

## How High Is Lake Berryessa?

Photographic and video evidence may show the lake spilling over the rim of Glory Hole for the first time in a decade on February 16, 2017. However, the official measurement provided by the Solano County Water Agency at that exact moment was 439.9 feet above mean sea level (msl) - low by 1 inch.

The rim of the structure is very flat - as can be seen from the photos and videos showing lake water spilling over at exactly the same height all around its circumference. Those of us who have ever used a bubble level to simply hang a picture frame should be immensely impressed by this feat of engineering from 1956.

The Lake Berryessa water level is actually measured on the Monticello Dam in a “stilling well” equipped with a float tape attached to a digital rotary encoder that measures precisely to 0.01 foot or 0.12 inch. There is a small discrepancy with the encoder that measures the lake level. It is also difficult to get the measured lake level dialed in to this exact level when there are any wind waves that cause small fluctuations in the stilling well.

The lake elevation is calibrated by measuring the distance from a known elevation to the water surface in the stilling well. This known elevation was determined during the original survey of the Berryessa Valley when the dam was built. The fact that the calibration between the measuring device and the actual lake level is only off by only .04 feet (1/2 inch) is amazing. But how accurate is that measurement and how important is it?



Precision and accuracy are often used interchangeably, but in science they have very different meanings. Measurements that are close to the known value are said to be accurate, whereas measurements that are close to each other are said to be precise. So, a good machine may measure precisely to a half inch every time it takes a lake level reading, but if the calibration point is off in accuracy by one foot, what does it matter? The ideal situation is when the measurement is both accurate and precise.

But the accuracy of any measurement relies on how the measurement is made - and all measurements have some level of variability. Variability is the tendency of the measurement process to produce slightly different

measurements on the same test item, where conditions of measurement are either stable or vary over time, temperature, operators, etc. Short-term variability ascribed to the precision of the instrument. Since most of the survey measurements on which Lake Berryessa data depends were performed in the 1950s with good optical equipment but in rough, irregular terrain, how variable in accuracy was the final data set - what was the level of the statistical standard deviations of the fundamental measurement results?