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MAPS SHOWING GROUND-WATER UNITS AND NUMBER OF LARGE CAPACITY WELLS, BASIN AND RANGE PROVINCE, OREGON

by

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INTRODUCTION

This report on ground-water units and large capacity wells, in the Basin and Range province of Oregon (see index map) was prepared as part of a program of the U.S. Geological Survey to identify prospective regions for further study relative to isolation of high-level nuclear waste (Bedinger, Sargent, and Reed, 1984), utilizing program guidelines defined in Sargent and Bedinger (1984). Also included in this report are selected references on pertinent geologic and hydrologic studies of the region. Other map reports in this series contain detailed data on ground-water quality, surface distribution of selected rock types, tectonic conditions, areal geophysics, Pleistocene lakes and marshes, and mineral and energy resources.

In the Basin and Range province, ground water occurs in basin-fill deposits and consolidated rocks. The basin fill consists mostly of unconsolidated to semi-indurated sedimentary deposits. The material ranges from poorly sorted to moderately sorted mixtures of gravel, sand, silt, and clay that were derived from the consolidated rocks in the nearby mountains. Evaporite deposits, limestone, conglomerate, and volcanic rocks are present in places in the unit. Some of the basins may contain as much as 9,000 feet of basin fill, but the most permeable rocks and most of the recoverable ground water is in the upper 1,000 feet of the unit.

The consolidated rocks consist mostly of sedimentary and volcanic rocks, with lesser amounts of metamorphic and intrusive rocks. The consolidated rocks make up the mountain ranges that border the basins and are the principal source of sedimentary material to the basin fill.

GROUND-WATER UNITS

This map shows boundaries of ground-water units, generalized directions of ground-water flow at the water table, areas of natural discharge to streams and lakes, areas of natural discharge by evapotranspiration in areas underlain by ground water at shallow depths, and the distribution of consolidated rock outcrops and areas underlain by basin fill.

Ground-water unit boundaries are based primarily on ground-water divides or surface streams. The ground-water table is used to delineate ground-water units in a manner analogous to the way land-surface topography is used to delineate drainage areas. Where information is available, water-level contour maps were used to define the boundaries. Where data on ground-water levels were lacking, ground-water unit boundaries were drawn on topographic divides that were assumed to overlie water-table divides.

Ground-water units shown on the map may contain one or more areas of natural recharge and natural discharge or ground-water withdrawal by wells. Some ground-water units comprise closed flow systems at the water table; that is, no ground-water flow occurs across the ground-water unit boundaries. However, ground-water flow may occur across some unit boundaries in basin-fill or consolidated-rock aquifers.

NUMBER OF LARGE CAPACITY WELLS

Systematic records of ground-water withdrawal have not been made for ground-water units in the Basin and Range province of Oregon. Estimates of withdrawal for 1980 are 41.8 million gallons per day for the Klamath River basin, including Swan Lake and Alkali Lake Valleys, and the Lost River basin; 9.8 for Goose Lake Valley, and 45.8 for the remaining ground-water units. Estimates of withdrawal were furnished for this report by J.K. Reid (written commun., 1982). The accompanying map shows the magnitude of ground-water development by indicating the number of large capacity wells (greater than 100 gal/min) in each township.

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