

Linking Surface-Ground Water Interactions to Future Growth

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The Facts

To effectively manage the Rathdrum-Prairie aquifer, it is critical to understand the complex relationship between surface and ground water.

About 50% of the water recharging the aquifer comes from the Spokane River both on the Idaho side and the Washington side. The Spokane River and the aquifer are not directly connected within the state of Idaho. However, surface water does flow (or leak) from the river and lakes in Idaho to the aquifer in a one-way flow of water. By contrast, the river and aquifer are hydrologically connected west of the state line, in Washington. This means water flows both ways, from surface to ground and ground to surface until, eventually, about 75% of the aquifer outflow recharges the Spokane and Little Spokane Rivers and about 25% is consumptively used (see pages 12-20 in the 2009 Aquifer Atlas).

With maximum build-out projected for Idaho over the next 50 years, as explained in the water demand study (SPF Water Engineering, 2010), consumptive use of the aquifer would increase to a total of about 7% of total average annual recharge flow due to evaporation and evapotranspiration generally associated with irrigation of landscapes and crops. Because of the relationship between surface and ground water, this increase in consumptive use of groundwater would not affect the water level or any users of the aquifer in Idaho. However, it would decrease the level of streamflow in the Spokane River in Washington. This relationship plays out in at least three different ways:

- Pumping groundwater near the river in Washington is felt very quickly in the river because surface and groundwater is hydrologically connected.
- By contrast, pumping groundwater in Idaho anywhere in the aquifer will have no affect on the river in Idaho. The portion of pumping that creates consumptive use of the aquifer in Idaho will affect the Spokane River a significant time later (weeks or months) somewhere beyond the Barker Road Bridge in Washington (plus or minus).
- Consumptive use of groundwater in Idaho closer to the state-line will be felt by the river in Washington faster than pumping groundwater in Idaho further away from the state-line.

To further complicate the interaction of surface and ground water, consumptive use from the aquifer spikes in the summer months, thereby decreasing leakage from the aquifer to the river in Washington. This means downstream river flows decrease but the timing of those effects and the management tools necessary to meet desired streamflow in Washington are not well understood compared to near-river pumping effects in Washington.

Implications

Better understanding of the interactions between surface and ground water (especially timing) is critical because it will help inform decisions about future growth and its impact on the aquifer and the river.

There may be places where communities in Idaho can grow and pump groundwater that is far enough from the river that the impact to the streamflows during critical periods (primarily between mid-July through mid-September when AVISTA starts releasing water from Post Falls) will be mitigated.

As a matter of public policy, the Advisory Committee may want to “encourage future growth and/or pumping where it will minimize the impact to the river and aquifer.”

To further clarify “where to grow,” the conclusion at the April meeting of the Advisory Committee was to use the existing bi-state aquifer model and complete a series of modeling runs (starting with the projected growth in 2060 as specified in the water demand study) for the critical periods that show:

- (a) River and aquifer flow Variations on a month-by-month basis; and
- (b) Variations in consumptive use (i.e., does cfs increase or decrease by month?)

While this information will be instructive, the challenge on this point is how to provide the Advisory Committee enough information to understand the interaction of surface and ground water and the impact of that relationship on future growth, and getting caught in the weeds of trying to understand exactly where growth should occur. As with other issues in CAMP, it seems that the Advisory Committee should be providing high-level guidance and policy recommendations and not detailed operational suggestions.

Notes

1. Prepared by Todd Tondee, Paul Klatt, and Bob Haynes with the assistance of Matt McKinney.
2. Attach the “losing and gaining reach” slides from the April meeting.