Abstract

An abstract of the thesis of Jason Michael Melady for the Master of Science in Geohydrology presented June 12, 2002.

Title: Hydrogeologic Investigation of the Klamath Marsh, Klamath County, Oregon.

Klamath Marsh is a wetland complex that lies in the rain shadow of the Cascade Range in the Williamson River sub-basin of the Klamath Basin. The marsh lies directly east of Crater Lake in an area inundated by pyroclastic-flow and -fall deposits from the Holocene eruptions of Mount Mazama. The physical characteristics of rocks of Pleistocene versus Pliocene age combined with NNW-striking fault systems divide the Williamson River basin into two distinct hydrogeologic regimes. The northwestern regime includes the east slope of the Cascades and consists of at least 150 m of interbedded sand, gravel, and stacks (15 to 45 m) of thin (3-5 m) and vesiculated basalt lava flows. Mean annual precipitation ranges from 150 cm near the crest of the Cascades to 50 cm near Klamath Marsh. Moderate to high yield (100 to 4000 gpm) water wells, springs and flowing wells suggest high permeability and ground water potential. The southeastern regime is underlain by Pliocene pyroclastic flows (~40 m) and lava flows (>30 m). Mean annual precipitation ranges from 70 cm in the highlands to 50 cm in the lowlands. Low-yield (20-100 gpm) water wells and perched unconfined aquifers in Holocene pumice deposits suggest low permeability and low ground water potential in areas underlain by the pyroclastic flows. Volumetric analysis of inflows and outflows in Klamath Marsh for 2000 indicates approximately 86% of inflow is from
groundwater and 14% from surface water, with nearly $200 \times 10^6 \text{ m}^3$ of water removed by evapotranspiration.