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Hydrology, Water Chemistry, and Revised Water Budgets for Tracy Segment Hydrographic Area, Storey, Washoe, and Lyon Counties, West-Central Nevada, 1998-2002

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ABSTRACT

Growth of the Reno/Sparks metropolitan area has resulted in development of rural and undeveloped land in the nearby Tracy Segment Hydrographic Area. A study of hydrology, inorganic water chemistry, distribution and movement of ground water, and water budgets for the 285 square mile hydrographic area began in 2000. Streamflow from the Truckee River and precipitation are dominant inflows of water to the Tracy Segment, and combined streamflow from the river and the Truckee Canal, along with evapotranspiration and consumptive water-use are the primary outflows. Estimated long term (1971–2000) mean-annual precipitation ranges in the study area from 150,000 to 200,000 acre-feet per year and during this study (water years 1998–2002) the range was adjusted from 130,000 to 174,000 acre-feet per year. Water year used herein is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which the 12-month period ends. Data from two micrometeorological stations located at 5,000 and 6,000 feet above sea level indicated that evapotranspiration of surface and soil moisture consumed 124,000 to 158,000 acre-feet per year during water year 2002. An additional 6,000 acre-feet per year is estimated to be transpired from ground water by phreatophytes.

Average flow of the Truckee River (water years 1998–2002) was 614,000 acre-feet per year at the upstream Tracy Segment Hydrographic Area boundary and 616,000 acre-feet per year near the downstream boundary crossed by the Truckee River and Truckee Canal. Five active agricultural diversions and one industrial diversion total an average flow of 9,000 acre-feet per year. About 5,000 acre-feet per year of flow may discharge to the river from tributary ephemeral channels. Streamflow data indicate a net gain of 11,000 acre-feet per year from ground water. Seepage loss to ground water beneath the Truckee Canal was estimated to be about 9,000 acre-feet per year, much of which contributed to gains in the lower reach of the river.

Depth to water at 30 wells ranged from about 25 feet above land surface at a flowing well completed in permeable bedrock to more than 400 feet below land surface in a test well completed in bedrock beneath an alluvial fan. Water levels measured in wells completed in

basin-fill deposits near the Truckee River are less than 30 feet below land surface and indicate a hydraulic gradient that parallels the river. Subsurface inflow from the Fernley Hydrographic Area was estimated at 3,200 acre-feet per year, most of which was from diverted irrigation water. Ground-water pumpage (2000) was 8,200 acre-feet per year and subsurface outflow to Dodge Flat Hydrographic Area was estimated at 2,400 acre-feet per year.

Ground-water samples collected from 11 wells indicated that ground water generally is suitable for drinking water and industrial supplies with a few exceptions. Concentrations of dissolved arsenic exceeded the current maximum contaminant level (50 micrograms per liter) at two sites and the future maximum contaminant level (10 micrograms per liter) was exceeded at four additional sites. The proposed maximum contaminant level for dissolved radon gas (300 picocuries per liter) was exceeded in 10 of the 11 samples collected. Secondary maximum contaminant levels for dissolved fluoride, manganese, iron, and dissolved solids were exceeded at three, two, one, and two wells, respectively. Stable isotopes of hydrogen and oxygen in samples indicate that 8 ground-water samples are mixtures of 11–94 percent Truckee River water and ground water represented by samples from 3 wells completed in the mountain blocks.

Water-budget estimates for water years 1998 through 2002 indicate total inflow ranged from 748,000 to 791,000 acre-feet per year and outflow ranged from 759,000 to 793,000 acre-feet per year. Ground-water inflow ranged from 78,000 to 101,000 acre-feet per year and outflow was 88,000 acre-feet per year. Surface water of the Truckee River dominates both total- and ground-water budget estimates, comprising about 80 percent of total inflow and outflow, and about 61 and 81 percent of ground-water inflow and outflow, respectively. Ground-water pumpage is about 9 percent of ground-water discharge.

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- **Scientific Investigations Report 2006-5010.pdf** (13.2 MB)
- **Appendix1** (191 kb)
- **Appendix2** (116 kb)

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