

Update on Ground Water Levels and Trends in the Lewiston Plateau Ground Water Management Area

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Geology and Hydrology

- The geology of the Lewiston area consists primarily of Columbia River Basalt formations with sedimentary interbeds. A syncline, with its axis oriented west-east, runs through the middle of the Lewiston area, creating a subsurface basin. The basin is bound on the north by a major tectonic feature that occurs immediately north of the Clearwater River. The basin is bound on the south by the Lime Kiln fault. The syncline basin transitions to the west and east into other geological regimes related to tectonic activities. Some small folds (anticlines and synclines) trend northwest-southeast within the basin. It is postulated that small faults occur in the basin.
- The lowermost formation of hydrologic importance is the Grande Ronde (Figure 1), which contains the regional aquifer in the western part of the area, and shallower water-bearing zones that are generally found throughout the Lewiston basin. The Grande Ronde regional aquifer is recharged by the Snake River to the southwest, and is thought to have a northwestern boundary along Lindsay Creek, and a southern boundary somewhere south of Tammany Creek. The regional aquifer extends to the west into Washington.
- The water-bearing zones in the Grande Ronde above the regional aquifer are called the Upper Grande Ronde. These aquifers have water level elevations (WLEs) that are significantly higher than WLEs for the regional aquifer. Thus, these aquifers do not appear to be hydraulically connected to the Snake River. The lateral extent of these aquifers, and the degree of hydraulic connection from well to well, are unknown. These aquifers have low yields and water level declines similar to the overlying Wanapum, indicating limited recharge.
- Overlying the Grande Ronde formation, in successive order, are the Vantage interbed, Wanapum basalt, Sweetwater interbed, and Saddle Mountains basalt (Figure 1). Aquifers exist in the Wanapum and Saddle Mountains formations. These aquifers are “perched”, meaning that they are thought to be recharged primarily by precipitation and infiltration of water from land surface. Some of them may also be recharged by surface water sources such as Lapwai and Sweetwater Creeks.

Ground Water Level Trends and Management Efforts to Halt Declines

- An initial assessment of the potential for ground water development in the Lewiston Orchards area was conducted by Ralston and Boyd in 1978.
- In 1992, IDWR received complaints from some home owners in the Lindsay Creek area regarding diminishing ground water supplies in their wells, which were completed in the Saddle Mountains aquifer. Lindsay Creek is about 3 miles east of downtown Lewiston. Generally, the wells were less than 250 feet in total depth. Steve Baker (IDWR) produced internal memos in 1991 and 1992 describing the ground water resources and water level decline problems in the Lindsay Creek area. Based on Baker's estimate of very limited ground water supplies in the Saddle Mountains aquifer, IDWR created the Lindsay Creek Ground Water Management Area (GWMA) in 1992.
- The USGS monitored ground water levels in several wells in the Lewiston area from 1985 to 2009. However, only two of the wells were still being measured in 2009 when IDWR assumed the monitoring responsibilities from the USGS. In addition to those two wells, IDWR began monitoring other wells in 1999. By 2012, there were 12 wells in the monitoring network, which included 1 well in downtown Lewiston, 5 wells in the Lindsay Creek GWMA, and 6 wells in the Tammany Creek area located southwest of the Lindsay Creek GWMA.
- A hydrogeologic analysis in 2012 indicated that most of the 12 monitoring wells showed moderate to steep water level declines in the Saddle Mountains, Wanapum, and Upper Grande Ronde aquifers (Neely, 2012).
- Based on data from several community supply wells, it appears that the Grande Ronde regional aquifer has not experienced any long-term water level declines. This is because the aquifer is hydraulically connected to the Snake River, which provides an endless supply of recharge.
- The Lewiston Ground Water Advisory Committee was formed in 2012 to address the water level declines in the Saddle Mountains, Wanapum and Upper Grande Ronde aquifers. The committee consists of a cross-section of stakeholders in the Lewiston area.
- Since 2012, IDWR has increased the number of monitoring wells in the Lindsay Creek and Tammany Creek areas (Figure 2).
- IDWR rescinded the Lindsay Creek GWMA and established the Lewiston Plateau GWMA in May, 2015. The Lewiston Plateau GWMA is considerable larger than the Lindsay Creek GWMA, which provides for more protection for the valuable and vulnerable ground water resources.
- The Lewiston Plateau GWMA has 3 Subareas, named A, A1, and B. Each subarea has unique hydrogeology which results in subarea-specific management strategies.

- The Advisory committee developed a Ground Water Management Plan which was approved by IDWR's Director in 2015. The plan restricts drilling in the Saddle Mountains and Wanapum aquifers, and protects against co-mingling of these aquifers with each other, and with the regional aquifer. Applications for new wells within the Lewiston Plateau GWMA can be approved by the Department provided they seek water from the regional aquifer. The wells are required to be sealed through the Saddle Mountains and Wanapum Formations and into the Grande Ronde. The Advisory Committee meets annually in May to review monitoring results and to discuss future plans for the GWMA.
- As of January 2017, there are 35 monitoring wells in the Lewiston Plateau GWMA. IDWR measures water levels in the monitoring wells semi-annually (Spring and Fall) using an electric tape. Electronic data loggers are deployed in 19 of the wells. IDWR maintains 16 of these data transducers. The Lewiston Orchards Irrigation District (LOID) maintains transducers in their #3, #4, and #5 wells.
- The Nez Perce Tribe maintains a transducer in Well #37 on the north side of the Clearwater River, between Lewiston and Spaulding at the Casino location. This well is just outside the northern boundary of the Lewiston Plateau GWMA.
- Monitoring results indicate the following:
 1. Saddle Mountains aquifer – Subarea A1. Based on 3 wells, water levels declined slightly from Spring 2012 to Spring 2016, at a rate of less than 0.3 feet per year (ft/yr).
 2. Wanapum aquifer - Subarea A1. Based on one well, water levels declined at a rate of 2.1 ft/yr from Spring 2012 to Spring 2016.
 3. Wanapum aquifer - Subarea A. Based on three wells, water levels declined at rates ranging from 1.0 ft/yr to 2.8 ft/yr from Spring 2012 to Spring 2016.
 4. Upper Grande Ronde aquifer. Based on several wells, water levels declined at variable rates throughout the GWMA from 2012 to 2016. For example:
 - a. Monitoring Well #10 in the central part of Subarea A1 declined 1.8 ft/yr from Spring 2013 to Spring 2016.
 - b. Monitoring Well #30 in the southeastern part of Subarea A1 declined 24.5 ft from Spring 2014 to Spring 2015, and 4.8 ft from Spring 2015 to Spring 2016.
 - c. Monitoring well #16 in the southwestern part of Subarea A declined 1.6 ft/yr from Spring 2014 to Spring 2016.
 - d. Two monitoring wells in the southeastern part of Subarea A actually had very slight increases in water levels from Spring 2012 to Spring 2016, while a third well had a slight decline.
 5. Grande Ronde regional aquifer. Water level data can be categorized in two ways: 1) long term (> 5 years) for Wells #13 and #23 (LOID #3 and #4), and 2)

short term (< 5 years) for Well #1 (City of Lewiston 1A), Well #19 (LOID #5), and three private domestic wells. The trends for these wells are as follows:

Well #13. Increased 8 feet from 2008 to 2011. Declined 5 feet from 2011-2015. Declined 15 feet from 2015 to 2016.

Well #14. No change from 2008 to 2012. Declined 14 feet from 2012 to 2016.

Well #1 (at the confluence of the Snake and Clearwater Rivers). Declined 5 feet from 2012 to 2016.

Well #5 (along Lindsay Creek). Declined 3 feet from 2014 to 2016.

Well #17 (western end of Tammany Creek). Declined 2 feet from 2014 to 2016.

- The lower ground water levels in the last couple of years may be related to the water level fluctuations in the Clearwater River near Lewiston. The river water levels were about 3 feet lower in the Spring and Summer of 2015, than in the Spring and Summer of 2014, due to a one-time lowering of the pool behind Lower Granite Dam for work in the reservoir. The Spring water levels in the river were about 2 feet higher in 2016 than in 2015. The Spring water level in Well #1 was 1.1 feet higher in 2016 than in 2015. Well #1 is very close to the confluence of the Snake and Clearwater Rivers. The increase in water levels in the well in 2016 indicates the existence of a close hydraulic connection between the Clearwater River and the well. Well #5 is about 3 miles southeast of the confluence of the two rivers, and about 1.5 miles south of the Clearwater River. The Spring water levels in Well #5 declined in 2015 and again in 2016. Thus, it appears that there is a hydraulic connection between the Clearwater River and Well #5 as indicated by the decline in the water levels in the well, which coincided with the lower water levels in the river in 2015. However, since the spring water level in the well did not recover in 2016, the hydraulic connection between the river and Well #5 must be such that there is a delay in the recovery response of the well to the increase in river water levels.

New Ground Water Studies

- In March 2016, the Idaho Water Resources Board funded a one year study to investigate the regional ground water systems in the Lewiston Plateau GWMA. Ralston Hydrologic Services, Inc., was contracted to conduct the study, whose two primary objectives are: 1) determine if a second regional aquifer exists in Subarea A1 with the source of the ground water being the Clearwater River to the northeast and/or Lapwai Creek to the east, and 2) begin monitoring ground water levels in Subarea B in an effort to determine the sustainability of the ground water resources in this area.

- In 2016 and early 2017, IDWR and Ralston Hydrologic Services added 12 monitoring wells in the Lapwai Creek valley, which is three miles east of eastern boundary of the Lewiston Plateau GWMA. Eleven of these wells have transducers deployed in them.
- IDWR and the Nez Perce Tribe signed a Memorandum of Agreement (MOA) in February 2016 that give IDWR access to Tribal lands for the purpose of surface water and ground water monitoring.
- IDWR is working toward establishing two MOAs and one Contract which would allow for additional monitoring in the Lewiston and Lapwai areas. The MOAs are with: 1) the Nez Perce County for access to county right of way land in the Lapwai Valley for the construction of a monitoring well, and 2) a private land owner in Tammany View (southeastern corner of Subarea B) for modifying his well so that it can become a viable monitoring site. IDWR is developing a contract with a private well owner in the northern part of Subarea A-1 for the drilling of a monitoring well on his property.
- Three new monitoring wells are proposed to be drilled in 2017. Well 1 – located midway between Lapwai and Spaulding on Nez Perce County Right of Way land, just east of Highway 95. Well 2 – located on the west end of the McCann Ranch in the northern part of Subarea A1, just south of the Clearwater River. Well 3 – located in the Nez Perce Business Park, which is just west of the Nez Perce National Historical Park in Spaulding.
- IDWR and Ralston Hydrologic Services Inc., plan to look for more opportunities to include existing wells in the monitoring network. In some cases, this requires monitoring tubing to be installed in the wells.

References

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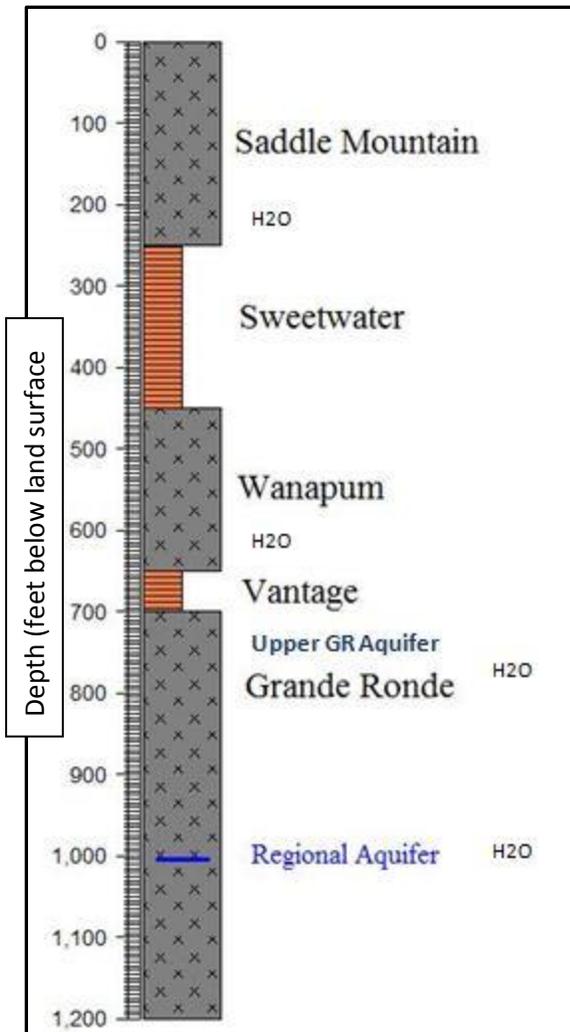


Figure 1. Typical stratigraphic section in the Lindsay Creek area of the Lewiston Plateau Ground Water Management Area.

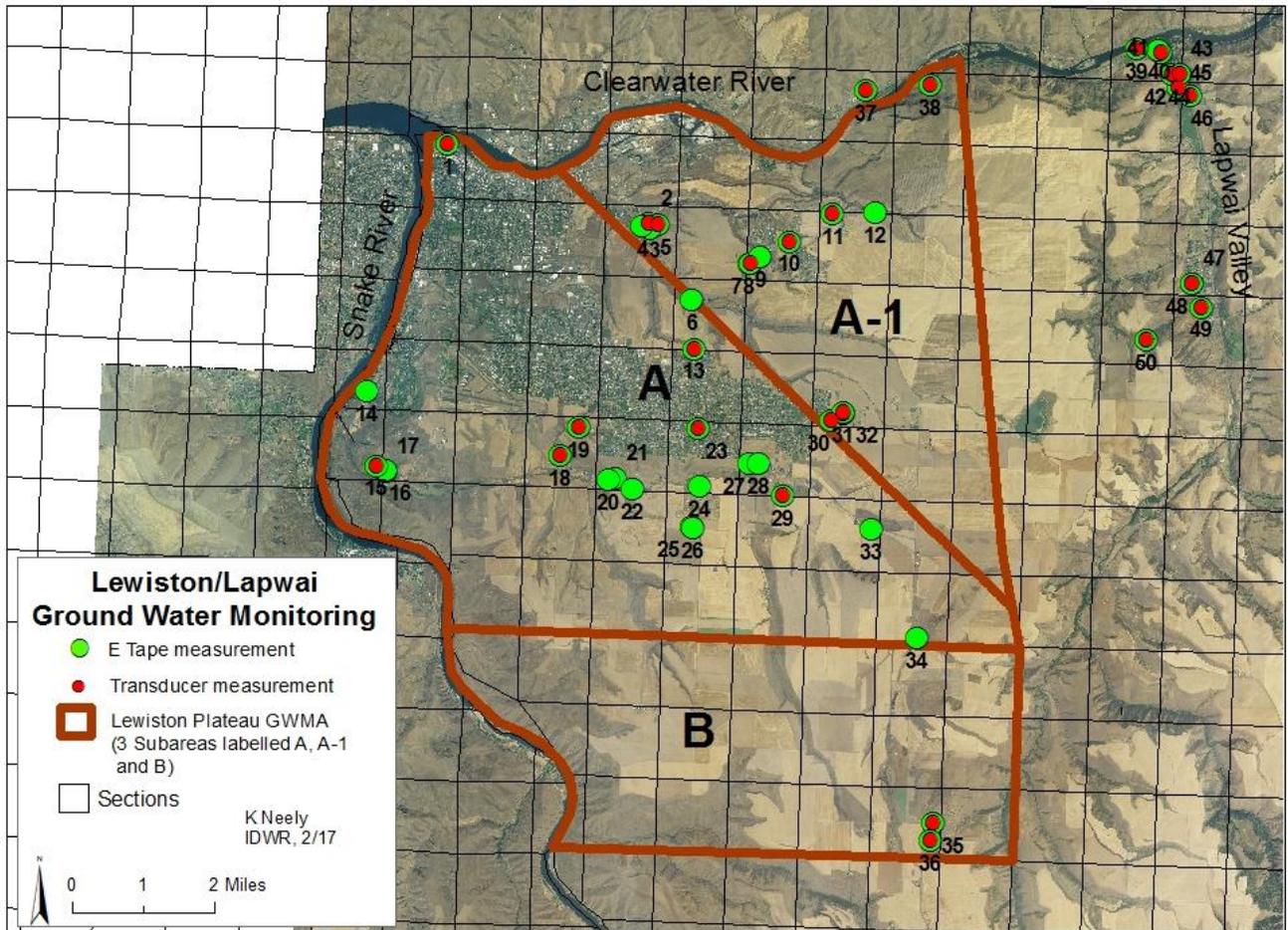


Figure 2. Ground water monitoring network for the Lewiston Plateau Ground Water Management Area, and the Lapwai Valley.