



The NHWC Transmission

Fall/Winter 2019

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New Flood Monitoring System for La Veta, Colorado

Shilpa Garg, OTT HydroMet

In 2018, the Spring Creek wildfire spread across 108,045 acres of a mountain pass in Southern Colorado and became infamous as the third largest wildfire in Colorado history. Approximately 65,000 acres of the burned area became scarred and hydrophobic (which is when soil becomes nearly calcified and rejects water or snow).

The town of La Veta was merely five miles downstream from this newly hydrophobic land, and Mayor Doug Brgoch quickly realized that this would have significant consequences for the town. The terrain would allow water to flow down and easily build force and speed, or even form walls of water. This meant that the likelihood of flooding and debris flows would be higher than normal for the same amount of precipitation and bringing the predicted magnitude of the 2-year recurrence interval event up to what would normally be predicted for the 100-year flood.

“Just a few more minutes could save many lives. It became all the more important to see how we could gain just an extra five minutes.”

- Doug Brgoch, Mayor of La Veta, Colorado

Given the heightened flood risk, it became crucial to know when flood events were approaching to give the citizens of La Veta enough time to safely evacuate. It was critical for this community to have real-time warnings for when rising water levels were moving its way.

Mayor Brgoch calculated that with their current system, town citizens would have 32-45 minutes to evacuate in the event of a large flood event. However, based on prior experience, he knew it would take approximately two hours to initiate effective evacuations.



Middle Creek

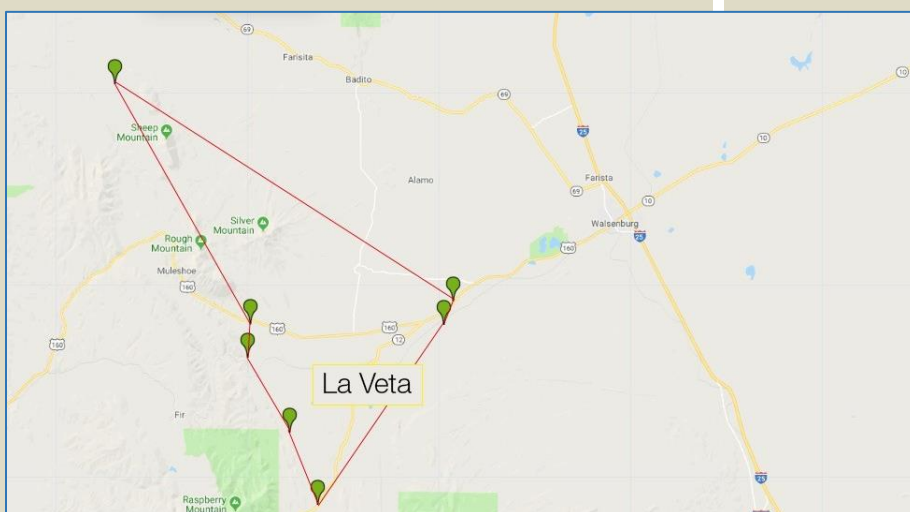
Since summer was fast approaching, which is the season that typically encounters intense monsoons in Southern Colorado, the Mayor acted quickly. He pulled in the Colorado Division of Water Resources, which had experience setting up surface water monitoring field stations in Colorado, to help with the set-up and assume maintenance

responsibilities for the following five years before turning the project back to the town of La Veta.

The Division of Water Resources has been responsible for water administration rights for Colorado for over 100 years. Their Chief of Hydrographic Services, Matt Hardesty, currently helps oversee over 600 surface water monitoring sites including stream gages and reservoirs, with the goal of understanding the current water supply and how to allocate it for purposes like crop irrigation.

Mayor Brgoch and Hardesty teamed up with Huerfano County Water Conservancy District board member Michael White to help conceptualize and design the system of gages for monitoring streams at flood state. Their main goal was to buy extra time to warn their citizens, as well as understand what proper water level thresholds should be used to trigger alarms. Financing for the project was administered by the Huerfano County Water Conservancy District and came from the District, the Colorado Division of Water Resources, Colorado Department of Homeland Security and Emergency Management, Huerfano County, and the Colorado Water Conservation Board.

With a defined plan, team members selected seven data collection station locations, and then ordered the stations with the technology they would need from OTT HydroMet, who was able to deliver the pre-configured equipment in 30 days.



Station location Map, La Veta, Colorado

Each station measures precipitation, water level, and water surface velocity. Given how intense incoming monsoons can be, it's important to know if a significant amount of water is approaching, how high it is, and

how fast it is moving downstream. The precipitation sensors have been valuable to the National Weather Service to verify actual precipitation during or after the issuance of precipitation and flooding watches and warnings.

The team compiles data from six of the seven stations into a decision matrix (with one being too far Northwest to be included in the La Veta area) to understand how runoff from each area in the 13 miles they span will affect the others during rain events. Four of these locations give a look into the burn scar above La Veta, while others surround nearby municipalities. Together, these stations provide a complete picture of the local area – for example, one station with surpassed thresholds may not be cause for alarm, but three or more could signal a serious flood approaching. The matrix allows human oversight to double check the data they see and allows the stations to work together.

One concern the team originally had was how to transmit the data quickly enough for it to be actionable. Existing surface water systems through the Division of Water Resources use GOES Satellite to transmit data, which gives hourly updates of data collected in 15-minute intervals. After the team discussed the flood network with OTT HydroMet, they decided on Iridium® satellite transmissions as their telemetry option which would give updated data every 3 minutes if levels exceed their threshold and are in alarm state.

Iridium is especially helpful given that the remote region has little cell coverage. Iridium two-way transmission capabilities also allow remote adjustment of warning thresholds as the needs of emergency managers are better understood.

Each station is connected to the data management software Hydromet Cloud, which Hardesty appreciates as a “turnkey system with a public interface” so the general public can view station levels in real-time without a log-in. It also allows the team to configure

alarms based on customized thresholds and use two-way communication to remotely change these settings. The mobile app allows the team to review data quickly and make adjustments on the go. →

Luckily, the summer of 2019 was a mild monsoon season. Since the system's installation, a full evacuation has not been needed.

As Mayor Brgoch's team learns more about their stations, they aim to continue improving a system that is still in its early stages. With more data coming in, they are getting a better understanding of how much rain the town can handle before it becomes an emergency state. They are constantly adjusting alarm threshold levels as rain events occur, to ensure each of their stations are finely tuned given their unique placements.

Given La Veta's smaller size, it's all the more important for their core team not to have to manually check field sites on a regular basis. Remote data transmission helps them make the most of every minute and get staff into the field when it is most crucial, to fulfill their goal of keeping Colorado residents safe. 🌧️



Each station includes a radar stage sensor, water surface velocity radar, disdrometer precipitation sensor, satellite data transmitter and a solar charging system.



Radar stage sensor and surface velocity sensor

The ALERT Users Group Training Conference & Exposition MAY 5-8, 2020 VENTURA BEACH MARRIOTT *Ventura Beach, California*

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New ALERT2 Protocol Specification Update

ALERT2 Intelligent Network Device Application Program Interface Specification
December 2019
Version 2.0
Final-RevB



ALERT2 Technical Working Group of the National Hydrologic Warning Council

Public Review and Comment Period

The Comment period for the latest ALERT2 Technical Specification is now open. The ALERT2 Technical Working Group (TWG) has published a proposed new ALERT2 Intelligent Network Device API Specification - December 2019, Version 2.0, Final-RevB.

The updated specification is now available for public comment through January 6, 2020. Click [here](#) to download the document.

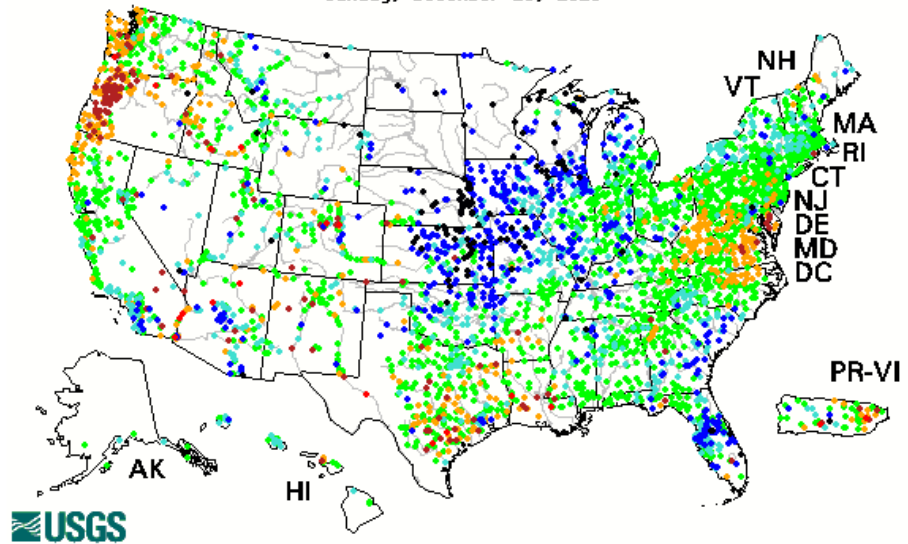
Please submit comments to

ALERT2@hydrologicwarning.org

by midnight January 6, 2020.

Hydrologic Conditions in the United States Through December 24, 2019

Sunday, December 29, 2019

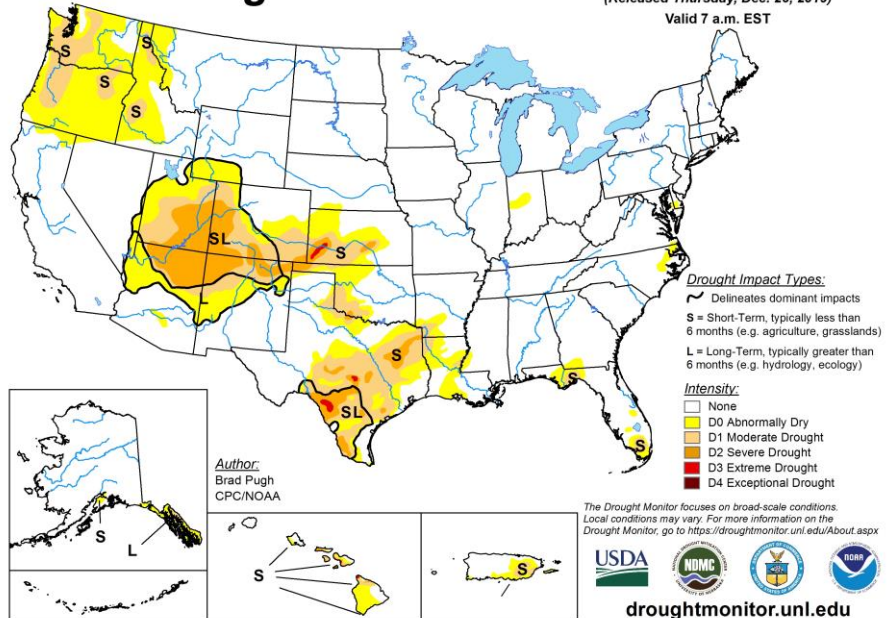


Explanation - Percentile classes						
●	●	●	●	●	●	●
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

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

U.S. Drought Monitor

December 24, 2019
(Released Thursday, Dec. 26, 2019)
Valid 7 a.m. EST



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

Call for Newsletter Articles:

The NHC is requesting articles that focus on the following topics:

Data Collection

practices, technologies and tools used to gather and disseminate real-time hydro-meteorological data

Hazard Communication and Public Awareness

practices, technologies and tools used to get the right real-time data and information to the right people for the right response

Hydrology

new methods, research, or discoveries in hydrology or a recent significant hydrologic event that helps us understand the science behind the floods

Modeling & Analysis

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

January 20th is the deadline for inclusion in the January/February issue.

NHWC Calendar

June 21-24, 2021 – [NHWC 14th Biennial Training Conference & Exposition](#), Breckenridge, Colorado

General Interest Calendar

January 12-16, 2020 – [American Meteorological Society 100th Annual Meeting](#), Boston, Massachusetts

May 5-8, 2020 – [ALERT Users Group Training Conference and Exposition](#), Ventura, California

June 7-11, 2020 – [ASFPM 44th Annual National Conference](#), Fort Worth, TX

September 8-11, 2020 – [Floodplain Management Association Annual Conference](#), Sacramento, California

September 20-24, 2020 – [ASDSO Dam Safety 2020](#), Palm Springs, CA

Parting Shot

Lee Valley Reservoir, Arizona



Lee Valley Reservoir is managed by the Arizona Game and Fish Department. For dam safety purposes, the department operates an ALERT precipitation/lake stage station along with two time-lapse trail cameras equipped with cell telemetry. The ALERT station is also equipped with redundant cell network telemetry. Realtime data and imagery may be viewed at <https://water.azgfd.gov>

Inset photo by Brian Iserman, JE Fuller/Hydrology & Geomorphology, Inc.

National Hydrologic Warning Council

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

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