Peak Performance

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

August 2011

This Issue:

NWS SERVICE ASSESSMENT Best Practices:

A SEASONAL REVIEW

By Doug Young, NWS Headquarters

Service assessment teams spend a considerable amount of time visiting NWS offices, conducting interviews, and taking note of several innovative actions used to accomplish the mission. All too often however, this information is collected, but not adequately shared throughout the Agency. In this article I've assembled a selected set of summer season best practices from the more recent past assessments. Specifically, I pulled best practices from assessments on hurricanes, tornadoes, and flash floods and made them more generic for broader application.

I hope you find some benefit in reviewing these best practices. You may find that your office already executes many of the items listed below. If so, that's excellent!! If not, I encourage you to share them with your colleagues and help to make your office more effective in achieving the NWS mission.

Best Practices—Tropical Storms/Hurricanes

- National Hurricane Center (NHC) forecasters should include their level of confidence in track and intensity forecasts.

Continued on next page...

NWS Service Assessment Best Practices: A Seasonal Review – Continued from Page 1

- Development of talking points for field offices ensures a uniform message is communicated to the media and government officials.
- Providing training to emergency managers will allow them to more effectively use NWS products and services.
- Prior to land-falling hurricanes, NOAA Public Affairs representatives should be placed on standby to help NHC with the media during events.
- The NOAA Public Affairs issuance of media advisories listing all agency media contacts helps the effort to direct reporters to the appropriate experts.
- Weather Forecast Offices (WFO) should consider including tropical cyclone event simulations as part of their comprehensive annual tropical cyclone drills.
- Volume Coverage Pattern (VCP) 121 may be used by WFOs to eliminate range folding, increase frequency of data, and increase in maximum Doppler range for better detection of significant radar velocity and reflectivity imagery. VCP 121 is designed to aid in the detection of tornadoes.
- Use of local scripting to reduce the NOAA Weather Radio All Hazards (NWR) cycle time during critical weather operations produces a concise and more effective broadcast of the tropical cyclone suite of products.
- When a tropical storm has the potential to increase to hurricane strength and affect an area, weekly NWR Tone Alarm Tests may be used as an opportunity to conduct live briefings to alert listeners to the status of the developing storm.

Best Practices—Tornadoes/Severe Thunderstorms

- During widespread severe weather events, sectorizing warning operations (i.e., dividing up the responsibility for monitoring and warning for specific geographic areas to prevent overload on the Warning Meteorologist) has proven to be a valuable mode of operation.
- Routinely using NWS Chat has proven to be an effective method of collaborating and communicating real-time information with NWS partners.
- Providing routine status updates to inform the public about post-event review/damage survey progress may help reduce phone calls to the WFO.
- Assembling talking points for the WFO staff within a short period (e.g., 2-hours) after an event helps to provide consistent media information.
- During major severe weather outbreaks, using an assistant warning forecaster may help reduce

Continued on next page… Page 2

NWS Service Assessment Best Practices: A Seasonal Review – Continued from Page 2

the workload, stress, and fatigue typically experienced by a single forecaster on the "hot seat."

- Including short-fuse backup exercises as part of WFO severe weather training aids in being well prepared to assume backup responsibility when the need arises.
- During complicated severe weather scenarios, WFOs should contact the Storm Prediction Center soon after the issuance of the Mesoscale Discussion, but prior to the watch coordination call, to discuss the severe weather threat and watch options. Discussion topics should involve which counties to include, watch type (Tornado or Severe Thunderstorm), and valid time.
- Issuing statements such as a "review of severe weather safety rules" prior to outbreaks of severe weather can bring to mind life-saving information.

Best Practices—Flash Flooding

- Adding extra polygon points to depict the precise flash flood warned area may help county emergency managers limit the area alerted through reverse 911 notification calls.
- Creating a catalog of all flash flood events over the past several years and turning it into an easily accessible database, both in AWIPS and in operations area computers, can improve both detection and statements. The AWIPS data can be displayed as an overlay with context sensitive pop-up information depicting past rainfall rates and resulting impacts by small basins. These data also can be accessed as an AWIPS text file for easy inclusion in Warngen statements.
- Surveying all river gages in a county warning area, including all non-forecast points, helps to identify the impacts for various river levels. WFO staff familiarization will also improve by having others accompany the service hydrologist on many of these river gage site surveys.

My strong point, if I have a strong point, is *performance*. I always do more than I say. I always produce more than I promise.

Richard M. Nixon

Want to Become a NOEES Expert?

By Brent MacAloney, NWS Headquarters

Since the new NWS Outreach and Education Event System (NOEES) has just been released, the Performance Branch has decided to offer a few training Webinars for those who are interested. These Webinars will be led by Brent MacAloney (NOEES Development Oversight), Chris Maier (National WCM Program Manager), and Mike Gerber (NOEES Policy Oversight).

This training will discuss what NOEES is, how the data will be used, the history of NOEES, data entry requirements, system permissions and support, as well as configuring the program, how to use the long and short form **(Figure 1)**, running reports, and viewing data.

Training will be 1-hour long and will be conducted three times during the months of August and September 2011. On page 5 you will find information on how to participate **(Figure 2)**.

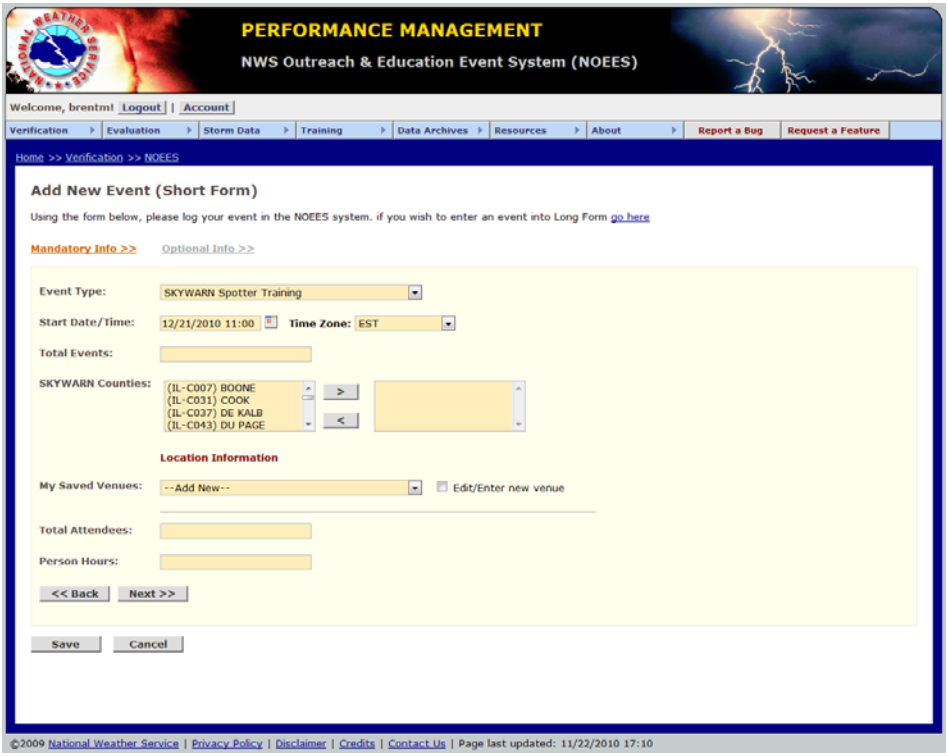

Figure 1. Screen capture of the new NOEES interface (Short Form).

Continued on next page...

Want to Become a NOEES Expert? – Continued from Page 4

Date	Time	Link to Register
Tuesday, August 16th	2pm EDT / 1pm CDT / Noon MDT / 11am PDT	http://goo.gl/wGYfa
Thursday, August 25th	2pm EDT / 1pm CDT / Noon MDT / 11am PDT	http://goo.gl/iLhAF
Tuesday, September 13th	2pm EDT / 1pm CDT / Noon MDT / 11am PDT	http://goo.gl/4v26B

Figure 2. NOEES Webinar training schedule for August and September 2011.

Space is limited, so if you plan on attending please register ASAP. For those of you who are unable to attend a live Webinar, we will make training available in the NOAA/NWS Learning Management System (LMS) by the end of September 2011.

By Beth McNulty, NWS Headquarters

Aviation weather forecasts are multi-tiered, and involve multiple parts of the NWS. My assignment with the Performance Branch focuses on aviation forecast performance, and how forecasters meet the needs of the flying community.

So, what are performance measures? Why measure aviation forecast performance anyway?

A performance measure describes an entity's work and the results of that work; usually as a numeric value. In aviation forecast performance, the numeric score is a quantified standard for aviation forecast quality and reliability.

If an entity consistently fails to meet a realistic standard (i.e., target), then steps must be considered to develop improved results. Such steps may include a review of the target to assure it is set at a realistic, attainable, yet still challenging, level; or whether additional training or management focus will lift performance to the standard expected.

Why measure aviation forecast performance? The FAA makes schedule and traffic flow decisions affecting airline capacity based on NWS forecasts. Do you want to get where you're going on time…or later? 'Nuff said.

On the Road Again...

Did you know that I'm on NWSChat during normal business hours? Those who have figured this out and added me to their buddy list are able to get their questions answered almost instantaneously!

By Brent MacAloney, NWS Headquarters

For the first time in my career at the National Weather Service, I've gone several months without travel. In fact, since we last caught up in the Spring 2011 Newsletter, I've been on absolutely no work related trips for the NWS.

Initially, the thought of no travel seemed odd, but the more I thought about it, I needed this break. You see, in any given week I receive around 1000 emails. Not all of them are actionable, but they are things I need to take notice of. When I am out of the office, my email inbox turns into a big, bloated mess that probably irks the email system management folks a million times over (although they have never officially said anything to me). Couple this email nightmare with the fact that the Nation was absolutely blasted with tornadoes this spring, and I think this break from travel occurred at the right time.

So, with that said, instead of discussing all the miles I've accumulated in the last three months, I'm going to discuss something a little different, in my column. That is, creative ways in which we can continue to *get the word out* regarding the availability of performance management tools with the current reduction in travel funds.

Webinars

Since I have not been able to make it out to various workshops and offices to give presentations on performance management, I have taken to the virtual route and begun conducting Webinars several times a month. Most recently, I teamed up with Ernie Wells from the Hydrologic Services Division to conduct a pair of Webinars on River Flood Warning (FLW) verification. Both of these sessions were well attended by those in the hydrology community. Feedback from attendees indicated the information presented was very useful.

So, the success of this FLW verification got me thinking. What Webinars could I conduct next? Well, I am thinking the next logical one would be to hold a Webinar on the new NWS Outreach and Education Event System (NOEES). This application has been completed and the policy was signed for an official release.

Continued on next page... Page 6

On the Road Again - Continued from Page 6

The NOEES application was developed so that anyone in the agency could start entering events without much training, but I could definitely see the benefit of holding a few Webinars, giving some demonstrations, and letting the field ask questions. So that will probably be the next set of Webinars I conduct. After that, who knows?

Do you have any ideas on what Webinars you would like me or others in the Performance Branch to conduct? If so, please let us know at NWS.Verification@noaa.gov and we will work with you to conduct virtual training.

Training Modules in LMS

The Performance Branch is fortunate to have a great working relationship with the NWS's Training Division in that we are allowed to create training modules and add them to the NWS's Learning Management System (LMS).

To date, I have personally created 3 training modules, and several of my coworkers have also created a few, for a grand total of six training modules dealing with performance management. Below **(Figure 1)** you will find the areas in which there are training modules on performance management tools and processes.

Next, I will begin creating training modules on Flash Flood Warning verification (yeah I know, long time overdue) and the NOEES system. Outside of those two, I am not sure what programs we should create a training module for. So again, I ask you. Do you have any ideas on what training modules you would like to be created by the Performance Branch? If so, please let us know at NWS.Verification@noaa.gov and we will work with you toward the generation of additional training modules to be placed in the LMS.

Title	Program Area	Duration (min)	Instructor
Introduction to TAF Verification	Aviation	48	Jerry Griffin
Interpreting TAF Verification Statistics	Aviation	43	Chuck Kluepfel
River Flood Warning Verification	Hydrology	20	Brent MacAloney
Winter Storm Warning Verification	Public	25	Brent MacAloney
National Service Assessment Team Training	Service Assessment	21	Doug Young
Storm-based Severe Warning Verification	Severe Weather	18	Brent MacAloney

Figure 1. Training modules on performance management tools and processes available through the NWS's Learning Management System (LMS)

Link to modules: https://verification.nws.noaa.gov/content/pm/training/modules.aspx

Continued on next page... Page 7

On the Road Again – Continued from Page 7

NWSChat

Finally, I mentioned how gnarly my email inbox has been. As I slowly whittle away at it, you may be waiting for an answer to an important question. First, I'm sorry for the delay. Email is evil and I'm swamped! Second, did you know that I'm on NWSChat during normal business hours? Those who have figured this out and added me to their buddy list are able to get their questions answered almost instantaneously (assuming I'm not away from my desk at a meeting).

Please feel free to add me as a buddy on NWSChat, and if I haven't personally met you yet, that is okay. My username is: nws-brent.macaloney

Well that is all I have for now. Hopefully, by the next time I'm able to catch up with you, I will be back on the road, participating in meetings and conducting training at forecast and regional offices. If not, then you are most certain to see a whole slew of new Webinars advertised on the Performance Management website in which you can participate.

Oh, in case you were wondering, I was able to sneak out for some well-needed, personal travel in the San Francisco Bay area to see the Boston Red Sox play. I've shared a couple of photos **(Figure 1 and Figure 2)** I took during my travels. That whole area is an amazing place to visit and if you have not been before, I *highly* recommend it. There is so much to do and it's a great way to get your mind out of the work mode.

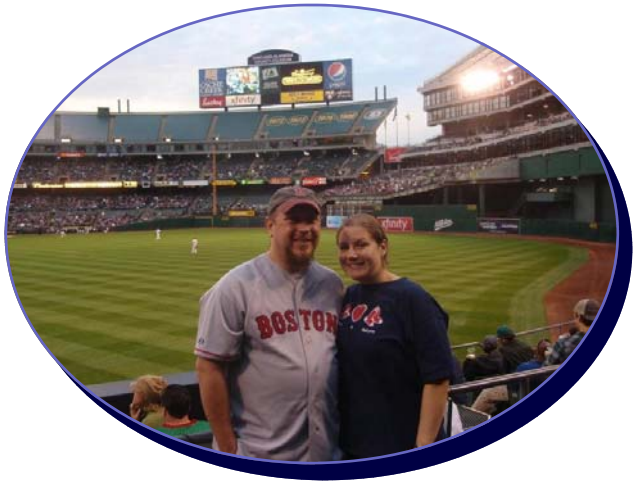

Figure 1. Brent and his wife Manina at the Red Sox / Oakland Athletics game. Photo taken by: Usher at the Oakland Colosseum.

Figure 2. A view of waves crashing along the shore at the Golden Gate Bridge. Photo taken by: Manina MacAloney

Until next time, I hope all your travels are safe.

Cheers!
Brent

Just can't wait to get back on the road again!

Kudos to NWS Marine Forecasters

By Chuck Kluepfel, NWS Headquarters

Marine forecasts of sustained wind speed and wind gusts were studied, and the verification results were briefed to the *Pacific and Western Arctic Marine Weather Workshop* (April 27, 2011) and the *National Performance Management Committee* (NPMC, May 24, 2011). Key briefing slides with notes to each slide can be accessed at the following link:

http://bit.ly/phMs5t

The briefing slides concentrated on Western and Alaska Regions during the most recent cool season (October 2010 to March 2011), but similar performance trends have been noted during all seasons of the past two years throughout the National Weather Service (NWS). This article looks at the entire NWS during the past two cool seasons. National Digital Forecast Database (NDFD) wind speed and wind gust forecasts were compared to several model guidance products. While all forecast and guidance data come from the respective native grid of each product, all data used for verification were interpolated to points with wind-measuring equipment, i.e., buoys and other wind measuring sites located within the NWS coastal marine and Great Lakes forecast waters. This practice ensured all verification was performed with *observed* wind speeds and wind gusts. No model simulations of the observed wind field were used.

Figure 1 provides contingency table data of gridded wind gust forecasts from the NDFD (columns) vs. verifying observations (rows) in the top table, and the gridded Global Forecast System Model Output Statistics (GFS MOS) (columns) vs. verifying observations (rows) in the bottom table. Values in the table are given as percentages of the total number of data entries for each forecast dataset. These data reflect a common pattern for wind speed data that guidance products consistently outperform the NDFD during low observed wind speeds; however, the NDFD takes the lead during the high-end gust events. Note from the observed frequencies that gale- and storm-force winds are relatively rare occurrences (just under 2% of all cases for gale-force winds and less than 0.2% of all cases for storm-force winds), and NWS forecasters do not follow the tendency of guidance products to under-predict these dangerous events. NWS forecasters respectively predicted gale - and storm-force winds 3.6% and 0.5% of the time, whereas GFS MOS respectively predicted these gust categories 1.3% and 0.03% of the time. The Gerrity skill score is a good measure of forecast skill for wind speed, and was used in this study. It emphasizes forecast performance during rare, potentially high impact events, thereby rewarding the forecaster for taking the risk of forecasting rare events, when appropriate. For a plot of the Gerrity score

Continued on next page... Page 9

Kudos to NWS Marine Forecasters – Continued from Page 9

vs. forecast projection time for the entire NWS during the past two cool seasons, see **Figure 2** on page 11. Performance among the NDFD and three frequently used guidance products are all compared. Through the 60-hour projection, the NDFD consistently had the best results of the four. During the 3 to 5 day period, the scores converge.

GFS MOS *point* forecasts were also studied for the 2010-11 cool season, and the results can be found in the referenced NPMC briefing. These products have been available for well over a decade, but each forecast is only intended for an individual buoy or wind-measuring platform, not the entire marine forecast zone in which it resides. In terms of raw forecast skill, the point MOS are more skillful at predicting high wind speeds than the gridded MOS. This is probably due to the difficulty involved in generating gridded forecast guidance over data sparse areas, such as marine forecast zones, which typically have very few or no wind-measuring points. These individual point MOS guidance products can alert forecasters to the potential for high winds near *individual* buoys, but point forecasts are not representative of the large coastal water forecast zones, for which NWS forecasters are responsible. Consequently, skillful gridded model guidance products are invaluable to forecasters.

NDFD						
Obs / Fcst	<20	20-24	25-33	34-47	> 47	Total
< 20	69.1%	10.04%	4.63%	0.68%	0.03%	84.52%
20-24	2.27%	2.46%	2.68%	0.56%	0.03%	8.00%
25-33	0.60%	1.00%	2.45%	1.35%	0.12%	5.52%
34-47	0.05%	0.12%	0.43%	0.92%	0.24%	1.76%
>47	0%	0.004%	0.03%	0.06%	0.09%	0.18%
Total	72.06%	13.62%	10.22%	3.57%	0.51%	100%
						(102,332)
GFS MOS						
Obs / Fcst	<20	20-24	25-33	34-47	> 47	
< 20	74.3%	7.77%	2.19%	0.11%	0.002%	84.39%
20-24	3.56%	2.89%	1.66%	0.13%	0.0003%	8.24%
25-33	1.18%	1.63%	2.35%	0.43%	0.00%	5.59%
34-47	0.16%	0.21%	0.70%	0.54%	0.01%	1.62%
>47	0.01%	0.01%	0.03%	0.08%	0.01%	0.14%
Total	79.23%	12.51%	6.93%	1.29%	0.03%	100%
						(286,947)
		NDFD / GFS MOS				
Gerrity skill score		0.605 / 0.382				

Figure 1. Contingency tables of gridded wind gust (in knots) forecasts (columns) vs. observations (rows) for cool seasons 2009-10 and 2010-11, including all NWS coastal and Great Lake marine forecast waters. In the upper table, the forecasts come from the NDFD. In the lower table, the forecast guidance comes from the gridded GFS MOS. The two samples are not well matched, but the difference in performance is noteworthy.

Continued on next page...

Kudos to NWS Marine Forecasters – Continued from Page 10

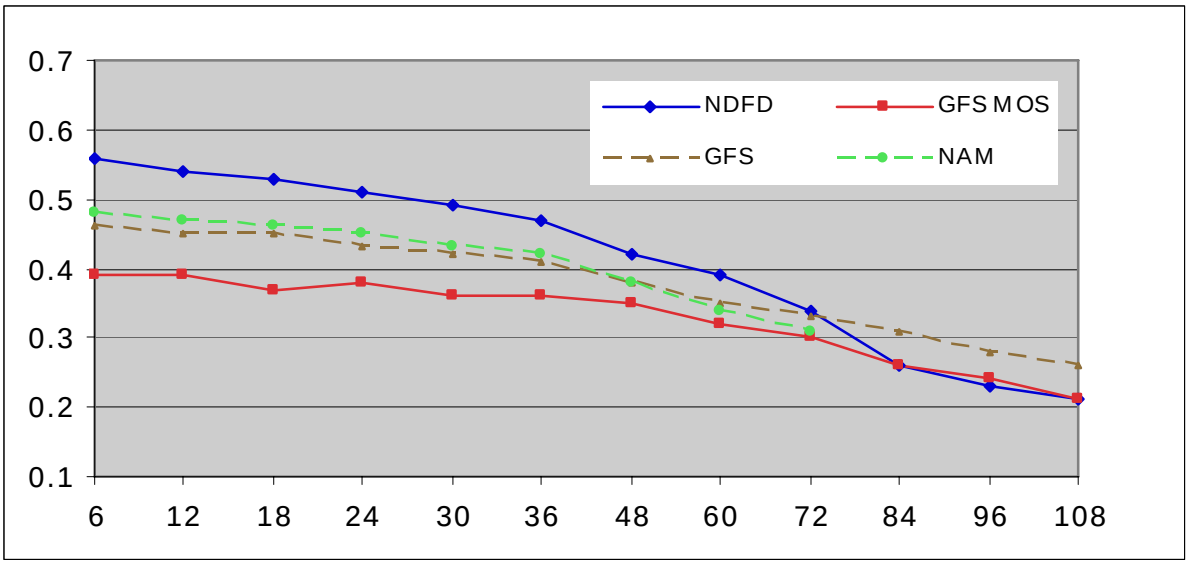

Figure 2. Plot of the Gerrity skill score vs. forecast projection time for sustained wind speeds across NWS coastal and Great Lake forecast waters for the following cool seasons: 2009–10 and 2010–11. Forecast data taken from gridded forecasts (NDFD) and various gridded models, but verification done only at observation platforms. ▮

Farewell to Hilda Yang

Ed French, NWS Headquarters

The Performance Branch bids farewell to our team member Hilda Yang, who has chosen to accept a federal position with the Internal Revenue Service. A native of Nanjing, China, and member of our contractor staff since May 2005, Hilda has played a key role in our web development efforts.

Over the years she has taken lead roles in the development and maintenance of Service Assessments, interactive buoy maps, Integrated Database for Education and Awareness (IDEA), and the *Peak Performance* newsletter sections of our Performance Management website.

Hilda has also worked to ensure usability and Section 508 accessibility compliance of our Performance Management system. ▮

We thank Hilda for all her support and dedication, and wish her well in her new endeavors!

Service Assessment Program

By Sal Romano, NWS Headquarters

Historic Tornado Outbreaks of April 2011 Service Assessment

A new service assessment was started on Thursday, May 5, 2011 for the massive outbreak of 362 reported tornadoes, from April 25 – 28. This included a record-setting 312 in one 24-hour period. The largest previous number of reported tornadoes (i.e., 148 tornadoes) on record in one event occurred from April 3 – 4, 1974.

This new service assessment team focused on the locations most severely affected by the weather-related hazards. This encompassed Alabama, Arkansas, Georgia, Kentucky, Illinois, Mississippi, Missouri, and Tennessee See map on next page **(Figure 1)**.

This 16-member team investigated:

1. Timeliness, quality, accuracy, and usefulness of NWS hazardous weather products and services

2. Effectiveness of NWS internal and external coordination/ collaboration for the tornadic events including any specialized decision support services/ activities

3. Effectiveness of NWS end-to-end information dissemination

4. Value of social media

5. Efficiency of product delivery

6. Effectiveness of NWS office procedures

7. Effectiveness of NWS severe weather awareness activities

8. Public Response – in order to gain a better understanding of factors contributing to high fatality rate. This includes social science issues and StormReady Communities.

The team has written the first draft of the service assessment document. The co-team leaders, Gary Woodall, NWS; and Jim Mullikin, FEMA; will brief the NWS Corporate Board on September 20, 2011.

Continued on next page...

Historic Tornado Outbreaks of April 2011 Service Assessment- Continued from Page 12

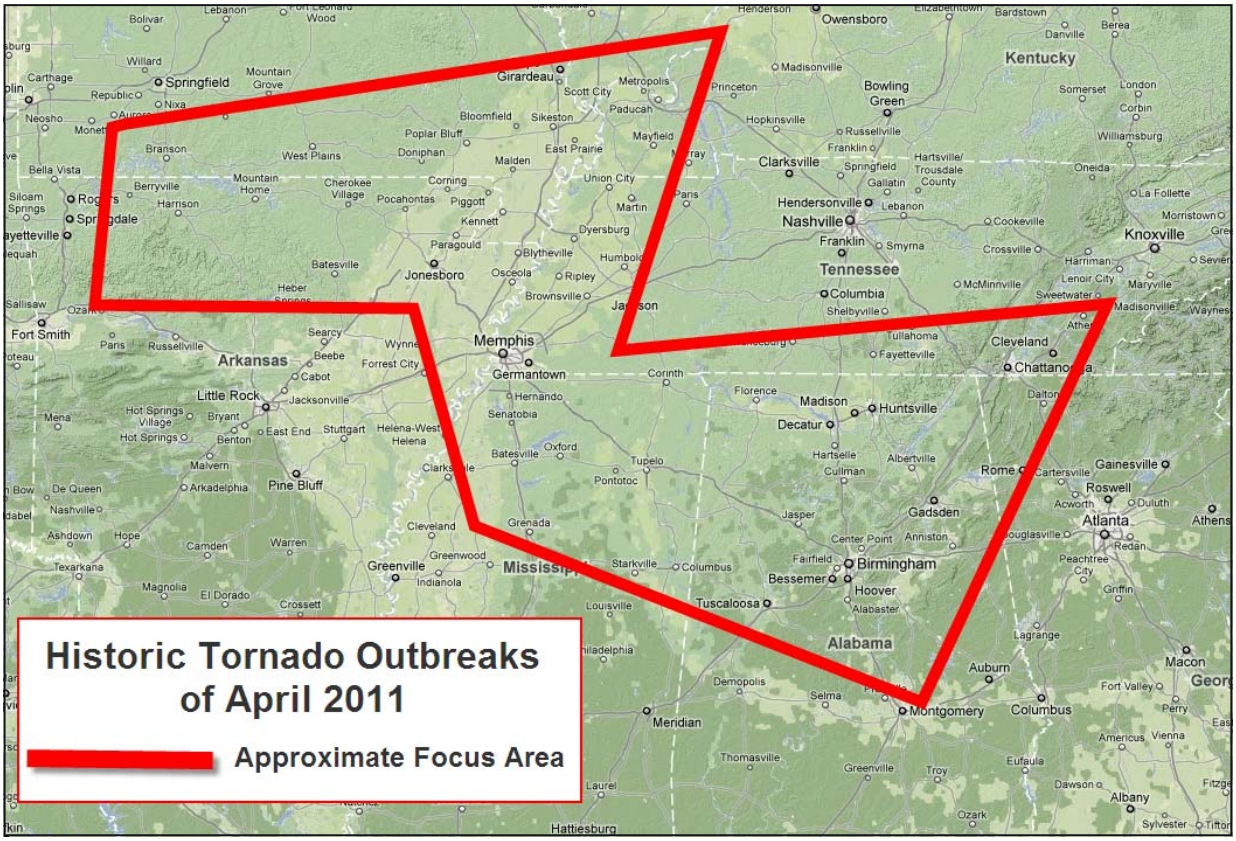

Figure 1. States most severely affected by the weather-related hazards: Alabama, Arkansas, Georgia, Kentucky, Illinois, Mississippi, Missouri, and Tennessee.

Don't lower your expectations to meet your performance. Raise your level of performance to meet your expectations. Expect the best of yourself, and then do what is necessary to make it a reality.

Ralph Marston

Interested in Workload at Your Location?

By Brent MacAloney and Doug Young,
NWS Headquarters

Recently, the Performance Branch has been asked several questions about ways in which we can measure the amount of workload at the forecast offices during high impact weather events. These questions were specifically geared towards how many warnings and follow-up statements are being issued by the office as opposed to a normal day. There was no way of getting this information in a format that was easy to analyze. Your only option was to use the "Group by Date" feature in the interactive Products Database and then do a comparison in an Excel Spreadsheet.

With that said, the Performance Branch is pleased to announce the release of a new data tool named the **Hazard Product Visualizer**, which should help assist with these workload questions. This tool will allow users to generate custom graphs showing of the number of products issued over the last 4 **(Figure 1)**, 8, 12, 26 **(Figure 2)**, and 52 weeks on a national, regional or local forecast office level. Specifically, the result of the Hazard Product Visualizer query is plots displaying the number of

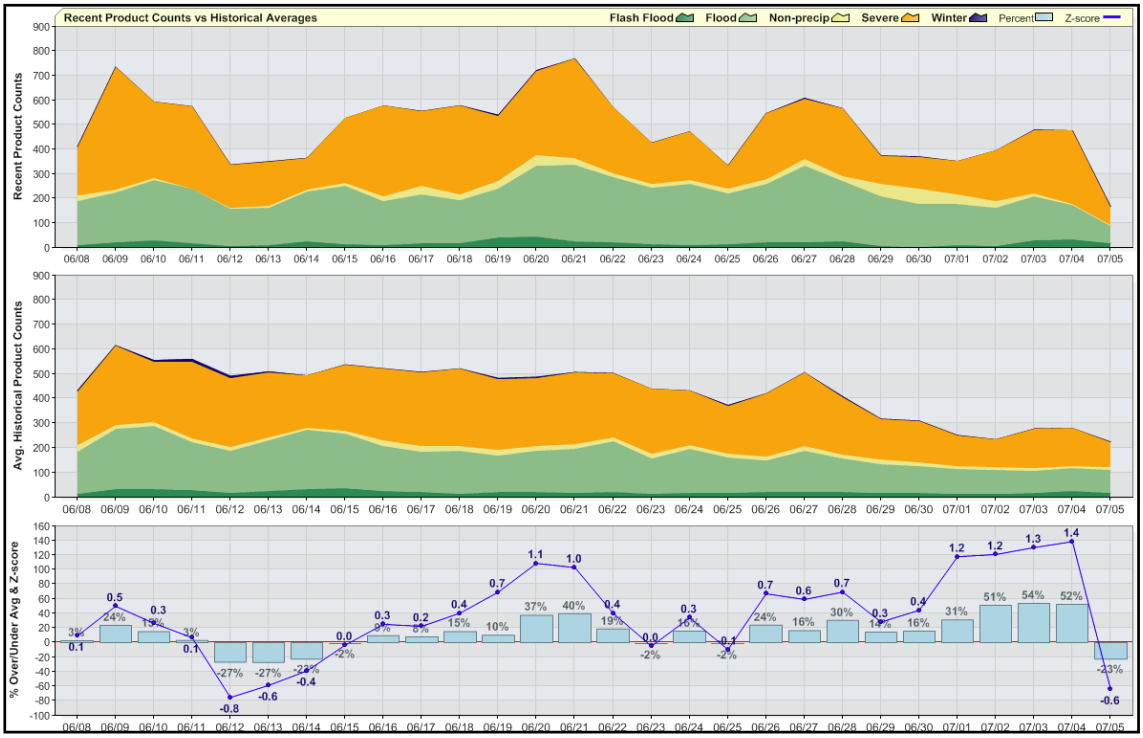

Figure 1. Hazard Product Visualizer chart showing number of products issued over the last 4 weeks.

Continued on next page...

Interested in Workload at Your Location- Continued from Page 14

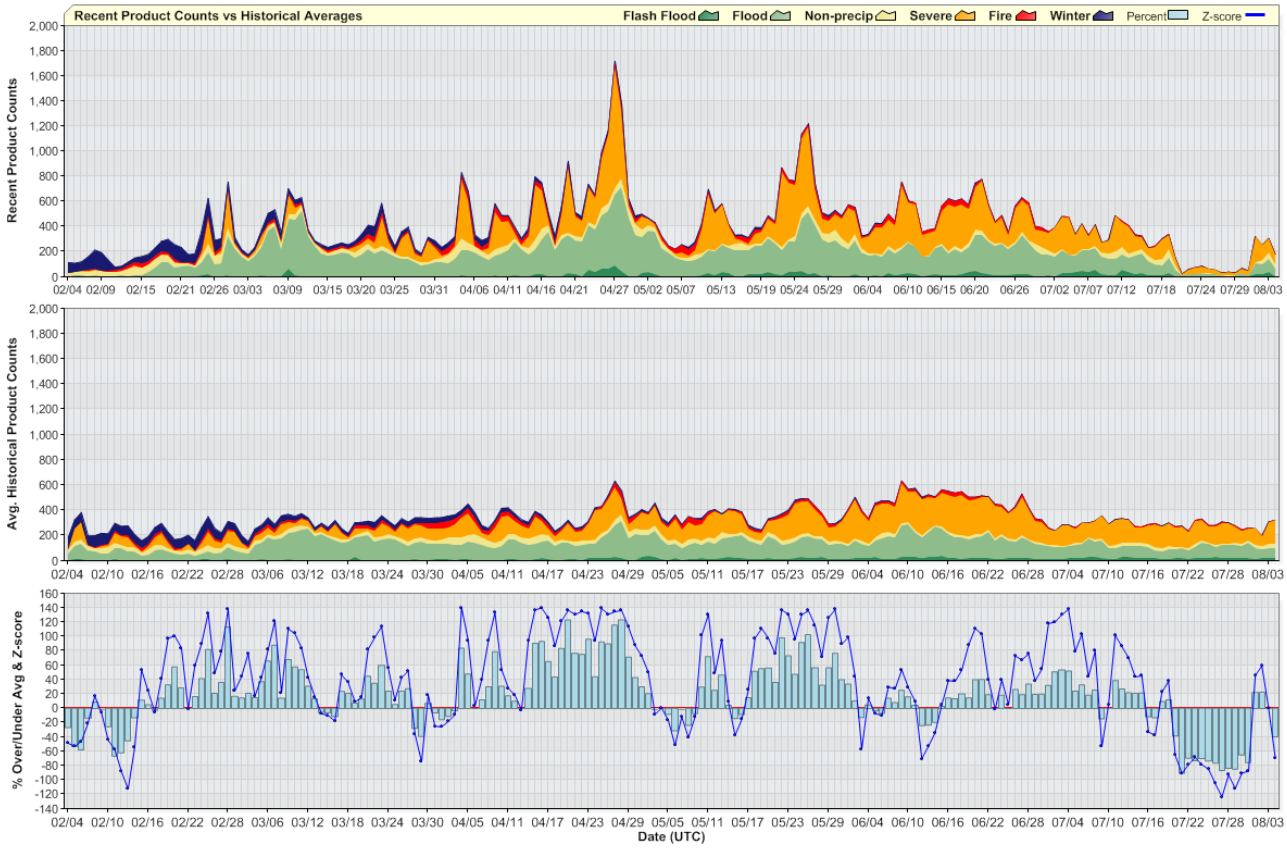

Figure 2. Hazard Product Visualizer showing products issued over the last 26 weeks.

recent products during the time period, an average historical product count (back to 2007), and a *daily* bar-chart breakout of the number of products, showing if the number of products (by date) is over or under the average.

Another feature of the Hazard Product Visualizer is the ability to view cumulative daily counts of NWS hazardous products issued at the national, regional, and WFO levels. **Figure 3** on page 16 shows the product counts visualizer, which is composed of two graphs. The upper line graph depicts the current year cumulative number of hazardous products issued versus the mean and max number. The background image displays one and two standard deviations from the mean. The lower line graph plots the observed daily hazardous product counts against the mean and max number. Based on historical data, projections are generated through the end of the current calendar year for the mean and maximum number. This tool provides the ability to visually see the number of hazardous products issued at various levels/locations within the agency compared to the "normal" or "extreme" number of issuances, and allows one to get a sense for what might be expected based on past climatology and activity. It is just one indicator to represent and project potential workload in the agency.

Continued on next page... Page 15

Interested in Workload at Your Location? – Continued from Page 15

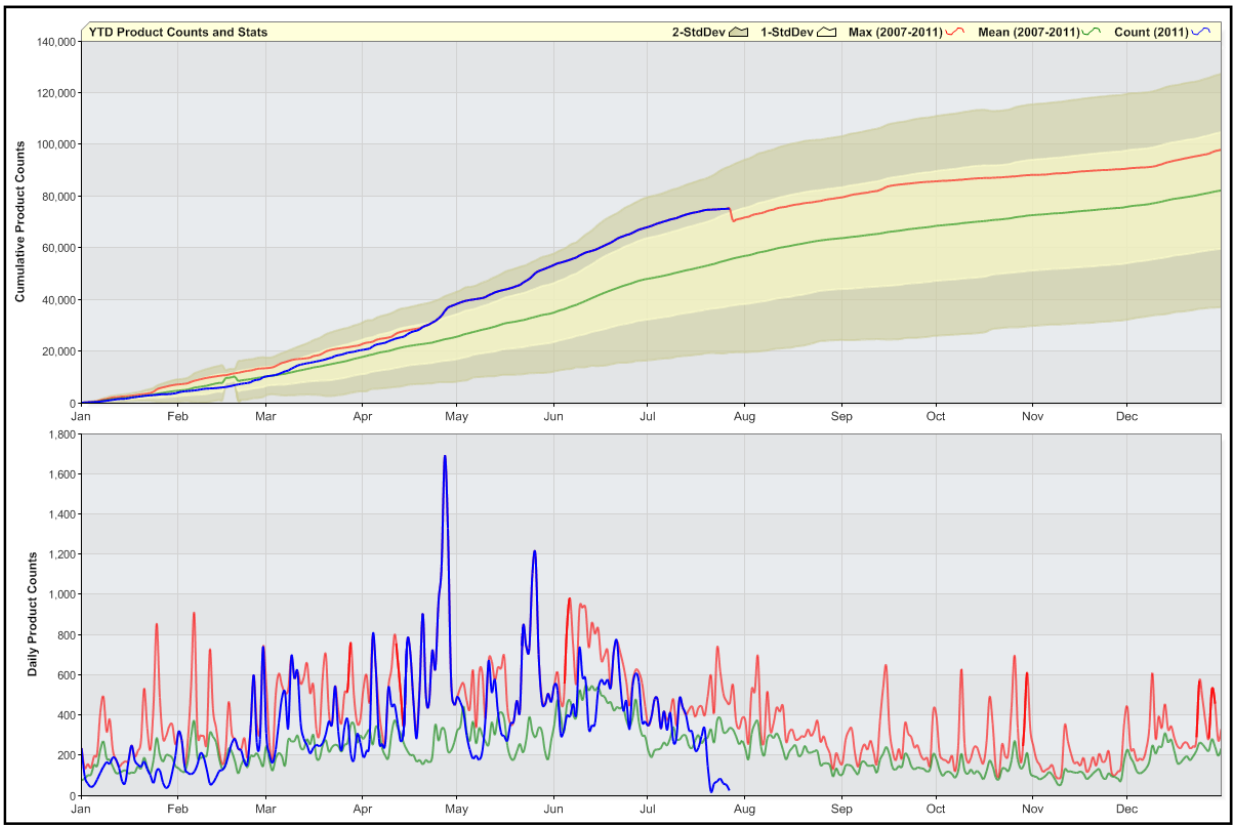

Figure 3. Hazard Product Visualizer: Product Counts. Lines depict the number of hazardous products issued during the current year (blue), mean number (green), and maximum number (red). Information is based on data since 2007. The top graph represents cumulative annual data, while the bottom shows daily data.

The Hazard Product Visualizer is located on the Performance Management website under "Data Tools" or directly at the following link:

http://verification.nws.noaa.gov/stormdat/sam_v2/warncount.aspx

Any feedback that you may have on this new tool should be directed to the developer (Momchil.Georgiev@noaa.gov) and Performance Branch Chief (Douglas.Young@noaa.gov) as they provided the main thought behind this project.

Contributors to this Summer 2011 Issue include . . .

Ed French
Performance Branch, NWS Headquarters
Verification
Edward.French@noaa.gov

Chuck Kluepfel
Performance Branch, NWS Headquarters
Verification
Charles.Kluepfel@noaa.gov

Brent MacAloney
Performance Branch, NWS Headquarters
Verification
Brent.Macaloney@noaa.gov

Beth McNulty
Performance Branch, NWS Headquarters
Aviation Performance and Verification
Beth.Mcnulty@noaa.gov

Sal Romano
Performance Branch, NWS Headquarters
Service Assessment and Evaluation
Salvatore.Romano@noaa.gov

Freda Walters, Co-Editor and Designer
Performance Branch, NWS Headquarters
Service Assessment and Evaluation
Alfreda.Walters@noaa.gov

Doug Young, Editor
Performance Branch Chief
NWS Headquarters
Douglas.Young@noaa.gov

Web Links

Stats on Demand

https://verification.nws.noaa.gov

NDFD Verification:

https://bestpractices.nws.noaa.gov/contents/ndfd-stats/verification/

(National Verification)

https://bestpractices.nws.noaa.gov/contents/ndfd-stats/wfosummary/

(WFO Verification)

Real-Time Forecast System:

http://rtvs.noaa.gov/

Please consider contributing to our next edition:

Articles Due : Monday, September 26, 2011