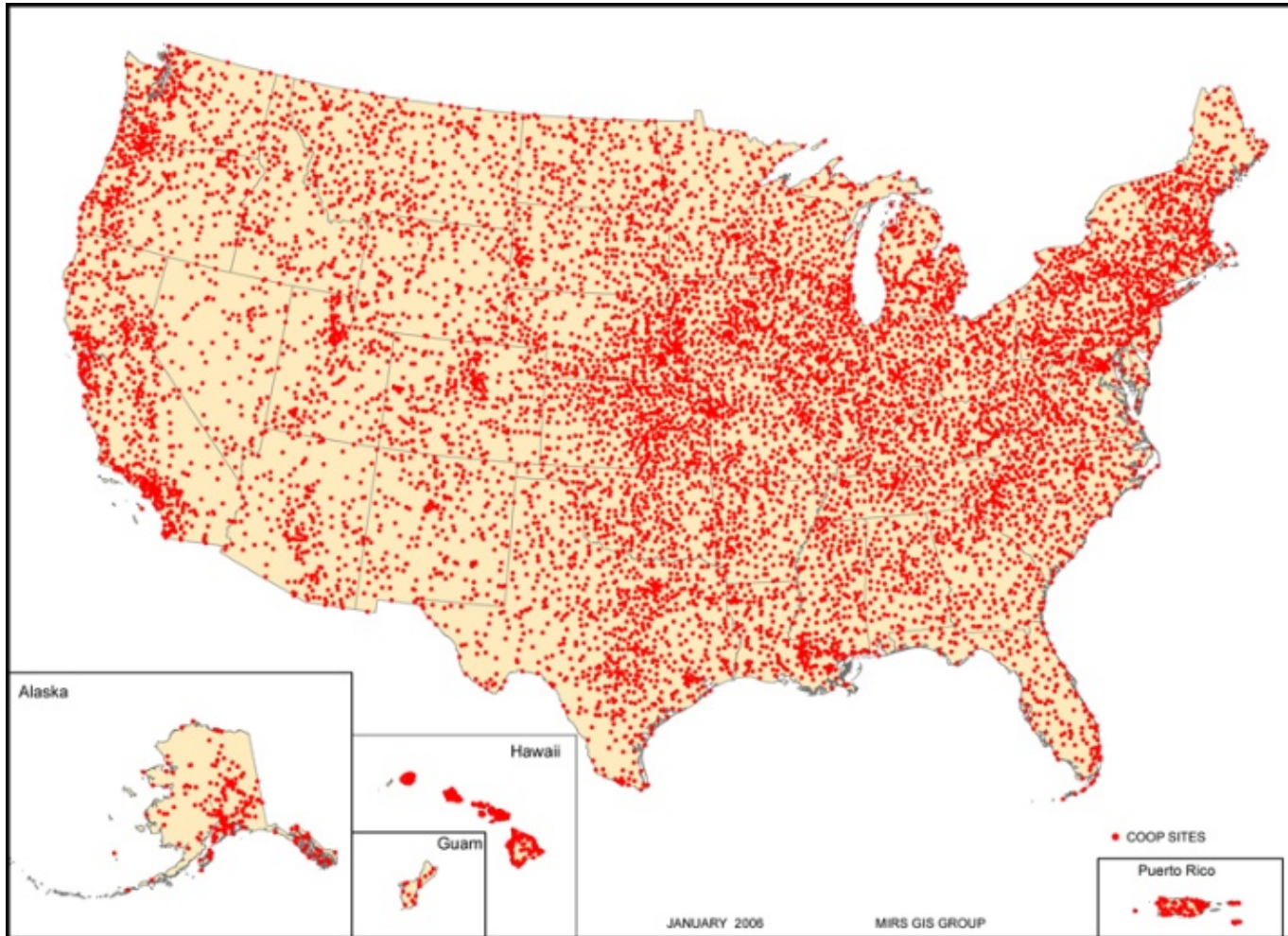
NWS Observations

Automated Surface Observing Sites



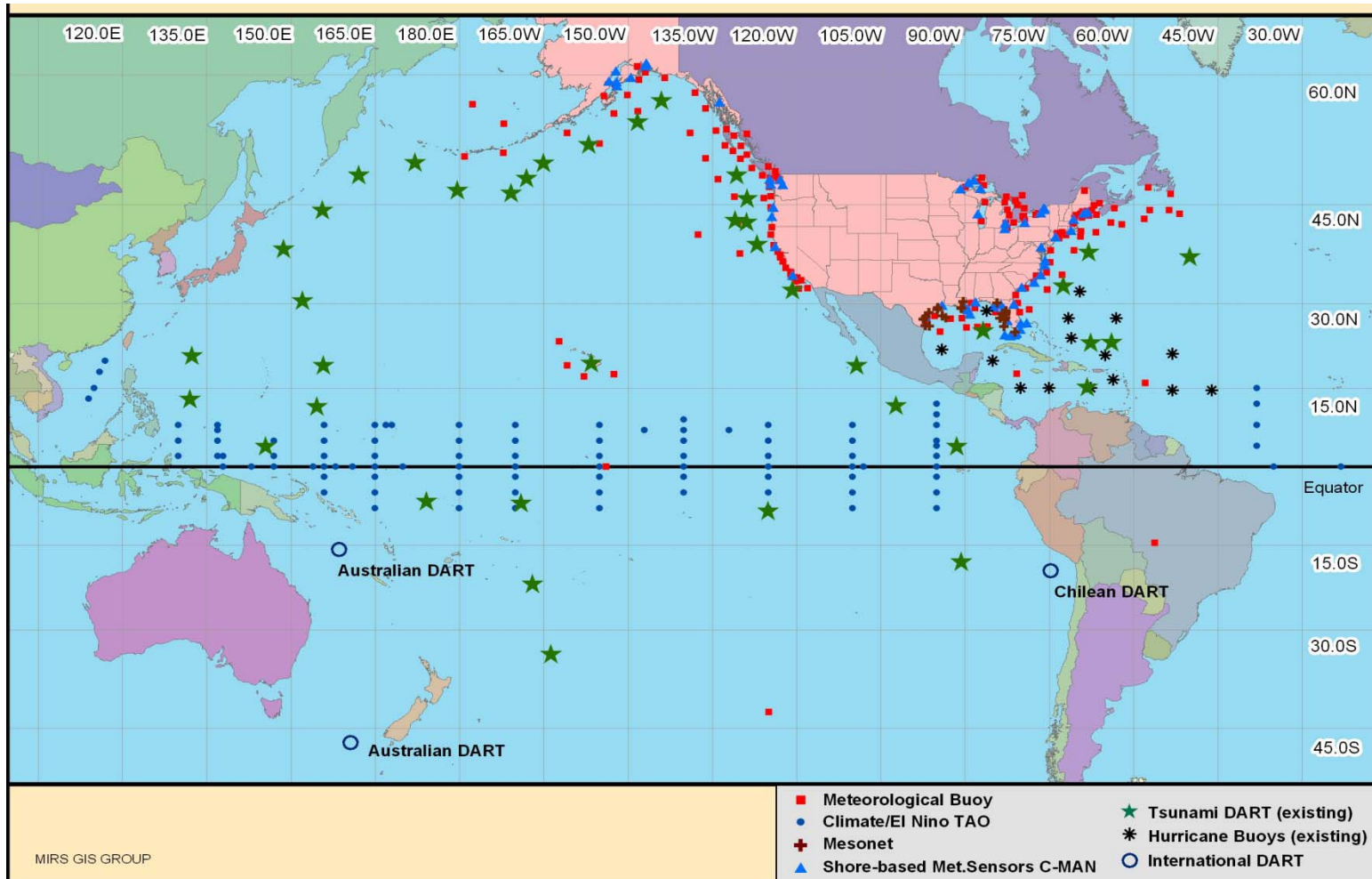
NWS Observations

Cooperative Observer Sites



NWS Observations

Buoy Networks



Dissemination

- **NOAA Weather Radio (NWR)**
- **NOAA Weather Wire (NWW)**
- **Internet**
- **NOAAPORT**
- **Emergency Managers
Weather Information Network
(EMWIN)**

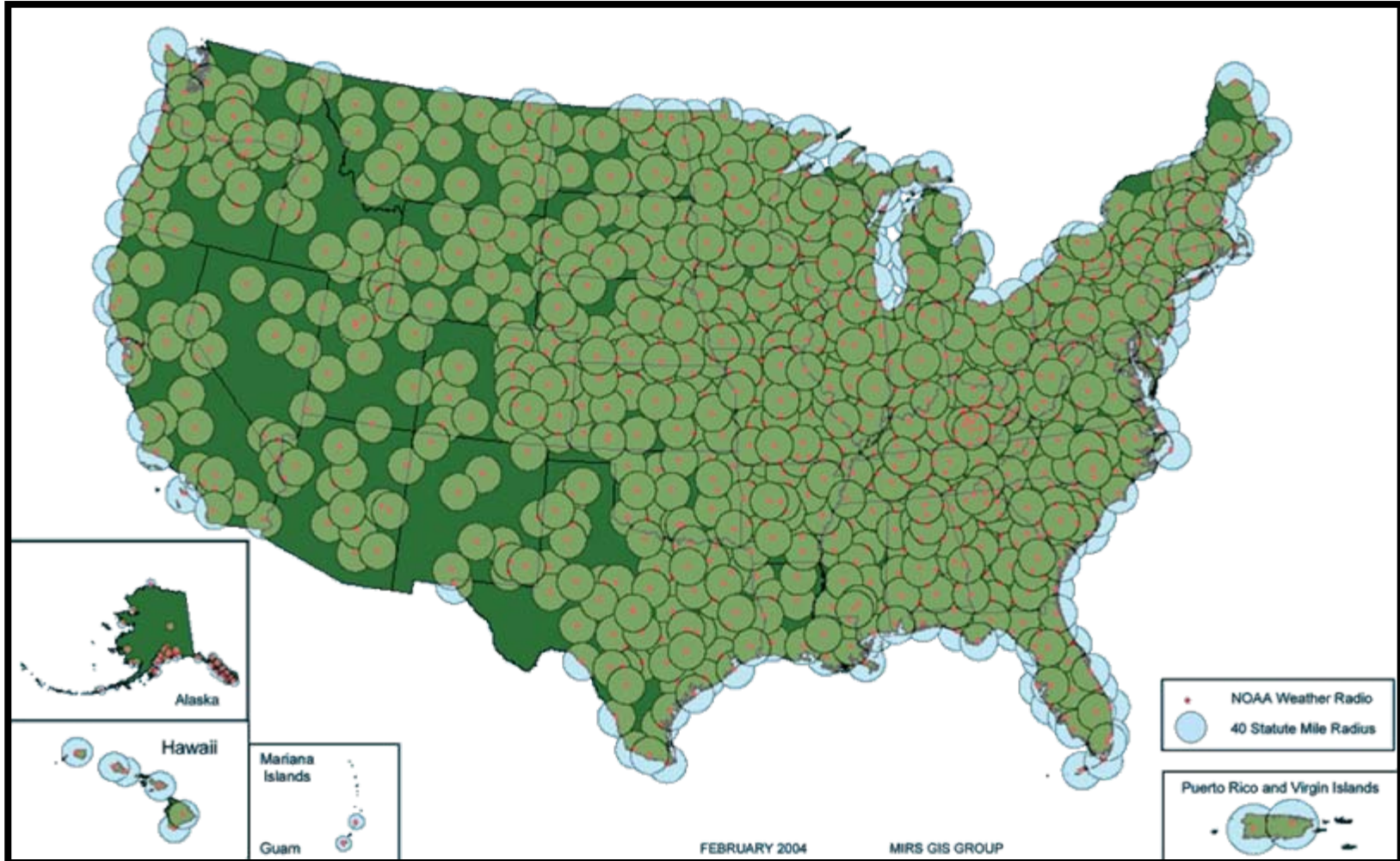
Family of Services

Broadcast Media

Private Sector

Dissemination

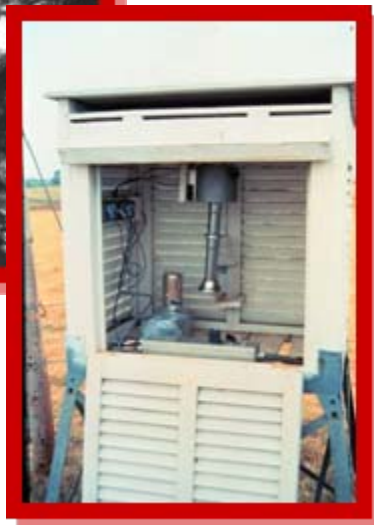
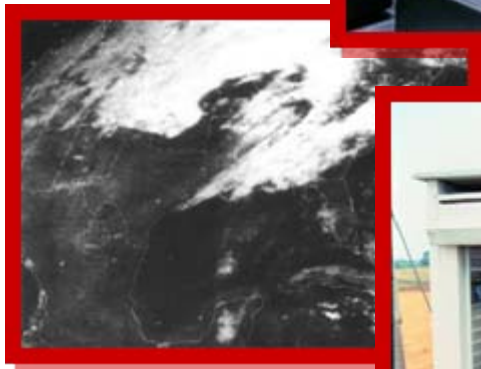
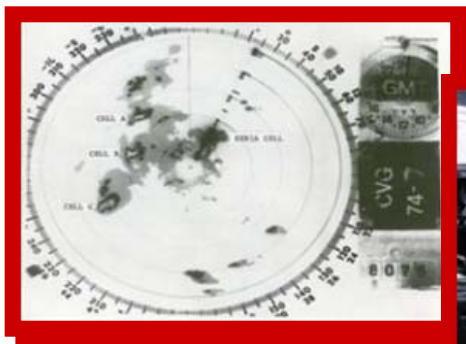
NOAA Weather Radio Transmitters



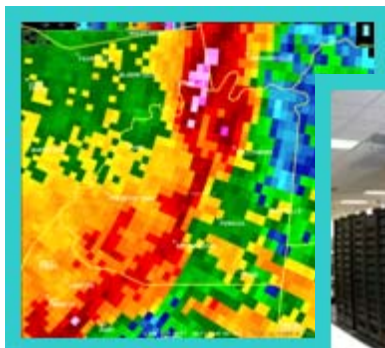
NWS Modernization

Enabled Successes

1970s...



1980s-1990s

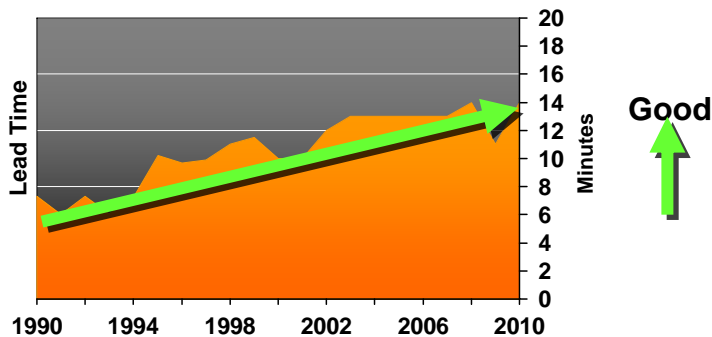


Some Services Improved

Others Have Not

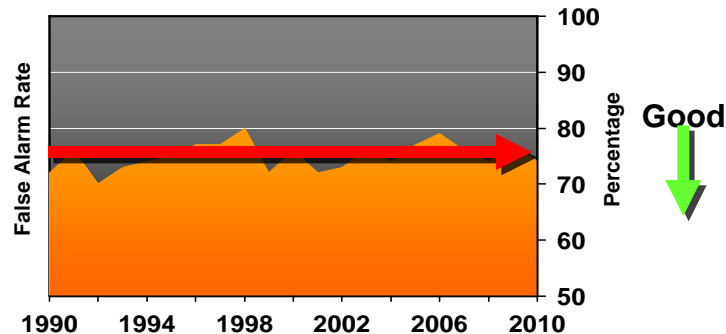
Improved

Tornado Warning Lead Time

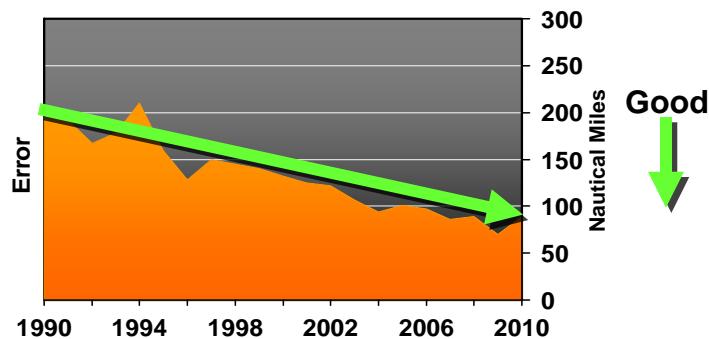


Not Improved

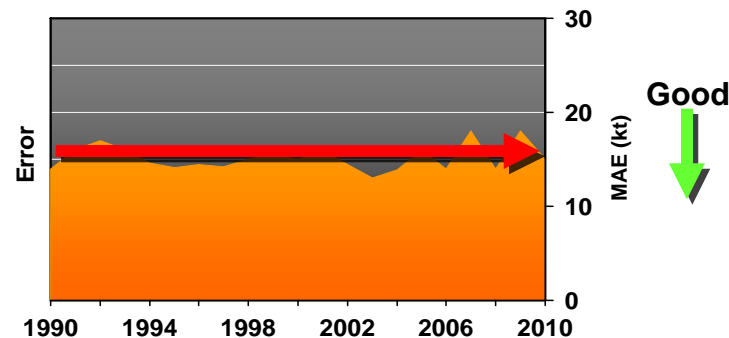
Tornado Warning FAR



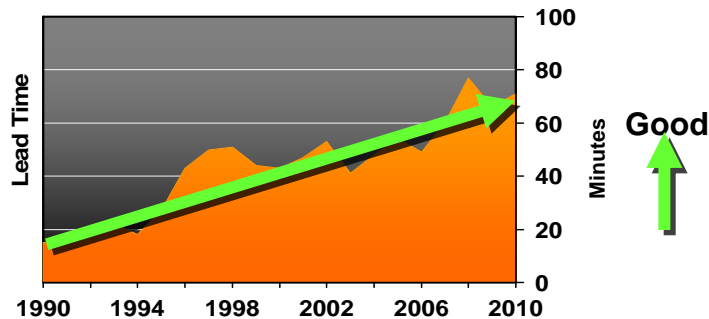
Hurricane Track Forecast



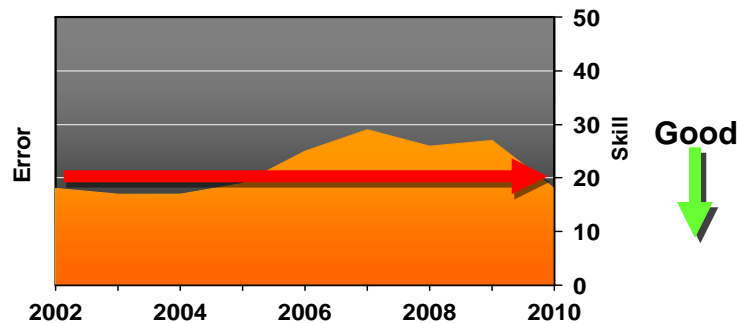
Hurricane Intensity Forecast



Flash Flood Warning Lead Time

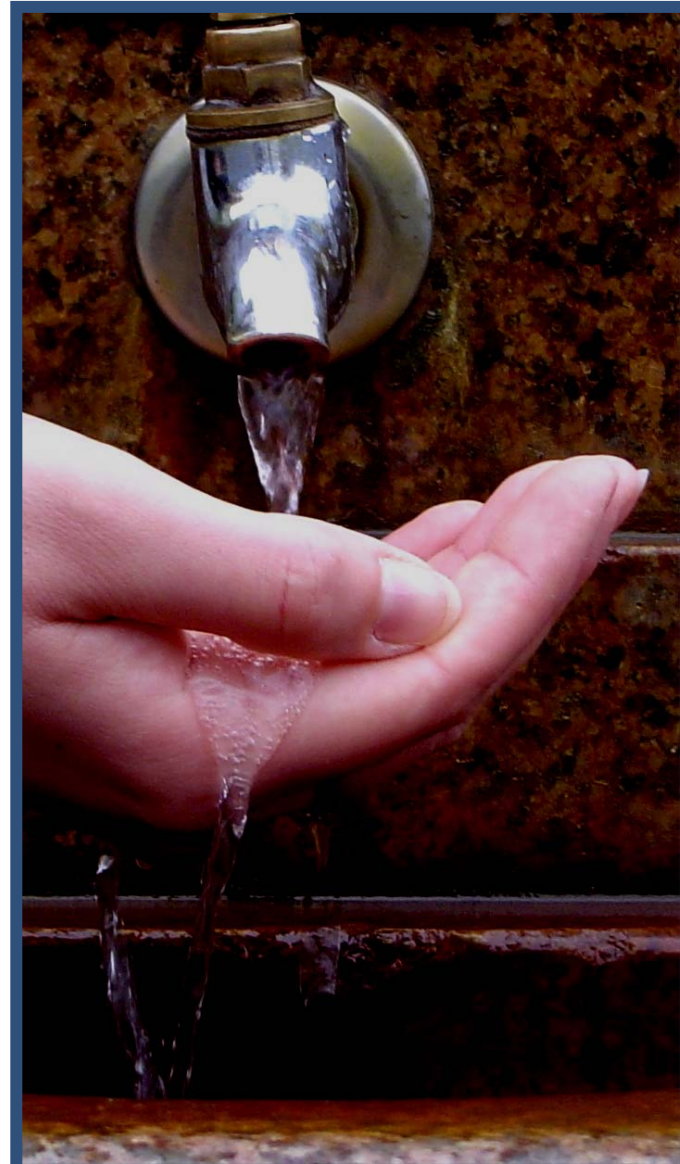


Seasonal Temperature Forecast



A Changing World

- **Increased vulnerability to high-impact weather**
 - *Growing population and demographic trends*
 - *Technological dependence*
 - *Water availability and quality*
 - *Aging infrastructure*



A Changing World

Coastal Population Growth

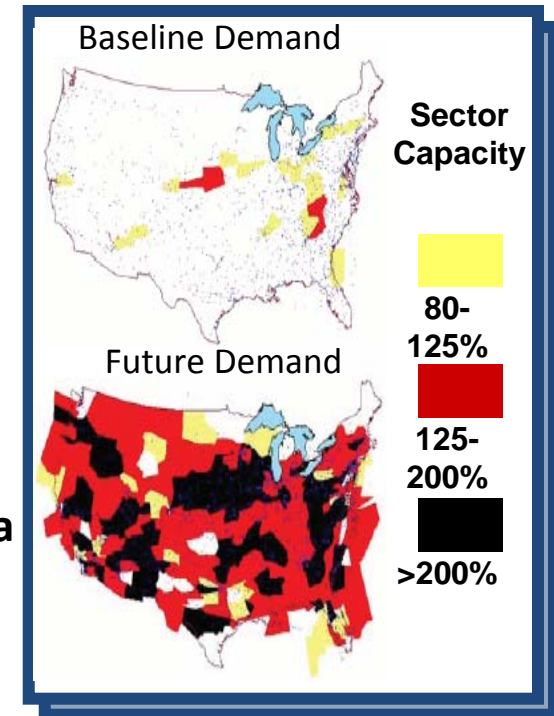
- **Coastal Threat: Intense Hurricanes**
 - *Hurricane Katrina: 2,000 deaths, \$125B in damages*
- **Goal: Improve preparedness, reduce loss of life, increase forecast accuracy and timeliness**
- **What we're doing:**
 - *Hurricane Forecast Improvement Project*
 - 50% improvement in track and intensity forecast accuracy
 - Improve storm surge forecasts and warnings
 - Extend forecast reliability out to 7 days
 - Reduce forecast uncertainty to enable earlier risk management decisions



A Changing World

Increasing Air Traffic

- **Threat: Air traffic doubling by 2025**
 - *Delays cost \$41 billion/year*
 - *70% are weather related*
- **Goal: Improve Forecasts for Aviation**
- **What we're doing:**
 - *NextGen aviation weather improvements*
 - **Increasing resolution, accuracy**
 - **Improving decision assistance—uncertainty data**
 - **Target: 2/3 reduction in aviation delays by 2025**
- **Benefits we've already realized**
 - *Golden Triangle Experiment*
 - **Increased forecast updates from every 6hrs to every 2 hrs**
 - *Saved \$185 million by reducing delays*



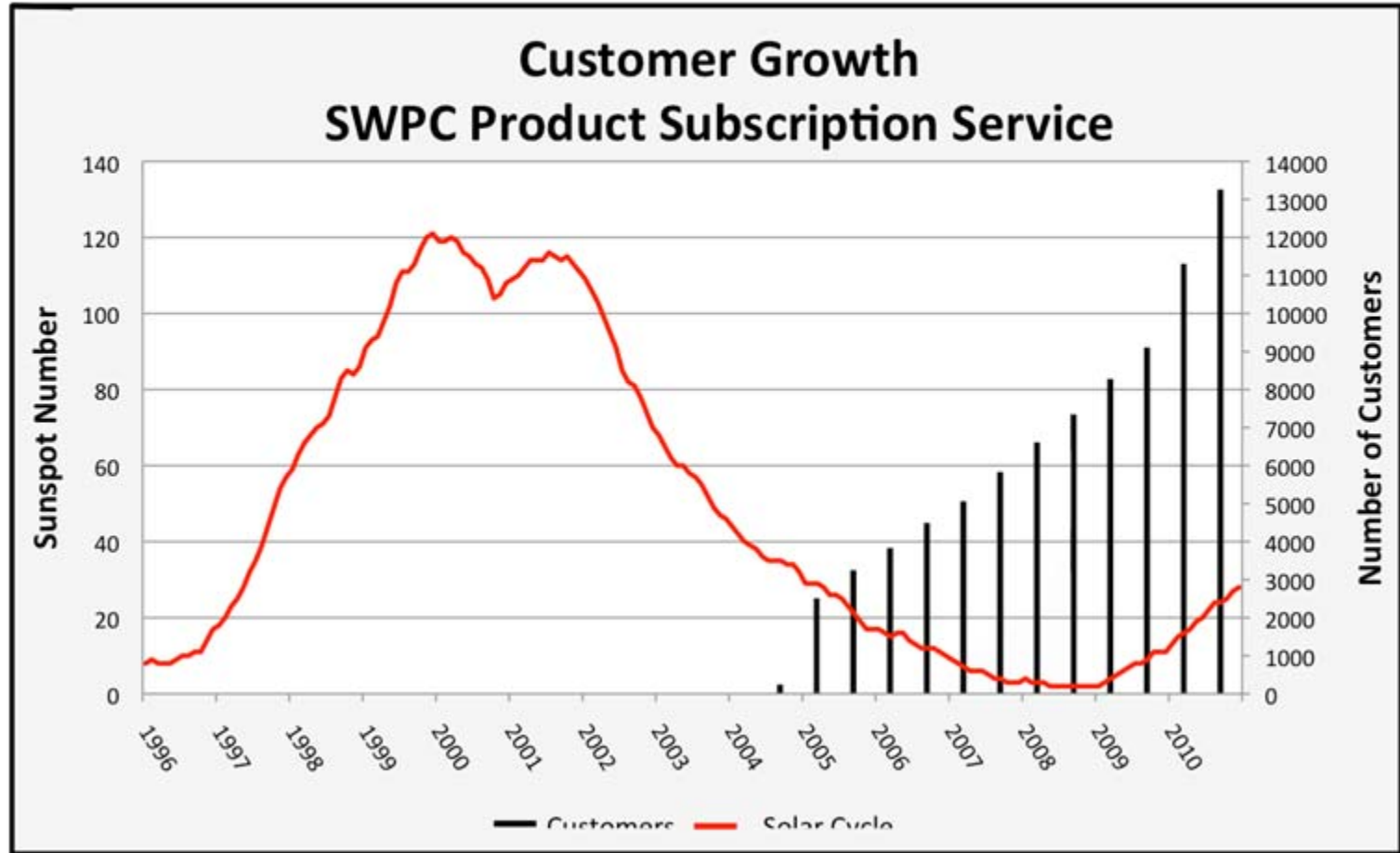


A Changing World

Vulnerability from Technological Dependence

- **Threat: Space Weather impacts critical infrastructure and national security (power grids, communications, air travel, satellites)**
 - *Expect vulnerabilities to grow with growing technological advances*
 - *Next solar maximum expected in 2013*
- **Goal: Increase National and International preparedness for solar storms**
- **What We're Doing**
 - *Increase real-time space situational awareness as solar disturbances trigger potentially high-impact space weather*
 - *Increase operational space weather warning accuracy and lead time for vulnerable infrastructure and missions*
 - *National and international research-operations partnership*

Fast Growing Demand for Space Weather Products



Sample Recent Registrants

SES Satellite	Inmarsat	FEMA	Boeing	FAA
Alaska DOT	Chrysler	Motorola	L-3 Communications	Bonneville Power Administration
Washington St. Dept of Transportation	John Deere & Caterpillar, Inc.	Major Airlines – UAL, AA, CO, Delta	United Launch Alliance	Salem and Hope Creek Nuclear Stations

Multiple critical infrastructures impacted

A Changing World

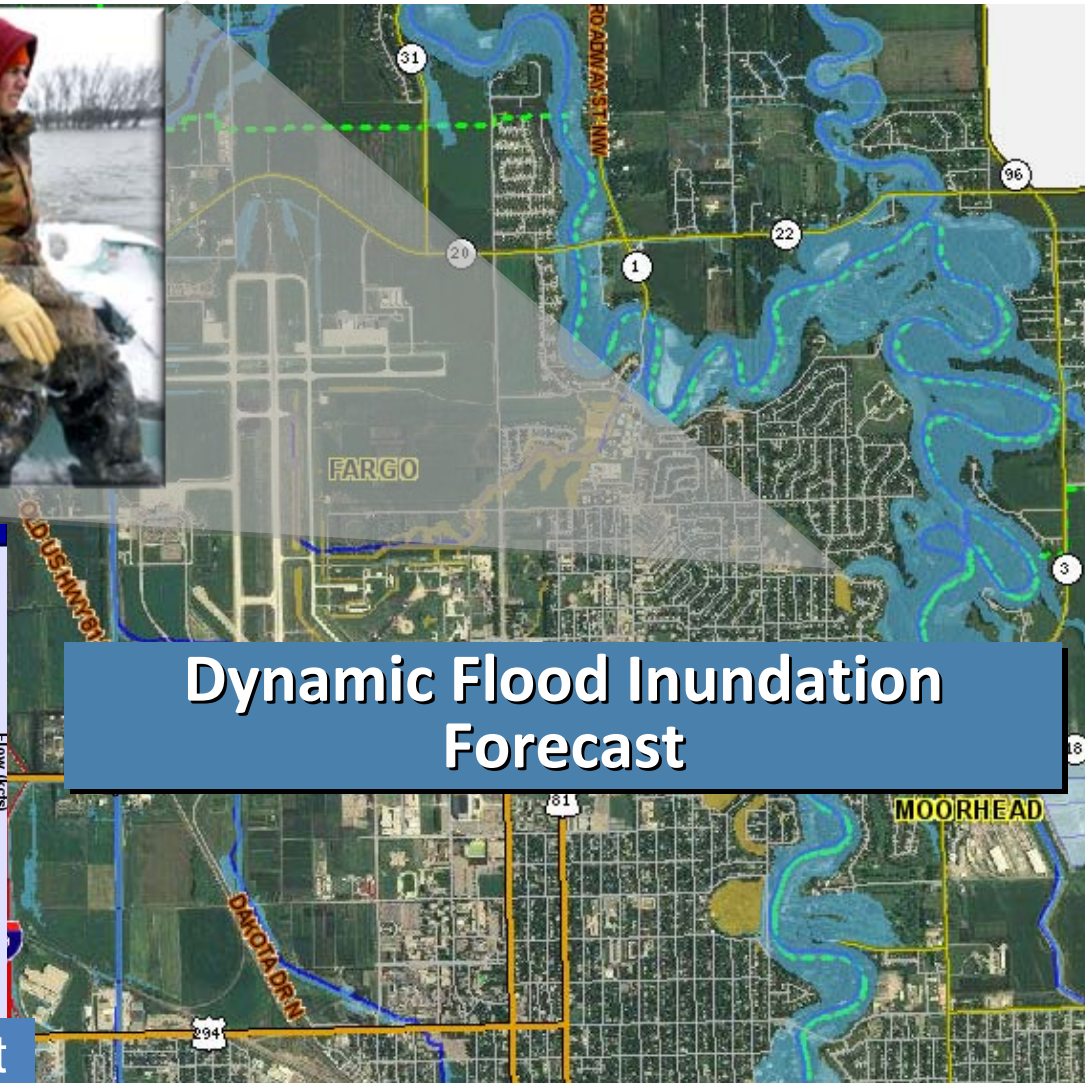
Water Availability and Quality

- **Threat: Too much, Too little, Poor Quality**
- **Goals:**
 - *Minimize losses due to floods and droughts*
 - *Increase economic benefits from water forecasts and information*
- **What we're doing**
 - *IWRSS: Partnership of 21 federal agencies.*
 - **Improving warnings, better season and extended drought and heavy precip outlooks**
 - **Developing Common Operating Picture**
 - **Creating Single portal for Water Information**
 - **Sharing technology, information, models, best practices**
 - **“Tool Box” for forecasts, data, mapping and programs**

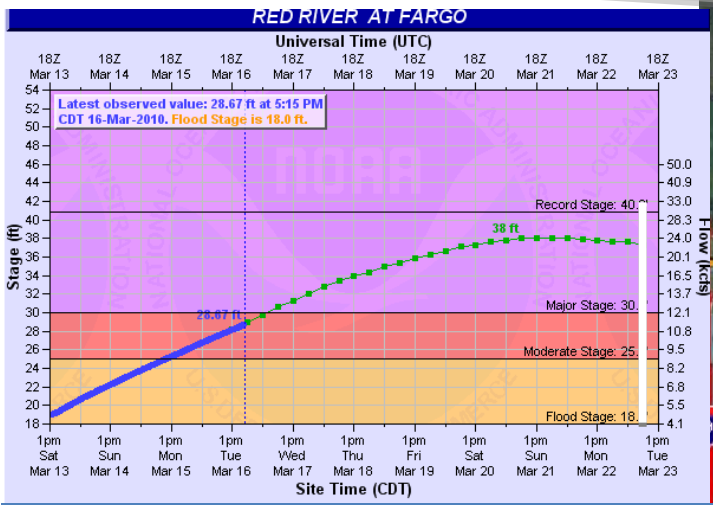


A Changing World

Water Availability and Quality



Dynamic Flood Inundation Forecast



Conventional Flood Forecast



A Changing World

Aging NOAA NWS Infrastructure

- **Threat: Many systems developed and facilities obtained during modernization are approaching the end of life**
 - *NWS Telecommunications Gateway assessed as high program risk*
 - Aging infrastructure
 - Limited backup capability
 - Inability to support high data volumes
 - *AWIPS/NEXRAD systems deployed in 1990s*
 - *Average WFO age is 21 years*
 - Owned facilities require are aging & require major improvements, O&M
 - WFO leases are expiring; 11 require relocation
- **Goal: Ensure field well equipped to sustain critical forecast and warning mission**
- **What we're doing:**
 - *Implementing Tech Refresh in Gateway to reduce program risk*
 - *AWIPS/NEXRAD S&T infusion ongoing—continuous improvement strategy*
 - **Key decision point NEXRAD**
 - *Conducting high priority WFO Facilities improvements (HVACs)*



2011: Must Ask Tough Questions

- **What else must be done to save lives and livelihoods?**
 - *Better prepared communities...*
 - *Warnings get to every American...*
 - *Better observations and models...*
 - *Public preparedness...*
 - *Social and behavioral sciences...*

Meeting the Nation's Needs

Building a Weather-Ready Nation

NWS Strategic Plan:

- Improve **weather**, **water**, and **climate** decision services for events that threaten lives and livelihoods
- Improve **accuracy** and **lead times** for high-impact events
- Better **communicate levels of confidence** in our forecasts
- Help improve community **preparedness and response**
- **Enable** the Weather Enterprise
- Develop a **sustainable** business model

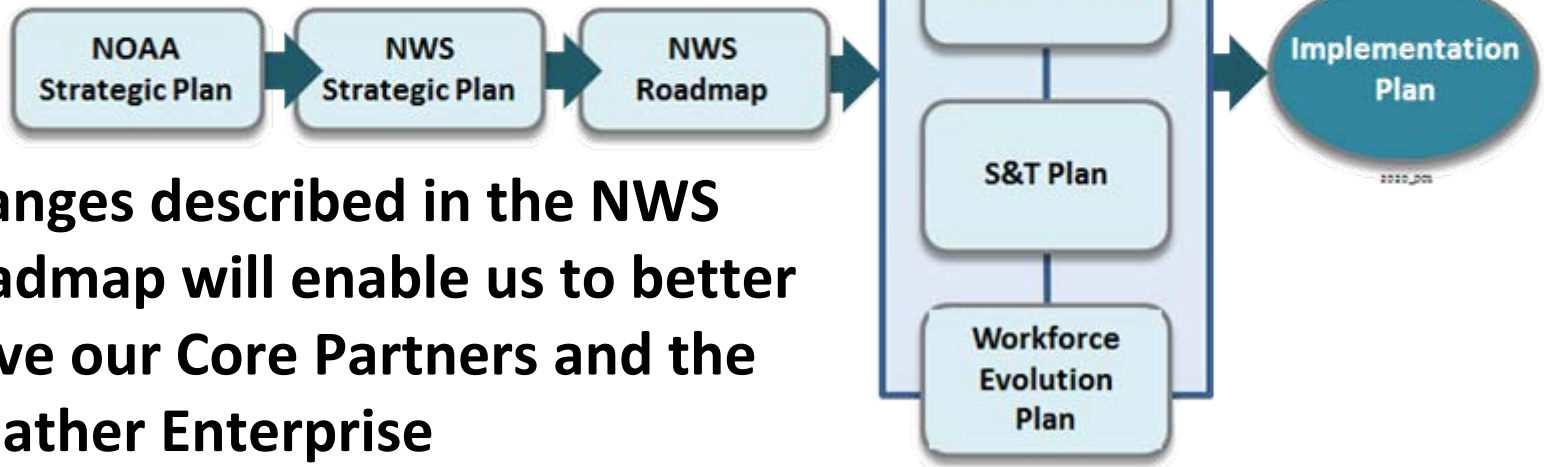


NAS Committee: The Assessment of the National Weather Service's Modernization Program

Meeting the Nation's Needs

Building a Weather-Ready Nation

- A Weather-Ready Nation will require more integrated environmental services
- Partners want to know what we know
 - *Probabilities, accuracy, timeliness, and accessibility*



- Changes described in the NWS Roadmap will enable us to better serve our Core Partners and the Weather Enterprise

Summary

- **NWS performance arises from the Modernization investment**
- **Nation faces increasing risks from high-impact weather**
- **Significant science and technology challenges remain**

