Lee, Karl K. and John C. Risley. "Estimates of Ground-Water Recharge, Base Flow and Stream-Reach Gains and Losses in the Willamette River Basin, Oregon." USGS, Portland Oregon: 2002. (Reviewed by Eleanor Gordon)

This paper details the USGS's use of various models to measure various changes in groundwater capacity of the Willamette Basin. These methods include precipitation runoff models, base-flow separation techniques, and stream gain-loss measurement. The measurements of runoff were made at 216 subbasins in the valley, while recharge and base flow were measured daily and used as a comparison to the precipitation model. Stream gains and losses were measured on five tributaries and sections of the Willamette River, including the Middle Fork Willamette, Willamette, South Yamhill, Pudding and South Santiam rivers. These data were used to monitor the change in river reaches both spatially and temporally. Most of the paper consists of the details of the studies carrried out using these three modeling systems.

The authors identify the increasing demand for water in the Willamette basin as due to the increase in industry, agriculture and urban populations in the area. The lack of summer rainfall is problematic for water usage in the summer; consequently the ground water is relied upon and depleted during the summer months. This study addresses the surface water/ground water interactions and how to control groundwater decline. It is also helpful that the authors provide a summary of the Willamette basin area, including climate, geology and watershed history.

Critique

While this paper is extremely interesting and comprehensive, it proves a little dense for those not accustomed to carrying out systematic studies to measure groundwater interactions. The language and descriptions of the study prove a bit much for the lay reader. Still, the resource is invaluable and makes good connections between Willamette River water resource use and the use of groundwater, while also giving a geologic base for this connection. I found the methodology interesting, as were the numerous maps and graphs and tables within the text that highlight the key information.

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