

NOAA's National Weather Service 101: Climate, Water, and Weather



Brig. Gen. David L. Johnson
NOAA Assistant Administrator for Weather Services

March 2004

NOAA's National Weather Service 101: *Climate, Water, and Weather*

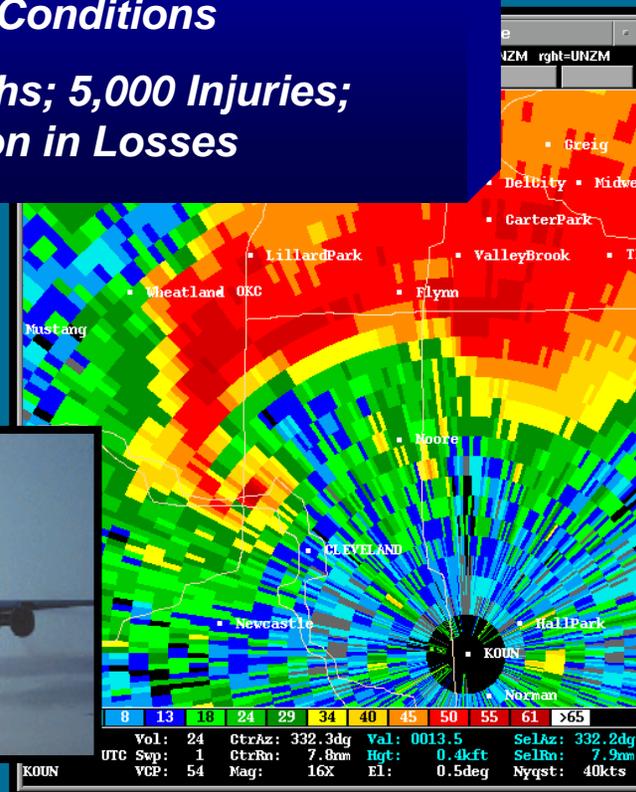
- **About the National Weather Service**
- **Modernization**
- **NWS Service Delivery**
- **Teamwork**
- **Performance**
- **Where We Are Going**

About the National Weather Service

- Provide climate, water, weather forecasts and warnings to protect **life** and **property** and enhance the economy
- Data and products are used by other government agencies, the private sector, the public, and the global community.

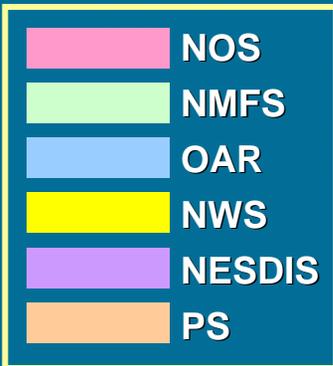
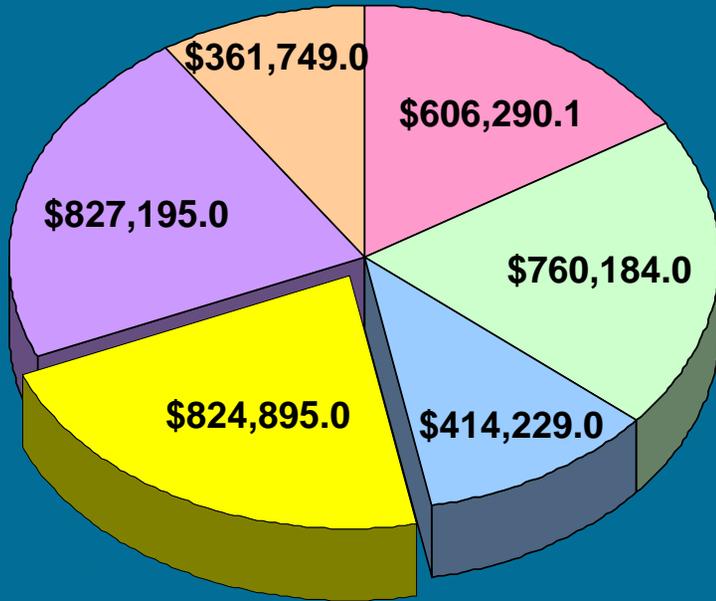
A Typical Year Brings:

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

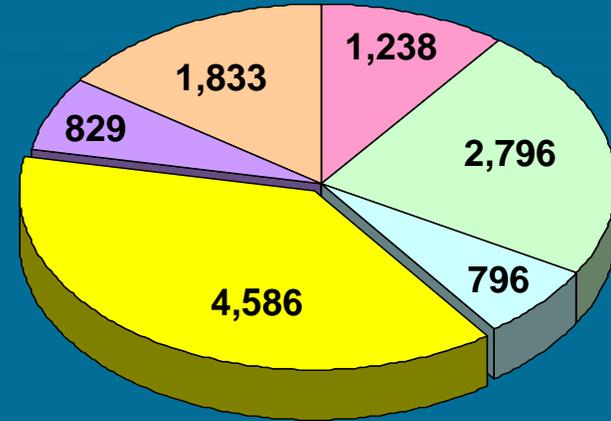


About the National Weather Service

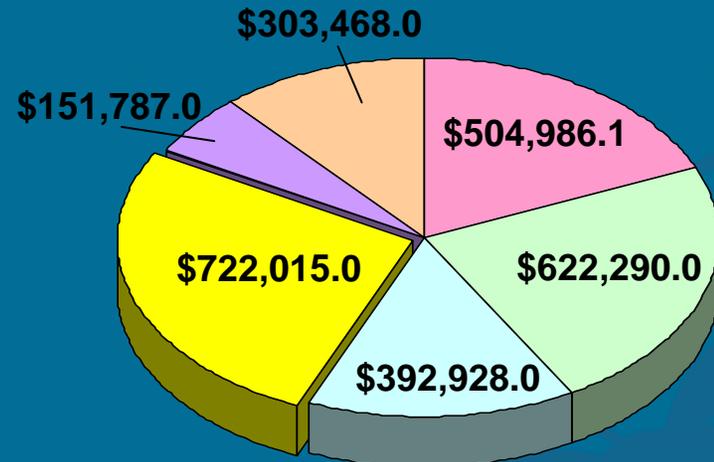
FY04 NOAA Appropriation (\$ in Thousands)



FY04 NOAA Employees



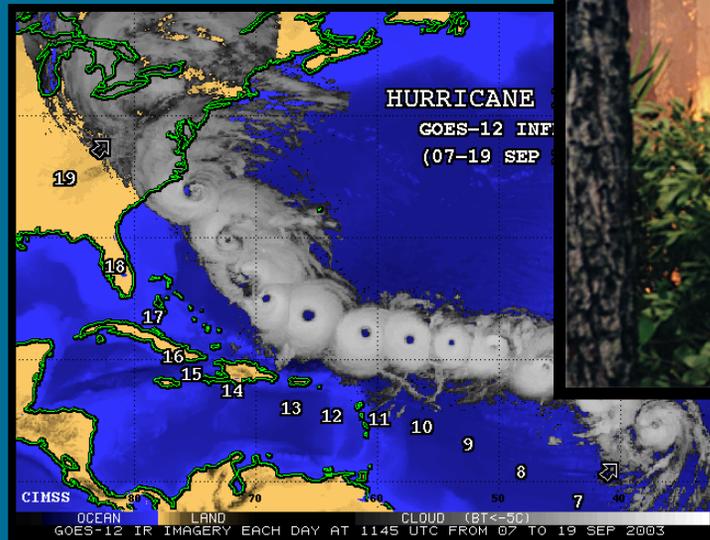
FY04 NOAA Appropriation Operations, Research, Facilities (\$ in Thousands)



About the National Weather Service

NWS Priorities

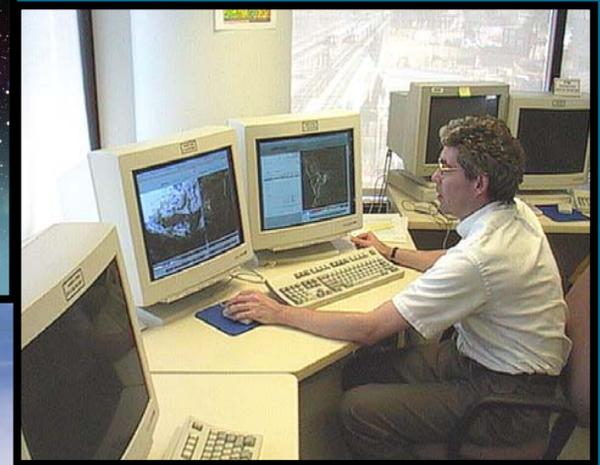
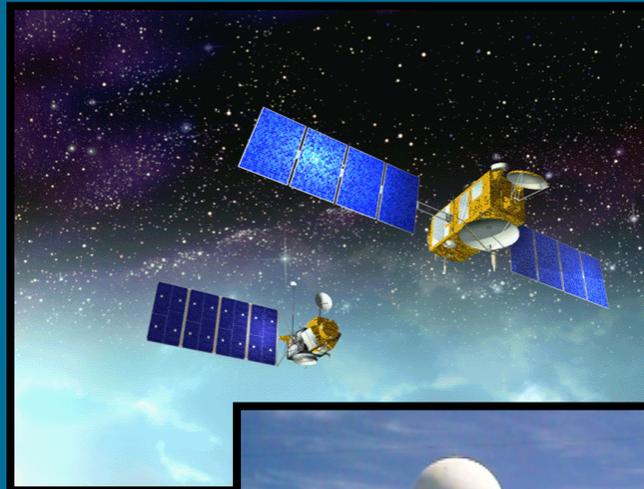
- Codify past investment by providing better climate, weather, and water forecasts for decision-making
- Leverage collaborative research to transfer new science into operations



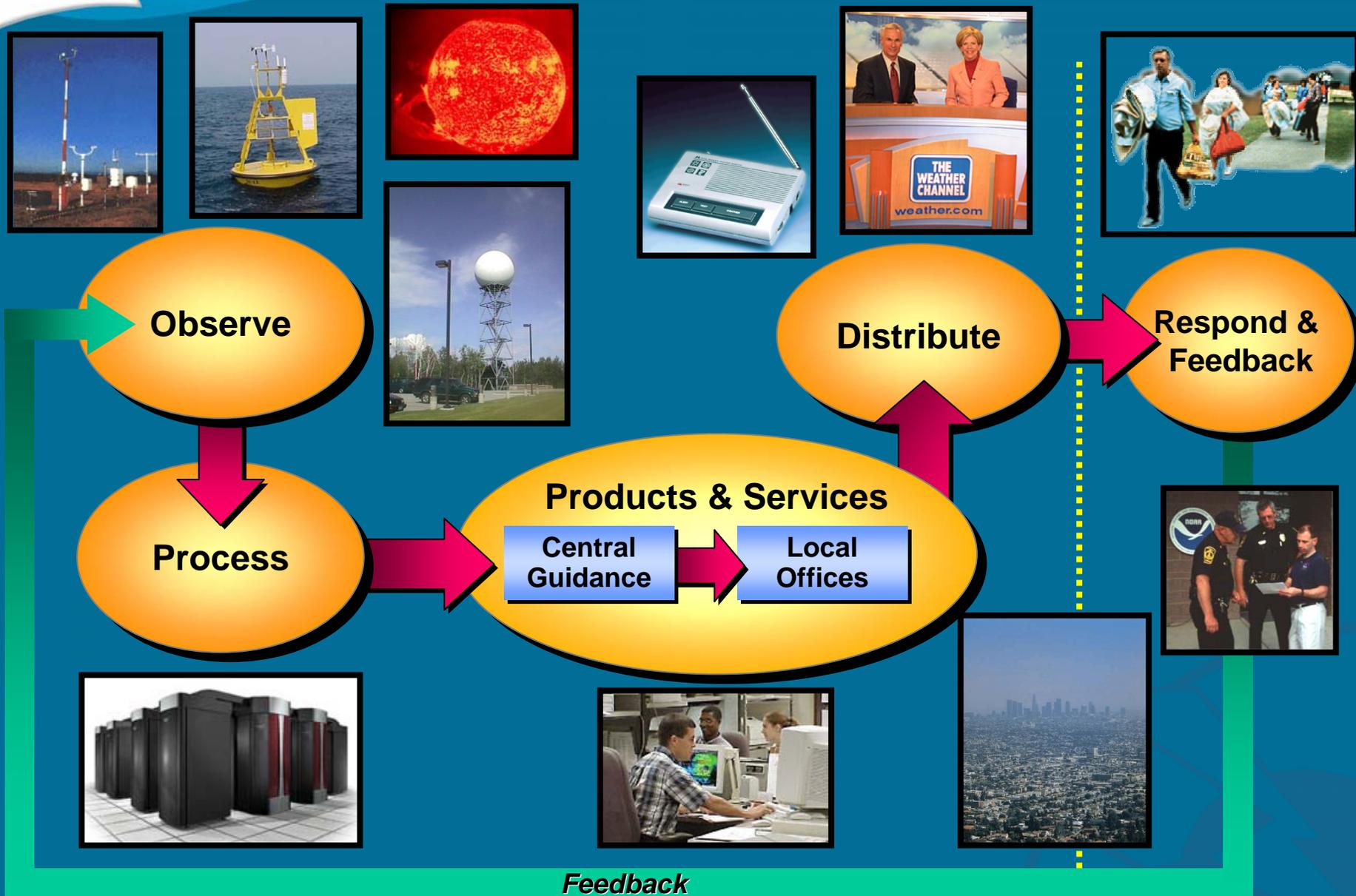
Modernization

Leveraging Taxpayers' \$4.5 Billion Investment

- **ASOS (318)**
- **NEXRAD (121)**
- **AWIPS (154)**
- **Supercomputer**
- **Workforce Restructuring**
- **Office Construction**
- **Satellites**



NWS Service Delivery

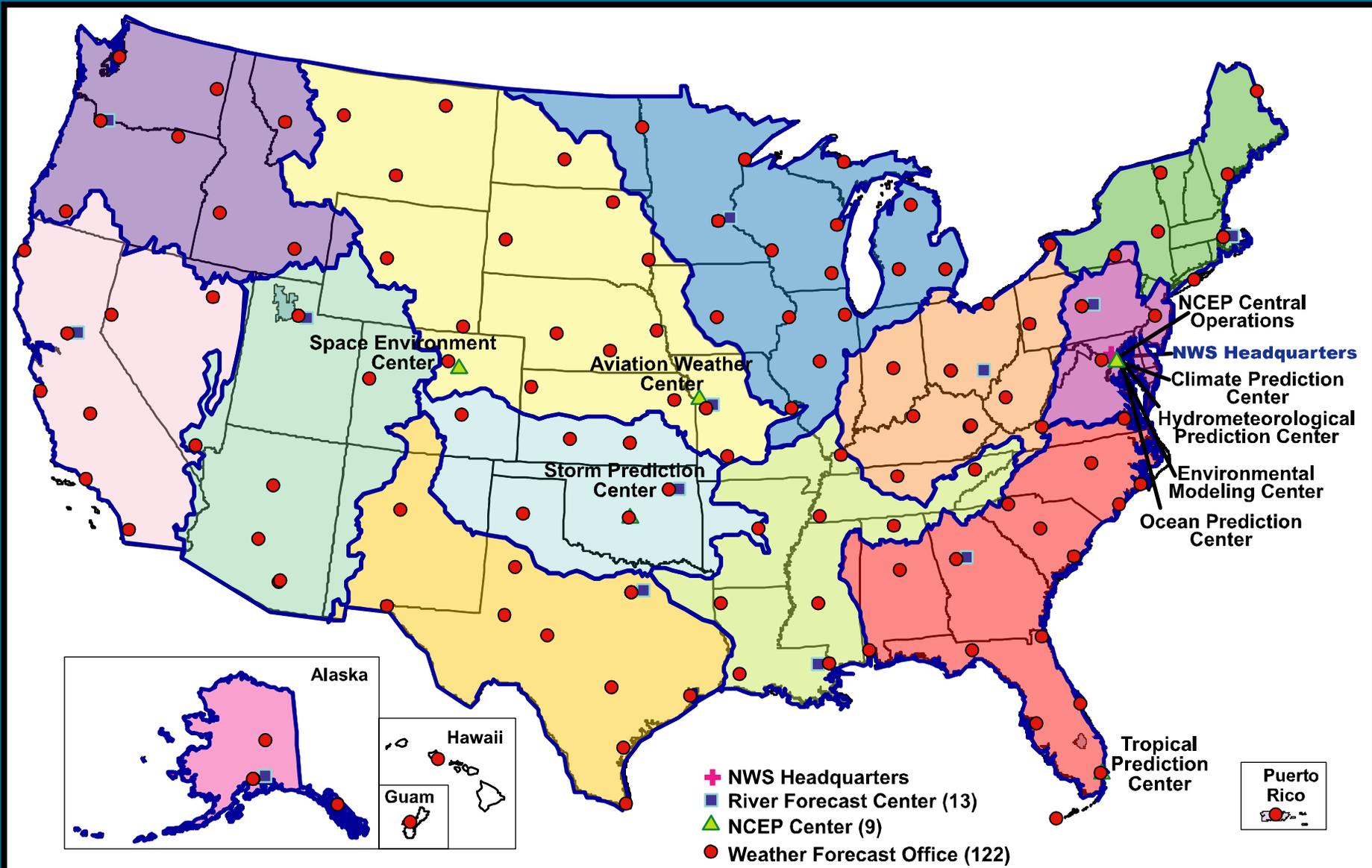


NWS Service Delivery Facilities



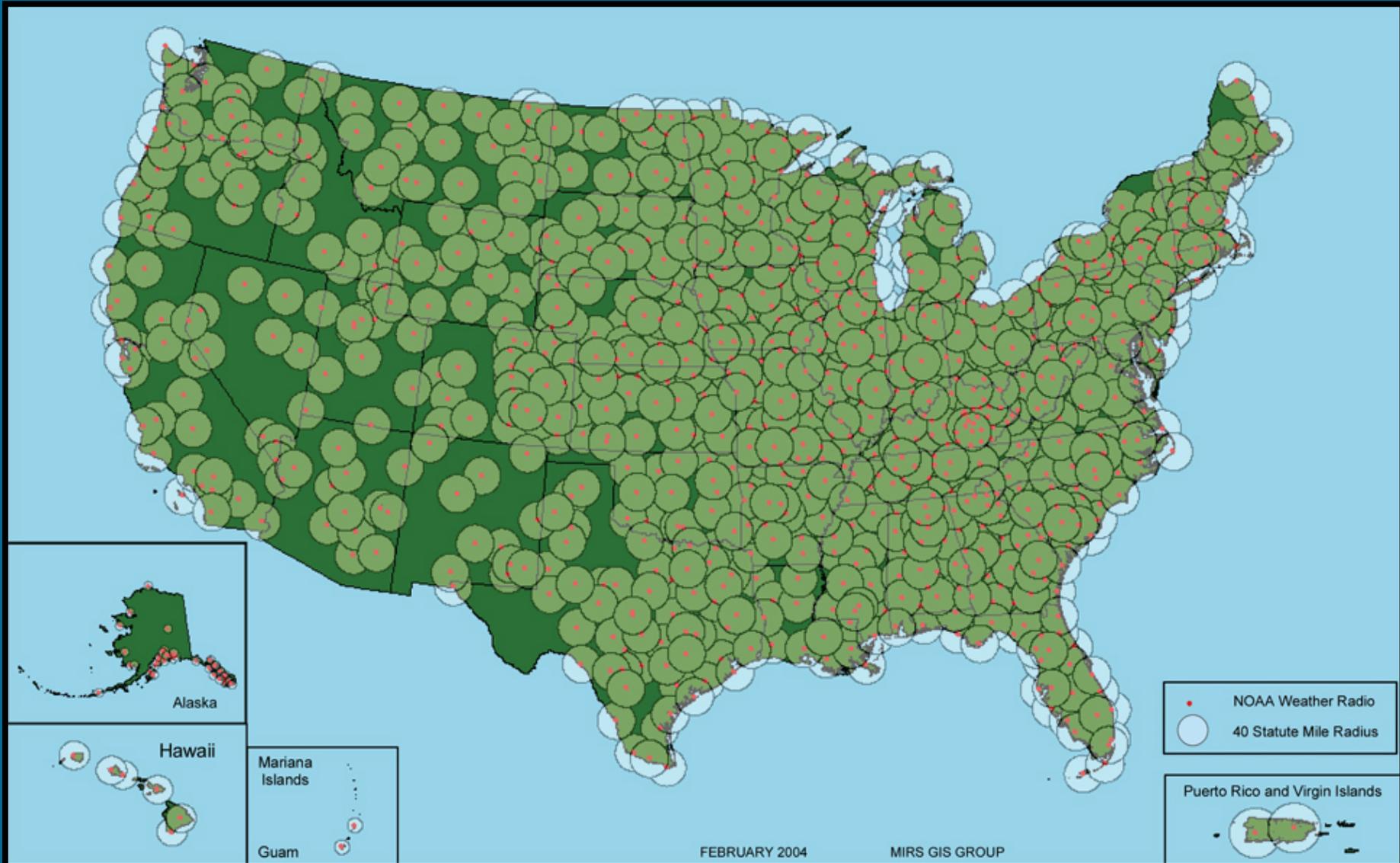
NWS Service Delivery

Hydrologic Coverage



NWS Service Delivery

800+ NOAA Weather Radio Stations



NWS Service Delivery *Doppler Radar Locations*

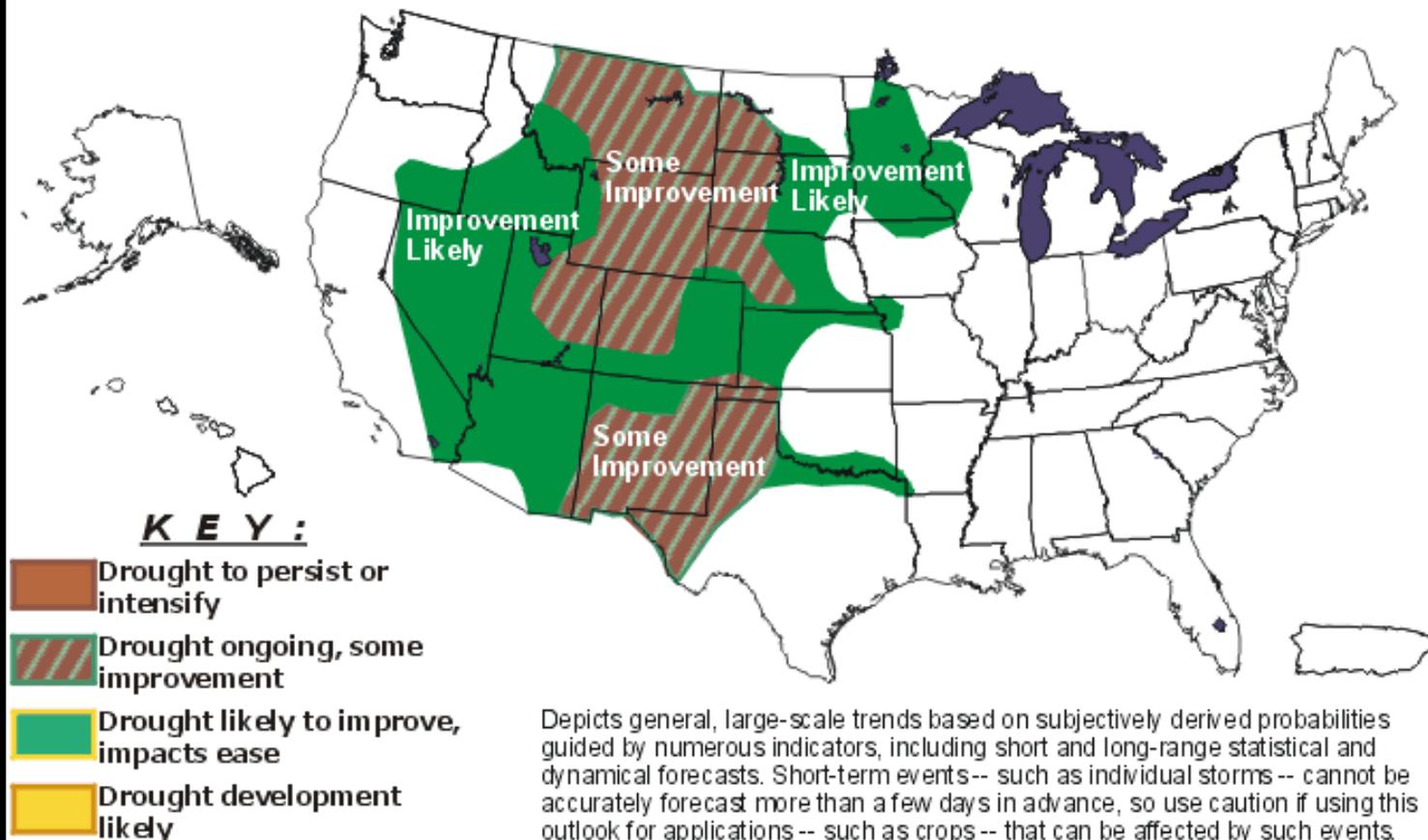


NWS Service Delivery

National Climate Products



U. S. Seasonal Drought Outlook Through May 2004 Released February 19, 2004



Depicts general, large-scale trends based on subjectively derived probabilities guided by numerous indicators, including short and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance, so use caution if using this outlook for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are schematically approximated from the Drought Monitor (D1 to D4). For weekly drought updates, see the latest Drought Monitor map and text.

Teamwork



Performance

NWS National Measures

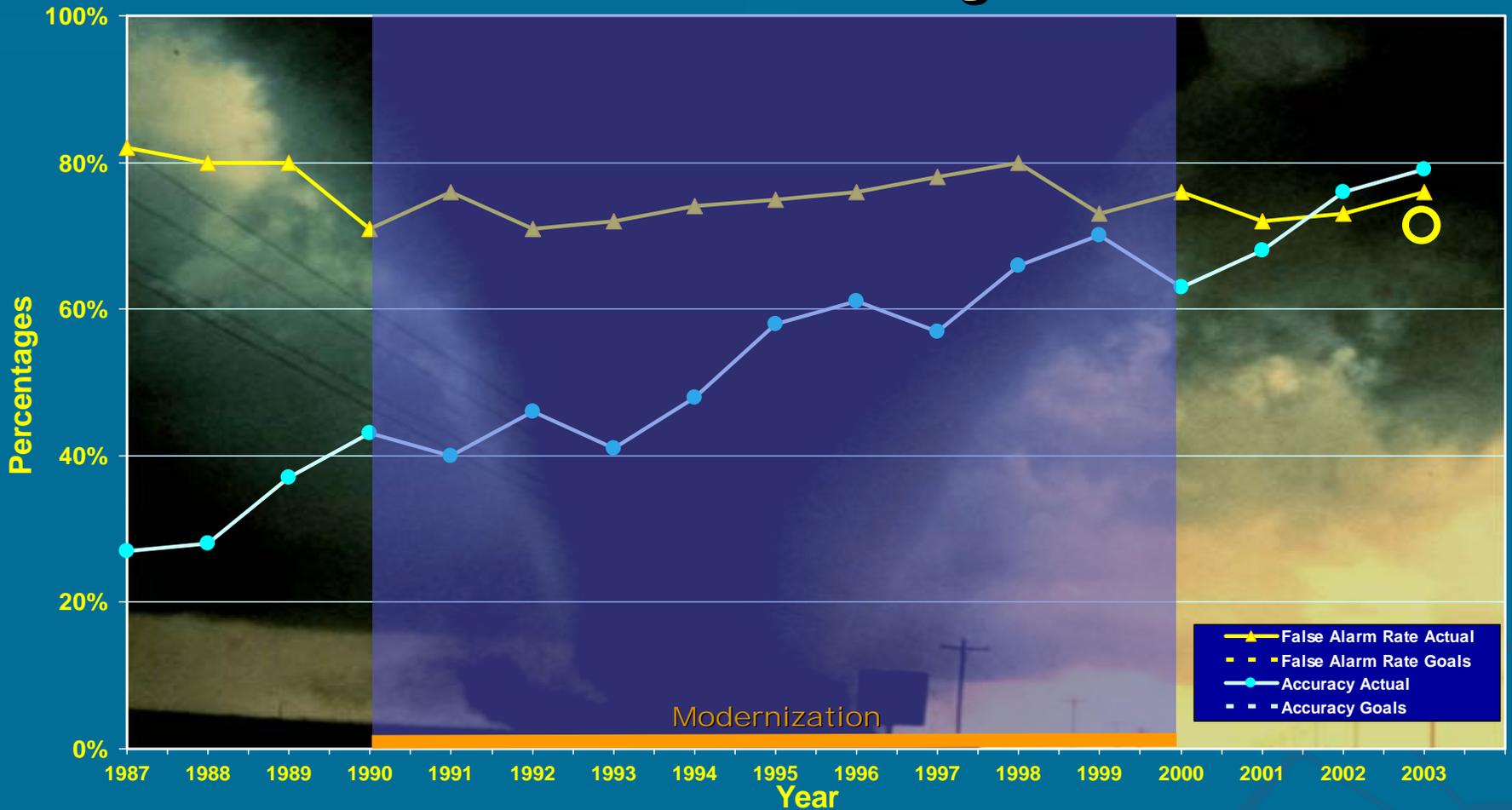
FY 2003 – FY 2009

Government Performance Requirements Act (GPRA) Performance Measure	Goals	Actual	Goals					
	2003	2003	2004	2005	2006	2007	2008	2009
Tornado Warnings - Accuracy (%)	72	79	72	73	75	75	76	76
Tornado Warnings - False Alarm Rate (%)	72	76	70	69	68	68	68	67
Tornado Warnings - Lead Time (Min)	12	13	12	13	14	15	15	16
Flash Flood Warnings - Accuracy (%)	87	89	88	89	90	90	90	91
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U.S. Seasonal Temperature – Skill	20	17	21	22	22	23	23	24
Precipitation Forecast – Day-1 Threat Score (%)	25	29	25	27	28	29	29	29
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Marine Wave Height Forecasts - Accuracy (%)	66	71	69	72	75	78	80	81

*Preliminary; will be finalized in April 2004

Performance

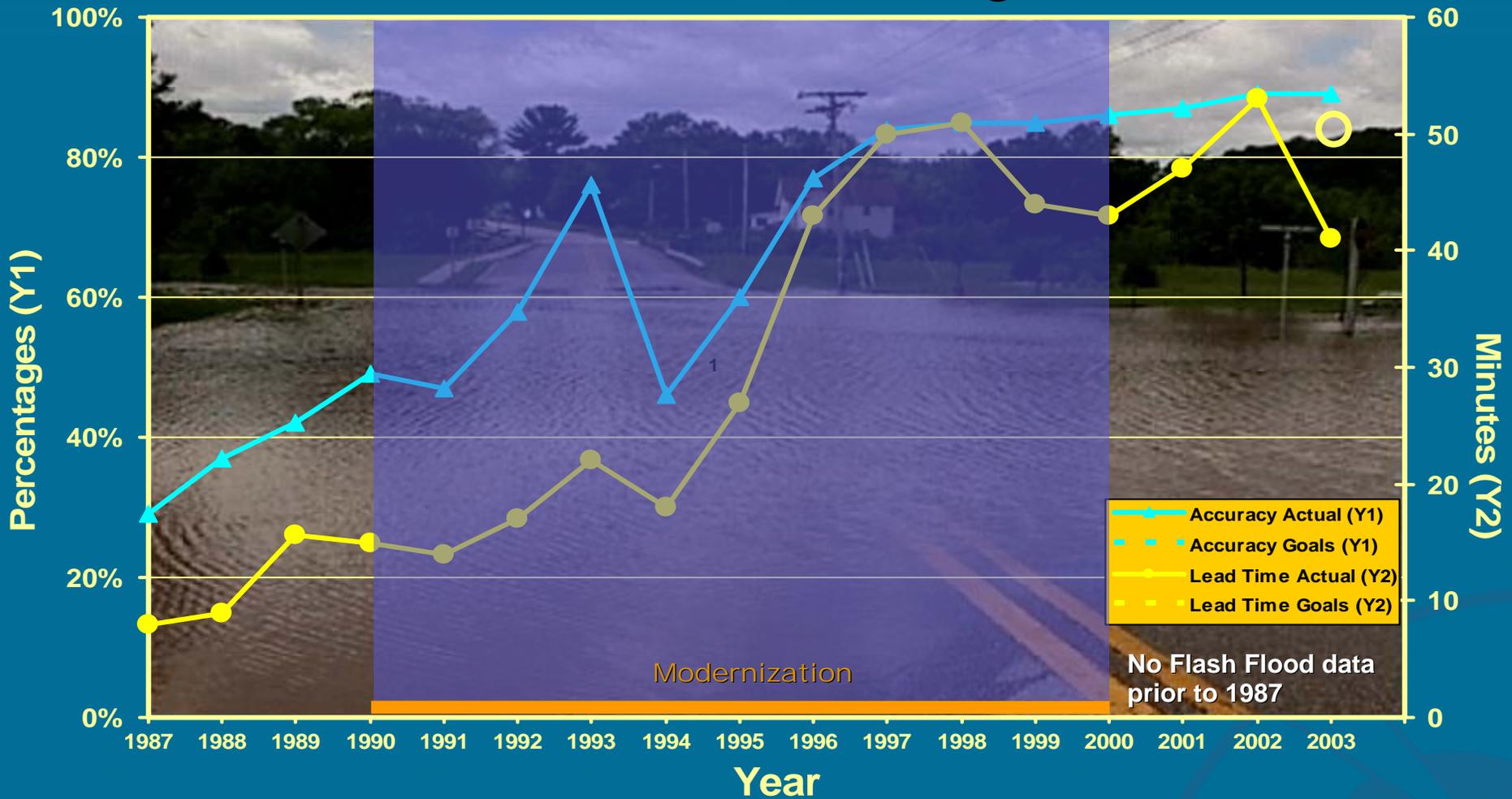
Tornado Warnings



○ False Alarm Goal

Performance

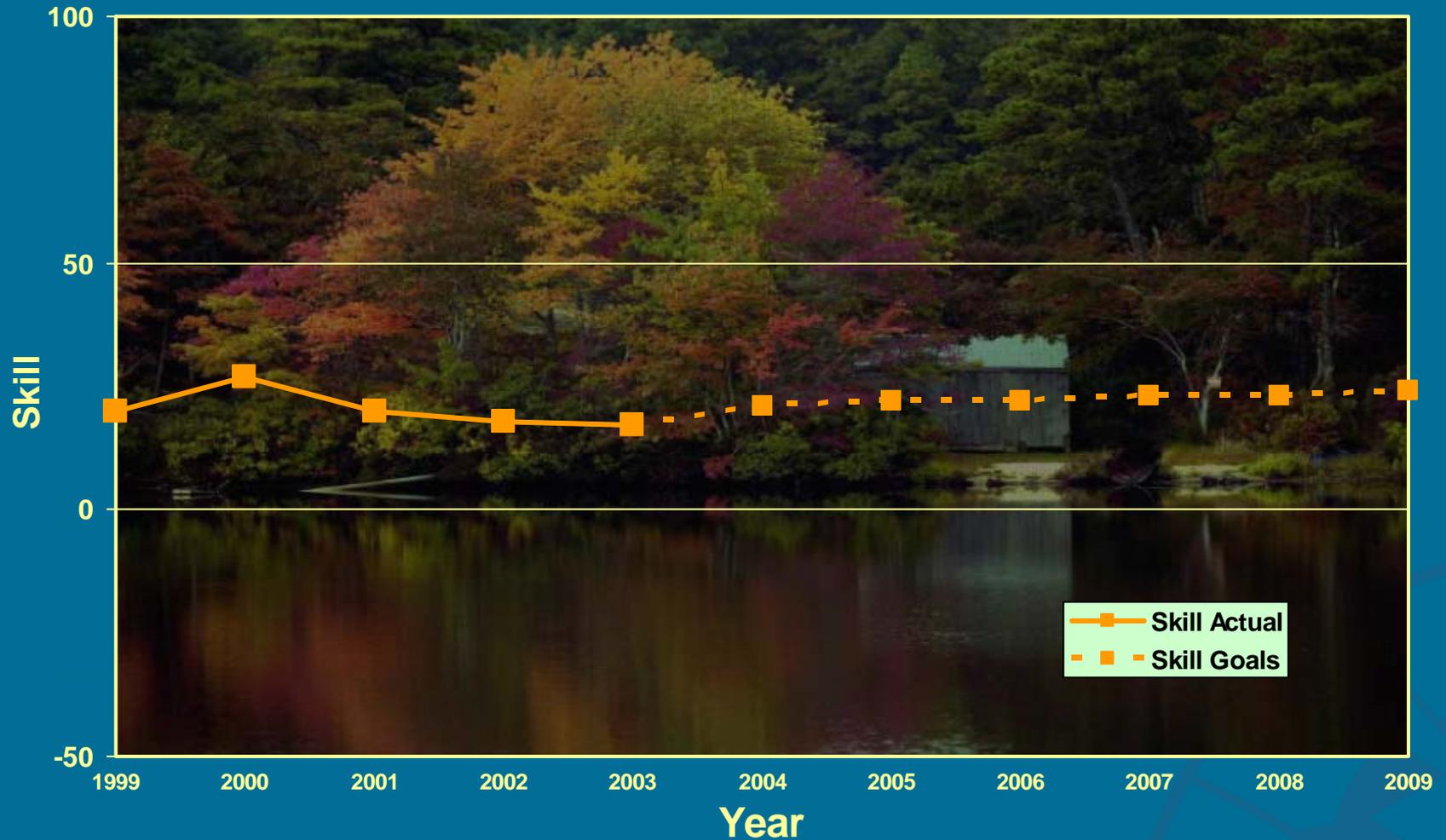
Flash Flood Warnings



○ Lead Time Goal

Performance

U.S. Seasonal Temperature - Skill

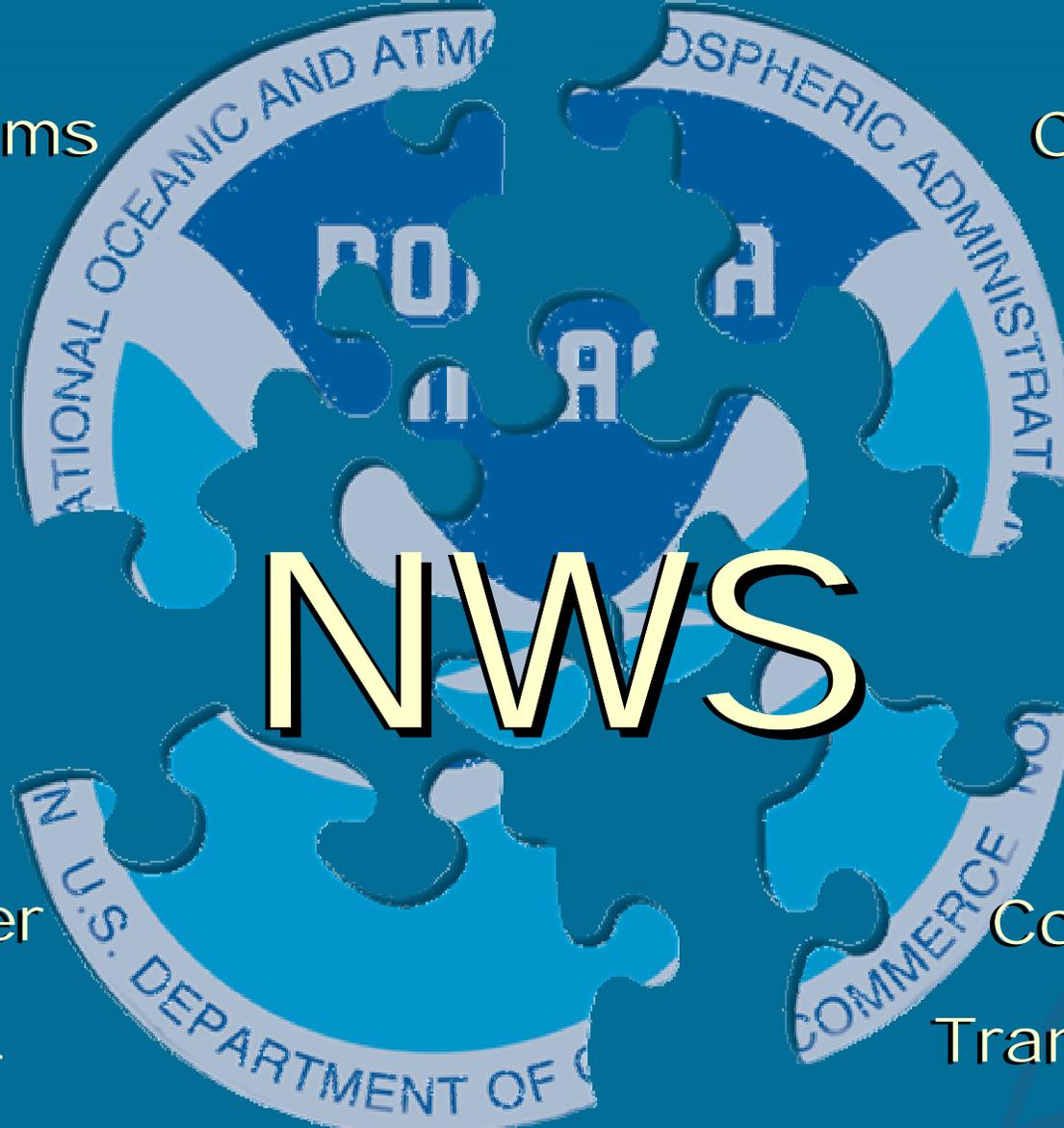


The Vision

NOAA's Mission Goals

Ecosystems

Climate

The NOAA logo is centered in the background, featuring a globe with the text 'NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION' and 'U.S. DEPARTMENT OF COMMERCE'. Overlaid on the logo are several interlocking gears in various shades of blue. The letters 'NWS' are prominently displayed in the center of the gears in a large, bold, white font with a black outline.

NWS

Weather
and
Water

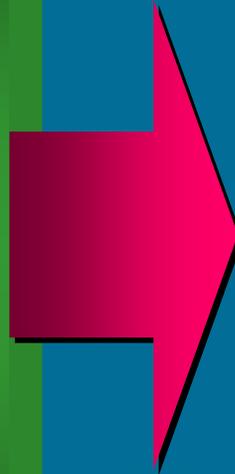
Commerce
and
Transportation

Where We Are Going

Science and Technology Infusion

Science & Technology Advances

- ✓ *Observations*
- ✓ *Numerical Prediction*
- ✓ *Forecast Applications*
- ✓ *IT Architecture*
- ✓ *Dissemination/Access*



Results

- Hurricane Track, Intensity and Precipitation Forecasts**
- Tornado and Flash Flood Forecasts**
- Aviation, Fire, and Marine Forecasts**
- Flood and River Predictions**
- Seasonal Climate Forecasts for Energy, Agriculture, Etc.**

Where We Are Going

Advanced Hydrologic Prediction Service



Where We Are Going

Expanding Climate Services

- **Feb. 19, 2004**
Release time
changed to meet
commodities market
needs

www.nws.noaa.gov

National Weather Service
Climate Prediction Center

Site Map News Organization Search All NWS Search Go

CPC Search
CPC search Go

Map Explanations
Official Fcsts
Fcst Tools

About Us
Our Mission
Who We Are

Contact Us
CPC Information
CPC Web Team

Official 90-day
Outlooks are issued
once each month near
mid-month at 8:30am
Eastern Time. Please
consult the schedule of
30 & 90-day outlooks
for exact release
dates.

HOME > Outlook Maps > Monthly to Seasonal Outlooks > Seasonal Outlooks

Seasonal Outlooks

OFFICIAL Forecasts

Apr-May-Jun 2004

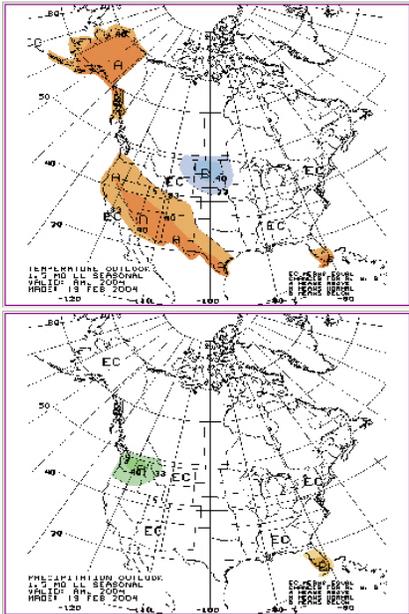
[1 & 3 MONTH AND DROUGHT SERVICE CHANGE NOTICE]
[EXPERIMENTAL TWO-CLASS SEASONAL FORECASTS]

Text-Format
Discussions
[Monthly](#)
[Long Lead](#)
[30-& 90-Day](#)
[Hawaiian](#)

More Outlooks
[0.5mn MAM 2004](#)
[1.5mn AMJ 2004](#)
[2.5mn MJJ 2004](#)
[3.5mn JJA 2004](#)
[4.5mn JAS 2004](#)
[5.5mn ASO 2004](#)
[6.5mn SON 2004](#)
[7.5mn OND 2004](#)
[8.5mn NDJ 2004-05](#)
[9.5mn DJF 2004-05](#)
[10.5mn JFM 2005](#)
[11.5mn FMA 2005](#)
[12.5mn MAM 2005](#)
[0.5mn Mar 2004](#)

[Time Series of Skill for all 1.5mn lead forecasts](#)

Tools Used (see Discussion for explanation)



Click on individual map to view larger format

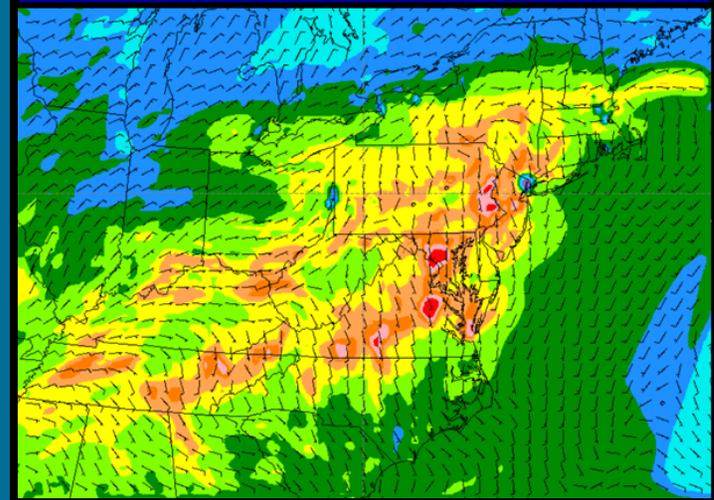
Where We Are Going

National Air Quality (AQ) Forecasting

- **Lives and property at risk from poor AQ**
- **AQ Forecast guidance produced 2 times daily**
- **Phased Deployment**
 - *Beginning FY 2005: Northeastern US, next-day, ozone*
 - *Five years: Nationwide coverage; begin particulates forecasts*



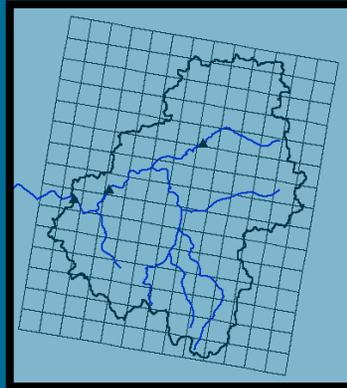
Test Product: Initial Operational Domain



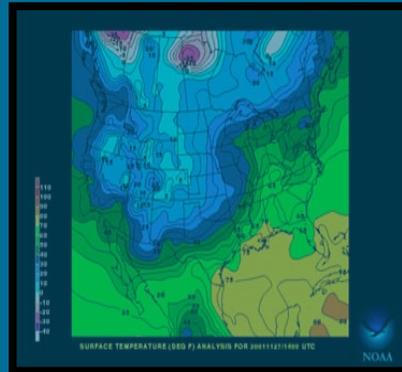
Where We Are Going

National Digital Forecast Database Gives Customers What They Want

Different Products for Different Customers



Commercial weather companies & emergency managers use grids to generate tailored products



The public, emergency managers and city planners use WWW. graphic products for detailed forecasts

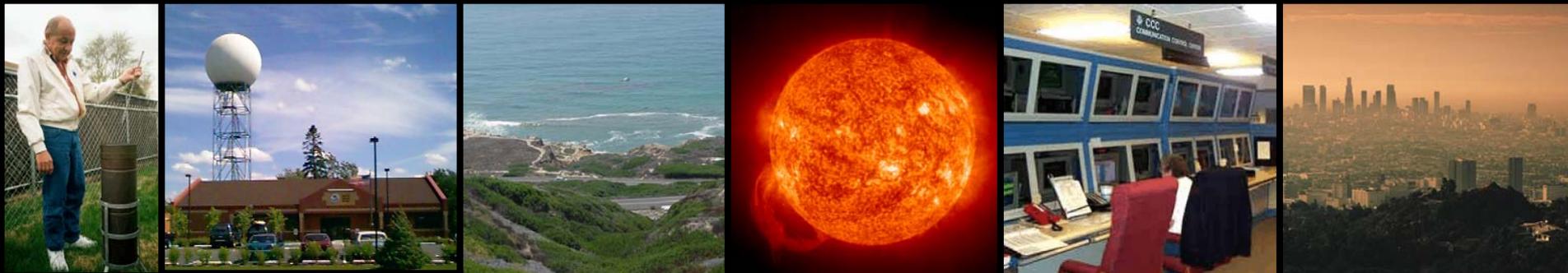
TODAY...RAIN LIKELY.
SNOW LIKELY ABOVE
2500 FEET. SNOW
ACCUMULATION BY LATE
AFTERNOON 1 TO 2
INCHES ABOVE 2500
FEET. COLDER WITH
HIGHS 35 TO 40.
SOUTHEAST WIND 5 TO
10 MPH SHIFTING TO THE
SOUTHWESTEARLY THIS
AFTERNOON. CHANCE OF
PRECIPITATION 70%.

Radio stations & public read text forecasts

- ✓ **More weather data**
- ✓ **Higher resolution forecasts**
- ✓ **Visual displays of probability**
- ✓ **User-defined products create business opportunities**

Highlights of the President's Budget Proposal:

- **Mandatory Adjustments** **\$20.1 M**
- **Telecommunications Gateway** **\$900 K**
- **Space Environment Center** **\$2.2 M**
- **Cooperative Observer (COOP) Modernization** **\$1.4 M**
- **Air Quality Ozone Forecasts** **\$5.5 M**
- **Facilities Security** **\$2.0 M**
- **Coastal-Global Observing System (C-GOOS)** **\$2.0 M**
- **U.S. Weather Research Program (improvements in 1-14 day forecasts)** **\$1 M**



NWS FY 2005 President's Budget - Highlights

FY 05 Change Increase	\$ M	Category	Comments
Adjustments to Base (ATBs)	\$20.1	Sustain Operations	Funds Federal Pay Raise as well as non-labor inflationary costs. Critical to sustain NWS operations and services
Telecommunications Gateway	\$0.9	Sustain Operations	Complete replacement of the Telecommunications Gateway Hardware & Software in Silver Spring, MD. The current system uses outdated technology and experiences delays in transmitting critical weather warning messages to the private sector and public
Space Environment Center	\$2.2	Sustain Operations	Budget transfers SEC from OAR to NWS to reflection operational mission of SEC. Increase restores funding to maintain operations and provide critical solar warnings and forecasts
Cooperative Observer Network Modernization	\$1.4	Sustain Operations	Provide operations & maintenance funding for 460 new COOP stations deployed in Northeastern US in FY 2003-2004. Observations will allow NWS forecasters to improve drought monitoring capabilities and improve daily temperature forecasts which are critical to the energy sector.
Air Quality Forecasting	\$5.5	New Service Capability	Sustain operational Ozone forecasts in Northeastern US and continue efforts to deliver Nationwide Ozone forecasts by FY 08 (CONUS)
Facilities Security	\$2.0	Enhance Security Capability	Provide enhanced security at NWS Weather Forecast Offices and National Prediction Centers. Multi-year funding initiative to meet Dept of Justice "Level II" Standards. This is a component of NOAA's Homeland Security Initiative and needed to protect NOAA employees and facilities from potential terrorist attacks
Coastal Global Ocean Observing System (CGOOS)	\$2.0	Enhance Observing Capability	Multi-year funding initiative to leverage investment in marine buoys to improve monitoring of the oceans, including salinity, currents, and sea surface temperature. The initiative will also address gaps in Nation's buoy network, improving marine warnings and forecasts to mariners.
Weather Research - THORPE	\$1.0	Enhance Weather Research	Program increase reflects a transfer for OAR to NWS. This multi-year international weather research initiative seeks to improve the accuracy of 7-14 day weather forecasts by improving global and regional weather models.

www. weather.gov

The screenshot shows the National Weather Service website interface. At the top, the NOAA logo is on the left, and the text "National Oceanic and Atmospheric Administration" and "National Weather Service" are centered. Below this is the slogan "WORKING TOGETHER TO SAVE LIVES". On the right, the "weather.gov" URL and the National Weather Service logo are visible. A navigation bar contains links for "Site Map", "News", "Organization", and "Search". The search bar has the placeholder text "Enter Search Here" and a "Go" button. On the left side, there is a "Local forecast by 'City, St'" section with a text input field and a "Go" button. Below this is a "Warnings" section with a list of options: "Current", "By State...", "Observations", "Radar", "Satellite", "Snow Cover", "Surface", "Weather...", "Forecasts", "Local", "Graphical", "Aviation", "Marine", "Hurricanes", "Severe Weather", "Fire Weather", and "Climate...". At the bottom of the left sidebar are "Forecast Models" and "Numerical Models". The main content area features a news article titled "NOAA Issues Draft Policy to Foster 'Fair Weather' Partnerships" with a sub-headline and a paragraph of text. Below the article is a navigation bar with buttons for "Warnings and Forecasts", "Graphical Forecasts", "National Maps", "Radar", "Rivers", and "Satellite". A "Warnings By State" dropdown menu is set to "Go". Below this is a map titled "National Weather Service Current Watches, Warnings, Statements, and Advisories" with a "Click On Map Below To Zoom In." instruction. The map shows the United States with various colored regions indicating weather alerts. A legend at the bottom left of the map lists "Puerto Rico", "Guam", and "American Samoa". The date and time "02-19-2004 1442Z (09:42AM EST)" are displayed in the bottom right corner of the map area.

weather.gov

National Oceanic and Atmospheric Administration
National Weather Service
WORKING TOGETHER TO SAVE LIVES

Site Map News Organization Search Go

Local forecast by "City, St"
 Go

Warnings
Current
By State...
Observations
Radar
Satellite
Snow Cover
Surface
Weather...
Forecasts
Local
Graphical
Aviation
Marine
Hurricanes
Severe Weather
Fire Weather
Climate...
Forecast Models
Numerical Models

NOAA Issues Draft Policy to Foster "Fair Weather" Partnerships
The National Oceanic and Atmospheric Administration (NOAA) is requesting public comment on a newly drafted policy governing NOAA's National Weather Service interactions and cooperation with the greater consortium of public, private and academic weather and climate institutions. [Details...](#)

Warnings and Forecasts Graphical Forecasts National Maps Radar Rivers Satellite

Warnings By State Click On Map Below To Zoom In.

National Weather Service
Current Watches, Warnings, Statements, and Advisories

02-19-2004 1442Z
(09:42AM EST)

- ◆ Puerto Rico
- ◆ Guam
- ◆ American Samoa

BUDGET SLIDES

NWS FY03 Accomplishments

- **Implemented Advanced Hydrologic Forecast Services (AHPS) at 366 New Locations (717 cumulative locations)**
- **Expanded NOAA Weather Radio population coverage to 95% of U.S.**
- **Certified 155 new StormReady communities; 645 at the end of FY03**
- **Replaced AWIPS Workstations with new hardware; implemented Linux technology**
- **Began use of new central supercomputer system: 2.5 Times the Computational Power of the Previous Computer**
 - *New computer completes 450B calculations/second (old computer completed 170B calc./second)*
- **Outstanding Warning and Forecast Performance during FY 2003:**
 - *Midwest Tornado Outbreak (May 03); Average lead time: 17 min. (13 Min. Goal)*
 - *Hurricane Isabel (Sept. 03); 48 Hour Track Error: 60 nautical miles (120nm Goal)*
 - *East Coast Winter Storm (Feb. 03); Average lead time: 17 hours (13 hr. Goal)*

NWS National Performance Measures

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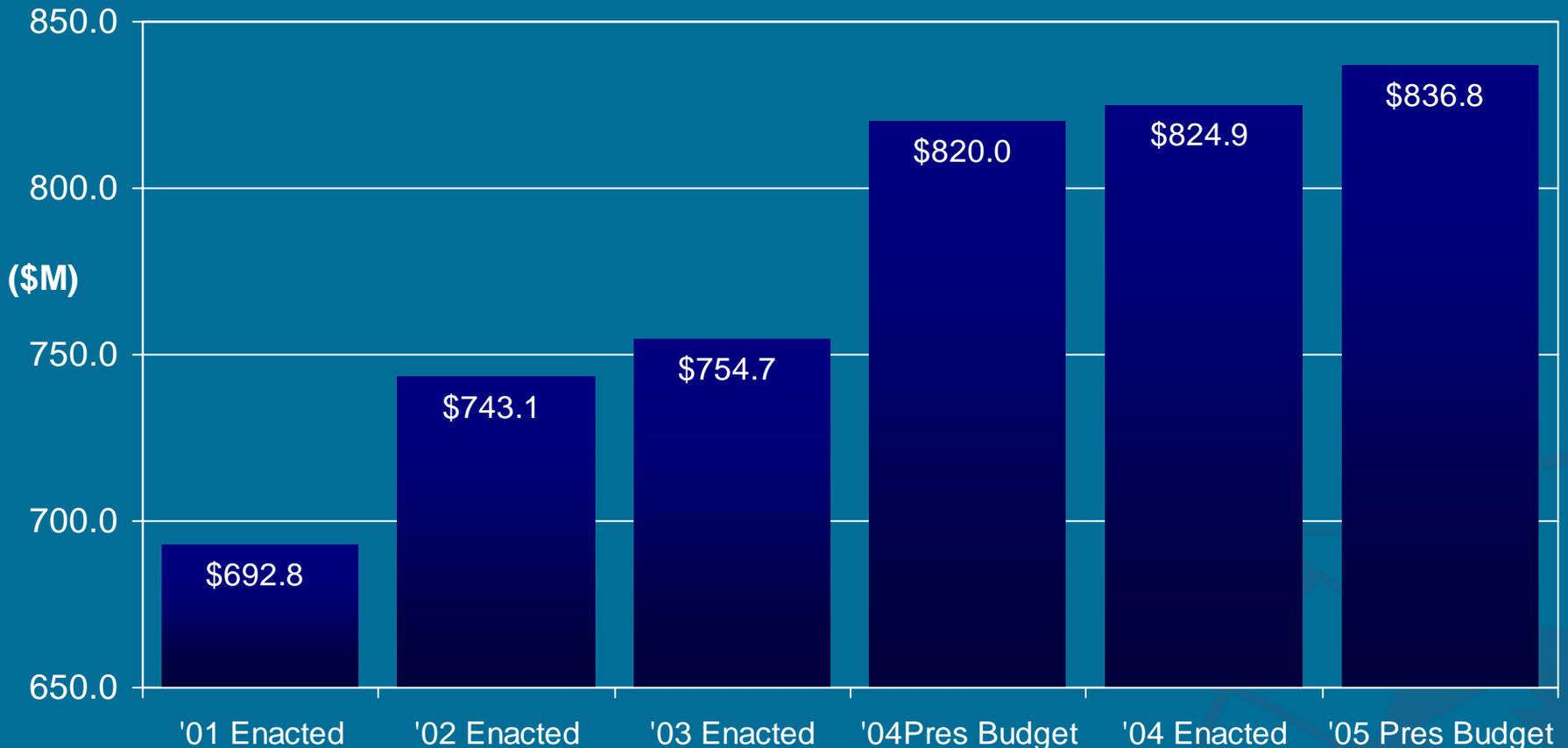
*Preliminary; will be finalized in April 2004

Missed Goals

Summary

- **NWS Budget Total by Fiscal Year**

- *FY 05 PB is \$836.8M or 1.4% above FY 04 enacted*



NWS FY05 Budget Highlights

- **Supportive Budget for NWS, Considering the Fiscal Environment**
- **Sustains Current Services for NWS**
- **Includes \$20.1M in mandatory cost increases**
 - *\$12.3M for Federal pay raise and non-labor inflation*
 - *\$7.8M in rescission restoration*
- **Transfers \$10.5M from OAR (Space Environment Center \$5.3M and USWRP/THORPEX \$5.2M)**
- **Funds key program changes (+\$13.7M ORF; -\$8.8M PAC):**
 - *Telecommunications Gateway Replacement; Space Environment Center; Maintains Modernized COOP sites; Air Quality; Facilities-Physical Security.*
 - *Continues Alaska and Pacific Facilities Construction Modernization*
 - *Continues Funding for the new NOAA Center for Weather and Climate Prediction (i.e. NWS Camp Springs Relocation)*

NWS Budget Summary

\$ in millions

	FY04 Approp	Terminations	ATBs	Program Change	FY 2005 Request	% Increase
OR&F	\$722.0	-\$23.6	\$37.1	\$13.7	\$749.2	3.8%
PAC	\$102.9	-	-\$6.5	\$-8.8	87.6	-14.8%
TOTAL	\$824.9	-\$23.6	\$30.6	\$4.9	\$836.8	1.4%

NWS OR&F Highlights

Program Increase Highlights

\$2.2M	Space Environment Center	Restores funding to maintain operations and provide critical solar warnings and forecasts.
\$5.5M	Air Quality Forecasting	Sustain operational Ozone forecasts in Northeastern US and continue efforts to deliver Nationwide Ozone forecasts by FY 08 (CONUS).
\$2.0M	Facilities-Physical Security	Provide enhanced security at NWS Weather Forecast Offices and National Prediction Centers to meet Dept of Justice "Level II" Standards. Component of NOAA's Homeland Security Initiative.
\$1.2M	U.S. Weather Research Program	\$1.2M increase including \$1.0M for THORPEX. International weather research initiative to improve 1-14 day weather forecast accuracy.
\$0.2M	Alaska Data Buoys	Program change to restore FY04 reduction
\$2.6M	Local Warnings & Forecasts	Needed to maintain current operations. Provides 24x7 weather, flood warning & forecast services for the nation.
\$13.7M	Total OR&F Program Changes	

NWS PAC Highlights

Program Increase Highlights

\$0.9M	NWS Telecommunications Gateway Replacement	Complete replacement & rightsizing of NWSTG Hardware & Software in Silver Spring, MD. Current system experiencing delays in transmitting critical weather warning messages to private sector and public; throughput capacity insufficient to distribute high-resolution model data to WFOs.
\$1.4M	Cooperative Observer Network Modernization	Operations & maintenance funding for 460 new COOP stations deployed in N.E. U.S. in FY03-04. Helps NWS forecasters improve drought monitoring capabilities & daily temperature forecasts critical to water resources, agriculture & energy sectors.
\$2.0M	Coastal Global Ocean Observing System (CGOOS)	New ocean sensors on existing marine buoys to improve ocean monitoring including salinity, currents, and sea surface temperature. Addresses gaps in buoy network, improving marine warnings & forecasts to mariners.
\$0.4M	Next Generation Weather Radar (NEXRAD)	Continues radar signal improvement program; continues dual-polarization technology development; begins high resolution radar data assimilation investments
-\$5.5M	All Hazards NOAA Weather Radio (NWR)	Reflects completion of Civil Emergency Message automation investment
-\$8.0M	NOAA Center for Weather and Climate Prediction	Planned construction program profile change
-\$8.8M	Total PAC Program Changes	

FY05 Program Increase Priorities

NWS priorities	(\$M)
1 Adjustments to Base (ATBs)	\$20.1
2 NWS Telecommunications Gateway Replacement	\$0.9
3 Cooperative Observer Network Modernization	\$1.4
4 Coastal Global Ocean Observing System (CGOOS)	\$2.0
5 U.S. Weather Research Program	\$1.2
6 Air Quality Forecasting	\$5.5
7 Space Environment Center	\$2.2
8 Facilities-Physical Security	\$2.0

NWS FY 2004 Clarifications

- **N.C. Flood Warning System - Need clarification on intent/ deliverables**
- **FY 2004 Congressional Reports - Planned submission dates:**
 - *NOAA Profiler Network - Transfer of NPN from OAR to NWS - Report to Congress August 2, 2004*
 - Cost and operational effectiveness analysis of seven alternatives for continued application development ongoing and near completion
 - *NEXRAD - Coverage in N.W. (N. CA., Central OR. to WA border) - Report to Congress June 1, 2004*
 - *Phased Array Radar (PAR) - Assessment of Navy's SPY-1 Radar for Wx Forecasting - Report to Congress August 2, 2004*
 - Status: Feasibility study underway