EXPLANATION Sand, gravel, and silt deposited by rivers and streams, including Sutherlin and Calapooya creeks and the Umpqua River. Thickness generally less than 30 feet. Some local occurrences in addition to those shown on map. Permeable, but the saturated thickness generally is small except in a few places, such as adjacent to the Umpqua River in the Cleveland Rapids area, Shallow wells may be subject to pollution if improperly constructed. (See current well-drilling regulations of the Oregon State Engineer) Landslide debris Debris of Tertiary rocks. Yields to wells probably low. Lies mostly above water table. Tyee Formation Thin-bedded and massive sandstone and siltstone. Generally well-indurated marine rocks, as much as 2,000 feet thick in mapped area. Yields to wells range from less than a fourth to about 15 gal/min. Rocks form mountainous areas of high relief. Depth to water and total depth of wells generally greater than for other formations. Umpqua Formation Tus, sandstone and siltstone; thin bedded. Also contains massive, well-indurated conglomerate. Tub, basalt member. Consists of basalt flows and basaltic breccia, locally interbedded with siltstone and tuff. Also contains a few intrusive bodies of basalt and INDEX MAP OF WESTERN OREGON SHOWING Yields to wells range from less than 1 to more than 15 gal/min. Siltstone beds generally have a lower yield and a higher incidence of unsuccessful wells than do other rock types. Contact Approximately located _____ Inferred thrust fault Approximately located; sawteeth on upper plate - -Anticline Syncline Fold axis; arrow shows direction of plunge Stream sampling site for chemical quality Chemical character shown on sheet 2, in trilinear diagram, and in table Strike and dip of beds O^{36adb} Well 25S/5W-13acd Well and number General chemistry of water shown on man Chemical character also shown on sheet 2 in trilinear diagram, and in table Dissolved-solids concentration, MILLEQUIVALENTS PER LITRE Chemical diagram showing concentration of major ions FACTORS FOR CONVERTING FROM ENGLISH TO METRIC UNITS To obtain DIAGRAM OF WELL-NUMBERING SYSTEM Inches (in.) 2.54 Feet (ft) .3048 Metres (m) Kilometres (km) Miles (mi) Square kilometres (km²) 2.590 Square miles (mi²) Gallons (gal) 3.785 Litres (1) Litres per second (1/s) .06309 Gallons per minute (gpm) WESTHUSING (1959) Gallons per minute per metre (1/s/m) per foot (gpm/ft) PAYTON (1961 LAWRENCE R. 7 W. INDEX TO GEOLOGIC MAPPING SCALE 1:62500 Geology modified from Baldwin (1964), Hamp-Base from U.S. Geological Survey Sutherlin and ton (1957), Lawrence (1961), Patterson Glide 1:62,500, 1954 and Tyee 1:62,500, 1955 (1961), Payton (1961), and Westhusing (1959). Strikes and dips of beds from above reports. CONTOUR INTERVAL 80 FEET DASHED LINES REPRESENT 40-FOOT CONTOURS DATUM IS MEAN SEA LEVEL

GEOHYDROLOGIC MAP AND SECTION

INTRODUCTION

The purpose of this map report is to present information in a form that will enable water users, potential water users, and planners to estimate the likelihood of obtaining ground water in adequate quantity and of suitable quality at desired

The Sutherlin area is in Douglas County in southwestern Oregon and includes about 280 square miles (720 km²) entirely within the Umpqua River drainage basin.

The 1970 census showed about 8,000 people living in the area, 3,000 of whom were in the city of Sutherlin and 1,000 in Oakland. The economy is based on timber and wood products, agriculture, tourism and recreation, and some light manufacturing. Until 1961 mercury was produced from mines near the northeast edge of the area.

The city of Sutherlin obtains its municipal water supply from Cooper and Calapooya Creeks; Oakland also uses Calapooya Creek. The Umpqua Basin Water Association withdraws water from the North Umpqua River in sec. 33, T. 26 S., R. 6 W. The association supplies water for domestic needs to an area that includes Cleveland, Elgarose, Garden Valley, Wilbur, and north Winchester. The city of Roseburg serves the area south of Winchester with water obtained from the North Umpqua River.

GEOHYDROLOGY

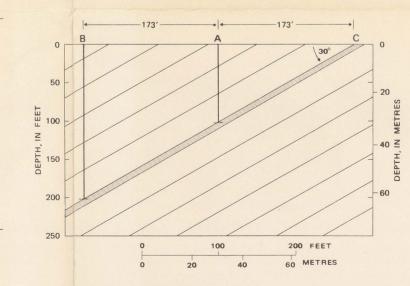
The surficial distribution of the geologic units is shown on the geohydrologic map. Some details of the geology that are important to the development of ground water are obscured locally, have not been mapped, or are not mappable at the scale of the map. Although alluvium is more widespread than shown, it is generally thin and unsaturated where it is not

Alluvium is the major aquifer adjacent to the Umpqua River in the western part of R. 6 W., east of Cleveland. For example, in sec. 19, T. 26 S., R. 6 W., the saturated thickness of the alluvium is sufficient to yield at least 10 gpm (gallons per minute) (0.6 1/s) to most wells. This is the only area where alluvium can ordinarily be expected to serve as an

The Tyee Formation underlies the entire northwest corner of the area. The formation dips about 15° to the west but is relatively undeformed. The rocks are marine, were deposited in moderately deep water, and are as much as 2,000 feet (600 m) thick. Wells are less than 300 feet (90 m) deep, and yields range from less than 1 gpm (0.06 1/s) to as much as 20 gpm (1.3 1/s).

The Umpqua Formation contains diverse rock types, but it has been mapped as dominantly thin-bedded siltstone and sandstone in the central part of the area, with some sandstone containing pebbles. In the southeast the major rock

type is basalt. The Umpqua Formation is deformed into a series of parallel northeast-trending anticlines and synclines. Baldwin (1964) has suggested the probable existence of a thrust fault in the southern part. Average dip of the Umpqua is 25°-30°; therefore, wells drilled only short distances apart may penetrate completely different beds of the formation. For example, the diagram showing depth-horizontal distance relation of dipping beds illustrates a hypothetical case where the dip is 30°. Well A penetrates the top of a particular bed at a depth of 100 feet (30 m); well B, only 173 feet (53 m) away and down-dip from A, would have to be drilled twice as deep to reach the top of the same bed. Near C, at a distance of more than 173 feet (53 m) up-dip from A, the top of the bed would be missing. Thus, wells in the same vicinity will frequently differ in type of materials penetrated and therefore in quantities of water yielded. Silt and clay are less permeable to the movement of water than is sand; wells that produce inadequate quantities of water for domestic use are likely to have been drilled where there is a substantial thickness of siltstone. Sandstone is not identified in most drillers' logs; where it is reported, it is usually less than half the total



thickness of materials penetrated.

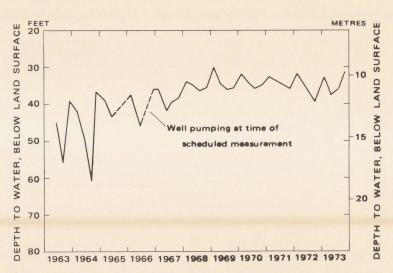
DIAGRAM SHOWING DEPTH-HORIZONTAL DISTANCE RELATION OF DIPPING BEDS

Water levels of wells range from slightly above land surface to as deep as 300 feet (90 m) below land surface. (See wellcharacteristics map, sheet 2.) In 90 percent of the sections, the deepest water level that has been reported is 70 feet (20 m) or less, and the average water level is 20 feet (6 m) below land surface. The interval of land-surface contours on the geohydrologic map is 80 feet (24 m). Depth to water in most places is less than one interval of land-surface altitude. A map showing contours of the average altitude of the water surface would be a virtual facsimile of the topography. Direction is an important factor in pollution studies, but probably neither topography nor water levels by themselves would be a good guide to the direction of ground-water movement. Water tends to move in response to differences in water levels, but permeability is usually greatest parallel to bedding planes, and the actual movement of water is substantially affected by the attitude of the beds, few of which are horizontal.

Water levels of most unpumped wells fluctuate seasonally about 4 to 6 feet (1 to 2 m), the highest levels occurring near the end of the rainy season, in late winter or early spring. The hydrograph of well 26S/5W-6aba, which reflects measurements made quarterly, shows a water-level response that is probably typical.

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OPEN-FILE REPORT (SHEET 1 of 2)

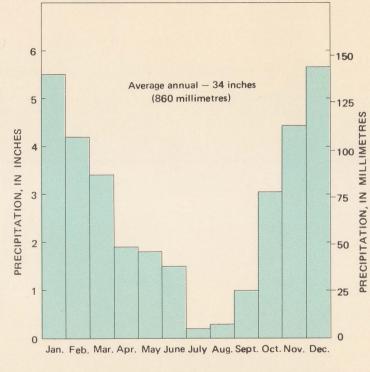


HYDROGRAPH OF WELL 26S/5W-6aba, FINISHED IN SEDIMENTARY ROCKS OF THE UMPQUA FORMATION

WATER USE AND AVAILABILITY

Most of the wells provide water for household use. This type of use is not ordinarily continuous; there are peak periods during the day when water is used for several purposes simultaneously, and there are slack periods when none is used. In addition to these fluctuations, water use varies seasonally, particularly if a lawn or garden is watered. Use during the warm, dry months of July and August is likely to be at least several times the use during the cold, wet months of December and January. Thus, a well that is adequate during winter might prove insufficient during summer. A well capable of yielding 5 to 10 gpm (0.3 to 0.6 1/s) usually is sufficient for a single household; smaller yields may suffice where an adequate storage tank or reservoir can be provided. Average daily household use is normally less than 100 gallons (380 1) per person.

Quantities of water obtainable from wells within the study area are not adequate for irrigation, municipal, nor large industrial use.



GRAPH SHOWING AVERAGE MONTHLY PRECIPITATION AT ROSEBURG (Based on data from National Weather Service)

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