

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

TO ACCOMPANY
WRI REPORT 83-4120-B

MAPS SHOWING GROUND-WATER LEVELS, SPRINGS, AND
DEPTH TO WATER,
BASIN AND RANGE PROVINCE, OREGON

by

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INTRODUCTION

This report on ground-water levels, springs and depth to ground water 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.

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. Also volcanic flows and air falls are present in places in the unit.

The consolidated rocks consist mostly of volcanic basalt and andesite flows, rhyolitic ash-flow tuffs, bedded tuff, and rhyolite domes. 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 LEVELS AND SPRINGS

The accompanying map shows the altitude of the ground-water level and the discharge and temperature of selected springs. This information was obtained primarily from reports listed in the "Selected references" and from files of the U.S. Geological Survey. The altitude of the ground-water level is shown by contours in those areas where sufficient data exist. In other areas, where regional data are inadequate to contour, data on selected wells are shown.

Ground-water-level changes occur daily, seasonally, and yearly in response to natural and man-induced hydrologic conditions. The ground-water-level map is a compilation of water-level measurements taken over a number of years. However, for any one ground-water study area the measurements generally were made during a relatively short time period. Collectively, the ground-water levels show the regional configuration of the ground-water surface.

Similarly, water temperatures and discharges of springs may vary with time. The reported values for individual springs were taken at one time; however, collectively the springs were measured over a number of years. Springs may issue from perched water tables or may be under artesian pressure; under these conditions the altitude of springs do not correspond to the altitude of the regional water table.

Depressions in the water table have been created in many areas of large concentrated ground-water withdrawal. Major withdrawal areas are approximately located on the map and may be the principal discharge mechanism for many of the ground-water flow units. The water table in these areas fluctuates seasonally in response to changes in rates and distribution of ground-water withdrawal. In addition, within areas where ground-water withdrawal has increased, predevelopment of ground-water flow patterns commonly have been altered.

DEPTH TO GROUND WATER

The accompanying map shows the approximate depth to ground water below the land surface. In the basin fill, ground water moves in a continuous system, although perched ground water may occur in places. In areas with good topographic control, the depth to ground water can be predicted with reasonable accuracy between widely-spaced water-level data points, except where geologic discontinuities, such as faults, may alter the flow pattern. Where data are sufficiently closely spaced, lines of equal depth to water are shown; where data are inadequate to draw lines, data from selected wells are shown. In consolidated rocks, indicated by shaded patterns on the map, ground water occurs in poorly interconnected joints and fractures; water levels in wells may vary in depth within short distances, and numerous zones of perched water may exist.

Line patterns approximately delineate zones within which the depth to ground water is inferred to be greater than 500 feet. These are highly generalized areas based on very limited data on depth to ground water in wells tapping consolidated rock and basin fill and mine shafts; and on information gained from the location and discharge rates of springs, locations of gaining and losing reaches of streams; and estimates of geohydrologic conditions in areas. The areas delineated as possibly having depths to ground water of greater than 500 feet are recognized as having potential for evaluating prospective environments for isolation of high-level nuclear waste in the unsaturated zone.

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