

WDWDD-SDSMT Report Card for Hardness

Private Well Tests

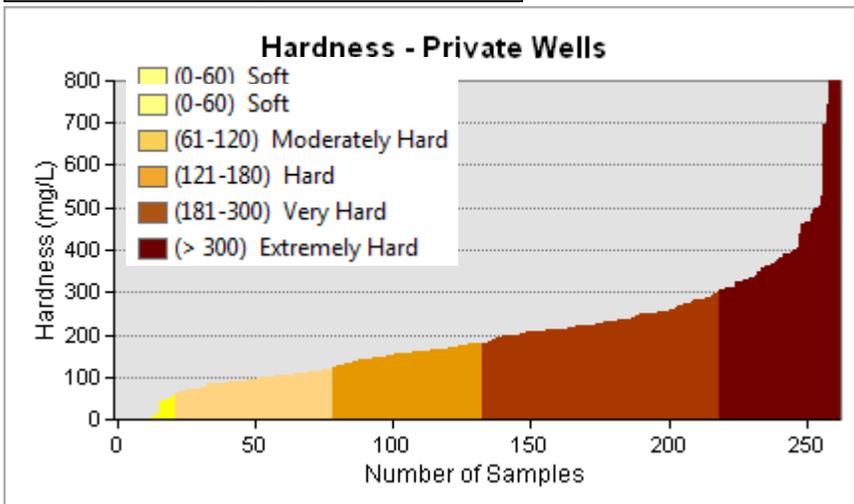
Number of wells	262
Number of tests	272
Earliest test date	5/5/2013
Latest test date	11/03/2015
Lowest value detected	0
Highest value detected (mg/L)	1130
Number of wells < 180 mg/L	
Percent wells > 180 mg/L	

Public Well Records

Number of wells	37
Number of recorded tests	126
Earliest test date	4/12/1967
Latest test date	7/9/2007
Lowest value detected	**
Highest value detected (mg/L)	935
Number of wells < 180 mg/L	
Percent wells > 180 mg/L	

Hardness measures the quantity of dissolved minerals in water, particularly calcium and magnesium, which occur from dissolution as the water percolates through rock. Most people experience hardness in reference to the soap-consuming capacity of water. Hard water requires more soap to produce lather, can cause rings in bathtubs and sinks, and can also result in scale build-up in water lines and equipment. Water with hardness greater than about 180 mg/L generally is considered very hard water. Hardness is considered a nuisance but it is not a health hazard.

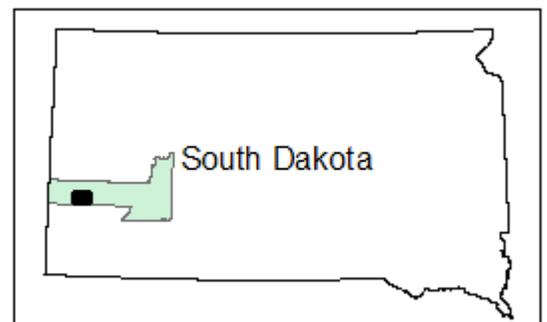
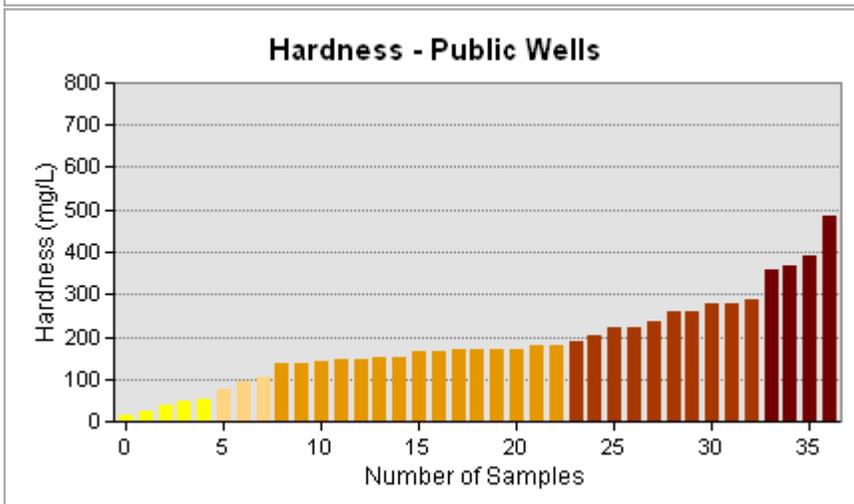
We sampled 262 private wells from 2013 to 2015 and compiled published data from 37 public wells to evaluate the hardness in well water in western Pennington County, SD. In some cases the wells were tested multiple times; we took the highest test in each case. We found that 41% of private wells and 31% of public wells had water with hardness higher than 180 mg/L. The maximum value detected was 1130 mg/L.



In the graphs, the height of the bar indicates the hardness, and the colors indicate the name of the ranges; several measurements extend beyond the top of the graph. Hard water is a common problem in the Black Hills.

Public water systems generally do not treat hard water, but consumers often purchase water softening units for their homes to mitigate the problems caused by hard water.

Private wells are not regulated by law and homeowners are not required to meet drinking water standards set by the EPA. However, homeowners are encouraged to test their water to ensure that it is safe to drink and to protect their families.



To protect the privacy of homeowners who participated in the study, we do not plot individual well test locations on maps shown to the public. Instead, we used the sampling locations to estimate values between the measurements to create a continuous map of hardness--a process called interpolation. Because subsurface conditions can change rapidly from place to place, we used only a few of each sampling point's closest neighbors to derive distance-weighted estimates, and so the map has a rough appearance rather than smooth contours, but it is more true to the data in any one place. However, the only way to know the hardness of the water in a particular well is to test it.

The highest hardness values occur in the eastern side of the study area and in the southwest corner. High values appear to be associated with quartzite and greywacke metamorphic rocks and lower values with metamorphosed shales. For interactive maps showing these associations, click [here](#).

