



# ***Adopting a Broader View of Environmental Prediction***

**National Weather Association  
29th Annual Meeting  
October 18, 2004  
Portland, Oregon**

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**Director, NOAA's National Weather Service**



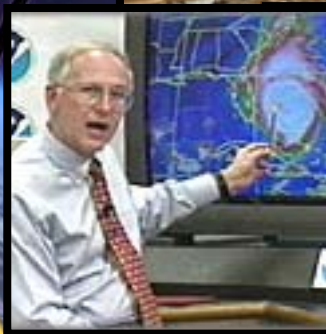
# **NOAA's National Weather Service**

*Adopting a Broader View of Environmental Prediction*

- Importance of Teamwork
- 2004 Highlights
- New Initiatives
- On The Horizon
- What's On Your Mind?



# Teamwork





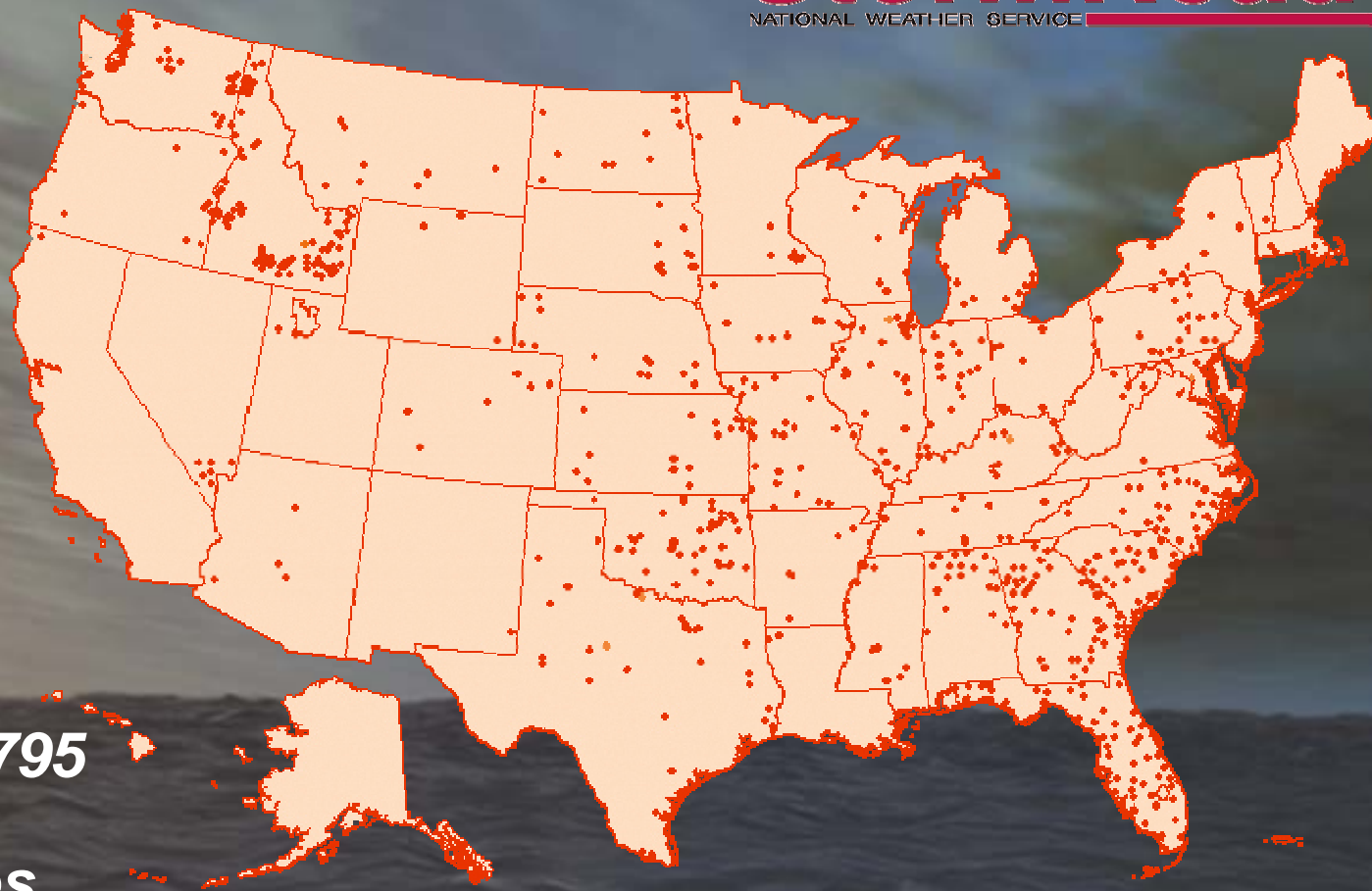
# Teamwork

## What the NWS Brings to the Team

- Weather, Water, and Climate Warnings, Forecasts, Outlooks
- Global Modeling
- Space Environment data, info, nowcasts/forecasts, warnings
- Homeland Security support
- UV and Air Quality
- Fire Weather
- Airborne Gamma Snow Surveys
- Cooperative Networks
- Aviation observations and forecasts
- Marine observations and forecasts
- Dissemination Systems



# Teamwork

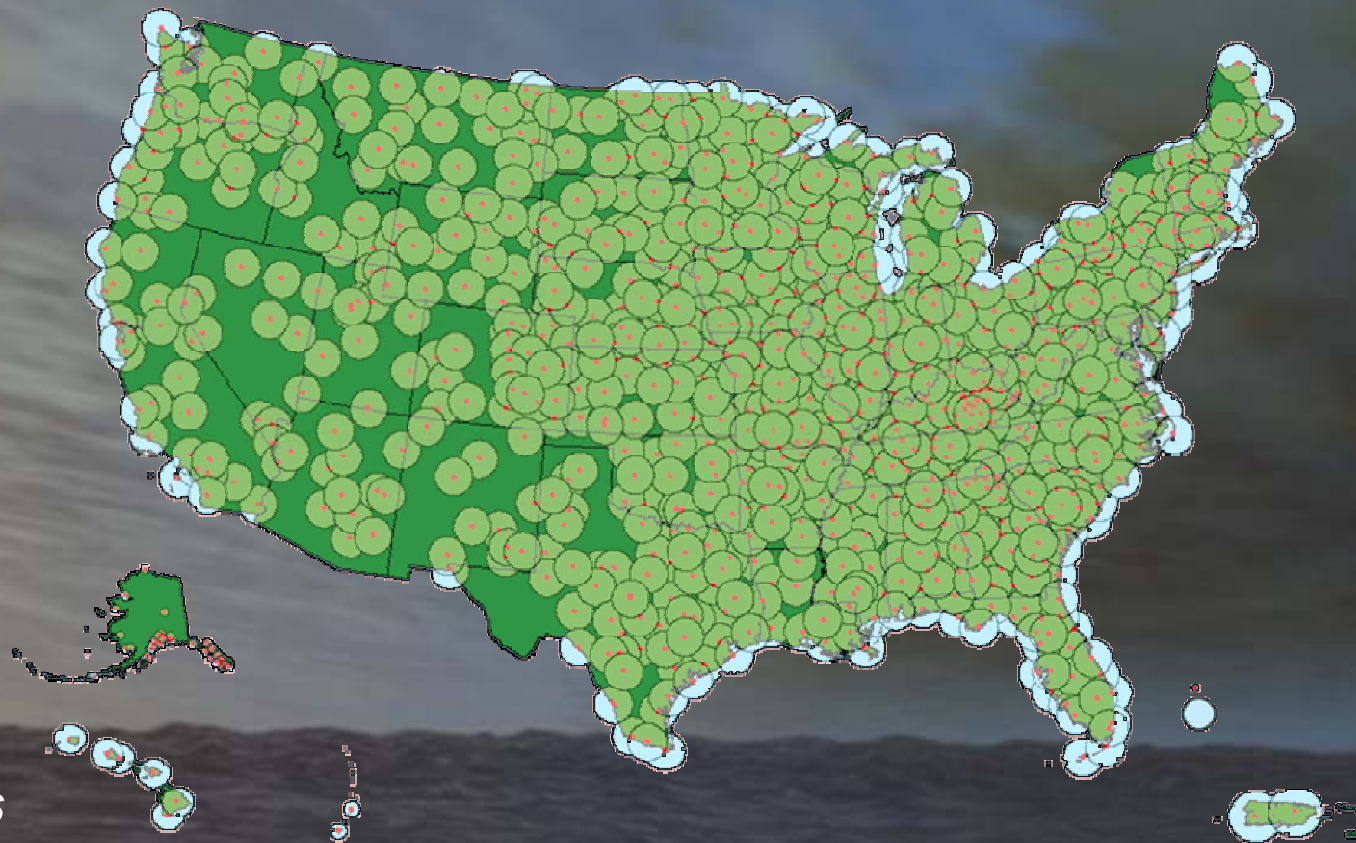


- **Total = 795**
- **47 States**



# Teamwork

## NOAA Weather Radio All Hazards



- *>900 transmitters*
- *95% coverage*
- *Partner with Department of Homeland Security*

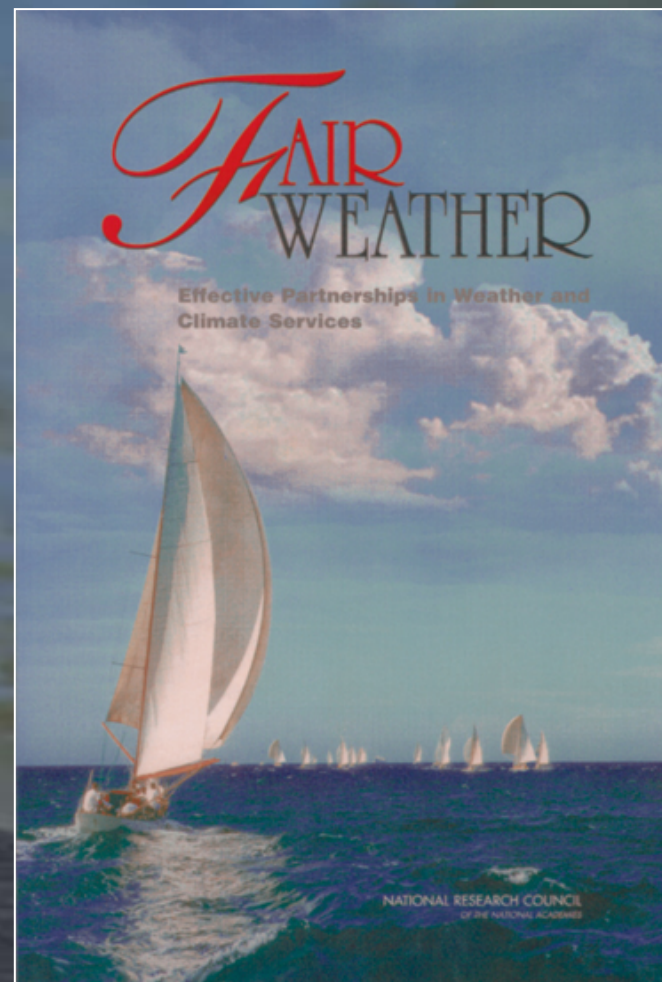


# Teamwork

## *National Research Council's Report*

### *Fair Weather: Effective Partnerships in Weather and Climate Services*

- *Today's partnerships are sound and functioning well*
  
- *Recommendations include:*
  - Congressional Mandate - protect life and property
  - Public/Private Partnership Process
  - Data and Products in standardized format
  - New/Discontinue Products
  - Communicate Uncertainty





# 2004 Highlights

## How is the Team Doing?



OCEAN  
LAKE PARK BLVD





# 2004 Highlights

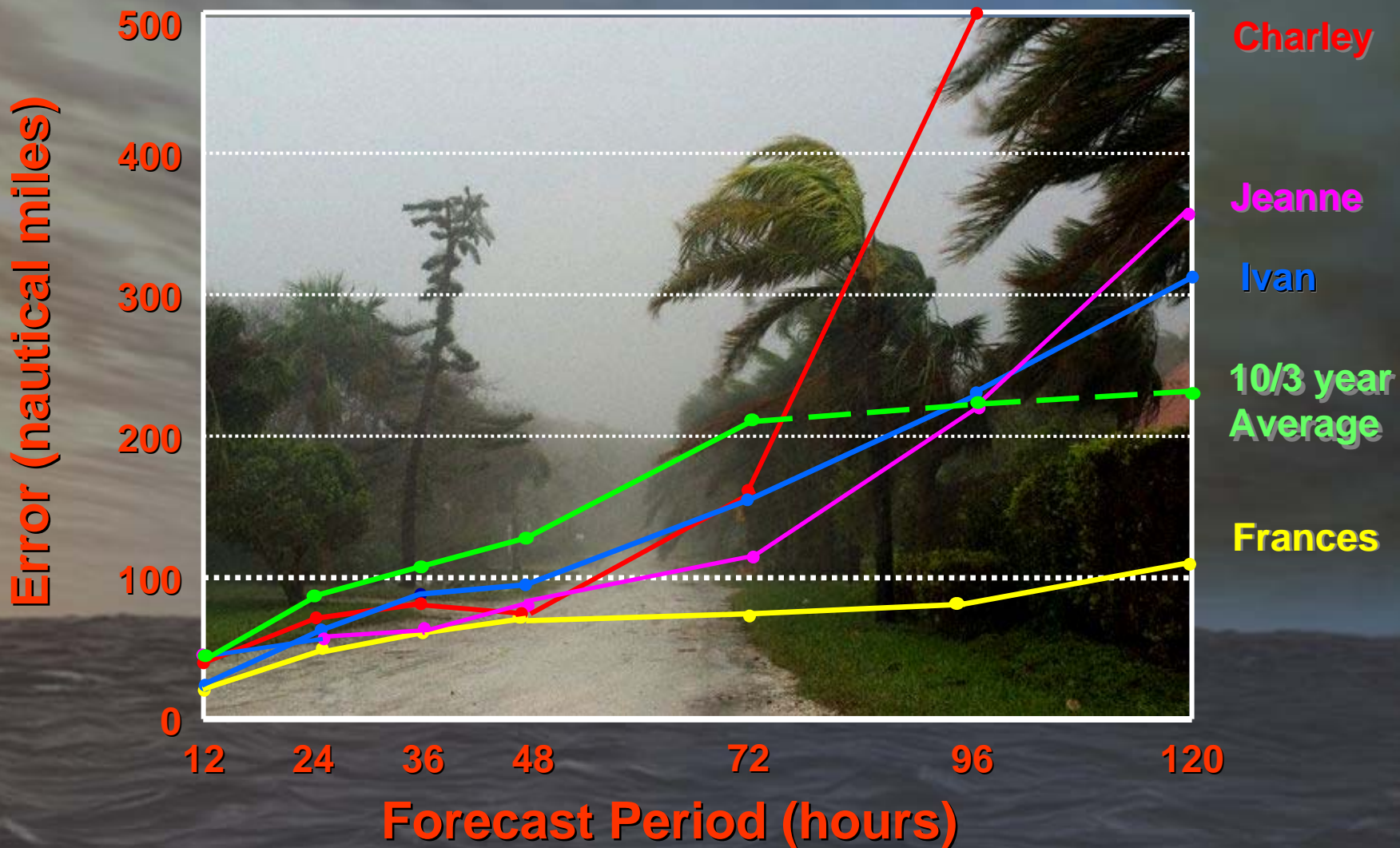
## *Atlantic Hurricanes*





# 2004 Highlights

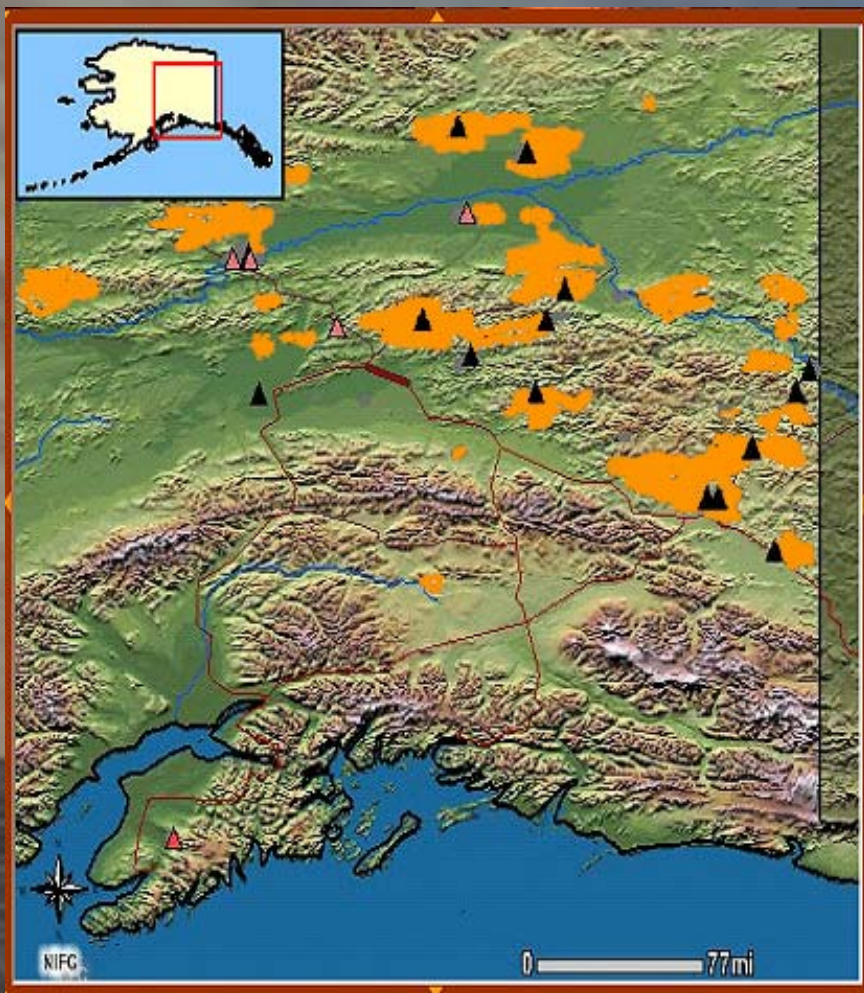
## Atlantic Track Forecast Errors





# 2004 Highlights

## AK Wildfires and Incident Meteorologists



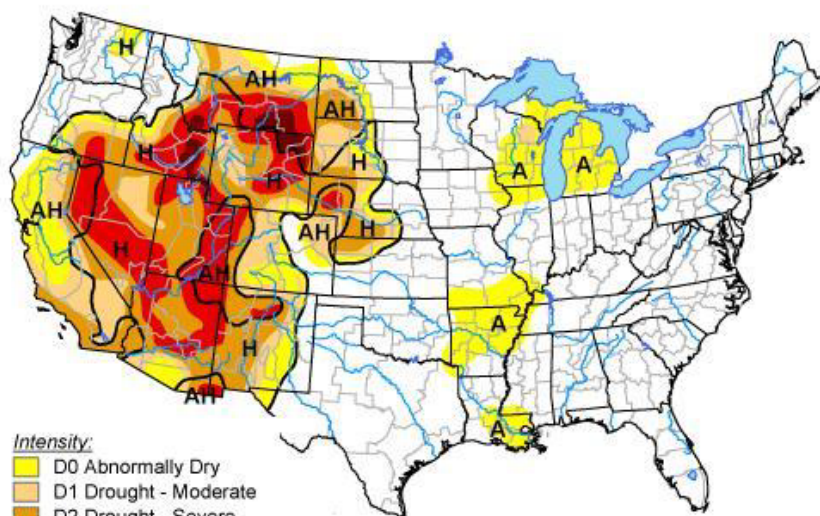
- 6.4 Million Acres Burned
- Record number of acres burned in Alaska
- 11 IMETs Dispatched
- All Hazard Meteorological Units used successfully



# 2004 Highlights

## Severe Drought in West

### U.S. Drought Monitor



*Intensity:*

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



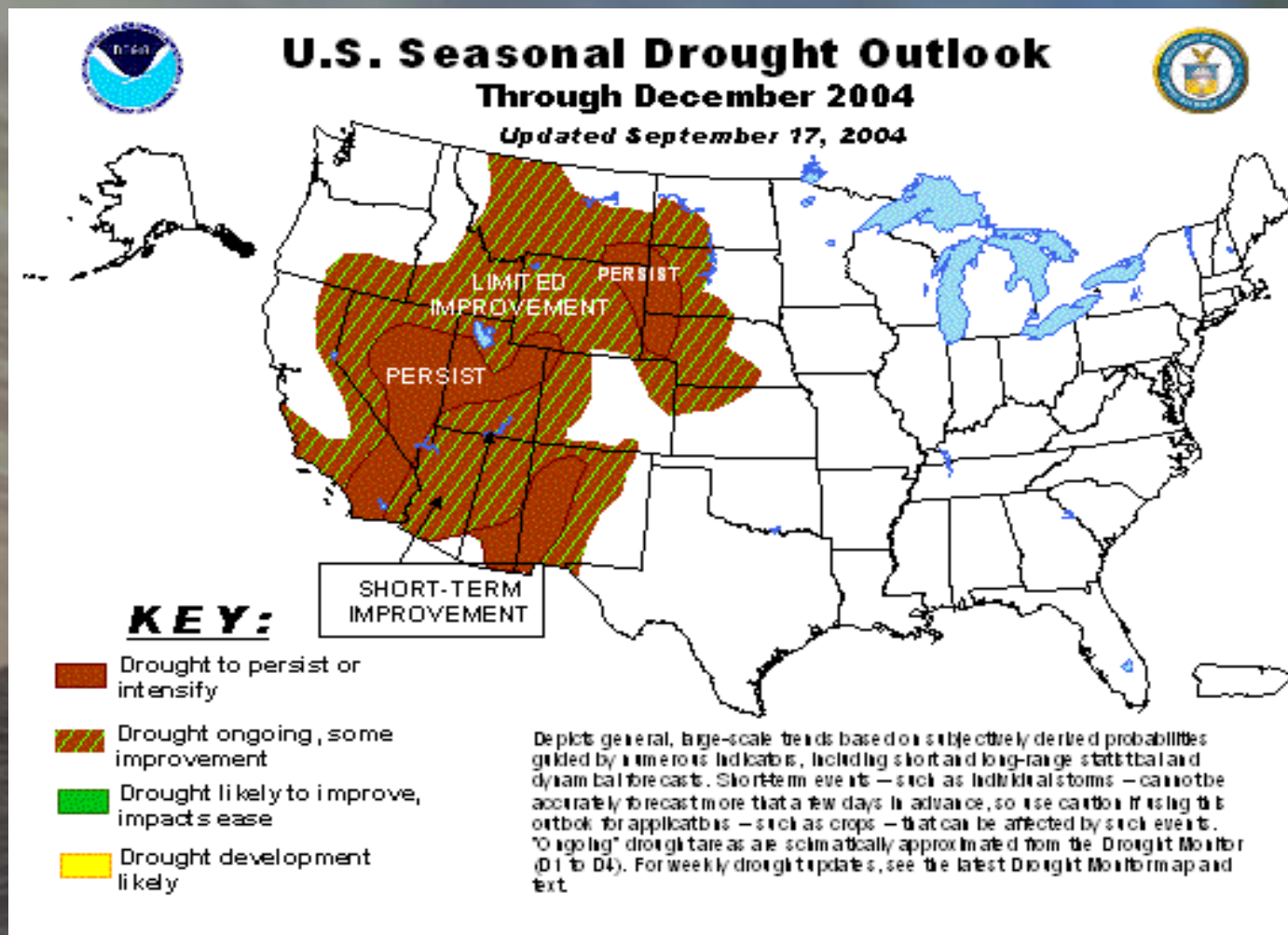
Released Thursday, September 30, 2004  
Author: Brad Rippey, U.S. Department of Agriculture

- In some areas, more than 5 years
- Many reservoirs seriously depleted
- 2004-2005 snow season critical
- NOAA-Western Governors Association
- National Integrated Drought Information System



# 2004 Highlights

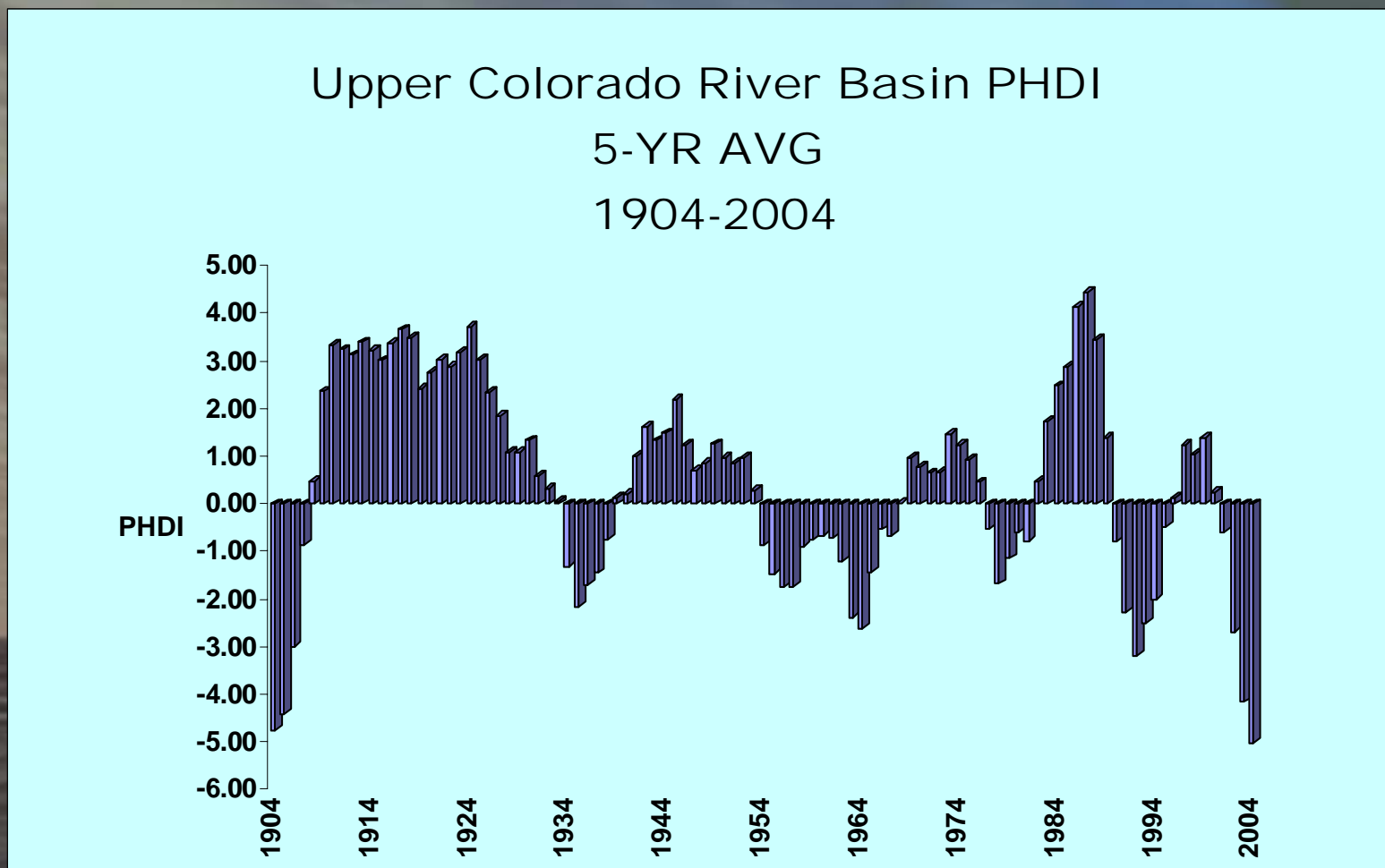
## Latest Seasonal Drought Outlook Climate Prediction Center





# 2004 Highlights

## Multi-year Drought: The Past 100 Years From the Palmer Hydro Index Perspective





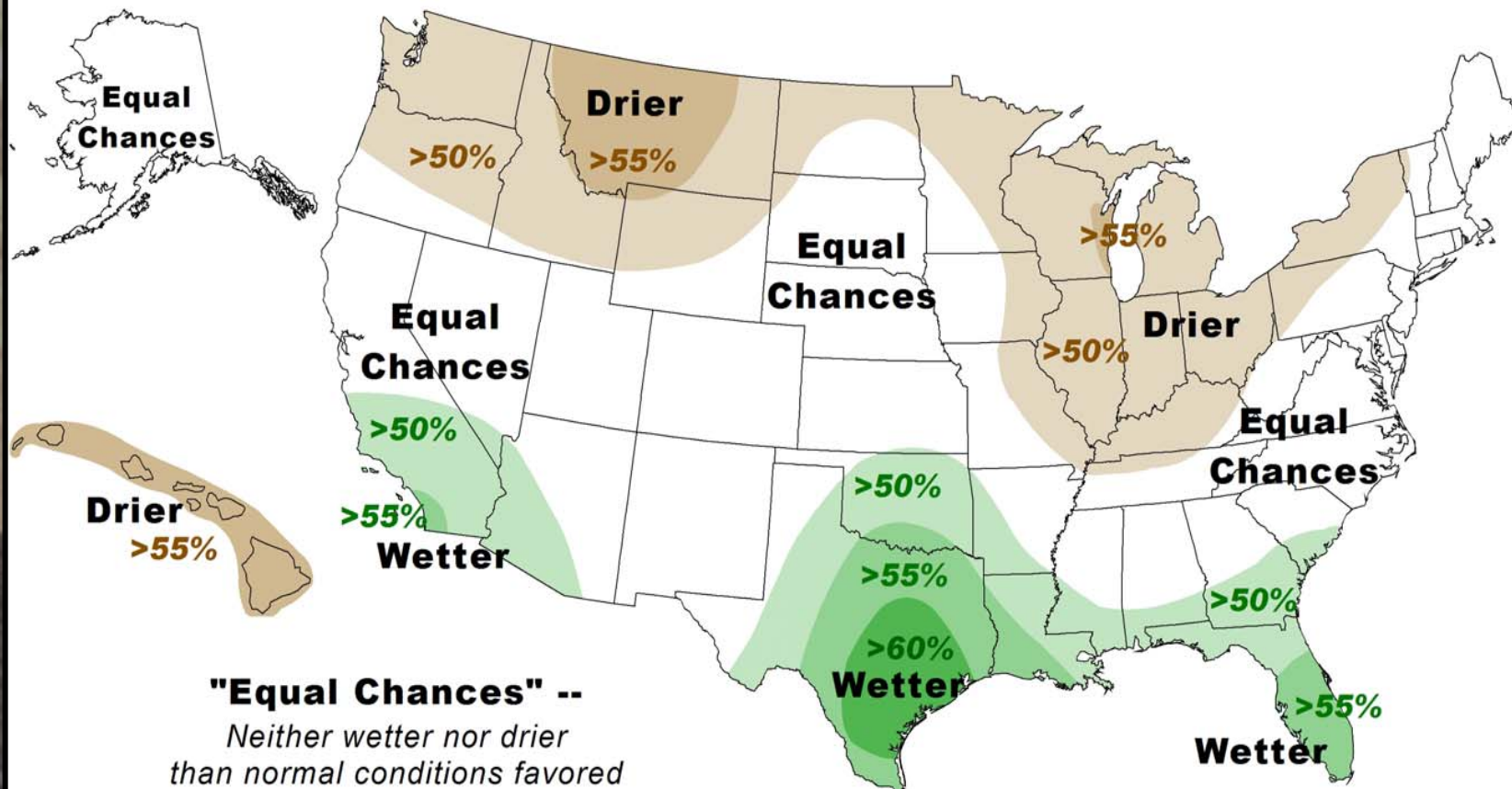
# 2004 Highlights



## Precipitation Outlook

Winter (Dec. - Feb.) 2004/05

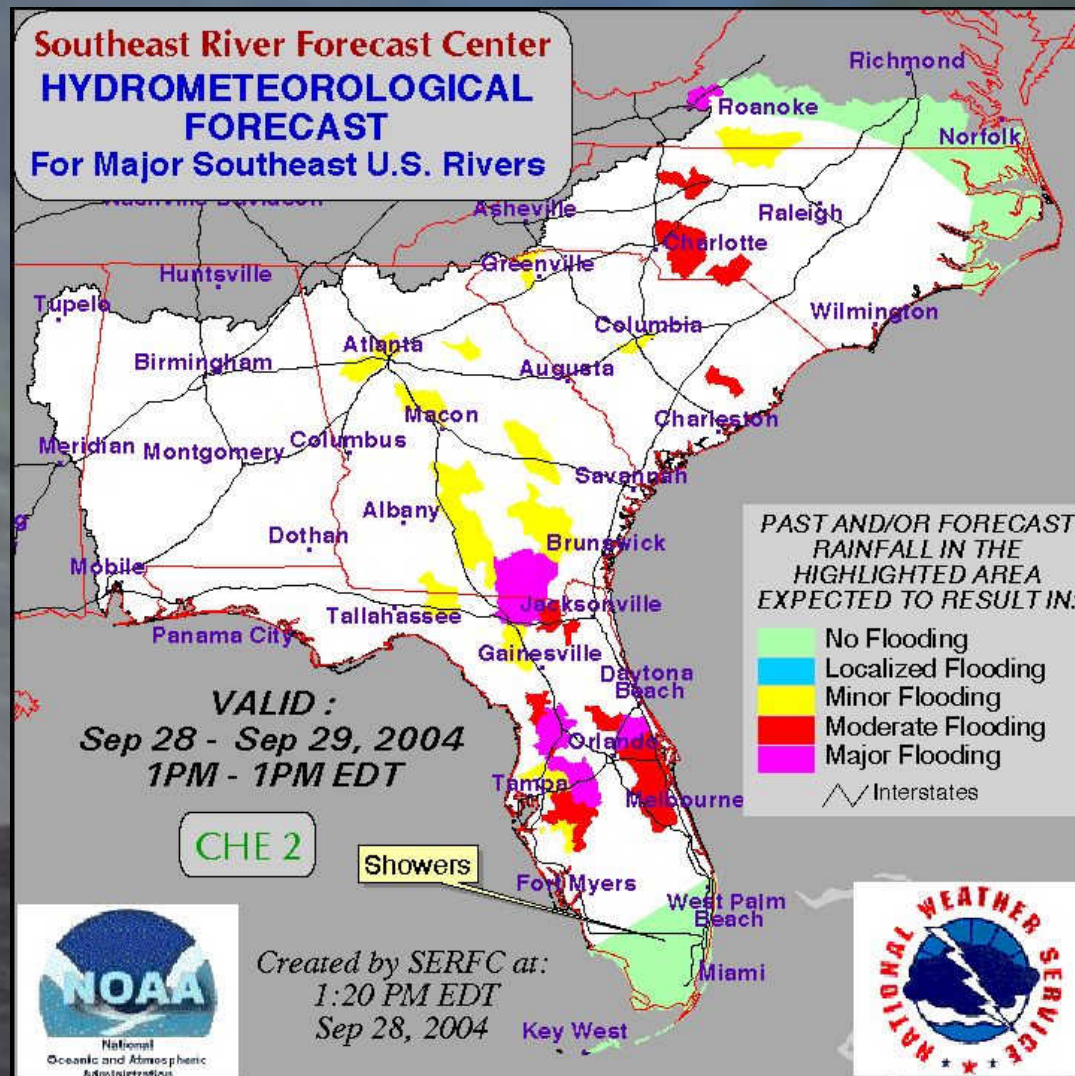
Conditions Compared to 1971-2000 Normal





# 2004 Highlights

## Inland Flooding from Hurricanes







# 2004 Highlights

## NWS National Performance Measures FY04–09

Government Performance Requirements Act (GPRA) Performance Measure	Goals	Actual	Goals				
	2004	2004	2005	2006	2007	2008	2009
* Tornado Warnings - Accuracy (%)	72	76	73	75	75	76	76
* Tornado Warnings - False Alarm Rate (%)	70	75	69	68	68	68	67
* Tornado Warnings - Lead Time (Min)	12	13	13	14	15	15	16
* Flash Flood Warnings - Accuracy (%)	88	91	89	90	90	90	91
* Flash Flood Warnings - Lead Time (Min)	50	50	53	56	58	58	59
Winter Storm Warnings - Accuracy (%)	89	90	90	90	90	90	91
Winter Storm Warnings - Lead Time (Hours)	14	16	15	15	15	15	16
* Hurricane Track Forecasts - 48 Hours Fcst Error (RMS)	129	95	128	128	126	126	125
Aviation Forecasts (Ceiling & Visibility) – Accuracy (%)	46	44	46	48	50	52	55
Aviation Forecasts - (Ceiling & Visibility) False Alarm Rate (%)	70	65	68	68	67	66	65
U.S. Seasonal Temperature – Skill	21	17	22	22	23	23	24
Precipitation Forecast – Day-1 Threat Score (%)	25	29	27	28	29	29	29
Marine Wind Speed Forecasts - Accuracy (%)	57	58	60	63	66	68	69
Marine Wave Height Forecasts – Accuracy (%)	69	67	72	75	78	80	81



# New Initiatives

## Computing Capability



***Commissioned/Operational IBM Supercomputer June 6, 2003***

- Global Models (Weather, Ocean, Climate)
- Regional Models (Aviation, Severe Weather, Fire Weather)
- Hazards Models (Hurricane, Volcanic Ash, Dispersion)
- Upgrade (3.3x) planned for January 2005
- West Virginia Operational Backup site: January 2005



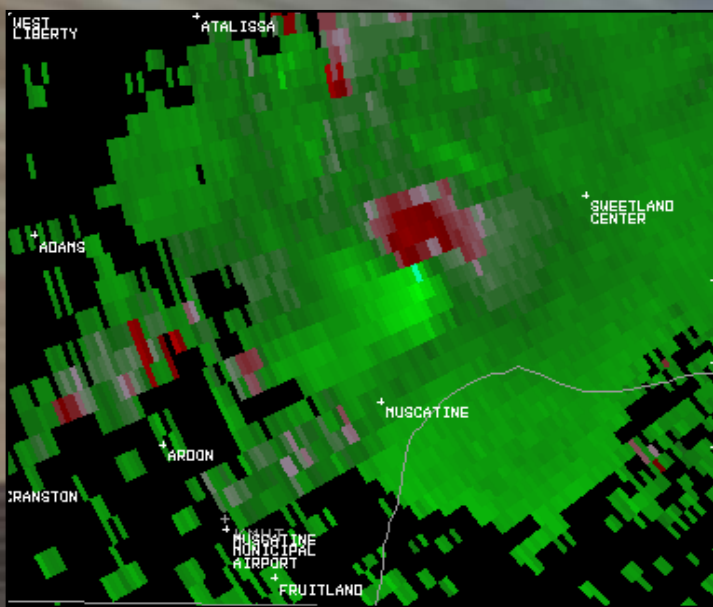
# New Initiatives

## Increased Data and Spatial Resolution

Improved tornado signature detection  
with better spatial resolution data.

Implemented In 2002

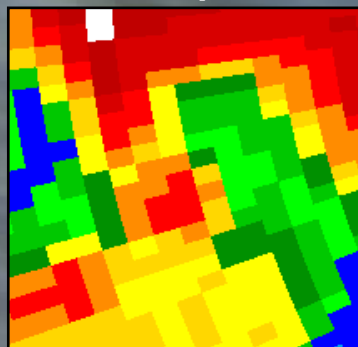
255 Data Levels vs Current 16



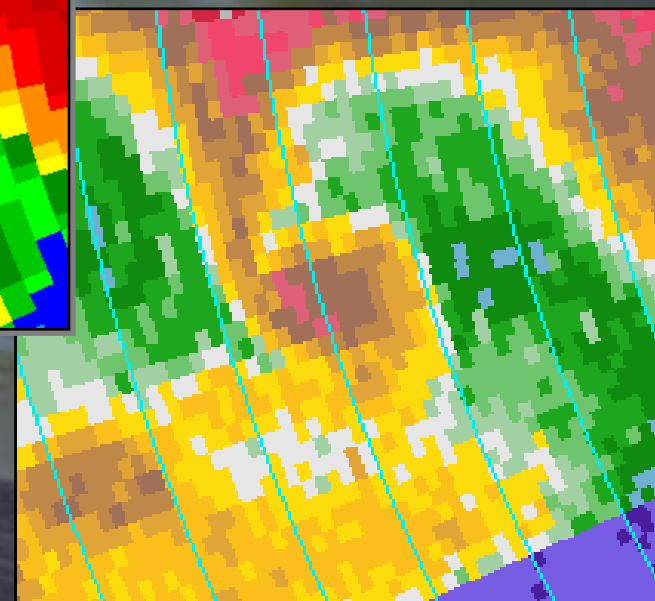
Velocity Rotation Signature Displayed  
With 255 Data Levels (8-bit Data)

Implementation Beginning in 2005

Super Resolution Data (1/4 Km x 1/2 Degree)



Current  
Resolution  
(1 km x 1 degree)



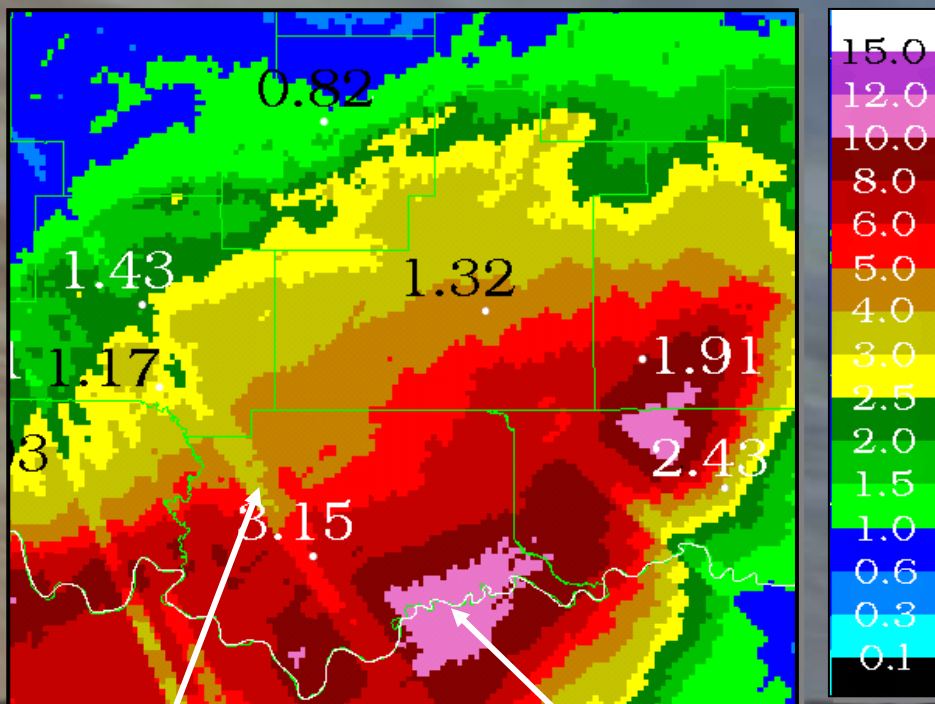
Hook Echo With Super-Resolution Data



# New Initiatives

## Dual Polarization Rainfall Estimation Enhancements

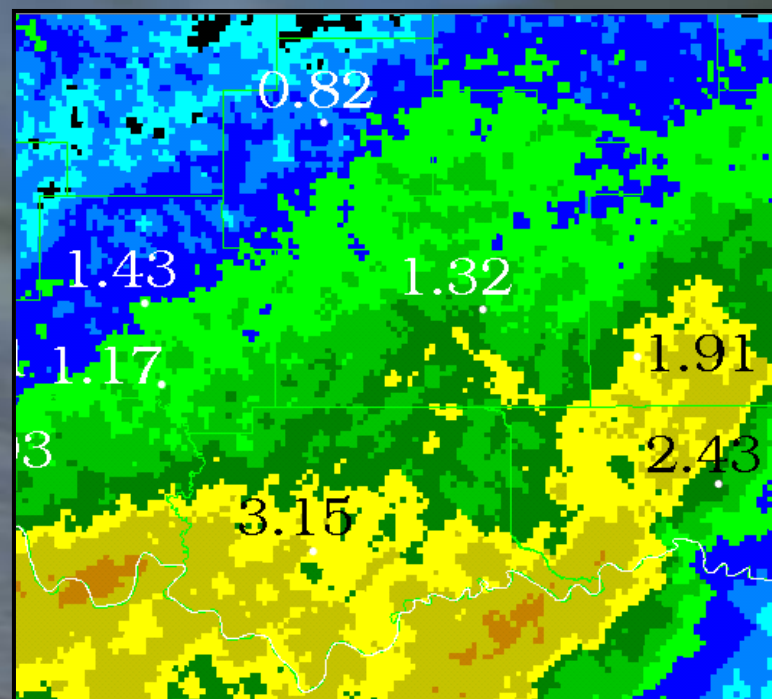
Reflectivity Based Estimation



Underestimation in  
partial beam  
blockage

Large overestimation  
in melting level & hail  
blockage

Dual Polarization Based Rainfall Estimation



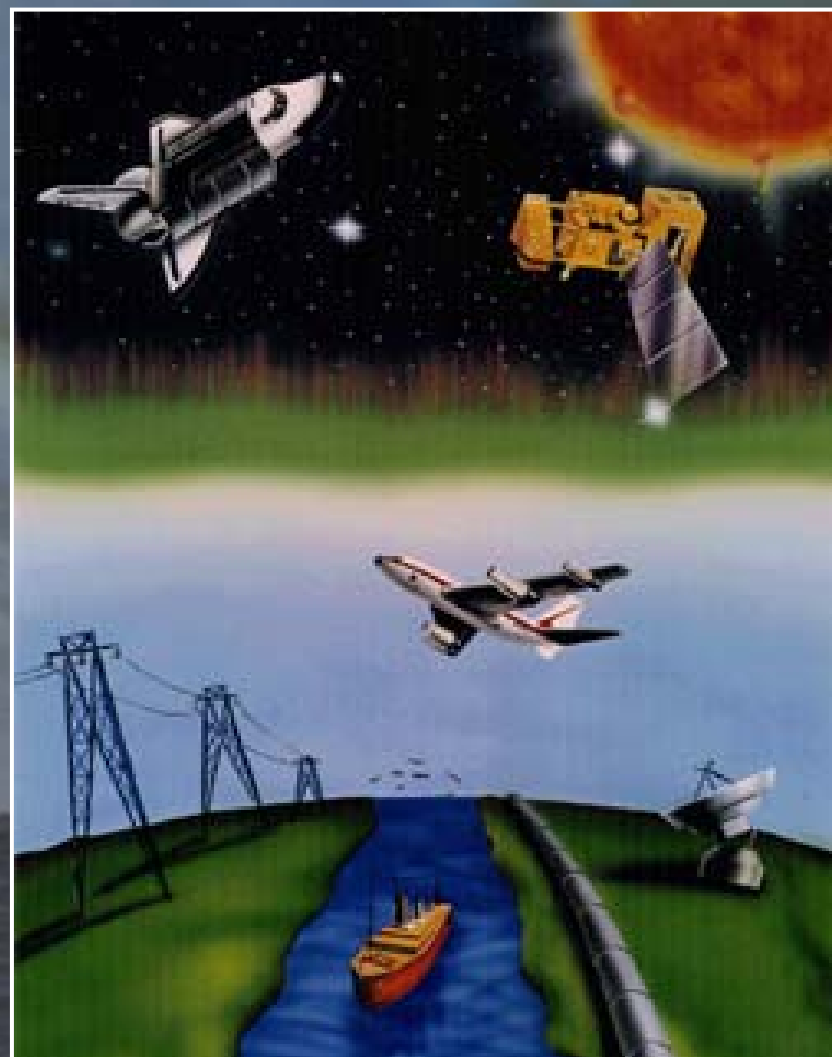
Planned for ~2008/2009



# New Initiatives

## Space Environment Center Transfer to NWS

- NOAA's mission relates to space weather
  - describe and predict changes in the Earth's environment
  - protect life and property and enhance the economy
- SEC will be placed within the National Centers for Environmental Prediction





# New Initiatives

## Air Quality Forecasts

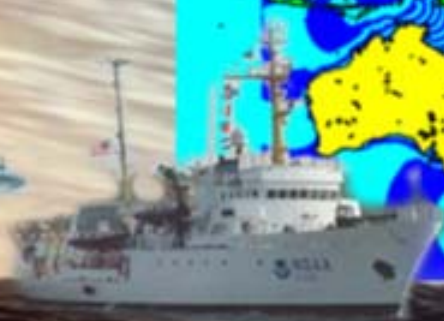
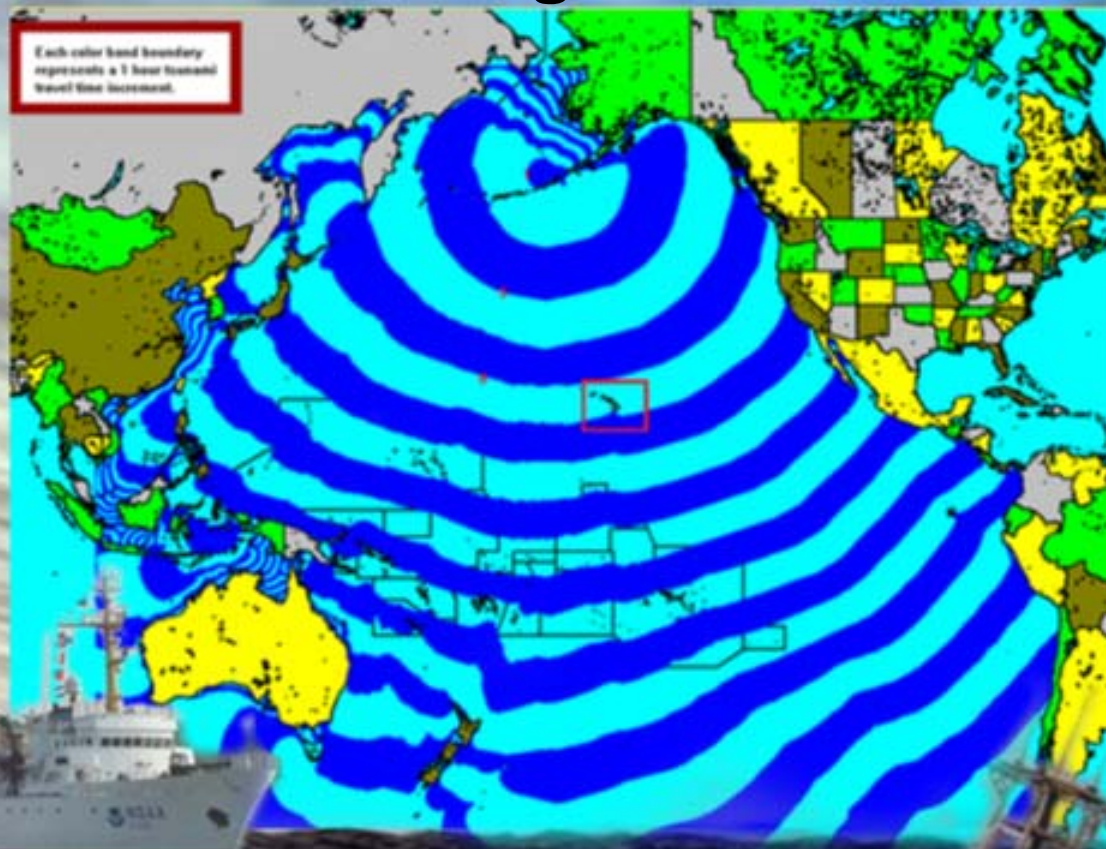
- Lives and property at risk from poor AQ
- AQ Forecast guidance produced 2 times daily
- **Phased Deployment**
  - *Implemented September 2004 for Northeastern US (next-day, ozone)*
  - *Deploy Nationwide by 2009*
  - *Develop particulates forecasts capability in 5 year timeframe*





# New Initiatives

## Tsunami Warnings





# **New Initiatives**

## **National Digital Forecast Database**

- ***Operational status on December 1***

*Max Temperature*

*Min Temperature*

*PoP 12*

- ***Improvements necessary before declaring these grids operational***

*Temperature*

*Dew Point*

*QPF*

*Snow amount*

*Sky cover*

*Wave heights*

*Wind direction and speed*



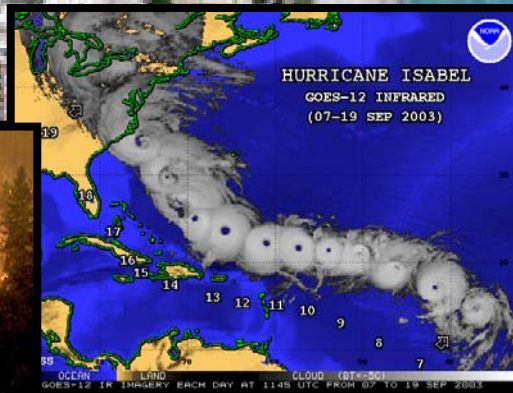




# On The Horizon

## Past Success Generates New Challenges

- Nation's Needs Growing
  - *Migration to coasts and environmentally sensitive areas*
  - *Awareness of health and economic impacts*
  - *Ecosystem sensitivities*
- Science & Technology Advancing
  - *Observing systems*
    - Satellites
    - Radar
- *Modeling*
  - Physics
  - Ensembles





# On The Horizon

## Increasing Global Pressures

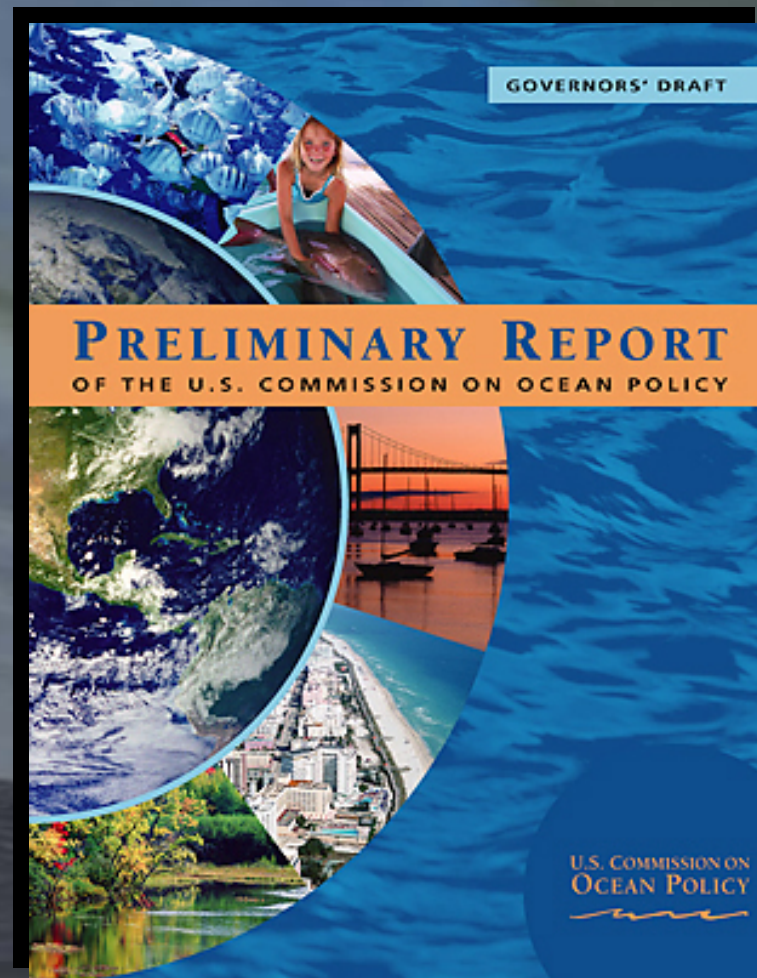




# On The Horizon

## Ocean Commission Recommendations

- Integrated Ocean Observing System
- National Water Quality Monitoring System





# On The Horizon

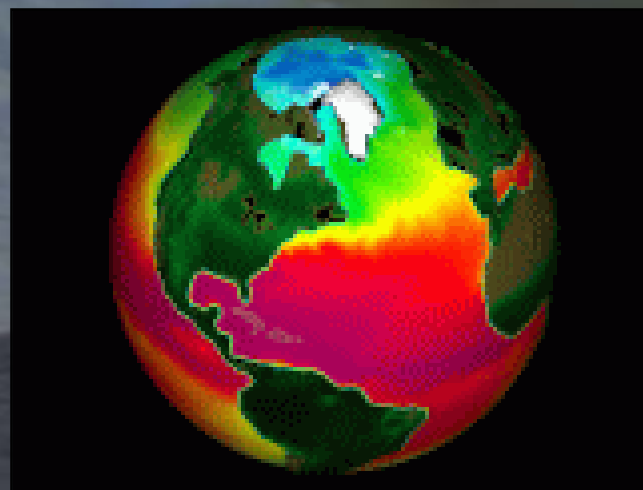
## Ocean Sensor?





# On The Horizon

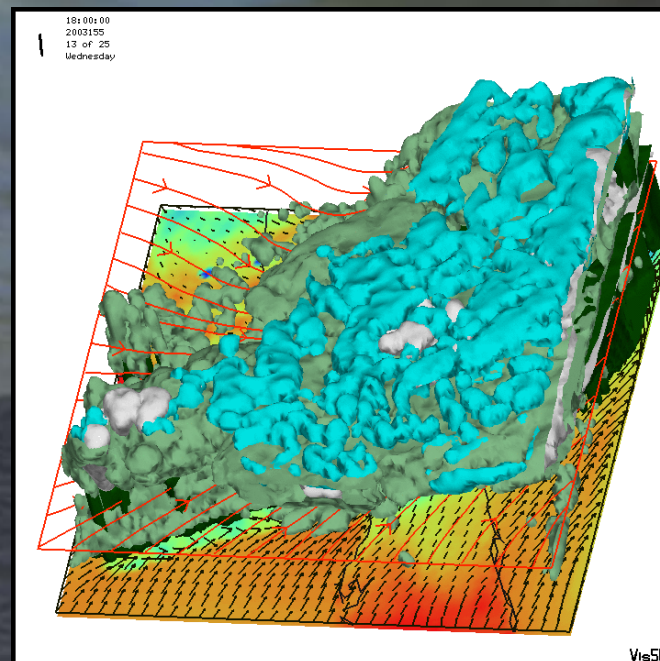
- Adopt broader view of Environmental Prediction
  - *Weather, water, and climate forecasts linked to societal impacts*
- Implement integrated Earth Observation System -- GEOSS
- Develop common Earth system models, fully exploiting ensemble and other information enhancement techniques





# Summary

- Develop and sustain reliable enterprise IT architecture
  - *Maximizes responsiveness -- promotes scientific interoperability*
- Accelerate transition from research to operations
  - *Better plans, processes, and architectures – ESMF*
  - *TAO Array*
  - *Phased Array Radar*
  - *Tsunami Warnings*
- Improve partnerships, nationally and internationally
  - *Weather enterprise focus*





# You Lead the Way

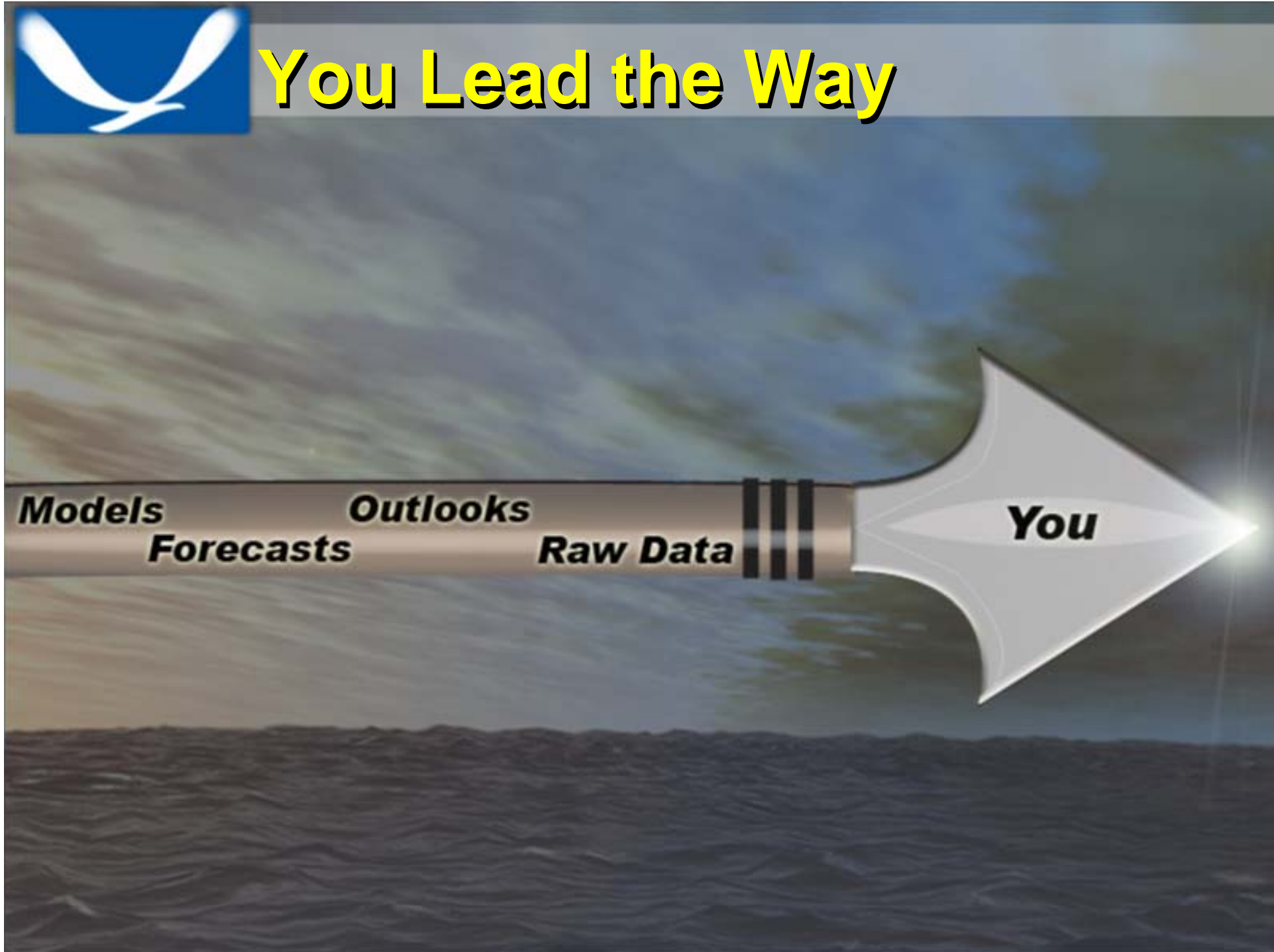
**Models**

**Forecasts**

**Outlooks**

**Raw Data**

**You**





***What's on your mind?***





# What is the Impact of a Climate Prediction Center Forecast for a Drier Than Normal Summer on Salmon Fishing in Olympic Peninsula rivers ?

## Seasonal Precipitation

