Hydrogeologic Conditions in the Blanchard Subarea of the Rathdrum Prairie, 2007 – 2015

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Overview

1. The Blanchard Subarea is one of five subareas for the Rathdrum Prairie. This subarea is located to the northwest of the northwestern portion of the Rathdrum Prairie aquifer.
2. The aquifer in the Blanchard Subarea is actually not part of the Rathdrum Prairie aquifer. The ground water in this subarea moves to the north/northwest away from the regional aquifer, and toward the Priest River.
3. There are two monitoring wells in the Blanchard Subarea.
4. Ground water level and water temperature data are collected at the two wells by manual electric tape measurements and electronic data transducers.
5. The ground water level trend from 2007 to 2010 was slightly declining. In 2011, the water level rose 15 feet and 18 feet in the two wells. Water levels were even higher in 2012. They declined in 2013 and 2014, but were still well above the pre-2011 levels.
6. The gradient from the southern well to the northern well was 1.8 feet per mile in the summers of 2012 through 2014. However, there was no gradient between the wells prior to 2011 and during the winters of 2012 – 2015.
7. Water temperatures are unusual with the southern well having annual cycles and abrupt downward shifts in 2012 and 2014, and the northern well having an essentially flat temperature profile. The reasons for these patterns are unknown.
8. An additional monitoring well north of Well #15 may be considered.

Detailed Analyses

The Idaho Department of Water Resources (IDWR) has a ground water level and ground water temperature monitoring program for the Rathdrum Prairie aquifer. The network currently contains 30 wells. The Blanchard Subarea, which is one of five subareas designated, is located in the northwestern part of the Rathdrum Prairie (Figure 1). There are two monitoring wells in the Blanchard Subarea. Figure 1 shows the location of the wells and Table 1 provides the attributes of each well. In Situ© transducers are deployed in both wells.

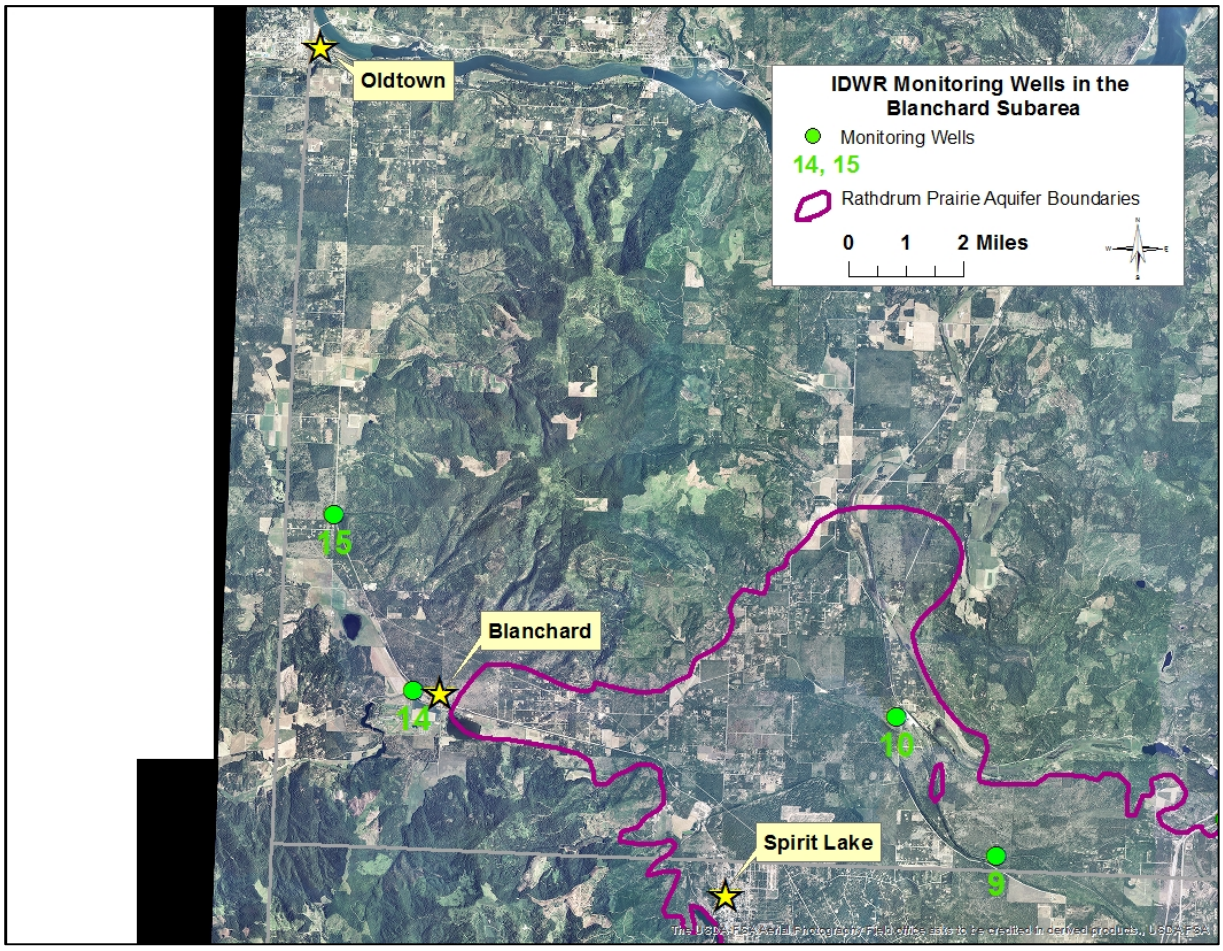

Figure 1. Location of IDWR's two monitoring wells in the Blanchard Subarea.

Table 1. List of the Blanchard Subarea monitoring wells.

Well Number	Station Name Common Name	Year Drilled	Well Depth (feet)	Open Interval[1] (feet from top of casing)	Open Interval (feet above Sea Level)	Water Level Elevation[2]	Height of water column (ft)[3]	Period of Monitoring Data
14	53N 03W 16BBA1 Yergens	1977	140	125-139 (P)	2148-2134	2202	50	6/2008-current[3]
15	54N 03W 27DDC1 Blanchard	1967	90	79-89 (S)	2098-2088	2196	35	4/2006-current[3]

[1] P = Perforations; O = Open Hole; S = Screen. [2] Based on maximum water level. [3] Based on maximum water level on June 15, 2012. [3] Transducer and manual measurements.

The water level trends in Wells #14 and #15 are nearly identical (Figure 2). Prior to 2011, there was essentially no ground water gradient between the two wells. The higher-than-normal snowpacks of 2011 and 2012 caused differences in the water level elevations. Both wells had significant increases in water levels. However, Well #14 had maximum water levels that were 3 – 6 feet higher than Well #15 in 2011 – 2014. Thus, the gradient from Well #14 to Well #15 was 1.8 feet per mile in June, 2012. The minimum water level elevations (WLEs) were essentially the same in both wells during the winter months, indicating there was no gradient between the two wells during these times.

Parliman and others (2008) noted that a ground water divide exists somewhere east of Well #14 and the town of Blanchard. The WLE in Well #14 was 2202 feet Above Sea Level (ft ASL) on June 15, 2012, which has been the highest WLE on record for this well. Well #10, located 8.5 miles to the east, had a WLE of 2151 ft ASL on that date, a difference of -51 feet compared to Well #14. Well #13, located 10 miles to the southeast, had a WLE of 2036 ft ASL on that date, a difference of -166 feet compared to Well #14. These differences, especially between Well #14 and Well #13, support the conclusion that there is a ground water divide at the mouth of Spirit Valley.

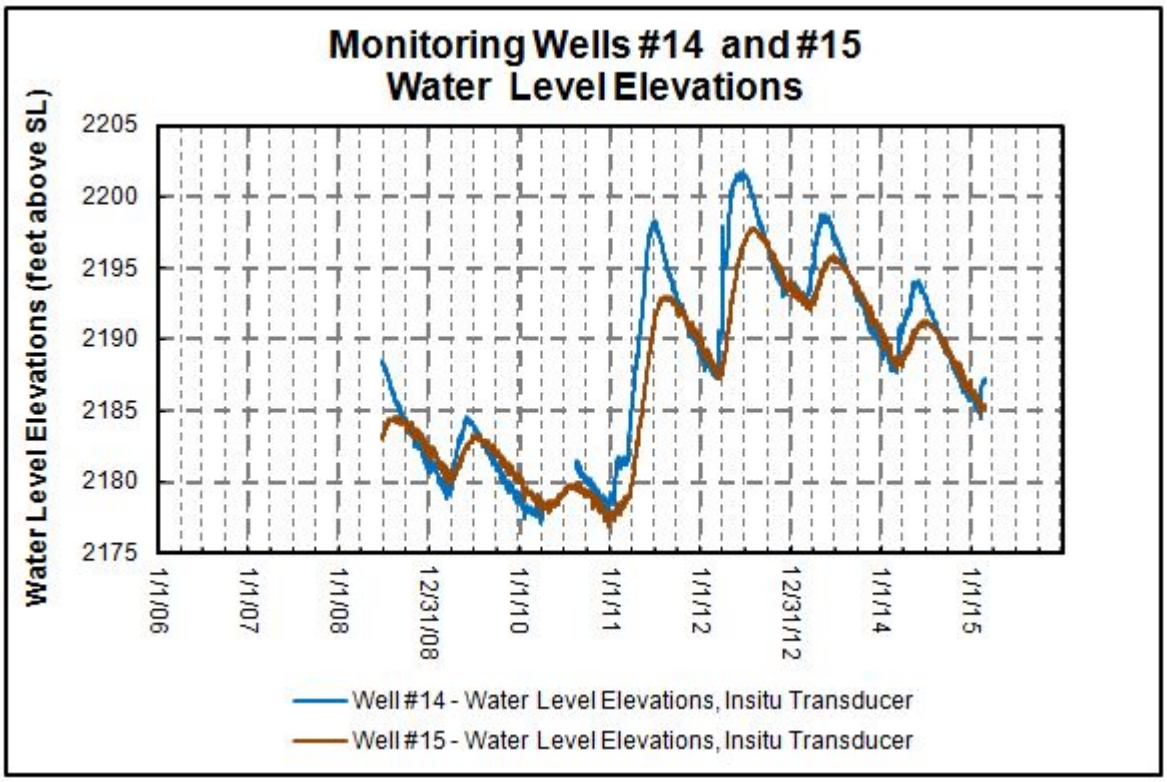

Figure 2. Ground water level elevations for Wells #14 and #15.

The water temperatures for the two wells are very different, with Well #14 having definite annual cycles with temperature ranges of 1 – 3 degrees Fahrenheit (°F), and with Well #15 having a flat profile with some very subtle variations. Abrupt downward shifts in water temperatures of 4°F occurred in Well #14 in the winters of 2012 and 2014. These shifts coincided with sharp rises in water levels. In 2012, the majority of the temperature shift occurred over three days, with additional smaller declines for 12 more days. In 2014, this majority of this abrupt shift again took place over three days. In 2013, there was no shift. The reason for these shifts and patterns is unknown.

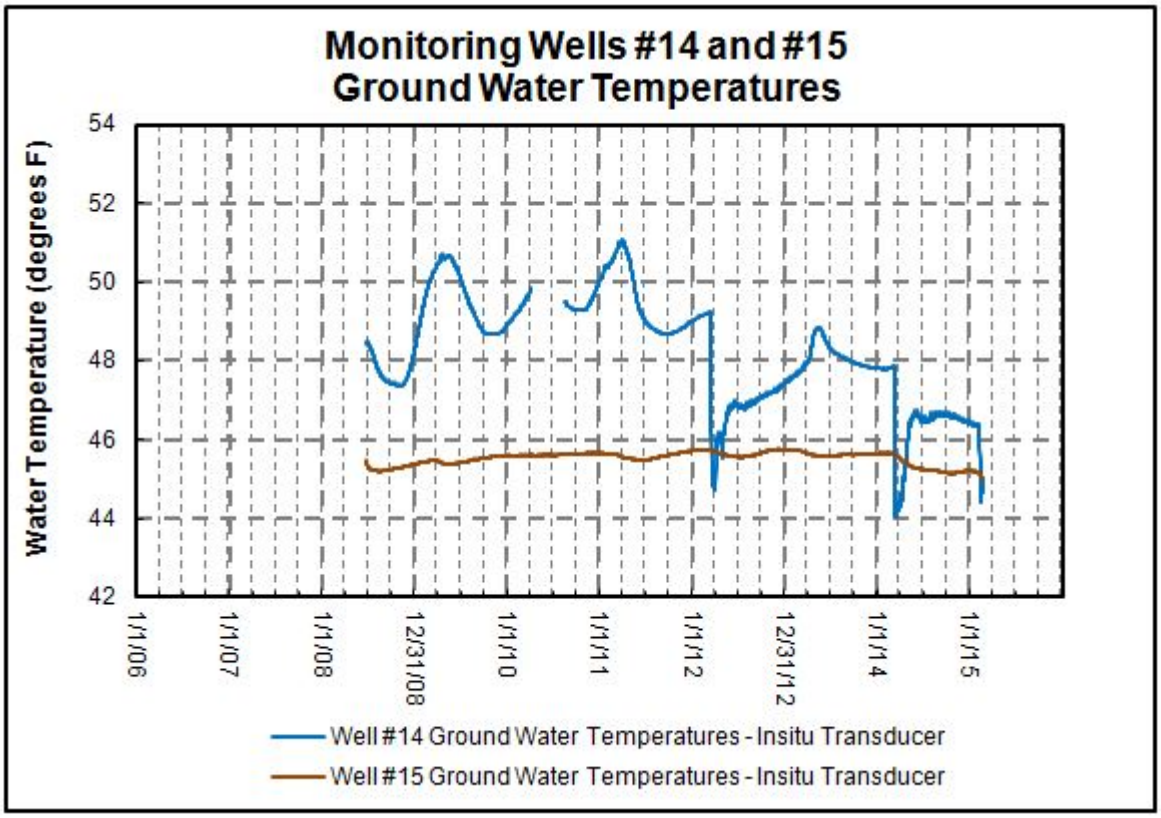

Figure 3. Ground water temperatures for Wells #14 and #15.

Future Plans

1. Continue to monitor the two wells.
2. Add an additional monitoring well in the area north of Well #15, if an opportunity arises.

References

Parliman, D.J., Seitz, H.R., and Jones, M.L., 1980, Ground-water quality in north Idaho: U.S. Geological Survey Open-File Report 80-596, 34 p.