

# Winter 2014-2015 Peak Performance Newsletter



Performance Branch, NWS Office of Climate, Water, and Weather Services, Silver Spring, Maryland

This Issue: December 2014

Results of the National Weather Service 2014 Customer Satisfaction Survey.....	1
Fly...with Ointment: Representative Classes of Performance Metrics .....	3
An Update on Marine Verification .....	5
Did You Know?.....	7
River Forecast Verification is Back!.....	10
Status of Service Assessment Actions.....	12
Contact Information.....	13

## Results of the National Weather Service 2014 Customer Satisfaction Survey

By Sal Romano, NWS Headquarters

A team of NWS employees developed the NWS 2014 Annual Customer Satisfaction Survey questions. This team included a representative from each of the six NWS regions. This general survey consisted of a core section and one optional section that respondents had the choice to complete. Similar to last year's survey, the core section contained questions about Hazardous Services, Weather Ready Nation and Decision Support Services, Dissemination, Outreach and Weather Education, and Demographics. Last year there were four optional sections. This year's one optional section contained aviation services questions. There were fewer questions this year than last year in both the core section and the one optional section to make the survey more appealing to potential respondents.

The independent survey firm Claes Fornell International (CFI) Group administered the survey, which had 31,384 general respondents, plus 271 Weather-Ready Nation Ambassadors, for the core section and of these, 5,445 respondents for the Aviation Services section. (Weather-Ready Nation Ambassadors are NOAA partners who are improving the Nation's readiness, responsiveness, and overall resilience against extreme weather, water, and climate events.) The survey was "live" between September 9 and September 25, 2014. As in previous years, most respondents were from the NWS Central Region (9439 respondents). There were 7748 respondents from the NWS Eastern Region, 5968 respondents from the NWS Southern Region, and 5228 respondents from the NWS Western Region. The NWS Alaska Region had 488 respondents and the NWS Pacific Region had 142 respondents.

[Continued on next page...](#)

## Results of the National Weather Service 2014 Customer Satisfaction Survey – Continued from Page 1

In addition to the general survey from links on various NWS Websites, 1000 selected individuals were paid to take a very similar survey as panelists on the Internet. These Internet Panelists more closely represented the demographics of the United States according to the 2010 U.S. Census.

CFI measures customer satisfaction with the American Customer Satisfaction Index (ACSI), the standard methodology used across public and private sectors to evaluate public opinion and help prioritize organizational changes that will improve the customer experience. The 2014 NWS survey resulted in a score of 84, on a scale of 0 to 100, for the general survey participants and for the Weather-Ready Nation Ambassadors. This score is 2 points higher than last year and is considered “excellent” by CFI. The score for the 1000 Internet Panelists was 79, which is still a strong score. The aggregate Federal Government ACSI for 2013 was 66. The aggregate score for 2014 is not yet available.

A majority of all respondents indicated high usage of a mobile device to obtain weather information. Wireless Emergency Alert (WEA) messages via cell phone increased 15% from 2013, with 40% of respondents reporting receiving WEA messages. Satisfaction with the Usefulness of WEA Message (84) increased 4 points from 2013 for respondents of the General Customer Satisfaction Survey, while Weather-Ready Nation Ambassadors rate the Usefulness of the WEA Message (90) even higher. The NWS presences on YouTube (64) is the lowest rated among social media sites. Weather-Ready Nation Ambassadors rate YouTube higher (74).

Over half of all respondents (General Customer Satisfaction Survey respondents–59%; Internet Panelists–56%) indicate they listen to their NOAA Weather Radio All-Hazards when seeking information about severe weather.

More respondents are better prepared in 2014 by having a Hazardous Weather Plan (79%), which represents a modest 5% gain from 2013. Also, 61% of respondents now report having a Hazardous Weather Emergency Preparedness Kit, which is an increase of 14% from 2013.

Outreach and Weather Education is the most influential driver of NWS customer satisfaction. Driver impacts show which driver has the most/least leverage—where improvements matter most/least to NWS customers. Increasing NWS Outreach and Weather Education efforts would have the greatest effect on increasing the public's satisfaction with the NWS.

A CFI representative briefed the NWS 2014 Customer Satisfaction Survey results at National Weather Service Headquarters on Tuesday, November 18. As in previous years, the briefing was available to the NWS Regions via GoToMeeting. The survey results are contained in a report created by CFI and are available through a Web portal provided by CFI.

If you'd like to look at the results in more depth, you may access the survey results' Web portal at [portal.cfigroup.com](http://portal.cfigroup.com). The username is NWS2014@noaa.gov and the password is nws2014!! ✨



# Fly...with Ointment

By Beth McNulty, Performance Branch, NWS Headquarters

## *Specific discussion of representative classes of performance metrics*

### **Forecast Accuracy: meteorological or operational**

Often when we think of forecast accuracy we assume that we are talking about meteorological accuracy. However, the concept of operational accuracy has become a measurable quantity in the world of decision support services, especially for aviation. When we speak of operational accuracy we refer to the actions taken by the forecast user based upon the forecast they received. A very basic aviation operational decision is the loading of extra fuel to allow for a possible diversion from the destination due to IFR conditions.

A forecast metric in this instance is the accuracy (or miss) of an IFR forecast. Meteorologically we are looking for a “did it happen?” answer. Operationally we need a “did the IFR forecast affect the operator’s decision for fuel loads or alternate destinations?” type of answer.

What is the difference?

Did the IFR in the example above occur as forecast? That is meteorological accuracy. Did the IFR occur with the timing predicted by the forecast, and did that timing intersect with the need for additional fuel? That is operational accuracy. In both cases the atmospheric dynamics are analyzed and the best forecast created and published. Meteorological accuracy depends on the atmosphere performing as expected. A hit forecast (accurate) occurs when the weather does what the forecaster anticipated, though timing may or may not be exact, but the sequence of

events is as expected. In contrast, an operationally accurate forecast hits the timing of weather changes, and the degree that the weather will change precisely, in addition to correctly forecasting the atmospheric conditions, such that the user made suitable decisions about their operations based on the forecast. In short, an accurate operational forecast is a forecast that performs as expected.

### False alarm defined

In both the operational and meteorological cases, a false alarm, missed forecast is defined the same way. If the forecast conditions do not occur, unforecast conditions occur, or the timing of an event is wrong even though an event occurred, then the forecast is counted as a false alarm. The metric value computed for this is called the False Alarm Ratio (FAR) and calculated as a ratio of the forecast misses to the total number of forecasts issued.

### **Process development: process or procedure**

Another area that can be measured for performance is the process used to arrive at a forecast or a particular decision support input. The process and its underlying procedure are not meteorological in nature, but impact the production of forecasts. A metric for a process is a yes/no event: did the forecaster follow a coherent process for evaluating weather conditions while developing a forecast?

Continued on next page...

Page 3

**Fly,,, with Ointment – Continued from page 3**

Similarly, was the standard procedure used while following that process?

What is the difference?

Some definitions are needed to ensure that the difference between a process and procedure are clear. A process is the series of actions that lead to a conclusion. A procedure is the series of actual steps taken at each stage of the process to complete the action. For example, in making a forecast the forecaster will evaluate data from models, satellites, radar, and surface observations to derive a conclusion about the near-term behavior of the atmosphere. The way the forecaster does this depends on the procedure they use while reviewing the data, reaching a conclusion, and producing the forecast or decision support input. The key difference between the two concepts is a matter of scale, and the tendency for procedures to take the form of checklists.

How to use measures to find errors or “perfection”

A measure for processes and procedures is necessarily concerned with yes/no type compliance. Did the person follow the checklist? (Yes or No). Was the process correctly applied to the situation? (Yes or No). The measure could be quantified by calculating the number of times a process or procedure was correctly used as a ratio to the total number of times it was used. Such a measure could be called “perfection,” or some other cute name, while the ratio of misapplied procedures and process to the total number of uses could be termed “errors.”

**Timeliness: meteorological, operational, or procedural**

We need a definition for “timely” and “timeliness” before we move into a discussion of meteorological, operational, or procedural timeliness. According to the dictionary, something

is “timely” when it happens or occurs at the right time. “Timeliness” is the condition of being timely. Therefore, when a meteorological forecast is issued on schedule, or if a weather warning product is issued as soon as practical after a potential hazard is detected, we say that the forecast or warning is timely, and able to be used to prepare for the event predicted.

When an operational forecast is issued for decision support, we say that the forecast is timely if it is issued before the fact, and provides ample information to allow the decision makers time to act before the onset of an anticipated event. A casual observer would note that there are similarities between the concepts of meteorological and operational timeliness.

In a similar manner if a procedure or process is performed when it is needed, and not afterward, then we can define it as a timely procedure or process.

What is the difference?

In each case if the forecast, process or checklist is completed, and published, before the fact we can say that they are timely, and we have met the test for timeliness. The chief difference is between the timely completion of a process and procedural checklist, and the timely provision of a forecast that can be used for weather or decision support services. Processes and procedures support the creation of a forecast, but do not rely on meteorological data. In contrast both meteorological and operational forecasts could rely on the proper completion of a procedure or checklist to ensure all atmospheric elements are considered.

Using timeliness to improve your service

Performance measures based on timeliness must

**Fly,,, with Ointment – Continued from page 4**  
 consider whether the forecast or processes were completed ahead of the time needed, or after they were needed. For the purposes of a metric, we define timeliness as the number of forecasts provided on time or early compared to the total number of forecasts issued. A untimely forecast would then be any forecast issued after the fact, and measured as a ratio of after the fact forecasts to the total number issued. A similar calculation can be created for process and procedures relating the on time completion of a process, or procedure, to the total number of processes, or procedures, completed.

The next thing to do is to make an effort to increase the timely actions, and decrease the late actions; resulting in an overall improvement of service.\*

**Next Issue of Peak Performance:**

**Data needed to create or  
 compute a metric**

*Meteorological metric*

*Operational metric*

*Process metric*



Chuck Kluepfel, NWS Headquarters

The new marine verification program has been operating for almost 6 months. The only issue that has taken a lot of our time is the “down” side of adding a lot of new, unfamiliar observation sites to the system. The old verification system had about 85 buoy points and 65 coastal land points. The new system has increased to about 190 buoys and 315 coastal land points. The “new” buoys tend to be buoys that are not owned and maintained by the National Data Buoy Center (NDBC); about fifty of which are “wave rider” buoys that only measure waves. The large number of unfamiliar coastal land points presents the biggest challenge. Quite a few land sites seem to have questionable wind exposures. Since land stations don’t usually report wave data (there are a few isolated exceptions), a poor wind exposure at a coastal land point usually disqualifies it for verification.

Our initial approach to managing this huge increase in land stations has been to be cautious

## An Update on Marine Verification

and base all Government Performance and Results Act (GPRA) data reports upon just buoy data. This means the land stations are still in the database, but they are not being used when GPRA verification data reports are requested for winds. Consequently, we are asking each WFO to supply us with a list of land stations with reliable wind exposures. Upon receiving that list, the Performance Branch will adjust the settings required for the software to acknowledge those stations whenever the platform selection switch is set to GPRA. Several WFOs have already responded with such a list, but we still need to hear from most offices.

How will the verification software help you manage this new level of complexity? In the verification program, you will use the platform selection switch, which is located just below the element selection switch in the request GUI. The platform selection switch allows you to sort each data request by selecting one of the

[Continued on next page...](#)

[Page 5](#)

## An Update on Marine Verification – Continued from page 5

following platform types:

- ⇒ the *default* setting—the verification of all sites used for GPRA reporting
- ⇒ only buoy points
- ⇒ only land points
- ⇒ all points in the database (all buoy and land points in the database)

Initially (up until about three weeks ago), a buoy only Stats on Demand request was identical to a GPRA request, but that is beginning to change. We expect the list of usable coastal land points to grow substantially. The choice required by each WFO for an unrepresentative site is to (a) remove it from the verification program, or (b) keep it in the verification program, but disallow its use for GPRA wind speed calculations. In the future, an individual WFO can adjust these settings at any time. We designed this process to be flexible, but we may have a few glitches over the next couple months.

Other than the data “sorting by platform” feature explained above, the operation of the web site is similar to before. We recommend setting the beginning and ending dates of your request first, and then proceed down the page. Your element and platform selections will determine which stations you will be able to pick from the area selection box. The cycle and

projection default settings are the same settings used for GPRA calculations, but we encourage you to look further ahead to your Days 2 thru 7 performance measurements.

As for upgrades early in 2015, the inclusion of model/guidance data will be added as a request option, and you will soon be able to start querying the database by observation dates. This feature will be provided in addition to the more familiar process of querying the database by forecast issuance dates. Querying the database by observation dates can also be thought of as querying by forecast valid dates. It will help you tailor your verification data requests to specific weather events and forecast performance leading up to those events.

By spring or summer 2015, we will add more points. A few Eastern Region offices have requested that we add some coastal land stations owned by the private company WeatherFlow. These offices have found the data from WeatherFlow to be very helpful to their operations, and WeatherFlow generously encourages the internal use of their data by the NWS as long as we don't disseminate it to the public. We believe these data could be helpful to other offices and regions for forecasting and verification.✿

### Winter 2014-2015 Peak Performance Newsletter Quote

**“Coming together is a beginning. Keeping together is progress.**

**Working together is success.” -Henry Ford**

Henry Ford was an American industrialist, the founder of the Ford Motor Company, and sponsor of the development of the assembly line technique of mass production.

# Did You KNOW



By Doug Young, Performance Branch,  
NWS Headquarters

"Did You Know" is a new column dedicated to making you aware of performance and evaluation-related information that you may not have known existed. This could be information within the pages of our website, techniques we are using to verify forecasts and warnings, performance trends, new research papers, training, customer feedback results, or a host of other topics of interest. We hope you find this column interesting and informative and, as always, we welcome your feedback!



## Service Assessment Recommendations *Really* Do Lead to Service and Process Improvements

*Did you know* that NWS service assessment recommendations really do lead to service and process improvements? While some people believe that service assessment reports are simply published and placed on the shelf, the fact is that the recommendations and resulting actions are carefully tracked by the NWS Performance Branch.

If the NWS does not make a good faith effort to address recommendations in some way, then the process becomes fruitless and not worth the time and effort. However, when actions are tracked and there is follow-through, real changes can be seen. That said, while some "low-hanging fruit" can be taken care of quickly, most actions require resources and funding that take time to secure. This may give the appearance that no action is underway to address the recommendations, unless the updated status of the action is known. If you would like to know the status of actions for the last several years of service assessments, you can find them [here](https://verification.nws.noaa.gov/sats/currentActions.aspx): (<https://verification.nws.noaa.gov/sats/currentActions.aspx>).

In the meantime, for this edition of Peak Performance, I'd like to share just a few of the changes brought about by recent NWS Service Assessment Findings and Recommendations. I hope that you find them enlightening.

### Service Assessment Name: May 2013 Oklahoma Tornadoes and Flash Flooding – Released March 21, 2014

**Finding 4:** Not all offices have enough easily portable devices with geolocation to enable the direct entry of data taken in the field during the storm survey into the DAT. Consequently, some NWS personnel are choosing to install the DAT app on their personal mobile devices to facilitate the use of the DAT.

**Action 4:** NWS should supply all WFOs with appropriate hardware, including computer tablets, with the Global Positioning System or other geolocation services, to facilitate the collection of survey information using the DAT software.

**Did You Know? – Continued from page 7**

The Office of Climate, Water, and Weather Service's Outreach Team now has 2 tablets. The NWS Regions received funding and either have tablets, or will be buying them in the near future, to provide WFOs with the tools they need to facilitate the collection of survey information using the DAT software.

**Finding 13:** The lack of NOAA/NWS-logged apparel reduced staff effectiveness while obtaining information from the public.

**Action 13:** NWS should provide appropriately logged apparel to employees in the field after an event, including employees providing onsite decision support services and conducting damage surveys.

An initial 50 Incident Command vests, with NOAA and NWS identifications (modeled by Sal Romano in Figure 1) were purchased, and delivered to the Performance Branch. We are preparing vests for distribution to the regional headquarters, the National Hurricane Center, and the Storm Prediction Center. Over the coming months, we will evaluate if this purchase effectively meets the need and consider next steps.



**Figure 1:** Front and back view of vest; Sal Romano, Performance Branch, Program Manager, Service Assessment and Evaluation, NWS Headquarters.

**Hurricane and Post-Tropical Cyclone Sandy – Released May 15, 2013**

**Finding 9:** The media is the primary intermediary for publicizing NOAA/NWS products and services.

**Action 9:** The NWS should provide the media with information that includes a concise overview of storm impacts, ready for public consumption as written.

The first of two tropical messaging in-residence training for NWS forecasters was completed in February, with the second one scheduled for May. The course covers tropical threat assessment, impact recognition and effective messaging. WDTB is in the process of completing a module on tornadoes associated with tropical cyclones. In addition, OS21 and OS6 and COMET® are finalizing a partnership with CIRA to transfer \$175K in Sandy funds to COMET for them to develop a storm surge impacts module external customers. This COMET® module is scheduled for release during Q2 of FY2015.

**Finding 21:** NHC and the NWS Eastern Region (ERH and WFOs) had critical staff shortages. Because these are operational units, these shortages make them vulnerable to failure during significant weather events when FEMA, EMS, media, and other important partners and the public depend on NWS offices the most.

**Did You Know? – Continued from Page 8**

**Action 21a:** NWS should identify and fill critical positions at operational facilities. If these positions cannot be filled, NWS should ensure awareness at higher levels in NOAA and the Administration that these vacancies may result in reduced levels of service, including constraints and potential failure on the delivery of products and services during the next significant weather event.

The NWS Director announced the opening of a large recruitment action in March 2014 aimed at filling 61 Intern/HMT positions across the NWS. Announcements were posted on USA Jobs, grouped by NWS region.

**Hurricane Irene in August 2011 – Released 10/5/2012**

**Finding 22:** The level of hydrologic training and experience varies within and among WFOs. WFO hydrologic training programs range from detailed and thorough to one Weather Event simulator event or an annual quiz.

**Action 22:** NWS should establish and implement a baseline standard for annual hydrologic training at all WFOs. NWS Regional Directors will ensure this hydrologic training is integrated into their WFOs' and RFCs' seasonal readiness training.

The Hydrologic Services Division has created the Hydrological PDS which identifies recommended training for various staff members (e.g., Service Coordination Hydrologists) responsible for hydrological forecasting. The PDS can be located at: <https://sites.google.com/a/noaa.gov/hydrology-pds/?pli=1>. HSD continues to fill any gaps found in the PDS. Local offices determine which training is needed for their staff.

**Finding 51:** CTAs for trees, branches, and other debris falling due to strong winds should inform the public of appropriate actions to take, not just describe possible damage.

**Action 51:** The NWS should compose AWIPS-baselined CTAs for trees, branches, and other debris falling due to strong winds. These CTAs must contain appropriate actions to take.

**Finding 52:** Specific, actionable guidance related to increased risk due to winds in high-rise buildings does not exist in the current NWS suite of tropical cyclone warning products.

**Action 52:** NWS should formulate specific guidance to communicate increased wind risk in high-rise buildings during tropical cyclones.

The Tropical Cyclone Wind Team was re-spun up in March 2014 to address these two action items. The team composed the AWIPS-baselined CTAs that contain appropriate actions to take.

**Finding 76:** The United States Coast Guard (USCG) places NDBC needs for buoy maintenance below other USCG mission priorities. This prioritization delays corrective and preventive maintenance of buoys for months and results in observational gaps. NWS does not have available funds to pay for ship time for buoy maintenance.

**Action 76:** NOAA should provide funding to be used in the most economical and efficient way for ship support to maintain weather buoys.

The FY14 funding was returned to normal levels for the repair/maintenance of weather buoys.✳

# River Forecast Verification is Back!



By Brent MacAloney, NWS Headquarters

Several years ago there was quite a bit of turnover in the Performance Branch with regard to the contracted programming staff. It became quite evident that we would be unable to continue to maintain all of the performance management tools that we offered on the website. Some hard decisions had to be made as to which programs we would continue to maintain and which ones to send into “hibernation” until we had the means to turn them back on.

One of those hibernating programs was the Stats-on-Demand (SOD) program that verified river forecasts produced by the River Forecast Centers (RFC). This program was developed and deployed by Robert Jones in 2001. When Robert departed in July 2012 we struggled to continue importing this data into our system. Couple his departure with the fact that the platform on which the program was developed was no longer supported and it is easy to see why this program was an obvious choice to temporarily turn off.

This past summer, we decided it was a good time to resurrect the River Forecast Verification SOD program. However, we did not want to just recreate the program as it was when we turned it off in 2012. Instead, we decided to update it based on user feedback that we had received over the 10-years the program was up and running. The underlying goal was to make the program much more user friendly, resulting in higher usage.

For those of you who were not familiar with the original River Forecast Verification SOD, the program took river forecasts produced by the RFCs and compared them with river gage observations to produce a set of verification scores. Unlike all the other programs the Performance Branch provides, the collection of forecast and observations, as well as the matching of data, does not take place on our servers. These jobs are generated at the RFCs. Once a month, the data is then transmitted by the RFC staff to the Performance Branch to import into our system at the beginning of the next month.

Our new program will look for recently transmitted verification data files every night. It will then automatically attempt to import them into the database. This will result in users not needing to wait up to 1 month to see their verification scores in the River Forecast Verification SOD program (**Figure 1**). They will now become available within 24 hours of transmission.

Some of the other key upgrades we made to the program were the following:

- ⇒ A more compact table of scores that allows the user to more easily view and compare data trends
- ⇒ Graphical output showing performance trends throughout the forecast periods selected

Continued on next page...

Page 10

River Forecast Verification is Back! – Continued from page 10

- ⇒ Comma separated value (CSV) output of verification scores, which can easily be imported into a spreadsheet or database
- ⇒ Ability to easily add additional verification points at the request of the RFC
- ⇒ Enhanced ability to better quality control the verification data going into the system

This new River Forecast Verification Stats-on-Demand program is located on the Performance Management website on the menu bar under Verification >> Hydrology under the title of River Forecast Verification, or directly by going to the following link: <https://verification.nws.noaa.gov/rfv/criteria.aspx> after January 14th.

As we head into the late winter and early spring, the Performance Branch will be creating a training module for the National Weather Service’s Learning Management System. In addition, the Performance Branch will conduct a couple of Webinars demonstrating the program and answering any questions you may have about the data. Please stay tuned to the Performance Management website for dates and times.

Also, it would be remiss of me not to mention the programming efforts for the modernized River Forecast Verification SOD system. Srilatha Yellela was the primary developer, with assistance from Lhou Mechat and Guynell Pittman. This team has done a great job in developing a robust tool that should go a long way in helping RFCs monitor their river forecast performance.

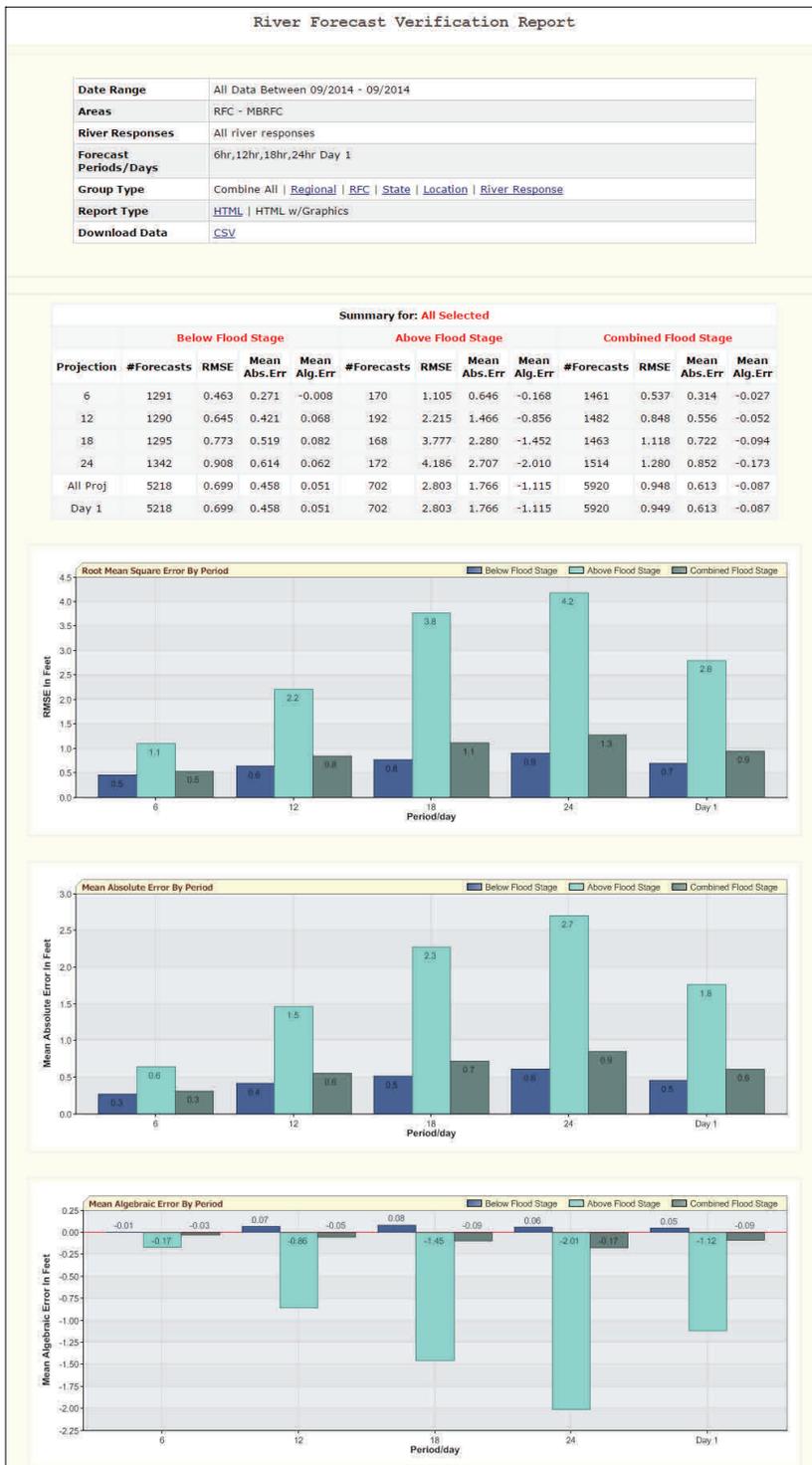


Figure 1: A view of the River Forecast Verification Stats on Demand output showing the verification data in table and graphical format.

Any questions about the program may be sent to [Brent.MacAloney@noaa.gov](mailto:Brent.MacAloney@noaa.gov).

# Status of Service Assessment Actions

## Summary – December 2014

- Currently, there are 444 total actions from Open Events.
- 104 actions remain open.
- 340 actions are closed.
- Currently, there are no activated service assessment teams/new events.

## Open Service Assessments

- ⇒ **Colorado Flooding of September 11-17, 2013**  
Released June 24, 2014  
26 Total Actions, 5 (19%) Closed Actions  
21 (81%) Open Actions
- ⇒ **May 2013 Oklahoma Tornadoes and Flash Flooding**  
Released March 21, 2014  
29 Total Actions, 15 (52%) Closed Actions  
14 (48%) Open Actions
- ⇒ **Hurricane and Post-Tropical Cyclone Sandy**  
Released May 5, 2013  
25 Total Actions, 11 (44%) Closed Actions  
14 (56%) Open Actions
- ⇒ **Historic Derecho of June 29, 2012**  
Released February 05, 2013  
14 Total Actions, 4 (29%) Closed Actions  
10 (71%) Open Actions
- ⇒ **Hurricane Irene in August 2011**  
Released October 05, 2012  
94 Total Actions, 68 (72%) Closed Actions  
26 (28%) Open Actions
- ⇒ **The Missouri/Souris River Floods of May – August 2011 (Regional Service Assessment)**  
Released June 05, 2012  
29 Total Actions, 22 (76%) Closed Actions  
7 (24%) Open Actions
- ⇒ **May 22, 2011 Joplin Tornado (Regional Service Assessment)**  
Released September 20, 2011  
16 Total Actions, 12 (75%) Closed Actions  
4 (25%) Open Actions
- ⇒ **Spring 2011 Mississippi River Floods**  
Released April 11, 2012  
31 Total Actions, 26 (84%) Closed Actions  
5 (16%) Open Actions
- ⇒ **The Historic Tornado Outbreaks of April 2011**  
Released December 19, 2011  
32 Total Actions, 31 (97%) Closed Actions  
1 (3%) Open Actions
- ⇒ **Record Floods of Greater Nashville: Including Flooding in Middle Tennessee and Western Kentucky, May 1-4, 2010**  
Released January 12, 2011  
17 Total Actions, 16 (94%) Closed Actions  
1 (6%) Open Action
- ⇒ **South Pacific Basin Tsunami of September 29-30, 2009**  
Released June 04, 2010  
131 Total Actions, 130 (99%) Closed Actions  
1 (1%) Open Action

## Closed Events (all actions completed)

- **Remnants of Tropical Storm Lee and the Susquehanna River Basin Flooding of September 6-10, 2011 (Regional Service Assessment)**  
Released July 26, 2012  
11 Total Actions - Closed
- **Washington, D.C. High-Impact, Convective Winter Weather Event of January 26, 2011**  
Released April 01, 2011  
6 Total Actions - Closed
- **Southeast US Flooding of September 18-23, 2009**  
Released May 28, 2010  
29 Total Actions - Closed
- **Mount Redoubt Eruptions of March - April 2009**  
Released March 23, 2010  
17 Total Actions - Closed
- **Central US Flooding of June 2008**  
Released February 03, 2010  
34 Total Actions - Closed
- **Mother's Day Weekend Tornadoes of May 10, 2008**  
Released November 06, 2009  
17 Total Actions - Closed
- **Super Tuesday Tornado Outbreak of February 5-6, 2008**  
Released March 02, 2009  
17 Total Actions - Closed

# Contributors to this Winter 2014-2015 edition of Peak Performance include . . .



**Brent MacAloney**

Performance Branch, NWS Headquarters  
Warning Verification  
[Brent.Macaloney@noaa.gov](mailto:Brent.Macaloney@noaa.gov)

**Beth McNulty**

Performance Branch, NWS Headquarters  
Aviation Performance and Verification  
[Beth.Mcnulty@noaa.gov](mailto:Beth.Mcnulty@noaa.gov)

**Doug Young**

Editor  
Performance Branch Chief, NWS Headquarters  
[Douglas.Young@noaa.gov](mailto:Douglas.Young@noaa.gov)

**Sal Romano**

Performance Branch, NWS Headquarters  
Service Assessment and Evaluation  
[Salvatore.Romano@noaa.gov](mailto:Salvatore.Romano@noaa.gov)

**Freda Walters**

Co-Editor and Designer  
Performance Branch, NWS Headquarters  
Service Assessment and Evaluation



*Questions and comments on this publication should be directed to Freda Walters.*

**please consider contributing to our next issue of Peak Performance: Spring 2015 Articles Due on Friday, February 27, 2015**



For any service assessment-related questions, information, or report copies, please email either Sal Romano ([Salvatore.romano@noaa.gov](mailto:Salvatore.romano@noaa.gov)) or Freda Walters ([Alfreda.walters@noaa.gov](mailto:Alfreda.walters@noaa.gov))

**Web Links**

Stats on Demand:  
<https://verification.nws.noaa.gov>  
Real-Time Forecast System:  
<http://rtvs.noaa.gov/>