

NOAA's National Weather Service



NWS Service Improvement Plan - 2004

NSIP

NOAA's National Weather Service
Working Together to Save Lives



www.weather.gov

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U.S. DEPARTMENT OF COMMERCE
National Oceanic & Atmospheric Administration
NOAA's National Weather Service



Introduction

The National Oceanic and Atmospheric Administration's (NOAA's National Weather Service (NWS) provides weather, water, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas. In performing this critical mission, the NWS provides for the protection of life and property and the enhancement of the national economy.

The NWS Service Improvement Plan (NSIP) is a compilation of expected changes in NWS services for Fiscal Year (FY) 2004. NSIP is a living document, and regular updates will be made on <http://www.nws.noaa.gov/os/nsip.shtml>.

The most recent updates, can be seen by clicking on the 'What's New' section on the NSIP page.

NWS data and products form a national and international information database and infrastructure that can be used by other governmental agencies, the private sector, the university community, the public, and the global community.

Some 90 percent of all presidentially



A trilogy of NWS documents complement the NOAA Strategic Plan.

declared disasters are weather related, causing approximately 500 deaths and \$11 billion in damage annually. Weather is directly linked to public safety, and about one-third of the U.S. economy (about \$3 trillion) is weather sensitive.

In addition, key NOAA customers, such as industry, state and local governments, and emergency managers are demanding more reliable and specific weather, water, and climate products for use in making key decisions. These multiple demands all point to the need to sustain and improve the observing, forecasting, and warning services of the NWS.

GPRA Goals

The NWS establishes and tracks key service performance improvement goals, and has been recognized as a leader in performance based management for delivering on their goals. NWS goals established by the Government Performance and Results Act (GPRA) of 1993, are referenced and charted within NSIP. GPRA goals are submitted by NWS to the Office of Management and Budget (OMB). GPRA goals represent some of our tangible, measurable objectives. For more information on GPRA, visit <http://www.whitehouse.gov/omb/mgmt-gpra/gplaw2m.html>.

Related Publications

Two NWS documents are referenced throughout this publication. The related documents are the NWS Strategic Plan, and the Science and Technology Infusion Plan (STIP).

Strategic Plan

The NWS Strategic Plan identifies high level goals, activities and priorities for fiscal years 2003-2008. The goals of the NWS Strategic Plan parallel the NOAA Strategic Plan:

- ✓ **Goal I:** Protect, restore, and manage the use of coastal and ocean resources through ecosystems-based management.
- ✓ **Goal II:** Understand climate variability and change to enhance society's ability to plan and respond.
- ✓ **Goal III:** Serve society's needs for weather and water information.
- ✓ **Goal IV:** Support the nation's commerce with information for safe, efficient, and environmentally sound transportation. The complete NOAA Strategic Plan is at <http://www.osp.noaa.gov/strplan.html>.

STIP

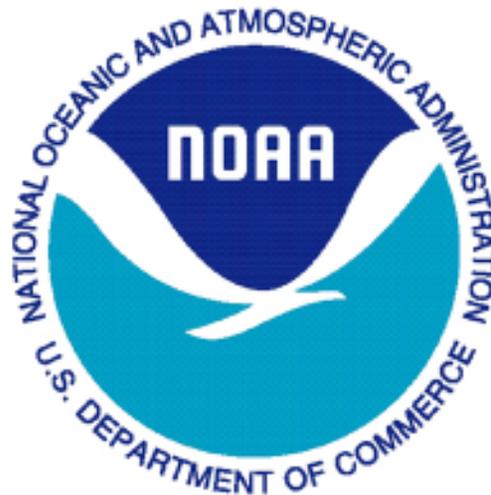
The NWS STIP looks into the future and explains how science and technology may evolve NWS products and services. It defines long term strategies, objectives, and programs. The STIP illustrates how the NWS plans to take advantage of scientific opportunities beyond the next ten years. The STIP will be posted at <http://www.weather.gov/ost>.

NSIP - 2004

NSIP 2004 was written to translate the grand visions of the STIP and the NWS Strategic Plan into specific service improvements. This plan is based upon the President's FY 04 budget request to Congress. Contingent upon congressional funding, the NWS Office of Climate, Water, and Weather Services (OCWWS) will guide development of new products and services.

Each new product will benefit NWS customers and bring the NWS closer to the vision described in STIP and Strategic Plan.

Overall comments on NSIP should be directed to LeRoy Spayd, Chief, Meteorological Services Division, 301/713-1858, ext. 105, leroy.spayd@noaa.gov.



Executive Summary

The NSIP outlines our planned product and services changes for 2004. The intended audience includes all public sector, private sector, academia partners, customers, and NWS employees. This plan is a living document and will be frequently updated at <http://www.nws.noaa.gov/os/nsip.shtml>. The NSIP will be updated annually after Congress passes the final budget appropriations. The plan for next year will be released after the President issues the budget for the following year to Congress.

This plan outlines new NWS efforts in providing services via the National Digital Forecast Database (NDFD). The NWS is committed to measuring and improving customer service, and to adopting a customer service plan. We plan to work with our partners and customers, and to use new and innovative methods to improve our dissemination services.

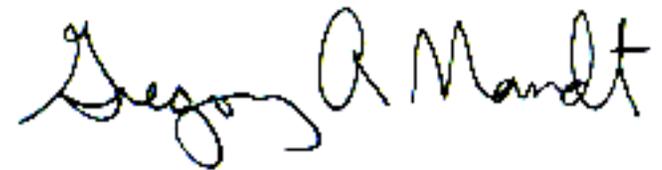
This plan summarizes our changes by service area:

- ✓ Digital Services
- ✓ Aviation Services
- ✓ Climate Services
- ✓ Fire Weather Services

- ✓ Hydrologic Services
- ✓ Marine, Weather Services
- ✓ Observation Services
- ✓ Public Weather Services

We encourage increased dialogue and communication about our plans. Please feel free to contact the appropriate manager listed at the end of each service area for additional details.

Overall comments on the plan can be directed to LeRoy Spayd, Chief, Meteorological Services Division, 301-713-1858, ext. 105, leroy.spayd@noaa.gov.



Gregory A. Mandt

Director, Office of Climate, Water, and Weather Services

Customer Service

NOAA's Strategic Plan calls for a citizen-centered, performance driven organization. NOAA's new Planning, Programming, and Budgeting System (PPBS) requires all programs to be customer driven, and to have measurable outcomes.

In FY 04, OCWWS plans to foster a culture of active customer involvement through the following activities:

- ✓ Developing a customer service plan
- ✓ Listening to NWS partners
- ✓ Managing customer relations
- ✓ Managing service change
- ✓ Notify customers of service change
- ✓ Gaging customer satisfaction

Vision

Satisfied customers through quality service leadership.

Mission

To lead the NWS effort to sustain and enhance climate, water, and weather services; to establish NWS operational requirements; to evaluate customer satisfaction; and to train the workforce.

Developing a Customer Service Plan

OCWWS contracted the Center for Organizational Excellence (COE) to develop a coherent, overarching customer service plan. Their 2004 analysis, which will cover all NWS customer activities, should be completed in the first quarter of FY 04.

Listening to NWS Partners

OCWWS participates in several partner forums, the Family of Services (FOS) meeting, and the annual NWS Partners meeting. From these meetings we've learned our partners want more frequent communication, and more involvement in planning future NWS products and services. We value this feedback. In response, OCWWS is attempting to increase ongoing dialogue, conducting two NWS Partner meetings annually, and initiating conference calls with partners.

Managing Customer Relations

In the past, there was no management of NWS responses to customer requests. This caused customer complaints, inconsistent message delivery, and an inability to get questions to the appropriate authority.

In 2003, OCWWS Director and Chief Information Officer (CIO) invested in Customer Relations Management (CRM) software for directing requests to appropriate authorities and for tracking responses. OCWWS is now piloting this software. If feedback is positive, the CRM software use will be expanded.

Managing Service Change

We will manage service change to ensure services meet customer needs of the private hydrometeorological community, and inform the community of our plans in advance. In 2004, policies and instructions for a new requirements process will be issued and a revised National Weather Service Instruction (NWSI) 10-102 for new experimental products will be published.

Notifying Customers of Service Changes

Customers need considerable advance knowledge of service changes so they can develop their software properly.

A draft of NWS Policy Directive (NWS PD) 10-1805, Service Change Notification, was sent to 300 customers in April, 2003. The Commercial Weather Services Association (CWSA) requested greater advance notification. This directive has since been revised and circulated again for NWS concurrence.

“The NSIP is a good step toward making the NWS a more transparent and understandable organization. By condensing all of the NWS programs down into a series of understandable initiatives, NWS partners can make firm decisions about their own next steps.”

Jim Block
*Chief Meteorological Officer,
Meteorlogix*

Gauging Customer Satisfaction

OCWWS contracted with the Federal Consulting Group to conduct surveys of prominent customer groups. Each survey results in a Customer Satisfaction Index (CSI) comparing results with other government agencies. Survey results can provide insight into how to improve customer satisfaction. The surveys collected information on the level

of customer satisfaction with current NWS products and services. It is the first step in establishing a continual customer feedback process. Surveys were completed for emergency managers, the media, and the aviation communities. In addition, a CSI survey for marine services was issued in September. The results of this last survey will be available in the first quarter of FY 04.

Emergency Managers

The NWS score (80) was considerably higher than the Federal agency average (70). While 77 percent of the respondents did not use automated techniques to process NWS information, many wanted graphical information, including Geographic Information System (GIS) based displays. Almost 90 percent of the respondents identified themselves as having responsibilities for counties or cities, so it is likely the lack of automation is due to budget limitations. A web-based dissemination process would address this finding.

Media

The NWS score (76) was higher than the Federal agency average (70). Timely, graphical information was of considerable interest to this audience. Use of hydrologic information was limited, but graphical Advanced Hydrologic Prediction Service (AHPS) products should address this concern. For more information on AHPS, see the Hydrology Services section of this publication.

Aviation

CSI scores for Pilots and Dispatchers (77) were higher than the Federal agency average (70). Components receiving the highest scores were Customer Support, Product Delivery,

and Information Utility. Accuracy was scored lower, but with a relatively high impact, identifying areas where small improvements could result in greater customer satisfaction.

Next Steps

- ✓ Individual comments from the surveys will be further analyzed and summarized.
- ✓ Follow up at appropriate intervals by re-surveying, to ascertain changes in customer satisfaction with product and service changes. Regular customer satisfaction surveys can serve as a valuable adjunct to traditional performance measures (such as warning lead time and probability of detection). Indeed, the surveys may provide additional insights on how the NWS works together to deliver services.
- ✓ Use results of customer satisfaction surveys to support budget requests for service improvements.
- ✓ Four additional surveys will be administered in FY 04. Topics may include a general public survey or surveys on users of climate, digital observations, or hydrological services.

Milestones by Quarter

1st Quarter

- Delivered Customer Service Plan by COE. (Milestone met, 1st quarter)
- Released Results of Marine CSI survey. (Milestone met, 1st quarter)

2nd Quarter

- Finalized plans for for FY '04 CSI surveys. (Milestone met, 2nd quarter)
- Conducted Partners Workshop at American Meteorological Society (AMS) annual meeting. (Milestone met, 2nd quarter)

3rd Quarter

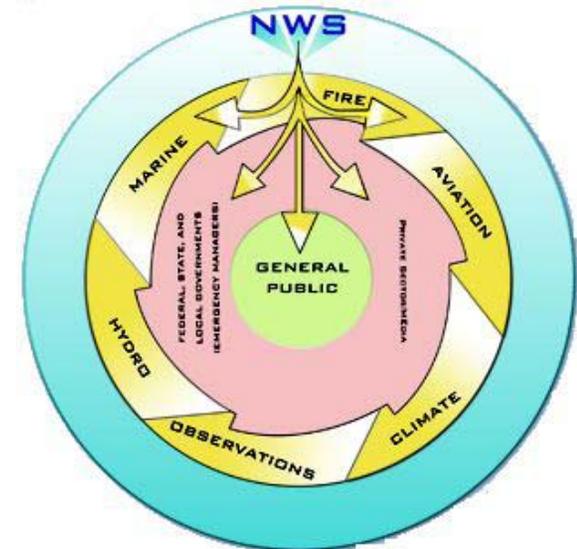
- Hold holds Partners Workshop in Washington, D.C. (Milestone met, 3rd quarter)

4th Quarter

- Release CSI survey for general public.
- Adoption of Customer Service Plan by NWS
- Released Hydrology or digital CSI Surveys to target audience.

Contact Information

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NWS Partner and Customer Model

Dissemination Services

Vision

Every person in the United States should receive the climate, water, and weather information they want, when and where they want it. All people at risk of hazards should receive timely alerts.

Concept of Operations

The NWS delivers two major categories of information:

- ✓ Time critical watches, warnings, and supporting information. The NWS directs this information to people in the affected areas.
- ✓ Routine weather data, for use by customers and partners, and data for use by other interested parties. This data is in accessible storage, so interested parties can retrieve the data electronically.

We get instant messaging immediately. We've damage here. We've got confirmation there. We see that immediately and get it to the public within seconds. That's the greatest idea I've seen since I've been doing weather."

Ben Smith
WAIT-TV Meteorologist

The NWS recognizes the importance of delivery services to NWS partners. Partners include emergency managers, local, state, federal and international government agencies, the media, the commercial weather sector, academia, and community organizations.

NWS product formats include text, graphical, digital, GIS, and audio. NWS disseminates time critical non-weather-related emergency messages from other government authorities. These additional "all hazards" emergency

messages include both natural events, such as earthquakes and volcanic activity, and technological events, whether accidental or intentional, such as chemical or biological releases, oil spills, or nuclear incidents.

Customer and Partner Requirements

The requirements of our partners and customers are evolving as quickly as our technologies. Requirements address the following:

- ✓ **Timeliness:** Data should be delivered in a timely manner.
- ✓ **Interactivity** (as it applies to users "pulling" data from NWS servers): Once a user makes a request for information, it should be delivered in a reasonable time period to the extent it is within control of the NWS.
- ✓ **Reliability** (for warnings and watches): The service must be completely reliable.
- ✓ **Quality:** Product formats and codes should be consistent. Dissemination systems should not degrade the quality of the original information.
- ✓ **Adaptability:** Dissemination formats and mechanisms which adapt to changing needs. This implies architecture built on industry standards, which can interface with new technologies, such as mobile devices.

- ✓ **Capacity:** NWS and its dissemination partners need to plan capacity expansion for a growing number of users and increased volumes and complexities of data.

- ✓ NWS will develop a digital capability to streamline the creation, authentication, and collection of non-weather emergency messages in a quick and secure fashion to speed alert and warning dissemination. This supports NOAA's responsibility in the Federal Response Plan and is pending FY 04 Congressional budget authority.

Science and Technology Requirements

- ✓ Display information in new formats including grids, graphics, and GIS.
- ✓ Develop an interactive forecast system from which customers produce user-defined, sitespecific forecast information.
- ✓ Develop geo-targeted watches and warnings addressed to sub-county areas.

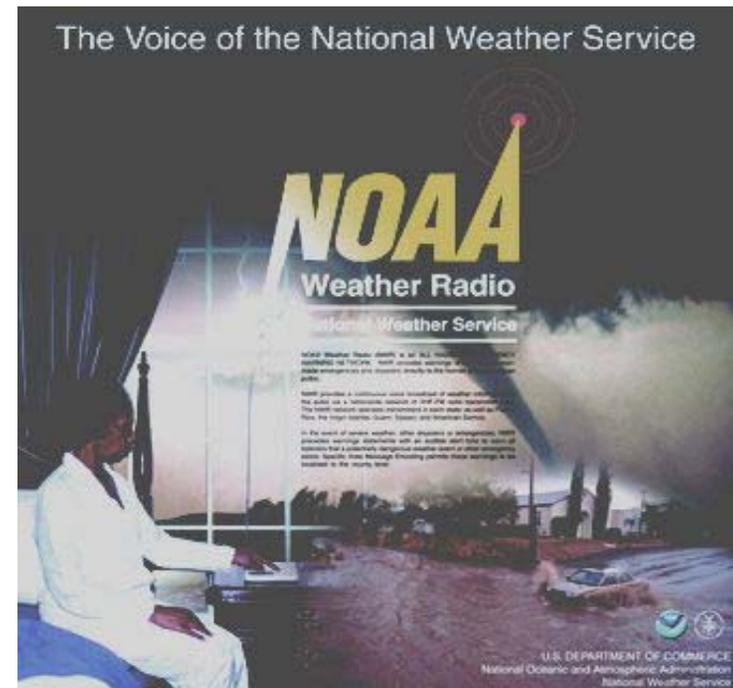
Milestones by Quarter

2nd Quarter

- Develop plan for VTEC OT&E.
(Milestone met, 2nd quarter)
- Present VTEC OT&E plan to partners.
(Milestone met, 2nd quarter)

Service Change 2004

- ✓ Valid Time Event Code (VTEC) software will be finalized to enhanced VTEC specifications. Also, VTEC Operational Tests and Evaluations (OT&E) will be conducted with partners.
- ✓ New Specific Area Message Encoding/Emergency Alert System (SAME/EAS) event codes will be implemented on NOAA Weather Radio (NWR) to add equivalent product codes with emergency text messages to non-weather hazards.



NOAA Weather Radio is an effective method for disseminating weather hazard information to the public.

3rd Quarter

- Implement SAME/EAS.
(Milestone met, 3rd quarter)

4th Quarter

- Conduct VTEC OT&E.

Integrated Requirements

- ✓ Baseline product formatters for products
- ✓ Installation of short duration quality control checker software

Customer Service

- ✓ Consumer Electronics Association (CEA) will establish CEA-2009, NWR receiver standard, in cooperation with NWS.

Outreach

- ✓ Give presentations on VTEC at appropriate media and hydrometeorology industry conferences, including those of the National Weather Association (NWA), American Meteorological Society (AMS), National Association of Broadcasters (NAB), and Radio and Television News Directors Association (RTNDA).

- ✓ Continue interactions with partners and customers in all phases of the VTEC OT&E.
- ✓ Continue interactions with the Department of Homeland Security (DHS), Federal Communications Commission (FCC), Media Security and Reliability Council, Partnership for Public Warning (PPW), and other federal, state and local agencies involved in homeland security.
- ✓ Present all hazards dissemination and NWR exhibits at government and industry shows including NAB, National League of Cities (NLC), Consumer Electronics Show (CES), Association of Late Deafened Adults (ALDA), Self Help for Hard of Hearing (SHHH), PPW, International Association of Emergency Managers (IAEM), and National Emergency Management Association (NEMA).
- ✓ Conduct NWS Family of Services and Partners Workshops.

Contact Information

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“The coordination between the National Weather Service and Emergency is excellent, and it definately saves lives.”

Rick McCoy
Emergency Manager
Van Wert County

Service Areas

Digital Services

As the National Digital Forecast Database (NDFD) becomes operational this year, it will revolutionize the way the NWS produces and distributes forecasts. The NDFD will generate opportunities for our partners and customers to provide new products and services for the public and will impact all of our service areas.

Vision

To provide access to high quality, high temporal and spatial resolution digital climate, water, and weather data to customers and partners.

Concept of Operations

The NWS will make available a number of forecast grids of sensible weather elements in the NDFD. In addition, national graphics and images from 16 predefined geographic sectors will be made available to the public. The NDFD is a seamless mosaic of digital forecasts from our field offices working in collaboration with National Centers for Environmental Prediction (NCEP).

The NDFD will be made available to all NWS customers and partners in formats including grids and graphics with tools provided for further conversion to shape files for GIS.

A large part of the FY 04 plan for Digital Services is to gather and integrate feedback from our customers and

partners. Our products will be modified and improved based on this feedback. For more information visit <http://www.nws.noaa.gov/ndfd>.

Customer and Partner Requirements

The customers and partners of NWS Digital Services require highly accurate, continually updated forecast information. Users of this new type of information require consistent forecasts across local forecast office boundaries. Unmet needs include forecast uncertainty using probabilistic techniques and the expansion of digital information to include observations and historic data. Partners would like digital services made available in a variety of formats.



Milestones by Quarter

1st Quarter

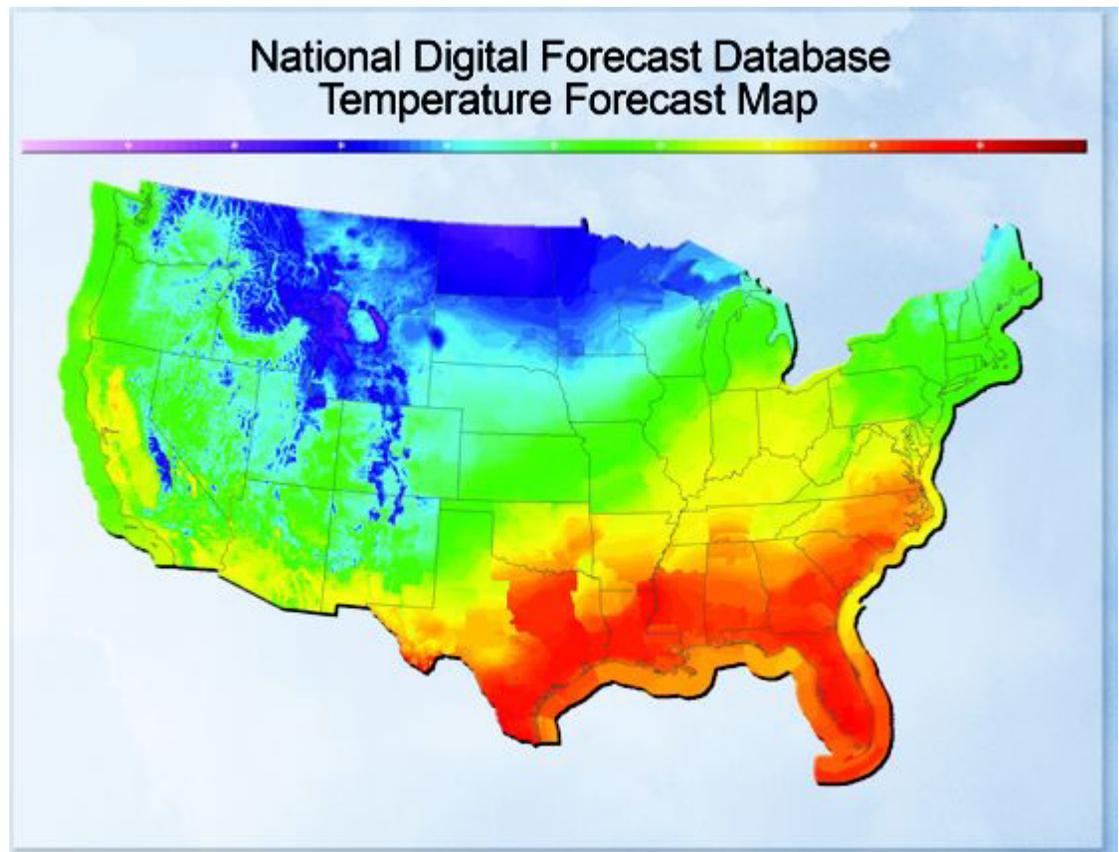
- Use Interactive Forecast Preparation Systems (IFPS) to generate point forecast matrices. (Milestone met, 1st quarter)
- Use IFPS to generate text products. (Milestone met, 1st quarter)
- Evaluate partner and customer feedback. (Milestone met, 1st quarter)

2nd Quarter

- Evaluate partner and customer feedback. (Milestone met, 2nd quarter)

3rd and 4th Quarters

- Decide which National Digital Forecast Database grid elements will be declared official products. (Milestone met, 4th quarter)
- For more information on new products, go to http://www.nws.noaa.gov/om/notifications/tin03-42ndfd_cca.txt.



Visit the current posting of this interactive map at <http://www.weather.gov/forecasts/graphical>

Training

IFPS Methodology Workshops will continue to allow sharing best practices. Teletraining sessions and web modules will continue to be used to improve forecasters' skills.

Outreach

An information toolbox for NDFD now exists for field offices. Content includes a calendar of events, briefing materials, resources, and feedback. Updated materials will be added in 2004. For more information, visit <http://onestop.noaa3.awips.noaa.gov/ndfdindex.html>.

Information on this new Digital Service Program will be shared with NWS partners and customers at the following venues:

- ✓ AMS meetings and conferences
- ✓ National Safety Council (NSC) Congress and Exposition
- ✓ IAEM and NEMA annual conferences
- ✓ NWS partners workshop

- ✓ National Hydrologic Warning Council (NHWC) meetings

Dissemination

Digital databases are available as grids on an FTP server, as graphical images on hosted web pages, and through a secure web service. For more information, please visit <http://www.nws.noaa.gov/ndfd/technical/technical.htm>.

Verification

- ✓ While a verification system for gridded information is being designed, the initial verification will consist of feedback from a point-based scheme.
- ✓ An automated daily forecast critique process will continue to be used in field offices.

- ✓ In FY 04, the NWS will expand the point based verification beyond Model Output Statistics (MOS) guidance points, to also include surface observation points.

Regional Initiatives

Central

- ✓ Central Region implements “point-andclick” from grids capability on web sites replacing traditional zone forecast concept.
- ✓ Automate NWR audio updates directly from IFPS grids.

Southern

- ✓ Implement graphical web page for each WFO.
- ✓ Continue to provide presentations and customer workshops about the digital era and improved digital services.
- ✓ Make available network Common Data Form (netCDF) grid format.
- ✓ Create forecasts directly from the grids for posting on the Internet.



PoP Grid for Northwest Sector

Contact Information

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Aviation Services

Vision

NWS personnel who are organized, equipped, and trained to enhance the FAA's extraordinary responsibility of conducting a safe and efficient National Airspace System (NAS).

Concept of Operations

To improve weather forecasting to meet consistency and timeliness demands of the NAS, as directed by the FAA. The NAS represents the overall environment for the safe and efficient operation of aircraft, including the aircrafts, pilots, facilities, tower controllers, terminal area controllers, en route controllers, oceanic controllers, computers, satellite navigation aids, radars, airports, maintenance personnel, and the airline dispatchers.

NWS will be better prepared to enhance and sustain NAS operations in the future by improving:

- ✓ Accuracy of information
- ✓ Timeliness of information
- ✓ Relevance to the operational user
- ✓ Unity of effort: one NAS, one forecast readiness

Customer and Partner Requirements

Improved forecast accuracy, with emphasis on 2-6 hour forecast time frame, for the aviation parameters of convection, turbulence, icing, and cloud ceiling/visibility.

pecific improvements in: Number of Terminal Aerodrome Forecast (TAF) locations supported Airport specific aviation products Improved training and awareness of weather products for pilots and forecasters A user-driven product requirements process Routine verification and results shared with users on all aviation products

Product and Service Change

- ✓ Continue developmental work on Graphical Area Forecast (GFA).
- ✓ Make Aviation Digital Database System (ADDS) operational.
- ✓ Import satellite and radar data to System for Convective Analysis and Nowcasting
- ✓ (SCAN) to enhance the Aviation Forecast
- ✓ Preparation System (AvnFPS) and provide amendment capabilities.
- ✓ Issue official Forecast Icing Potential (FIP) product.



Other Performance Measures

Starting in 2004, Aviation Services will focus on developing and delivering accurate and operationally relevant aviation weather observations and forecasts using the following performance measures for implementation in FY 06:

- ✓ NAS delays due to weather, or weather support
- ✓ NAS airport forecast coverage, including number of TAFs produced

Performance Measures

3 Mile Visibility / 1000 foot ceilings	2002	2003	2004
Probability of Detection	45	45	46
False Alarm Ratio	71	71	70

- ✓ Convective delays and Collaborative Convective
- ✓ Forecast Product (CCFP) performance
- ✓ TAFs and their affect on system capacity
- ✓ Ceiling/visibility forecasts—monetary impacts to operations

- ✓ Fog forecasts—monetary impacts to operations
- ✓ Winter weather forecasts— monetary impacts to operations

Milestones by Quarter

1st Quarter

- ADDS becomes operational.
(Milestone met, 1st quarter)

- Release MakeTAF with National Climatic Data Center (NCDC) data to all field sites.
(Milestone met, 1st quarter)
- Begin development of Distance Learning Aviation Course (DLAC)/2 Convection.
(Milestone met, 1st quarter)

2nd Quarter

- Implement and deploy AvnFPS version 2.0.
(Milestone met, 2nd quarter)
- Release statistics on demand, in new aviation verify format. (Milestone met, 2nd quarter)

3rd Quarter

- Update AvnFPS. (Milestone met, 3rd quarter)

4th Quarter

- Transition to the final phase of the World Area Forecast System (WAFS).
- Draft Joint Planning Office (JPO) strategic vision for aviation weather.
- Implement statistics on demand with individual forecaster verification.

Integrated Requirements Supporting Service Programs

- ✓ Import National Convective Weather Forecast (NCWF) into AWIPS/OB3.

- ✓ Expand NDFD to four dimensional products.
- ✓ Expand Meteorological Data and Collection Reporting System (MDCRS) by placing water vapor sensors on commercial aircraft

- ✓ Develop and test DLAC-2, Convective Forecasting, at the Cooperative Program for Operational Meteorology, Education and Training.
- ✓ Partner with Aircraft Owners and Pilots Association (AOPA), and Air Safety Foundation to develop a training program for general aviation pilots in the interpretation of aviation weather products.
- ✓ Develop training for the Current Icing Potential (CIP) and the FIP products for use in CWSU and Aviation Weather Center (AWC)

Link to Science and Technology Infusion Plan

Increase the accuracy, specificity, and lead time of aviation forecast and warnings for more effective planning and decision making by:

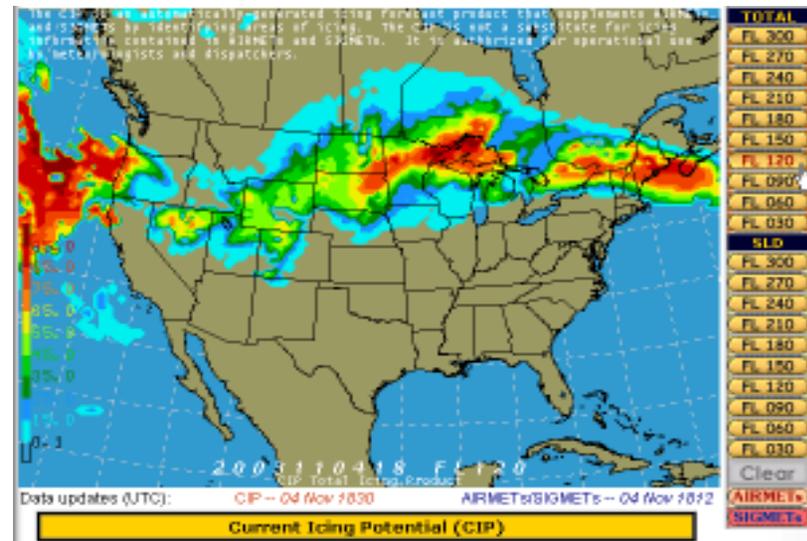
- ✓ Increasing the resolution of wind and temperature observations
- ✓ Improving the data quality and timeliness of wind and moisture observations
- ✓ Expanding aircraft targeting, winds, and aircraft observations
- ✓ Improving model physics (Regional Common Atmospheric Modeling System) with rapid refresh
- ✓ Incorporating 3-Dimensional forecast grids in IFPS

Training

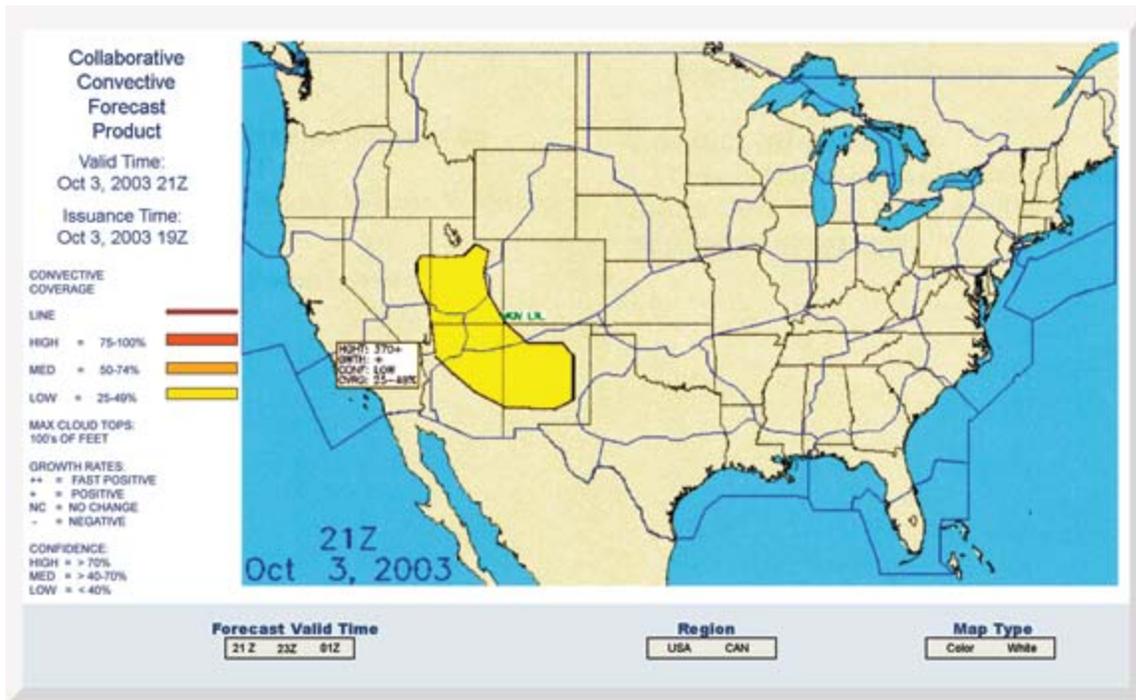
- ✓ Continue DLAC-1, Low-Cloud and Fog Forecasting. Information on DLAC1 can be found at: <http://meted.ucar.edu/dlac/web-site/index.htm>.

Outreach

Aviation Services will participate in the following outreach activities:



The Current Icing Potential (CIP) is an automatically generated icing diagnostic product that supplements NWS's AIRMETs and SIGMETs. The CIP is issued hourly.



Collaborative Convective Forecast Product

- ✓ Work closely with the FAA and NASA to foster better working relationships and to facilitate requirements setting.
- ✓ Work closely with aviation industry representatives such as AOPA, the National Business Aviation Association (NBAA), the Air Transport Association (ATA), the International Air Transport Association (IATA), the Small Aircraft Manufacturers Association (SAMA), the Helicopter Association International (HAI), and the Experimental Aircraft Association (EAA) to foster better relationships, to promote NWS aviation products and services, and to ascertain additional customer requirements.

- ✓ Support trade shows such as AOPA National and local Fly-Ins, NBAA National Meeting, HAI International Meeting, and 2004 EAA Sun'n Fun Fly-In and Air Venture.
- ✓ Attend meetings of the International Civil Aviation Organization (ICAO) to participate in international requirements setting for aviation meteorology and development of forecasting tools such as the automated Aerodrome Meteorological Forecast

Dissemination

- ✓ Aviation Digital Database becomes operational.
- ✓ Transition to final phase of WAFS.

Verification

Aviation services will continue using the expanded collection of pilot reports at the AWC and Forecast Systems Laboratory's (FSL's) Real Time Verification System (RTVS). In addition, aviation services intends to increase verification ability to capture and score all centralized products at AWC and the Alaska Aviation Weather Unit (AAWU).

Regional Initiatives

Alaska

- ✓ Complete test of the Alaska Airport Specific TAF Amendment Criteria.

- ✓ Collaborate with AWC to develop an experimental GFA at AAWU.
- ✓ Collaborate with the Alaska Aviation Safety Foundation and the Medallion Foundation to develop aviation weather training for pilots for Alaska Aviation Safety Outreach.

Eastern

- ✓ Develop performance measures for individual TAF sites.
- ✓ Hold Eastern Region Aviation Workshop.

Central

- ✓ Review Best Practices based on AVTNverify.

Southern

- ✓ Complete tests of the Tactical Convective Hazards Product at the Prototype Aviation Collaborative Effort (PACE) at the Dallas/Fort Worth CWSU.

Western

- ✓ Complete the San Francisco Fog and Stratus Project.

Pacific

- ✓ Host annual local Aviation Users Workshop at WFO Guam.

- ✓ Expand the number of sites for Winds/Temperature Aloft Forecasts to cover much of the Pacific by transferring responsibility from WFO Honolulu to NCEP.
- ✓ Develop Aviation Area Forecast products for Marshall Islands and the Federated States of Micronesia.
- ✓ Implement conditional climatology program to assist TAF creation.

Contact Information

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Climate Services

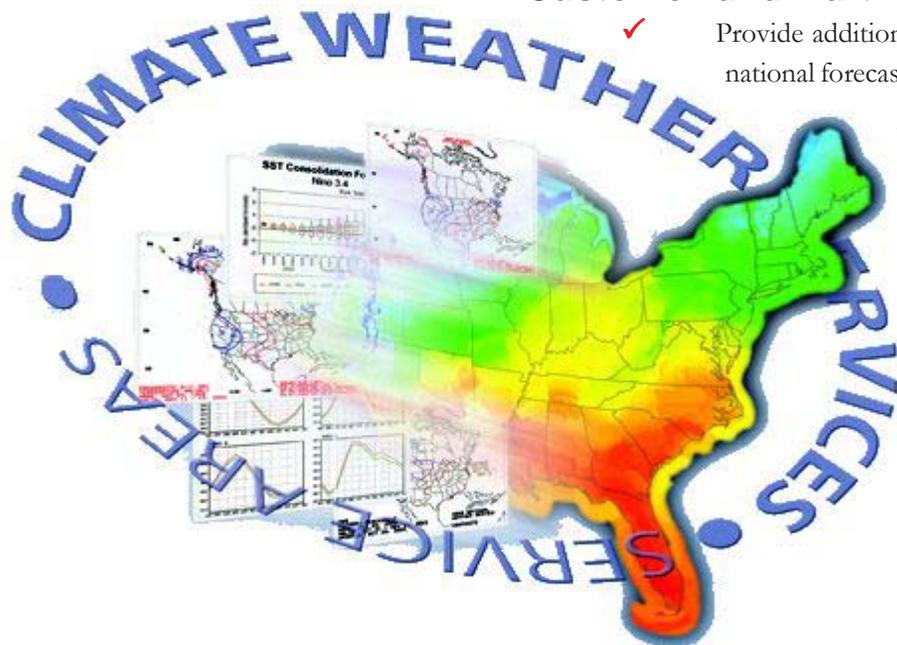
Vision

To provide resources and direction to ensure NWS climate services are easily accessible, well understood, optimally used, and satisfy customer needs.

Concept of Operations

OCWWS sets policy and requirements, secures and allocates resources, and acts as the national coordinator for NWS regional and local climate services. Climate services include real time monitoring, forecasting products, models and technology, observations, and customer outreach and education. For more information go to <http://www.nws.noaa.gov/om/csd>.

Customer and Partner Requirements



✓ Provide additional regional/local detail to national forecasts.

✓ Ensure the time of issuance of Climate Prediction Center (CPC) products favor U.S. equity and commodity market interests at <http://www.cpc.ncep.noaa.gov/products/forecasts>.

- ✓ Provide climate forecasts based on ensemble prediction techniques.
- ✓ Provide verification for all forecast products.
- ✓ Make tools and data used in forecast development publicly available.
- ✓ Partner with local expertise for development and delivery of products and for customer/stakeholder interaction.
- ✓ Tailor forecasts and guidance to varying sophistication of constituent audience.
- ✓ Ensure data continuity principles are followed in the management of surface and upper air data.
- ✓ Strengthen climate services partnerships to leverage existing infrastructure for delivery and development of products.
- ✓ Expand climate training availability to local customers.
- ✓ Support Department of Energy (DOE) Energy Information Agency's fuel cost analysis with CPC heating degree day outlooks.

Product or Service Change

- ✓ Disaggregate seasonal forecasts into monthly forecasts in a consistent manner, as well as provide both low and high frequency forecasts.
- ✓ Provide user access to digital guidance material.

- ✓ Improve the Drought Outlook and Drought Monitor by including both short-term and long-term components. Justify the issuance of the Outlook through routine verification. Product is posted at http://www.cpc.ncep.noaa.gov/products_expert_assessment/drought_assessment.html.
- ✓ Convert the format of seasonal/monthly forecasts to one which displays total probability (instead of probability anomaly) to maintain consistency among CPC forecast products.
- ✓ Improve global precipitation analyses to include operational near real-time analyses of precipitation every half hour at a spatial scale of 8 km.
- ✓ Improve analyses of U.S. temperature departures from normal in support of realtime monitoring and forecast verification.

Milestones by Quarter

1st Quarter

- Produce experimental CPC heating degree day outlooks to support DOE Energy Information Agency (EIA) needs for use in their winter season U.S. household fuel cost outlook forecasts.
(Milestone met, 1st quarter)

2nd Quarter

- Develop new training module on the importance of accurate, consistent surface climate observations and make it available on the web.
(Milestone met, 2nd quarter)

- Incorporate the Climate Diagnostics Center's (CDC's) Office of Oceanic and Atmospheric Research (OAR) experimental digital calibrated forecast tool into 6-10 day and Week-2 forecast operations. The tool replaces a graphic only tool prior to operational implementation by the Environmental Modeling Center (EMC), NCEP Central Operations (NCO) and CDC.

(Milestone met, 2nd quarter)

- Develop a climate multi-model ensemble tool to maximize seasonal forecast skill with International Research Institute for Climate Prediction (IRICP).

(Milestone met, 2nd quarter)

- Publish the NOAA El Niño/La Niña index and definitions in the World Meteorological Organization (WMO) World Climate News.

(Milestone met, 2nd quarter)

3rd Quarter

- Co-sponsor NOAA weather and climate data users' workshop with the NCDC.
(Milestone met, 3rd quarter)
- Co-sponsor NOAA Snow Network Observation Workshop (SNOW) and NOAA Data users Forum with the NCDC.
(Milestone met, 3rd quarter)
- Solicit customer feedback on experimental Eastern Pacific Hurricane Outlook product.
(Milestone met, 3rd quarter)

GPRA Performance Measure

GPRA Goal	Unit of Measure	1998 - 2002 Baseline	2003	2004
Improve U.S. Seasonal Forecast Skill	Heidke Skill Score *	20	20	21

* The Heidke Skill Score has a value of 100 when all forecasts are correct and has a value of zero when the number correct is equal to the expected number correct by a random forecast.

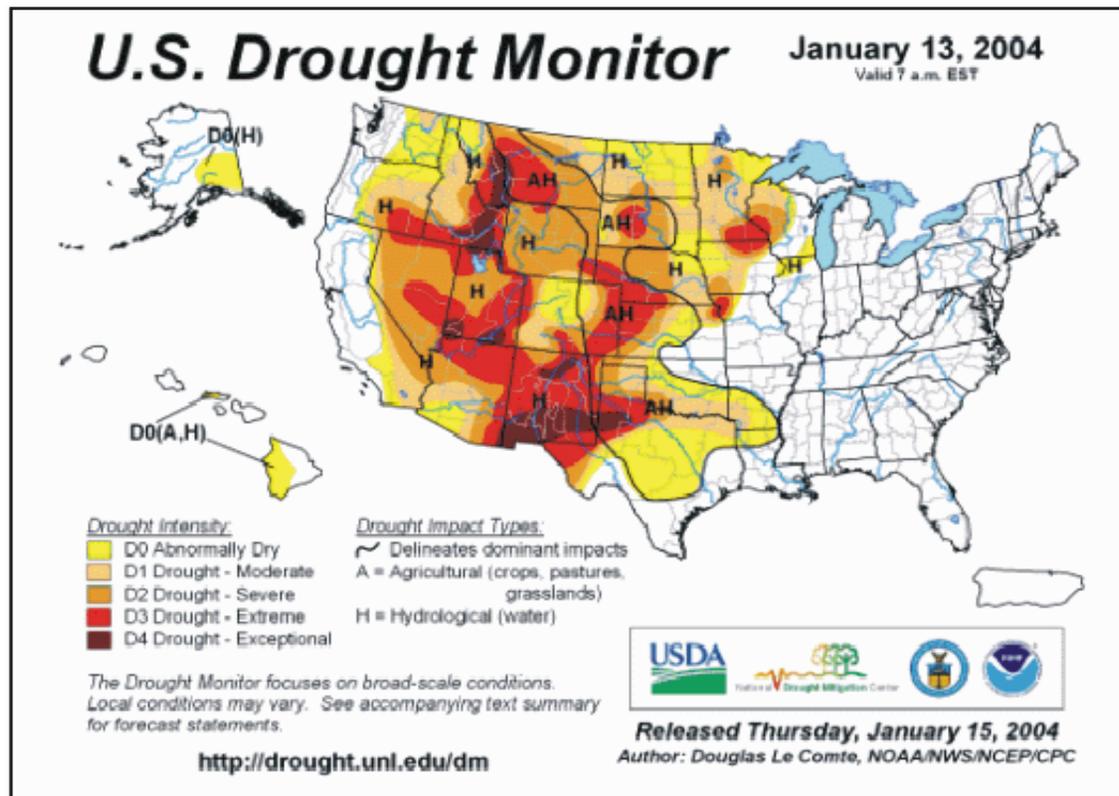
- Solicit customer feedback on experimental Puerto Rico and U.S. Virgin Islands Rainfall Outlook product. (Milestone met, 3rd quarter)

4th Quarter

- Implement full access to European Center for Medium-Range Weather Forecasts 1 degree x 1 degree ensemble data (12 hourly, twice per day, out to 240 hours).

- Participate in the North American Monsoon Experiment 2004 field campaign. For more information visit: <http://www.joss.ucar.edu/name/>

- Operationalize the zero-lead version of the monthly forecast including verification.
- Provide a written post-mortem for each bimonthly lead seasonal outlook to include verification of the outlook, discussion of physical causes, and evaluation of tools used.
- Conduct climate prediction workshop at annual meeting of the American Association of State Climatologists (AASC).
- Conduct a climate prediction terminology workshop.
- Work with WMO to get universal acceptance of a continuous scale for El Niño and La Niña and widespread recognition that definitions adopted by NOAA are appropriate for monitoring and prediction of ENSO impacts in North America.
- Implement the zero lead version of the monthly forecast including verification.
- Participate in a snowfall data workshop with NCDC for the media and customers.
- Implement advanced coupled atmosphere-ocean forecast system for monthly to Seasonal/ Interannual forecasts and upgrade Seasonal Forecast Model (SFM).

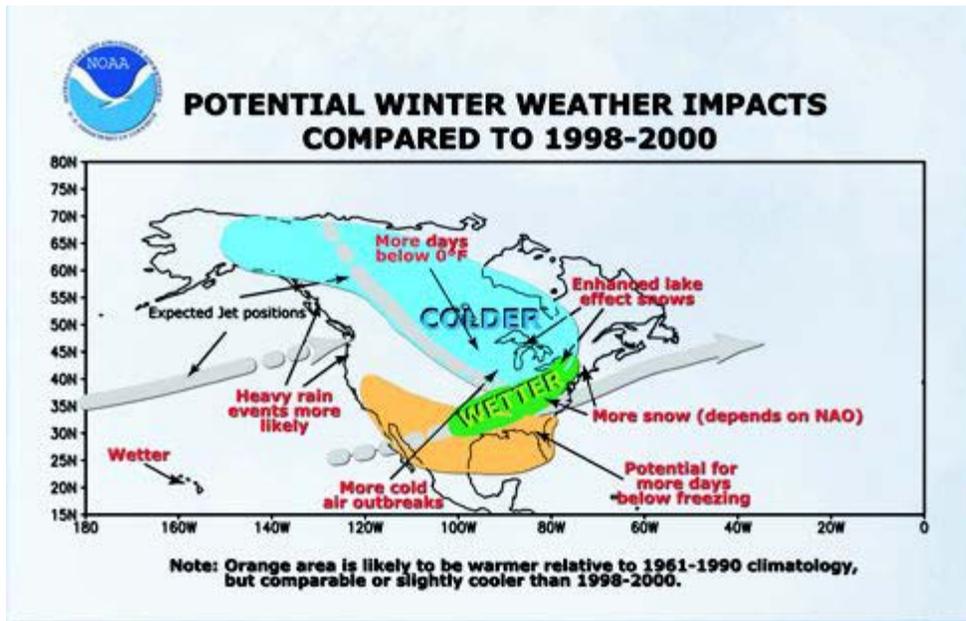


NOAA's Climate Prediction Center (CPC) and the National Climate Data Center (NCDC), the U.S. Department of Agriculture, and the National Drought Mitigation Center (NDMC) jointly issue this weekly product at <http://www.cpc.ncep.noaa.gov/>

- Implement CDC ensemble Week 2 forecast system.
- Evaluate experimental objective long term-short term drought indicator products for transition to operation status.
- Test dynamical seasonal prediction with alternate Sea Surface Temperature forecasts.
- Develop prototype global land data assimilation systems and test impact on seasonal precipitation and temperature forecast skill and use for the Drought Monitor.

Link to Science and Technology Infusion Plan

- ✓ Achieve temporal understanding of North American Monsoon System.
- ✓ Improve atmosphere, ocean, and land data assimilation systems to provide more accurate initial conditions of these earth system components for climate prediction models.
- ✓ Improve week-2 forecasts through successful inclusion in dynamical and statistical models of influences of the Madden-Julian Oscillation (MJO) and weather regime breaks.



Potential 2000-2001 winter weather impacts compared to 1998-2000

Science and Technology Requirements

- ✓ Implement ASOS V2.8 software to remove false precipitation reporting from ASOS sites.
- ✓ Investigate feasibility of automated snowfall reporting.
- ✓ As a companion to improving existing national and global atmospheric and ocean data assimilation systems, develop and demonstrate national and global land data assimilation systems to provide land state conditions for climate prediction models and drought monitors and outlooks.

Training

The Climate Services Professional Development Series (PDS) for NWS climate personnel will offer the following new training initiatives in 2004:

- ✓ Two sessions of residence training on climate variability and change, the latest developments in climate analysis and prediction, (including CPC operations) and methods for documenting and forecasting local climate fluctuations.
- ✓ New web-based training modules (webcasts) including topics on the ENSO Cycle, causes and predictions of drought, and climate change.
- ✓ Online training on 8- to 14-day forecasts, monthly and seasonal outlooks, local climate products, and climate observations.
- ✓ Teletraining sessions on NOAA Hurricane Outlooks. Training materials are available at <http://www.nwstc.noaa.gov/nwstrn/d.ntp/meteor/clipds.html>.

Outreach

- ✓ Conduct Climate Prediction Applications Science Workshop for researchers and developers of applications of climate forecasts: <http://climatservices.coaps.fsu.edu>.
- ✓ Co-sponsor the NOAA SNOW workshop and NOAA Data Users Forum with NCDC.
- ✓ Conduct climate prediction workshop at annual meeting of the AASC: <http://lwf.ncdc.noaa.gov/oa/climate/aasc.html>.

- ✓ Collaborate with the Western Governors, the Interim National Drought Council, the Regional Climate Centers, and the State Climatologists.
- ✓ Work with NWS regions to develop a uniform climate services web presence.

Dissemination

All products, experimental and official, are on the Internet. Official products are also available on secured, commissioned NWS dissemination systems.

Verification

Begin developing CPC verification program for complete suite of forecast products.

Regional Initiatives

- ✓ Continue development of Regional Climate Service programs.
- ✓ Improve collaborative efforts by holding sub-regional meetings with state climatologists, Regional Climate Centers (RCC) and appropriate WFOs, RFCs, and other partners.
- ✓ Focus on training efforts for Central Region Climate Service focal points.

Contact Information

Robert Livezey, Chief, Climate Services Division,
301-713-1970, ext. 182, robert.e.livezey@noaa.gov.

Fire Weather Services

Vision

To eliminate weather-related wildland fire fatalities and injuries, and to reduce fire suppression and land management costs by providing more timely and accurate weather information.

Concept of Operations

When fuels and meteorological conditions warrant, WFO forecasters issue Fire Weather Watches and Red Flag Warnings for fire weather patterns that contribute to extreme fire danger. Site specific forecasts may also be generated for land agencies to track wildland fires.

Fire Weather Services also provide on site meteorological support to wildland fires. This is done by sending specially trained Incident Meteorologists (IMET) to the fire location.

The Storm Prediction Center (SPC) issues national outlooks identifying critical fire weather patterns.

Locally, NWS forecasters produce meteorologically consistent gridded forecast databases, including fire weather parameters. From these databases, fire weather zone forecasts are issued for presuppression planning, and for the National Fire Danger Rating System (NFDRS).

Customer and Partner Requirements

Probabilistic fire-related forecast products should include the following:

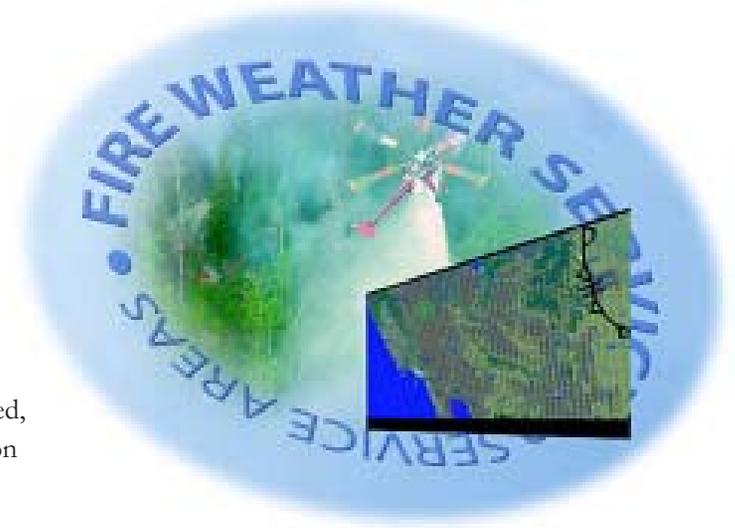
- ✓ Probabilistic outlooks for critical fire weather patterns (days 2-7),
- ✓ Smoke management information, and
- ✓ High resolution forecast/model grids for input into fire behavior/fire danger tools.

Product and Service Change

- ✓ Develop Fire Weather Relative Humidity, 20 foot wind, Haines Index, Transport Wind, and Mixing Height grids for NDFD.
- ✓ Develop and test probabilistic medium range fire weather and fire danger guidance.

Performance Measures

Performance measures in Fire Weather have traditionally been recorded in the fire-prone Western U.S. The Fire Weather program has recently been expanded in the NWS. National baseline measurements of warning and watch parameters will be developed over the next few seasons. Until new baselines have been produced, performance measures will be based on Western U.S. numbers.



Milestones by Quarter

1st Quarter

- Develop fire weather elements in NDFD.
(Milestone met, 1st quarter)

2nd Quarter

- Collect fire season 2003 national statistics for Red Flag Warnings and establish a national baseline.
(Milestone met, 2nd quarter)

3rd Quarter

- Conduct incident meteorologist work shop and fire weather forecasting course in Boise, ID.
(Milestone met, 3rd quarter)

4th Quarter

- Begin local Graphical Forecast Editor capability on site for wildfire support.

Fire Weather Performance Measures

Year	Red Flag Probability of Detection	Red Flag Lead Time*
2004	90 percent	9.5 hours**
2003	89 percent	9.3 hours**
1999 - 2002	89 percent	9.2 hours**

* Based on Western US Performance

** For wind and low Relative Humidity events only

Integrated Requirements

The AWIPS supports fire weather operations at WFOs. The land management agencies operate observation platforms, and RAWS, and support fire weather. In this capacity, AWIPS is used as a communications interface. With ever-increasing demand for spot forecasts, the spot forecast system needs to be integrated into AWIPS to take advantage of available digital forecasts, and to increase efficiency of forecasters by using one system.

Link to Science and Technology Infusion Plan

The 10 year goal of Fire Weather Services is to improve on site and site-specific wildland fire support capabilities, and to provide probabilistic weather information for enhanced planning and decision making. Better on site and site-specific support will improve fire-scale observations, higher resolution fire weather modeling, and routine verification of products and services.

Science and Technology Requirements

Solutions to several science and technological requirements for Fire Weather Services will be investigated in FY 04. National and regional customers are interested in probabilistic forecast information for resource decision-making. Similar projects at the NCEP will be leveraged to produce test products for fire weather.

Fire Weather Performance Measures

NCEP is also supporting IMETs by running mesoscale model forecasts for active fire areas. In 2003, NCEP ran the Nested Mesoscale Model at 8 km horizontal resolution for varying domains. These runs supported IMETS at active wildfires. The plan for 2004 may include 4 km resolution support. The NWS is also investigating methods to push digital forecast data into land management agency applications. The availability of the NDFD will allow some tests to commence using the NFDRS as a test-bed.

Training

- ✓ Conduct annual IMET Workshop.
- ✓ Conduct the S-591 Fire Weather Forecaster's course.

Outreach

Fire Weather Services are actively involved with customers at the national and local levels. NWS will participate in several national interagency working teams in 2004 including:

- ✓ Fire Danger Working Team
- ✓ Fire Weather Working Team
- ✓ Predictive Services Working Team

These teams discuss and work on national issues related to fire danger, fire weather, and fire behavior. At the local level, most WFOs with fire weather programs will meet with customers twice during the next year.

Dissemination

Include RAWS on Emergency Manager's Weather Information Network (EMWIN).

Verification

Verification measures in Fire Weather have been sporadic and focused primarily on the fireprone western U.S. In 2004, the requirements will be developed to add verification data for Red Flag Warnings and Fire Weather Watches to the national baselines developed in 2003. In the future, the baseline will be used to adjust national performance measures. Requirements for generating baselines for NFDRS for temperature, relative humidity, and wind will be explored.

Regional Initiatives

Central

- ✓ Analyze prototype CR Fire Weather Watch/ Red Flag Warning verification methodology and statistical output.
- ✓ Effectively coordinate with regional Geographic Area Coordination Center Predictive Services Meteorologists with the goal of improving products and services.

Contact Information

James Lee, Manager,
Fire Weather Program, 208-334-9824,
james.e.lee@noaa.gov.



Fire suppression efforts in Montana

Hydrologic Services

Vision

To provide water information for life's decisions for the protection of life and property and to ensure the Nation's economic well being.

Concept of Operations

The Advanced Hydrologic Prediction Services (AHPS) infuses new science and technology into operations, and is the cornerstone of the NWS Hydrologic Services modernization. AHPS will enable improved river forecasts, flood forecasts, and water information to meet our mission and the changing needs of our partners and customers.

In 2004, NWS plans to implement basic AHPS services at an additional 419 forecast points, bringing the total number to 1,136 forecast locations. In addition, the NWS will standardize access to AHPS products and information through the Internet. These enhancements will facilitate the following:

- ✓ Improved forecast accuracy
- ✓ More specific and timely information on fast rising floods
- ✓ New types of forecast information
- ✓ Longer forecast horizons

- ✓ Products in more user friendly formats, including graphics
- ✓ More timely, consistent products and information
- ✓ Expanded outreach

The AHPS Concept of Services and Operations can be found at <http://www.nws.noaa.gov/om/water/AHPSconcept.pdf>.

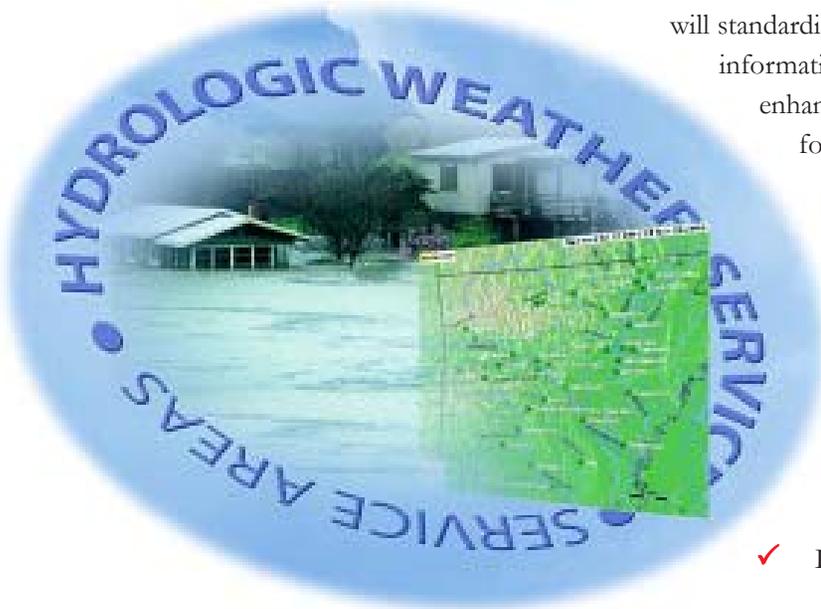
Customer and Partner Requirements

As a result of recent interactions with hydrologic customers and partners, the following items have been identified as important needs:

- ✓ Explicit specification of flood and flash flood | watch areas using latitude and longitude pairs.
- ✓ Visually oriented products, including hydrographs, graphical representations of flood watches and warnings, and flood forecast inundation maps.
- ✓ Enhanced (i.e., probabilistic) information to support risk-based decisions.

Link to Science and Technology Infusion Plan

The 10-year goal is to increase the average flash flood warning lead time to 60 minutes for specific portions of counties. For river floods, the 10-year goal is to increase the average warning lead time to 12 hours. These schedules should allow time for orderly evacuation and for emergency managers to take mitigating actions to reduce damage to communities.



Product or Service Change

- ✓ Implement AHPS services at 419 new forecast points.
- ✓ Modify Flash Flood Warning (FFW) product to include latitude and longitude coordinates.
- ✓ Standardize web access to AHPS products.
- ✓ Implement and garner feedback on AHPS experimental graphical products. Product Description Documents (PDD) will be posted on <http://products.weather.gov>.
- ✓ Standardize Flood Watch (FFA) product.

GPRA Performance Measures

Flash floods are the most destructive and lifethreatening type of flooding. These events occur within hours after heavy rainfall and typically provide little time to respond. The Hydrological Services Program's GPRA goals concentrate on increasing advanced warning for these devastating events.

GPRA Performance Measures

Year	FFW Probability of Detection	Lead Time Performance Goal
2004	88 Percent (goal)	48 Minutes (goal)
2003	87 Percent (goal)	47 Minutes (goal)
1999-2002	86.8 Percent (actual)	46.4 Minutes (actual)

Milestones by Quarter

1st Quarter

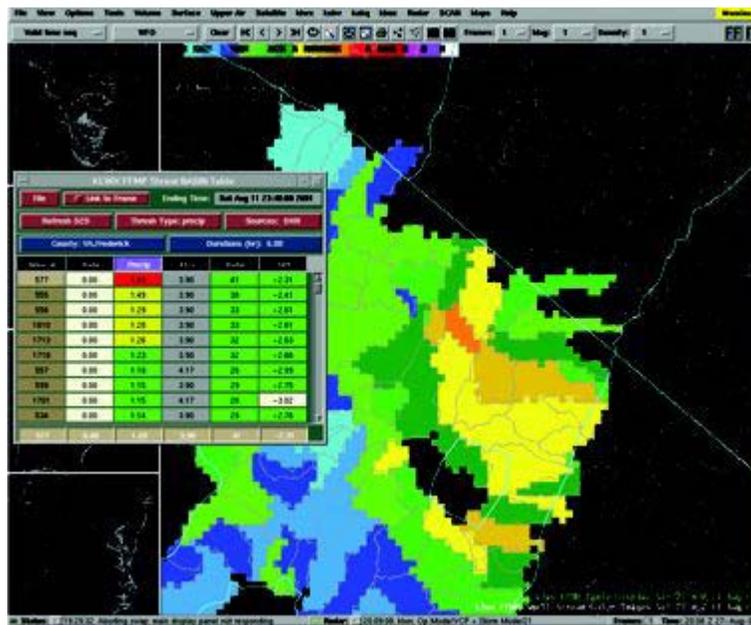
- Develop AHPS requirements documentation for enhancing Flash Flood Services. (Milestone met, 1st quarter)
- Implement web-based AHPS information tool box. (Milestone met, 1st quarter)
- Increase the airborne snow survey flight lines in Alaska by 80. (Milestone met, 1st quarter)

2nd Quarter

- Develop Flood Warning (FLW) verification concept of operations plan. (Milestone met, 2nd quarter)
- Complete annual flood loss summary. (Milestone met, 2nd quarter)
- Provide operational, web-based National Operational Hydrologic Remote Sensing Center (NOHRSC) National Snow Analysis (NSA) products and data sets in map, alphanumeric, and time-series formats for the Eastern U.S. during the winter of 2003-2004. (Milestone met, 2nd quarter)
- Develop a plan for an end-to-end, fully integrated national snow pack monitoring, modeling, and prediction service. (Milestone met, 2nd quarter)

3rd Quarter

- Prepare and update a National Hydrologic Assessment in support of NOAA spring press briefing. (Milestone met, 2nd quarter)
- Develop AHPS requirements documentation to support the implementation of flood inundation mapping. (Milestone met, 3rd quarter)
- Collect airborne gamma radiation snow water equivalent data over Alaska calibrated flight-line network. Provide near real-time airborne snow water equivalent data to Alaska Pacific RFC. (Milestone met, 3rd quarter)



Flash Flood Monitoring and Prediction Radar Map

- Develop user documentation for the AWIPS Operational Build 3 (OB3) hydrologic capabilities. (Milestone met, 3rd quarter)
- Coordinate development and delivery of small basin datasets necessary to utilize the Flash Flood Monitoring and Prediction (FFMP) tool operationally in Alaska and Hawaii. (Milestone met, 3rd quarter)
- Evaluate partner and customer requirements for XML-formatted products and information. (Milestone met, 3rd quarter)

4th Quarter

- Develop formal CSI survey of users of hydrologic information.
- Complete annual National Directives System update of all hydrologic services program policy.
- Develop AHPS requirements documentation to support the implementation of enhanced probabilistic streamflow forecasts.

Integrated Requirements

AWIPS supports hydrologic operations. At WFOs, AWIPS provides tools to monitor and analyze hydrologic conditions, assess the potential for flash floods, and create and disseminate hydrologic forecasts, watches, and warnings. At RFCs, AWIPS provides the infrastructure enabling RFCs to execute hydrologic models and to produce forecasts of future river conditions.

Science and Technology Requirements

In 2004, AWIPS will provide:

- ✓ Enhanced tools to support the WFOs and RFCs in developing point-specific hydrologic forecasts for headwater locations.
- ✓ Enhanced decision making techniques to support the FFW program.
- ✓ Tools to better provide information related to dam failures.

Training

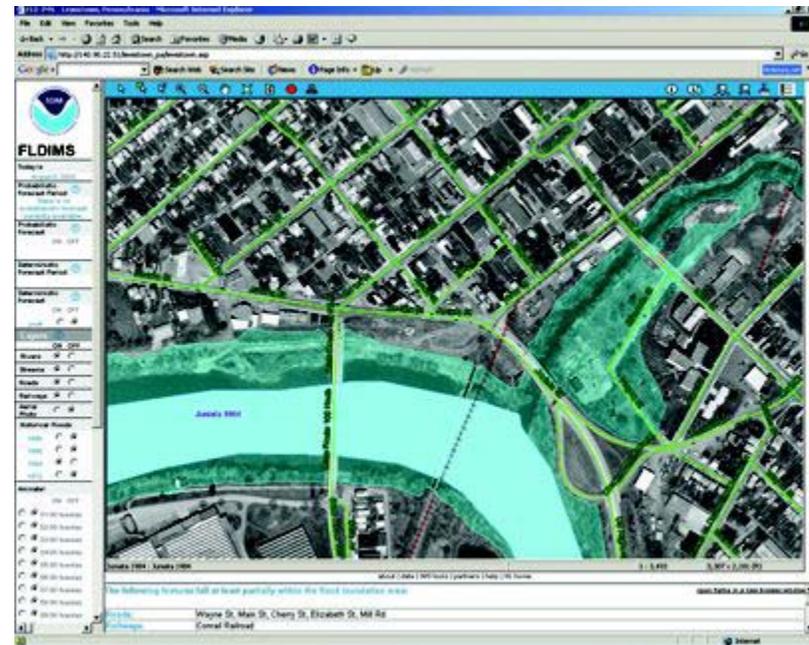
Training requirements for Hydrologic Services can be found at <http://www.nwstc.noaa.gov/nwstrn/d.ntp/pds.html#hyd>. New training initiatives:

- ✓ An Advanced Hydrologic Applications residence course will be offered five times. This course will focus on the enhancements to the hydrologic suite of applications in AWIPS.
- ✓ A Heavy Precipitation/Flash Flood Forecasting workshop will be developed and offered. This workshop will emphasize the FFMP tool, a part of the AWIPS suite of hydrologic applications.
- ✓ New hydrologic science training modules will be developed for hydrologists at the WFOs and RFCs. Hydrologic science training will be conducted as a combination of distance learning and residence courses.

Outreach

The Hydrologic Services will participate in the following outreach activities:

- ✓ Quarterly meetings with the U.S. Geological Survey (USGS)
- ✓ Annual meetings with the National Resources Conservation Service (NRCS)
- ✓ Quarterly meetings with the Advisory Committee on Water Information's Subcommittee on Hydrology
- ✓ NOAA Hurricane Conference
- ✓ Interdepartmental Hurricane Conference
- ✓ Interagency Coordinating Committee on Hurricanes



Real time flood forecast map

- ✓ National Safety Council
- ✓ Association of State Flood Plain Managers (ASFPM)
- ✓ National Hydrologic Warning Council (NHWC)
- ✓ Southwest Association of Alert Users (SAAS)
- ✓ Integrated Flood Observing and Warning System (IFLOWS) Users Group
- ✓ Federal Emergency Regulatory Commission (FERC) Dam Safety Council
- ✓ National Hurricane Conference

Dissemination

Hydrologic Services is actively involved in the VTEC definition, ensuring hydrologic products will meet our customers needs and expectations. Hydrologic Services will also maintain a consistent web presence for the dissemination of new products and services provided by AHPS.

Verification

Verification statistics are generated routinely for FFWs. For the past two years, verification statistics have been generated for RFC river stage forecasts at a subset of forecast points. In 2004, requirements and implementation plans will be developed for verifying the areal and point Flood Warnings issued at WFOs.

Regional Initiatives

In FY 04, NWS Regions will implement basic AHPS services at 419 river forecast points throughout the continental United States and Alaska. The Tar River Basin project in North Carolina encompasses an implementation of the full suite of AHPS capabilities including the provision of flood forecast mapping services at three forecast points. In addition, a consistent delivery of AHPS information will be provided on the Internet by the second quarter of FY 04.

Contact

Glenn Austin, Chief, Hydrologic Services Branch, 301-713-0006, ext. 158, glenn.austin@noaa.gov.

Marine Weather Services

Vision

To meet safety needs through ready access to accurate, timely, easily understood and technologically advanced products, forecasts, and warnings. These activities and advances in science and technology will provide the means by which the NWS will meet its strategic vision.

Concept of Operations

The planned activities will focus on three areas:

- ✓ Enhance operational marine and tropical cyclone services with emphasis on gridded and graphical products,
- ✓ Improve marine forecast process, and
- ✓ Maintain an active customer outreach program.

Development will continue for AWIPS and the National Center Advanced Weather Interactive Processing System (NAWIPS). These critical systems will provide new and enhanced capabilities, and new data sets to support marine and tropical product generation. New science and technology plans will be implemented to increase forecast and warning accuracy, and to meet our customer needs for ready access to easily understood information.

Customer and Partner Requirements

Marine and Coastal Services Requirements

- ✓ Issue swell direction and period forecasts for coastal, offshore, Great Lakes, and high seas marine zones
- ✓ Issue probabilistic confidence level of marine forecasts
- ✓ Provide early and accurate port or harbor specific forecasts and warnings
- ✓ Integrate National Ocean Service (NOS) Physical Oceanographic Real Time System (PORTS) data with weather information and forecasts
- ✓ Offer marine-only weather radio



- ✓ Provide regularly spaced grid of marine observations in all coastal and offshore areas
- ✓ Offer observations for wave period, swell height, direction and period, and visibility

Tropical Cyclone Services Requirements

- ✓ Increased accuracy of tropical cyclone track and intensity.
- ✓ Improved storm surge forecasts.
- ✓ Increased accuracy of 34-, 50- and 64-knot wind radii.
- ✓ Improved tropical cyclone quantitative precipitation estimates.

GPRA Performance Measures

GPRA Goal	1998 - 2002 baseline	2003	2004
Hurricane Forecast Track Error (48 hrs.)	133 nautical miles	130 nautical miles	129 nautical miles
Marine Wind Speed Forecasts - Accuracy	0.53 equitable skill score	0.54 equitable skill score	0.54 equitable skill score
Marine Wave Height Forecasts - Accuracy	0.65 equitable skill score	0.66 equitable skill score	0.66 equitable skill score

Link to Science and Technology Infusion Plan

Tropical Cyclones

Supports the vision of providing timely and accurate tropical cyclone products using cuttingedge technology in a

cost effective manner, improving the economic value of tropical cyclone information, decreasing tropical cyclone related fatalities, and fulfilling the STIP goal of decreasing the 48-hour mean track error.

Maritime Wind and Wave Warnings

Supports the mission of providing current and accurate information for decision-making by marine and coastal interest on or near U.S. coastal waters, open oceans, and the Great Lakes. These warnings ensure the safety of life and the protection of property. This warning effort increases marine wind and wave forecast skills toward achieving STIP goals.

Product and Service Changes

- Graphical Hurricane Local Statement PDD available from: <http://products.weather.gov/>.
- Marine Point Matrices PDD not yet available. Feedback from second to third quarter, FY 04.

Milestones by Quarter

1st Quarter

- Release web training for marine wave forecasting. (Milestone met, 1st quarter)

2nd Quarter

- Release plan for populating NDFD with Tropical Cyclone force winds. (Milestone met, 2nd quarter)
- Establish a volunteer marine observation program for recreational and small commercial mariners. (Milestone met, 2nd quarter)

3rd Quarter

- Increase NWS Tropical Cyclone Program Outreach to Spanish-speaking community. (Milestone met, 3rd quarter)
- Launch a National Rip Current Outreach Program. (Milestone met, 3rd quarter)
- Prototype a Tropical Cyclone Watch/Warning summary product suitable for Emergency Alert System. (Milestone met, 3rd quarter)
- Expand NDFD into marine areas. (Milestone met, 3rd quarter)
- Begin a phased in implementation of graphical Hurricane Local Statement (Milestone met, 3rd quarter)

4th Quarter

- Conduct an assessment of NOAA/NWS ice products and services.
- Coordinate the dissemination of gridded Great Lakes marine data with Environment Canada.

- ✓ Include Global Sea Surface Temperature Analysis.

Science and Technology Requirements

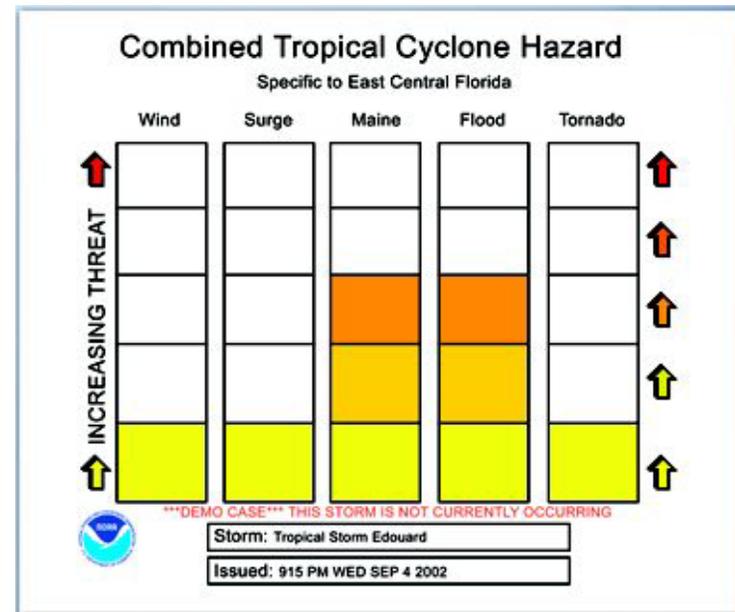
Provide gridded guidance from Wave Watch III global and regional models for the primary and secondary swell height, direction, and period.

Training

- ✓ Development of marine PDS: http://meted.ucar.edu/topics_marine.php
- ✓ Annual regional marine workshops

Integrated AWIPS Requirements

- ✓ Include Tropical Cyclone Watches and Warning Headlines from National Hurricane Center (NHC) in other products.
- ✓ Include the System on AWIPS for Forecasting and Evaluation of Seas and Lakes (SAFESEAS).
- ✓ Include Gridded Ice Analyses from National Ice Center (NIC).



The combined Tropical Cyclone Hazard of the Graphical Hurricane Local Statement will be nationally implemented as a new product in 2004.

- ✓ Annual Hurricane Liaison Team training which includes NWS and Federal Emergency Management Agency (FEMA)
- ✓ Rip Current forecaster training module.

Outreach

- ✓ Annual marine and tropical cyclone customer and partner meetings
- ✓ Town meetings at boat and trade show events
- ✓ Rip current outreach and education materials and events



The experimental Rip Current Graphic will be evaluated for proposed national implementation as a product new in 2004.

- ✓ Hurricane Awareness Week
- ✓ National Safe Boating Week
- ✓ Articles for marine related magazines.

Dissemination

- ✓ Expand prototyping of cell-phone compatible marine and tropical cyclone products.
- ✓ Prototype a remote radiofax monitoring system.

Verification

- ✓ Complete migration of national marine verification program from NCEP to OCWWS.
- ✓ Develop initial programmatic phase to verify NDFD Marine Forecast grids.

Regional Initiatives

Eastern

- ✓ Collaborate with the National Data Buoy Center (NDBC) to develop buoy and Coastal Marine Automation Network (C-MAN) station climatology for sites. (Milestone met, 2nd quarter)
- ✓ Coordinate two Tropical Prediction Center/ National Hurricane Center (TPC/NHC) hurricane forecaster office visits.
- ✓ Expand participation in the Rip Current Program.
- ✓ Conduct marine forecaster training workshop.
- ✓ Coordinate two forecaster exchanges between two coastal WFOs and NCEP Ocean Prediction Center (OPC).

Southern

- ✓ Host the Hurricane Preparedness Tour at selected coastal locations.
- ✓ Conduct marine forecaster training workshop. (Milestone met, 2nd quarter)

- ✓ Expand forecast methodologies and techniques for producing graphical marine products using gridded fields to all coastal WFOs.
- ✓ Implement procedures for disseminating marine products via Internet-Ready cellular phones at two coastal WFOs.

Central

- ✓ Represent NWS at Lake Carrier and Great Lakes Ship Captains Organization meetings. (Milestone met, 1st quarter)
- ✓ Conduct Central Region/Eastern Region marine forecaster training workshop. (Milestone met, 1st quarter)
- ✓ Collaborate with a wide spectrum of NWS services with all NOAA agencies including the Great Lakes Environmental Research Laboratory (GLERL). (Milestone met, 2nd quarter)
- ✓ Coordinate forecaster familiarization visits between WFO Detroit and GLERL. (Milestone met, 2nd quarter)
- ✓ Analyze the benefits and deficiencies of expanding Port Meteorological Officer duties of WFO Chicago to all five Great Lakes. (Milestone met, 2nd quarter)
- ✓ Develop requirements for expanding the Great Lakes observation network. (Milestone met, 2nd quarter)
- ✓ Evaluate NDFD methodologies for the Great Lakes marine environment.

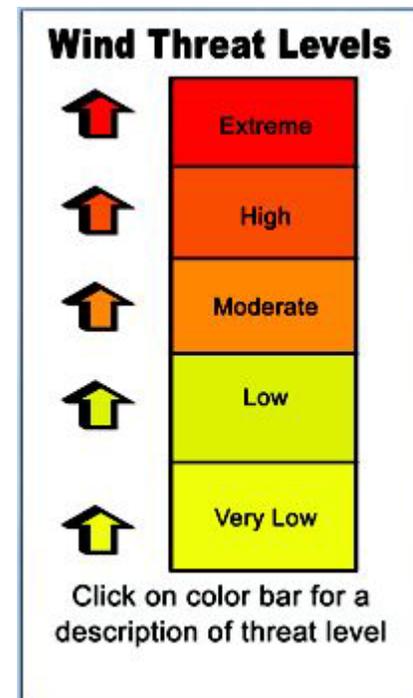
- ✓ Investigate the feasibility and potential value of an Entrance or Port Forecast. (Milestone met, 2nd quarter)

Western

- ✓ Conduct annual WFO marine weather workshops for customers. (Milestone met, 1st and 2nd quarter)
- ✓ Develop and implement a standardized customer feedback mechanism at the WFO level. (Milestone met, 2nd quarter)
- ✓ Implement a consistent regional policy for issuing and headlining High Surf Advisory.
- ✓ Conduct marine forecast training workshop.
- ✓ Establish warning criteria for high surf.

Alaska

- ✓ Plan to develop a prototype digital marine forecast matrix at a selected office
- ✓ Conduct marine customer outreach and partner workshops.
- ✓ Evaluate customer needs for NWR broadcasts in coastal areas.
- ✓ Conduct a regional assessment of WFO marine services and forecast performance.
- ✓ Evaluate impacts of new marine observingsystems.
- ✓ Continue assessment of the impacts of new marine observing systems.



The Experimental Graphical Hurricane Local Statement will be nationally implemented as a new tropical product in 2004.

Pacific

- ✓ Conduct annual marine customer workshop. (Milestone met, 2nd quarter)
- ✓ Implement Surf Zone Product for Guam and the Commonwealth of Northern Mariana Islands.
- ✓ Convert tropical cyclone brochures into six indigenous languages.
- ✓ Implement Sea State Forecasts for 48- and 72-hours.
- ✓ Transition from radiofax dissemination of numerical model guidance to WFO generated products.
- ✓ Implement a Tropical Cyclone Danger Area product for WFO Honolulu's entire marine area of responsibility.
- ✓ Install surf markers at designated surf reporting sites in Guam's area of responsibility.
- ✓ Expand Guam's surf reporting network.
- ✓ Sponsor a water safety summit conference in cooperation with the Guam Visitors Bureau.
- ✓ Conduct annual Tropical Cyclone and Disaster Preparedness workshops throughout Micronesia.

NCEP Ocean Prediction Center and Tropical Analysis and Forecast Branch

- ✓ Unify NCEP marine operations.
- ✓ Establish partnerships to integrate customer outreach efforts.

- ✓ Expand dissemination of OPC products to low-bandwidth devices.
- ✓ Implement gridded significant wave height and wave period products for the high seas areas.
- ✓ Assess need for reconfiguration of the Hudson Canyon to Baltimore Canyon marine zone based on customer feedback.

NCEP TPC/NHC

- ✓ Begin test and evaluation of second round of United States Weather Research and Joint Hurricane Test Bed projects. (Milestone met, 1st quarter)
- ✓ Conduct three Introduction to Hurricane Preparedness Workshops for local emergency managers. (Milestone met, 2nd quarter)
- ✓ Conduct hurricane awareness tour to Caribbean countries, Mexico, and along the U.S. Gulf Coast, with emphasis on outreach and public education.
- ✓ Conduct an international Regional Area IV Workshop for meteorologists on hurricane forecasting and warning.
- ✓ Develop gridded Tropical Cyclone Forecast/Advisories (TCM) for the Central Pacific Hurricane Society (CPHC) and Guam.

Contact Information

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Observing Services

Vision

To set policy, develop procedures, and articulate requirements for the maintenance and enhancement of in situ and remote environmental monitoring.

Concept of Operations

The Cooperative Observer Network and the Radiosonde Network are being modernized. These modernization activities include replacement of the current 91 station upper air network and enhancement of 8,000 cooperative observing stations over the remainder of the decade. As part of a demonstration pilot in New England, about 400 stations are scheduled to be modernized. The modernization of NWS sponsored observing programs will integrate new technologies and science, while building stronger relationships with NOAA's public and private sector partners.

Customer and Partner Requirements

Customer and partner requirements include support for:

- ✓ Real-time access to Automated Surface Observing System (ASOS) data
- ✓ Access to mesonet data including those from surface transportation
- ✓ Real-time access to Cooperative Observer Program (COOP) data
- ✓ Access to high resolution data.

Performance Measures

The performance measures focus on increasing the number and quality of observations customers can obtain from NOAA. Increasing observations is vital to NOAA's ability to maximize the benefits of its products and services and improve the Nation's environment, public safety and economy.

Science and Technology Requirements

- ✓ Data assimilation
- ✓ Ocean Atmosphere model resolution and mesoscale physics
- ✓ Coupling of mesoscale ocean and atmospheric Numerical Weather Prediction (NWP) models
- ✓ Expand targeted observations
- ✓ High resolution modeling at the land surface

Performance Measures

Program	FY 04 # of Observing Sites
COOP Modernization	200-400 modernized sites
Radiosonde Replacement System	20 sites



Product and Service Changes

- ✓ Modernize up to 400 COOP sites.
- ✓ Deploy 20 Radiosonde Replacement System (RRS) sites.
- ✓ Distribute new metadata system software.
- ✓ Implement new instruction for conducting data continuity.
- ✓ Implement new COOP handbooks.

Milestones by Quarter

1st Quarter

- Finalize design for metadata system. (Milestone met, 1st quarter)
- Participate in WMO on Upper Air and Capacity Building committees. (Milestone met, 1st quarter)
- Provide input to 10-year plan supporting the Integrated Earth Observing System. (Milestone met, 1st quarter)

2nd Quarter

- Begin planning for data continuity studies for ASOS replacement Ice-Free Wind Sensor, Dew Point Sensor, and All Weather Precipitation Accumulation Gauge. (Milestone met, 2nd quarter)
- Ensure requirements solutions are in place at New England modernized COOP Beta sites. (Milestone met, 2nd quarter)
- Coordinate Upper Air BUFR code tables uniformity issues with WMO Open Area Program Group (OPAG) on Upper Air and with WMO Commission on Basic Services (CBS) codes group on FM 32 and 35. (Milestone met, 2nd quarter)

- Provide and validate RWS thermodynamic and wind processing software algorithms, data quality assessment procedures, and data coding issues. Provide support to problem resolution for system integration testing. (Milestone met, 2nd quarter)

3rd Quarter

- Complete installation of New England Cooperative Observer Demonstration Project. (Milestone met, 3rd quarter)

4th Quarter

- Validate RRS Work Stations (RWS) Software algorithms and provide support to problem resolution. (Milestone met, 4th quarter)
- Expand use of non-government mesonet data.
- Begin gathering measurements for NCDC data continuity studies on ASOS replacement Ice-Free Wind Sensor, Dew Point Sensor, and All Weather Precipitation Accumulation Gauge.
- Full deployment of modernized metadata system.
- Publish final Operations Training Guide for commissioning of RRS.

Integrated Requirements

- ✓ Graphic user interface for quality control in OB2
- ✓ Local Data Acquisition and Dissemination (LDAD) capability to ingest mesonet data

Link to Science and Technology Infusion Plan

The future for Observing Services includes:

- ✓ Air quality sensors
- ✓ Boundary layer profilers
- ✓ Advancements in communications
- ✓ More detailed aircraft meteorological reports
- ✓ Increased capacity of satellite reports
- ✓ Improved GPS Radiosonde Measurements
- ✓ Global Position System
- ✓ Improved use of surface transportation sensors

Training

- ✓ Updates to COOP and Data Acquisition (DATAC) classes at NWS Training Center (NWS TC)
- ✓ Training for WFO staff on Fischer & Porter upgrade
- ✓ MDCRS on-line training activities

Outreach

- ✓ International, federal, state, and private sector partners
- ✓ NOAA Climate Monitoring Working Group
- ✓ Climate Reference Network Advisory Panel

- ✓ Western Governor's Drought Advisory Council
- ✓ WMO Committees on Integrated Meteorological Observations and Codes and Commission on Basic Services
- ✓ Annual Meeting of the Association of State climatologists
- ✓ Partners meetings on COOP modernization and site selection teams
- ✓ Oshkosh Air Show
- ✓ NBAA Convention
- ✓ Air Transport Association Meetings
- ✓ Aircraft Owners and Pilots Association meetings and conventions
- ✓ WMO Expert on Upper Air Systems Intercomparisons
- ✓ AMS Conference
- ✓ WMO Technical Conference
- ✓ NOAA Observing Systems Council
- ✓ Environmental Services Data and Information Management (ESDIM)
- ✓ Satellite Telecommunications Interagency Working Group
- ✓ Earth Observation System
- ✓ Weather Information Surface Transportation

Dissemination

- ✓ Work toward developing and implementing Internet access to high resolution data sets.
- ✓ Work with the FSL in providing data collection capabilities.
- ✓ Provide improved interim data assimilation for COOP data.
- ✓ Secure National support for the Central Region Weather Coder II (WxCoder II) and Southern Region Interactive Voice Remote Observation Collection (IV ROC) data assimilation solutions.

Verification

Observing Services will coordinate the process of using COOP data sites for temperature forecast verification.

Regional Initiatives

The Regions are assisting with the deployment of Fischer & Porter raingauge upgrade. The regions are actively supporting Station Metadata Management System (SMS) implementation. The regions are developing two methods for automating the transmission of data from COOP stations.

Central

- ✓ WxCoder II provides for web based entry and dissemination of WS form B-91. Support annual EAA Fly-in at Oshkosh, WI, with the goal of fostering both aviation and observational services outreach.

Southern

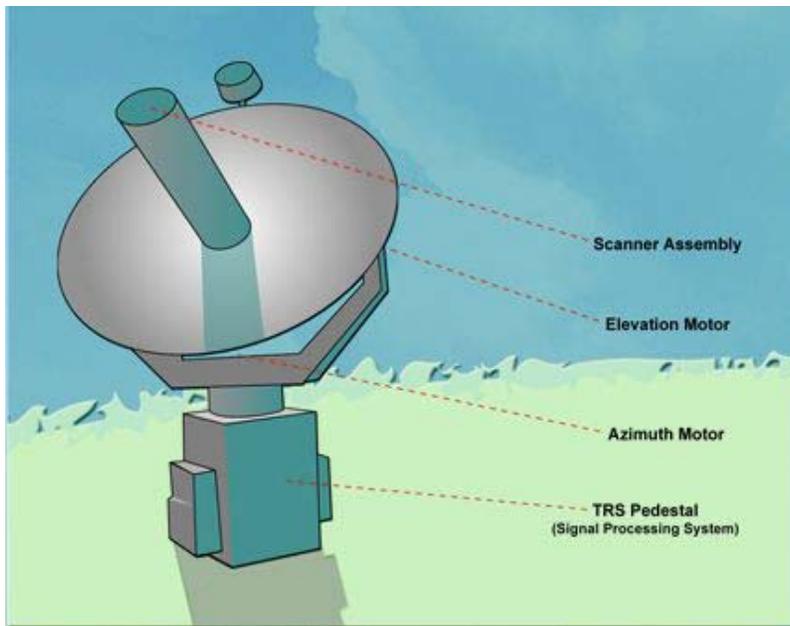
- ✓ Interactive Voice Remote Observation Collection (IV ROC) provides a telephonic system to collect and disseminate COOP observations.

Eastern

- ✓ The Eastern Region is leading the effort to establish and operate the COOP New England Demonstration Pilot.

Contact Information

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Radiosonde Replacement System's 1680 MHz Telemetry Receiving System (TRS).

Public Weather Services

Vision

To satisfy customer and partner requirements for consistent, timely, and accurate weather services, products, forecasts, and warnings. Some areas of focus include severe and winter weather, air quality, and homeland security support.

Concept of Operations

The Public Weather Services program will collaborate with various NOAA offices and other government agencies, along with non-government offices and academia to create new and improved weather services by:

- ✓ Improving performance metrics for tornado, severe storm, and winter storm warnings
- ✓ Providing public health agencies concerned with air quality output from a combined mesoscale prediction and atmospheric chemistry model
- ✓ Providing Homeland Security support including running air dispersion models like the Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) at NCEP.

Customer and Partner Requirements

- ✓ More accurate forecasts
- ✓ Improved warning lead times
- ✓ Information displayed in new formats including grids, graphics, and GIS
- ✓ Forecast uncertainty using probabilistic techniques
- ✓ More frequent updates
- ✓ Interactive forecast system where customers can produce user-defined, site specific forecast information
- ✓ Computer readable weather summaries
- ✓ Severe weather warnings based on subcounty areas
- ✓ Metropolitan area forecasts for use by commercial, public, TV, radio broadcasters, and emergency managers



Link to Science Technology Infusion Plan

Severe weather research and development are directly tied to GPRA performance measures. No significant improvement in technology is expected to be delivered to the WFOs or the Storm Prediction Center during FY 04.

Air Quality (AQ) research and development is a joint collaboration between the Environmental Protection Agency (EPA) and OAR's Air Resources Laboratory (ARL). This initial capability is a result of refinements to testing in Summer 2003. Improvement in forecasting critical ozone threshold values over day-to-day persistence (approximately 85 percent) is expected.

GPRA Performance Measures

GPRA Goal	1998 – 2002 Baseline	FY 2003 Goal	FY 2004 Goal
Tornado Warning, Accuracy	69%	72%	72%
Tornado Warning, Lead Time	11 minutes	12 minutes	12 minutes
Tornado Warning, False Alarm Ratio	75%	72%	70%

GPRA Goal	1998 – 2002 Baseline	FY 2003 Goal	FY 2004 Goal
Winter Storm Warning, Lead Time	12 hours	13 hours	14 hours
Winter Storm Warning, Accuracy	88%	88%	89%

Product and Service Change

- ✓ New zone forecast product format
- ✓ New Tabular State Forecast product

- ✓ Blowing Snow Advisory and Wind Chill products (Watch/Warning/Advisory) under new product category of Winter Storm Warning (WSW)
- ✓ Air Quality forecasts for national, state, and local agencies
- ✓ Ozone concentration posted to NCEP and EPA sites
- ✓ Quarterly local tests involving Nuclear Regulatory Commission (NRC) and WFOs, to benefit the Department of Homeland Security efforts
- ✓ Enhance GIS capabilities of HYSPLIT output to allow direct multiple model comparisons
- ✓ Model domain covering the Northeast U.S.
- ✓ Terminology and numerical parameters in public products with incorporated and mirrored WMO standardized observational values as the metric for performance evaluation and verification

Milestones by Quarter

1st Quarter

- Insert NWS attribution phrase for the initial issuance of winter weather, and non-precipitation weather Watch/Warning/Advisory. (Milestone met, 1st quarter)
- Issue Blowing Snow and Wind Chill products (Watch/Warning/Advisory) under product category WSW. (Milestone met, 1st quarter)
- Complete Review of 2003 Limited Test with Air Quality Focus Group. (Milestone met, 1st quarter)
- Put Ozone product on “experimental products” web site. (Milestone met, 1st quarter)

- Implement new Zone Forecast product format nationally. (Milestone met, 1st quarter)
- Implement new Tabular State Forecast product nationally. (Milestone met, 1st quarter)
- Implement new all weather hazards preliminary local storm report format. (Milestone met, 1st quarter)

3rd Quarter

- Develop and implement additional Heat Health Watch Warning Systems. (Milestone met, 3rd quarter)
- Develop Severe Weather Gridded Forecast Plan for WFOs and SPC. (Milestone met, 3rd quarter)

4th Quarter

- Consolidate product for significant (non-severe) weather situations.
- Consolidate product for Winter Weather and Non-Precipitation Weather Outlooks.
- Conduct Air Quality Real-Time Testing and Evaluation (RTTE).
- Decide Air Quality Operational Readiness for FY 05.
- Develop Homeland Security product suite so WFOs can access and display critical data sets.

Integrated Requirements

- ✓ Baseline Product Formatters for products specified in NWS Instruction 10-503.
- ✓ Install Short Duration Quality Control Checker Software.

- ✓ Homeland Security product suite to access and display critical data sets in the Watch/Warning/Advisory Application.
- ✓ System for Convective Analysis and Nowcasting.
- ✓ Local storm report application.

Science and Technology Requirements

- ✓ Continue testing and evaluating Eta 12/CMAQ, (the community model for AQ coupled model) for improving surface ozone concentration forecasts.
- ✓ Plan transition to WRF model.
- ✓ Implement model upgrades including changes to short range ensemble forecasts (SREF) and medium range ensemble forecasts (MREF), run an ensemble high resolution window to support Homeland Security and fire weather applications, and improve assimilation and subgrid-scale orographic forcing schemes in mesoscale and global forecast systems.
- ✓ Continue Improvements which will be highly dependent on observations and mesoscale model improvements.



Kimberly Buttrick uses the Interactive Forecast Preparation System (IFPS) Graphical Forecast Editor (GFE) to modify the local digital database at WFO Taunton, Mass.

Outreach

- ✓ Presentations on Watch by County and Short Duration Warning Quality Control at NWA and AMS conventions and the annual National Severe Weather Workshop
- ✓ AMS presentations on Heat Health Watch Warning Systems
- ✓ Continued interactions with AQ focus group to provide feedback to modelers and AQ researchers to correct/improve model performance
- ✓ Presentations on AQ Forecast System at National AQ Workshops and AMS convention
- ✓ Continued interactions with the DoD, Homeland Security, DOE, NRC, and other federal and state agencies involved in homeland security at meetings and workshops
- ✓ Severe Weather Program Leader's Meeting, prior to National Severe Weather Workshop

Dissemination

- ✓ Streamline Public Weather Product Suite

Verification

- ✓ Extend new temperature and Probability of Precipitation (PoP) verification to seven days and a ten-fold increase in verification sites to approximately 1,500

- ✓ Begin verification development of other forecast elements including cloud amount, snow amount, wind speed and direction, and precipitation type
- ✓ Start development of polygon verification for thunderstorms and showers
- ✓ Develop simple grid verification using states' emissions monitoring data for ozone collection by EPA

Regional Initiatives

Central

- ✓ Improve GPRA performance measures by employing best practices
- ✓ Define WFO role with respect to the DoD, Department of Homeland Security, DOE, and the NRC
- ✓ Define WFO role in the air quality program
- ✓ Expand WFO customer outreach to include IFPS/NDFD capabilities and potential utility

Contact Information

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Acronym List

AASC	American Association of State Climatologists	CPHC	Central Pacific Hurricane Society
AAWU	Alaska Aviation Weather Unit	CRM	Customer Relations Management
ADDS	Aviation Digital Database System	CSI	Customer Satisfaction Index
AHPS	Advanced Hydrologic Prediction Service	CWSA	Commercial Weather Services Association
ALDA	Association of Late Deafened Adults	CWSU	Center Weather Service Unit
AMS	American Meteorological Society	DATAAC	Data Acquisition
AOPA	Aircraft Owners and Pilots Association	DHS	Department of Homeland Security
AQ	Air Quality	DLAC	Distance Learning Aviation Course
ARL	Air Resources Laboratory	DoD	Department of Defense
ASFPM	Association of State Flood Plain Managers	DOE	Department of Energy
ASOS	Automated Surface Observing System	EAA	Experimental Aircraft Association
ATA	Air Transport Association	EIA	Energy Information Agency
AvnFPS	Aviation Forecast Preparation System	EMC	Environmental Modeling Center
AWC	Aviation Weather Center	EMWIN	Emergency Manager Weather Information Network
AWIPS	Advanced Weather Interactive Processing System	ENSO	El Niño Southern Oscillation
BUFR	Binary Universal Format for the Representation of Meteorological Data	EPA	Environmental Protection Agency
C-MAN	Coastal Marine Automation Network	ESDIM	Environmental Services Data and Information Management
CBS	Commission on Basic Services	FAA	Federal Aviation Administration
CCFP	Collaborative Convective Forecast Product	FCC	Federal Communications Commission
CDC	Climate Diagnostics Center	FEMA	Federal Emergency Management Agency
CEA	Consumer Electronics Association	FERC	Federal Emergency Regulatory Commission
CES	Consumer Electronics Show	FFA	Flood Watch
CIO	Chief Information Officer	FFMP	Flash Flood Monitoring and Prediction
CIP	Current Icing Potential	FFW	Flash Flood Warning
COE	Center for Organizational Excellence	FIP	Forecast Icing Potential
COOP	Cooperative Observer Program	FLW	Flood Warning
CPC	Climate Prediction Center	FOS	Family of Services

FSL	Forecast Systems Laboratory	NAS	National Airspace System
FY	Fiscal Year	NAWIPS	National Center Advanced Weather Interactive Processing System
GFA	Graphical Area Forecast	NBAA	National Business Aviation Association
GFE	Graphical Forecast Editor	NCDC	National Climatic Data Center
GIS	Geographic Information System	NCEP	National Centers for Environmental Prediction
GLERL	Great Lakes Environmental Research Lab	NCO	NCEP Central Operations
GPRA	Government Performance and Results Act	NCWF	National Convective Weather Forecast
GUI	Graphical User Interface	NDBC	National Data Buoy Center
HAI	Helicopter Association International	NDFD	National Digital Forecast Database
HPC	Hydrometeorological Prediction Center	NDMC	National Drought Mitigation Center
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model	NEMA	National Emergency Management Assn.
IAEM	International Association of Emergency Managers	netCDF	network Common Data Form
IATA	International Air Transport Association	NFDRS	National Fire Danger Rating System
ICAO	International Civil Aviation Organization	NHC	National Hurricane Center
IFLOWS	Integrated Flood Observing and Warning System	NHWC	National Hydrologic Warning Council
IFPS	Interactive Forecast Preparation Systems	NIC	National Ice Center
IMET	Incident Meteorologist	NLC	National League of Cities
IRI	International Research Institute for Climate Prediction	NOAA	National Oceanic and Atmospheric Administration
IV ROC	Interactive Voice Remote Observation Collection	NOHRSC	National Operational Hydrologic Remote Sensing Center
JPO	Joint Planning Office	NOS	National Ocean Service
LDAD	Local Data Acquisition and Dissemination	NRC	Nuclear Regulatory Commission
MDCRS	Meteorological Data and Collection Reporting System	NRCS	National Resources Conservation Service
MJO	Madden-Julian Oscillation	NSA	National Snow Analysis
MOS	Model Output Statistics	NSC	National Safety Council
MREF	Medium Range Ensemble Forecasts	NSIP	NWS Service Improvement Plan
NAB	National Association of Broadcasters	NWA	National Weather Association
		NWP	Numerical Weather Prediction
		NWS	National Weather Service

NWSPD National Weather Service Policy Directive
NWSI NWS Instruction
NWSTC NWS Training Center
OAR Office of Atmospheric Research
OB2 Operational Build 2
OB3 Operational Build 3
OCWWS Office of Climate Water and Weather Services
OGP Office of Global Programs
OMB Office of Management and Budget
OPAG Open Area Program Group
OPC Ocean Prediction Center
OT&E Operational Tests and Evaluations
PACE Prototype Aviation Collaborative Effort
PDD Product Description Documents
PDS Professional Development Series
PoP Probability of Precipitation
PORTS Physical Oceanographic Real Time System
PPBS Planning, Programming, and Budgeting System
PPW Partnership for Public Warning
QPF Quantitative Precipitation Forecast
RAWS Remote Automatic Weather Stations
RCC Regional Climate Centers
RFC River Forecast Center
RRS Radiosonde Replacement System
RTNDA Radio and Television News Directors Assn.
RTTE Real-Time Testing and Evaluation
RTVS Real Time Verification System
RWS RRS Work Station
SAAS Southwest Association of Alert Users

SAFESEAS System on AWIPS for Forecasting and Evaluation of Seas and Lakes
SAMA Small Aircraft Manufacturers Association
SAME/EAS Specific Area Message Encoding/Emergency Alert System
SCAN System for Convective Analysis and Nowcasting
SFM Seasonal Forecast Model
SHHH Self Help for Hard of Hearing
SMS Station Management System
SNOW Snow Network Observations Workshop
SPC Storm Prediction Center
SREF Short Range Ensemble Forecasts
STIP Science and Technology Infusion Plan
TAF Terminal Aerodrome Forecast
TCM Tropical Cyclone Forecast/Advisories
TPC/NHC Tropical Prediction Center/NHC
TRS Telemetry Receiving System
USAID U.S. Agency of International Development
USGS U.S. Geological Survey
VTEC Valid Time Event Code
WAFS World Area Forecast System
WFO Weather Forecast Office
WMO World Meteorological Organization
WSW Winter Storm Warning
WxCoder II Central Region Weather Coder II



U.S. DEPARTMENT OF COMMERCE
National Oceanic & Atmospheric Administration
NOAA's National Weather Service