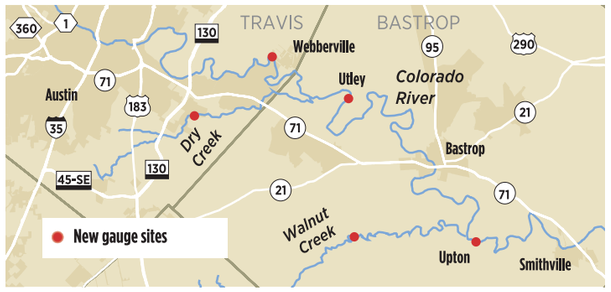
FLOOD WATCH

New gauges along the Colorado River take high-water warnings to another level

Spencer Selvidge photos

LEFT: David Walker, LCRA river operations manager, checks out a new Hydromet site in Webberville. **ABOVE:** The new gauges, like this one near Upton, provide community leaders advance warning of rising water. **RIGHT:** Bastrop County's emergency management coordinator Mike Fisher tells Walker the technology will improve his ability to help people prepare for a flood.



Austin American-Statesman map

This spring, LCRA installed five additional sets of gauges and sensors on the Colorado and creeks flowing into it. The technology allows officials and citizens to monitor rain and river conditions via hydromet.lcra.org.

By Ed Crowell

Five new sentries stand guard along the Colorado River and two inflowing creeks to survey the waters that within hours can turn from picturesque to hazardous. For residents and businesses in Bastrop County and farther downstream, these electronic garrisons could save lives.

"The key is to know how much water is coming into the river from the tributaries," said Mike Fisher, coordinator of Bastrop County's emergency management department. "We've known for years how much is coming across the dams. It's the tributaries that we're now getting a handle on. Great stuff!"

The additions to the Lower Colorado River Authority's "Hydromet" network of water gauges were put in place this spring following severe flooding in Bastrop County last October. (Hydromet is shorthand for hydrological/meteorological).

The five refrigerator-sized gauge boxes perch on steel legs and concrete pads on the banks of waterways in and near Bluebonnet Electric Cooperative's service area. The data collected at each box is automatically sent to LCRA's headquarters in Austin for computations and frequently updated postings on a website available to the public at hydromet.lcra.org.

Emergency officials and first responders say the gauges will provide earlier, more specific and more complete information about rainfall over the Colorado River and its tributaries. Armed with that data, officials will be better equipped to decide what kind of public safety warnings to issue and when.

Three of the gauges are on the Colorado River near Upton and Utley in Bastrop County and Webberville in Travis County. The other two are on Walnut Creek near Rockne in Bastrop County and Dry Creek near Elroy in Travis County.

Anyone living, working or traveling in those areas or farther downstream can check the information that is updated every 15 minutes on the LCRA website.

The National Weather Service uses its own forecasts and data in addition to the Hydromet information to issue flood advisories and warnings.

On a sunny spring afternoon, Fisher and LCRA officials toured two of the new Hydromet sites. The first was on a small ranch near Upton southeast of Bastrop, just below where a half dozen creeks in the Cedar Creek watershed feed into the Colorado River.

As is the case with most of the Hydromet sites, the gauge was on private property and the landowner provided free access.

Terry Randall, a Bluebonnet member, said he was more than happy to allow the gauge to be built on a bluff where the river curves around his ranch.

"It was the neighborly thing to do to help people out and warn them of something coming. I'd hate to be asleep at night and wake up with the water knocking on my door," said Randall.

Five years ago he moved to the property from The Woodlands near Houston. Although the house Randall built is far uphill from the 40-foot bluff and not in the floodplain, he looked up records of historic floods in the area. They were worrisome enough that he bought flood insurance.

Randall said that when the river rose so quickly last October it was "a mighty sight and you could hear the roar up at the house."

The Hydromet gauge assembly is at the top of a sandy embankment. Inside the steel box is a low-voltage, car-size battery, sensors and radio signal telemetry to send information to the Hydromet computers at LCRA. Small solar panels atop the unit provide power.

A crucial pressure sensor is at the end of a plastic conduit that runs down the riverbank from the gauge assembly and into the water. This is where information is collected to report streamflow (how fast the river is running in cubic feet per second). One cfs is equal to about 450 gallons per minute.

The streamflow information is supplemented with a ruler-like water stage plate on the riverbank that measures the water's height (called stage level) in feet.

On the Hydromet website, each location highlights two benchmark numbers. The "bank full stage" in yellow shows the level at which some type of protective action should be taken to prepare for possible flooding. The "flood stage" in red shows the level at which a hazard exists to lives, property or commerce.

"This will give us brand new information," said David Murdoch, LCRA supervisor of Hydromet operations, as he showed off the workings of the Upton site gauges. "We used to have gauges at Bastrop and Smithville only. Now we've got this one between the two that will help the National Weather Service do flood forecasts for Smithville, La Grange and other towns on the river."

Murdoch said the river's crest could move from the Upton location to Smithville in a half day or less, so flood warning time is critical.

The LCRA Hydromet team will visit each gauge site about six times a year to calibrate the instruments and make sure the readings are correct, he said.

In addition to measuring water in the river and creeks, the gauges also report rainfall amounts, temperature and relative humidity.

The entire Hydromet system monitors conditions with more than 270 gauges in 14,700 square miles of the Highland Lakes watershed and in 3,600 square miles of the Colorado River watershed downstream of Lake Travis' Mansfield Dam.

The monitoring system began in the early 1980s with 74 gauges. Since then it has been upgraded with more powerful computers and expanded its reach into tributaries. New gauges cost the LCRA about $300,000 each for the equipment, installation and maintenance.

Last October, heavy rains led to evacuation calls for some areas around Bastrop and Smithville. Roads were closed and the Colorado River came out of its banks in a few places.

Soon after, Fisher and Bastrop County Judge Paul Pape approached the LCRA to ask for more water gauges. They learned such expansion plans were under way. A more aggressive installation schedule resulted, with five new gauges put in place this spring in case rains brought flooding again.

The gauges were assembled on site, requiring about two days of work for each location and then more time to integrate the data transmission into the Hydromet reporting system.

As Fisher picked his way amid riverbank bramble to check out the new Webberville site, he said what worries him is "all the new people moving into Bastrop County who don't have a sense of the danger that can be imminent when the river rises. It's an education and learning process we're doing in addition to the technology."

The Webberville installation is on land owned by Jim Sansom, who ran a family dairy operation there for 45 years. "It's an honor to have it here," he said of the gauge.

Fisher said the data recorded on the Colorado River in Webberville would help him give residents in the town of Bastrop as much as 22 to 24 hours notice to take action to protect themselves and their property.

"The key for us is to know how much water is moving our way," Fisher said. "I'm tickled to have this information now. It's been a long time coming." ■

LEFT: Beside a yardstick-like sensor that measures how high water is rising, Fisher thanks LCRA officials Susan Thorne, David Murdoch and David Walker for adding the new important flood gauges.

Timeline of a flood

One feature of the Hydromet website is historic data that can give residents a dramatic lesson in how quickly the Colorado River can flood.

Go to hydromet.lcra.org and click on "Historic data by gauge." Select the desired gauge location and the sensor for "Level of River/Creek." A time period of up to 180 days is available if the gauge has been in place at least that long.

The Hydromet gauge on the Colorado River in downtown Bastrop shows what happened last fall during heavy rains:

On Oct. 24, 2015, at 6:55 a.m., a day before the first of the heavy rains fell, the river stage was at 2.92 feet (about the norm) and the streamflow was at 459 cubic feet per second.

Just 24 hours later, the river stage was 15.58 feet and the streamflow was 15,068 cfs.

The peak of the flooding came on Oct. 31 at 4:10 p.m. The same Bastrop gauge recorded 36.14 feet of river water moving at 61,062 cfs.

It took nearly two weeks before the river measurements returned to a more normal stage range of 3-4 feet and a streamflow of less than 1,000 cfs.