The Oxbow

FROM THE NORTH DAKOTA STATE WATER COMMISSION

Figure 1 - USGS gages on the Little Missouri River.

WATER COMMISSION USES NEW TECHNOLOGY TO BENEFIT ICONIC RIVER

In 1975, the North Dakota State Legislature enacted Chapter 61-29 of the Century Code, the "Little Missouri State Scenic River Act" (LMSSRA). The intent of the Act was "to preserve the Little Missouri River as nearly as possible in its present state, which shall mean that the river will be maintained in a free-flowing natural condition…"

The LMSSRA continues to provide protection for the Little Missouri River, along with the badlands it has created. The Little Missouri River is the region's preeminent water supply for livestock, irrigation, and as of late – industry. As such, prudent management of this valuable water resource is needed to balance water use needs, while preserving cultural resources and maintaining the scenic, historic, and recreational qualities of the river.

The State Water Commission (SWC) has launched an initiative to intensively monitor a 109-mile reach of the Little Missouri River between Medora and the Long-X bridge (south of Watford City). This reach of the river is especially important as the home to the state's only National Park and the Maah-Daah-Hey trail. "This reach of the river has seen an increase in new oil wells that need water for hydraulic fracturing (fracking)," according to Jon Patch, Director of the Water Appropriation Division of the SWC. Fracking a new oil well requires an average of about 25 acre-feet of water. That equates to pumping from the river at about 1,000 gallons per minute for about six days straight.

The purpose of the initiative is to better understand the hydrology of this particular stretch of river in order to make sound, scientifically based decisions on water appropriation, while remaining in compliance with the intent of the LMSSRA. A real-time continuous monitoring device, designed by SWC staff, dubbed the PRESENS (Pushing REmote SENSors), monitors the stage of the Little Missouri at four locations, and one location on Beaver Creek. In addition, USGS operates gages that continuously monitor flow in the Little Missouri River between Medora and Long-X Bridge.

RAIN EVENT TESTING

On July 21, 2018, a one-inch thunderstorm rain event occurred in the upper basin of the Little Missouri River. The four USGS gages on the Little Missouri (Figure 1) are well-established with long periods of record, and are therefore considered very accurate for tracking water pulses from precipitation events.

The five PRESENS are located between the Medora and Long X Bridge USGS gages (Figure 2). As illustrated in Figure 3, the pulse of water from the July 21 event reaches the Medora USGS gage around July 28, and can be tracked as it goes downstream past each PRESENS on the mainstem, until it reaches the Long X Bridge USGS gage around July 31. As expected, the pulse is not seen at the Beaver Creek PRESENS site, as the precipitation event was not over this tributary's drainage area.

By using the well-established USGS gages to verify PRESENS' ability to track precipitation events and the subsequent change in the height of the river, the SWC knows it has a reliable technology that can be used on streams and rivers that do not currently have gages on them. This capability will allow the Appropriation Division to better manage the state's water resources.

Figure 2 - PRESENS monitoring sites along the Little Missouri River between the Medora and Long-X Bridge USGS gages.

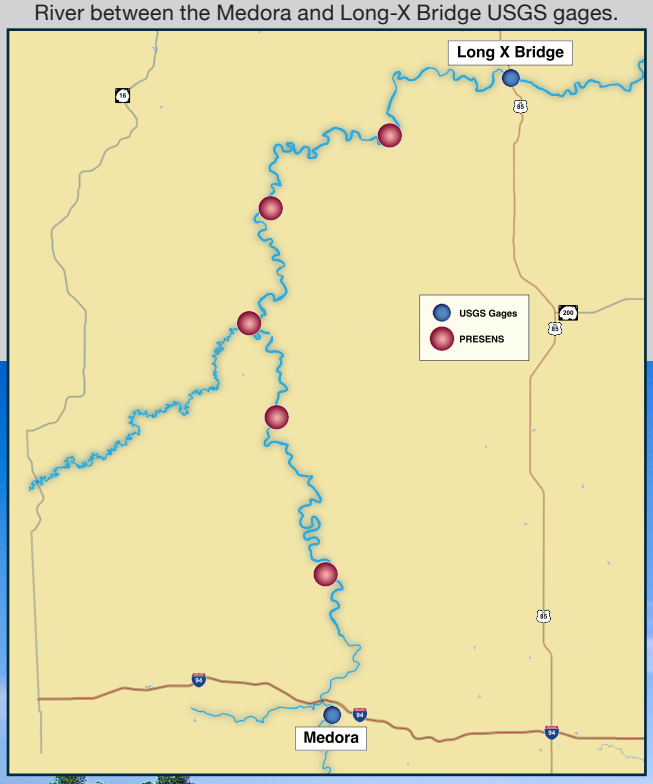

Figure 3 - Comparison of USGS gages and PRESENS sites.