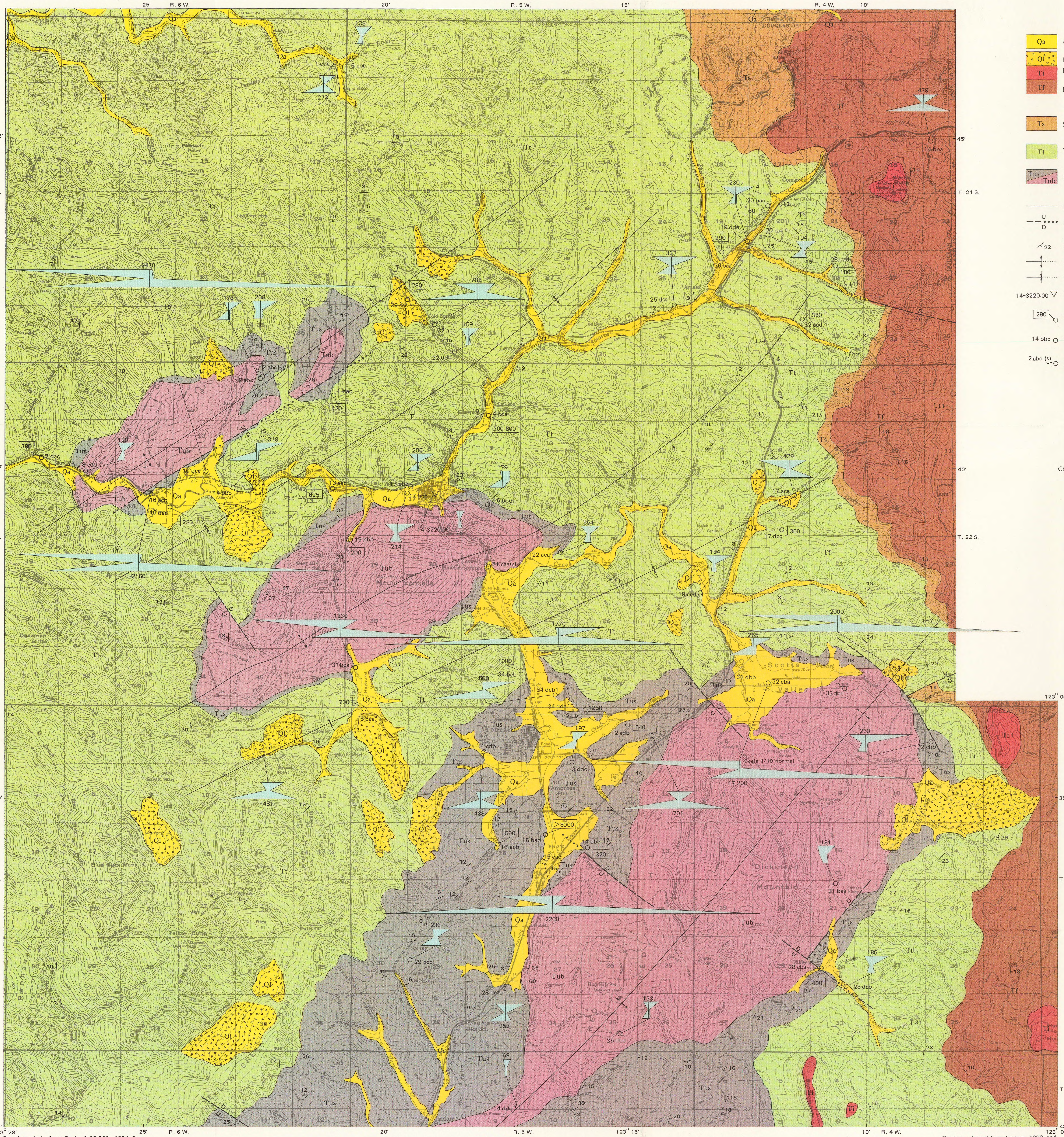
PREPARED IN COOPERATION WITH
DOUGLAS COUNTY

WATER-RESOURCES INVESTIGATIONS 76-105
OPEN-FILE REPORT (SHEET 1 of 2)



Base from Anlauf and Drain, 1:62,500, 1954; Crow, 1:62,500, 1942; and Cottage Grove, 1:62,500, 1957

SCALE 1:62 500

CONTOUR INTERVAL 25, 50, AND 80 FEET
DATUM IS MEAN SEA LEVEL

Geology adapted from Hoover, 1963, and Vokes, Snavely, and Myers, 1951.

GEOHYDROLOGIC MAP

DESCRIPTION OF MAP UNITS

- Qa — ALLUVIUM – Sand, gravel, and silt deposited by rivers and streams
- Ql — LANDSLIDE DEBRIS – Debris of Tertiary rocks
- Ti — INTRUSIVE ROCKS – Dikes, sills, and massive bodies of diabasic and basaltic composition
- Tf — FISHER FORMATION – Massive to poorly bedded andesitic tuff, breccia, conglomerate, sandstone, and siltstone, with some andesite flows. Up to 5,500 feet (1,700 m) thick a few miles east of study area
- Ts — SPENCER FORMATION – Massive to poorly bedded marine sandstone, interbedded siltstone, and tuff. Up to 500 feet (150 m) thick
- Tt — TYEE FORMATION – Thin-bedded and massive sandstone and siltstone. Generally well-indurated marine rocks, up to 5,000 feet (1,500 m) thick
- Tus / Tub — UMPQUA FORMATION (Roseburg Formation of Baldwin, 1974)
  Tus, sandstone and siltstone member
  Tub, basalt member

Contact – Approximately located

U / D — Fault – Approximately located; dotted where concealed. U, upthrown side; D, downthrown side

22 — Strike and dip of beds (see text)

Anticline – Fold axis; dotted where concealed

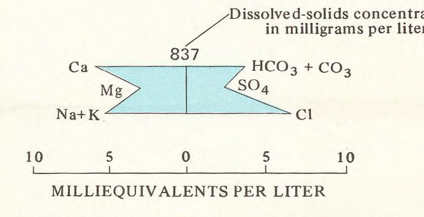
Syncline – Fold axis; dotted where concealed

14-3220.00 — Stream sampling site for chemical quality. General chemistry of water shown on map and in table

290 — Well – Specific conductance of water shown. Values in micromhos/cm at 25°C

14 bbc — Well – Location number shown. General chemistry of water shown on map and in table

2 abc (s) — Spring – Location number shown. Chemistry shown in table



Chemical diagram showing concentrations of major ions

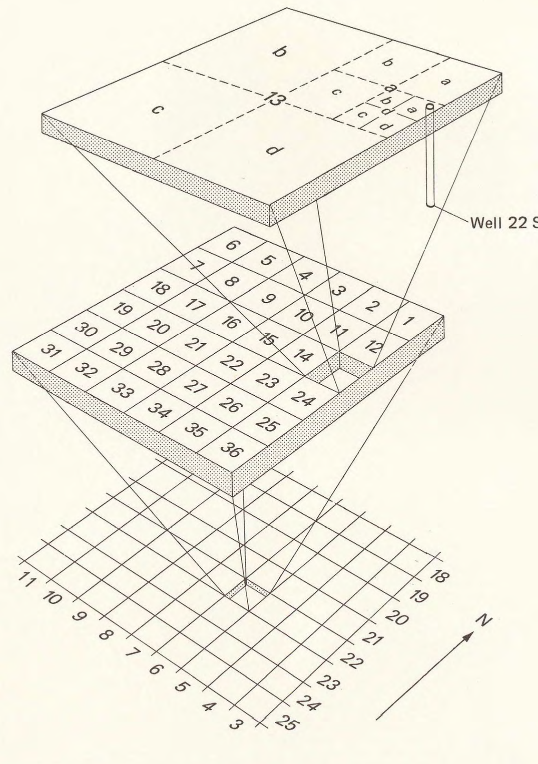
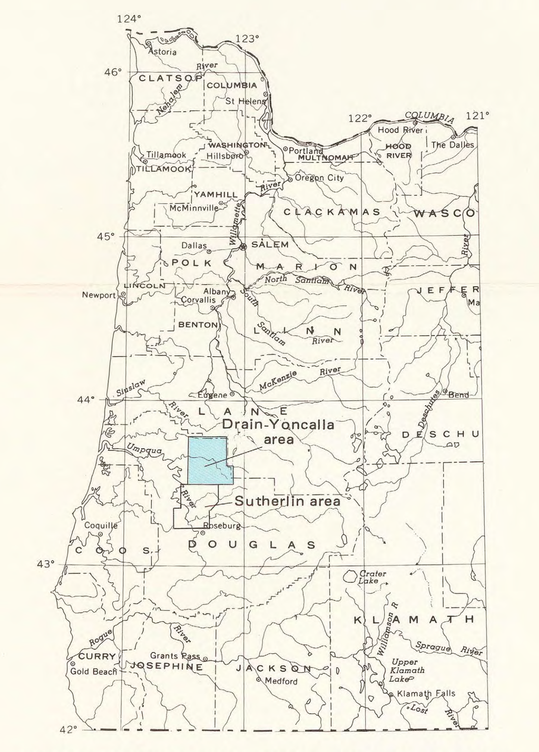


DIAGRAM OF WELL-NUMBERING SYSTEM



INDEX MAP OF WESTERN OREGON SHOWING LOCATION OF STUDY AREA

INTRODUCTION

The purpose of this report is to present information that may 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 locations within the study area.

The Drain-Yoncalla area is in Douglas County in southwestern Oregon, includes about 340 mi^2 (880 km^2), and lies within the Umpqua River drainage basin.

The 1970 census showed that about 4,000 people were living in the area, of whom 1,200 were in Drain and 700 were in Yoncalla. The economy is based on timber and wood products, agriculture, tourism and recreation, and railroading. Mercury has been mined intermittently near Elkhead, with some production as recently as 1971 (Ramp, 1972).

The city of Drain obtains its municipal water supply from Bear Creek and Yoncalla obtains its water from Adams Creek.

GEOHYDROLOGY

The surficial distribution of the geologic units is shown on the geohydrologic map. Some details of the geology that may be important to the development of ground-water supplies are obscured locally, have not been mapped, or cannot be shown at the scale of this map.

Alluvium floors the larger valleys, such as those formed by Pass, Yoncalla, and Elk creeks. Alluvium is more widespread than is shown on the map, but even where shown, it generally is thin. In the Drain-Yoncalla area there is little, if any, saturated permeable alluvium at depths greater than 18 ft (5 m), the minimum depth to which all new wells must be cased and sealed with cement grout. (Check with Oregon Water Resources Department regarding current well-construction regulations.)

The oldest rock exposed in the Drain-Yoncalla area is the Umpqua Formation, which has been subdivided into two mapping units. The basalt member consists mostly of basaltic flows and some interbedded tuff and siltstone. The overlying sandstone and siltstone member consists of as much as 5,000 ft (1,500 m) of mostly sedimentary rocks; they are fine grained and of marine origin. Most wells in the sedimentary rocks yield less than 10 gal/min (0.6 l/s). Well yields vary widely in the basalt members; the maximum yield reported is 40 gal/min (2.5 l/s).

The Tyee Formation, which overlies the Umpqua Formation, underlies much of the area, including the thinly populated highlands in the north and west. The rocks, an interbedded sequence of marine sandstone and siltstone, have a maximum thickness of about 5,000 ft (1,500 m). Yields to wells range from less than 1 gal/min (0.06 l/s) to more than 50 gal/min (3 l/s). Many of the higher yielding wells are less than 100 ft (30 m) deep, an indication that the most permeable zones generally are shallower than 100 ft (30 m). This suggests that chances are small for substantially increasing the yield of a well by drilling deeper than 100 ft (30 m).

The Spencer Formation crops out as a narrow belt in the northeastern part of the area. The formation consists of massive to poorly bedded sandstone, siltstone, and tuff. No records were available for any wells completed in the Spencer, but yields to any wells tapping the formation are likely to be small.

The Fisher Formation, which overlies the Spencer Formation, is made up of several types of sedimentary and volcanic rocks. It underlies the hills of the sparsely populated eastern part of the area. Only a few wells have been completed in the Fisher; yields available to wells commonly may be less than adequate for domestic supplies.

No wells have been reported in the intrusive rocks, which occupy small areas in mountainous terrain.

Landslide debris (see map) derived from underlying or adjacent formations may be variable as a source of water to wells.

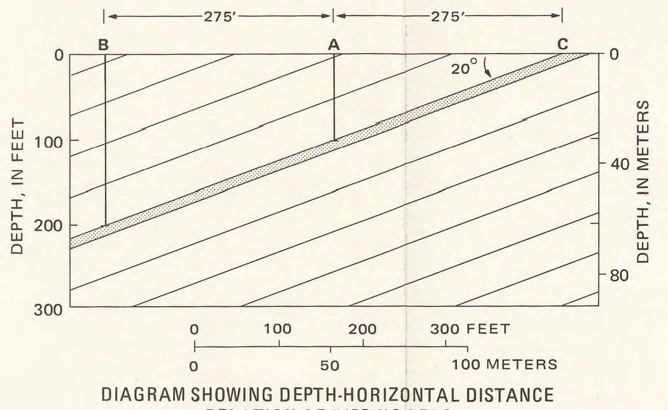
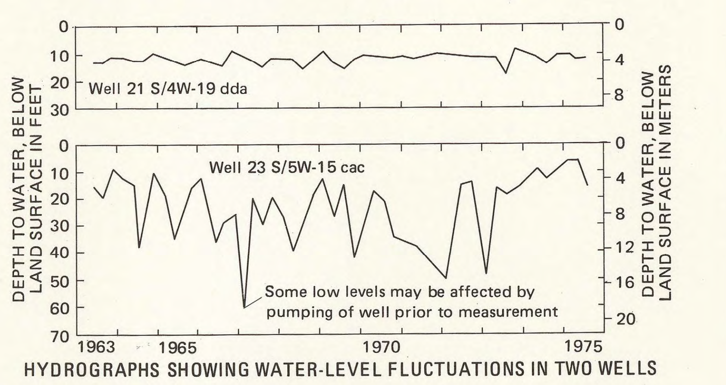


DIAGRAM SHOWING DEPTH-HORIZONTAL DISTANCE RELATION OF DIPPING BEDS

The Umpqua and Tyee Formations are deformed into a series of parallel northeast-trending anticlines and synclines. Average dip of the formations may be more than 15°. (The *dip* of a bed is its angle of inclination from an imaginary horizontal plane. The *strike* is the direction of a horizontal line on the bed. See geohydrologic map.) Therefore, wells drilled only short distances apart may penetrate completely different beds. For example, the diagram showing depth-horizontal distance relation of dipping beds illustrates a hypothetical case where the dip is 20°. Well A penetrates the top of a particular bed at a depth of 100 ft (30 m); well B, only 275 ft (84 m) away and downdip 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 275 ft (84 m) updip from A, the top of the bed would be missing. Thus, wells in the same vicinity frequently differ in type of materials penetrated and therefore in quantities of water yielded.

Depth to water in wells ranges from slightly above land surface to as deep as 256 ft (78 m). In most places, the depth to water is less than one contour interval of land-surface altitude (80 ft, or 24 m). Thus, a map of the altitude of the water table would be a virtual facsimile of the topographic base. Water tends to move in response to differences in water levels, but permeability, and therefore water movement in the report area is usually greatest parallel to bedding planes in a formation, which are seldom horizontal.

Water levels of wells that are unaffected by pumping fluctuate seasonally about 4 to 6 ft (1 to 2 m), the highest levels occurring during the rainy season, in winter or early spring. Wells that are pumped or are affected by nearby pumping may show a greater range of fluctuation. The hydrographs of wells 21S/4W-19dda and 23S/5W-15cac reflect measurements made quarterly and show responses that are typical.

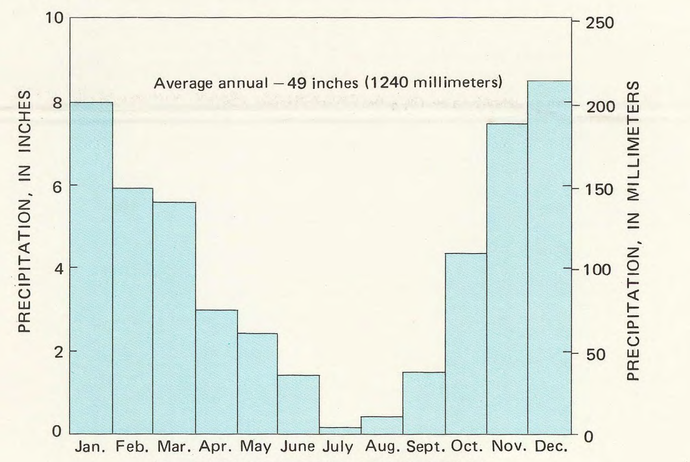


HYDROGRAPHS SHOWING WATER-LEVEL FLUCTUATIONS IN TWO WELLS

WATER USE

Most wells provide water for household use. This type of use ordinarily is not 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 to be inadequate during summer. A well capable of yielding 5 to 10 gal/min (0.3 to 0.6 l/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 gal (380 l) per person exclusive of outdoor uses.

In most places the quantities of water obtainable from wells are inadequate or would be only marginally adequate for irrigation, community, or large industrial use.



GRAPH SHOWING AVERAGE MONTHLY PRECIPITATION AT DRAIN

(Based on data from National Weather Service)

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FACTORS FOR CONVERTING FROM ENGLISH TO METRIC UNITS

Multiply	By	To obtain
Inches(in)	25.4	Millimeters(mm)
Feet(ft)	.3048	Meters(m)
Miles(mi)	1.609	Kilometers(km)
Square miles(mi^2)	2.590	Square Kilometers(km^2)
Gallons(gal)	3.785	Liters(l)
Gallons per minute(gpm)	.6309	Liters per second(l/s)
Gallons per minute per feet(gpm/ft)	.207	Liters per second per meter(l/s/m)

AVAILABILITY AND QUALITY OF GROUND WATER IN THE DRAIN – YONCALLA AREA, DOUGLAS COUNTY, OREGON

By J. H. Robison and C. A. Collins, 1976