

Remote monitoring of livestock watering devices

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The most important nutrient for grazing livestock is water.

Remote monitoring devices allow managers to monitor the water supply in multiple, often distant locations, saving both time and travel expense. Remote monitoring is most often used with watering tanks.

Game cameras can be positioned near a tank so that a photo of the water level can be captured at specified times and transmitted to a programmed cell phone number. Game camera systems are reliable, low cost, and can also reveal problems such as a failed pump or leaking tank. Cell service is required at both the game camera location and the cell phone location for photo transmittal. For best results, manufacturers recommend at least 3 bars of cellular strength for proper functioning. At least one of the Game Camera companies has associated a website to store the photos so they can be viewed from a computer or phone by visiting the web site. Game cameras normally rely on motion to activate the camera. The camera can be scheduled to look for motion at specific times reducing the number of pictures taken and stored.

Pressure transducers powered by a solar panel transmit text messages and reporting the water level as a percentage of a full tank. The water level is assessed every hour, and an alert is sent if the water level drops below a predetermined level. A related technology uses satellite transmission for areas without cell service and can report at varying time intervals as determined by the operator. Pressure transducer systems do not provide a visual confirmation of the water level.

Other companies are using cellular transmission which may be a limitation in very remote locations. As this technology is advancing, producers will see other livestock behavior associated activities being reported by the same monitors as the water depth sensors. An example might be the monitors that claim to be able to collect the identification (and time) when the livestock visit an area, or the level of feed within a feeder.

Cost, features, and the operator's comfort with the technology and frequency of the information is reported are important considerations when selecting a remote monitoring system. Peace of mind associated with knowing that livestock have water is as important as economic and labor savings.

We evaluated 3 units, one game camera and two units that use pressure transducers to sense the water level.



If “a picture is worth 1000 words”, a game camera that will provide a picture of the tank could be valuable. Many game cameras take great shots, but the method the producer receives the photos is improving. The timeliness of the photo becomes an important factor.

In our demonstration we used a game camera that allows us to specify the time period to look for livestock at the stock tank. When the camera takes a photo, it would then send the picture to a website via the cellular phone network. The photo is stored on the site where the producer can view the photo on the website either on a computer or cell phone.

In our case, we scheduled the camera to look for livestock at the tank site between 1:00 and 1:30 pm and again between 1:30 and 2:00 pm so we had the opportunity for 2 photos each day. This camera system requires motion to activate the camera for a photo and only during our designated times. If a photo was taken, the photo is posted on the website within 5 to 10 minutes of being taken.

You may need to re-aim the camera after seeing the initial photos. It would be an improvement if we had set a gauge stick in the tank or place marks on the side of the tank so it is easier to evaluate the level of water in the tank from the photo.

In our case, the camera costs about \$100, and storage of the pictures on the website is FREE if we store less than 100/month (2 or 3 photos per day).

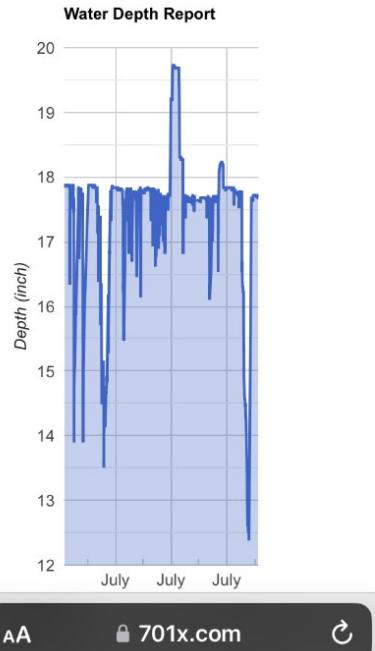
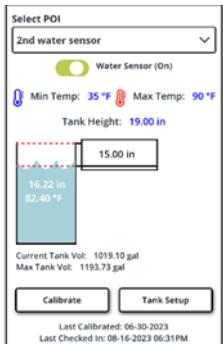




The XBASE system, 701x, uses a pressure transducer in the tank to sense the depth of water above the sensor as well as the temperature of the water. The system proposes to update the website about every 2 hours (cellular communication). In addition, the system proposes to send a notification to one or more cell phones when the water in the tank drops below an alert level the producer specified or if the temperature of the water becomes greater than a specified temperature.

The instructions ask to have the depth of water “Calibrated” during set-up which is done by starting the calibration process and slowly raising the sensor out of the water then lowering the sensor back, so it lies on the bottom of the tank.

The instruction suggests placing the cord to the pressure transducer through a conduit to prevent livestock from messing with the installation. The xBASE station should be placed in a protected space from livestock. The xBASE has a solar panel on the front, to keep the batteries recharged, which should be south facing. The cellular phone reception should be of reasonable strength for the system to perform well.



The 701x system has the capability to do many other management related tasks. The extra technology within the system may contribute to the cost of the unit. As we understand, the equipment we are demonstrating would have a cost of about \$1,000 with a yearly fee of about \$72.



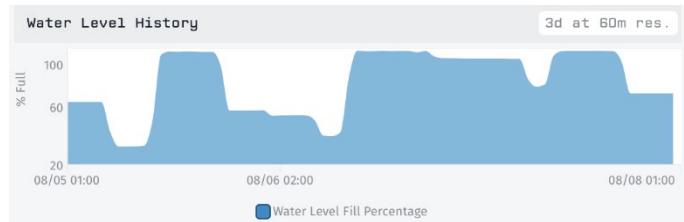
(previously called FairWave)



The RanchSense system uses a pressure transducer to read the depth of water above the sensor (from the bottom of the tank). The system proposes to update the website about every 2 hours (depending of the satellite orbit coverage). The system has the ability to send a text message to a cell phone if the water level drops below a producer specified level. The information is reported as a percentage of tank depth, (76%). RanchSense uses the Low Elevation Orbit satellite system to transmit the information from the tank site back to the website. The producer can view the website from a computer or a cellular phone.

The instruction suggests running the cord to the pressure transducer through a conduit to prevent livestock from messing with the installation. The RanchSense station should be placed in a protected space from livestock. The RanchSense station has a solar panel on the front with the components on the back of the panels. The solar panel front is used to keep the batteries recharged and should be south facing.

- ❖ this unit collects data every 30 minutes.
- ❖ When they connect to a satellite, they dump all that data at once.
- ❖ they have no control over the satellites, so they cannot control that interval.
- ❖ At your latitude, they generally see 2-4 hr. intervals, but again that is not guaranteed. Occasionally we see extended intervals due to satellite travel patterns or other anomalies.
- ❖ Alarms are only generated once data is transmitted. So, if an alarm state is logged at the first reading in a 4-hr. window of transmission, the alarm will not be received until that transmission, 4 hours later.



Observations of the systems

The game camera is a simple and straight forward system. The photos can be viewed reasonably soon after the picture is taken, however if the livestock are not there, the camera may not record a photo for you. It has been suggested that a flag or banner could be placed within the photo range so the camera will more often see motion even if the livestock are not present.

The systems that use the pressure transducers seem to be accurate and there was no reason question the accuracy of either device. This technology is emerging, and the companies are still making improvements to their systems and add additional features. **The timeliness of the updates and alerts** was the greatest concern with both of the systems.

Studying the data that is available from the website showed livestock behavior that we would have missed otherwise. It was easy to see changes in drinking times as the temperatures. We saw some drinking after midnight a number of times.

One surprise that I had not expected to see was a tank that was higher by about 2 inches in the middle of the night then went back to normal about 6:30 am. It had rained during the night.

For many producers, a photograph of the tank is all they need to see. Other producers will want to receive the notification or text to their cell phone and then check the tank level history on the website. The additional management technology can provide the produce will make the water level monitoring just one of many chores these devices will eventually provide.

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