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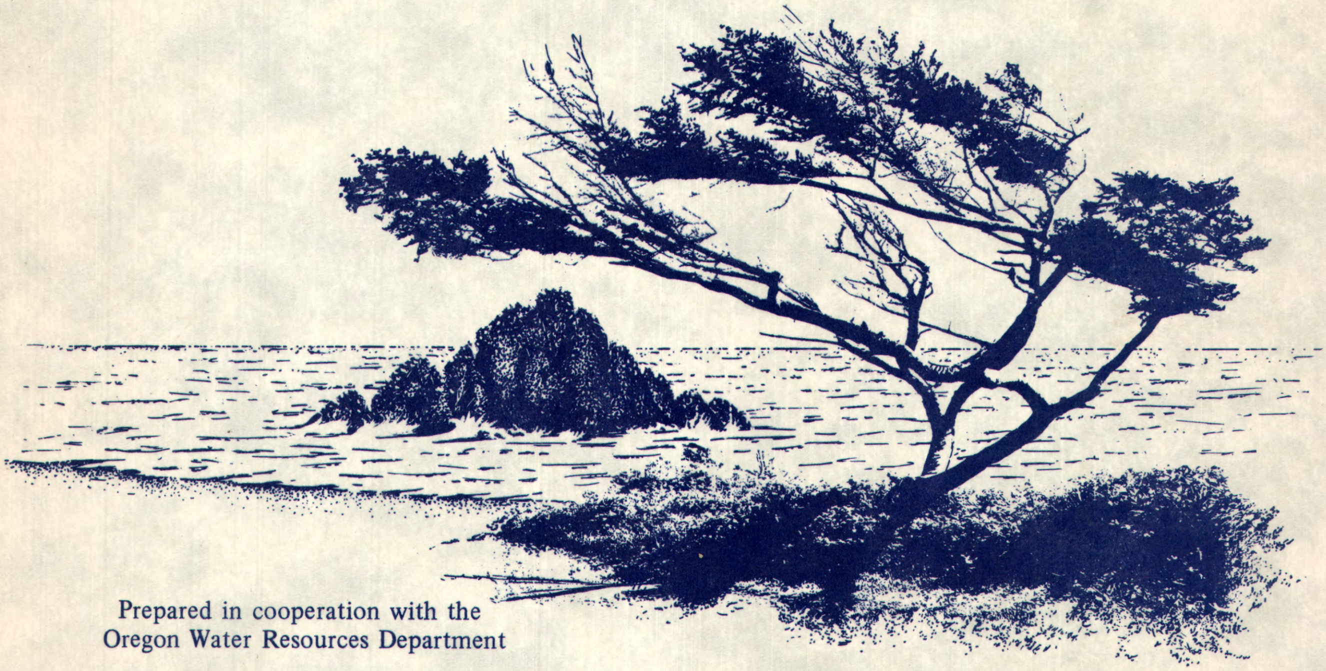
WATER RESOURCES OF LINCOLN COUNTY COASTAL AREA, OREGON

Water Resources Investigations 76-90

U.S. GEOLOGICAL SURVEY
Water Resources Investigations 76-90



Prepared in cooperation with the
Oregon Water Resources Department

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By F. J. Frank and Antonius Laenen

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations 76-90
Open-File Report

Prepared in cooperation with the
Oregon Water Resources Department

1977

UNITED STATES DEPARTMENT OF THE INTERIOR
CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY
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FACTORS FOR CONVERTING FROM ENGLISH TO METRIC UNITS

For readers who may prefer to use metric units rather than English units, the conversion factors for terms used in this report are listed below. The factors are shown to four significant figures; however, in the text the metric equivalents are shown only to the number of significant figures consistent with the values for the English units.

Multiply English units	By	To obtain metric units
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)
Acres	.4047	Hectares (ha)
Acre-feet (acre-ft)	.001233	Cubic hectometers (hm^3)
Gallons per minute (gal/min)	.06309	Liters per second (L/s)
Cubic feet per second (ft^3/s)	.02832	Cubic meters per second (m^3/s)
Cubic feet per second per square mile [$(ft^3/s)/mi^2$]	.01093	Cubic meters per second per square kilometer [$(m^3/s)/km^2$]
Tons (short)	.9072	Tonnes (t)
Tons per square mile ($tons/mi^2$)	.3503	Tonnes per square kilometer ($tonnes/km^2$)
Tons per square mile per day [$(tons/mi^2)/d$]	.3503	Tonnes per square kilometer per day [$(tonnes/km^2)/d$]
Degrees Fahrenheit (°F)	5/9, after subtracting 32	Degrees Celsius (°C)

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ABSTRACT

The Lincoln County coastal area is underlain by Tertiary volcanic and sedimentary rocks of low permeability that store only a small volume of the annual precipitation which averages 68 inches (1,730 millimeters). Consequently, the Tertiary units yield small quantities of water to wells and furnish little ground-water discharge to maintain the base flow of streams. Although streamflow is normally abundant during the wet season, flow decreases greatly during summer when needed most.

Quaternary marine terrace deposits of semiconsolidated sand border the western part of the area and are the most productive aquifers. Several wells drilled into the Quaternary deposits are among the highest producing wells of the area, with yields of 25 to 60 gallons per minute (1.6 to 3.8 liters per second). The Siletz River Volcanics is one of the better aquifers in the area and generally yields water in volumes sufficient for domestic use. The average well drilled into these rocks yields 5 to 10 gallons per minute (0.3 to 0.6 liters per second). Locally, this formation is quite permeable and has a producing well in the study area, with a yield of 120 gallons per minute (7.6 liters per second). Other volcanic rocks of small areal extent and largely untested, are the basalts near Depoe Bay, Cape Foulweather, Yachats, and Cape Perpetua. Wells drilled in January 1976 near Depoe Bay indicate that as much as 125 gal/min (10 L/s) of water can be obtained from wells drilled into the basalt.

Tertiary marine sedimentary rocks of siltstone and sandstone are widespread throughout the area. Yields of wells drilled in these rocks are generally low (less than 5 gallons per minute, or 0.3 liters per second), and many wells in these formations produce no usable quantities of ground water.

Approximately 5,000,000 acre-feet (6,000 cubic hectometers) of water discharges annually into the Pacific Ocean from all streams along the Lincoln County coast. About 85 percent of the annual streamflow occurs from November through April. Minimum streamflows occur from August through October when, at times, as little as 450 acre-feet (55 hectometers) per day flows from all streams.

Most of the ground water, with the exception of water from some wells drilled in the marine siltstone and sandstone, contains relatively small concentrations of dissolved minerals. Wells that tap the marine deposits at low altitudes have high concentrations of dissolved minerals, particularly sodium

and chloride. In general, analyses of water from the 14 streams sampled in Lincoln County show very good chemical quality. The iron content of Depoe and Thiel Creeks is above the Environmental Protection Agency's recommended limit of 0.3 milligrams per liter for drinking water.

Annual water use totals 6.7 billion gallons, which is less than 0.5 percent of runoff. About 70 percent of the use is for industrial purposes at one lumber products mill, about 25 percent is for public supplies, and less than 5 percent for irrigation.

Water supplies for all municipalities in Lincoln County currently (1975) are obtained from surface-water sources. Because of rapid economic development of the coastal area, it is expected that additional water will be needed in the future. Additional water can be supplied (1) by reservoirs on major streams; (2) by the expansion, in some locations, of present surface-water facilities on small streams; and (3) locally, by an additional small volume of supplemental water from ground-water sources.

INTRODUCTION

The rapid economic development of the coastal area in Lincoln County is placing additional demands on existing water supplies. The available volume of ground water is generally sufficient for domestic supplies only. Although streamflow is normally abundant during the wet seasons, flow decreases greatly during summer when needed most.

The purpose of this report is to provide sufficient geologic and hydrologic data to aid in the future development of ground- and surface-water supplies. The objectives were to determine the availability, quantity, and quality of ground- and surface-water supplies with reference to problems of development, and to determine the limitations of the water resources.

This investigation is part of a continuing cooperative program between the Oregon Water Resources Department and the U.S. Geological Survey to evaluate the water resources of Oregon. Many of the data were supplied by well owners and heads of water districts. The helpful cooperation of these people, and especially of the well owners who permitted access to their wells to collect ground-water data, is gratefully acknowledged.

GEOGRAPHIC FEATURES

The project area consists of the coastal area of Lincoln County in west-central Oregon. The location and general features of the area are shown in figure 1.

According to Oregon Population and Research figures for July 19, 1974, the population of Lincoln County is approximately 27,300 people, most of whom live in municipalities near or adjacent to the coast. The largest stable population centers in the study area are Newport (population 5,840), Lincoln City (population 4,610), and Toledo (population 3,100). Small centers of population are Waldport (population 855), Siletz (population 725), Depoe Bay

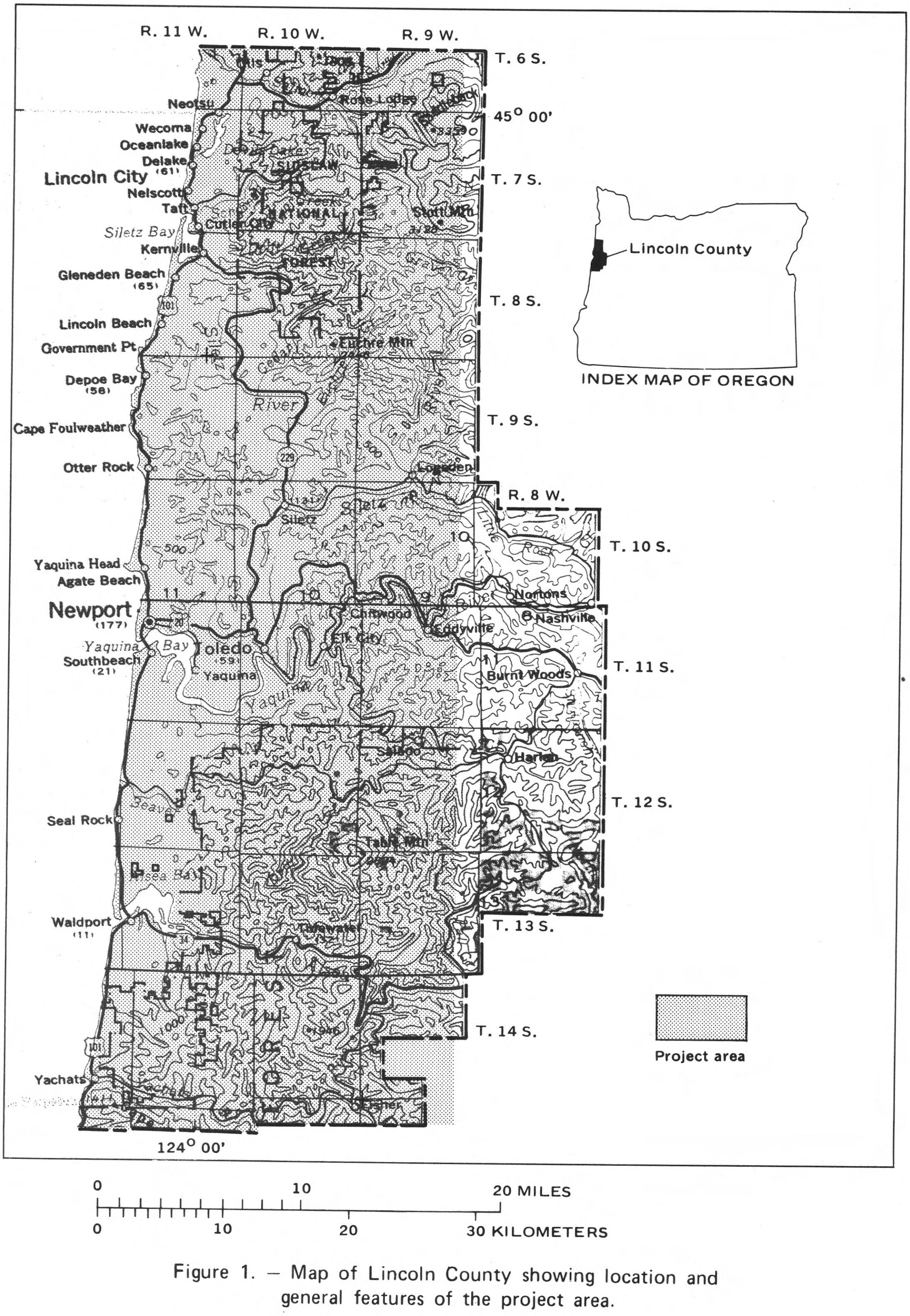

Figure 1. – Map of Lincoln County showing location and general features of the project area.

(population 55), and Yachats (population 465). During the summer tourist season, the number of people in the area increases to three or four times the stable population.

The major industries in the area are lumber and forest products, recreation, tourism, and commercial fishing.

Climate

The area has a temperate marine climate. Nearness to the Pacific Ocean and exposure to middle-latitude westerly winds are the principal climatic controls.

Normal annual precipitation at Newport is about 68 in (1,730 mm), most of which occurs as rain. The wettest months are from November through March, when about 70 percent of the total precipitation occurs. Figure 2 shows minimum, mean, and maximum monthly precipitation at Newport for the period of record, 1937-74. The isohyetal map (fig. 3) of Lincoln County shows that precipitation in the area increases rapidly with altitude and exceeds 100 in (2,540 mm) annually in that part of the Coast Range adjacent to the southern part of the area. In that part of the Coast Range adjacent to the north end of the project area, rainfall is indicated to be as much as 200 in (5,080 mm) per year.

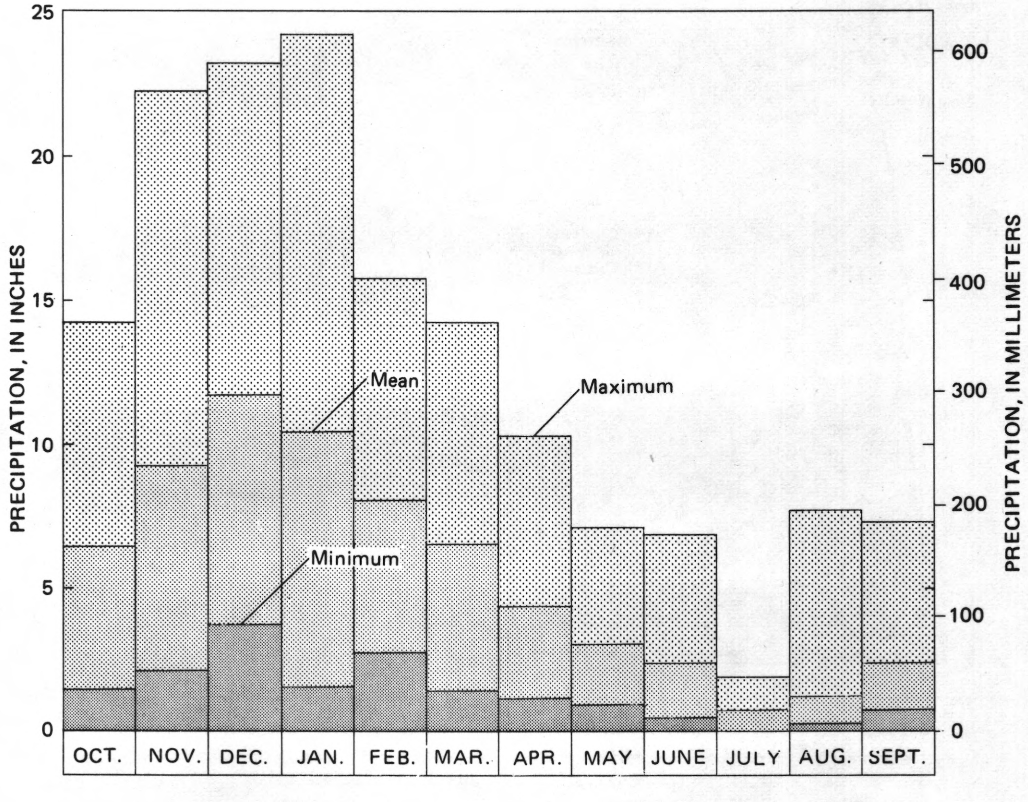

Figure 2. — Monthly precipitation at Newport (1937-74).

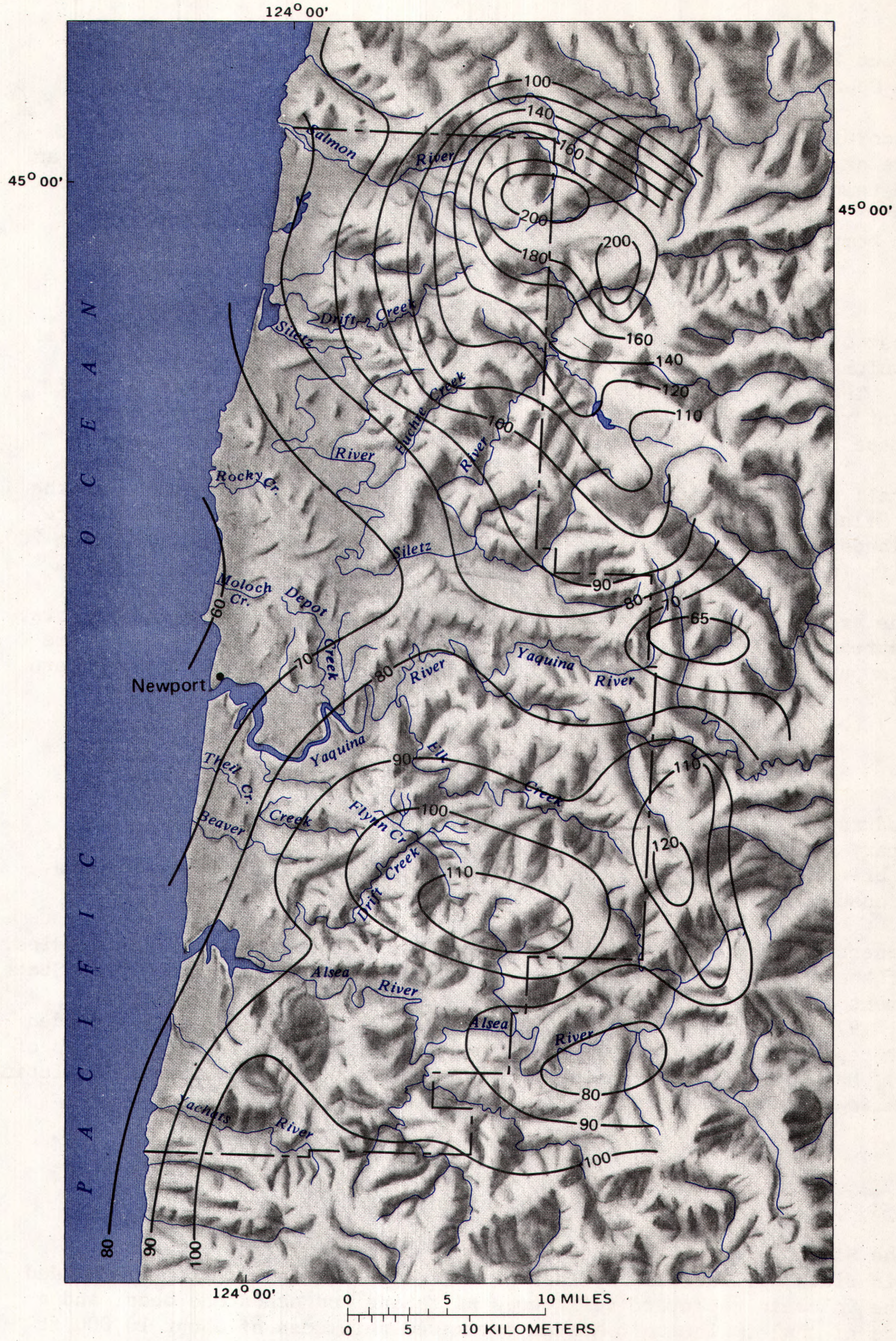

Figure 3. – Normal annual precipitation, in inches, for Lincoln County (1930-57). (Based on records of the National Weather Service.)

About 20 in (500 mm) of evapotranspiration occurs annually in the Lincoln County coastal area.

According to National Weather Service records, the average annual temperature at Newport is 51°F (10.5°C); January is the coldest month, with an average temperature of 43.7°F (6.5°C); and the average minimum temperature is 37.5°F (3.5°C). July is generally the warmest month, with an average maximum temperature of 64.2°F (18°C).

Topography and Drainage

Most of the western part of the project area is bordered by marine terraces which range from 50 to 200 ft (15 to 60 m) above sea level. (See pl. 1.) The trend of the marine terraces is broken by broad headlands of resistant rock with altitudes of 400 to 700 ft (120 to 210 m) at Cascade Head, Cape Foulweather, Otter Crest, Yaquina Head, and Cape Perpetua.

Small estuaries with tidal flats along their edges occur at the mouths of the Siletz, Alsea, and Yaquina Rivers. East of the marine terraces are the uplands and foothills of the Coast Range, with altitudes ranging from 200 to 800 ft (60 to 240 m).

The area is drained primarily by the Siletz, Alsea, and Yaquina Rivers. Other streams of importance are the Salmon River, which drains the extreme northern part of the area, and the Yachats River, which drains the southern part of the area. Among the larger of the secondary streams that drain directly to the ocean are Schooner, Drift, Big, and Beaver Creeks.

GEOLOGIC UNITS AND THEIR WATER-BEARING PROPERTIES

Indurated rock units of Tertiary age and unconsolidated deposits of Quaternary age underlie the area. The consolidated rocks include basaltic flows, breccia, tuff, marine siltstone and sandstone, and intrusive rocks. The unconsolidated deposits include sand, silt, and gravel.

General geologic features of this area were known from previous studies. Maps of the bedrock and surficial geology have been published in Oregon State Department of Geology and Mineral Industries Bulletin 81 (Schlicker and others, 1973), and a complete description of all geologic units is included in that report. The distribution of the rock units, modified after a map of Snavely, MacLeod, Wagner, Schlicker, Deacon, Olcott, and Beaulieu in Bulletin 81 (Schlicker and others, 1973), is shown on plate 1.

Tertiary Rocks

Siletz River Volcanics

The Siletz River Volcanics consists of fine-grained to porphyritic basaltic flows, pillow basalt, lapilli tuff, and tuff breccia. Interbedded with the volcanic rocks are tuffaceous siltstone and sandstone beds, and a few beds of shale. The unit has an estimated thickness of about 10,000 ft (3,000 m) in areas of former volcanic centers.

These rocks crop out in the northern part of the project area and constitute one of the better aquifers. Locally the series is quite permeable and precipitation can readily infiltrate fractured and porous zones. Porous zones may store and transmit large quantities of water, as shown by well 6S/10W-33abd2 (table 10 and pl. 1), which produces 120 gal/min (0.6 L/s). Several nearby wells yield 25 to 30 gal/min (1.6 to 1.9 L/s). However, some of the wells in the Siletz River Volcanics produce inadequate volumes of water for domestic uses, and a few of them have been abandoned. Although much of the area underlain by these rocks has not been tested by drilling of water wells, available data indicate that water is generally obtainable in volumes sufficient for domestic uses at most places. Yields of wells that penetrate these rocks average from 5 to 10 gal/min (0.3 to 0.6 L/s).

Tyee Formation

The Tyee Formation is a marine sequence of micaceous and arkosic sandstone and siltstone. The sandstone beds range from hard and well indurated to poorly consolidated. Alternating siltstone beds are softer and, in places, contain plant debris. The Tyee is the most extensive bedrock unit in the area and has a maximum thickness of about 6,000 ft (1,800 m).

Sandstone beds in the Tyee are fine grained and poorly permeable. The formation discharges only small volumes of water to maintain the base flow of streams. Although much of this unit has not been test drilled for water, available data indicate that most wells drilled into it will yield from 1 to 5 gal/min (0.2 to 1 L/s). (See wells 10S/10W-2dca and 13S/11W-27bdd, table 10.)

Siltstone and Sandstone

Included in the siltstone and sandstone unit are the sandstone of Whale Cove, Astoria Formation, Yaquina Formation, Nye Mudstone, siltstone of Alsea, Nestucca Formation, and Yamhill Formation, as mapped by Snavely and others (Schlicker and others, 1973). In this report, the units are grouped together as "siltstone and sandstone" because of similar lithologic and hydrologic characteristics.

These rocks consist of tuffaceous siltstone and fine-grained sandstone. Locally they are interbedded with minor amounts of arkosic, basaltic, and glauconitic sandstone, and range in thickness from 200 to 5,000 ft (60 to 1,500 m). The siltstone and sandstone have poor permeability and a low capacity for storage of ground water. The yields of wells that penetrate these rocks are generally low (less than 5 gal/min, or 0.3 L/s); many wells drilled into them produce no usable quantities of water. This is particularly true near Toledo, where many wells yield quantities of water inadequate for domestic uses. (See table 10, wells 11S/10W-19dbd and 11S/10W-17aac.)

Siltstone and sandstone units north of Lincoln City are more permeable and transmit water more readily than do their counterparts in other parts of the study area. Well 6S/11W-24abd (table 10), north of Lincoln City, reportedly yields 100 gal/min (6.3 L.s). Other wells in this part of the area reportedly yield 20 to 25 gal/min (1.3 to 1.6 L/s).

Basalt

The Cape Foulweather Basalt, Depoe Bay Basalt, and the basalts of Yachats and Cascade Head, as mapped by Snavely and others (Schlicker and others, (1973), have similar lithologic and hydrologic characteristics and are treated as a single unit in this report.

The basalts consist of basaltic and andesitic flows, fine-grained basaltic breccia, lapilli tuff, and pillow flows, and in places are interbedded with siltstone. Individual flows are generally 16-20 ft (5-6 m) thick and reach a total thickness of 2,000 ft (610 m) at Cape Perpetua in the southernmost part of the area. These rocks form the headlands along the coast at (1) Cascade Head, in the northernmost part of the area; (2) near Depoe Bay; and (3) south of Yachats.

Because few wells have been drilled into the basalt in the area, data are sparse. However, available information indicates that yields generally will be higher than for most wells drilled into underlying and adjacent sandstone and siltstone formations. Permeable zones in the basalt include breccia, porous zones between lava beds, and cracks and joints. That these rocks absorb and store precipitation is demonstrated by the many springs and seeps flowing from the basalt, especially along the contact of the basalt with less permeable siltstone and sandstone. The relationship of the basalt to the base flow of streams is discussed more fully in a later section, "Base flow of streams." The basalt may yield water to wells, because it is permeable and precipitation is readily infiltrated and stored, particularly at altitudes below its main areas of recharge. This is borne out by the performance of two wells drilled into the basalt near Depoe Bay in January 1976. (See records of wells 9S/11W-8ccd2 and 9S/11W-17bba, tables 9, 10.) Well 9S/11W-17bba was test pumped for 48 hours at 125 gal/min (8 L/s) with about 210 ft (64 m) of drawdown, and well 9S/11W-8ccd2 was test pumped for 48 hours at 20 gal/min (1.3 L/s) with 86 ft (26 m) of drawdown. The Depoe Bay Water District plans to use both wells for public water supplies.

Intrusive Rocks

Dikes, stocks, and sills of basalt, gabbro, nepheline, syenite, dacite, and camptonite compose the intrusive rocks of the area. Although intrusive bodies occur throughout the area, in order to simplify the map, only the major ones are shown on plate 1. No wells in the study area are known to penetrate the intrusive rocks which are generally of low permeability and probably would not yield appreciable quantities of water.

Quaternary Deposits

Marine Terrace Deposits

The marine terrace deposits consist of semiconsolidated fine-grained sand, silt, and clay, with thin interbedded layers of loose sand. In some places, the terrace deposits are stabilized by vegetation and in other places they are overlain by fine-grained dune sand. These terrace deposits are exposed along the entire length of the project area. They occur at altitudes ranging from 80 ft (25 m) near Waldport to 200 ft (60 m) south of Yaquina Bay and range from 20 to 50 ft (6 to 15 m) in thickness.

The marine terrace deposits have good porosity and permeability. Where they are sufficiently thick and extensive, wells drilled into them are among the most productive in the area. Well 11S/11W-20bca yields 60 gal/min (3.8 L/s) and well 11S/11W-20cba yields 25 gal/min (1.6 L/s). (See table 10.) Both wells are used for park facilities at Southbeach. Well 8S/11W-21cdd reportedly yields at least 30 gal/min (1.9 L/s) and is used as a standby reserve for the Lincoln Beach Water District.

Well 13S/11W-30bad (table 10) pumps some sand, as do some other wells that produce water from the marine terrace deposits. Refinements in well construction by the use of fabricated well screens or a gravel pack around the screen or perforated parts of a casing might solve sand problems and increase the yields of wells in these deposits. Well-construction methods are described in many publications, including a publication by Edward E. Johnson, Inc. (1972).

Alluvium

Included in these deposits are alluvial terraces and flood-plain deposits along the major streams, and sands that make up the beaches and active dunes along the coast.

The alluvial terraces are generally narrow--about 1,000 ft (300 m) in width--and consist of sand and silt with some clay interbedded with thin gravel layers. In places along the Siletz and Salmon Rivers, the alluvial terraces contain coarse gravel beds. Flood-plain deposits consist of silt, clay, and organic matter, with gravel near the top of the deposits. Thickness of the gravel averages about 10 ft (3 m) and rarely exceeds 20 ft (6 m). Beach and dune sands are fine- to medium-grained and locally contain layers of peat.

The present flood plains are narrow, and the alluvium and associated terrace deposits are mostly thin; in many places, the underlying bedrock is barely covered. Consequently, these deposits in most parts of the area lack the thickness necessary to store large quantities of water. In other places, water in alluvial terrace deposits occurs at altitudes above the regional water table and soon drains away through seeps and springs after cessation of winter rains. In a few places where saturated thickness is about 20 to 25 ft (6 to 8 m), wells in the alluvial deposits yield about 5 to 25 gal/min (0.3 to 1.6 L/s). (See wells 13S/11W-28ada, 9S/10W-7dad, and 8S/10W-20cbd2, table 10.)

The alluvial deposits are most extensive and have a thickness of 16 to 25 ft (5 to 8 m) in a few widely scattered areas along the Siletz River; in places, these deposits store usable quantities of water. However, even along the Siletz River, there are abrupt lithologic changes typical of most alluvial deposits, as shown in table 9 by the log of well 10S/10W-4bda which shows no coarse material, and by the log of well 10S/10W-4ccb which shows about 6 ft

(1.8 m) of sand and gravel. Near the town of Siletz, the alluvial deposits reach their greatest width, have an average thickness of about 25 ft (8 m), and a saturated thickness of about 12 ft (4 m). However, because of danger of pollution from septic tanks, water from the alluvial deposits near Siletz may not be suitable for domestic purposes.

The main dune deposits of the area occur in the Southbeach area south of Yaquina Bay and in the area of Hidden Lake near Alsea Bay. Because the dune deposits are generally thin and of small extent, they cannot (as in other parts of the Oregon coast) be relied on to supply large volumes of water. With the exception of a small area in Southbeach, the dune sands rarely exceed a thickness of about 15 ft (5 m) and are deposited directly on marine terrace material. At the contact of the dune sands with the terrace material, water from the dune sands seeps to clifflike faces of marine terraces, at the bottom of which form streamlets which drain to the ocean. Although the dune sands become partly saturated from the infiltration of winter precipitation, the sands lose much of that water by seepage in late spring and early summer. Consequently, in most cases, dune deposits of the area can be relied on for domestic supplies only. Because of housing in most of the dune area, pollution from septic tanks may cause the water to be unfit for domestic use.

GROUND WATER

Source and Movement

Ground water is water, other than soil moisture, beneath the land surface. Precipitation maintains the supply of ground water in the area. Part of the precipitation evaporates; some is transpired to the atmosphere by vegetation, some runs off, and some infiltrates the ground. Part of the water that infiltrates is retained as soil moisture; the remainder percolates downward to form a zone of saturation. The water in the saturated zone moves by force of gravity downgradient to points of discharge such as springs, seeps along stream channels, or wells. Saturated permeable rock materials that yield usable quantities of water to wells and springs are called aquifers.

Recharge and Discharge

The aquifers of the area are recharged seasonally by precipitation, mostly during late autumn and winter, the seasons of greatest precipitation (fig. 4). As the ground-water reservoirs fill, ground-water gradients steepen and the rate of discharge through seeps and springs increases.

Ground water is discharged naturally from aquifers in the area by seeps and springs, evapotranspiration, and subsurface outflow to the ocean; ground water is discharged artificially through wells. During the dry summer months, the rate of ground-water discharge exceeds the rate of recharge and the upper part of the ground-water reservoir becomes dewatered. Much of the ground water is discharged through seeps and springs, which sustain the flow of rivers and streams in the area.

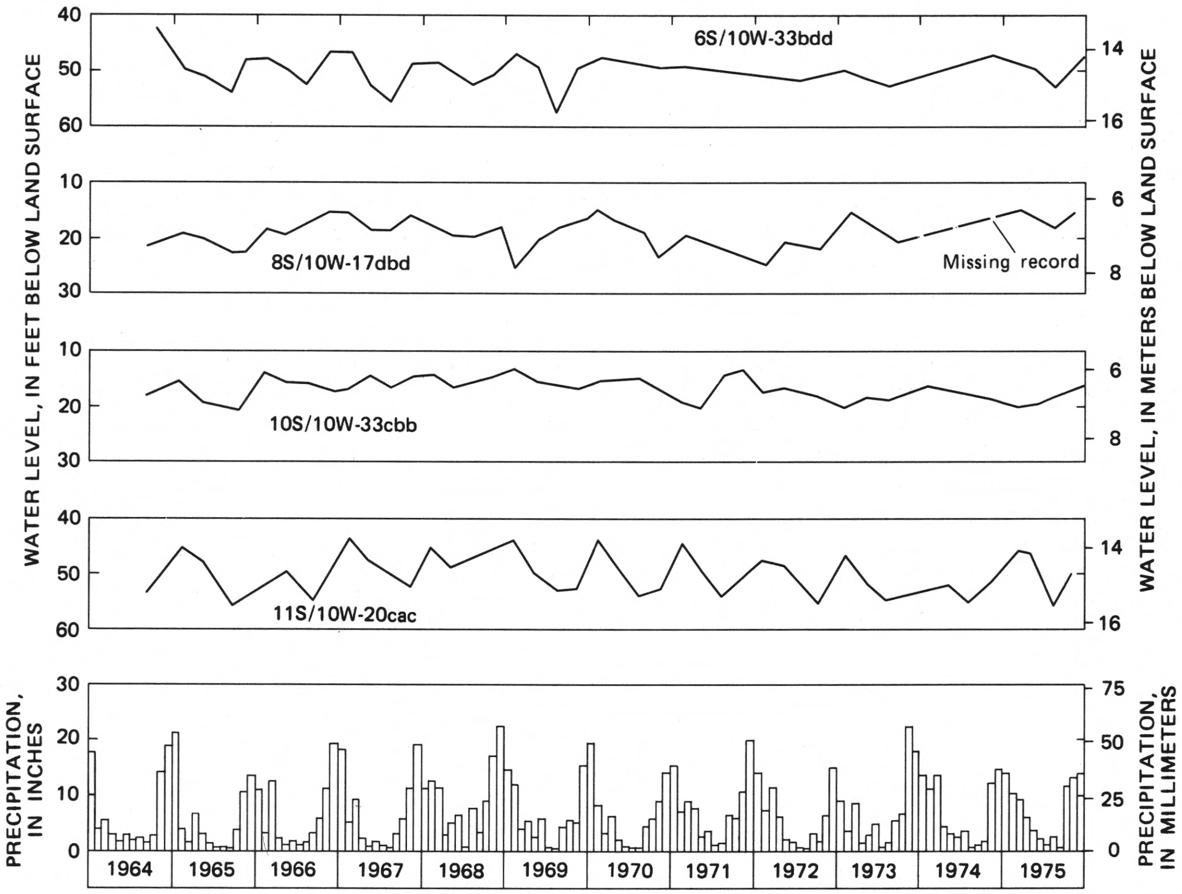

Figure 4. — Relationship between monthly precipitation recorded at Newport and changes of water levels in four selected wells in the study area.

Hydrographs in figure 4 show water-level fluctuations in four wells during the period 1964-74. Rising water levels on the hydrographs indicate periods when more water was added to the reservoir than was discharged; declining water levels indicate periods when more water was discharged from the reservoir than was added. As the hydrographs in figure 4 show, water levels are highest during the wet winter and spring months and lowest during the dry summer and autumn months. The hydrographs generally show no long-term change in water levels during the period of record.

Occurrence

Unconfined

Unconfined ground water is water in an aquifer that has a water table. The water table is the upper surface of a zone of saturation where the pressure is atmospheric. Most of the wells in the area tap unconfined ground water. Water levels of some of these wells are shown graphically in figure 4.

Perched

Perched ground water is unconfined ground water that occurs in places where ground water in permeable rocks is collected above impermeable unsaturated materials that locally are above the main or regional water table. Perched-water bodies in the study area generally yield only small quantities of water to wells because the recharge and volume of water in storage are usually small.

Perched water occurs throughout much of the area, particularly in consolidated rocks of the Siletz River Volcanics, the Tyee Formation, and the siltstone and sandstone units. These rocks underlie upland and foothill areas; many of the wells drilled into them penetrate local ground-water bodies perched above the main water table. (See well 6S/10W-31dbd, table 10.) At many places where these rocks intersect the land surface, perched-water bodies form outlets for springs which contribute water to the flow of streams and for domestic uses. Other perched-water bodies occur in the marine-terrace deposits adjacent to the coast and the alluvial-terrace deposits along the rivers. Many small springs flow from perched zones in the marine-terrace deposits. Several of these springs supply usable quantities of ground water for domestic uses. (See table 11.) Alluvial-terrace deposits contain perched-water bodies only during wet seasons, and most of the water they contain is lost through seeps and springs in summer and early fall.

Confined

Confined ground water is under pressure greater than atmospheric and is held in the zone of saturation by an overlying bed or layer of material through which it cannot pass readily. In a well that penetrates such a body of confined ground water, the water will rise above the bottom of the confining bed. Water will flow naturally from a well that penetrates a body of confined ground water where the hydrostatic head raises the water level above land surface. (See record of well 13S/11W-27aca, table 10.) Confined ground water occurs at depth in the sedimentary and volcanic aquifers.

SURFACE WATER

To evaluate the surface-water characteristics of the study area, streamflow data from three long-term continuous-recording stations were used: Siletz River at Siletz (14305500), with 55 years of record; Alsea River near Tidewater (14306500), with 35 years of record; and Flynn Creek near Salado (14306800), with 15 years of record. In addition to these stations a continuous-recording station was installed on Yaquina River near Chitwood (14306030) and maintained for 2 years only, from September 1972 to September 1974. To supplement these data, streamflows were measured monthly during the 1973 water year at 11 other sites along the coast representing different geologic conditions and drainage areas. Seventeen other streams were also measured several times during low-flow periods. Table 1 and plate 1 summarize the streamflow data collected.

Table 1.--Selected streamflow data

Station number	Stream name	Drainage area (mi^2)	Mean			Discharge Dependable low flow1/ (ft^3/s)	Maximum observed		
			1973 (ft^3/s)	Annual (ft^3/s)	Annual (in)		Measured (ft^3/s)	Date	Approximate R.I.
14303748	Salmon River	60.4	340	550	76	22	2/3,600	11-16-73	1.5
14303968	Drift Creek	37.6	233	380	84	14	4,530	1-27-65	15
14305500	Siletz River	202	1,060	1,580	71	51	2/40,800	11-20-21	100
14306000	Euchre Creek	13.4	85	136	86	4.0	2/2,400	1-11-72	15
14306010	Rocky Creek	5.36	28	46	72	1.0	283	3- 4-56	5
14306016	Moloch Creek	2.23	8.7	14	53	.5	42	12-19-72	1.01
14306030	Yaquina River	71.0	156	250	30	3.4	2/10,000	1-11-72	15
14306032	Elk Creek	85.0	166	265	26	6.5	2/7,200	11-16-73	5
14306038	Depoe Creek	9.08	31	50	46	.8	153	12-20-72	1.01
14306041	Thiel Creek	4.10	13.5	22	45	1.0	72	do	1.01
14306044	Beaver Creek	14.3	61	98	58	4.1	260	1-17-73	1.01
14306500	Alsea River	334	925	1,540	38	51	41,800	12-22-64	80
14306800	Flynn Creek	.78	2.70	4.37	49	.13	139	1-28-65	25
14306820	Drift Creek	60.6	230	380	52	15	3,440	12-21-72	2
14306875	Yachats River	50.7	173	275	46	13	5,430	1-28-65	10

1/ Represents the lowest continuous 7 days for the 50-year recurrence interval statistically.

2/ Estimated discharge by high-water mark and rating extension.

Mean Annual Flow

For the 1973 water year, estimates of monthly flows at each of the 11 miscellaneous sites were made by first relating the measured flow at each site to the daily flow at a long-term continuous-recording station and then extending this relation by direct ratio to the monthly flow of the long-term station. The annual mean was then computed by totaling monthly estimates. This method yields results generally within 10 percent for an annual mean streamflow (Riggs, 1969). Data from nine long-term stations in and near the study area were then used to define a relationship of the 1973 annual mean flow to the long-term mean annual flow. Long-term mean annual flows for the 11 miscellaneous sites and the short-term site on the Yaquina River were taken from this curve. (See figure 5.) The excellent relationships shown by

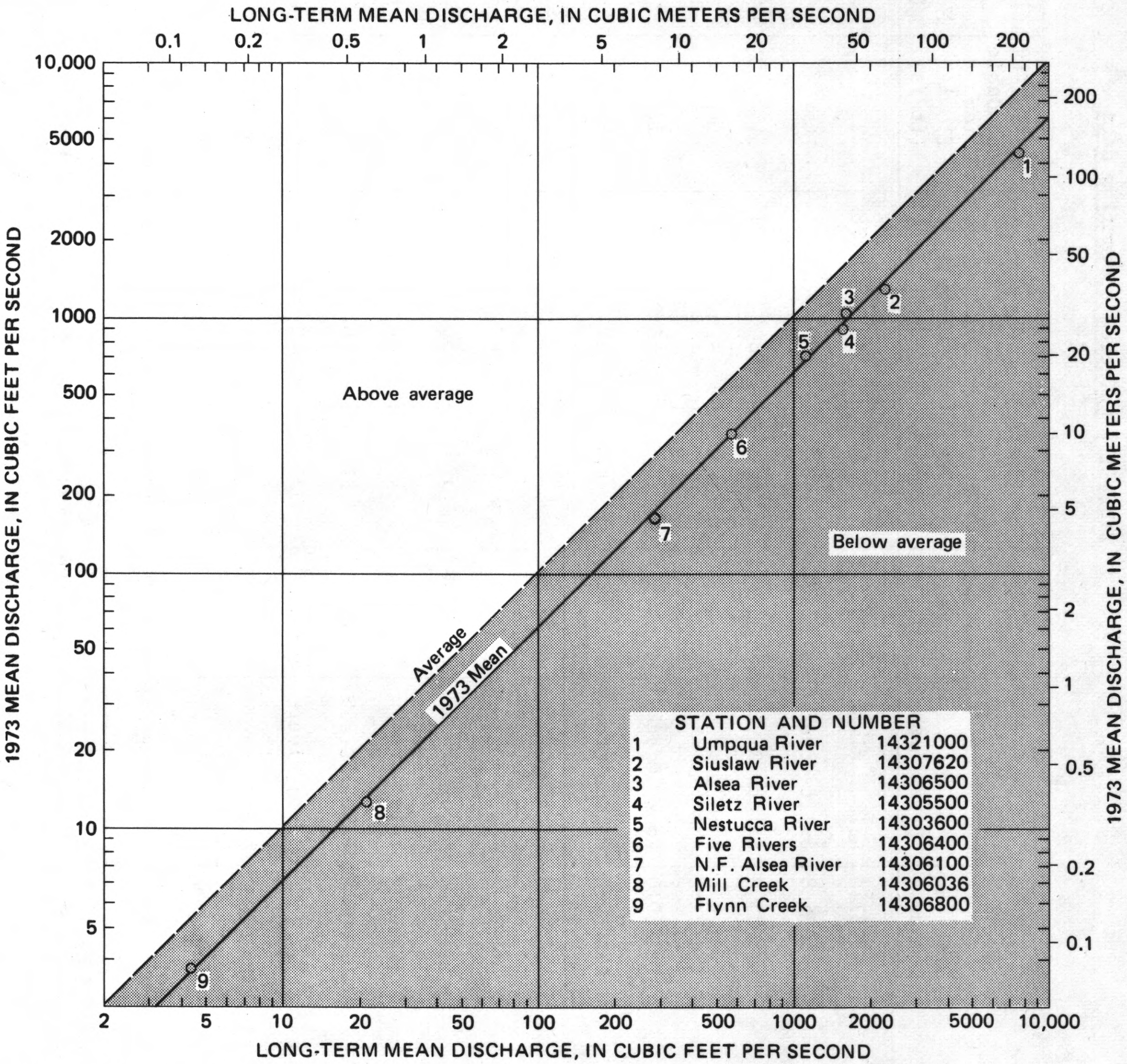

Figure 5. — Relationship of 1973 mean flow to long-term mean annual flow for gaging stations on selected streams.

figure 5 suggests that annual flow characteristics are homogeneous within the study area and that the mean annual flow estimates are quite reliable. Figure 5 also shows that the 1973 water year was below average in mean annual flow.

Dependable Flow

Dependable low flows for the Yaquina River, the 11 monthly measurement sites, and 17 additional small streams were estimated by relating measured low flows with concurrent daily flows of a long-term station (either the Siletz or the Alsea River) (Riggs, 1972). As used in this report, dependable low flow ($Q_{7,\ 50}$) is the lowest average rate of discharge for a 7-day period that may be expected on an average of once in 50 years. Dependable low flows for long-term stations were determined by log-Pearson Type III frequency analysis. Both the long-term stations had flows of $Q_{7,\ 50}$ magnitude, 51 ft^3/s (1.4 m^3/s), during September 24-30, 1965. Figure 6 shows one of the correlations of low flow--Salmon River near Otis (a monthly-measurement site) and Siletz River at Siletz (a long-term site) with the projection to

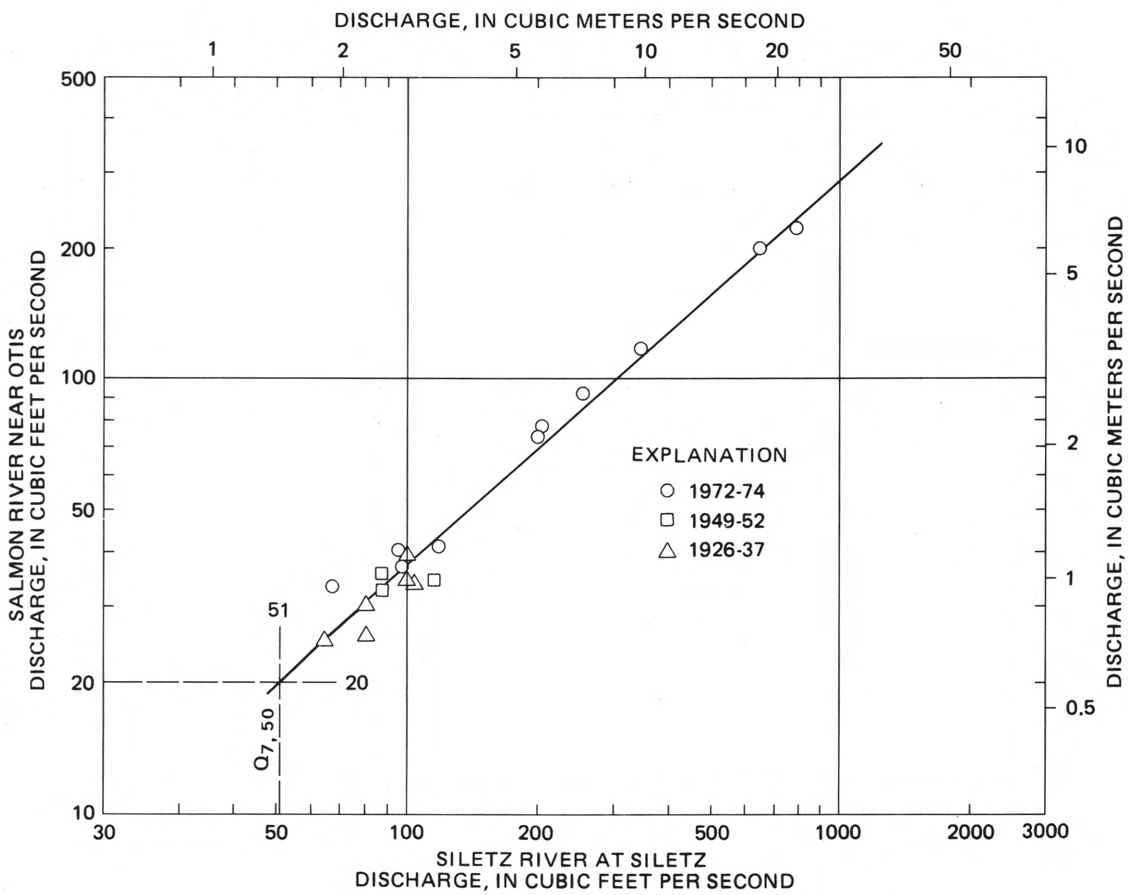

Figure 6. — Correlation of flows of the Salmon and Siletz Rivers.

dependable low flow. On the basis of the statistical scatter of points, dependable low-flow estimates are considered to be within 30 percent of actual value for all stations analyzed.

Peak Flows

No extreme flood event occurred in Lincoln County during the 1973-74 period of study. In 1973, annual peaks on the Siletz and Alsea Rivers were of low magnitude, with recurrence intervals of less than 2 years. (See figure 7.) In 1974, the annual peak on the Siletz was also of low magnitude, with a recurrence interval of less than 2 years, but the Alsea River had an annual peak with a recurrence interval of about 15 years (fig. 7). High-water marks were documented throughout the study period, and peak-discharge estimates were made for about half the 15 sites listed in table 1. High-flow information for the rest of the sites was obtained from earlier studies and (or) prior high-water marks. Maximum observed flow with associated recurrence interval (R.I.) for each site is listed in table 1.

Log-Pearson Type III flood-frequency curves for the Siletz and Alsea Rivers (fig. 7) are almost identical, with the 100-year-frequency flood only 7 percent higher on the Alsea River. Siletz River at Siletz has only two-thirds the drainage area of Alsea River near Tidewater, but it has consistently higher precipitation in its basin. The maximum discharge each year on either river is rarely less than 15,000 ft^3/s (425 m^3/s), and the frequency curves are relatively flat and have skews near zero. Therefore, the ratio between the 100-year flood and either the 20-year flood or the 2-year flood are small. This indicates that heavy rainfall and high runoff are almost annual events.

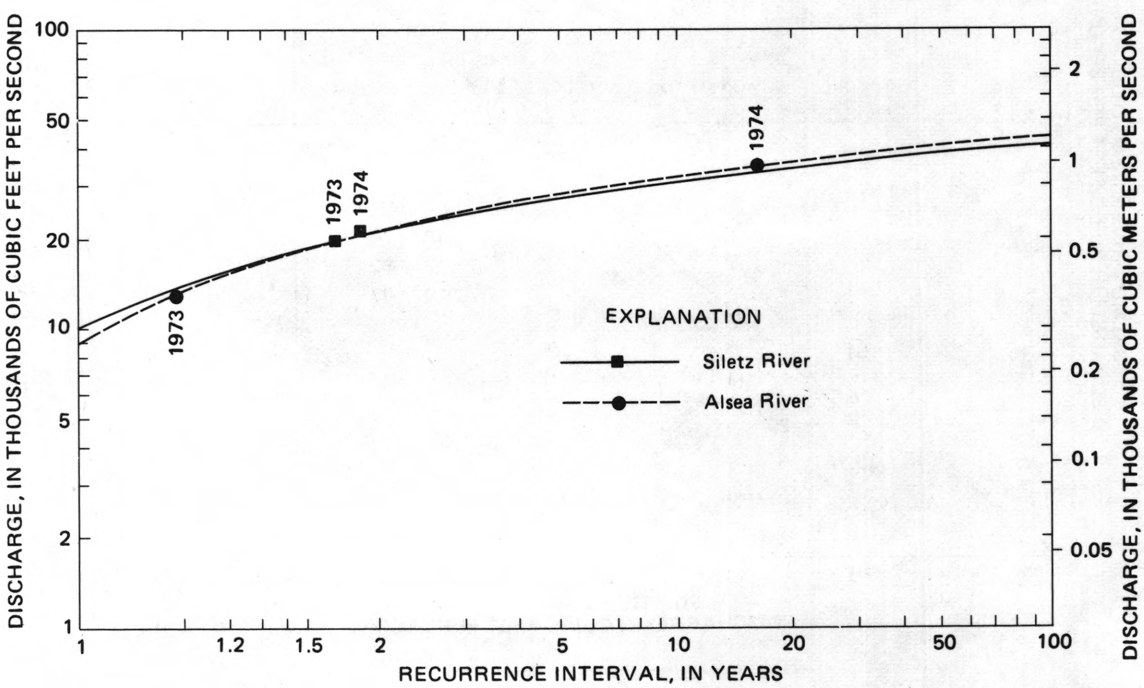

Figure 7. – Flood-frequency curves for the Siletz and Alsea Rivers.

Streamflow Distribution

Approximately 5,000,000 acre-ft (6,000 hm^3) of fresh water discharges annually into the Pacific Ocean from streams along the Lincoln County coast. About 80 percent of this flow is from five major stream systems: the Siletz River (not including Drift and Schooner Creeks) and the Salmon, Yaquina, Alsea, and Yachats Rivers. Usually 85 percent of the annual streamflow occurs from November through April. Minimum streamflows occur from August through October, when at times as little as 450 acre-ft (0.55 hm^3) per day flows from all streams.

Most of the major streams in Lincoln County originate several miles inland from the coast, and all of them, with the exception of the Yachats, have drainage basins that extend to the crest of the Coast Range beyond the east boundary of Lincoln County. (See figure 8.) Because tidal effects cause changing flow conditions that are difficult to evaluate, many streams were measured at considerable distances inland where flow conditions are more stable. Streamflow-measuring sites are shown in figure 8 and on plate 1. Table 1 shows mean annual discharges for the major streams and for selected smaller streams in the study area.

Of the major streams, only the Salmon and Yachats Rivers can be measured far enough downstream to include most of their drainage areas. Thus, the mean annual flows of these streams represent their approximate outflow to the Pacific Ocean (table 1). Mean annual discharges into the Pacific Ocean for the other major streams are estimated as follows:

Stream	Drainage area (mi^2)	Annual discharge (ft^3/s)	Annual discharge (acre-feet)
Siletz River	280	2,000	1,400,000
Yaquina River	270	800	580,000
Alsea River	473	2,000	1,400,000

Discharges were determined by totaling measured main-stream flow, measured tributary flow, and unmeasured flow that was estimated on a drainage-area basis.

Streamflow Variability

Streamflow records from the Siletz and Alsea Rivers reflect the seasonal variability that can be expected of streams in Lincoln County. Figure 9 shows the monthly mean discharges of the Siletz and Alsea Rivers for the 1940-74 period. Variations in precipitation from north to south in Lincoln County (fig. 3) result in higher runoff from the Siletz River than from the Alsea River basin during November through April. Base flow, from May to October, also is higher in the Siletz than in the Alsea Basin. Estimated dependable low flows (base flows) are shown on plate 1 for 32 streamflow sites. These values indicate that base flow per unit area is generally higher in the northern part of the county. Monthly variations of the Siletz River flow are shown in figure 10. The large range of flows in September, October, and November reflects the onset of the rainy season when flows can

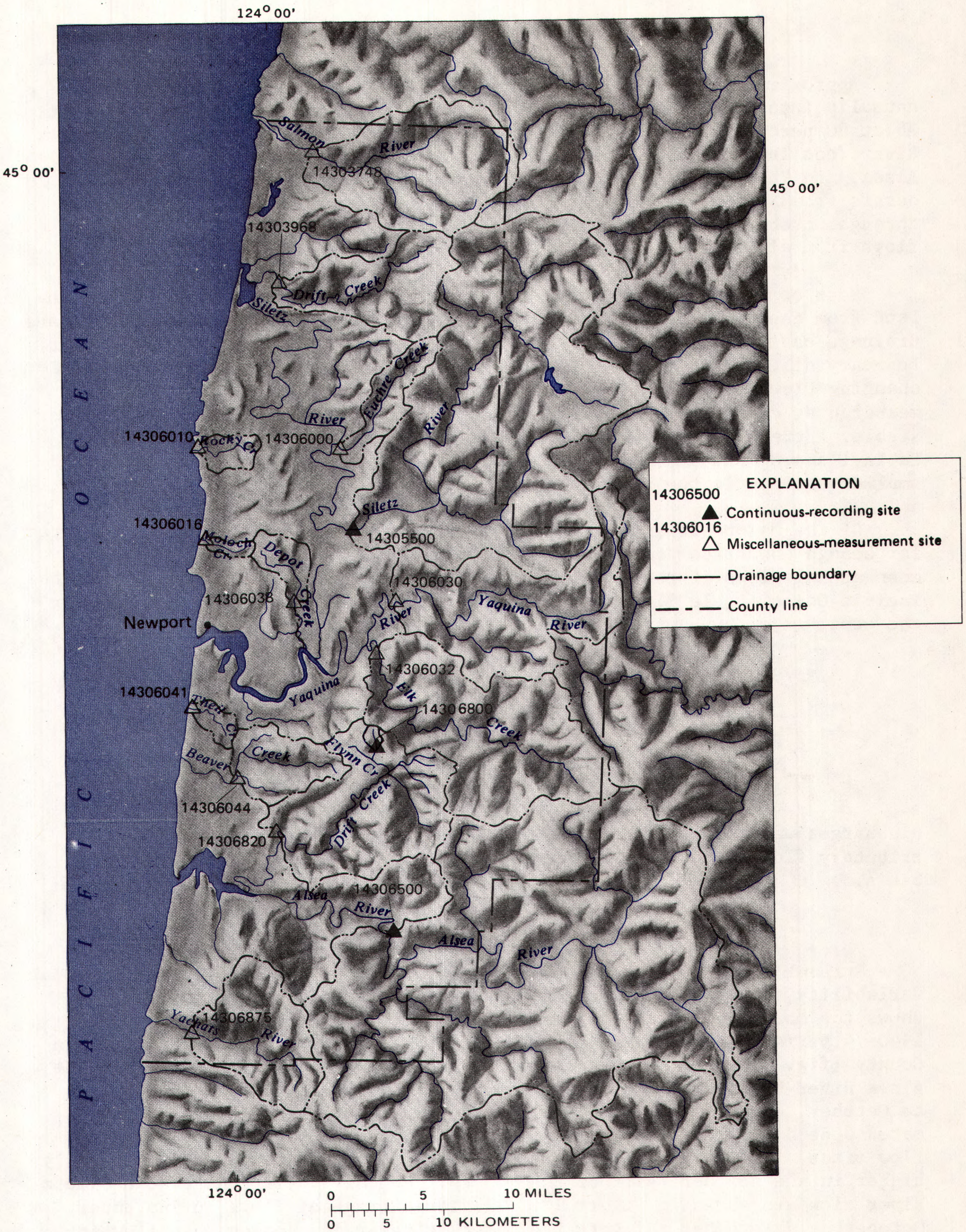

Figure 8. — Drainage areas of streamflow-measurement sites.

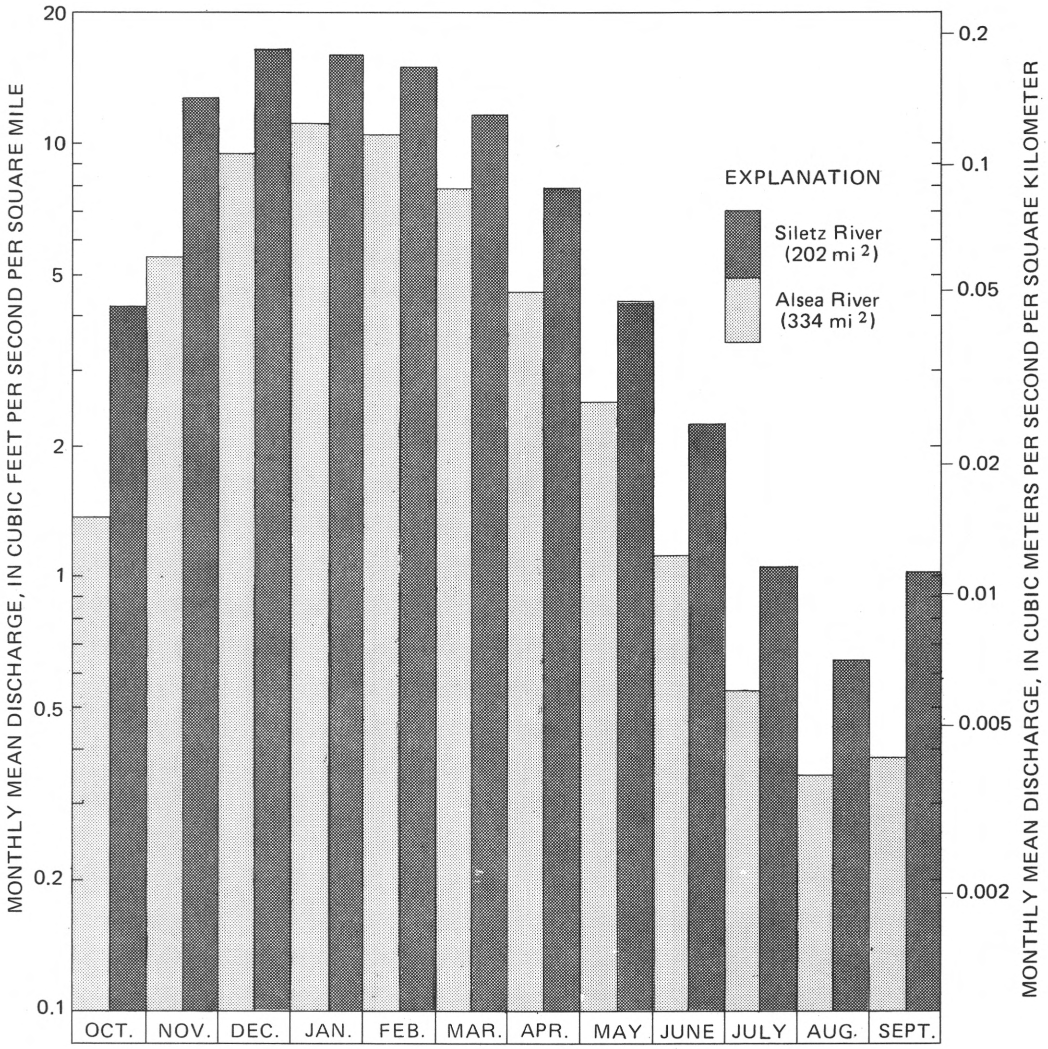

Figure 9. — Mean monthly discharges of the Siletz and Alsea Rivers (1940-74).

range from the extreme lows carried over from the dry summer period to high flows caused by storm runoff. Annual variations of streamflow also can be large. For the 55 water years of record (1906-11, 1926-74) collected at Siletz River at Siletz, annual mean discharges ranged from 4.36 $(ft^3/s)/mi^2$ $[0.05\ (m^3/s)/km^2]$ in 1941 to 11.5 $(ft^3/s)/mi^2$ $[0.13\ (m^3/s)/km^2]$ in 1974.

QUALITY OF WATER

Because water is a solvent for practically all minerals, most natural water contains some dissolved chemicals. In low concentrations, most are harmless and include many substances that are necessary for proper nutrition of plants and animals. Features of the chemical quality of the water are summarized in the following paragraphs.

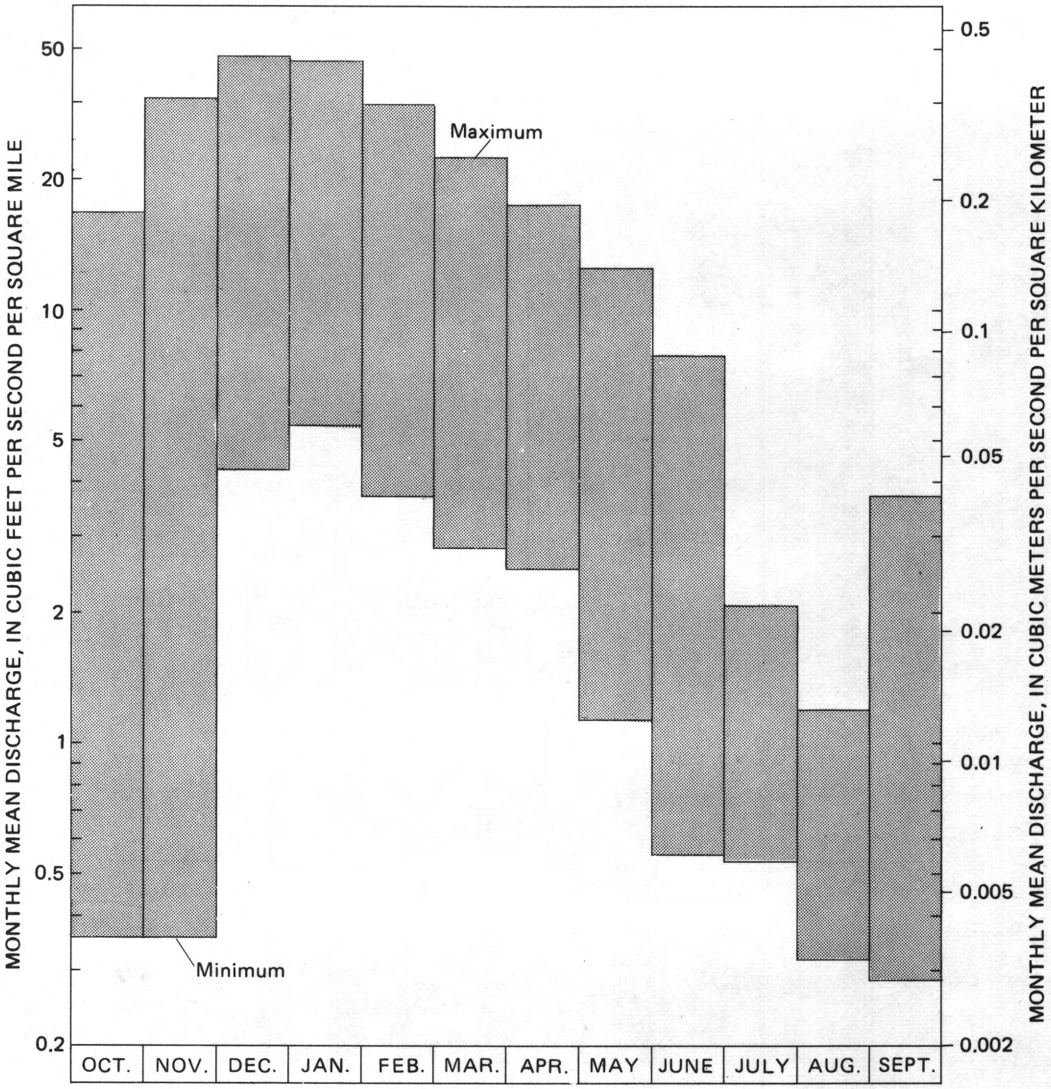

Figure 10. — Range in monthly discharges of the Siletz River (1906-11, 1926-74).

Explanation of Quality-of-Water Data

Dissolved solids refers to the chemicals dissolved in water and are reported in milligrams per liter. A concentration of 1 mg/L (milligram per liter) is a weight of 1 milligram of the particular constituent dissolved in 1 liter of water. Within the range of the density of waters in Lincoln County, dissolved concentrations in milligrams per liter are numerically equivalent to values in parts per million, which was formerly used in reporting chemical-quality data. Table 2 shows the common chemical constituents dissolved in natural waters, their sources, and significance with respect to use.

Table 2.--Sources and significance of common chemical constituents of water

Constituent	Recommended limits for drinking water[1] (mg/L)	Principal sources	Significance with respect to use
Silica (SiO_2)	--	Dissolved from almost all soils and rocks in the area.	May form scale in pipes used in zeolite-type water softeners and in boilers.
Iron (Fe)	0.3	Common iron-bearing minerals present in most rocks in the area.	More than about 0.3 mg/L may stain laundry and utensils. Larger quantities may color and impart objectionable taste to water.
Manganese (Mn)	.05	Manganese-bearing minerals.	Same objectionable features as iron. Causes dark-brown or black stain.
Calcium (Ca) and magnesium (Mg).	--	Dissolved from almost all soils and rocks in the area.	Principal causes of hardness and the major constituents in scale deposits.
Sodium (Na) and potassium (K).	--	do	Large amounts in combination with chloride may give water a salty taste. Excessive amounts of sodium may reduce soil permeability and limit use of water for irrigation. Potassium is essential for proper plant nutrition.
Bicarbonate (HCO_3)	--	All carbonate minerals in the presence of carbon dioxide especially abundant in soil and atmosphere.	In combination with calcium or magnesium, causes carbonate hardness resulting in the deposit of boiler scale when used with hot-water facilities.
Sulfate (SO_4)	250	Gypsum, iron sulfides, and other sulfur compounds. Also commonly present in many industrial wastes.	Sulfates of calcium and magnesium form hard scale and are cathartic and unpleasant to taste.
Chloride (Cl)	250	Chloride salts, largely NaCl, in the consolidated rocks of marine origin.	In high concentrations imparts salty taste and may accelerate corrosion in pipes and other fixtures.
Fluoride (F)	1.4-2.4	Occurs in trace amounts in many soils and rocks.	Optimum concentrations tend to reduce decay of children's teeth; large amounts may cause mottling of the enamel of teeth.
Nitrate (NO_3, as N).	10	Decayed organic matter, sewage, and nitrates in soil.	Values higher than local average may suggest pollution. An excess of 10 mg/L in drinking water may cause methemoglobinemia, the so-called "blue-baby" disease in infants.
Phosphate (P)	--	Occurs naturally in varying concentrations. Also found in soaps and detergents.	Phosphate is essential to all forms of life. In certain forms, phosphates can interfere with coagulation processes at water-treatment plants.
Boron (B)	--	Occurs in trace amounts in some of the rocks in in the area.	Essential in small amounts for proper plant nutrition. Unsuitable in quantities of more than 4 mg/L for even the most tolerant plants.
Arsenic (As)	.1	do	Prolonged consumption of water containing an excessive amount of arsenic may cause chronic poisoning.

1/ Environmental Protection Agency (1972).

Specific conductance is a measure of the ability of water to conduct electrical current and is expressed in micromhos per centimeter at 25°C (Celsius). Numerically, the dissolved-solids content of water in milligrams per liter is usually 55 to 75 percent of the specific-conductance value.

Hardness of water is an important factor in any domestic or industrial supply because it affects the cleansing properties of water and is related to scale deposits. In this report, the following numerical ranges (expressed in milligrams per liter as calcium carbonate ($CaCO_3$) and terms are used to classify water hardness:

Hardness as $CaCO_3$ (mg/L)	Classification
0-60	Soft
61-120	Moderately hard
121-180	Hard
180	Very hard

The chemical diagrams on plate 1 show the concentrations of major ions expressed in milliequivalents per liter. In this report, these diagrams are used to show visually the chemical character of water throughout the area.

There are no generally established limits for sediment concentration, but usually the higher the concentration the more objectionable the water for a given use. Excessive sediment in drinking water is objectionable primarily because of its esthetic effect; it also clogs pipes and water tanks. High concentrations of sediment are also known to be detrimental to aquatic life in streams. Where the sustained sediment concentration is high, sediment detention or removal can be expensive.

Coliform bacteria are used as indicators of pollution. Fecal coliforms, whose source is human or animal feces, are considered to be a strong indication of domestic waste. For public water supplies the Environmental Protection Agency (1972) recommends a limit not to exceed a mean of 20,000 colonies per 100 ml of water for total coliforms and a mean of 2,000 colonies per 100 ml for fecal coliforms in untreated surface water (Water quality criteria, Environmental Protection Agency [1972]). Treated water for public water supplies should not exceed a mean of 1 colony per 100 ml of total coliforms (interim primary drinking water standards [Environmental Protection Agency, 1975]).

Quality of Ground Water

Variations in Chemical Quality of the Water

Variations in dissolved-solids content of the ground water relate generally to the geologic environment. These variations depend chiefly on the rock types forming the aquifer, the altitude of the rocks, and in places the depth of the well. The Stiff diagrams on plate 1 illustrate that most of the ground water contains small concentrations of dissolved constituents. Exceptions are waters from many wells that tap the sandstone and siltstone beds or Tyee

Formation at low altitudes because there entrapped saltwater has not been displaced by circulating ground water. As shown by the Stiff diagrams, water from wells 10S/10W-3cbb, 11S/11W-22dbd2, and 13S/11W-27aca is high in dissolved constituents, particularly sodium and chloride. Conversely, water from wells that tap these rocks at higher altitudes is usually low in dissolved constituents because local recharge from precipitation has displaced the saline water. Samples of water from 24 wells and 2 springs were analyzed by the U.S. Geological Survey, and samples from 5 wells were analyzed by MEI-Charlton, Inc., and are reported in table 3.

Suitability for Use

The acceptability of any water is directly related to the intended use of the water. For example, iron concentrations greater than 0.3 mg/L may cause staining of porcelain fixtures and laundered articles, but is not harmful if consumed in drinking, and does not affect use of the water for irrigation.

As shown in table 3, most of the ground water analyzed contained low concentrations of iron; of the 29 ground-water samples analyzed, only 9 contained excessive concentrations of iron. Five of the water samples with high iron concentrations were collected from wells tapping the siltstone or sandstone, suggesting that excessive iron concentration may be a problem in water from these units. The other four wells penetrate the alluvial-terrace deposits.

Boron is an essential element for plant growth; however, excessive boron is harmful to many plants. According to the Environmental Protection Agency Water Quality Criteria (1972), a maximum concentration of 0.75 mg/L is recommended for sensitive plants. Recommended maximum concentrations are 1 mg/L for semitolerant plants and 2 mg/L for tolerant plants. In the 22 samples analyzed for boron, concentrations ranged from 0 to 5.4 mg/L. With the exception of water from wells 11S/11W-22dbd2, 10S/10W-3cbb, and 13S/11W-9bca1, all water analyzed was suitable for even the most boron-sensitive plants. Table 3 shows that ground water high in boron is also generally high in dissolved constituents such as chloride and sodium. As shown on plate 1, water from most of the wells in the area that are high in these constituents are drilled into the siltstone and sandstone bedrock unit at low altitudes. Table 2 can be used as a guide to indicate the sources of the more common chemical constituents, the significance of these constituents in the use of water, and their recommended limits for drinking water.

Most of the ground water sampled was within the desirable ranges of hardness for most industrial and public-supply uses. With the exception of well 13S/11W-27aca (hardness 210) and well 6S/11W-24bbd (hardness 64), which penetrate the siltstone and sandstone unit, the observed hardness of ground water was in the soft classification.

Some of the chemical analyses of ground water (table 3) show concentrations, particularly of iron, manganese, and chloride, that exceed the recommended limits shown in table 2. Most of the ground water that exceeds these limits is produced by wells that penetrate the Tyee or the siltstone and sandstone units. This is especially true of water produced by wells drilled into

Table 3.--Chemical analyses of ground water

Location number[1]	Water-bearing material	Date of collection	Milligrams per liter																			Sodium-adsorption-ratio (SAR)	Specific conductance (micromhos/cm at 25°C)	pH	Temperature		Laboratory[2]
			Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite + Nitrate (as N)	Phosphate, ortho as P	Boron (B)	Arsenic (As)	Dissolved solids, calculated from determined constituents	Hardness (CaMg)	Noncarbonate hardness				°C	°F	
6S/10W-32dab	Sandstone and shale	5-29-72	17	0.07	0.02	2.0	1.7	6.3	0.71	11	0	8.2	9	0.01	1.1	--	--	--	55	12	--	--	--	6	--	--	CL
6S/10W-33abd1	Sandstone	3-14-68	--	.62	--	--	--	--	--	59	0	--	10.1	--	--	--	--	0.01	102	--	--	--	--	6.8	--	--	CL
6S/10W-33abd2	Volcanic rock	2- 7-72	22	.12	.02	20	.5	46	.20	60	24	54	23	.85	.09	--	--	.001	187	--	--	--	--	--	--	--	CL
6S/11W-24bbd	Siltstone and sandstone	6-18-74	49	2.4	.0Ɛ	18	4.7	15	1.6	64	0	32	10	.4	.10	0.04	0.02	.001	165	64	12	.8	215	6.8	11	52	USGS
6S/11W-35cbc	Shale	1-15-71	47	.44	.04	1.1	.8	35	7.2	3.5	0	38.9	19.2	.04	.06	--	--	.001	--	6.1	--	--	--	7.4	--	--	CL
7S/10W-25acd	Siltstone and claystone	6-20-73	25	.02	0	17	0	290	1.1	0	23	64	390	.1	.05	.03	--	0	816	42	4	19	1,500	9.6	14	58	USGS
7S/11W-1cac	Claystone	do	28	.19	.02	4.2	.8	120	.9	276	17	4.0	20	.2	.73	.34	.43	.002	336	14	14	14	525	8.5	14	58	USGS
7S/11W-34ddd	Sand and gravel	do	18	2.1	.02	4.7	2.8	24	3.5	64	0	5.8	19	.3	.10	.43	0	0	113	23	0	2.2	167	8.0	--	--	USGS
8S/10W-8dcb	Basalt	do	27	.05	0	11	3.3	21	.4	70	0	6.4	17	.3	.66	.06	.18	0	124	41	0	1.4	165	8.1	14	58	USGS
8S/11W-21cdd	Sand	--	7	.44	.04	1.1	3.4	25.6	2.5	--	--	11.2	44	.04	--	--	--	.001	117	25	--	--	--	5.5	--	--	CL
8S/11W-28cab	do	6-14-74	8.1	.74	.11	4.5	3.3	29	1.1	9	0	7.7	44	.0	1.7	.09	.02	0	111	25	17	2.5	203	5.5	11	51	USGS
8S/11W-32dbb	Sandstone	6-21-73	67	3.3	.30	5.3	.2	96	.8	161	6	17	47	.8	.09	1.0	.13	.001	324	14	0	--	451	8.5	--	--	USGS
8S/11W-36adas	Basalt	6-20-73	19	.04	0	4.3	1.0	7.2	1.2	19	0	7.7	9.5	.5	.65	1.2	.01	.001	63	15	0	.8	75	--	14	57	USGS
8S/11W-36adc	Shale and sandstone	do	5.2	.08	.01	1.8	.2	260	.9	409	19	3.2	160	1.2	0	.04	--	--	653	5	0	49	1,180	8.6	17	63	USGS
9S/10W-7dad	Sand and gravel	do	12	.05	.01	2.8	1.3	5.2	.4	5	0	3.8	3.3	.2	2.9	.00	.02	0	44	12	8	.6	56	7.1	--	--	USGS
9S/11W-8ccd2	Basalt	3- 7-76	--	--	--	14	4.9	--	--	123	--	--	35	--	--	--	--	--	228	55	0	--	355	--	--	--	USGS
9S/11W-17bba	do	3- 2-76	44	.02	0	4.7	.5	89	1.0	101	29	22	40	.3	.01	.10	.04	0	281	14	0	10	450	8.9	10	50	USGS
10S/10W-3cbb	Claystone	6-20-73	8.3	.03	.01	2.8	.3	480	1.1	262	53	3.0	530	.8	.02	.21	2.4	0	1,215	8	0	73	2,250	8.9	13	56	USGS
10S/10W-4ccb	Gravel	do	26	.01	0	10	2.7	8.2	.6	49	0	5.5	1.7	.1	1.0	.06	0	0	83	36	0	--	113	7.6	--	--	USGS
10S/11W-8dcas	Sand	6-21-73	10	.04	.C2	1.5	2.2	15	.8	12	0	7.0	25	.6	.007	.03	.04	0	68	13	3	--	113	8.2	--	--	USGS
10S/11W-20bdb	Sandstone	6-20-73	18	2.1	.02	4.7	2.8	24	3.5	64	0	5.8	19	.3	.10	.14	0	0	113	23	0	--	167	8.0	--	--	USGS
11S/10W-17aac	do	do	20	.06	0	1.2	.5	110	1.0	238	16	14	8.6	.0	1.4	.89	.28	.002	296	5	0	21	472	8.5	15	59	USGS
11S/10W-19dcc	Clay and shale	do	17	.03	0	4.7	.7	7.6	.9	19	0	6.7	5.9	.6	1.0	.01	.70	.001	58	15	0	.9	63	6.8	11	52	USGS

See nootnotes at end of table.

Table 3.--Chemical analyses of ground water--Continued

Location number[1]	Water-bearing material	Date of collection	Milligrams per liter: Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite + Nitrate (as N)	Phosphate, ortho as P	Boron (B)	Arsenic (As)	Dissolved solids, calculated from determined constituents	Hardness (CaMg)	Noncarbonate hardness	Sodium-adsorption-ratio (SAR)	Specific conductance (micromhos/cm at 25°C)	pH	Temperature °C	Temperature °F	Laboratory[2]
11S/10W-29cba	Sandstone	6-20-73	14	2.0	0.09	15	1.4	78	1.2	219	0	4.7	7.3	1.0	0.39	0.58	0.56	.003	237	43	0	5.2	237	7.6	13	56	USGS
11S/11W-22dbd2	Claystone	do	27	.08	.01	10	3.0	990	3.7	584	0	6.1	1,300	1.2	.00	.12	5.4	.004	2,630	37	0	71	4,650	7.9	13	56	USGS
12S/12W-25aac	Sand	6-19-73	37	.05	0	5.3	1.8	160	2.2	278	59	4.0	41	.8	.87	.49	.50	.001	454	21	0	15	738	8.4	14	57	USGS
13S/11W-9bca1	Claystone	6-12-74	17	.07	0	4.9	.3	160	1.2	333	24	38	16	.3	1.2	1.2	.99	0	433	13	0	.59	714	9.0	10	50	USGS
13S/11W-27aca	Sandstone	6-19-73	5.9	.04	.01	84	1.2	1,100	1.7	36	0	8.1	1,800	2.9	.02	.01	--	0	3,020	210	190	33	5,670	8.1	13	56	USGS
13S/11W-28ada	Gravel	do	0	.11	.05	6.7	6.7	15	1.3	12	0	41	16	.5	.39	.00	.04	0	107	44	34	1.0	168	6.1	14	57	USGS
13S/11W-31baa	Sand	do	32	.06	0	1.8	.9	22	1.4	42	0	5.2	18	.3	.12	.15	.04	.003	103	8	0	3.3	128	6.7	12	54	USGS
14S/11W-32cdb	Sandstone	do	11	.06	.01	2.2	1.1	5.2	.6	15	0	4.5	5.3	.9	.56	.00	.01	0	41	10	0	.7	45	6.5	13	55	USGS

1/ Small s indicates spring.

2/ Laboratory: **MEI-Charlton, Inc.; USGS, U.S. Geological Survey.**

these formations at altitudes near or slightly above sea level. The quality of the water produced by wells in these formations in the foothills at higher altitudes, where circulating ground water has flushed them of seawater, usually is within the recommended limits. At lower altitudes, wells in these formations that exceed about 50 ft (15 m) in depth produce water of increasingly higher concentrations of dissolved constituents as depth increases. Ground water from the basalt and Siletz River Volcanics contains small concentrations of dissolved constituents and is excellent for most uses.

The presence of coliform bacteria also affects suitability of the water for use. During this study, one water sample was taken from each of nine wells and two springs and was analyzed for fecal coliform bacteria. Of the 11 analyses made, only one (water from well 10S/10W-5ddc) showed presence of fecal coliforms--two colonies per 100 ml of water). Further study is required to determine if ground-water pollution exists in the area.

Quality of Surface Water

Chemical Quality

In general, analyses of water from the 14 streams sampled in Lincoln County indicate very good chemical quality (table 4, plate 1). Conductivity of stream water generally is less than 100 micromhos in spring and less than 150 micromhos in late summer.

Two streams, Depoe and Thiel Creeks, were relatively high (0.37 and 0.52 mg/L, respectively) in iron, making the water objectionable for domestic use. (See table 2.)

Nitrogen in the Yaquina River was relatively high (0.90 mg/L), but less than one-tenth the recommended limit for drinking water. (See table 2.) Nitrogen concentrations in the Yaquina, and possibly other coastal streams, may be higher in the spring and fall when overland runoff occurs than during late summer when streamflows are low.

In late summer and fall when streamflow is low, water in most streams on the Lincoln County coast has a slightly dark color (red-brown), making it esthetically unpleasant for public-supply use. All the dark color was removed by filtering the low-flow water samples through a 0.45-micron filter. Probably most of the color in surface water on the Lincoln County coast during summer is caused by extremely fine suspended particles of organic materials. Very little dark coloring was noted in samples collected during winter when streamflows are much larger.

Biological Quality

Six streams on the Lincoln County coast were sampled once each to determine fecal coliform concentrations that might be expected in this area (table 5). None of the samples had high fecal coliform concentrations.

Table 4.--Chemical quality of surface water

Station number	Stream name	Date of collection	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrite + nitrate (as N)	Phosphate, ortho as P	Boron (B)	Arsenic (As)	Dissolved solids, calculated from determined constituents	Hardness (Ca, Mg)	Noncarbonate hardness	Sodium-adsorption ratio (SAR)	Specific conductance (micromhos/cm at 25°C)	pH	Temperature °F	Temperature °C	Discharge (ft^3/s)
			Milligrams per liter																							
14303748	Salmon River	4- 3-74	11	0.10	0.0	5.1	1.0	4.4	0.3	18	2.1	4.1	0	0.33	0.06	--	--	39	17	0	0.5	65	--	45	7.0	1,000
		8-21-74	18	.18	.01	4.0	2.9	12	2.7	21	7.0	18	0	.06	.03	0.04	0	75	22	5	1.1	140	7.5	56	13.5	60
14303968	Drift Creek	4- 3-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	60	--	46	8.0	580
		8-21-74	12	.02	0	9 0	1.9	6.0	.2	33	4.0	5.0	0	.04	.03	--	--	55	30	3	.5	120	7.0	57	14.0	45
14305500	Siletz River	4- 3-74	9.7	.12	0	3.4	.7	3.4	.4	12	1.4	3.3	0	.32	.06	--	--	30	11	2	.4	38	6.7	46	8.0	4,280
		8-21-74	14	.05	0	7.4	2.2	5.9	.5	34	5.3	4.5	.1	.18	.09	--	--	58	28	0	.5	80	6.8	62	16.5	168
14306000	Euchre Creek	4- 3-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	55	--	48	9.0	350
		8-21-74	12	.02	0	5.3	1.9	5.5	.4	32	2.8	3.3	0	.01	.03	--	--	47	21	0	.5	100	7.1	57	14.0	15
14306010	Rocky Creek	4- 3-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	80	--	49	9.5	45
		8-21-74	12	.04	0	4.1	1.0	4.0	.6	23	2.3	3.2	0	.03	.03	--	--	39	14	0	.5	140	6.8	56	13.5	1.5
14306016	Moloch Creek	4- 3-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	90	--	49	9.5	12
		8-21-74	22	.17	0	4.0	2.4	13	1.5	20	6.3	19	0	.11	.03	.05	0	79	20	3	1.3	150	6.4	55	13.0	1.0
14306030	Yaquina River	4- 4-74	12	.16	0	4.0	.9	5.3	.7	14	1.8	4.3	0	.90	.09	--	--	40	14	2	.6	55	6.8	46	8.0	860
		8-21-74	12	.15	0	4.8	1.6	7.8	1.7	29	2.5	6.4	0	.18	.93	--	--	52	19	0	.8	110	6.8	63	17.5	14
14306032	Elk Creek	4- 4-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	55	--	46	8.0	820
		8-21-74	7.5	.11	0	4.4	1.2	8.2	1.1	28	2.5	5.2	0	.08	.03	--	--	44	16	0	.9	100	7.6	66	19.0	15
14306038	Depoe Creek	4- 3-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	65	--	48	9.0	110
		8-21-74	20	.37	0	5.8	2.3	9.5	1.4	27	7.1	9.5	0	.23	.06	--	--	70	24	2	.8	140	6.9	60	15.5	4.0
14306041	Thiel Creek	4- 4-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	90	--	47	8.5	24
		8-21-74	15	.52	0	3.4	1.9	15	1.0	18	5.0	21	0	.18	.03	--	--	73	16	2	1.6	150	6.5	61	16.0	3.0
14306044	Beaver Creek	4- 4-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	60	--	46	8.0	200
		8-21-74	12	.16	0	4.4	1.6	8.2	1.1	21	3.0	8.4	0	.29	.03	--	--	51	18	0	.9	130	6.5	61	16.0	12
14306500	Alsea River	4- 3-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50	--	46	8.0	4,330
		8-21-74	12	.04	0	4.6	1.7	4.8	.8	29	2.4	4.2	.1	.05	.06	--	--	45	18	0	.5	100		66	19.0	116
14306820	Drift Creek	4- 3-74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	48	--	45	7.5	850
		8-22-74	12	.04	0	4.0	1.9	7.6	.9	25	2.4	6.1	0	.11	0	.02	0	48	18	0	.8	100	6.9	60	15.5	40
14306875	Yachats River	4- 5-74	12	.06	0	2.7	.9	4.7	.6	14	1.5	5.3	0	.34	.09	--	--	36	10	0	.6	55	6.8	45	7.5	700
		8-22-74	14	.08	0	4.6	2.7	6.6	.7	27	2.8	6.3	0	.10	.03	.03	0	52	23	0	.6	100	6.9	57	14.0	30

Table 5.--Fecal coliform analyses of streams in Lincoln County, August 22, 1974

Station number	Stream name	Time (a.m.)	Fecal coliform (colonies/100 ml)	Stream discharge (ft^3/s)
14303748	Salmon River	11	20	58
14305500	Siletz River	9:30	21	159
14306010	Rocky Creek	10	13	1.5
14306500	Alsea River	7:45	11	113
14306820	Drift Creek	8:30	25	40
14306875	Yachats River	7	178	30

Sediment

Data collected in 1965, 1973, and 1974 provided a basis for estimating suspended-sediment transport in Lincoln County. To compute annual suspended-sediment discharge, observed suspended-sediment discharge was related to concurrent water discharge (Colby, 1956). Daily sediment discharge was determined from daily streamflow, using the water discharge-sediment discharge relationship curves. Annual sediment discharge was computed by accumulating the daily values. Streamflow at sites where continuous record was not available was synthesized by relating measured discharges of the nonrecording site to the recording site. Loads estimated using this technique (Curtiss, 1975) agree closely with loads computed at selected daily sediment stations in Oregon.

About 490,000 tons (440,000 tonnes) of sediment is transported annually by streams in Lincoln County to estuaries or directly into the Pacific Ocean. Usually 80 to 90 percent of the annual sediment load is discharged during periods of peak streamflows, which generally occur during less than 30 days out of each year. Annual sediment loads vary greatly from year to year; years with extreme peak streamflow events can have annual sediment discharges four to five times those of the long-term mean.

Sediment data collected at Flynn Creek (station 14306800) disclose that 70 percent of the 15-year total load occurred in water years 1961, 1965, 1966, and 1972. In 1965, 93 percent of the annual load was discharged in the rainy months of December and January, and 50 percent of the total annual load occurred during 1 day, January 28. In 1972, 88 percent of the annual load occurred during a very wet January.

Because surface water may be used as a public water supply, it becomes necessary to treat water to remove suspended sediment. To treat water, the

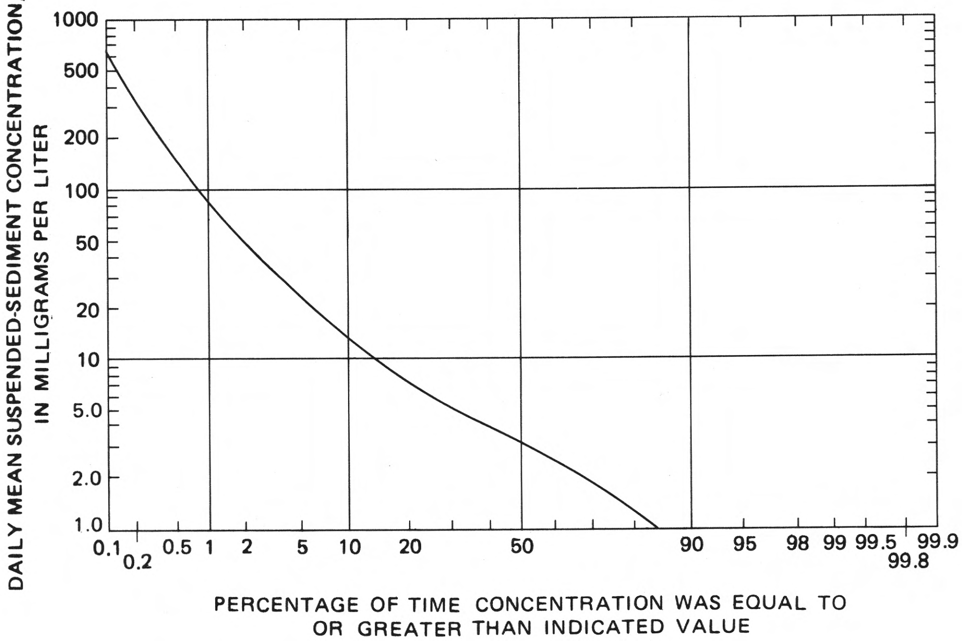

Figure 11. — Duration curve of suspended-sediment concentrations of Flynn Creek (1959-65).

quantity of sediment, particle size, and time distribution should be known. Information on time distribution can be obtained from the suspended-sediment duration curve of Flynn Creek (fig. 11). Although Flynn Creek is a small stream, it provides insight into time distribution of suspended sediment for coastal streams. Table 6 shows an estimate of size distribution of suspended sediment for three streams. The reported suspended-sediment sizes for the Alsea and Yaquina Rivers are for one storm event and those for Flynn Creek are an average of several events. A different particle-size distribution of suspended sediment will result from each storm event.

Table 6.--Suspended-sediment size analyses for selected sites

Stream	Date	Percentage composition by weight			
		Clay (<0.004 mm)	Silt (0.004-0.062 mm)	Sand (0.062-2.0 mm)	Very fine gravel (2.0-4.0 mm)
Flynn Creek	1/	9	25	61	5
Alsea River	1-15-74	10	40	48	2
Yaquina River	1-16-74	12	60	28	--

1/ An average of several samplings, 1958-72.

A certain part of the total sediment load cannot be measured using standard sampling techniques. The unmeasured load (which is usually small in this area) consists primarily of the bedload. Bedload is defined as that material transported in a stream along the bed. Measurements made at Flynn Creek, using volumetric methods (Harris and Williams, 1971), show that the bedload was an average of 2.5 percent of the annual suspended-sediment load. An average of 3 percent was used to estimate bedloads for streams in Lincoln County.

Suspended-sediment data for specific sites are shown on plate 1 and in table 7. On plate 1, suspended-sediment yield values are shown as estimated mean annual yields in tons per square mile. These data reflect current conditions and are reasonable estimates of future sediment loads provided conditions remain the same. Sediment discharges are highly variable, being subject to the activities of man and the whims of nature. Most of man's land-use activities, such as road building, harvesting of trees, and farming, increase the sediment transported in streams at least temporarily. Forest fires and landslides also increase availability of sediments to the streams. Rainfall intensity and duration largely determine the magnitude of the sediment load during a given period of runoff.

Table 7.--Suspended-sediment statistics for selected sites

Station number	Stream name	Drainage area (mi²)	Estimated annual suspended-sediment load (tons/yr) 1973	1974	Mean	(tons/mi²) Mean	Maximum observed sediment load (tons/day)	Date
14303748	Salmon River	60.4	14,000	--	21,000	350	920	11-16-73
14303968	Drift Creek	37.6	32,000	--	52,000	1,380	29,700	1-27-65
14305500	Siletz River	202	72,000	--	120,000	590	102,000	1-28-65
14306000	Euchre Creek	13.4	3,500	--	5,400	400	781	12-20-72
14306016	Moloch Creek	5.36	340	--	670	120	9	12-19-72
14306030	Yaquina River	71.0	1/8,000	1/44,000	22,000	310	5,590	11-16-73
14306032	Elk Creek	85.0	8,800	--	24,000	280	4,520	Do
14306038	Depoe Creek	9.08	2,600	--	4,900	540	185	12-20-72
14306041	Thiel Creek	4.10	1,000	--	2,600	630	21	Do
14306044	Beaver Creek	14.3	1,600	--	3,300	230	19	12-19-72
14306500	Alsea River	334	1/76,800	1/279,000	157,000	470	22,100	11-16-73
14306800	Flynn Creek	.78	74	--	227	290	491	1-28-65
14306820	Drift Creek	61.0	6,600	--	17,000	280	3,570	12-21-72
14306875	Yachats River	51.0	7,800	--	22,000	430	21,300	1-28-65
	Unmeasured streams	--	--	--	15,000	--	--	--

Total suspended sediment	470,000
Bedload (3 percent of suspended sediment)	15,000
Total sediment load	490,000

1/ Actually measured; not estimated.

The basin above the station on Drift Creek (14303968) had the greatest sediment yield (tons per square mile per day) of all basins sampled. (See plate 1.) Drift Creek had a sediment yield more than twice that of the Salmon River, the Siletz River, or Euchre Creek, all of which are in the same general area and drain the same type of rugged topography. Conversely, the basins above the Yaquina River (14306030) and Elk Creek (14306032) stations had low sediment yields and will probably never yield much sediment because topographic relief is low.

GROUND WATER-SURFACE WATER RELATIONSHIPS

The sustained flow of streams during dry weather illustrates the interrelationship between surface water and ground water. During periods of no direct surface runoff, streamflow is maintained by water that issues from the ground as springs and seeps.

Analysis of streamflow and ground-water data, as shown in the following sections, indicates that ground and surface water in the area are closely related and may be considered as a single resource.

Base Flow of Streams

Base flow is defined as that component of stream runoff that is composed largely of ground-water discharge. Base-flow measurements of streams in the area indicate that streamflow has a direct relationship to the ability of the geologic units to store and transmit water. The discharge measurements used in the table below were made September 11-21, 1972. (See plate 1 and table 11, p. 57.

The table shows the relative magnitude of base runoff for certain geologic units. The base runoff is a measure of the water-yielding characteristics of the units.

Geologic unit	Base runoff $(ft^3/s)/mi^2$	Base runoff $(m^3/s)/km^2$
Tyee Formation (sandstone)	0.05-0.2	0.0005-0.002
Siletz River Volcanics	.5-0.7	.005-0.008
Marine terrace deposits	.4-1.6	.004-0.017

Base flows were measured in the Yachats River basin in southern Lincoln County in August 1974, when the flows were higher than those in September 1972. In that area, base flows from streams in Eocene marine siltstone and sandstone were low, about 0.3 $(ft^3/s)/mi^2$ [0.003 $(m^3/s)/km^2$]. In comparison, base flows from streams in the Eocene basalts were higher, about 0.8 $(ft^3/s)/mi^2$ [0.009 $(m^3/s)/km^2$]. Where the geology is more complex, dependable low-flow data can be used to estimate ground-water characteristics. Plate 1 shows how dependable low flow varies areally with geology.

Comparison of Base Flow with Yields of Wells

Plate 1 shows the geology of the area and also well-yield and dependable low-flow stream data. Dependable low flow is a low base flow. Analysis of these data indicates that higher yields can be expected from wells in parts of the area where base flows are highest. In the northern end of the Lincoln County coastal area, the Salmon River has one of the highest base flows per square mile of any major drainage basin in the project area. In that basin, well 6N/10W-33abd2, drilled in the Siletz River Volcanics, yields more water (120 gal/min, or 7.6 L/s) than most wells in the project area.

Streams that originate in the Quaternary marine terrace deposits (see pl. 1) have higher base flows than do streams originating in the siltstone and sandstone unit that, in many places, lies either adjacent to or beneath the marine terrace deposits. Also, wells drilled in the Quaternary marine terrace deposits have higher yields than most wells in the siltstone and sandstone unit.

WATER USE AND OUTLOOK FOR THE FUTURE

Annual water use in the Lincoln County coastal area totals about 6.7 billion gallons (26 hm^3), less than 0.5 percent of annual runoff. Of that use, 4.7 billion gallons (17 hm^3) is diverted from the Siletz River and Olalla Creek for industrial use by the Georgia-Pacific Corp. mill at Toledo, and 0.33 billion gallons (1.2 hm^3) is withdrawn from streams for irrigation of pasture and hay lands. Because of a trend away from farming in the area, irrigation use is declining and now may be less than the use reported in a 1964 report of the U.S. Department of Agriculture. Water for public supply, which totals about 1.7 billion gallons (6.4 hm^3), is obtained principally from surface-water sources, as shown by table 8. In addition, small volumes of ground water are pumped from wells and used for mobile-home courts, parks, and private residences and farms.

Because of rapid development of the coastal area, additional water will be needed in the future. This water can be supplied (1) by reservoirs on major streams; (2) by expansion, in some locations, of present surface-water facilities on small streams; and (3) locally, by an additional small volume of supplemental water from ground-water sources.

Surface Water

Lincoln County receives some of the highest amounts of precipitation in the State (60 to more than 200 in, or 1,500 to 5,100 mm). Most stream runoff occurs from November through April, and mean annual flows from Lincoln County streams emptying into the Pacific Ocean total 5,000,000 acre-ft (6,000 hm^3). Intense storms are frequent and flooding occurs almost annually. The tight soil and rock formations and steep, rugged topography in some of the county cause rapid storm runoff. Because most of the water courses are relatively short, peak flows are produced within hours of the passage of a storm front. Most land development, other than reforestation or reservoir construction, will only cause more rapid runoff and greater flooding from streams. The very tight soil and rock formations in the area form poor aquifers; as a result, all large streams and most small streams in the county have very low

Table 8.--Public-supply water use in Lincoln County coastal area

[Based on table compiled by Lincoln County Planning Department (1972)]

Water user	Wells or springs	Stream	Average annual use (Mgal/yr)[1/]	Industrial use[2/] (percent)
Panther Creek Water Dist.	--	Panther Creek	7	--
Roads End	1 well 2 springs	--	7	--
Lincoln City	--	Rock Creek South Fork Schooner Creek	260	--
Kernville Gleneden Beach Lincoln Beach	-- -- 1 well	Drift Creek	80	1
Depoe Bay	--	North Depoe Bay Creek	22	4
Miroco	--	Rocky Creek	2	--
Otter Rock	--	Johnson Creek	4	--
Beverly Beach State Park	--	Spencer Creek	1	--
Beverly Beach	--	South Fork Spencer Creek Wade Creek	1	--
Karmel Knoll	1 spring	--	>1	--
Agate Beach	--	Little Creek	30	--
Newport	--	Big Creek	280	11
Southbeach	--	Unnamed	40	--
Seal Rock Water Dist.	--	Henderson Creek Hill Creek	270	--
Waldport	--	Eckman Creek	110	>1

See footnotes at end of table.

Table 8.--Public-supply water use in Lincoln County coastal area--Continued

Water user	Wells or springs	Stream	Average annual use (Mgal/yr)1/	Industrial use2/ (percent)
Mount Angel Job Corps Center	--	Big Creek	4	--
Southwest Lincoln County Water Dist.	--	Big Creek Starr Creek	182	--
Yachats	--	Reedy Creek	91	--
Cape Perpetua National Forest Visitor Information Center	--	Cape Creek	1	--
Siletz	--	Tangerman Creek Siletz River	11	--
Toledo	--	Mill Creek Siletz River	290	6
Total public-supply use (rounded)			1,700	

1/ Mgal/yr, million gallons per year.
2/ Based on report by Erichsen and Associates (1965).

summer flows, with dependable low flows ranging from 0.05 $(ft^3/s)/mi^2$ [0.0005 $(m^3/s)/km^2$] from the Tyee Formation at the Yaquina River station near Chitwood to 1.54 $(ft^3/s)/mi^2$ [0.017 $(m^3/s)/km^2$] from Quaternary marine terrace deposits at Fox Creek near Waldport. (See plate 1.) About 1 percent of the annual runoff of most of these streams occurs during August and September.

Population growth will increase the need to use and impound more water from streams along the Lincoln County coast. The small streams adjacent to the coast can supply only limited water for increased domestic demands. Ultimately, large streams (such as the Siletz and Alsea Rivers) may have to be impounded, probably at their higher altitudes. With their summer flows augmented, the river water could then be pumped and treated at convenient locations.

Suspended sediment is probably one of the more objectionable constituents in the surface water of the coast. Mean annual loads of all streams studied in the project area ranged from 125 to 1,380 $tons/mi^2$ (70 to 780 $tonnes/km^2$). It is estimated that for most coastal streams a suspended-sediment concentration of 10 mg/L is exceeded approximately 20 percent of the time. Sediment transport is highly variable, depending primarily on source material, water discharge, and land use.

Supplemental Ground Water

Because most of Lincoln County is underlain by sandstone and siltstone units of rather low permeability, large supplies of good-quality water adequate for municipal and industrial use are not generally available. However, ground-water supplies for supplemental use can be obtained in parts of the area underlain by volcanic rocks and marine terrace deposits.

Areas that appear to have promising potential for the development of supplemental ground-water supplies from the marine terrace deposits are (1) the area extending about 3 mi (5 km) south of Siletz Bay and on the east side of U.S. Highway 101; (2) the Southbeach area south of Yaquina Bay; (3) the area to the south of Seal Rock, particularly the Hidden Lake area; and (4) the area south and east of Alsea Bay. Generally, these areas have few housing and recreational developments, which minimizes the possibility of pollution from septic tanks. In places, the terrace deposits are overlain by dune sand which permits infiltration and storage of additional precipitation. Wells that produce water from the fine materials of the terrace deposits may pump troublesome amounts of sand, thereby decreasing the efficiency of wells and resulting in a lower volume of water obtainable from the aquifer. This problem can be alleviated and maximum quantities of water can be obtained from these fine-grained aquifers by the construction of wells using properly designed screens or gravel packs.

The Siletz River Volcanics is the second most widespread rock unit in the county and contains some of the higher yielding wells in the area. In the northern part of the area, several wells drilled into this formation yielded appreciable (30-120 gal/min, or 1.9-7.6 L/s) volumes of water. Much of the area made up of these rocks has not been tested for ground water, but locally these rocks have the ability to intercept and store precipitation. Therefore, the Siletz River Volcanics should be considered in any plan to obtain supplementary ground-water supplies.

Other volcanic rocks, largely untested but having the ability to accept precipitation and store ground water, are the basalts near Depoe Bay, Cape Foulweather, Yachats, and Cape Perpetua. Wells drilled in January 1976 near Depoe Bay indicate that as much as 125 gal/min (10 L/s) of water can be obtained from wells drilled into the basalt. Although substantial volumes of water can be obtained from the basalt, the small areas of outcrop of these rocks place a restriction on the volume of water that can be stored and pumped. Wells in the basalt should be spaced so as to prevent well interference and should be pumped at a rate that does not produce drawdown to the extent that it may cause the intrusion of seawater and upward migration of saline water from the underlying marine-deposited siltstone and sandstone.

WELL- AND SPRING-NUMBERING SYSTEM

Designations of wells discussed in this report are based on the official system for rectangular subdivision of public lands. The number indicates the location of the well by township, range, and section, and its position within the section. A graphic illustration of this method of well numbering is shown in figure 12. The first numeral indicates the township; the second, the range; and the third, the section in which the well is located. The letters following the section number locate the well within the section. The first letter denotes the quarter section (160 acres, or 65 hm^2); the second, the quarter-quarter section (40 acres, or 16 hm^2); and the third, the quarter-quarter-quarter section (10 acres, or 4 hm^2). For example, well 13S/11W-16acb is in NW¼SW¼NE¼ sec. 16, T. 13 S., R. 11 W. Where two or more wells are located in the same 10-acre (4 hm^2) subdivision, serial numbers are added after the third letter. Springs are numbered in the same manner, except that the letter "s" is added following the final letter. The first spring recorded in NE¼SE¼NE¼ sec. 36, T. 8 S., R. 1 W., would have the number 8S/11W-36adas. Locations of all wells and springs located in the field are found on plate 1.

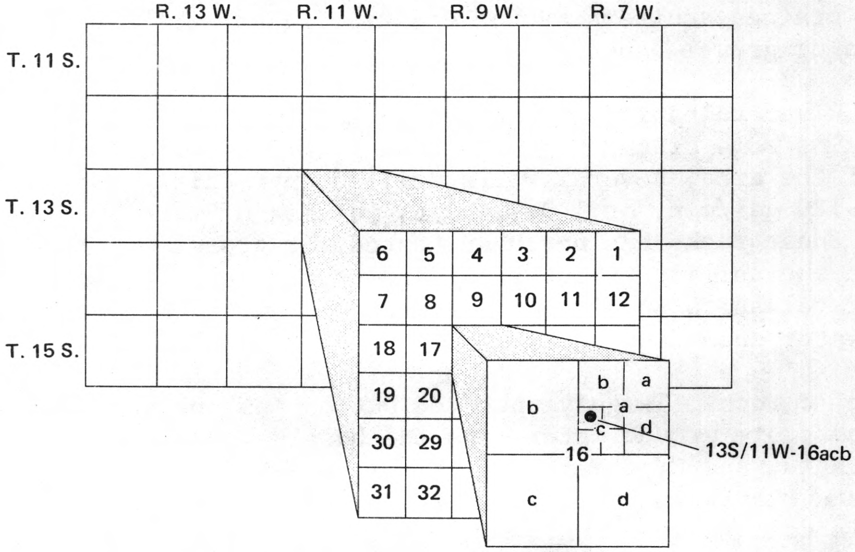

Figure 12. — Well- and spring-numbering system.

HYDROLOGIC DATA

Table 9 contains lithologic logs of representative wells drilled in the study area. Nearly all the logs were obtained from drillers' reports submitted to the Oregon Water Resources Department. The reports were edited for consistency of terminology and for conformance with the stratigraphic units described in the text but are otherwise unchanged.

Data summarized in table 10 are representative of ground-water data collected in the study area during this investigation. Well records shown in table 10 were obtained from reports compiled by well drillers and from well owners and operators. Table 11 contains records of five springs that are fairly representative of a great many springs in the area. The locations of wells and springs are shown on plate 1.

Additional unpublished ground-water data, including well reports and ground-water level records are on file in the offices of the Oregon Water Resources Department, Salem, Oreg., and the U.S. Geological Survey, Portland, Oreg.

Table 12 contains miscellaneous streamflow and sediment data.

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HYDROLOGIC DATA

Table 9.--Drillers' logs of representative wells

6S/10W-31dbd. Kenneth Murphy. Altitude 650 ft. Drilled by R. J. Strasser Drilling Co., 1964. Casing: 6-in. diam to 64 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	3	3
Clay, brown	16	19
Rock, gray	23	42
Clay, brown	16	58
Rock, black, broken, water-bearing (approximately 5 gal/min)	10	68
Shale, gray	2	70
Rock, black, broken, water-bearing	12	82
Shale, gray	5	87
Rock, white, hard	5	92

6S/10W-32dab. Eldon Heringer. Altitude 160 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1972. Casing: 8-in. diam to 60 ft; perforated 35-50 ft

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, tan, sandy	12	13
Claystone, weathered	19	32
Sandstone, blue-gray, hard	22	54
Sandstone, blue, hard	95	149
Sandstone, tan, hard	18	167
Sandstone, gray, hard	188	355

6S/10W-33abd1. Larry DuRette. Altitude 165 ft. Drilled by Charles Panschow, 1967. Casing: 8-in. diam to 85½ ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Clay, brown	12	12
Clay, brown, and rock	18	30
Clay, gray, hard, and rock	6	36
Shale, gray, hard, and rock	96	132
Shale, gray	29	161

6S/10W-33abd2. Larry DuRette. Altitude 165 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1971. Casing: 8-in. diam to 23 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, red-brown	13	14
Sandstone, gray, hard	53	67
Sandstone, tan	17	84
Sandstone, blue-gray	75	159
Sandstone, gray, fractured at intervals	39	198
Sandstone, blue and light-gray, hard	32	230

6S/10W-35aab. Agnes Martinson and Alberta Maxwell. Altitude 195 ft. Drilled by Mosher Drilling Co., 1970. Casing: 6-in. diam to 30 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, yellow-brown	4	5
Boulders, fine gravel, and black sand	20	25
Basalt	45	70
Shale, gray	8	78
Basalt	36	114
"Lime"	1	115
Basalt	25	140

6S/11W-24abd. Al Gibson. Altitude 400 ft. Drilled by Corvallis Drilling Co., Inc., 1972. Casing: 8-in. diam to 40 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, brown, and boulders	16	17
Clay, brown, sticky	12	29
Clay, blue, silty	4	33
Claystone, blue, medium-hard	120	153
Sandstone, blue, hard	8	161
Claystone, brown, sandy, medium-hard	19	180

6S/11W-24bbd. Sea River Properties. Altitude 210 ft. Drilled by Charles Panschow, 1969. Casing: 6-in. diam to 93½ ft; perforated 43-93 ft

Materials	Thickness (feet)	Depth (feet)
Clay, brown	6	6
Clay, gray and yellow	21	27
Clay, gray, and some fine gravel	20	47
Gravel, fine	3	50
Gravel, fine, and dark-gray clay	10	60
Gravel, fine, and dark-gray clay; some water	4	64
Soapstone, gray-white	3½	67½
Gravel, fine, and dark-gray clay; water-bearing	4½	72
Gravel, fine, and dark-gray clay	23	95
Gravel, fine, and light-gray clay	14	109
Gravel, fine, and light-gray clay and some shale	4	113
Shale	½	113½
Sand, coarse, and light-gray clay	2	115½
Shale	2	117½
Sandstone, gray, and some clay	5½	123
Sandstone, gray, and shale	12	135

6S/11W-26dcc. Scenic Enterprises. Altitude 240 ft. Drilled by R. J. Strasser Drilling Co., 1965. Casing: 6-in. diam to 150 ft; perforated 78-83 ft, 87-92 ft, 98-103 ft, 137-142 ft

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, yellow	8	10
Clay, gray	6	16
Clay, yellow	18	34
Shale, gray, hard	90	124
Clay, white	3	127
Shale, brown	5	132
Shale, gray	18	150
Rock, brown, broken	4	154
Shale, gray	16	170
Rock, brown, broken	2	172
Clay, gray, and shale	17	189

6S/11W-35aad. Scenic Enterprises. Altitude 240 ft. Drilled by R. J. Strasser Drilling Co., 1965. Casing: None

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, yellow	25	27
Shale, gray	133	160
Clay, blue	10	170

6S/11W-35bad1. Wilbur Day. Altitude 150 ft. Drilled by Wilcox Drilling & Pump Co., 1972. Casing: 6-in. diam to 47 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil, decomposed red and yellow clay, and rock particles	42	42
Shale, gray and blue, firm	153	195

6S/11W-35cbc. Developers Contractors, Inc. Altitude 100 ft. Drilled by Charles Panschow, 1971. Casing: 8-in. diam to 68½ ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	3	3
Sand and clay, yellow	25	28
Sand and clay, red, mixed	30	58
Lava rock, black	8	66
Lava rock, black, and shale and gray clay	3	69
Shale	22	91
Shale, gray, and clay	43	134
Shale, gray	27	161
Shale, gray, and clay; water-bearing	23	184
Shale, gray, and clay, mixed	42	226

Materials	Thickness (feet)	Depth (feet)
6S/11W-36ada. Andrew Briggs. Altitude 320 ft. Drilled by R. J. Strasser Drilling Co., 1965. Casing: 6-in. diam to 135 ft; perforated 116-119 ft, 132-135 ft		
Soil	2	2
Clay, yellow	34	36
Shale, gray	36	72
Rock, broken	1	73
Shale, gray	20	93
Rock, broken	1	94
Shale, gray	16	110
Rock, broken	1	111
Shale, gray, water-bearing 117-132 ft	71	182
Clay, gray	3	185
Rock, broken	2	187
Clay, gray	12	199
7S/10W-21cba. U.S. Forest Service. Altitude 250 ft. Drilled by Arrow Drilling & Supplies, 1965. Casing: 6-in. diam to 30 ft; unperforated		
Sand and gravel	5	5
Rock, partly decomposed	13	18
Basalt, brown	7	25
Basalt, black	85	110
7S/11W-1cac. K.O.A. Camp. Altitude 50 ft. Drilled by Miller-Robinson & West, 1968. Casing: 6-in. diam to 35 ft; unperforated		
Soil, brown	2	2
Clay, yellow	14	16
Claystone, gray	44	60
Basalt, brown	2	62
Claystone, gray, with narrow layers of basalt rock	38	100
Claystone, gray	30	130
7S/11W-15acc. Ocean Crest Chalet. Altitude 40 ft. Drilled by Charles Panschow, 1968. Casing: 6-in. diam to 72½ ft; unperforated		
Clay, brown, and sand and pieces of sandstone	18	18
Clay, dark-gray, and sand and gravel; water-bearing	14	32
Clay, dark-gray	32	64
Clay, dark-gray, and coarse sand and gravel	4	68
Sand, coarse, and gravel	5	73
Rock, dark-gray	1	74
Rock, dark-gray, and shale; water-bearing	14	88
Shale, dark-gray, and sand and clay	7	95
7S/11W-25acd. Mrs. Harvey Hill. Altitude 40 ft. Drilled by Kulick Well Drilling, 1959. Casing: 6-in. diam to 38 ft; unperforated		
Silt, black, and yellow clay	14	14
Shale, blue, and clay	14	28
Shale, gray, and hard soapstone	6	34
Rock, black, hard	14	48
"Limerock," solid	16	64
"Limerock," water-bearing	10	74
7S/11W-34ddd. H. V. Olson. Altitude 35 ft. Drilled by Miller-Robinson & West, 1969. Casing: 6-in. diam to 30 ft; perforated 20-30 ft		
Soil	1	1
Clay and sand, brown	14	15
Sand, fine, and gravel	14	29
Sand, black	1	30
8S/10W-19dac2. Clyde Bales. Altitude 50 ft. Drilled by Art Clinton Well Drilling Co., Inc., 1967. Casing: 6-in. diam to 82 ft; perforated 50-80 ft		
Soil	2	2
Clay, brown	21	23
Shale, blue	17	40
8S/10W-19dac2.--Continued		
Sandstone, blue, water-bearing	42	82
Sandstone, blue, and shale	18	100
8S/10W-20cbd2. Calkins Acres Development. Altitude 40 ft. Drilled by Charles Panschow, 1971. Casing: 10-in. diam to 37½ ft; perforated at unknown depth		
Clay, brown, yellow, and gray	24	24
Gravel	2	26
Sandstone, gray, hard	4	30
Sandstone, gray, hard, and clay and shale; water-bearing	7	37
Rock, hard, water-bearing	5½	42½
8S/11W-32dbb. R. G. Harbaugh. Altitude 50 ft. Drilled by Kulick Well Drilling, 1956. Casing: 6-in. diam to 11 ft; unperforated		
Clay	7	7
Sandstone, black	26	33
Basalt	19	52
Sandstone, water-bearing	11	63
8S/11W-36adc. George Nielson. Altitude 45 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1971. Casing: 6-in. diam to 50 ft; unperforated		
Soil and loam	8	8
Clay, brown	17	25
Clay, blue	13	38
Gravel	6	44
Shale, black	16	60
Sandstone, blue, hard	20	80
Sandstone, gray	47	127
Shale, gray	28	155
8S/11W-36daa. Paul Burnett. Altitude 55 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1971. Casing: 6-in. diam to 46 ft; unperforated		
Soil	1	1
Clay, brown, sticky	22	23
Clay, blue, sandy	16	39
Claystone, brown, sandy	56	95
9S/10W-7dad. Leon Anderson. Altitude 45 ft. Drilled by L. W. Mutschler Well Drilling, 1964. Casing: 6-in. diam to 31 ft; unperforated		
Soil	4	4
Clay, yellow, sandy	25	29
Sand, yellow, fine, with fine black gravel; water-bearing	2	31
Claystone, blue	6	37
9S/10W-33ddc1. Arthur Bensell. Altitude 125 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1970. Casing: 6-in. diam to 20 ft; unperforated		
Soil, brown	4	4
Soil, light-brown, and boulders	9	13
Shale, gray	69	82
Sandstone, white, hard	8	90
Sandstone, blue	19	109
Shale, gray	106	215

Table 9.--Drillers' logs of representative wells--Continued

Materials	Thickness (feet)	Depth (feet)
9S/11W-5dcd. Depoe Bay Water Dist. Altitude 90 ft. Drilled by Schoen Electric & Pump, 1971. Casing: 6-in. diam to 20 ft; unperforated		
Clay and boulders	3	3
Clay, yellow	3	6
Clay, gray	2	8
Claystone, blue, sandy	109	117
Sandstone, blue	5	122
Sandstone, blue, hard	152	274
Sandstone, blue, soft	113	387
Sandstone, blue	77	464
Sandstone, blue, with seashells	7	471
Sandstone, blue	3	474
Sandstone, blue, with hard streaks	20	494
Soapstone, brown	3	497
Sandstone, blue	3	500
9S/11W-8ccd2. Carl Halvorson. Altitude 100 ft. Drilled by Corvallis Drilling Co., Inc., 1976. Casing: 8-in. diam to 34 ft, 6-in. diam to 263 ft; perforated 160-245 ft		
Soil	1	1
Clay, brown	6	7
Sand, brown	4	11
Sandstone, brown	2	13
Sand, brown	6	19
Basalt, black, with broken layers	260	279
Sandstone, light-blue, hard	112	391
Sandstone, dark-blue, soft	34	425
9S/11W-12adb. Frank McRae. Altitude 50 ft. Drilled by Moug Drilling Co., 1966. Casing: 6-in. diam to 55 ft		
Soil	8	8
Sandstone, brown	9	17
Boulders, small	3	20
Sandstone, gray	32	52
Shale, gray	8	60
9S/11W-17bba. Carl Halvorson. Altitude 100 ft. Drilled by Corvallis Drilling Co., Inc., 1976. Casing: 8-in. diam to 33 ft; unperforated		
Soil	1	1
Clay, light-gray and brown	7	8
Sand, brown	11	19
Sandstone, blue	12	31
Sandstone, light-pink, hard	7	38
Basalt, black	19	57
Basalt, black, broken	7	64
Basalt, black, with quartz	65	129
Basalt, black	6	135
Basalt, black, with quartz	74	209
Basalt, black	13	222
Basalt, black, broken	12	234
Basalt, black, with quartz	65	299
Sandstone, light-blue	2	301
Shale, gray	4	305
9S/11W-32caa. Otter Crest Condominiums. Altitude 60 ft. Drilled by Charles Panschow, 1970. Casing: 10-in. diam to 40 ft, 8-in. diam surface to 198 ft; perforated 80-190 ft		
Clay	6	6
Clay, brown, and small rock	5	11
Clay, gray and yellow	11	22
Clay, brown, and sand	4	26
Clay, brown, and sand and gravel	4	30
Clay, brown and red	3	33
Clay, gray	8½	41½
Clay, gray, and some shale	1½	43
Clay, gray	38	81
Clay, gray, and some shale, mixed	10	91
Clay, gray, and shale, water-bearing	10	101
Clay, gray, and some shale	28	129
Shale, light-gray	1½	130½
Shale, light-gray, water-bearing	6½	137
Sandstone, gray, and some clay	2	139
Clay, gray	10	149
Clay, light-gray, and shale	10	159
9S/11W-32caa.--Continued		
Clay, gray, and some clay	7	166
Shale, gray, and dark-gray clay	16	182
Clay, gray, hard, and some light-gray shale	23	205
Shale, light-gray, and some clay	4	209
Clay, dark-gray, and some light-gray shale	14	223
9S/11W-32dca2. Alpine Chalets. Altitude 50 ft. Drilled by Charles Panschow, 1966. Casing: 6-in. diam to 145 ft; perforated 85-145 ft		
Fill	3	3
Clay, brown	12	15
Clay, blue	37	52
Clay, blue, hard, and shale	148	200
10S/10W-1abc1. Ernest Ludahl, Jr. Altitude 250 ft. Drilled by Valley Well Drillers, 1968. Casing: 6-in. diam to 20 ft; unperforated		
Sand, dark-brown	12	12
Clay, soft	28	40
Rock, medium-hard, gray	240	280
Shale, water-bearing (saline)	42	322
10S/10W-3cbb. Don Pressey. Altitude 130 ft. Drilled by Bill Howell Well Drilling, 1961. Casing: 6-in. diam to 60 ft; unperforated		
Clay, brown	17	17
Claystone, blue	68	85
10S/10W-4bda. Harry Rasmussen. Altitude 130 ft. Drilled by Howell Well Drilling, 1969. Casing: 6-in. diam to 20 ft; unperforated		
Soil	3	3
Clay, brown	11	14
Claystone, blue-gray	136	150
10S/10W-4ccb. Harry Rasmussen. Altitude 105 ft. Drilled by Bill Howell Well Drilling, 1969. Casing: 6-in. diam to 36 ft; perforated 34-35½ ft		
Soil	17	17
Sand and gravel	14	31
Gravel	6	37
10S/10W-30baa2. Ed Hamness. Altitude 85 ft. Drilled by Art Clinton Well Drilling Co., 1967. Casing: 6-in. diam to 69 ft; unperforated		
Soil	1½	1½
Clay, gray	18½	20
Clay, brown, sandy	20	40
Shale, blue	30	70
Sandstone, blue, water-bearing	20	90
Shale, blue	70	160
10S/10W-34bbc. Dean Martin. Altitude 125 ft. Drilled by Franklin Well Drilling, 1962. Casing: 6-in. diam to 20 ft; unperforated		
Soil	5	5
Soapstone	20	25
Clay, blue	20	45
Shale	5	50
Clay, blue	30	80

10S/11W-20bdb. W. L. Haven. Altitude 110 ft. Drilled by John W. Beck Well Drilling, 1959. Casing: 6-in. diam to 66 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Sand, brown	16	18
Sandstone, brown	14	32
Clay, brown, and silt	32	64
Rock, dark-blue, hard, broken	19	83

10S/11W-29abc. Agate Beach Water Dist. Altitude 150 ft. Drilled by American Well Drilling Co., 1964. Casing: 8-in. diam to 62 ft; 6-in. diam 56-240 ft; perforated 60-80 ft, 140-240 ft

Materials	Thickness (feet)	Depth (feet)
Soil	3	3
Clay, red	32	35
Clay, blue	24	59
Shale, brown, water-bearing	9	68
Shale, green	80	148
Shale, shattered, water-bearing	2	150

10S/11W-30aaa. Agate Beach Water Dist. Altitude 35 ft. Drilled by Wilcox Drilling Co., 1958. Casing: 10-in. diam to 106 ft; perforated 76-106 ft

Materials	Thickness (feet)	Depth (feet)
Soil	1½	1½
Clay, sandy	8½	10
Clay, blue, silty	11	21
Sand, with streaks of sandstone	80	101
Mudstone	5	106

11S/9W-9aad. Eddyville High School. Altitude 125 ft. Drilled by L. W. Mutschler Well Drilling, 1972. Casing: 8-in. diam to unknown depth; unperforated

Materials	Thickness (feet)	Depth (feet)
Old well	75	75
Claystone, gray	43	118
Sandstone, blue, broken, water-bearing (2½ gal/min)	1	119
Claystone, brown	21	140
Sandstone, blue, broken, water-bearing (4 gal/min, salty)	5	145

11S/10W-6dcc2. John Boydston. Altitude 75 ft. Drilled by L. W. Mutschler Well Drilling, 1972. Casing: 6-in. diam to 40 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Claystone, yellow, soft	32	32
Claystone, yellow, broken	18	50
Claystone, gray, broken, with yellow clay	55	105

11S/10W-9adc. D. L. McMillin. Altitude 75 ft. Drilled by Howell Well Drilling, 1967. Casing: 6-in. diam to 30 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	6	6
Clay, tan, and sand	22	28
Sandstone, blue-gray	63	91
Claystone, blue	14	105

11S/10W-14bbd. Lincoln County Parks. Altitude 50 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1971. Casing: 6-in. diam to 27½ ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, red-brown, sandy	20	21
Sandstone, blue-gray	36	57
Claystone, gray	5	62
Sandstone, brown	4	66
Sandstone, blue-gray	14	80

11S/10W-17aac. Kelly Gilkerson. Altitude 110 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1969. Casing: 6-in. diam to 22 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Clay, brown, sandy	17	17
Sandstone and shale, layered	158	175

11S/10W-18abd. Georgia-Pacific Corp. Altitude 15 ft. Drilled by A. M. Jannsen Drilling Co., 1948. Casing: Well not finished

Materials	Thickness (feet)	Depth (feet)
Mud and silt, brackish water from 60-65 ft	65	65
Clay, brown	5	70
Shale, gray, sandy; some gas at 335 ft	265	335
Shale, caving last 100 ft	665	1,000
Shale, sandy; shells 1,035-1,040 ft	200	1,200
Shale, soft	127	1,327
Shale, rock, strong inflammable gas at 1,330 ft	8	1,335
Shale, sandy, with shells	565	1,900

11S/10W-19dcc. Don Scroggins. Drilled by Raymond C. Gellatly, 1958. Casing: 6-in. diam to 42 ft; perforated 34-42 ft

Materials	Thickness (feet)	Depth (feet)
Soil	2	2
Clay, yellow, and shale	32	34
Clay, yellow, and broken shale; water-bearing	8	42

11S/10W-29cba. Walter Hunsucker. Altitude 75 ft. Drilled by Avery I. Crawford, 1960. Casing: 6-in. diam to 58 ft; perforated 46-58 ft

Materials	Thickness (feet)	Depth (feet)
Soil	11	11
Clay, yellow	16	27
Clay, blue	17	44
Sandstone	16	60

11S/11W-5cca. R. W. Kern. Altitude 160 ft. Drilled by L. W. Mutschler Well Drilling, 1970. Casing: 6-in. diam to 45 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	3	3
Sand, yellow, with clay	29	32
Sand, brown, water-bearing	9	41
Sandstone, gray, broken	4	45

11S/11W-9bdb. Victor Bump. Altitude 100 ft. Drilled by Charles Panschow, 1970. Casing: Removed

Materials	Thickness (feet)	Depth (feet)
Clay, light-brown, and sand and gravel	7	7
Clay, brown, and sand	6	13
Clay, brown	3	16
Clay, yellow, and gravel	33	49
Clay, yellow, and sand and gravel	2	51
Clay, brown, and sand and gravel	21	72
Clay, dark-gray	9	81
Clay, dark-gray, and shale	17	98
Sandstone, dark-gray, hard	2	100
Clay, dark-gray, and sand and fine gravel	28	128
Clay, gray, and sand and shale	26	154
Clay, dark-gray, and shale	6	160
Clay, medium-gray, and sandstone	15	175
Clay, dark-gray, and shale	18	193
Clay, dark-gray	86	279
Shale and clay	13	292
Clay, gray, and shale	3	295
Shale and clay	6	301

11S/11W-10acb. Sammy Franklin. Altitude 200 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1971. Casing: 6-in. diam to 44 ft; unperforated

Materials	Thickness (feet)	Depth (feet)
Soil	1	1
Clay, brown	28	29
Sandstone, tan, weathered	8	37
Claystone, blue-gray, sandy	84	121
Sandstone, gray, hard	5	126
Claystone, gray, sandy, with hard sandstone layers	239	365

Materials	Thickness (feet)	Depth (feet)
11S/11W-17aaa. Oregon State University. Altitude 15 ft. Drilled by Mosher Drilling Co., 1968. Casing: 6-in. diam to 24 ft; screened 20-24 ft		
Sand, fine	12	12
Sand, fine, and claystone	48	60
Mudstone	40	100
11S/11W-20bca. Oregon State Highway Division. Altitude 20 ft. Drilled by L. W. Mutschler Well Drilling, 1971. Casing: 6-in. diam to 77 ft, 5-in. diam 88-96 ft; 5-in. screen, slot size 10, 77-87 ft		
Sand, medium, and clay	22	22
Sand, medium, yellow, water-bearing	26	48
Sand, medium, blue, with clam shells; water-bearing	48	96
11S/11W-22dbd2. T. H. Baley. Altitude 50 ft. Drilled by Art Clinton Well Drilling Co., 1966. Casing: 6-in. diam to 41 ft; unperforated		
Soil	1	1
Shale, gray	31	32
Shale, blue	98	130
Sandstone, blue, water-bearing	35	165
11S/11W-31dad. C. V. Griffiths, Sr. Altitude 110 ft. Drilled by L. W. Mutschler Well Drilling, 1971. Casing: 6-in. diam to 36 ft; 6-in. screen, slot size 15, 32-37 ft		
Sand and clay, yellow	26	26
Clay, yellow	5	31
Sand, fine, brown, water-bearing	5	36
Claystone, blue	2	38
11S/11W-32cda. Ferris Nursery. Altitude 110 ft. Drilled by Charles Panschow, 1970. Casing: 6-in. diam to 219 ft; perforated 45-220 ft		
Clay, brown, and decayed wood and sand	4	4
Clay, brown, and sand	4	8
Sand, coarse, water-bearing	6	14
Clay, light-yellow, and sand	8	22
Sand, yellow, and clay	23	45
Clay, dark-gray, and sand	8	53
Clay, dark-gray, and sand and shale	24½	77½
Clay, dark-gray, and shale	17½	95
Rock, light-gray	1	96
Clay, dark-gray, and shale	49½	145½
Shale	1	146½
Shale and clay, mixed	12½	159
Clay, green, and shale	31	190
Shale, green-gray, hard	2	192
Clay, green, and shale	11	203
Clay, light-gray, and shale	16	219
Clay, dark-gray, and shale	34	253
11S/11W-36bdb. S. J. Smith. Altitude 170 ft. Drilled by Corvallis Drilling Co., Inc., 1973. Casing: 6-in. diam to 60 ft, 5-in. diam to 85 ft; perforated 65-85 ft		
Soil, "fill"	6	6
Clay, blue, silty, with embedded oyster shells	8	14
Clay, silty, blue-gray	19	33
Sand, brown, silty	21	54
Claystone, dark-blue, sandy	31	85
12S/11W-29add. David Branson. Altitude 80 ft. Drilled by Corvallis Drilling Co., Inc., 1973. Casing: 6-in. diam to 80 ft, 4-in. diam 10-210 ft; unperforated		
Soil	1	1
Clay, brown	27	28
Clay, tan	11	39
Clay, blue-gray, sticky	34	73
Claystone, gray, soft	86	159
Claystone, blue-gray, soft	34	193
Claystone, hard	17	210
12S/11W-33dba. George Lechner. Altitude 70 ft. Drilled by Corvallis Drilling Co., Inc., 1973. Casing: 6-in. diam to 80 ft, 4-in. diam to 180 ft; unperforated		
Soil	1	1
Clay, brown	24	25
Clay, tan, soft	22	47
Clay, blue-gray, soft	22	69
Claystone, gray, medium-hard	72	141
Claystone, light-gray, medium-hard	39	180
12S/12W-25aac. Bailey Bird. Altitude 60 ft. Drilled by Bill Howell Well Drilling, 1960. Casing: 6-in. diam to 60 ft; unperforated		
Sand, brown	24	24
Sand, tan	27	51
Clay, blue, mixed with sand	9	60
Sandstone, blue	41	101
Shalestone, blue	8	109
13S/11W-7dbd1. F. M. Gillson. Altitude 280 ft. Drilled by Raymond C. Gellatly & Ronald S. Witham, 1971. Casing: 6-in. diam to 46 ft; unperforated		
Soil	1	1
Loam, sandy	7	8
Sand, light-brown	32	40
Sand, dark-gray, and clay	20	60
Sandstone, light-gray	55	115
Clay, dark-gray, and grit	10	125
Clay, light-gray, and sand	35	160
Shale, gray	70	230
"Hardpan" clay, light-gray	19	249
Clay, light-gray, and sand; water-bearing (1 gal/min)	50	299
Clay, dark-gray	26	325
13S/11W-7dcd. Frank Wilson. Altitude 240 ft. Drilled by Raymond C. Gellatly & Ronald S. Witham, 1971. Casing: 6-in. diam to 47 ft; unperforated		
Soil	1	1
Sand, yellow	9	10
Sand, brown	19	29
Gravel, small-sized	5	34
Sand, light-gray, water-bearing (2 gal/min)	12	46
Clay, dark-gray	34	80
Sandstone, gray, hard	25	105
Sandstone, light-gray, water-bearing (18 gal/min)	25	130
13S/11W-9bca2. Bayview Co. Altitude 240 ft. Drilled by Raymond C. Gellatly & Ronald S. Witham, 1970. Casing: 6-in. diam to 54½ ft; unperforated		
Soil	3	3
Clay, light-gray	14	17
Sandstone, red, and clay	28	45
Claystone, red, broken	6	51
Claystone, light-gray	90	141
Claystone, gray, hard, with streaks of limestone	15	156
Claystone, gray	28	184
Claystone, gray, hard	19	203
13S/11W-10cca. John Mashek. Altitude 240 ft. Drilled by Casey Jones Well Drilling Co., Inc., 1970. Casing: None		
Clay, sandy	17	17
Shale and sandstone, mixed	228	245

Table 9.--Drillers' logs of representative wells--Continued

Materials	Thickness (feet)	Depth (feet)
13S/11W-16bdc. Elmer Betts. Altitude 80 ft. Drilled by Raymond C. Gellatly & Ronald S. Witham, 1969. Casing: 6-in. diam to 141 ft; unperforated		
Soil	3	3
Clay, yellow, sandy	5	8
Clay, yellow, and brown grit	35	43
"Muck," sandy, and rotten wood	72	115
Clay, light-gray, and sand and rotten wood	18	133
Gravel and fine sand	4	137
Claystone	6	143
Sandstone, light-gray, water-bearing	5	148
Claystone, gray	51	199
13S/11W-27aca. Mrs. Mable Pate. Altitude 11 ft. Drilled by Schoen Electric & Pump, 1970. Casing: 6-in. diam to 63 ft; unperforated		
Sand, yellow	10	10
Sand, gray	23	33
Sandstone, gray	13	46
Sandstone, brown	4	50
Sandstone, gray	60	110
Sandstone, brown	10	120
Sandstone, blue	15	135
Sandstone, brown	5	140
Sandstone, blue	5	145
Claystone, blue to brown, sandy	165	310
Claystone, gray	10	320
13S/11W-28ada. Ray Duncan. Altitude 12 ft. Drilled by Avery I. Crawford, 1960. Casing: 6-in. diam to unknown depth; unperforated		
Soil	15	15
Gravel	13	28
Clay	2	30
13S/11W-30bad. Crestview Hills Golf Course. Altitude 170 ft. Drilled by Raymond C. Gellatly & Ronald S. Witham, 1969. Casing: Perforated 45-75 ft		
Loam, sandy	2	2
Sand, yellow, and clay	8	10
Sand, white	15	25
Sandstone, dark-brown	14	39
13S/11W-30bad.--Continued		
Grit, brown, and small-sized gravel, water-bearing (15 gal/min)	2	41
Claystone, gray, broken	19	60
Claystone, gray, water-bearing (30 gal/min)	10	70
Clay, dark-gray, with grit	5	75
13S/11W-31baa. Gene Dahl. Altitude 205 ft. Drilled by Raymond C. Gellatly & Ronald S. Witham, 1967. Casing: 6-in. diam to 50 ft; unperforated		
Sandstone, gray	3	3
Claystone, gray, sandy	7	10
Clay, yellow	15	25
Sand and grit, brown	18	43
Sand, gray, hard-packed	6	49
Sand, light-gray, water-bearing	14	63
13S/11W-32bbb. Ray Wells. Altitude 300 ft. Drilled by Schoen Electric & Pump, 1972. Casing: 6-in. diam to 80 ft; unperforated		
Soil	1	1
Clay, brown	5	6
Claystone, brown	8	14
Claystone, blue	35	49
Sandstone, blue	29	78
Clay, dark-brown	154	232
Claystone, gray	49	281
Clay, dark-brown	49	330
14S/11W-32cdb. S. B. Sarver. Altitude 68 ft. Drilled by Charles Panschow, 1965. Casing: 6-in. diam to 30 ft; unperforated		
Soil, brown	3	3
Clay, brown, and gravel	8	11
Clay, yellow	12	23
Sandstone, gray	35	58
Shale	6	64

Table 10.--Records of representative wells

Well number: See page 36 for description of well-numbering system.
Type of well: B, bored; Dg, dug; Dr, drilled.
Finish: B, open bottom (not perforated or screened); P, perforated; Sc, screened.
Altitude: Altitude of land surface at well, in feet above mean sea level.
Water level: Depth to water given in feet and decimal fractions were measured; those given in whole feet were reported by well driller or owner.
Specific conductance: Reported in micromhos per centimeter at 25°C. Field and laboratory measurements by U.S. Geological Survey personnel.

Type of pump: C, centrifugal; Hn, hand; J, jet; N, none; S, submergible; T, turbine.
Well performance: Yield, in gallons per minute, and drawdown, in feet, generally reported by driller, owner, or pump company for period indicated under "Remarks."
Use: D. domestic; N, none; PS, public supply.
Remarks: Ca, chemical analysis reported in table 3; L, driller's log in table 9; P, pumped; B, bailed; or AT, air tested, for indicated number of hours to determine yield under "Well performance."

Well number	Owner	Type of well	Year completed	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Water-bearing zone(s): Thickness (feet)	Water-bearing zone(s): Character of material	Altitude (feet)	Water level: Feet below datum	Water level: Date	Specific conductance of water	Type of pump and hp	Well performance: Yield (gal/min)	Well performance: Drawdown (feet)	Use	Remarks
T. 6 W., R. 10 W.																			
31dbd	Kenneth Murphy	Dr	1964	92	6	64	B	64	6	Sandstone and shale	650	18.50	5- 2-73	280	S, 1	25	10	D	P 3 hr, L.
32abc	Eldon Heringer	Dr	1972	355	8	20	B	--	--	--	80	.50 above datum	6-20-74	--	N	--	--	N	Well produces inadequate supply of water.
32dab	do	Dr	1972	355	8	60	P, 35-50	--	--	Sandstone	160	17.79	do	--	S, 1	65	18	D	P 48 hr, L, Ca. Used as water supply for trailer court.
33abd1	Larry DuRette	Dr	1967	155	8	85½	B	--	--	Volcanic rock	165	6.84	5- 3-73	--	S, 2½	26	46	D	P 3 hr, L, Ca. Used as auxiliary well for trailer park
33abd2	do	Dr	1971	230	8	23	B	--	--	do	165	54.74	do	280	S, 10	120	185	D	P, L, Ca. Water supply for 32 families in trailer park.
33bdd	A. A. Corkhill	Dr	1964	215	6	21	B	--	--	do	140	50.03	do	280	S, 2½	33	150	D	AT 1 hr.
34dbd	Milo Bowen	Dr	1968	108	6	19	B	98	10	Sandstone and shale	150	27.68	do	300	J, 1	9	10	D	B 3 hr.
34dca	M. R. Greer	Dr	1968	146	6	26	B	110	2	Shale	140	35	7-27-68	300	J, 3/4	5½	Total	D	B ½ hr. Water has slight hydrogen sulfide odor.
34dcb	Harry Davenport	Dr	1960	68	6	22	B	38 58	4 5	Volcanic rock do	150	26.72	5- 3-73	260	J, 1/3	7	35	D	B 4 hr.
35aab	Agnes Martinson and Alberta Maxwell	Dr	1970	140	6	30	B	--	--	do	195	1	7-15-70	300	S, ½	7	120	D	B 1 hr, L.
35abc	H. P. Warner	Dr	1971	122	6	26	B	--	--	do	195	17.37	5- 3-73	220	J, ½	15	83	D	B 1 hr.
35bdc	Hank Wright	Dr	--	75	6	--	--	--	--	--	180	12.15	6-14-74	360	J, ½	--	--	D	
T. 6 S., R. 11 W.																			
24abd	Al Gibson	Dr	1972	180	8	40	B	--	--	Claystone and sandstone	400	153	9-25-72	--	S, 2	100	27	D	AT 1 hr, L.
24bab	Sea River Properties	Dr	1971	221	6	22	B	--	--	Sand, clay, and shale	325	10.33	6-18-74	--	N	26	91½	N	B 1 hr.

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year com-pleted	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Water-bearing zone(s): Thick-ness (feet)	Water-bearing zone(s): Character of material	Alti-tude (feet)	Water level: Feet below datum	Water level: Date	Specific conduct-ance of water	Type of pump and hp	Well performance: Yield (gal/min)	Well performance: Draw-down (feet)	Use	Remarks
										T. 6 S., R. 11 W.--Continued									
24bbd	Sea River Properties	Dr	1969	135	6	93½	P, 43-93	45 --	48 --	Gravel and clay Shale and sand-stone	210	64.22	6-18-74	180	J, 2	20½	20½	D	B ½ hr, L, Ca.
26dcc	Scenic Enterprises	Dr	1965	189	6	150	P, 78-83, 87-92, 98-103, 137-142	78 88 98 38	5 4 5 4	Shale do do do	240	19	7-19-65	--	N	57	101	N	P 10 hr, L.
35aad	do	Dr	1965	170	--	None	--	43	10	do	240	36	7-22-65	--	--	--	--	N	Well reported to yield small quantity of water. L.
35acd	do	Dr	1965	118	--	None	--	--	--	--	150	--	--	--	N	--	--	--	No water; abandoned.
35baa	Wilbur Day	Dr	1970	136	6	18	B	--	--	Shale and clay	260	64.65	5- 4-73	--	N	12	82	N	P 24 hr.
35bad1	do	Dr	1972	195	6	47	B	--	--	do	150	78.09	5- 9-73	420	S, 3/4	15	50	PS	B 1 hr, L.
35bad2	do	Dr	1966	116	6	20	B	--	--	Clay and silt-stone	140	83.95	5- 4-73	--	S, 1/3	30	6	N	B 1 hr. Produces limited supply of water.
35bbd	Scenic Enterprises	Dr	1965	198	6	120	P, 90-120	90	30	do	160	64.50	do	400	S, 5	50	17	PS	P 9 hr.
35cbc	Developers Con-tractors, Inc.	Dr	1971	226	8	68½	B	181	3	Shale and clay	100	45.87	6-18-74	--	S	20	101	PS	P 3½ hr, L, Ca. Water supply for State park.
36ada	Andrew Briggs	Dr	1965	199	6	135	P, 116-119, 132-135	117 132	2 3	Shale do	320	115	7- 6-65	--	S	1½	30	N	P 4 hr, L.
										T. 7 S., R. 10 W.									
21cba	U.S. Forest Service	Dr	1965	110	6	30	B	--	--	Basalt	250	6	6- 3-65	180	H	9	90	PS	B 1 hr, L.
										T. 7 S., R. 11 W.									
1cac	K. O. A. Camp	Dr	1968	130	6	35	B	--	--	Claystone	50	20	8-17-68	600	J, 1	22	80	PS	B, 1 hr, Ca, L.
1dbc	Central California Conference of Seventh Day Adventists	Dr	1968	162	6	154	P, 104-144	137	142	Shale	50	11 10	5- 2-73	--	N	2	Total	N	B ½ hr. Water reported to be saline.
15acc	Ocean Crest Chalet	Dr	1968	95	6	72½	B	32	41	Sand and gravel	40	34	7- 3-68	--	N	24	30	N	B 3½ hr. Well destroyed. L.
25acd	Mrs. Harvey Hill	Dr	1959	74	6	38	B	--	--	Siltstone and claystone	40	1	4- 9-59	1,480	J, 3/4	3	48	D	B 1 hr, Ca, L. Can easily be pumped dry during summer. Has strong odor of hydrogen sulfide.
34ddd	H. V. Olson	Dr	1969	30	6	30	P, 20-30	20	10	Sand and gravel	35	3.61	4-20-73	190	C, 2	50	12	D	B 1 hr, Ca, L.

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year completed	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Water-bearing zone(s): Thickness (feet)	Water-bearing zone(s): Character of material	Altitude (feet)	Water level: Feet below datum	Water level: Date	Specific conductance of water	Type of pump and hp	Well performance: Yield (gal/min)	Well performance: Drawdown (feet)	Use	Remarks
								T. 8 S., R. 10 W.											
8dcb	Florence Fessenden	Dr	1970	210	6 5	53 68	B	--	--	Basalt	75	21.68	4-11-73	200	S, ½	12	20	D	B 1 hr, Ca.
17dbd	Dollar Loan Co.	Dr	1961	100	6	--	--	--	--	do	28	15.85	do	--	J, 1	--	--	N	Well originally drilled to depth of 64 ft. Water reported to have unpleasant taste.
19cad	Western Engineer Consultants	Dr	1970	100	6	21	B	--	--	Sandstone and shale	40	25	7-22-70	--	N	12	61	N	B 2 hr.
19dac1	K. Bales	Dr	1962	80	6	80	P, 74-80	66	14	Sand and gravel	50	10.96	5- 8-73	190	J, 3/4	12	20	D	B 8 hr.
19dac2	Clyde Bales	Dr	1967	100	6	82	P, 50-80	40	42	Sandstone	50	9.98	5- 8-72	480	S, ½	10	82	D	AT 1 hr, L.
20cbd2	Calkins Acres Development	Dr	1971	42½	10	37½	P	24 37	2 5½	Gravel Sandstone	40	20.05	5- 8-73	180	S, 2	25	5.75	D	P 6 hr, L. Water supply for three permanent residents.
31caa	Mrs. Osborne	Dr	1968	67	6	43	P, 28-35	30	34	Claystone	60	9.80	4-12-73	--	N	2	47	N	B 1 hr.
31cba	D. C. Slack	Dr	1969	138	6	120	B	--	--	Sandstone and claystone	150	89.15	8-12-73	380	S, ½	1	105	D	B 5 hr. Has low yield; easily pumped dry.
								T. 8 S., R. 11 W.											
21cdd	Lincoln Beach Water District	Dr	1956	100	8	--	--	--	--	Sand	50	--	--	--	T, 15	30	--	PS	Ca. Used as a standby reserve. Reported to be an excellent well.
28cab	Willark Park	Dr	1968	65	12	40	P, 25-40	25	10	do	50	19	6- 1-68	280	T, 3	25	5	PS	P 1 hr, Ca. Water supply for 91 trailer spaces.
32dbb	R. G. Harbaugh	Dr	1956	63	6	11	B	52	11	Sandstone	50	14.70	4-11-73	480	J, ½	15	40	D	B, L, Ca. Has hydrogen sulfide odor.
36adc	George Nielson	Dr	1971	155	6	50	B	--	--	Shale and sandstone	45	28	7-30-71	1,250	S, 3/4	4	127	D	AT 1 hr, L, Ca.
36add	do	Dr	1971	80	6	44	B	--	--	Sandstone	45	16.75	5-11-73	--	N	20	62	N	AT 1 hr.
36daa	Paul Burnett	Dr	1971	95	6	46	B	--	--	Claystone	55	14.29	do	--	N	5	74	N	AT 1 hr, L.
								T. 9 S., R. 10 W.											
7bcb	E. P. Hoskinson	Dr	1970	77	6	--	--	--	--	Claystone and sandstone	50	33.88	5-11-73	420	J, ½	--	--	--	
7dad	Leon Anderson	Dr	1964	37	6	31	B	29	2	Sand and gravel	45	22	6-13-64	70	J, ½	8	Total	D	B 1 hr, L, Ca.
8dbc	Dennis Briley	B	1973	22	8	22	P	15	7	--	45	12.46	6-20-74	75	J, ½	--	--	D	
9cad	Howard Steele	D	1972	115	6	--	--	--	--	Sandstone	50	7.75	do	1,400	J, 3/4	--	--	D	

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year completed	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Water-bearing zone(s): Thickness (feet)	Water-bearing zone(s): Character of material	Altitude (feet)	Water level: Feet below datum	Water level: Date	Specific conductance of water	Type of pump and hp	Well performance: Yield (gal/min)	Well performance: Drawdown (feet)	Use	Remarks
								T. 9 S., R. 10 W.--Continued											
21cca	Bob Deskins	Dr	1946	60	6	--	B	--	--	--	50	10	5-10-73	80	C, ½	--	--	--	Water from nearby dug well is piped to this well.
21dcb	Tim Miller	Dg	--	18	24	--	B	--	--	Sand	75	3.85	do	100	C, 1	--	--	S	Reported to have high bacteria count.
33ddc1	Arthur Bensell	Dr	1970	215	6	20	B	--	--	Shale and sandstone	125	44.66	5- 9-73	--	N	½	165	N	B 1 hr, L. Water reported to be slightly saline. Well has inadequate yield.
33ddc2	do	Dg	1972	12	48	12	B	8	4	Sand and gravel	125	9.63	do	--	S, ½	--	--	D	
								T. 9 S., R. 11 W.											
5dcd	Depoe Bay Water Dist.	Dr	1971	500	6	20	B	--	--	Sandstone	90	15	5- 3-71	--	N	3	485	N	AT 2 hr, L.
8ccd	Halverson Assoc.	Dr	1966	32	6	26	B	24	8	Basalt	100	13.00	4-10-73	--	S, ½	4	18	N	B 1 hr.
8ccd2	do	Dr	1976	425	8	34	B			do	100	38	1-29-76	355	N	20	86	N	P 48 hr, L.
12adb	Frank McRae	Dr	1966	60	6	55	P, 30-55	20	35	Sandstone	50	22	11- 6-66	240	S, ½	6	38	D	B 1 hr, L. Reported to have high iron content.
17bba	Halvorson Assoc.	Dr	1976	305	8	33	B	129	--	Basalt	100	0	3- 2-76	450	N	125	210	N	P 48 hr, L.
32caa	Otter Crest Condominiums	Dr	1970	223	10 8	40 190	P, 80-190	91 129	10 8	Clay and shale Shale	60	14.37	8-25-72	--	N	23	20	N	B 1 hr, L.
32dca1	Alpine Chalets	Dr	1963	163	6	82	B	135	4	do	35	28.74	4-10-73	--	N	--	--	N	Yielded inadequate supply of water.
32dca2	do	Dr	1966	200	6	145	P, 85-145	70 200	5 27	Shale do	50	12.97	4-11-73	--	N	8	72	N	B 2 hr, L. Reported to have bad taste and odor.
32dcd1	R. F. Thomas	Dr	1963	65	6	53	P, 23-53	30	23	Shale and clay	50	27.78	4-10-73	700	J, 3/4	16	10	D	B 2 hr.
32dcd2	M. V. Anhoury	Dr	1963	84	6	68½	P, 45-68½	45	23	do	35	30	10-10-73	--	C, ½	12	10	D	P 4 hr.
								T. 10 S., R. 10 W.											
1abc1	Ernest Ludahl, Jr.	Dr	1967	322	6	20	B	--	--	Siltstone	250	40	10-23-67	--	N	15	Total	N	P 2 hr, L. Water is of poor quality; too mineralized for use.
1abc2	do	Dr	1967	125	10	20	B	--	--	Claystone	250	19.92	5- 7-73	170	J, 3/4	10	Total	D	P 2 hr. Can be pumped dry if pump is run continuously.
2dca	Melvin Teague	Dr	1971	69	6	30	B	38	30	Clay	180	22	5-16-71	520	S, ½	4	Total	D	B 1 hr.
3cbb	Don Pressey	Dr	1961	85	6	60	B	--	--	Claystone	130	17.28	5- 9-73	2,200	C, ½	5	--	D	B, L, Ca.
4bda	Harry Rasmussen	Dr	1969	150	6	20	B	--	--	do	130	10.29	do	--	N	--	--	N	Yields inadequate supply of water. L.

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year completed	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Water-bearing zone(s): Thickness (feet)	Water-bearing zone(s): Character of material	Altitude (feet)	Water level: Feet below datum	Water level: Date	Specific conductance of water	Type of pump and hp	Well performance: Yield (gal/min)	Well performance: Drawdown (feet)	Use	Remarks
T. 10 S., R. 10 W.--Continued																			
4ccb	Harry Rasmussen	Dr	1969	37	6	36	P, 34-35½	31	6	Gravel	105	26	9- 2-73	150	J, 1	30	1½	D	B 1 hr, L, Ca. Water supply for recreation camp.
4dba	P. N. Gibson	Dr	1947	80	6	--	--	--	--	--	150	20.33	5- 9-73	460	J, ½	--	--	D	Has limited water supply; can easily be pumped dry.
4dbb	do	Dr	1967	44	6	41	P, 29-40	--	--	Sand and gravel	150	24	6-16-67	220	J, ½	4	15	D	B 1 hr.
5dba	Harry Rasmussen	Dg	--	14	36	14	B	--	--	do	140	4.27	5- 9-73	75	C, ¼	--	--	D	
5ddc	Leroy Erickson	Dg	1965	18½	48	18	B	--	--	do	125	--	--	--	C, 3/4	--	--	D	
30baa1	Ed Hamness	Dr	1965	42	6	42	P, 30-42	30	12	Claystone	85	9	7-18-65	--	N	11	22	N	B 1 hr. Well reported to have caved in.
30baa2	do	Dr	1967	160	6	69	B	70	90	Sandstone	85	6.73	5-10-73	--	N	2	146	N	B 1 hr, L. Water reported to be too "salty" to use.
32aac	Don Campbell	Dr	1962	51	6	51	P, 25-45	26	--	Shale and sand	50	20.44	6-13-74	60	J, 3/4	8	6	D	B 1 hr. Water supply for two families.
32aca	Roy Byland	Dr	1971	95	6	27	B	--	--	Sandstone	45	23	7-28-71	650	S, 3/4	4	72	D	AT 1 hr.
32dcd	Mathew Gruber	Dr	1962	42	6	42	P, 32-42	35	7	Gravel	75	6.00	6-13-74	--	N	4	35	D	B 1 hr.
34bbc	Dean Martin	Dr	1962	85	6	20	B	--	--	Shale	125	25.22	do	3,500	J, ½	1	45	D	B 1 hr, L.
T. 10 S., R. 11 W.																			
17aba	Bob Gans	Dr	--	50	6	--	--	--	--	Sandstone	100	12.25	10-27-72	180	C, ½	--	--	--	
20bdb	W. L. Haven	Dr	1959	83	6	66	B	--	--	do	110	50.10	8-25-72	167	S, ½	8	47	D	B 2 hr, L, Ca.
29abc	Agate Beach Water Dist.	Dr	1964	250	8 6	62 240	P, 60-80, 140-240	59 148 194	4 2 50	Shale do Clay and sand	150	17	2-10-64	--	N	15	120	N	P 2 hr, L. Well reported to have been abandoned due to excessive pumping of sand.
29dda	do	Dr	1965	179	10	56	B	--	--	Shale	200	111.80	8-24-72	--	N	9	65	N	B 1 hr.
30aaa	do	Dr	1958	106	10	106	P, 76-106	--	--	Sandstone	35	42.13	do	--	N	20	71	N	P 24 hr, L.
T. 11 S., R. 9 W.																			
9aad	Eddyville High School	Dr	1971	145	8	--	B	118	1	Sandstone	125	36.17	6-12-74	--	S, ½	2½	Total	PS	AT 1 hr, L, H. State observation well. Used in conjunction with a spring as school water supply. Backfilled to 125 ft to block salt stratum.

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year completed	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Thickness (feet)	Character of material	Altitude (feet)	Water level: Feet below datum	Date	Specific conductance of water	Type of pump and hp	Well performance: Yield (gal/min)	Drawdown (feet)	Use	Remarks
										T. 11 S., R. 10 W.									
6dcc1	John Boydston	Dg	--	30	36	30	B	--	--	--	45	11.08	4-19-73	--	J, 3/4	--	--	D	
6dcc2	do	Dr	1972	105	6	40	B	50	--	Claystone	75	25.54	do	120	J, 3/4	4½	Total	D	B 1 hr, L.
8bca	R. G. Dalbey	Dr	1962	54	6	54	P, 34-54	--	--	Shale	210	24.27	11- 4-62	--	J, ½	5	36	D	B 1 hr.
9adc	D. L. McMillin	Dr	1967	105	6	30	B	--	--	Sandstone	75	24.60	4-18-73	220	J, ½	2	87	D	B 1 hr, L.
14bbd	Lincoln County Parks	Dr	1971	80	6	27½	B	--	--	do	50	12	7-28-71	--	S, 3/4	8	68	PS	AT 1 hr, L.
17aac	Kelly Gilkerson	Dr	1969	175	6	22	B	--	--	do	110	54	8-11-69	525	S, ½	1	121	D	B 1 hr, L, Ca.
18aad	Georgia-Pacific Corp.	Dr	1948	975	10	--	--	450	--	Shale	15	--	--	--	N	--	--	N	Water reported to be saline. Well abandoned.
18abd	do	Dr	1948	1,900	--	--	--	60	5	Silt	15	--	--	--	N	--	--	N	Do. L.
19dbd	Leo Denn	Dr	1968	250	6	24	B	--	--	Shale	250	25.98	4-19-73	--	J, ½	1½	230	N	B 2 hr. Produces inadequate water supply. No longer used; now use water from spring.
19dcc	Don Scroggins	Dr	1958	42	6	42	P, 34-42	--	--	Clay and shale	150	21.30	do	--	J, 3/4	24	--	D	B 1½ hr, L, Ca.
20cac	Joe Brown	Dr	1962	87	6	50	B	70	17	Claystone	165	51.78	6-12-72	310	J, 1	25	8	D	B 1 hr. State observation well. H.
20dcc	J. W. Branstiter	Dr	1969	100	6	40	B	--	--	Sandstone	70	1	1-19-69	--	J, ½	10	20	D	B 6 hr.
29abb	James Webb	Dr	1972	65	6	27	B	52	--	Claystone	150	45	8-29-72	--	S, ½	30	20	D	B 1 hr. Well equipped with water softener and chlorinator.
29bcc	Vernon Huntsucker	Dr	1962	100	6	27	B	--	--	Shale	38	30	9- 4-62	--	N	4	25	N	B 1 hr. Well abandoned because water was of poor quality.
29cba	Walter Huntsucker	Dr	1960	60	6	58	P, 46-58	--	--	Sandstone	75	24.93	4-18-73	380	S, 1/3	12	40	D	B, L, Ca. Water reported to be high in iron.
30abc	Mr. Kolback	Dr	1968	100	6	100	P, 40-100	40	--	do	100	30	8-31-68	--	J, ½	3	70	D	B 1 hr.
										T. 11 S., R. 11 W.									
5cca	R. W. Kern	Dr	1970	45	6	45	B	32	41	Sand	160	26.73	8-25-72	200	S, ½	14	Total	D	B 1 hr, L.
9abc	B. B. Bales	Dr	--	99	6	--	--	--	--	--	150	28.60	8-23-72	300	J, ½	--	--	D	Has another 6-in., 295-ft well which is easily pumped dry.
9bda	Roy Foss	Dg	1900	--	40	--	--	--	--	--	150	20.03	do	240	C, 1	--	--	D,Ir	Used for nursery and greenhouses.

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year com-pleted	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Thick-ness (feet)	Character of material	Alti-tude (feet)	Water level: Feet below datum	Date	Specific conduct-ance of water	Type of pump and hp	Well performance: Yield (gal/min)	Draw-down (feet)	Use	Remarks
T. 11 S., R. 11 W.--Continued																			
9bad	A. L. Jincks	Dr	1963	80	6	58½	P, 32½-58½	44	28	Clay	250	30	10-15-63	220	C, ½	16	10	D	B 2 hr.
9bdb	Victor Bump	Dr	1970	301	6	--	--	--	--	--	100	--	--	--	N	--	--	--	Well reported to be dry. Casing removed and well abandoned. L.
10acb	Sammy Franklin	Dr	1971	365	6	44	B	--	--	Sandstone	200	126.67	8-23-72	--	N	2½	245	N	AT 1 hr, L.
17aaa	Oregon State Univ.	Dr	1968	24	6	24	Sc, 20-24	20	4	Sand	15	10.00	8-15-72	520	S, ½	12	10	D	B 1 hr, L. Used by Marine Science Center to dilute seawater. Originally drilled to 100 ft.
20bca	Oregon State Highway Dept.	Dr	1971	96	6	77	Sc, 77-87	22 77	26 10	do do	20	15.00	4-29-71	--	S, 3	60	35	PS	P 4 hr, L.
20cba	do	Dr	1969	94	6	84	Sc, 84-94	84	10	do	55	50	6-25-69	--	S	25	5	PS	P 2½ hr.
22dbd1	R. C. Yarbrough	Dr	1964	100	6	20	B	50	--	Claystone	100	2	9- 9-64	--	S, ½	5	Total	D	B 1 hr. Used in conjunction with a spring. Water from both sources barely adequate for domestic needs.
22dbd2	T. H. Baley	Dr	1966	165	6	41	B	130	35	Sandstone	50	0	--	5,000	S, ½	3	157	D	B 1 hr, L, Ca. Water has salty taste. A spring is used for drinking water.
22dca	Donald Swift	Dr	1972	125	6	--	--	--	--	do	50	7	7-14-72	1,050	S, ½	3	100	D	AT 1 hr.
22dcb	do	Dr	1957	200	6	46	--	--	--	--	160	50+	8-22-72	360	S, 1	3	--	D	Well originally drilled to 100 ft. Deepening did not increase yield.
31dad	C. V. Griffith, Sr.	Dr	1971	38	6	36	Sc, 32-37	31	4	Sand	110	14	1-14-71	240	J, 1	18	8	D	B 1 hr, L.
31dda	B. E. Reynoldson	Dg	--	20	48	20	B	--	--	Sandstone	100	11.86	6-21-74	220	C, ½	--	--	D	
32cda	Ferris Nursery	Dr	1970	253	6	219	P, 45-220	--	--	Shale	110	29	4- 8-70	--	N	9	244	N	B 1 hr, L. Gravel packed from 39-214 ft.
36bca	Fowler Pacific Oysters	Dr	1972	94	6	56	B	51	4	do	175	8	10-22-72	--	N	6	Total	N	B 1 hr.
36bdb	S. J. Smith	Dr	1973	85	6 5	60 85	P, 65-85	60	25	Claystone	170	5.89	6-21-74	1,600	S, ½	20	74	D	AT 1 hr, L. Water reported to have high concentration of iron.
T. 12 S., R. 11 W.																			
21bdd	H. A. Hallowell	Dr	--	55	6	55	--	--	--	Sandstone	100	--	--	160	S, ½	--	--	D	
29add	David Branson	Dr	1973	210	6 4	80 10-200	P, 80-210	--	--	Claystone	80	22.49	4-25-74	--	N	2	167	N	AT 1 hr, L.

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year com- pleted	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s): Depth to top (feet)	Thick- ness (feet)	Character of material	Alti- tude (feet)	Water level: Feet below datum	Date	Specific conduct- ance of water	Type of pump and hp	Well performance: Yield (gal/ min)	Draw- down (feet)	Use	Remarks
										T. 12 S., R. 11 W.--Continued									
33cdc	Bill Flansberg	Dr	1973	85	6	40	B	--	--	Claystone	75	24.66	4-25-74	--	N	6	49	N	AT 1 hr.
33dba	George Lechner	Dr	1973	180	6 4	80 180	P, 80-180	--	--	do	70	22.80	do	--	N	1	100	N	AT 1 hr, L.
										T. 12 S., R. 12 W.									
25aac	Bailey Bird	Dr	1960	109	6	60	B	--	--	Sand	60	55	6-14-60	850	J, 3/4	4	--	D	B, L, Ca.
25ddc	Mrs. Margaret McGee	Dr	1960	103	6	25	B	60	6	Shale	60	8	5- 9-60	--	J, ½	4	Total	D	B 1 hr.
										T. 13 S., R. 11 W.									
7dbd1	F. M. Gillson	Dr	1971	325	6	46	B	--	--	Siltstone	280	90	12-20-71	--	N	1	234	N	B 2 hr, L.
7dbd2	do	Dr	1972	145	6	43	B	81	--	Sandstone	280	29.38	8-17-72	--	J, ½	1	120	D	B 2 hr.
7dcd	Frank Wilson	Dr	1971	130	6	47	B	105	25	do	240	25	7- 7-71	100	S, ½	20	80	D	B 2 hr, L.
9bbb	Leroy Green	Dr	1969	60	6	56	B	48	--	Claystone	240	48	7-12-69	160	S, ½	7	4	D	B 2 hr.
9bca1	Bayview Co.	Dr	1970	93	6	38	B	78	3	do	180	75	7-15-70	750	S, 3/4	4½	Total	D,PS	P 21 hr, Ca.
9bca2	do	Dr	1970	203	6	54½	B	--	--	do	240	86	4-28-70	--	N	3	104	N	B 4 hr, L.
10cca	John Mashek	Dr	1970	245	6	None	--	--	--	None	240	--	--	--	N	--	--	N	L. Casing pulled; well abandoned.
16acb	Ken Golden	Dr	1967	102	6	38	B	35 38	3 --	Gravel and sand Claystone	65	14	1- 6-67	--	N	8	30	N	B 2 hr. Well has caved in.
16bcd	Elmer Betts	Dr	1969	199	6	141	B	143	5	Sandstone	80	60	11-21-69	--	S, 3/4	10	120	N	B 2½ hr, L. Water reported to be highly mineralized.
19bdc	Waldport Motel	Dg	--	--	24	9½	B	--	--	Sand	20	6.28	8-16-72	--	C, 1/3	--	--	D	
27aca	Mrs. Mable Pate	Dr	1970	320	6	63	B	--	--	Sandstone	11	At sur- face	do	5,000	S, ½	4	318	D	AT 2 hr, L, Ca. Water has unpleasant taste and seeps over top of casing when well not in use.
27acb	Alsea Bay Gardens	Dr	1970	100	6	57	B	--	--	Sand and sand- stone	12	15	6- 9-70	400	S, ½	12	85	D	AT 2 hr.

Table 10.--Records of representative wells--Continued

Well number	Owner	Type of well	Year com-pleted	Depth of well (feet)	Diameter of well (inches)	Depth of casing (feet)	Finish	Water-bearing zone(s)			Alti-tude (feet)	Water level		Specific conduct-ance of water	Type of pump and hp	Well performance		Use	Remarks
								Depth to top (feet)	Thick-ness (feet)	Character of material		Feet below datum	Date			Yield (gal/min)	Draw-down (feet)		
									T. 13 S., R. 11 W.--Continued										
27bdd	George Cox	Dr	1970	130	6	60	B	--	--	Sandstone	85	67.83	8-16-72	400	S, ½	1½	87	D	B 1 hr.
28ada	Ray Duncan	Dr	1972	30	6	--	B	15	13	Gravel	12	8.48	do	220	J, 1	15	4	D	B ½ hr, L, Ca. Water supply for 20-unit trailer court.
30bad	Crestview Hills Golf Course	Dr	1969	75	12 8	55 45	P, 45-75	39 41	3 19	do Claystone	170	31.69	do	--	N	45	30	N	B 3 hr, L. Well pumps sand; production has fallen to 10 gpm.
30bda	do	Dr	--	190	12	--	--	--	--	do	190	--	--	--	N	--	--	N	Yields very small quantity or water.
31baa	Gene Dahl	Dr	1967	63	6	50	B	49	14	Sand	205	37.98	6-13-73	160	J, 3/4	8	20	D	B 2 hr, L, Ca.
32bbb	Ray Wells	Dr	1972	330	6	80	--	--	--	None	300	--	--	--	N	None	--	N	L. Casing pulled and well abandoned.
									T. 14 S., R. 11 W.										
32cdb	S. B. Sarver	Dr	1965	64	6	30	B	--	--	Sandstone	68	19.18	6-13-73	65	J, 1	30	1	D	P 1½ hr, L, Ca.
33cdd	Jennie Carrier	Dr	1964	65	6	--	--	--	--	do	65	--	--	400	J, 3/4	--	--	D	Produces limited supply of water; can easily be pumped dry.

Table 11.--Records of representative springs

Spring number	Owner	Altitude (feet)	Geologic source	Yield (gal/min)	Yield Date	Use	Specific conductance[1]	Remarks
6S/11W-35bad3s	Wilbur Day	100	Siltstone and sandstone	8	5- 4-73	PS	180	Auxiliary water supply for Roads End water system. Has 10x6x4-ft storage tank.
8S/11W-32acas	Mrs. J. D. Abbott	55	Basalt	2-3	6-19-74	D	220	Has 10x10x6-ft concrete reservoir.
8S/11W-36adas[2]	George Nielson	50	do	3	6-20-74	D	130	8x8x5-ft brick storage site.
10S/11W-8dcas[2]	Unknown	110	Marine terrace deposits	2-3	10-26-72	PS	150	Auxiliary water supply for 13 families. Has 12x12-ft settling and storage tank with 100-gallon pressure tank and chlorinating attachment.
10S/11W-17abds	do	100	do	2-3	do	PS	150	Formerly used as water supply for several families. Has 6x4-ft circular wooden storage tank.

1/ Reported in units of micromhos per centimeter at 25°C.

2/ Chemical analysis in table 3.

Table 12.--Miscellaneous streamflow and suspended-sediment measurements, 1972-74

Station number	Stream	Tributary to	Location	Drainage area (mi^2)	Date of measure-ment	Gage height (ft)	Discharge (ft^3/s)	Suspended sediment concentration (mg/l)
14303705	Treat Creek	Salmon River	SE¼SE¼ sec.25, T.6 S., R.10 W.	--	7-18-73	--	3.14	--
					8-30-73	--	1.52	--
14303708	Slick Rock Creek	do	NW¼NW¼ sec.1, T.7 S., R.10 W.	--	7-23-73	--	14.9	--
					8-13-73	--	8.86	--
					8-30-73	--	7.36	--
14303718	Trout Creek	Slick Rock Creek	NW¼NW¼ sec.1, T.7 S., R.10 W.	--	9-22-60	--	3.40	--
14303738	Salmon River	Pacific Ocean	SW¼NW¼ sec.35, T.6 S., R.10 W.	--	7-11-72	--	57.1	--
14303742	Bear Creek	Salmon River	SE¼NE¼ sec.3, T.7 S., R.10 W.	--	7-11-72	--	6.35	--
					10- 6-72	--	3.11	--
					12-11-72	--	14.2	--
					5-21-73	--	7.97	--
					7-18-73	--	6.67	--
					8-20-73	--	4.52	--
14303744	Panther Creek	do	SE¼NE¼ sec.34, T.6 S., R.10 W.	--	7-18-73	--	1.80	--
					7-30-73	--	1.33	--
					8-20-73	--	.91	--
					9-10-73	--	.77	--
					9-15-73	--	.68	--
14303748	Salmon River	Pacific Ocean	NE¼SW¼ sec.29, T.6 S., R.10 W. (low-flow measurements made at site 0.5 mi upstream in SE¼SW¼ of same section)	60.4	7-11-72	1.82	74.0	--
					9- 6-72	1.59	33.5	--
					10-18-72	--	37.0	--
					11-13-72	3.13	222	6
					12-19-72	10.45	1,920	107
					1-15-73	8.87	1,280	19
					2-20-73	2.55	168	4
					3-19-73	5.80	955	23
					4-16-73	2.55	200	8
					5-14-73	2.20	119	2
					6-14-73	2.07	93.3	--
					7-17-73	1.89	67.4	--
					8-14-73	1.71	41.4	--
					9-18-73	1.68	40.5	--
					11-16-73	13.03	--	116
					4- 3-74	7.02	--	--
14303798	Thompson Creek	Devils Lake	NE¼SW¼ sec.1, T.7 S., R.11 W.	--	9- 6-72	--	.2	--
					5-14-73	--	.44	--
					7-24-73	--	.17	--
					9-18-73	--	.2	--
14303800	Rock Creek	do	SW¼NE¼ sec.12, T.7 S., R.11 W.	3.02	7-11-73	--	3.90	--
14303808	do	do	NE¼SW¼ sec.14, T.7 S., R.11 W.	--	9- 6-72	--	[1]3.8	--
					5-14-73	--	[1]11.0	--
					7-24-73	--	[1]9.7	--
					9-18-73	--	[1]6.8	--
14303818	Baldy Creek	Pacific Ocean	SW¼SE¼ sec.22, T.7 S., R.11 W.	.53	9- 6-72	--	.5	--
					5-14-73	--	1.07	--
					7-24-73	--	.66	--
					9-18-73	--	.6	--
14303928	North Fork Schooner Creek	Schooner Creek	SW¼NE¼ sec.21, T.7 S., R.10 W.	--	7-13-73	--	7.56	--
					8- 9-73	--	4.59	--
					9- 6-73	--	4.62	--
14303948	South Fork Schooner Creek	do	SW¼NE¼ sec.26, T.7 S., R.10 W.	--	6-18-73	--	5.85	--

See footnote at end of table.

Table 12.--Miscellaneous streamflow and suspended-sediment measurements, 1972-74--Continued

Station number	Stream	Tributary to	Location	Drainage area (mi^2)	Date of measurement	Gage height (ft)	Discharge (ft^3/s)	Suspended sediment concentration (mg/l)
14303958	Schooner Creek	Pacific Ocean	SE¼NE¼ sec.25, T.7 S., R.11 W.	14.8	7-12-72	--	[1]22.9	--
					9-12-72	--	[1]12.7	--
					5-14-73	--	[1]34.9	--
					7-24-73	--	[1]26.1	--
					9-18-73	--	[1]16.7	--
14303965	Erickson Creek	Schooner Creek	NE¼NE¼ sec.19, T.7 S., R.10 W.	--	7-13-73	--	4.8	--
					8- 9-73	--	4.34	--
					9- 6-73	--	3.92	--
14303967	Drift Creek	Pacific Ocean	SE¼SE¼ sec.4, T.8 S., R.10 W.	26.2	8-26-74	--	27.8	--
14303968	do	do	SE¼SW¼ sec.36, T.7 S., R.11 W.	37.6	7-12-72	1.69	46.7	--
					9-12-72	1.36	21.0	--
					10-16-72	1.38	23.8	--
					11-13-72	2.57	163	9
					12-19-72	6.93	1,230	628
					1-15-73	6.09	941	343
					2-20-73	2.22	102	6
					3-19-73	4.44	597	57
					4-16-73	2.40	153	18
					5-14-73	1.94	88.2	12
					6-14-73	1.90	75.9	--
					7-17-73	1.76	64.4	--
					8-14-73	1.34	36.4	--
					9-18-73	1.37	32.6	--
					11- 9-73	8.00	--	382
					4- 3-74	4.78	--	--
					8-26-74	--	45.6	--
14305500	Siletz River	do	NW¼SW¼ sec.11, T.10 S., R.10 W.	202	11-10-72	--	1,540	22
					12-27-72	--	11,000	120
					2- 1-73	--	1,230	6
					3-23-73	--	1,600	2
					5- 3-73	--	466	2
					6-12-73	--	258	0
					7-27-73	--	153	1
					11- 9-73	13.35	12,000	221
14306000	Euchre Creek	Siletz River	NW¼NW¼ sec.22, T.9 S., R.10 W.	13.4	7-20-72	1.82	11.2	--
					9-12-72	1.70	5.20	--
					10-16-72	1.77	7.18	--
					11-13-72	2.41	53.0	16
					12-20-72	4.22	650	445
					1-16-73	3.44	278	32
					2-20-73	2.13	34.6	6
					3-19-73	3.28	208	26
					4-16-73	2.37	67.8	14
					5-15-73	2.01	23.4	2
					6-14-73	2.05	29.1	--
					7-17-73	1.94	20.7	--
					8-14-73	1.76	10.9	--
					9-19-73	1.85	14.1	--
					4- 3-74	3.70	--	--
14306003	Schoolhouse Creek	Pacific Ocean	NW¼NW¼ sec.21, T.8 S., R.11 W.	1.13	9- 6-72	.94	.03	--
					5-14-73	1.32	.23	--
					7-24-73	1.20	.43	--
					9-18-73	--	.20	--
14306005	Fogarty Creek	do	NW¼NE¼ sec.28, T.8 S., R.11 W.	--	7-13-72	--	.46	--
14306006	do	do	NE¼NE¼ sec.32, T.8 S., R.11 W.	5.20	9- 6-72	--	.9	--
					5-14-73	--	4.60	--
					7-24-73	--	2.81	--
					9-18-73	--	2.04	--
14306008	South Depoe Bay Creek	do	SW¼NE¼ sec.8, T.9 S., R.11 W.	3.98	9- 6-72	.37	.90	--
					5-14-73	.90	3.80	--
					7-24-73	.72	2.84	--
					9-18-73	.56	1.70	--

See footnote at end of table.

Station number	Stream	Tributary to	Location	Drainage area (mi^2)	Date of measurement	Gage height (ft)	Discharge (ft^3/s)	Suspended sediment concentration (mg/l)
14306010	Rocky Creek	Pacific Ocean	SW¼NE¼ sec.19, T.9 S., R.11 W.	5.36	7-13-72	0.38	4.13	--
					9- 7-72	.20	.91	--
					10-16-72	.18	1.13	--
					11-13-72	.40	7.66	--
					12-19-72	1.85	128	--
					1-15-73	.80	46	--
					2-20-73	.30	11.4	--
					3-19-73	1.45	93	--
					4-16-73	.45	14.2	--
					5-14-73	.28	8.82	--
					6-14-73	.38	9.51	--
					7-17-73	.30	5.59	--
					8-14-73	.24	2.47	--
					9-18-73	.21	2.98	--
					4- 3-74	.80	--	--
14306012	Johnson Creek	do	NE¼NE¼ sec.5, T.10 S., R.11 W.	--	9-10-73	--	.41	--
14306013	Spencer Creek	do	NW¼SW¼ sec.4, T.10 S., R.11 W.	5.51	7-12-72	1.14	4.34	--
					9-12-72	1.00	1.06	--
					5-14-73	1.06	6.46	--
					7-24-73	.97	3.97	--
					9-18-73	--	3.16	--
14306014	Wade Creek	do	NW¼SE¼ sec.8, T.10 S., R.11 W.	--	7-27-73	--	1.42	--
					8-27-73	--	1.15	--
14306015	Coal Creek	do	NE¼NW¼ sec.17, T.10 S., R.11 W.	2.19	9- 6-72	--	.40	--
					5-14-73	--	2.42	--
					7-24-73	--	1.48	--
					9-18-73	--	1.19	--
14306016	Moloch Creek	do	NW¼SE¼ sec.17, T.10 S., R.11 W.	2.23	7-13-72	1.12	2.04	--
					9-12-72	1.02	.71	--
					10-16-72	1.01	.66	--
					11-13-72	1.17	2.14	2
					12-19-72	3.22	39.7	82
					1-15-73	2.29	27.6	14
					2-20-73	1.33	3.74	6
					3-19-73	2.45	37.5	28
					4-16-73	1.60	8.52	2
					5-14-73	1.18	2.32	12
					6-14-73	1.27	3.58	--
					7-17-73	1.15	2.09	--
					8-14-73	1.06	1.14	--
					9-18-73	1.04	1.14	--
					4- 3-74	1.95	--	--
14306017	Schooner Creek	do	NW¼SW¼ sec.20, T.10 S., R.11 W.	.91	9- 6-72	--	.40	--
					5-14-73	--	1.18	--
					7-24-73	--	.82	--
14306020	Big Creek	do	NW¼SW¼ sec.34, T.10 S., R.11 W.	.90	7-13-72	--	.73	--
					9- 6-72	--	.27	--
					5-15-73	--	1.07	--
					7-25-73	--	.68	--
					9-19-73	--	1.10	--
14306021	Blattner Creek	Big Creek	NW¼NW¼ sec.34, T.10 S., R.11 W.	1.09	7-13-72	--	.92	--
					9- 6-72	--	.26	--
					5-15-73	--	1.25	--
					7-25-73	--	.76	--
					9-19-73	--	1.20	--
14306022	Big Creek	Pacific Ocean	NW¼SE¼ sec.32, T.10 S., R.11 W.	5.08	7-13-72	--	1/4.20	--
					9- 6-72	--	1/1.16	--
					5-15-73	--	1/4.36	--
					7-25-73	--	1/4.14	--
					9-19-73	--	1/3.90	--

See footnote at end of table.

Station number	Stream	Tributary to	Location	Drainage area (mi^2)	Date of measure-ment	Gage height (ft)	Discharge (ft^3/s)	Suspended sediment concentration (mg/l)
14306032	Elk Creek	Yaquina River	SE¼NW¼ sec.24, T.11 S., R.10 W.	85	9- 7-72	--	10.6	--
					10-17-72	--	9.97	--
					11-14-72	--	55.1	6
					12-20-72	3.45	528	45
					1-16-73	4.56	885	48
					2-21-73	--	124	6
					3-20-73	3.85	648	42
					4-17-73	1.76	128	8
					5-15-73	1.17	71.3	4
					6-14-73	1.89	41.2	--
					7-17-73	1.60	22.8	--
					8-15-73	1.41	11.0	--
					9-19-73	1.45	10.4	--
					11-16-73	13.02	3,620	462
					4- 3-74	7.35	--	--
14306038	Depoe Creek	do	SE¼SE¼ sec.31, T.10 S., R.10 W.	9.08	7-20-72	1.42	2.16	--
					9-12-72	1.18	.78	--
					10-16-72	1.23	1.11	--
					11-14-72	1.93	6.72	--
					12-20-72	5.83	153	447
					1-16-73	5.57	123	13
					2-20-73	2.33	11.5	11
					3-20-73	5.52	121	22
					4-16-73	2.83	20.0	12
					5-15-73	2.13	9.93	--
					6-14-73	2.11	8.6	--
					7-17-73	1.96	5.90	--
					8-15-73	1.44	2.50	--
					9-19-73	1.53	3.00	--
					4- 3-74	5.24	--	--
14306040	Henderson Creek	Pacific Ocean	SE¼NE¼ sec.30, T.11 S., R.11 W.	.85	7-14-72	.81	.50	--
					9- 8-72	.55	.47	--
					5-15-73	1.08	.52	--
					7-25-73	.78	.49	--
					9-19-73	--	1.24	--
14306041	Thiel Creek	do	NW¼NE¼ sec.6, T.12 S., R.11 W.	4.10	7-21-72	--	2.90	--
					9- 8-72	--	1.57	--
					10-17-72	--	1.33	--
					11-14-72	.80	3.08	24
					12-20-72	4.41	72.0	107
					1-15-73	4.16	49.0	55
					2-21-73	1.45	6.3	10
					3-20-73	4.13	52.9	27
					4-17-73	1.79	8.07	14
					5-15-73	1.37	3.90	7
					6-15-73	1.42	4.27	--
					7-18-73	1.30	3.00	--
					8-16-73	1.10	1.60	--
					9-19-73	1.36	4.20	--
					4- 4-74	3.28	--	--
14306042	Lost Creek	do	SE¼NW¼ sec.7, T.12 S., R.11 W.	.40	9- 7-72	--	.30	--
					5-17-73	--	.40	--
					7-25-73	--	.36	--
14306043	Elkhorn Creek	Beaver Creek	SE¼NE¼ sec.27, T.12 S., R.11 W.	--	7-31-73	--	4.65	--
					8-27-73	--	3.21	--
14306044	Beaver Creek	Pacific Ocean	NW¼SW¼ sec.22, T.12 S., R.11 W.	14.3	7-21-72	1.56	12.0	--
					9- 7-72	1.17	5.98	--
					10-17-72	1.15	5.32	--
					11-14-72	2.09	17.2	6
					12-19-72	8.02	230	30
					1-17-73	8.62	260	16
					2-21-73	3.18	36.1	8
					3-20-73	7.91	221	10
					4-17-73	3.84	52.2	10
					5-16-73	1.73	24.2	2
					6-15-73	1.59	22.7	--
					7-18-73	1.70	23.3	--
					8-15-73	1.08	12.1	--
					9-19-73	1.47	17.5	--
					4- 4-74	7.35	--	--

See footnote at end of table.

Table 12.--Miscellaneous streamflow and suspended-sediment measurements, 1972-74--Continued

Station number	Stream	Tributary to	Location	Drainage area (mi^2)	Date of measurement	Gage height (ft)	Discharge (ft^3/s)	Suspended-sediment concentration (mg/l)
14306045	South Beaver Creek	Beaver Creek	NW¼SW¼ sec.33, T.12 S., R.11 W.	5.97	9-13-72	--	1.01	--
					5-16-73	--	3.83	--
14306048	Collins Creek	Pacific Ocean	NE¼SE¼ sec.36, T.12 S., R.12 W.	1.51	9- 7-72	--	.64	--
					5-17-73	--	1.17	--
					7-25-73	--	.73	--
					9-19-73	--	1.20	--
14306049	Deer Creek	do	SE¼SE¼ sec.24, T.12 S., R.12 W.	--	7-30-73	--	.79	--
					9-11-73	--	.44	--
14306050	Fox Creek	do	SE¼NE¼ sec.1, T.13 S., R.12 W.	.39	9- 7-72	--	.64	--
					5-17-73	--	1.17	--
					7-25-73	--	.73	--
					9-19-73	--	1.20	--
14306820	Drift Creek	Alsea River	NE¼NE¼ sec.12, T.13 S., R.11 W.	60.6	7-21-72	1.78	37.3	--
					9-13-72	1.57	20.7	--
					10-17-72	1.51	21.0	--
					11-14-72	2.21	88.8	2
					12-21-72	9.25	3,440	384
					1-17-73	5.41	1,150	26
					2-21-73	2.48	130	4
					3-20-73	4.35	697	11
					4-17-73	2.92	226	10
					5-16-73	2.19	94.7	2
					6-15-73	2.09	71.3	--
					7-18-73	1.84	48.5	--
					8-15-73	1.61	29.7	--
					9-19-73	1.72	34.0	--
					4- 4-74	4.76	--	--
14306852	Governor Patterson Creek	Pacific Ocean	SW¼NE¼ sec.25, T.13 S., R.12 W.	.55	9- 7-72	--	.37	--
					5-16-73	--	.62	--
					7-25-73	--	.48	--
14306854	Big Creek	do	NW¼SW¼ sec.7, T.14 S., R.11 W.	--	9-13-72	--	.78	--
14306856	do	do	SW¼SW¼ sec.2, T.14 S., R.12 W.	6.60	7-20-72	--	5.15	--
					9-13-72	--	2.63	--
					5-16-73	--	9.42	--
					7-25-73	--	5.53	--
14306859	Vingie Creek	do	NW¼NE¼ sec.24, T.14 S., R.12 W.	1.24	8-27-74	--	.90	--
14306860	do	do	NE¼SW¼ sec.14, T.14 S., R.12 W.	1.74	7-20-72	--	.84	--
					9-13-72	--	.40	--
					5-16-73	--	2.61	--
					7-18-73	--	2.21	--
					8-27-74	--	1.66	--
14306864	North Fork Yachats River	Yachats River	SE¼NW¼ sec.35, T.14 S., R.11 W.	--	9-11-73	--	3.65	--
14306865	Yachats River	Pacific Ocean	NW¼SW¼ sec.35, T.14 S., R.11 W.	--	7-31-73	--	12.2	--
14306867	Axtel Creek	Yachats River	SW¼NE¼ sec.34, T.14 S., R.11 W.	.85	8-28-74	--	.37	--
14306869	Carson Creek	do	SW¼SW¼ sec.33, T.14 S., R.11 W.	1.09	8-28-74	--	.26	--
14306870	Beamer Creek	do	NE¼SE¼ sec.32, T.14 S., R.11 W.	2.20	8-28-74	--	1.79	--

See footnote at end of table.

Table 12.--Miscellaneous streamflow and suspended-sediment measurements, 1972-74--Continued

Station number	Stream	Tributary to	Location	Drainage area (mi^2)	Date of measurement	Gage height (ft)	Discharge (ft^3/s)	Suspended-sediment concentration (mg/1)
14306872	Yachats River	Pacific Ocean	NW¼SE¼ sec.32, T.14 S., R.11 W.	--	7-31-73	--	19.6	--
14306874	Left bank tributary	Yachats River	NW¼SW¼ sec.31, T.14 S., R.11 W.	.37	8-28-74	--	.25	--
14306875	Yachats River	Pacific Ocean	NW¼SW¼ sec.31, T.14 S., R.11 W.	50.7	7-20-72	1.26	31.0	--
					9-13-72	1.13	14.5	--
					10-18-72	1.16	14.6	--
					11-15-72	1.66	53.7	3
					12-21-72	6.19	2,430	288
					1-17-73	4.05	867	24
					2-21-73	1.95	105	6
					3-21-73	3.14	465	11
					4-18-73	2.37	188	9
					5-16-73	1.73	66.1	1
					6-15-73	1.69	58.5	--
					7-18-73	1.49	35.2	--
					8-15-73	1.33	26.1	--
					9-20-73	2.24	118	--
					4- 4-74	3.80	--	--
14306876	Salmon Creek	Yachats River	NW¼SE¼ sec.26, T.14 S., R.12 W.	.87	8-28-74	--	.60	--
14306877	Cape Creek	Pacific Ocean	SW¼SW¼ sec.2, T.15 S., R.12 W.	1.61	7-20-72	--	.90	--
					9-13-72	--	.40	--
					5-16-73	--	1.96	--
					7-18-73	--	2.10	--

1/ Adjusted to natural flow.

UNITED STATES DEPARTMENT OF THE INTERIOR
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