



Oregon

Kate Brown, Governor

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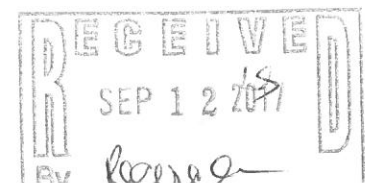
September 12, 2017

Acting on behalf of the Oregon Water Resources Department, I have prepared these comments regarding recent correspondences to the Department from a community member of Dunes City, as well as the City of Dunes City, raising concerns about the potential for a new well that was recently drilled (log ID: LANE 75118) to have severe negative impacts on groundwater and surface water in the area and specifically Woahink Lake. The Department feels that there are two main parts to this concern: one being the impact of well LANE 75118 on the natural groundwater and surface water system and the other being the legality of the well and the use of the water. This letter addresses the former while the latter issue can be handled at the local government level and through communications with the district Watermaster in Roseburg.

The geology of the Dunes City area and surrounding Mid-Coast consists of a thick sequence of 40-50 million year old marine sandstone, mudstone, and shale that began as sea-floor sediments and was scraped up onto the continent to form the Coast Range Mountains. This massive chunk of rock is referred to as the Tyee Formation and is several thousand feet thick, extending as much below sea level as above. The Tyee Formation is a tightly compacted mass of sediments that hosts groundwater primarily in fractures that crisscross through the rock. Because these fractures are typically narrow, and the surrounding rock is dense and tight (little pore space), groundwater from wells can be difficult to come by and well yields are generally low.

The attached set of figures summarize well log information taken from OWRD's Well Log Database for T19S, R12W, Sections 23 and 26, the section in which LANE 75118 was drilled and adjacent section to the north. Well yields in these Sections range from < 1 to 20 gallons per minute. Since these fractures vary in size (width and length) and may or may not be efficiently connected to one another, one well may penetrate a productive fracture and produce a good amount of water while a nearby well may produce little or no water. It is worth mentioning that the presence of a "dry" well does not mean that there is no water in the rocks, only that the well did not encounter a sufficiently productive set of fractures to produce usable amounts of water. Because water moves so slowly in these rocks, high salinity is occasionally encountered in deeper wells, but this is primarily the result of old seawater that was trapped within the rock before it was scraped onto the land and not seawater intrusion. Overlying the Tyee Formation rocks are much more recent sand dune deposits that extend from a few miles inland out to the ocean and range in thickness from 0 feet at the eastern edges to over 100 feet westward. These materials are much more productive (wells produce greater amounts of water) but limited in area.

LANE 75118 was drilled within the Tyee rocks and although it was completed to a depth of 430 feet, the driller's log reports water-bearing zones from 171 to 412 feet. The depth of the water-bearing zone, as interpreted by a well driller, generally means the depths where productive quantities of water are encountered. Water likely exists above these zones but the rock is too tight to get much water out. The driller's log for LANE 75118 also reports a water level in the well of 31.2 feet below ground level. Most other well logs in the area report similar water levels. This level represents the water level in the Tyee rock aquifer. The surface of Woahink Lake is approximately 70 feet below the ground level of the well.



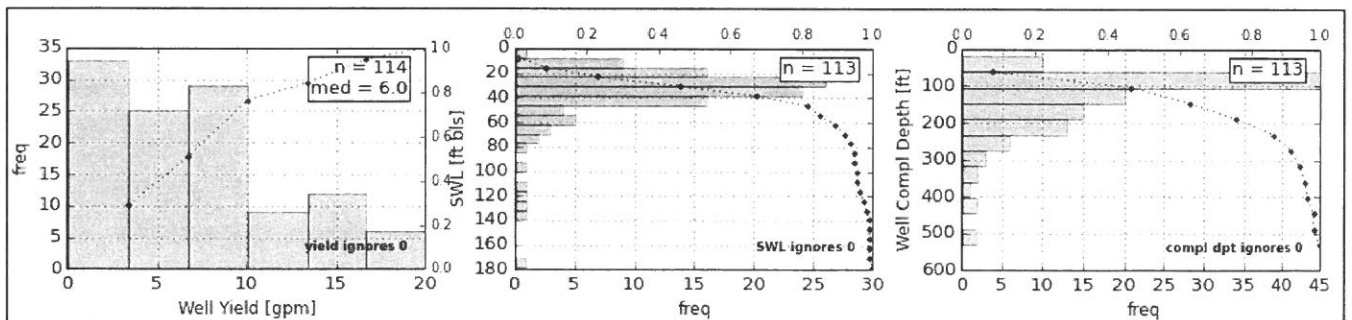
Groundwater works similar to surface water so since the groundwater level is higher in the well than the lake level, this means that groundwater is flowing down towards the lake. It would take an unreasonably high pumping rate and a long time pumping for this to be reversed and the well to begin taking water directly from the lake. Given that the well yield reported for LANE 75118 is 14 gallons per minute, it is unlikely that even heavy use of this well will significantly impact the lake. Ultimately, the depth of the well has no effect on the groundwater system and a 400 feet deep well will have about the same impact as a 100 feet well, specifically since the water level in the well LANE 75118 is similar to the other wells in the area. At 430 feet deep, the well is producing from the same aquifer as other wells. There are several other wells in the area that are > 200 feet deep and a few are also over 400 feet deep. These deep wells should be no more of a concern than any other well.

Salt-water intrusion should similarly be of no greater concern with any new well or deep well. As with the relation with the lake, the elevation of the groundwater is much higher than the ocean level meaning that groundwater is flowing toward the ocean. The presence of the Coast Range and the high rainfall amounts in the Oregon Coast (roughly 70 – 90 inches per year) provide a constant, large, natural flow of groundwater toward the ocean and it would be very difficult to reverse this flow direction and induce saltwater intrusion based on use of any individual well or even the combined use of wells in the area given the fact that well yields are so low. Seawater intrusion is much more of a concern in areas 1) that receive little rainfall, 2) where the topography is low and flat, which means less groundwater flow toward the ocean, and 3) where groundwater pumping is high, such as large cities.

These comments were prepared by:

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OWRD Well Log Database: http://apps.wrd.state.or.us/apps/gw/well_log/Default.aspx



From left to right: distribution of well yields; distribution of static water levels; distribution of well depths. All data are taken from driller's logs