



Oregon

Theodore R. Kulongoski, Governor

Water Resources Department

North Mall Office Building
725 Summer Street NE, Suite A
Salem, OR 97301-1271
503-986-0900
FAX 503-986-0904

MEMORANDUM

TO: Water Resources Commission

FROM: Barry Norris, Technical Services Division

SUBJECT: Agenda Item I, June 1, 2007
Water Resources Commission Meeting

Klamath Basin Hydrology Report

I. Issue Statement

The U.S. Geological Survey (USGS) and the Oregon Water Resources Department (OWRD) have released a report on ground water hydrology in the Upper Klamath Basin. The report, "Ground-Water Hydrology of the Upper Klamath Basin, Oregon and California," can be viewed on the web and is available free of charge from the USGS. The Department will report on the release of the cooperative USGS/OWRD Klamath Basin Hydrology report and outreach efforts in the basin.

II. Background

In 1998 USGS and OWRD signed a cooperative agreement to study ground water in the Upper Klamath Basin. Hydrologists from the California Department of Water Resources participated in data collection, and the U.S. Bureau of Reclamation provided funding. The "Ground-Water Hydrology of the Upper Klamath Basin, Oregon and California" report is the first report of two that will result from this cooperative effort. The first report characterizes the hydrology and geology of the basin. Although the ground water-surface water connection has long been understood and documented in earlier studies, this report is the first to provide quantitative estimates of ground water discharge to streams over the entire basin.

III. Discussion

The upper Klamath Basin is approximately 8000 square-miles in area and spans the California-Oregon border. The basin is semiarid, with most of the basin interior averaging less than 20 inches of precipitation each year.

Of the roughly 10 million acre-feet of precipitation that falls on the upper Klamath Basin each year, 2 million acre-feet enter the ground water system. Most of this, approximately 1.8 million acre-feet, discharges to streams through major spring complexes. Generally, ground water flows from principal recharge areas in the Cascade Range and eastern margins of the basin toward discharge areas in the lake basins and stream valleys. Ground water discharge varies seasonally, and from year to year, in response to climate cycles. Larger spring discharges, such as those feeding the Wood

River and Spring Creek located above Upper Klamath Lake, can vary by a factor of two. For decades, hydrologists have recognized that much of the water flowing into Upper Klamath Lake originates as ground water, discharging directly into the lake and tributary streams within 12 miles of the lake. Considerable effort was spent during this investigation quantifying the hydraulic relationship between ground water discharge and the Upper Klamath Lake.

There are approximately 500,000 acres of irrigated agriculture within the basin, of which approximately 60,000 acres were irrigated using ground water in 2000. As a response to water shortages beginning in 2001, use of ground water has increased significantly. In 2000 approximately 150,000 acre-feet of ground water was pumped for agriculture use, while in 2004 it is estimated 226,000 acre-feet of ground water was used. Prior to 2001, year to year ground water-level declines were rare. The significant increase in pumping since 2001 has resulted in local area, year-to-year declines exceeding 15 feet in some areas.

The timing and distribution of the effects of ground water use relate to pump location. If pumping occurs near discharge areas such as springs, flow from those springs can diminish relatively quickly. Springs affected by pumping in the past include those in the Lost River subbasin including Bonanza Springs, and those near Whisky Creek in the Sprague River subbasin.

The second and final ground water report to be released as part of the USGS/OWRD cooperative investigation will provide an extensively calibrated hydrologic flow/optimization model. This model will be used to simulate ground water system response to new ground water development. Additionally, it will be used to test and optimize various water management objectives for the basin. The report is scheduled for release in the fall of 2008.

IV. Recommendation

This is an informational report. No Commission action is required.

Barry F. Norris, Administrator
(503) 986-0828