



The NHWC Transmission

April 2019

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Nashville's 2018 Functional Exercise

Bradley Heilwagen, Wood Environment & Infrastructure Solutions, Inc.
Clay Pacheco, Emergency Preparedness Group, LLC

When comparing the Nashville of May 1, 2010 with the Nashville of May 1, 2018, you can see the City has changed. Downtown, new high-rise buildings are popping up with kitschy names or corporate logos. Where once was a parking lot, now stands a sprawling 1.2M square foot convention center. Walk down lower Broadway on any weekend night and you'll see thousands of tourists piling in and out of the countless honky-tonks and rooftop bars. In an isolated, once industrial section of town called The Gulch, locals scramble for reservations at the newest hot restaurants in an exploding food scene. Heck, we even had a prime-time TV show about our City.

Seven years removed from a flood that killed 11 people (within city limits) and resulted in over 2 billion dollars in damage, the way the City responds to flood threats has changed too. In the years after the flood, the U.S. Army Corps of Engineers (USACE) led Nashville Flood Preparedness Program, along with the Metropolitan Government of Nashville and Davidson County's own Nashville SAFE Program (Situational Awareness for Flooding Events) emphasized improved coordination between responding agencies during flood events, development of more and better data for use by those agencies, and more personnel trained to understand that data to help our emergency managers make decisions during a flood emergency.

Lessons learned from post-flood After Action Reports (AARs) resulted in changes to how agencies such as the National Weather Service (NWS), Metro Water Services (MWS), Metro Planning, and Nashville's Office of Emergency Management (OEM) operate. This has included new Standard Operating Procedures (SOPs) and the inclusion of a new group of MWS employees called "Watershed Advisors". Improvements have been made at Nashville's Emergency Operations Center (EOC) as well, including a transition from the WebEOC incident management software system to Law Enforcement Online and the creation of a supplemental work area for Watershed Advisors above the EOC.

While it is obvious that a lot has changed over seven years and Nashville is certainly thriving, the question arose, "Is Nashville's flood preparedness thriving as well?"

The chance to answer that question came in 2018. Having just completed development of real-time flood forecasting models using HEC-RTS (RTS is short for real-time simulation) for four watersheds within Nashville for use by NWS and MWS staff during real events, the USACE needed a way to test the models and their integration into Nashville SAFE

and OEM emergency procedures. At the same time, OEM staff recognized that, given the time elapsed, employee turnover across Metro Government, and the changes made since the May 2010 flood, a Homeland Security Exercise and Evaluation Program compliant functional exercise would be appropriate.

Having played a central role in Nashville SAFE and Nashville Flood Preparedness Programs since 2011, Wood Environment & Infrastructure Solutions (formerly AMEC) was chosen to oversee the effort. To assist with exercise design and execution, Wood engaged specialty consultant, Emergency Preparedness Group, LLC. A planning committee was formed that included representatives from USACE, NWS, MWS, OEM, Metro Planning, Metro Emergency Communications (ECC), and the Nashville Mayor's Office.

Through numerous meetings and calls it was decided that the functional exercise would be held on August 23. The exercise objectives were set to align with Federal Emergency Management Agency core capabilities of intelligence and information sharing, operational coordination, situational assessment, public information and warning, and planning. Those objectives, custom to Metro Nashville's needs and pre-identified gaps, were determined to be the following:

1. Train, test, and implement USACE flood forecasting models and Nashville SAFE procedures;
2. Assess key agencies' ability to appropriately execute their roles and responsibilities during a flood event;
3. Assess information sharing processes among primary response agencies in the EOC;
4. Process information in real time during a flood event and initiate public formation protocols; and
5. Identify improvements that could enhance the Comprehensive Emergency Management Plan or other plans.

The hypothetical weather scenario was comprised of two modules, or evolutions of the ongoing weather system, and precluded by a weather briefing and forecast delivered via webinar the day before the exercise. The planning team brought in numerous staffers to serve as players, controllers, simulators, evaluators,

observers, and support staff, and an Exercise Plan laid-out the flow of events throughout the exercise day. The planning process included development of a Master Scenario Events List which described each scenario change and dictated the numerous injects, or emergency calls to the over 100 planned exercise participants, which included every department with the Metro Nashville Government, local utility companies, and non-government organizations (NGOs). These injects would test participants' knowledge of plans and procedures through their responses to the emergency scenarios.

Role	Participants
Exercise Staff	22
Observers	5
Players	72
Volunteers	5
Total	104

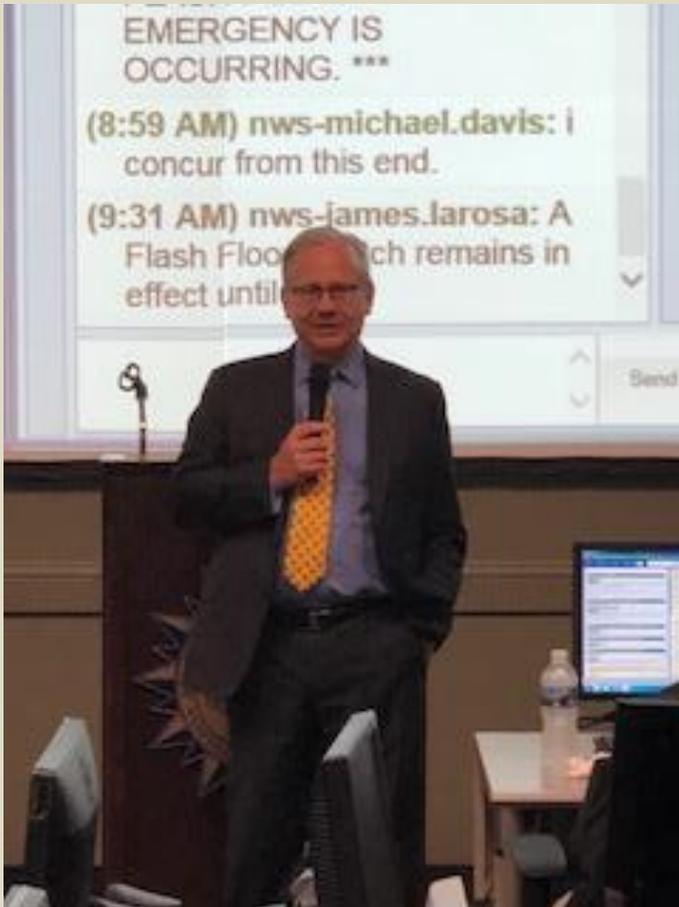
Exercise Participant Roles

The day before the exercise, a "forecast" was issued that involved an approaching cold front, predicted to bring heavy rainfall in a short period of time, as well as potential for strong storms with damaging winds and possible isolated tornado threats. As is common in Nashville on the day before a storm, the NWS facilitated a weather briefing webinar to communicate the forecast. The webinar was attended by many of the planned exercise participants, anxious to gain any insight into the upcoming "event."

On August 23 at 9:00 am, Module 1 began with an updated "forecast", reiterating the potential for major flooding and severe weather. From 9:00 am to 10:30 am, participants performed the usual duties that they would be performing in the event of an actual flood threat. Throughout this time, participants were tested through numerous injects. Some highlights of Module 1 injects included:

- The "Mayor's Office" calling representatives from Metro Public Schools and MWS for a briefing on preparations for anticipated heavy rain.
- A "local news channel" calling the Public Information Officer (PIO), asking for a quote regarding evacuations and shelters.
- Another "local news channel" calling MWS asking if citizens will receive sandbags.

- A “local citizen” calling a local NGO to volunteer use of his john boat.



Mayor David Briley kicks-off the exercise with a welcome message

At 10:45 am, Module 2 began by jumping the hypothetical scenario up by two hours. An updated weather briefing was provided, indicating that the rainfall totals seen on the ground had doubled from what was previously forecasted. With updated information in hand, participants were able to spring into action, generating lists of potential response locations and dispatching responders to those areas. From 10:45 am to 12:00 pm, injects continued to push participants to their limits with reports of flooding impacts across the City. Some highlights on Module 2 injects included:

- NWS reporting to MWS and Metro Planning on the most recent HEC-RTS model runs, including current and predicted inundation mapping.
- A “local hospital” requesting information on where to send discharged patients whose homes were under evacuation orders.
- Numerous “911 calls”, relayed to OEM

logistics, fire department, and police responders, reporting vehicles stuck in water at several locations requiring rescue.

At 12:00 pm, which was simulation time 2:00 pm, the scenario went from bad to worse with the issuance of a tornado warning by the NWS. The tornado threat on top of severe flooding tested each participant’s ability to balance multiple threats and concerns within the same emergency. Through NWS Chat, the NWS communicated a possible tornado on the ground only five miles outside of downtown Nashville. “Spotter reports” through social media, relayed to OEM through NWS Chat, reported a large tornado on the ground and damage to homes, as well as a local high school. From there, the NWS issued a tornado emergency. From 12:33 to 12:57 pm, injects continued, centered around tornado response and recovery, including family reunification at the high school.



NWS Meteorologist Intern C.J. Padgett provides the initial weather briefing on exercise day.

The exercise ended at 1:00 pm, and after taking a deep breath, the participants were able to provide feedback on the strengths and weaknesses of the exercise itself and their response to the scenario. An after-action conference was held one month later to go over the exercise and report on the key strengths, areas for improvement, corrective actions, and next steps identified by the team of evaluators. The following strengths were identified:

- Flood forecasting models and Nashville SAFE data and procedures were successfully utilized in the EOC in conjunction with the exercise scenario.
- Participants actively engaged in incident

response and coordinated with EOC representatives. Those not previously familiar with Nashville SAFE and the information it can provide were engaged and became familiar with such during the exercise.

- Key agencies coordinated response efforts well and conducted many productive face-to-face meetings.
- Many new agency representatives participated in the exercise and had the opportunity to actively utilize their SOPs and interact with responding agencies as they would in a real-life scenario specific to their position and expertise.
- PIOs coordinated incoming intelligence well and developed a unified public message.
- ECC has pre-established interoperability channels for all responders dedicated for large scale Incident Command events and/or emergencies.
- NGOs did a great job of proactively discussing information and developing solutions to problems and arose.

- PIOs responded quickly and knowledgeably to requests for information and scheduled press releases in a timely manner, and additionally noted several internal improvements to supplement current processes in plan.
- Exercise injects were followed-up upon in a timely manner and the participants worked together to track down necessary information.

At the beginning of this article, the question was posed, “Is Nashville’s flood preparedness thriving?” Reflecting upon the 2018 functional exercise, it was observed that, despite having many new staff and SOPs implemented since the May 2010 flood, all participating agencies did work well together and performed well when their core capabilities were tested. The agencies were engaged and eager to participate cooperatively. While there were many recommendations listed in the AAR, those only aim to provide constructive suggestions for continuing in the path towards more successful and effective response and recovery. All in all, we feel that the answer to the question is a resounding “Yes”. 🙌

Call for NHWC Awards Nominations

NHWC highlights the exceptional work and innovation in the field of hydrologic warning that so effectively serve our communities. The seventh biennial awards will be presented at the 13th NHWC Conference & Exposition in Louisville, KY, being held from June 17-20, 2019. Recognize those deserving individuals and organizations by submitting your nomination for 2019 Awards by April 30, 2019.



Award categories include:

Outstanding Service Award – Awarded to an individual whose work has exceptionally benefited an individual organization and/or the hydrologic warning profession.

Operational Excellence Award – Awarded to an organization that has developed and/or maintained an exceptional hydrologic warning system.

Hydrologic Warning Innovation Award – Awarded to an individual or organization that has developed an innovative product or program improvement that has exceptionally benefited the hydrologic warning profession.

Click [here](#) to see nomination guidelines posted on the NHWC website.

The NHWC also recognizes newsletter contributions with the Outstanding NHWC Transmission Article Award– Awarded to an individual who prepared an outstanding article for publication in NHWC Transmission during 2018-19. Article nominees are presented to the Awards Committee by the newsletter editor for review and final selection.

So many individuals and organizations work tirelessly to advance the field of hydrologic warning. NHWC Award nominations are a great way to recognize and appreciate jobs well done. Submit your 2019 Award nominations by April 30, 2019.

NHWC 2019 Deadlines

Only two months remain until the 2019 NHWC Conference, and only one month until the hotel reservation deadline.

If you haven't already done so, you need to make your hotel reservations.

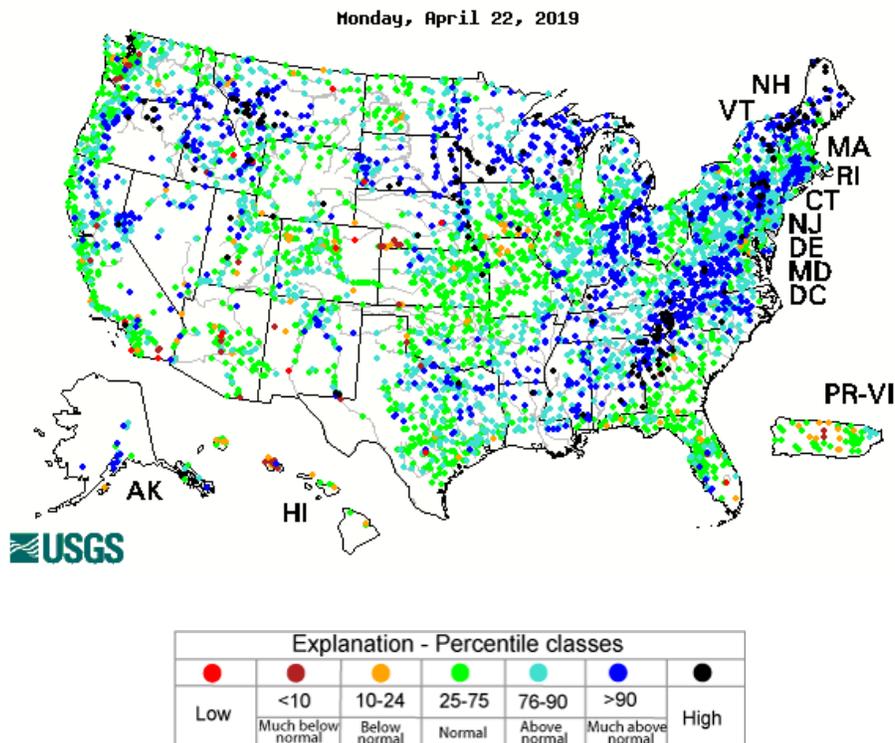
The negotiated general attendee room rate is \$169.00 per night. The room rate is available June 13-23, so you can make a weekend out of it. General reservations can be made at:

<https://book.passkey.com/go/NHWC19>

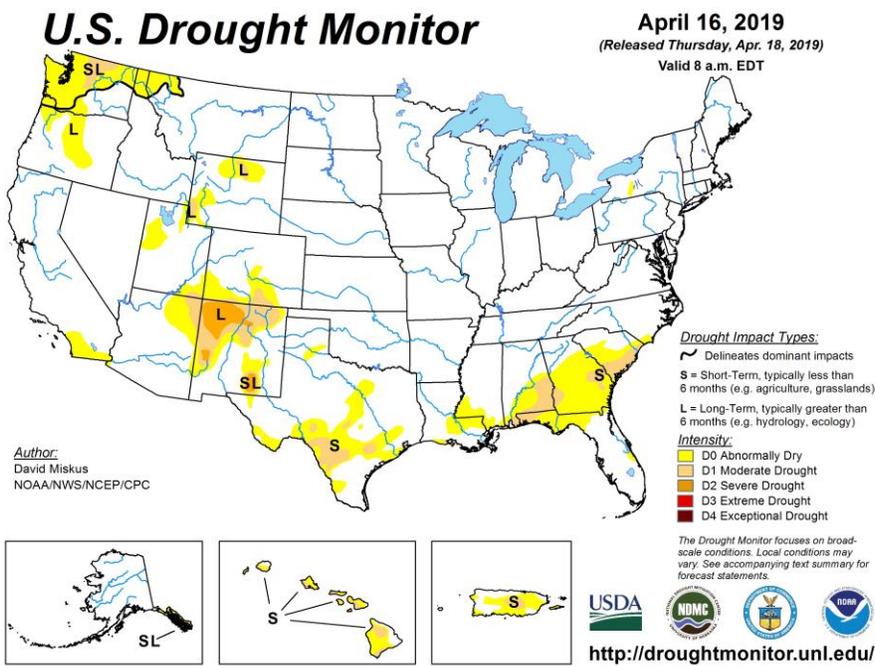
If you are having trouble booking nights for dates prior to June 17 or following June 20, or need assistance with our government room block, please email april@aprilkrieg.com for help.

Or, click the 2019 [Conference link](#) for more conference details.

Hydrologic Conditions in the United States Through April 16, 2019



Latest stream flow conditions in the United States. (courtesy USGS)



Latest drought conditions in the United States.
(courtesy National Drought Mitigation Center)

May Newsletter Articles Focus: Modeling & Analysis

The NHWC is requesting articles that focus on practices, technologies and tools used to model, predict and analyze hydro-meteorological events and to support decision making for emergency response and floodplain management.

Submit your article to:

editor@hydrologicwarning.org

May 10th is the deadline for inclusion in the May issue.

Future Newsletter Articles Focus

To give you more time to prepare articles, below is the article focus schedule for the next four months:

May - Modeling/Analysis
Jun - Data Collection
Jul - Hydrology
**Aug - Hazard
Communication &
Public Awareness**

NHWC Calendar

June 17-20, 2019 – [The NHWC 13th Biennial Training Conference and Exposition](#), Louisville, Kentucky

General Interest Calendar

May 1-3, 2019 – Arizona Floodplain Management Association Spring Conference, Prescott, Arizona

May 19-23, 2019 – [ASFPM 2019](#), Cleveland, Ohio

September 8-12, 2019 – [ASDSO Dam Safety 2019](#), Orlando, Florida

(See the [event calendar](#) on the NHWC website for more information.)

Parting Shot

San Pedro River, Arizona 3/4/2019

N 32.742076, W 110.648081



The Pinal County Flood Control District installed this new ALERT station on February 28th and March 4, 2019. Data from this and other stations in the Pinal County ALERT System can be accessed at:

<https://app3.pinalcountyyaz.gov/efmap/>

National Hydrologic Warning Council

*Providing Timely, Quality Hydrologic Information to Protect Lives,
Property, and the Environment*

<http://www.hydrologicwarning.org>