

United States Multi-Hazard Early Warning System

Saving Lives Through Partnership

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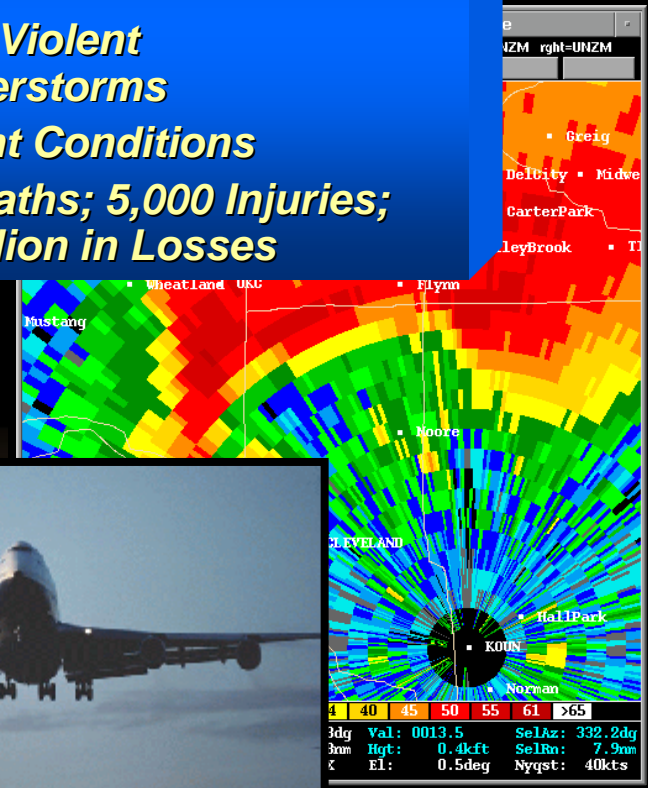
"America's Weather Enterprise: Protecting Lives, Livelihoods, and Your Way of Life"

U.S. Yearly Threats/Impacts

- Climate, Water, Weather Forecasts and Warnings are used to protect **life** and **property** and enhance the economy
- 76 billion observations
- 1.5 million forecasts
- 50,000 warnings

A Typical Year Brings:

- 6 Hurricanes
- 1,000 Tornadoes
- 5,000 Floods
- 10,000 Violent Thunderstorms
- Drought Conditions
- 500 Deaths; 5,000 Injuries; \$14 Billion in Losses



Policy, Institutional and Legal Frameworks

- The U.S. National Response Framework (NRF) provides the guiding principles that enable all response partners to deliver a unified national response to disasters and emergencies.
- Maintained by the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA)



National to Local Emergency Planning

- The National Incident Management System (NIMS) provides information to guide departments and agencies at all levels of government, nongovernmental organizations, and the private sector to work seamlessly during significant events.
- The components of NIMS work together to provide the national framework for incident management from Preparedness, Communications and Information Management, Resource Management, Command and Management to Ongoing Management and Maintenance.



NMHS/DRM Responsibilities

- **Planning**

Hazard analysis completed to identify all natural hazards that impact jurisdiction. Mitigation strategies are created with emphasis on mitigating weather linked hazards.

- **Response**

Response protocols are developed for identified hazards for both pre event and during for responder and victim safety.



Responsibilities cont...

- **Warning**

Risk information coordinated with the NWS for sheltering, long term mass care and evacuation activities.

Warning times are crucial to allow local jurisdictions, states and the federal response agencies to alert citizens of impact, recommend protective measures, and to allow authorities to prepare response capabilities.



Emergency Preparedness And Response Activities (local to national)

- Actions taken once warning is issued
 - *Weather warnings are issued for both potential impact and verified impact of event (i.e. Tornado Warnings)*
 - Local governments continue monitoring situation to determine impacts
 - State government response
 - Federal response



Improvement Example In Preparedness And Prevention

- Integrated Warning Team – partnership of National Weather Service, local media representatives and local emergency managers
 - *Common communication protocols to public*
 - *Joint understanding of why warnings issued and local government response – led to better understanding by NWS, media and local governments of responsibilities to citizens*



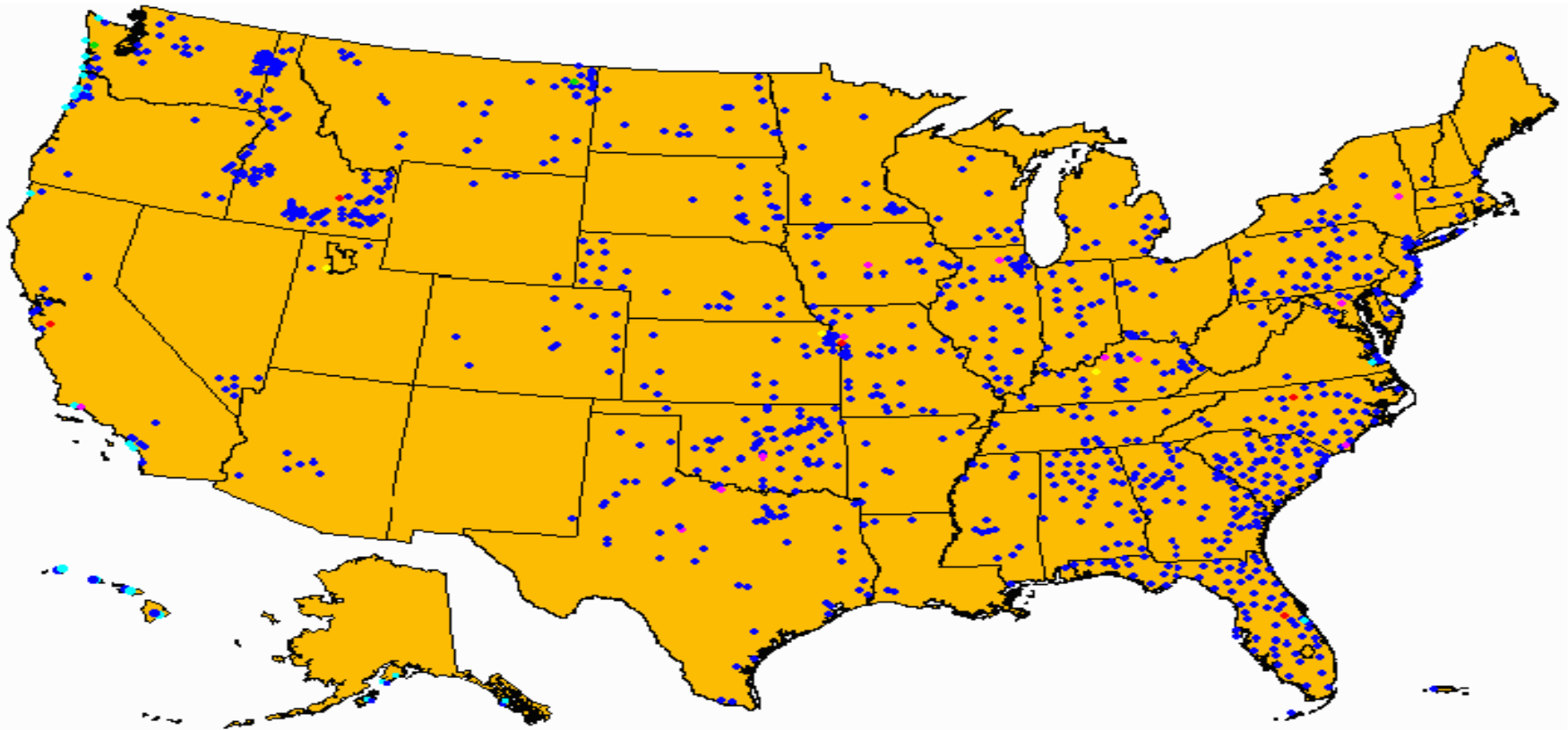
Overall Lessons Learned And Future Steps For Improving The System

- Continue to link warning areas to citizen notification systems (Text, S.A.M.E. Radios, Cell notification)
- Enhancement of the Integrated Warning Team concept to continue cooperation between local media, the NWS and local emergency managers
- Continue to use weather research to define hazards and use to justify education and training of citizens to mitigate known hazards.



StormReady/TsunamiReady Community Preparedness Program

~1500 StormReady Communities in 50 States
67 TsunamiReady Communities in 10 States



Legend

Gold states have StormReady® communities or counties
Light Blue dots are TsunamiReady communities
Blue dots are StormReady® Communities
Red dots are StormReady® Commercial Sites

Green dots are StormReady® Indian Nations
Purple dots are StormReady® Universities
Yellow dots are StormReady® Military sites



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Our Goal

Saving Lives Through Partnerships

NOAA TEAM

PARTNERS

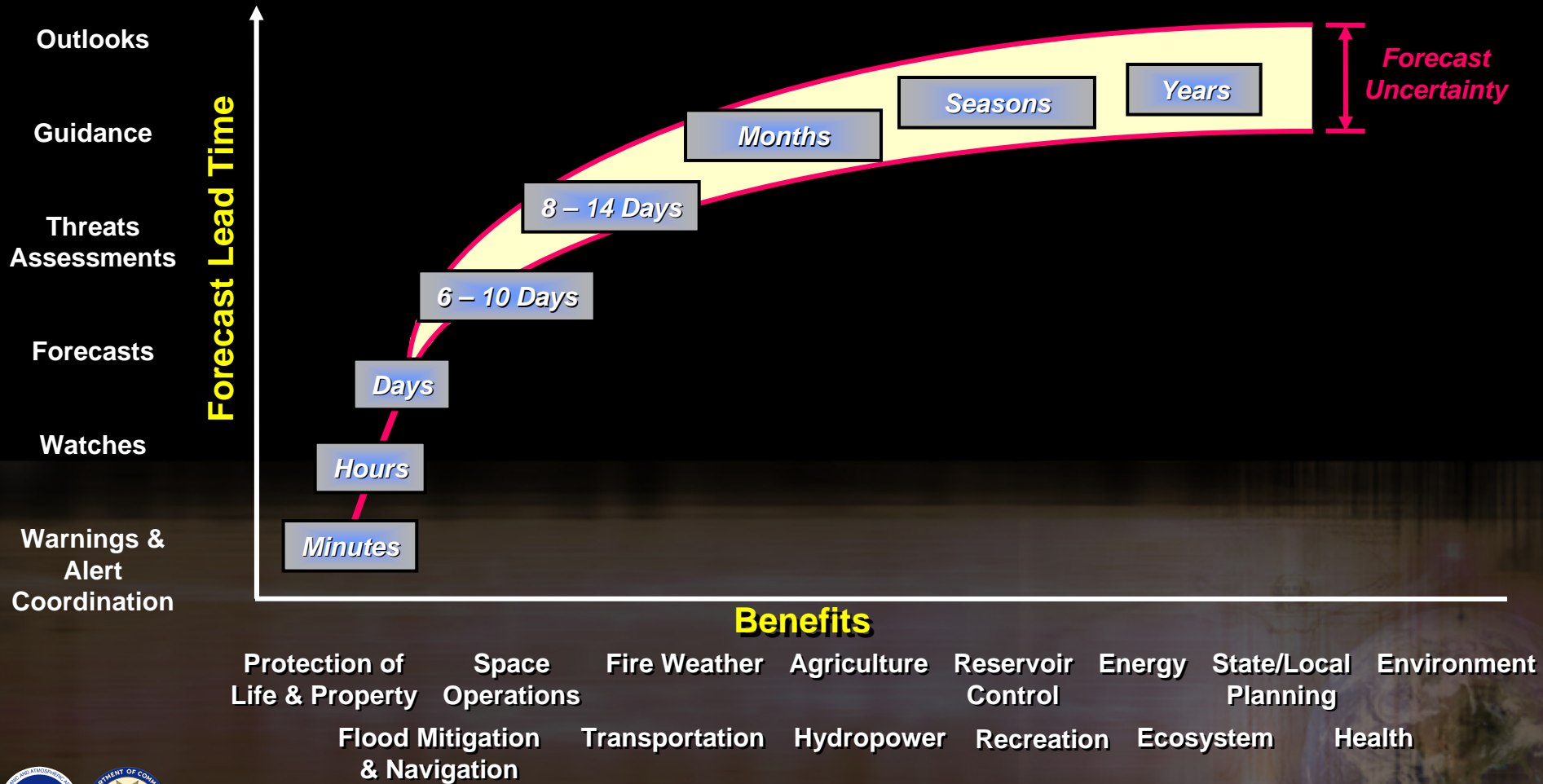
END USERS



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NOAA's NWS Overview

Seamless Suite of Products



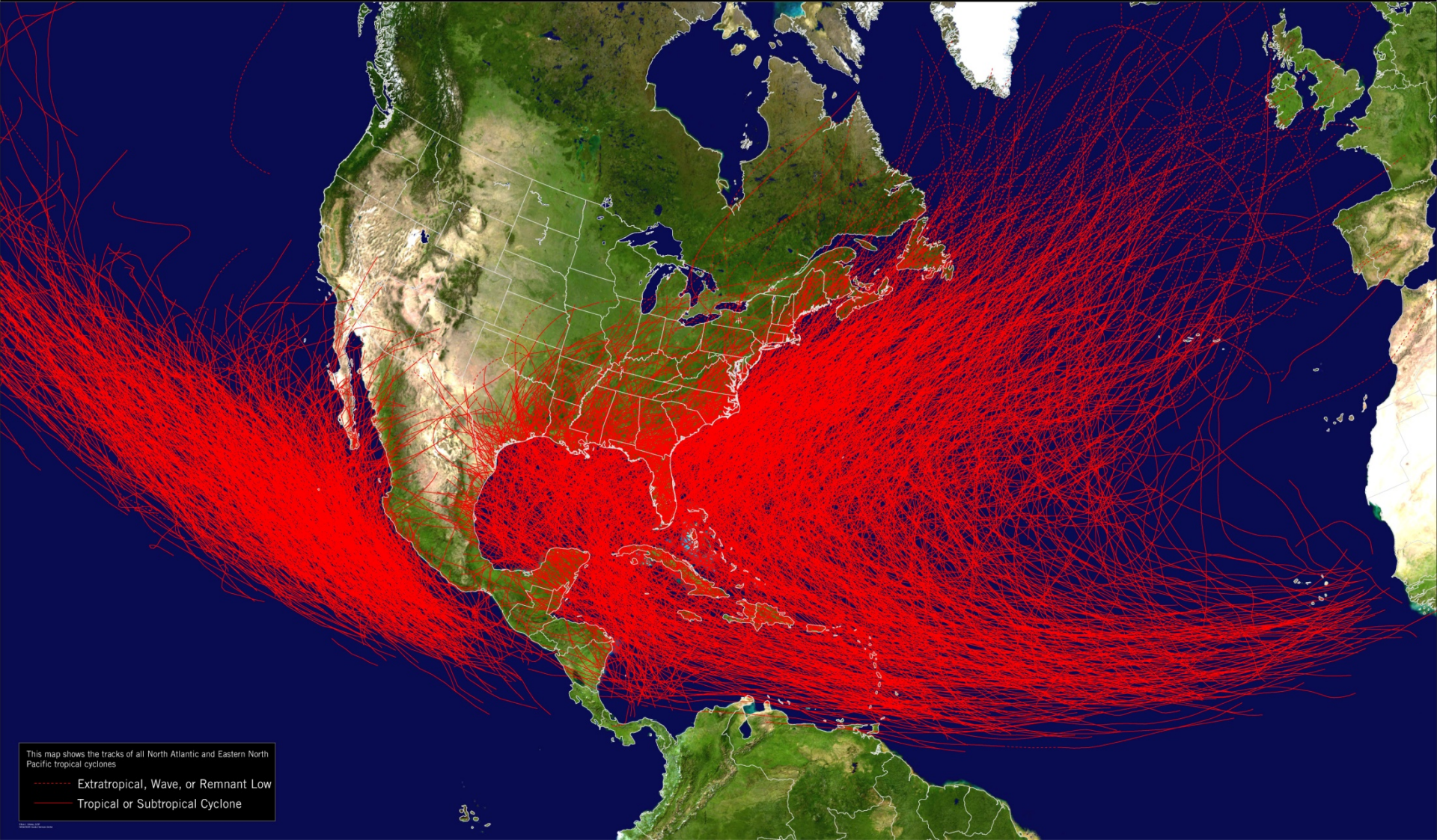
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Hurricane Concerns

Tropical Cyclone History

Data since 1949 in the Pacific, 1851 in the Atlantic



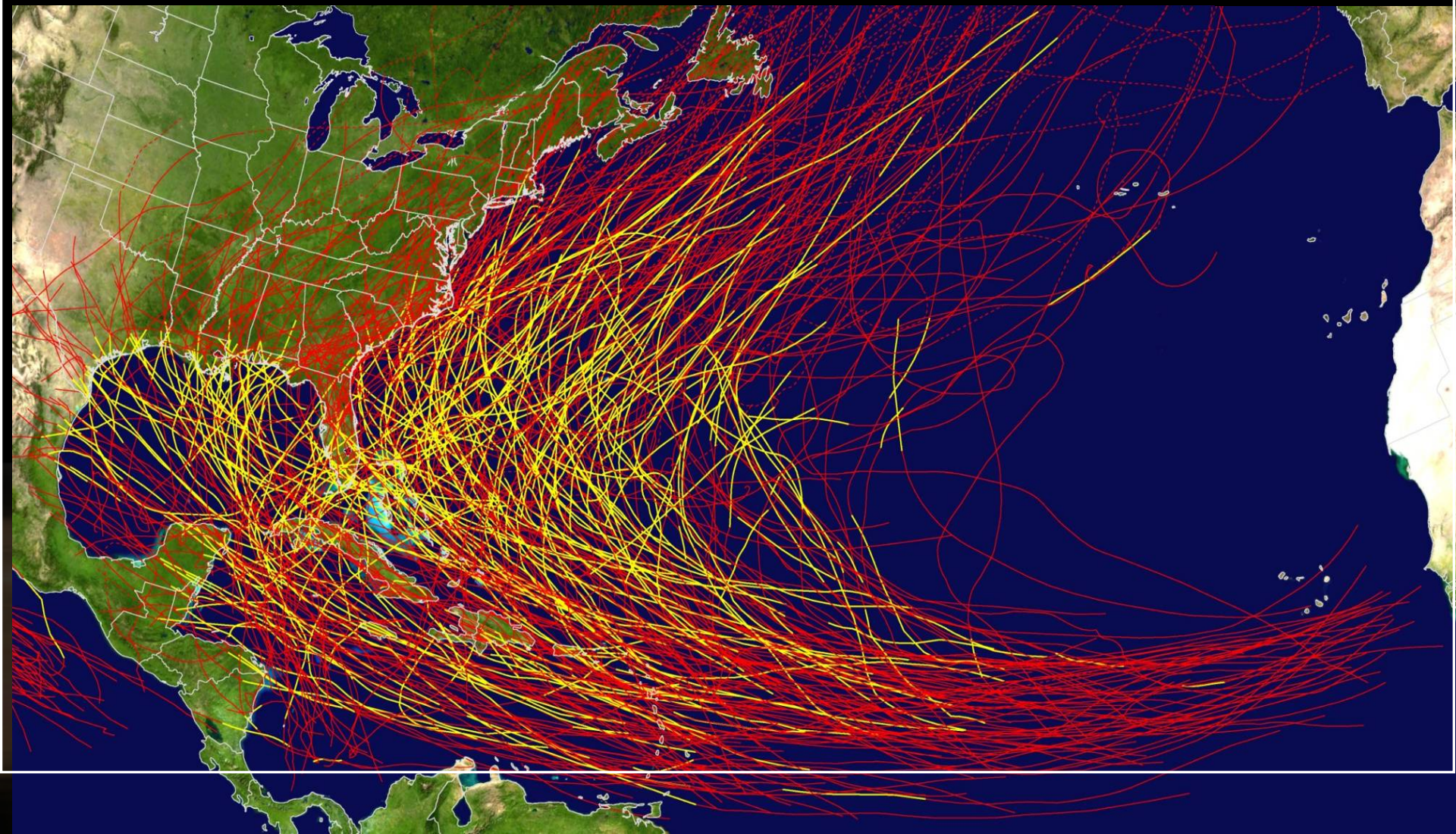
This map shows the tracks of all North Atlantic and Eastern North Pacific tropical cyclones

- Extratropical, Wave, or Remnant Low
- Tropical or Subtropical Cyclone

Major Hurricanes Account for Most of the Damage

Major Hurricane History

Data since 1949 in the Pacific, since 1851 in the Atlantic



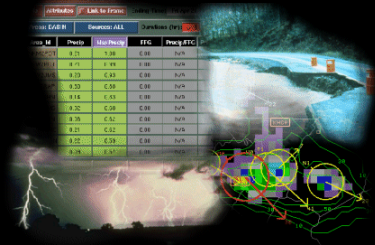
Flash Flood and Debris Flow



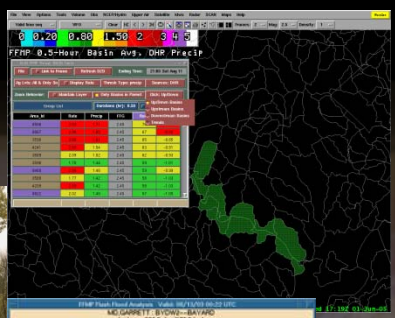
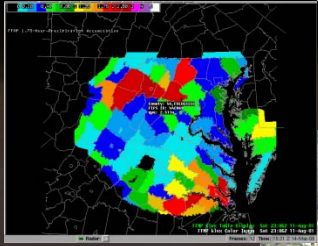
Warning



Detection



Forecasting/Monitoring



River Forecasts

Weather Data



Doppler Radar



Rain Gage



Snow Measurements



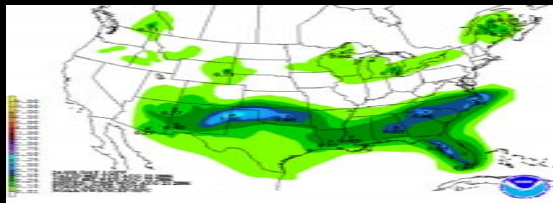
River Stage Measurements



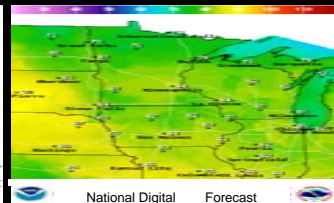
Reservoir Data / Locks and Dams

River Data

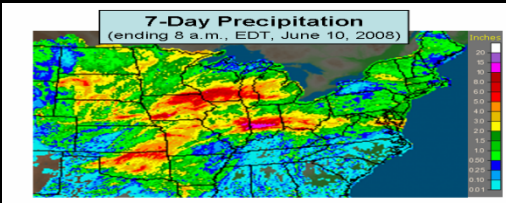
WATER CONTROL



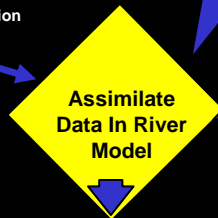
Future Rain (24-72 hours)



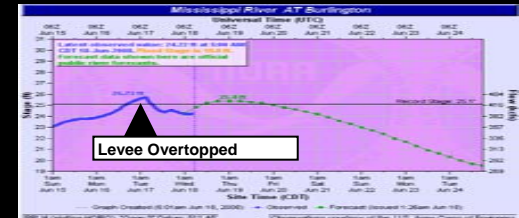
National Digital Forecast
Temperature/Evaporation



Doppler Radar Estimated Precipitation



Hydrologist Interaction With Model Tools Creates Forecast

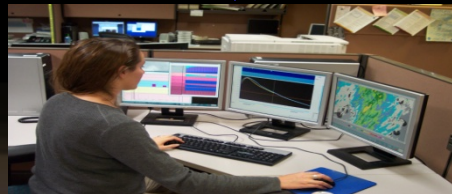


Levee Overtopped

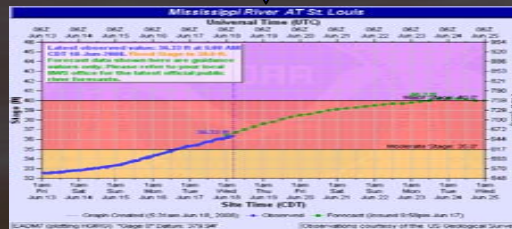


Levee Overtopping Status

Forecast Collaboration with Corps



Forecast Disseminated to Customers



Adjust Predicted Hydrograph for Non-Uniform Rainfall Distribution

Adjust Snow Cover Extent and Snow Melt Rates

Adjust Rating Curves Based on Real-time Stream Flow Measurements from USGS

Adjust Soil Moisture Parameterization to Current Wetness/Dryness

Compare Current Flooding to Historical Events

Quality Control Observed River Stages and Rain Gage Reports

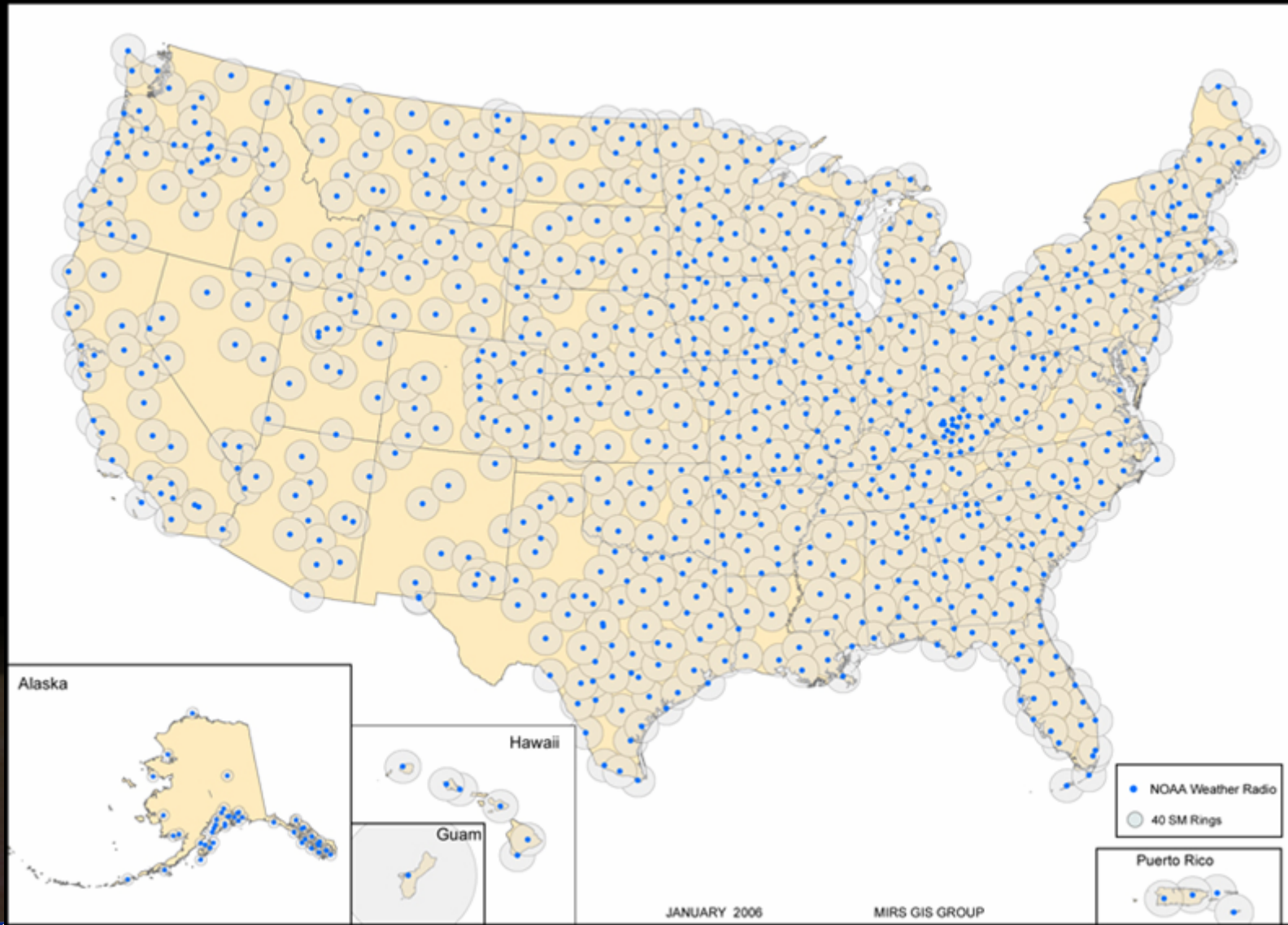


Dissemination Methods

- National Weather Service Controlled Methods
 - ✓ NOAA Weather Radio All Hazards
 - ✓ NOAA PORT
 - ✓ Weather Wire
 - ✓ Emergency Managers Weather Information Network
- Mobile Communication Devices
 - ✓ Cell Phones
 - ✓ Personal Digital Assistants (PDA)
- Internet



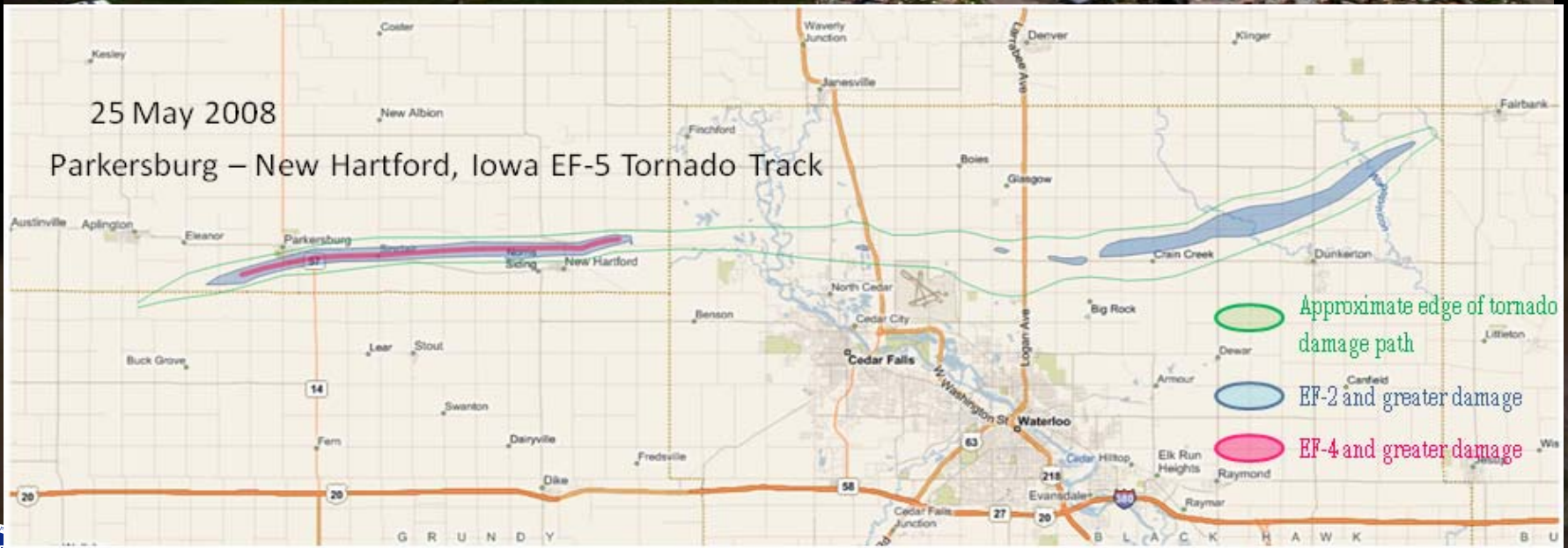
NOAA Weather Radio All Hazards



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Storm Surveys/Assessments



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