The NHWC Transmission

January 2018

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Model-based Hydrologic Network Design

Baxter Vieux and Jean Vieux, Vieux and Associates

The National Weather Service's (NWS) Advanced Hydrologic Prediction Service (AHPS) mitigates economic losses by providing flood and drought forecasts at over 7,800 points across the United States. The NWS-AHPS system provides flow forecasts and flood warnings for emergency response, flood control, reservoir operation and more. Forecasts may include how high a river will rise, when it will peak, where property will be flooded, and how long the flooding will continue. Information provided to water managers and emergency personnel supports decisions regarding evacuation of people and goods, or using reservoir storage capacity and operations to reduce flood impacts.

In 2016, the Texas Water Development Board (TWDB), in the aftermath of a tragic and deadly flash flood, acted to support and enhance NWS efforts with new rain gages and streamgages. They chose to use a distributed hydrologic model, V*flo*®, to identify streamgage locations that would improve flood forecasting. In the analysis, performed by Vieux & Associates, Inc., over 50 new streamgage locations were identified, ranked, and recommended.

Prioritization of streamgages considered the socio-economic impact suffered by communities and available locations (typically bridges and other areas with easy access to the river) in each watershed. Simulated flows at proposed monitoring sites were evaluated in the model at 1-km resolution for the watersheds affecting Texas communities. Runoff from rainfall input produced by an extreme storm event (Wimberley/Blanco May 23-24, 2015) was simulated for each vulnerable community. The relative magnitude of the peak flows, the volume of water produced by the event, and the lead time provided by each possible streamgage location were considered in determining the proposed location in each watershed.

Figure 1 on the following page shows evaluation of lead time for a location in Wimberley Texas, which could be achieved for a proposed gage located upstream. The two hydrographs were simulated for the upstream (240 sq. mi. drainage area) location and a downstream location (356 sq. mi. drainage area) using measured rainfall that produced record flooding on May 23, 2015. The watershed area draining to the proposed gage location is highlighted. Urban areas are shown as gray areas, and the drainage network at 1-km resolution (0.6 miles) is indicated by the black lines that connect upstream to downstream areas in the Blanco River and surrounding watersheds. The lead time is the period indicated by the space between the two vertical arrows.

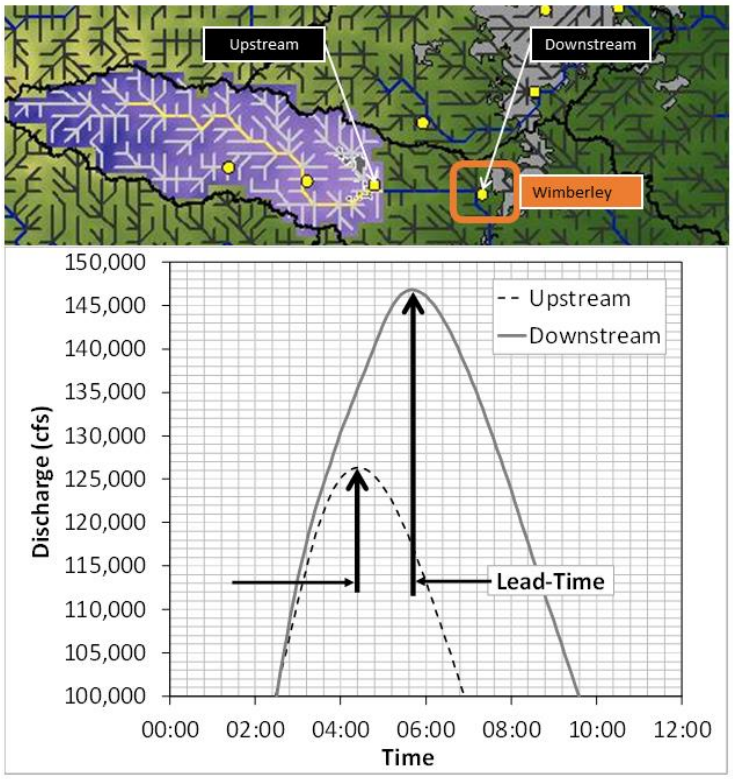


Figure 1. Analytical approach showing lead time gained by installing a new streamgage on the Blanco River upstream of Wimberley at a bridge crossing.

Model simulation helps determine potential effectiveness achieved by a proposed streamgage. In the example described above, if a streamgage were located further up in the watershed, then it may provide more lead time to the citizens of Wimberley, but if located too far upstream, it would not have helped determine the extreme magnitude of the flood. In many watersheds, the locations evaluated provide lead-time and were recommended, while other watersheds exhibited little or no lead time due to hydrologic/hydraulic characteristics relative to the vulnerable community forecast location.

Communities can spend resources more wisely by model-based analysis of proposed hydrologic monitoring locations. Based on this analysis, the recommended streamgage locations are currently being installed across Texas, and soon will be operated by the USGS for use by the NWS in their AHPS flood prediction operations.

For more detailed information, the full report may be found at:

https://www.twdb.texas.gov/publications/reports/contracted_reports/doc/1600012027_aquaStrategies.pdf

Registration is open for the
ALERT Users Group 27th Flood Warning Systems Training Conference and Exposition

ALERT Users Group 27th Flood Warning Systems Training Conference & Exposition

April 17-20, 2018
Ventura, California

Call for Abstracts

Instructions for Submitting Abstracts

1. Abstracts should not exceed one page.

2. Abstracts should clearly describe the topic and have a title that clearly relates to the subject matter to be presented.

3. A concise biography of all authors must be submitted. This should include the name, job title, employer, phone number, street and e-mail address of each author. The person or people who will present the paper at the conference must be clearly identified.

4. Abstracts and biographies must be submitted as a PDF file by January 19, 2018. Send to: AUG-Conf@alertsystems.org

5. Preparation for a complete paper is highly encouraged, but is not a requirement for submitting an Abstract and making a presentation at the conference.

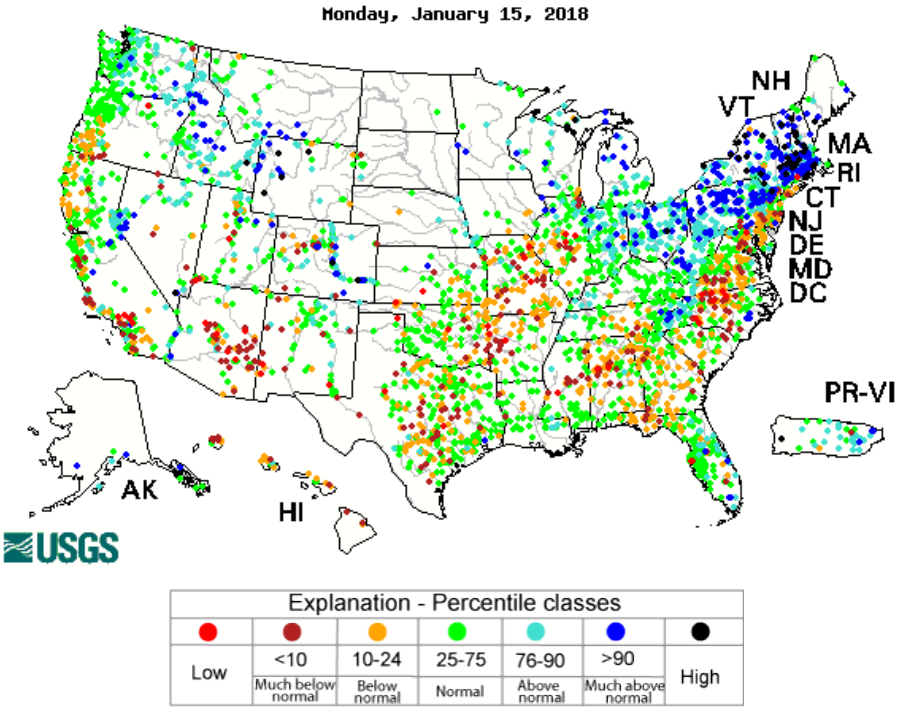
6. By submitting an Abstract or paper, authors agree to its distribution at the conference and to subsequent reproduction in the conference proceedings and on the website of the ALERT Users Group.

7. Authors will be notified in February 2018 of their inclusion in the conference program.

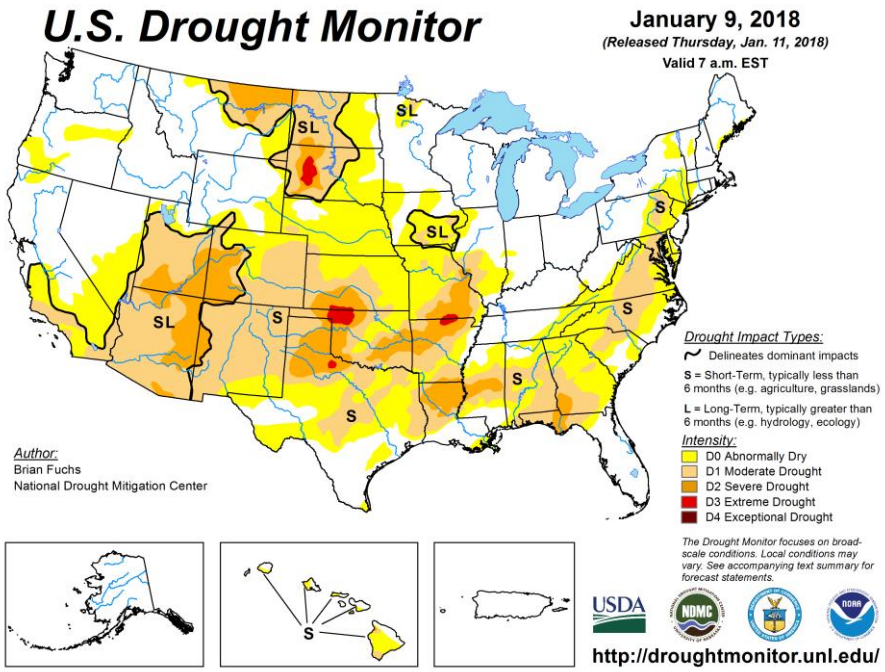
Additional Conference details are on the ALERT Users Group web site:

www.alertsystems.org

Hydrologic Conditions in the United States
Through January 9, 2018



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



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

February Newsletter Articles Focus:

Data Collection

The NHWC is requesting articles that focus on practices, technologies and tools used to gather and disseminate real-time hydro-meteorological data.

Please consider writing an article that highlights how your organization collects and disseminates real-time data.

Submit your article to:

editor@hydrologicwarning.org

February 8th is the deadline for inclusion in the February issue.

Future Newsletter Articles Focus

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

Feb - Data Collection
Mar - Hydrology
Apr - Hazard Communication & Public Awareness
May - Modeling/Analysis

NHWC Calendar

General Interest Calendar

March 29, 2018 – Southwest Extreme Precipitation Symposium (SWEPSYM), Scripps Seaside Forum, Scripps Institution of Oceanography, California

April 17-20, 2018 – The ALERT User's Group Training Conference and Exposition, Ventura, California

June 4-7, 2018 – 2018 ASCE Environment and Water Resources Institute International Congress, Minneapolis, Minnesota

June 17-21, 2018 – ASFPM 2018 Annual Conference, Phoenix, Arizona

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

Parting Shot

One can't get much better than that at Brookbank Point, Arizona ALERT repeater.

Hint: see the output, reflection and SWR calculation in the display.

Photo by **Brian Iserman**, JE Fuller/Hydrology & Geomorphology, Inc.