



# LOW-FLOW CHARACTERISTICS OF STREAMS ON THE OLYMPIC PENINSULA, WASHINGTON



U.S. GEOLOGICAL SURVEY  
Open-File Report 77-812



Prepared in Cooperation With State of Washington  
Department of Fisheries and Department of Game

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

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By W. L. Haushild and D. E. LaFrance

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Tacoma, Washington  
1978

For further information on this investigation and on other water-resources studies in Washington carried out by the U.S. Geological Survey, contact the U.S. Geological Survey, Water Resources Division, 1201 Pacific Avenue, Suite 600, Tacoma, Washington 98402.

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# METRIC CONVERSION TABLE

| <u>Multiply</u>                                 | <u>By</u> | <u>To obtain</u>                               |
|-------------------------------------------------|-----------|------------------------------------------------|
| Inches-----                                     | 2.540     | centimeters (cm)                               |
| Square miles (mi <sup>2</sup> )-----            | 2.590     | square kilometers<br>(km <sup>2</sup> )        |
| Cubic feet per second--<br>(ft <sup>3</sup> /s) | .02832    | cubic meters per<br>second (m <sup>3</sup> /s) |

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ABSTRACT

The purpose of the study was to determine--for the benefit of water users and managers--the magnitude, frequency, and normal time of occurrence of low flows of many streams on the Olympic Peninsula. Streams in lowland basins generally have their low flows in summer and their peak flows in winter, whereas streams originating at higher elevations in the mountains have their low flows in late summer-early fall and they have both winter and spring peak flows. The data from long-term stations indicate no important trend in low flows during 1940-73 but do indicate that low flows generally were lower during the relatively dry 1940's than during the relatively wet 1950-73 period. The magnitude and frequency of 7-day low flows were estimated for 116 stations either from frequency analyses of data at long-term stations or from correlation of data at a short-term station with data at an appropriate long-term station.

## INTRODUCTION

The purpose of the study was to determine the magnitude, frequency and the normal time of occurrence of low flows in many streams on the Olympic Peninsula. The information is for the use of various agencies and individuals involved in the management of the water resources of the peninsula. The study, made in cooperation with the State of Washington Department of Fisheries and Department of Game, utilized streamflow records through the 1973 water year for the low-flow analyses.

Information on low flows at most of the long-term streamflow stations on the Olympic Peninsula has been reported earlier (Puget Sound Task Force, 1970; Hidaka, 1973; and Nassar, 1973). In addition, a report by Walters (1970) includes an evaluation of the quantity and quality of water in some streams in Olympic National Park and a tabulation of flows of many park streams during the low-flow periods in 1965 and 1966.

The study area includes those stream basins of the Olympic Peninsula in northwestern Washington shown in figure 1. The streams in the study area flow to the Pacific Ocean, Strait of Juan de Fuca, Hood Canal, and several inlets of southwestern Puget Sound (shown in pl. 1, in pocket). Excluded from the study are the streams flowing southward to the Chehalis River, Grays Harbor, and the southern coastal part of the peninsula (fig. 1).

A narrow strip along the Pacific Coast and much of the central, mountainous part of the peninsula are in the Olympic National Park and most of the adjacent land is in the Olympic National Forest. Seven Indian reservations occupy lowland parts of the peninsula.

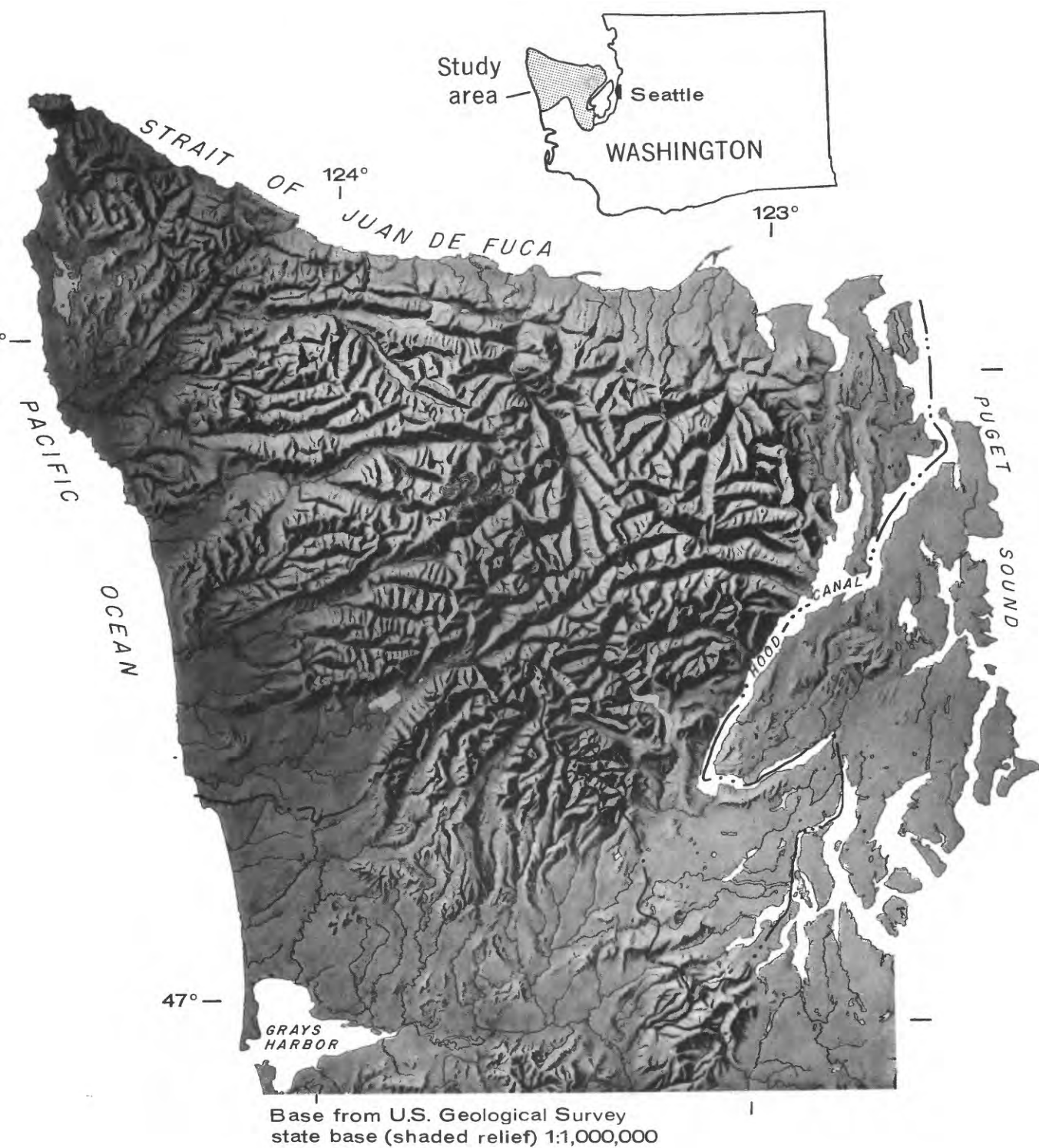


FIGURE 1.--Physiography of Olympic Peninsula and boundary of study area.

## CLIMATE AND PRECIPITATION

The Olympic Peninsula has a marine climate, with cool wet winters and warm, relatively dry summers. The area's precipitation is derived from clouds formed over the Pacific Ocean and moved over the peninsula by the prevailing southwesterly and westerly winds. The average annual precipitation on the windward side of the Olympic Mountains increases from about 80 inches along the Pacific Coast to more than 200 inches at the highest elevations of the mountains (U.S. Weather Bureau, 1965a). On the protected lee sides of the mountains, the average annual precipitation decreases rapidly with elevation, and is less than 20 inches in the northeastern part of the peninsula and about 50 inches along the Hood Canal and western Puget Sound. An occasional winter snowfall over the lowlands usually melts quickly. During late fall to early spring, much of the precipitation at the higher elevations of the Olympic Mountains may fall as snow which accumulates and usually does not melt until late spring and early summer. Some precipitation (mostly snow) is stored for long periods in the glaciers and perennial snowfields on many of the higher peaks.

The variations in annual precipitation during the period 1931-73 at the Quilcene 2 SW station (fig. 2) indicate relatively drier periods in the mid-thirties and early forties and a generally wetter period since then. As shown for three stations in figure 3, the seasonal distribution of precipitation has a peak in December, decreases to a low in July-August and then increases to the next peak. The distribution pattern is the same at all three stations even though the average annual amount varies with station location. (Amanda Park is on the windward side and Sequim and Quilcene 2 SW are on the lee sides of the Olympic Mountains, plate 1.) The data for Quilcene 2 SW in figures 2 and 3 emphasize that magnitudes of monthly and annual precipitation may vary greatly.

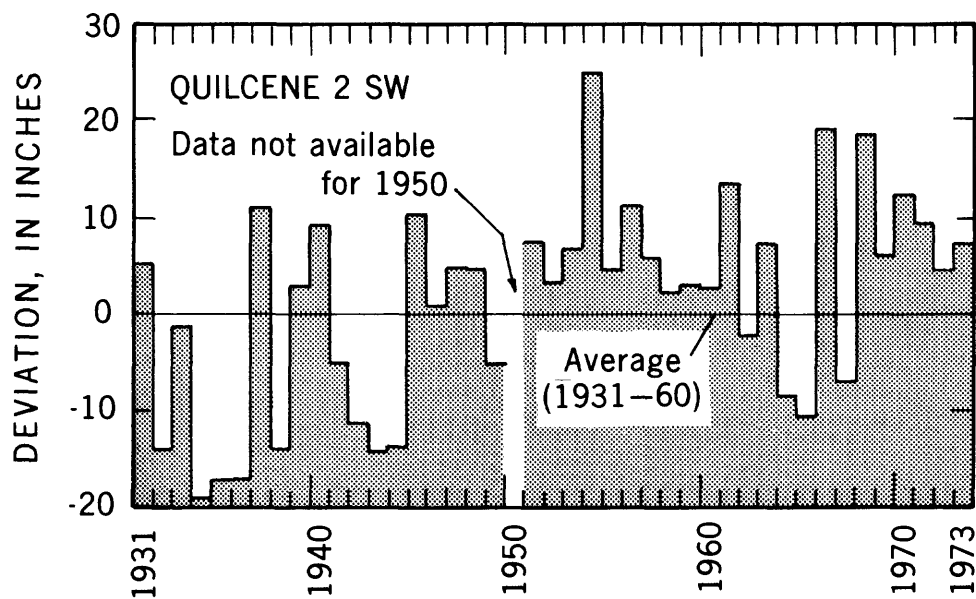


FIGURE 2.--Deviations of annual precipitation during 1931-73 from average annual precipitation during 1931-60, at Quilcene 2 SW station. Data from U.S. Weather Bureau (1956, 1965b, and annual summaries), Environmental Science Services Administration (annual summaries) and National Oceanic and Atmospheric Administration (annual summaries).

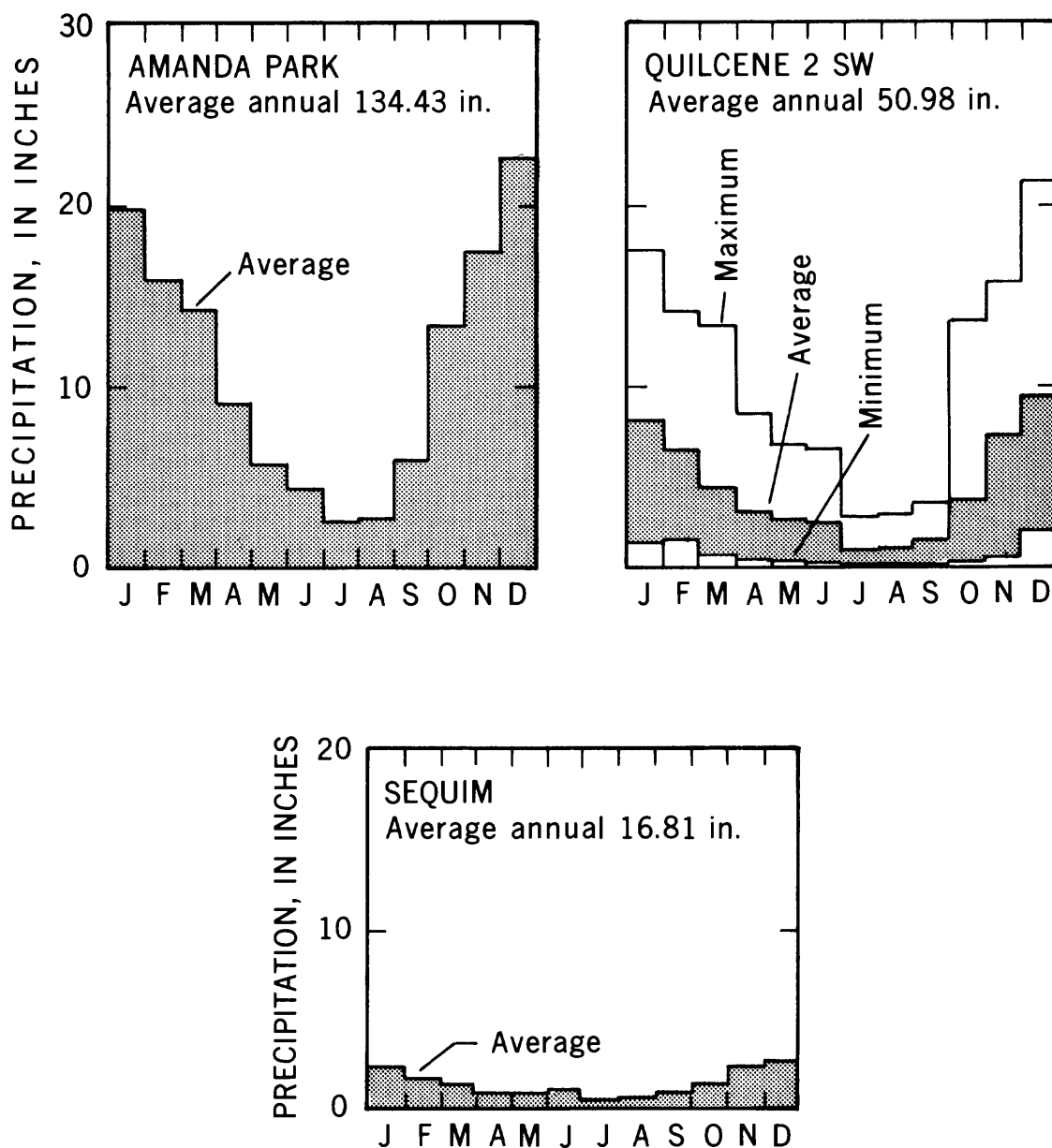


FIGURE 3.--Monthly precipitation at three stations. Data for 1931-60 from U.S. Weather Bureau (1956, 1965b).

## SEASONAL DISTRIBUTION OF STREAMFLOW

The seasonal distribution of flow of Olympic Peninsula streams follows three distinct patterns. This is indicated by data from 27 long-term streamflow stations, for which determinations were made of the monthly mean flows that have a 50-percent probability (chance of 1 in 2) of not being exceeded in any year (table 1). The pattern of streamflow from mostly lower elevation basins is similar to that of precipitation: the distribution is single-peaked with maximum flows in December-February and minimum flows in August-September. Examples of streams having this seasonal distribution of flow are the Queets River near Clearwater (site 4)<sup>1</sup> and Kennedy Creek near Kamilche (site 113).

Streamflow from middle- and high-elevation basins has both a winter and a spring peak, due to the storage of some winter precipitation as accumulated snow and the subsequent melting of snow in spring and early summer. The choice of the two seasonal-distribution patterns used to characterize the double-peaked distribution of streamflow depends on which of these peaks is dominant. Examples of the pattern of dual-peaked streamflow distributions with dominant winter peaks are those for sites 5 and 6 on the Hoh River and for site 95 on the North Fork Skokomish River below Staircase Rapids near Hoodspport. Examples of the pattern of dominant spring peaks are site 74 on the Dungeness River near Sequim and site 88 on the Duckabush River near Brinnon.

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<sup>1</sup>Site numbering begins with the stations in the southernmost stream basin along the Pacific Coast. Within a basin, site numbers increase in the downstream direction. Among the basins, site numbers increase clockwise around the peninsula, from south to north along the Pacific Coast, from west to east along the Strait of Juan de Fuca, and from north to south along the eastern drainages of the peninsula.

In addition to differences in time of occurrence of maximum monthly flows, the data for the long-term stations in table 1 indicate a between-streams variability in (1) the timing of minimum monthly flows and (2) the differences between minimum monthly flows and flows in adjacent months. Mean August flows of some streams are distinctively lower than either mean July or mean September flows; for example, see data for streams at sites 3, 18, 40, and 113 in table 1. In some streams the minimum mean flows in August and September are about equal; for example, see data for streams at sites 6, 71, and 109. Other streams have minimum mean flows in September; for example, see data for streams at sites 1, 57, 65, and 88. The variability in seasonal distribution of streamflow is a factor to be considered in planning for the management and use of the water in these streams.

TABLE 1.--Monthly mean flows with a 50-percent probability of not  
being exceeded in any year at selected streamflow stations  
[Flows are given in cubic feet per second]

| Site num-<br>ber on<br>plate 1 <sup>a</sup> | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May  | June | July | Aug. | Sept. |
|---------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1                                           | 510  | 970  | 1100 | 1000 | 750  | 800  | 580  | 1000 | 1300 | 880  | 420  | 340   |
| 2                                           | 2200 | 3900 | 4400 | 4000 | 3500 | 2500 | 2600 | 2800 | 2800 | 1800 | 890  | 840   |
| 3                                           | 1100 | 2000 | 2400 | 1900 | 2000 | 1400 | 1100 | 700  | 300  | 240  | 160  | 270   |
| 4                                           | 3100 | 6000 | 7300 | 6100 | 5900 | 5100 | 3700 | 3000 | 2300 | 1600 | 860  | 1200  |
| 5                                           | 1800 | 2700 | 3100 | 2600 | 2300 | 1800 | 1700 | 1900 | 2000 | 1600 | 1100 | 990   |
| 6                                           | 2000 | 3300 | 3900 | 4200 | 3200 | 2400 | 2000 | 2000 | 2100 | 1700 | 1200 | 1200  |
| 7                                           | 410  | 830  | 1100 | 980  | 830  | 590  | 590  | 650  | 560  | 320  | 150  | 140   |
| 8                                           | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.5  | 1.0  | .9    |
| 9                                           | --   | --   | --   | --   | --   | --   | --   | --   | --   | 18.  | 9.3  | 25    |
| 10                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 7.7  | 5.9  | 7.6   |
| 11                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 3.7  | 1.8  | 5.1   |
| 12                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 13   | 6.4  | 17    |
| 15                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 440  | 310  | 520   |
| 16                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 28   | 15   | 37    |
| 17                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 36   | 16   | 54    |
| 18                                          | 540  | 840  | 1200 | 1300 | 900  | 760  | 450  | 190  | 92   | 73   | 35   | 140   |
| 19                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 3.7  | 1.7  | 5.3   |
| 20                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 9.8  | 5.0  | 13    |
| 21                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 2.5  | 1.1  | 3.7   |
| 22                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 8.6  | 4.4  | 12    |
| 23                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 2.3  | 1.0  | 3.3   |
| 24                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 100  | 50   | 140   |
| 24.5                                        | --   | --   | --   | --   | --   | --   | --   | --   | --   | .6   | .3   | .9    |
| 25                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .9   | .4   | 1.3   |
| 26                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.1  | .5   | 1.6   |
| 29                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 3.7  | 1.2  | 6.2   |
| 30                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .7   | .2   | 1.2   |
| 31                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.7  | .5   | 3.0   |
| 32                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.0  | .3   | 1.7   |
| 33                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.2  | .4   | 2.8   |
| 34                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .7   | .3   | 1.7   |
| 35                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 12   | 5.8  | 17    |
| 36                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 9.0  | 4.6  | 12    |
| 37                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 29   | 13   | 42    |
| 38                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .3   | .1   | .4    |
| 39                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .6   | .3   | .9    |
| 40                                          | 340  | 580  | 820  | 960  | 650  | 520  | 300  | 140  | 72   | 62   | 31   | 85    |
| 41                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 8.0  | 3.5  | 12.   |
| 42                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 9.8  | 4.5  | 14    |
| 43                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.8  | .7   | 2.8   |
| 44                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 8.8  | 4.1  | 12    |
| 45                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .9   | .3   | 1.3   |

TABLE 1.--Monthly mean flows with a 50-percent probability of not  
being exceeded in any year at selected streamflow stations--cont.  
[Flows are given in cubic feet per second]

| Site num-<br>ber on<br>plate 1 <sup>a</sup> | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May  | June | July | Aug.              | Sept. |
|---------------------------------------------|------|------|------|------|------|------|------|------|------|------|-------------------|-------|
| 46                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.6  | 0.6               | 2.6   |
| 47                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 17   | 6.8               | 26    |
| 48                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .2   | .1                | .2    |
| 50                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 8.3  | 4.6               | 8.0   |
| 51                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 7.6  | 4.5               | 7.3   |
| 52                                          | 32   | 91   | 140  | 160  | 110  | 100  | 61   | 33   | 13   | 8.0  | 4.8               | 7.8   |
| 53                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .1   | <sup>b</sup> ≤.05 | .1    |
| 54                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .5   | .3                | .2    |
| 55                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 3.2  | 1.4               | 1.0   |
| 56                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 30   | 13                | 9.9   |
| 57                                          | 110  | 160  | 310  | 430  | 420  | 290  | 210  | 200  | 180  | 110  | 64                | 56    |
| 58                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .7   | .5                | .4    |
| 59                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .3   | .1                | .3    |
| 60                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .5   | .3                | .2    |
| 61                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .7   | .6                | .5    |
| 62                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .4   | .2                | .2    |
| 63                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .9   | .6                | .6    |
| 64                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 2.0  | 1.5               | 1.2   |
| 65                                          | 830  | 1500 | 1800 | 1700 | 1600 | 1100 | 1300 | 2000 | 2300 | 1500 | 790               | 580   |
| 66                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 43   | 23                | 17    |
| 67                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 14   | 11                | 11    |
| 68                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.6  | 1.4               | 1.2   |
| 69                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 8.0  | 4.8               | 3.8   |
| 70                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 82   | 36                | 26    |
| 71                                          | 5.6  | 9.2  | 23   | 34   | 24   | 21   | 14   | 10   | 7.4  | 4.0  | 3.4               | 3.0   |
| 72                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 9.8  | 8.4               | 7.6   |
| 73                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 380  | 200               | 160   |
| 74                                          | 200  | 220  | 320  | 310  | 320  | 240  | 300  | 490  | 510  | 360  | 200               | 140   |
| 75                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 3.8  | 3.0               | 2.6   |
| 75.5                                        | --   | --   | --   | --   | --   | --   | --   | --   | --   | 2.2  | 1.7               | 1.6   |
| 76                                          | -    | --   | --   | --   | --   | --   | --   | --   | --   | 3.7  | 2.5               | 2.4   |
| 77                                          | 4.5  | 11   | 21   | 27   | 24   | 22   | 20   | 19   | 12   | 6.3  | 3.5               | 3.0   |
| 78                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | .2   | .1                | .1    |
| 79                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 3.7  | 3.4               | 3.2   |
| 80                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 2.1  | 1.4               | 1.3   |
| 81                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 1.7  | .9                | .7    |
| 82                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 140  | 37                | 23    |
| 83                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 110  | 64                | 59    |
| 84                                          | 220  | 350  | 480  | 440  | 380  | 350  | 430  | 730  | 790  | 460  | 220               | 170   |
| 85                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 610  | 300               | 240   |
| 86                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 16   | 7.8               | 6.1   |
| 87                                          | --   | --   | --   | --   | --   | --   | --   | --   | --   | 590  | 300               | 230   |
| 88                                          | 250  | 460  | 530  | 460  | 460  | 310  | 390  | 580  | 580  | 360  | 160               | 120   |

TABLE 1.--Monthly mean flows with a 50-percent probability of not  
being exceeded in any year at selected streamflow stations--cont.  
[Flows are given in cubic feet per second]

| Site num-<br>ber on<br>plate 1 <sup>a</sup> | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. |
|---------------------------------------------|------|------|------|------|------|------|------|-----|------|------|------|-------|
| 89                                          | --   | --   | --   | --   | --   | --   | --   | --  | --   | 2.1  | 1.3  | 1.2   |
| 90                                          | --   | --   | --   | --   | --   | --   | --   | --  | --   | 2.8  | 1.6  | 1.9   |
| 91                                          | 240  | 450  | 450  | 460  | 440  | 300  | 350  | 460 | 440  | 240  | 120  | 88    |
| 92                                          | 95   | 210  | 230  | 290  | 240  | 170  | 150  | 120 | 90   | 48   | 25   | 25    |
| 93                                          | --   | --   | --   | --   | --   | --   | --   | --  | --   | 5.8  | 4.7  | 4.6   |
| 94                                          | --   | --   | --   | --   | --   | --   | --   | --  | --   | 19   | 14   | 15    |
| 95                                          | 340  | 640  | 700  | 600  | 570  | 400  | 500  | 670 | 610  | 310  | 140  | 120   |
| 97                                          | 1.6  | 6.1  | 14   | 18   | 14   | 11   | 7.0  | 2.7 | 1.7  | 1.2  | .9   | .8    |
| 98                                          | 37   | 130  | 120  | 150  | 190  | 140  | 70   | 84  | 40   | 23   | 9.3  | 10    |
| 99                                          | 530  | 1000 | 1100 | 910  | 1100 | 640  | 720  | 580 | 330  | 190  | 130  | 140   |
| 100                                         | 470  | 1000 | 1300 | 1200 | 1100 | 850  | 760  | 580 | 350  | 200  | 130  | 150   |
| 101                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 26   | 22   | 21    |
| 102                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 19   | 14   | 15    |
| 103                                         | 780  | 1700 | 2100 | 2000 | 2000 | 1400 | 1200 | 890 | 540  | 330  | 230  | 250   |
| 104                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 18   | 13   | 14    |
| 105                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 10   | 7.6  | 6.9   |
| 107                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 19   | 13   | 14    |
| 108                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 2.0  | 1.0  | 1.2   |
| 109                                         | 48   | 130  | 190  | 260  | 220  | 180  | 130  | 66  | 44   | 31   | 25   | 24    |
| 110                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 17   | 10   | 8.2   |
| 111                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 20   | 15   | 17    |
| 112                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 3.7  | 2.5  | 2.8   |
| 113                                         | 15   | 67   | 130  | 170  | 110  | 100  | 54   | 25  | 9.2  | 5.3  | 3.5  | 4.2   |
| 114                                         | --   | --   | --   | --   | --   | --   | --   | --  | --   | 4.0  | 2.8  | 3.1   |

<sup>a</sup>See table 3 for description of stations and footnotes about upstream diversions and regulation.

<sup>b</sup>Flow estimated to be greater than zero but less than or equal to 0.05 ft<sup>3</sup>/s.

## ANALYSIS OF LOW FLOWS

### Long-Term Stations

The annual 7-day low flows at two long-term streamflow stations (fig. 4) do not suggest any unusual trend during 1940-73. Some relatively short-term changes in the annual 7-day low flows generally corresponded to short-term changes in the annual mean precipitation (compare data in figs. 4 and 2). For example, relative to the long-term average, both annual low flow and precipitation generally were low during the 1940's, and generally have been high during the period since then. Although the seasonal distribution of streamflow (table 1; fig. 5) differs at the two stations, the data shown in figure 4 suggest that the variations in the annual 7-day low flows at these two stations are not greatly different.

From daily streamflow data at the long-term stations, the mean low flows for 7-, 30-, 60-, 90-, and 183-day periods were computed for the 50-, 20-, 10-, and 5-percent probabilities of not being exceeded in any year; these data are given in table 2. The low flows for a specific period and nonexceedance probabilities were defined by fitting a log-Pearson Type III frequency distribution to the appropriate data. For example, a 7-day low flow of 400 ft<sup>3</sup>/s at the 20-percent-probability level means that during any year the minimum of the mean flows for 7-day periods has a 20-percent probability (chance of 1 in 5) of not exceeding 400 ft<sup>3</sup>/s. Similarly, a 30-day low flow of 20 ft<sup>3</sup>/s at a 50-percent probability of nonexceedance means that the chance is 1 in 2 that the minimum 30-day flow in any year will be less than 20 ft<sup>3</sup>/s. It should be noted that, because the low-flow-frequency data are available mostly for only one station on many major streams, changes in low flows at various points along the streams were not estimated.

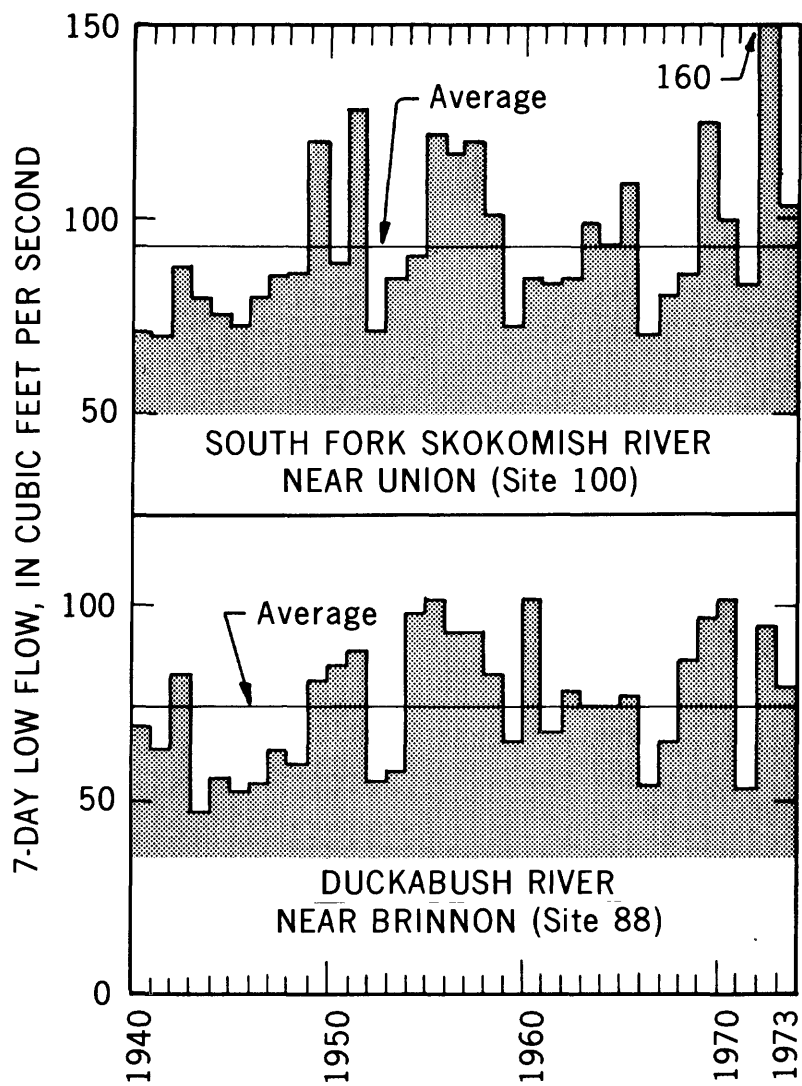


FIGURE 4.--Annual 7-day low flows at two streamflow stations during 1940-73.

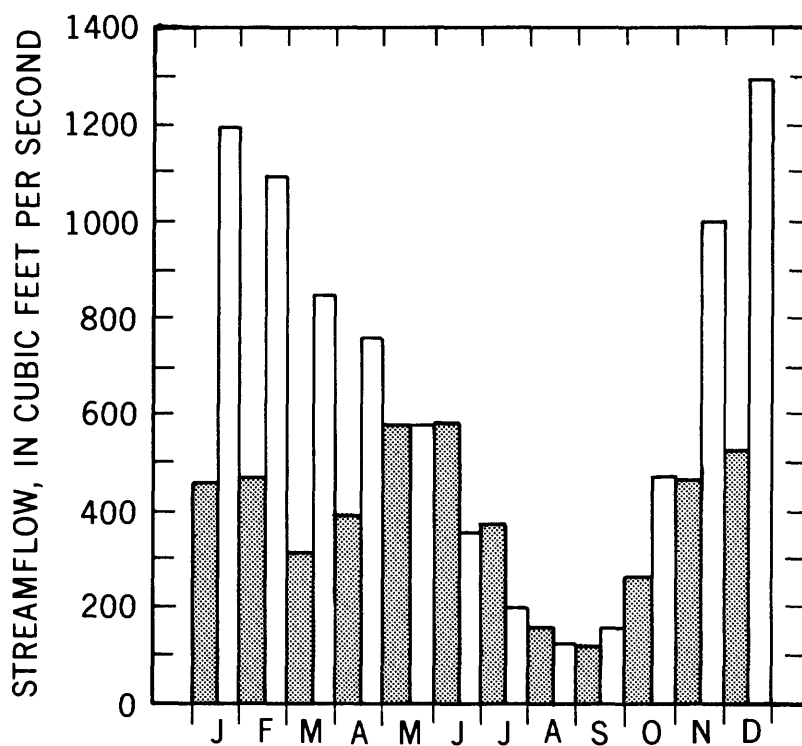


FIGURE 5.--Comparison of monthly mean flows having a 50-percent probability of not being exceeded in any year, South Fork Skokomish River near Union (plain bars) and Duckabush River near Brinnon (solid bars).

TABLE 2.--Low-flow-frequency data for streamflow stations  
with 10 or more years of data

| Site no.<br>on<br>plate 1 <sup>a</sup> | Station name and<br>USGS number                                   | Number of<br>consecutive<br>days | Streamflow (ft <sup>3</sup> /s) for indicated<br>probabilities of nonexceedance<br>(percent) |      |      |      |
|----------------------------------------|-------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------|------|------|------|
|                                        |                                                                   |                                  | 50                                                                                           | 20   | 10   | 5    |
| 1                                      | North Fork Quinault<br>River near Amanda Park<br>(12039300)       | 7                                | 160                                                                                          | 130  | 120  | 110  |
|                                        |                                                                   | 30                               | 200                                                                                          | 160  | 140  | 130  |
|                                        |                                                                   | 60                               | 270                                                                                          | 210  | 190  | 170  |
|                                        |                                                                   | 90                               | 380                                                                                          | 290  | 260  | 230  |
| 2                                      | Quinault River at<br>Quinault Lake (12039500)                     | 7                                | 490                                                                                          | 390  | 350  | 320  |
|                                        |                                                                   | 30                               | 590                                                                                          | 450  | 400  | 350  |
|                                        |                                                                   | 60                               | 740                                                                                          | 540  | 470  | 410  |
|                                        |                                                                   | 90                               | 940                                                                                          | 680  | 580  | 500  |
|                                        |                                                                   | 183                              | 1700                                                                                         | 1400 | 1200 | 1100 |
| 3                                      | Clearwater River near<br>Clearwater (12040000)                    | 7                                | 95                                                                                           | 77   | 69   | 62   |
|                                        |                                                                   | 30                               | 110                                                                                          | 89   | 80   | 72   |
|                                        |                                                                   | 60                               | 140                                                                                          | 110  | 92   | 80   |
|                                        |                                                                   | 90                               | 180                                                                                          | 130  | 110  | 92   |
|                                        |                                                                   | 183                              | 400                                                                                          | 320  | 290  | 260  |
| 4                                      | Queets River near<br>Clearwater (12040500)                        | 7                                | 500                                                                                          | 440  | 420  | 410  |
|                                        |                                                                   | 30                               | 630                                                                                          | 510  | 470  | 440  |
|                                        |                                                                   | 60                               | 790                                                                                          | 630  | 560  | 520  |
|                                        |                                                                   | 90                               | 980                                                                                          | 760  | 660  | 600  |
|                                        |                                                                   | 183                              | 1800                                                                                         | 1500 | 1400 | 1300 |
| 5                                      | Hoh River near<br>Forks (12041000)                                | 7                                | 610                                                                                          | 500  | 450  | 400  |
|                                        |                                                                   | 30                               | 780                                                                                          | 640  | 580  | 520  |
|                                        |                                                                   | 60                               | 920                                                                                          | 770  | 700  | 650  |
|                                        |                                                                   | 90                               | 1100                                                                                         | 880  | 800  | 740  |
|                                        |                                                                   | 183                              | 1400                                                                                         | 1200 | 1200 | 1100 |
| 6                                      | Hoh River at U.S. Highway<br>101 near Forks (12041200)            | 7                                | 700                                                                                          | 560  | 500  | 450  |
|                                        |                                                                   | 30                               | 920                                                                                          | 750  | 670  | 600  |
|                                        |                                                                   | 60                               | 1100                                                                                         | 950  | 900  | 870  |
|                                        |                                                                   | 90                               | 1200                                                                                         | 1100 | 1000 | 1000 |
|                                        |                                                                   | 183                              | 1600                                                                                         | 1400 | 1400 | 1300 |
| 7                                      | Soleduck River near<br>Fairholm (12041500)                        | 7                                | 79                                                                                           | 66   | 61   | 58   |
|                                        |                                                                   | 30                               | 95                                                                                           | 77   | 70   | 65   |
|                                        |                                                                   | 60                               | 120                                                                                          | 90   | 80   | 73   |
|                                        |                                                                   | 90                               | 160                                                                                          | 110  | 96   | 85   |
|                                        |                                                                   | 183                              | 320                                                                                          | 260  | 230  | 210  |
| 18                                     | Dickey River near<br>LaPush (12043100)                            | 7                                | 18                                                                                           | 13   | 11   | 10   |
|                                        |                                                                   | 30                               | 24                                                                                           | 16   | 14   | 12   |
|                                        |                                                                   | 60                               | 34                                                                                           | 22   | 18   | 16   |
|                                        |                                                                   | 90                               | 54                                                                                           | 33   | 25   | 20   |
|                                        |                                                                   | 183                              | 130                                                                                          | 100  | 95   | 88   |
| 40                                     | Hoko River near Sekiu<br>(12043300)                               | 7                                | 20                                                                                           | 16   | 15   | 14   |
|                                        |                                                                   | 30                               | 26                                                                                           | 19   | 17   | 15   |
|                                        |                                                                   | 60                               | 33                                                                                           | 24   | 21   | 19   |
|                                        |                                                                   | 90                               | 43                                                                                           | 30   | 25   | 22   |
|                                        |                                                                   | 183                              | 96                                                                                           | 78   | 72   | 67   |
| 52                                     | East Twin River near<br>Pysht (12043430)                          | 7                                | 3.8                                                                                          | 3.3  | 3.0  | 2.8  |
|                                        |                                                                   | 30                               | 4.7                                                                                          | 3.9  | 3.5  | 3.2  |
|                                        |                                                                   | 60                               | 6.3                                                                                          | 4.8  | 4.1  | 3.6  |
|                                        |                                                                   | 90                               | 8.3                                                                                          | 6.7  | 6.1  | 5.7  |
|                                        |                                                                   | 183                              | 37                                                                                           | 30   | 27   | 25   |
| 57                                     | Lyre River at<br>Piedmont (12044000)                              | 7                                | 35                                                                                           | 27   | 23   | 20   |
|                                        |                                                                   | 30                               | 45                                                                                           | 33   | 28   | 24   |
|                                        |                                                                   | 60                               | 55                                                                                           | 41   | 35   | 31   |
|                                        |                                                                   | 90                               | 74                                                                                           | 53   | 44   | 38   |
|                                        |                                                                   | 183                              | 140                                                                                          | 110  | 91   | 79   |
| 65                                     | Elwha River at McDonald<br>Bridge near Port Angeles<br>(12045500) | 7                                | 380                                                                                          | 290  | 240  | 200  |
|                                        |                                                                   | 30                               | 480                                                                                          | 380  | 330  | 300  |
|                                        |                                                                   | 60                               | 560                                                                                          | 440  | 390  | 350  |
|                                        |                                                                   | 90                               | 660                                                                                          | 510  | 450  | 410  |
|                                        |                                                                   | 183                              | 1100                                                                                         | 840  | 740  | 670  |

TABLE 2.--Low-flow-frequency data for streamflow stations  
with 10 or more years of data--continued

| Site no.<br>on<br>plate 1 <sup>a</sup> | Station name and<br>USGS number                                                   | Number of<br>consecutive<br>days | Streamflow (ft <sup>3</sup> /s) for indicated<br>probabilities of nonexceedance<br>(percent) |     |     |     |
|----------------------------------------|-----------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------|-----|-----|-----|
|                                        |                                                                                   |                                  | 50                                                                                           | 20  | 10  | 5   |
| 71                                     | Siebert Creek near<br>Port Angeles (12047500)                                     | 7                                | 2.6                                                                                          | 2.2 | 2.1 | 2.0 |
|                                        |                                                                                   | 30                               | 2.8                                                                                          | 2.5 | 2.3 | 2.3 |
|                                        |                                                                                   | 60                               | 3.1                                                                                          | 2.7 | 2.5 | 2.4 |
|                                        |                                                                                   | 90                               | 3.4                                                                                          | 2.9 | 2.7 | 2.6 |
|                                        |                                                                                   | 183                              | 5.2                                                                                          | 4.2 | 3.8 | 3.6 |
| 74                                     | Dungeness River near<br>Sequim (12048000)                                         | 7                                | 120                                                                                          | 96  | 87  | 80  |
|                                        |                                                                                   | 30                               | 130                                                                                          | 110 | 100 | 94  |
|                                        |                                                                                   | 60                               | 160                                                                                          | 130 | 110 | 100 |
|                                        |                                                                                   | 90                               | 180                                                                                          | 140 | 120 | 110 |
|                                        |                                                                                   | 183                              | 260                                                                                          | 200 | 180 | 160 |
| 77                                     | Snow Creek near<br>Maynard (12050500)                                             | 7                                | 2.2                                                                                          | 1.8 | 1.6 | 1.5 |
|                                        |                                                                                   | 30                               | 2.7                                                                                          | 2.2 | 2.0 | 1.8 |
|                                        |                                                                                   | 60                               | 3.0                                                                                          | 2.4 | 2.1 | 2.0 |
|                                        |                                                                                   | 90                               | 3.3                                                                                          | 2.6 | 2.4 | 2.2 |
|                                        |                                                                                   | 183                              | 6.3                                                                                          | 4.6 | 3.9 | 3.5 |
| 84                                     | Dosewallips River near<br>Brinnon (12053000)                                      | 7                                | 110                                                                                          | 92  | 85  | 79  |
|                                        |                                                                                   | 30                               | 130                                                                                          | 110 | 100 | 96  |
|                                        |                                                                                   | 60                               | 150                                                                                          | 120 | 110 | 110 |
|                                        |                                                                                   | 90                               | 180                                                                                          | 140 | 130 | 120 |
|                                        |                                                                                   | 183                              | 300                                                                                          | 240 | 200 | 180 |
| 88                                     | Duckabush River near<br>Brinnon (12054000)                                        | 7                                | 72                                                                                           | 59  | 52  | 48  |
|                                        |                                                                                   | 30                               | 90                                                                                           | 71  | 63  | 57  |
|                                        |                                                                                   | 60                               | 120                                                                                          | 85  | 72  | 63  |
|                                        |                                                                                   | 90                               | 150                                                                                          | 110 | 89  | 77  |
|                                        |                                                                                   | 183                              | 280                                                                                          | 230 | 210 | 200 |
| 91                                     | Hamma Hamma River near<br>Eldon (12054500)                                        | 7                                | 60                                                                                           | 49  | 44  | 40  |
|                                        |                                                                                   | 30                               | 71                                                                                           | 56  | 50  | 45  |
|                                        |                                                                                   | 60                               | 89                                                                                           | 67  | 58  | 51  |
|                                        |                                                                                   | 90                               | 120                                                                                          | 86  | 73  | 64  |
|                                        |                                                                                   | 183                              | 230                                                                                          | 190 | 180 | 170 |
| 92                                     | Jefferson Creek near Eldon<br>(12054600)                                          | 7                                | 13                                                                                           | 11  | 10  | 9.3 |
|                                        |                                                                                   | 30                               | 16                                                                                           | 13  | 12  | 11  |
|                                        |                                                                                   | 60                               | 20                                                                                           | 16  | 14  | 13  |
|                                        |                                                                                   | 90                               | 27                                                                                           | 20  | 18  | 15  |
|                                        |                                                                                   | 183                              | 59                                                                                           | 47  | 42  | 39  |
| 95                                     | North Fork Skokomish River<br>below Staircase Rapids near<br>Hoodsport (12056500) | 7                                | 64                                                                                           | 45  | 37  | 31  |
|                                        |                                                                                   | 30                               | 80                                                                                           | 57  | 47  | 41  |
|                                        |                                                                                   | 60                               | 100                                                                                          | 70  | 57  | 49  |
|                                        |                                                                                   | 90                               | 140                                                                                          | 91  | 73  | 60  |
|                                        |                                                                                   | 183                              | 190                                                                                          | 120 | 98  | 81  |
| 96                                     | North Fork Skokomish River<br>near Hoodsport (12057500)<br>Before regulation      | 7                                | 120                                                                                          | 100 | 91  | 85  |
|                                        |                                                                                   | 30                               | 140                                                                                          | 110 | 100 | 94  |
|                                        |                                                                                   | 60                               | 180                                                                                          | 130 | 120 | 110 |
|                                        |                                                                                   | 90                               | 230                                                                                          | 170 | 140 | 120 |
|                                        |                                                                                   | 183                              | 430                                                                                          | 330 | 300 | 270 |
| 96                                     | North Fork Skokomish River<br>near Hoodsport (12057500)<br>After regulation       | 7                                | 99                                                                                           | 38  | 19  | 10  |
|                                        |                                                                                   | 30                               | 140                                                                                          | 49  | 24  | 12  |
|                                        |                                                                                   | 60                               | 200                                                                                          | 120 | 85  | 64  |
|                                        |                                                                                   | 90                               | 270                                                                                          | 170 | 120 | 97  |
|                                        |                                                                                   | 183                              | 420                                                                                          | 290 | 230 | 190 |

TABLE 2.--Low-flow-frequency data for streamflow stations  
with 10 or more years of data--continued

| Site no.<br>on<br>plate 1 <sup>a</sup> | Station name and<br>USGS number                        | Number of<br>consecutive<br>days | Streamflow (ft <sup>3</sup> /s) for indicated<br>probabilities of nonexceedance<br>(percent) |     |     |     |
|----------------------------------------|--------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------|-----|-----|-----|
|                                        |                                                        |                                  | 50                                                                                           | 20  | 10  | 5   |
| 97                                     | Deer Meadow Creek near<br>Hoodsport (12058000)         | 7                                | .5                                                                                           | .4  | .3  | .3  |
|                                        |                                                        | 30                               | .7                                                                                           | .5  | .4  | .4  |
|                                        |                                                        | 60                               | .8                                                                                           | .6  | .5  | .5  |
|                                        |                                                        | 90                               | .9                                                                                           | .7  | .6  | .5  |
|                                        |                                                        | 183                              | 1.4                                                                                          | 1.1 | 1.0 | .9  |
| 98                                     | North Fork Skokomish River<br>near Potlatch (12059500) | 7                                | 7.3                                                                                          | 4.9 | 3.8 | 3.0 |
|                                        |                                                        | 30                               | 8.4                                                                                          | 5.9 | 4.6 | 3.7 |
|                                        |                                                        | 60                               | 9.5                                                                                          | 6.6 | 5.2 | 4.2 |
|                                        |                                                        | 90                               | 11                                                                                           | 7.7 | 6.4 | 5.4 |
|                                        |                                                        | 183                              | 23                                                                                           | 16  | 13  | 11  |
| 99                                     | South Fork Skokomish River<br>near Potlatch (12060000) | 7                                | 81                                                                                           | 64  | 55  | 48  |
|                                        |                                                        | 30                               | 90                                                                                           | 71  | 61  | 54  |
|                                        |                                                        | 60                               | 100                                                                                          | 79  | 67  | 58  |
|                                        |                                                        | 90                               | 120                                                                                          | 91  | 76  | 65  |
|                                        |                                                        | 183                              | 250                                                                                          | 190 | 170 | 150 |
| 100                                    | South Fork Skokomish River<br>near Union (12060500)    | 7                                | 88                                                                                           | 76  | 71  | 67  |
|                                        |                                                        | 30                               | 99                                                                                           | 83  | 76  | 72  |
|                                        |                                                        | 60                               | 120                                                                                          | 93  | 84  | 78  |
|                                        |                                                        | 90                               | 140                                                                                          | 110 | 96  | 87  |
|                                        |                                                        | 183                              | 280                                                                                          | 220 | 200 | 180 |
| 103                                    | Skokomish River near<br>Potlatch (12061500)            | 7                                | 180                                                                                          | 160 | 150 | 140 |
|                                        |                                                        | 30                               | 190                                                                                          | 170 | 160 | 150 |
|                                        |                                                        | 60                               | 220                                                                                          | 180 | 170 | 160 |
|                                        |                                                        | 90                               | 260                                                                                          | 210 | 190 | 170 |
|                                        |                                                        | 183                              | 470                                                                                          | 380 | 330 | 300 |
| 109                                    | Goldsborough Creek near<br>Shelton (12076500)          | 7                                | 21                                                                                           | 19  | 18  | 17  |
|                                        |                                                        | 30                               | 22                                                                                           | 20  | 19  | 18  |
|                                        |                                                        | 60                               | 24                                                                                           | 21  | 20  | 19  |
|                                        |                                                        | 90                               | 25                                                                                           | 23  | 21  | 20  |
|                                        |                                                        | 183                              | 39                                                                                           | 33  | 30  | 27  |
| 113                                    | Kennedy Creek near<br>Kamilche (12078400)              | 7                                | 2.7                                                                                          | 2.2 | 2.0 | 1.8 |
|                                        |                                                        | 30                               | 3.2                                                                                          | 2.6 | 2.3 | 2.1 |
|                                        |                                                        | 60                               | 3.5                                                                                          | 2.9 | 2.6 | 2.5 |
|                                        |                                                        | 90                               | 3.9                                                                                          | 3.1 | 2.9 | 2.7 |
|                                        |                                                        | 183                              | 9.5                                                                                          | 7.9 | 7.3 | 7.0 |

<sup>a</sup>See footnotes in table 3 for diversions and regulation.

### Short-Term and Periodic-Data Stations

Correlation and regression analyses were used to estimate the 7-day low flows for the 5-, 10-, and 20-, and 50-percent probabilities of not being exceeded in any year at short-term and periodic-data sites. At short-term stations (sites), the available records of streamflows are less than 10-years long. At periodic data sites (stations), the available streamflows are those measured at regular or irregular frequencies. For a short-term station with 5 to 9 years of daily streamflow record, regression relationships were computed in the correlation analysis between the minimum annual 7-day low flows at the station and the minimum annual 7-day low flows at an appropriate long-term station. For a short-term station with less than 5 years of record, either concurrent daily flows or measured discharges at the station and a long-term station were used to determine the regression relationship; for a periodic-data station, concurrent measured discharges were used. The 7-day low-flow-frequency data for the long-term station were then used in the regression relationship to estimate the 7-day low-flow-frequency data for the short-term or periodic-data station.

Generally the data for each short-term or periodic-data station was correlated against data for several long-term stations. Selection of the best relationship from among any valid regression relationships depended on--somewhat in order of priority--(1) the highest accuracy as indicated by the lowest standard error of estimate, (2) the highest degree of correlation between the data for the two stations as indicated by the correlation coefficient nearest unity, and (3) the least amount of extrapolation necessary to estimate the 7-day low-flow-frequency data from the regression relationship.

The 7-day low-flow-frequency data calculated for 89 short-term or periodic-data stations and for the 27 long-term stations (pl. 1) are given in table 3.

The mean flows for July, August, and September at a 50-percent probability of not being exceeded in any year also were estimated for 82 short-term or periodic-data stations; these are included in table 1. The monthly mean flows were estimated for the 3 months by correlating either measured discharges or appropriate monthly mean flows at the short-term or periodic-data stations with the monthly mean flows at suitable long-term stations.

### Accuracy of 7-Day Low Flows

Hardison and Moss (1972) reported a procedure for evaluating the accuracy of low-flow-frequency characteristics that are estimated from relating logarithms of base flows at ungaged sites to logarithms of base flows at gaged sites. In developing the procedure they also presented a method of determining the accuracy of low-flow-frequency characteristics that are estimated from fitting a log-Pearson Type III distribution to the annual n-day low flows at gaged sites. (The term "n" specifies some number of days such as 1, 7, 14, 30, etc.) The standard error of estimate was the statistic they used to evaluate the accuracy of estimating the low-flow characteristics.

The principal low-flow-frequency characteristics in this report are those for the 7-day period. Therefore, standard errors of estimate were computed by using the procedures given by Hardison and Moss for only the 7-day low flows at the gaged and ungaged sites. These errors are given in table 3. Standard errors of estimate could be computed for the other n-day low-flow characteristics given in table 2 and, by using techniques similar to those used by Hardison and Moss, the standard errors can be computed for the monthly mean flows given in table 3.

1

TABLE 3.--7-day low-flow-frequency data for all sites

| Site no.<br>on<br>plate 1 | Name of stream or streamflow station,<br>station number (in parenthesis) and<br>period of low-flow record | Location <sup>1</sup> | Drainage<br>area<br>(mi <sup>2</sup> ) | Magnitude (ft <sup>3</sup> /s) and standard error of estimate (percent) of 7-day low flows for indicated probabilities of nonexceedance, in percent |     |            |     |            |     |            |     |
|---------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----|------------|-----|------------|-----|------------|-----|
|                           |                                                                                                           |                       |                                        | 50                                                                                                                                                  |     | 20         |     | 10         |     | 5          |     |
|                           |                                                                                                           |                       |                                        | Flow Error                                                                                                                                          |     | Flow Error |     | Flow Error |     | Flow Error |     |
| 1                         | North Fork Quinault River near Amanda Park (12039300), 1966-75                                            | SW 6 24/7             | 74.1                                   | 160                                                                                                                                                 | 8   | 130        | 8   | 120        | 9   | 110        | 10  |
| 2                         | Quinault River at Quinault Lake (12039500), 1913-73 <sup>2</sup>                                          | SW,NE 25 23/10        | 264                                    | 490                                                                                                                                                 | 4   | 390        | 4   | 350        | 5   | 320        | 6   |
| 3                         | Clearwater River near Clearwater (12040000), 1938-49 <sup>3</sup>                                         | NW 18 24/12           | 140                                    | 95                                                                                                                                                  | 7   | 77         | 9   | 69         | 11  | 62         | 13  |
| 4                         | Queets River near Clearwater (12040500), 1932-49                                                          | NE,SW 36 24/13        | 445                                    | 500                                                                                                                                                 | 4   | 440        | 4   | 420        | 5   | 410        | 5   |
| 5                         | Hoh River near Forks (12041000), 1928-64                                                                  | SW,NE 34 27/11        | 208                                    | 610                                                                                                                                                 | 3   | 500        | 5   | 450        | 6   | 400        | 7   |
| 6                         | Hoh River at U.S. Highway 101 near Forks (12041200), 1962-73                                              | NE,NE 33 27/12        | 253                                    | 700                                                                                                                                                 | 7   | 560        | 9   | 500        | 11  | 450        | 13  |
| 7                         | Soleduck River near Fairholm (12041500), 1919-71                                                          | SE,SW 35 30/10        | 83.8                                   | 79                                                                                                                                                  | 4   | 66         | 4   | 61         | 4   | 58         | 5   |
| 8                         | Snider Creek, 1962-66                                                                                     | NE,SE 28 30/11        | .64                                    | .6                                                                                                                                                  | 18  | .6         | 18  | .6         | 18  | .5         | 18  |
| 9                         | Bear Creek, 1962-66                                                                                       | SW,SW 27 30/12        | 17.9                                   | 6.2                                                                                                                                                 | 21  | 4.9        | 21  | 4.5        | 22  | 4.3        | 23  |
| 10                        | Pavel Springs Creek, 1963-64                                                                              | SW 31 30/12           | --                                     | 5.2                                                                                                                                                 | 18  | 4.8        | 18  | 4.6        | 18  | 4.4        | 18  |
| 11                        | Cold Creek, 1962-66                                                                                       | SW 9 30/12            | 2.62                                   | 1.2                                                                                                                                                 | 15  | 1.0        | 15  | .9         | 17  | .9         | 19  |
| 12                        | Beaver Creek, 1962-66                                                                                     | NE 20 30/12           | 9.81                                   | 4.1                                                                                                                                                 | 9   | 3.2        | 10  | 2.9        | 11  | 2.8        | 12  |
| 13                        | Rainey Creek, 1962-66                                                                                     | SW,SE 20 30/12        | 2.12                                   | 0                                                                                                                                                   | 88  | 0          | 110 | 0          | 120 | 0          | 120 |
| 14                        | Lake Creek, 1962-64                                                                                       | SW,SE 4 29/13         | 11.4                                   | (a)                                                                                                                                                 | 350 | (a)        | 350 | (a)        | 350 | (a)        | 350 |
| 15                        | Soleduck River, 1917, 27, 62, 72                                                                          | SW,NE 16 29/13        | --                                     | 250                                                                                                                                                 | 57  | 220        | 57  | 210        | 57  | 210        | 57  |
| 16                        | East Fork Dickey River, 1964-68                                                                           | SE,SE 30 29/14        | 39.8                                   | 9.9                                                                                                                                                 | 24  | 8.1        | 25  | 7.7        | 25  | 7.2        | 25  |
| 17                        | West Fork Dickey River, 1962-66, 73                                                                       | SE,SE 30 29/14        | 44.4                                   | 8.5                                                                                                                                                 | 16  | 6.3        | 16  | 5.6        | 16  | 5.3        | 16  |
| 18                        | Dickey River near LaPush (12043100), 1964-73                                                              | NE,NE 6 28/14         | 86.3                                   | 18                                                                                                                                                  | 12  | 13         | 12  | 11         | 14  | 10         | 16  |
| 19                        | Colby Creek, 1962-66                                                                                      | NW 8 28/14            | 6.2                                    | 1.1                                                                                                                                                 | 31  | .8         | 31  | .8         | 33  | .7         | 35  |
| 20                        | Big River, 1962-66, 73                                                                                    | NE,NW 29 31/14        | 8.77                                   | 3.4                                                                                                                                                 | 23  | 2.7        | 23  | 2.5        | 23  | 2.4        | 23  |
| 21                        | Trout Creek, 1962-66                                                                                      | SW,NW 2 30/15         | 3.59                                   | .6                                                                                                                                                  | 59  | .5         | 59  | .4         | 59  | .4         | 61  |
| 22                        | Umbrella Creek, 1962-66                                                                                   | NW 3 30/15            | 11.4                                   | 2.9                                                                                                                                                 | 24  | 2.3        | 24  | 2.1        | 24  | 2.0        | 24  |
| 23                        | Coal Creek, 1962-66                                                                                       | SW,SW 29 31/15        | 5.82                                   | .6                                                                                                                                                  | 53  | .5         | 53  | .4         | 53  | .4         | 56  |
| 24                        | Ozette River, 1962-66, 73                                                                                 | SE,SE 30 31/15        | 77.5                                   | 32                                                                                                                                                  | 42  | 25         | 42  | 23         | 42  | 22         | 42  |
| 24.5                      | Thirty Cent Creek, 1962-66                                                                                | NW,SE 22 32/15        | .57                                    | .2                                                                                                                                                  | 33  | .1         | 35  | .1         | 38  | .1         | 41  |
| 25                        | Miller Creek, 1962-66                                                                                     | SW,NE 22 32/15        | 1.11                                   | .3                                                                                                                                                  | 81  | .2         | 81  | .2         | 81  | .2         | 81  |
| 26                        | Grimes Creek, 1962-66                                                                                     | NW,SW 15 32/15        | 1.38                                   | .3                                                                                                                                                  | 82  | .2         | 82  | .2         | 82  | .2         | 82  |
| 27                        | Waatch Creek, 1962-66                                                                                     | NW 20 33/15           | .55                                    | .4                                                                                                                                                  | 120 | .3         | 120 | .3         | 130 | .3         | 140 |
| 28                        | Village Creek, 1962-66                                                                                    | SW 10 33/15           | .68                                    | .1                                                                                                                                                  | 52  | .1         | 52  | .1         | 52  | .1         | 52  |
| 29                        | Sail River, 1962-66, 71                                                                                   | 18 33/14              | 5.42                                   | .6                                                                                                                                                  | 32  | .4         | 34  | .4         | 38  | .3         | 40  |
| 30                        | Snow Creek, 1962-66                                                                                       | SW 17 33/14           | 1.45                                   | .1                                                                                                                                                  | 40  | .1         | 40  | .1         | 40  | (a)        | 40  |
| 31                        | Bullman Creek, 1962-66                                                                                    | NE,NE 20 33/14        | 3.69                                   | .3                                                                                                                                                  | 34  | .2         | 36  | .1         | 40  | .1         | 44  |
| 32                        | Rasmussen Creek, 1962-66                                                                                  | SE,NE 27 33/14        | 2.32                                   | .1                                                                                                                                                  | 35  | .1         | 35  | .1         | 39  | .1         | 42  |
| 33                        | Jansen Creek, 1962-66                                                                                     | SE,SE 26 33/14        | 2.02                                   | .2                                                                                                                                                  | 32  | .1         | 32  | .1         | 36  | .1         | 40  |
| 34                        | Olsen Creek, 1962-66                                                                                      | NE,NE 01 33/14        | 1.14                                   | .1                                                                                                                                                  | 36  | .1         | 37  | .1         | 41  | (a)        | 46  |
| 35                        | North Fork Sekiu River, 1962-66                                                                           | NW,NE 15 32/14        | 11.1                                   | 3.7                                                                                                                                                 | 22  | 2.9        | 22  | 2.6        | 22  | 2.5        | 22  |
| 36                        | South Fork Sekiu River, 1962-66                                                                           | NW,NE 15 32/14        | 8.86                                   | 3.0                                                                                                                                                 | 20  | 2.4        | 20  | 2.2        | 20  | 2.1        | 21  |
| 37                        | Sekiu River, 1962-66                                                                                      | 8 32/13               | 31.6                                   | 8.1                                                                                                                                                 | 19  | 6.1        | 19  | 5.6        | 19  | 5.2        | 19  |

TABLE 3.--7-day low-flow-frequency data for all sites--Continued

| Site no. | Name of stream or streamflow station, on station number (in parenthesis) and plate 1 period of low-flow record | Location <sup>1</sup> | Drainage area (mi <sup>2</sup> ) | Magnitude (ft <sup>3</sup> /s) and standard error of estimate (percent) of 7-day low flows for indicated probabilities of nonexceedance, in percent |    |     |    |            |            |            |            |
|----------|----------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|----|------------|------------|------------|------------|
|          |                                                                                                                |                       |                                  | 50                                                                                                                                                  | 20 | 10  | 5  | Flow Error | Flow Error | Flow Error | Flow Error |
| 38       | Hoko River Tributary, 1962-66                                                                                  | NE, NE 23 31/14       | 0.88                             | 0.1                                                                                                                                                 | 29 | 0.1 | 31 | 0.1        | 34         | 0.1        | 37         |
| 39       | Hoko River Tributary, 1962-66                                                                                  | NE, NW 24 31/14       | .94                              | .2                                                                                                                                                  | 52 | .2  | 52 | .2         | 53         | .1         | 56         |
| 40       | Hoko River near Sekiu (12043300), 1964-73                                                                      | NE, SW 28 32/13       | 51.2                             | 20                                                                                                                                                  | 10 | 16  | 10 | 15         | 11         | 14         | 12         |
| 41       | Little Hoko River, 1962-66, 1972-73                                                                            | SE, NE 22 32/13       | 11.5                             | 2.2                                                                                                                                                 | 16 | 1.6 | 16 | 1.5        | 16         | 1.4        | 17         |
| 42       | Clallum River, 1962-66                                                                                         | NW, SW 33 32/12       | 137                              | 3.0                                                                                                                                                 | 16 | 2.3 | 16 | 2.1        | 17         | 2.0        | 18         |
| 43       | Charley Creek, 1962-66                                                                                         | SW, SW 28 32/12       | 5.23                             | .4                                                                                                                                                  | 55 | .3  | 55 | .2         | 55         | .2         | 55         |
| 44       | Pysht River, 1962-66                                                                                           | SE, NW 23 31/12       | 10.2                             | 2.6                                                                                                                                                 | 12 | 2.0 | 12 | 1.9        | 12         | 1.8        | 12         |
| 45       | Green Creek, 1962-66                                                                                           | SW, NW 14 31/12       | 1.96                             | .2                                                                                                                                                  | 33 | .1  | 35 | .1         | 39         | .1         | 42         |
| 46       | Green Creek, 1962-66                                                                                           | SW, SE 14 31/12       | 5.28                             | .3                                                                                                                                                  | 45 | .2  | 52 | .2         | 56         | .2         | 60         |
| 47       | Pysht River, 1962-66, 72, 73                                                                                   | NE, NE 18 31/11       | 37.6                             | 3.9                                                                                                                                                 | 28 | 2.8 | 28 | 2.5        | 28         | 2.4        | 28         |
| 48       | Jim Creek, 1962-66                                                                                             | SW 13 31/11           | 3.70                             | (a)                                                                                                                                                 | 38 | (a) | 40 | (a)        | 46         | (a)        | 52         |
| 49       | Joe Creek, 1962-66                                                                                             | NW, NE 24 31/11       | 1.51                             | (a)                                                                                                                                                 | 42 | (a) | 42 | (a)        | 42         | (a)        | 42         |
| 50       | Deep Creek, 1962-66                                                                                            | NW, NW 20 31/10       | 17.3                             | 3.5                                                                                                                                                 | 18 | 3.0 | 18 | 2.7        | 18         | 2.5        | 24         |
| 51       | West Twin River, 1962-66                                                                                       | NW, SE 23 31/10       | 12.8                             | 3.5                                                                                                                                                 | 18 | 3.0 | 18 | 2.7        | 18         | 2.5        | 24         |
| 52       | East Twin River near Pysht (12043430), 1963-72                                                                 | NW, SW 24 31/10       | 14.0                             | 3.8                                                                                                                                                 | 5  | 3.3 | 7  | 3.0        | 9          | 2.8        | 11         |
| 53       | Murdock Creek, 1962-66                                                                                         | SW 29 31/9            | 2.26                             | (a)                                                                                                                                                 | 54 | (a) | 57 | (a)        | 65         | (a)        | 74         |
| 54       | Fairholm Creek, 1962-66                                                                                        | NW 30 30/9            | 3.81                             | .2                                                                                                                                                  | 22 | .2  | 24 | .1         | 26         | .1         | 28         |
| 55       | Lapoel Creek, 1962-66                                                                                          | SW, NW 32 30/9        | 1.15                             | .6                                                                                                                                                  | 34 | .5  | 35 | .4         | 38         | .4         | 41         |
| 56       | Barnes Creek, 1962-66, 73                                                                                      | NW, NE 35 30/9        | 15.7                             | 5.8                                                                                                                                                 | 18 | 4.7 | 18 | 4.1        | 18         | 3.7        | 18         |
| 57       | Lyre River at Piedmont (12044000), 1918-27                                                                     | NE 14 30/9            | 49.5                             | 35                                                                                                                                                  | 10 | 27  | 12 | 23         | 15         | 20         | 18         |
| 58       | Suzie Creek, 1962-66                                                                                           | NW, SE 28 31/9        | 3.56                             | .3                                                                                                                                                  | 47 | .2  | 47 | .2         | 47         | .2         | 47         |
| 59       | Field Creek, 1962-66                                                                                           | SE 26 31/9            | 3.90                             | .1                                                                                                                                                  | 49 | .1  | 49 | .1         | 49         | .1         | 49         |
| 60       | Whiskey Creek, 1962-66                                                                                         | NE, NE 36 31/9        | 1.63                             | .1                                                                                                                                                  | 37 | .1  | 38 | .1         | 42         | .1         | 45         |
| 61       | Salt Creek, 1952, 62-66, 73                                                                                    | NW, SE 2 30/8         | 4.09                             | .4                                                                                                                                                  | 26 | .4  | 26 | .3         | 26         | .3         | 26         |
| 62       | Salt Creek Tributary, 1952, 61-66                                                                              | NE, SW 2 30/8         | 1.88                             | .1                                                                                                                                                  | 31 | .1  | 31 | .1         | 31         | .1         | 31         |
| 63       | Salt Creek, 1952-53, 61                                                                                        | NW, NW 2 30/8         | 7.07                             | .5                                                                                                                                                  | 35 | .4  | 35 | .3         | 35         | .3         | 35         |
| 64       | Salt Creek, 1952-53, 61-66                                                                                     | SW, NW 27 31/8        | 15.9                             | .9                                                                                                                                                  | 33 | .7  | 33 | .6         | 33         | .6         | 33         |
| 65       | Elwha River at McDonald Bridge near Port Angeles (12045500), 1899-1973 <sup>4</sup>                            | NE, NW 33 30/7        | 269                              | 380                                                                                                                                                 | 4  | 290 | 6  | 240        | 8          | 200        | 10         |
| 66       | Little River, 1899-1902, 1952                                                                                  | SE, NE 28 30/7        | 23.0                             | 8.1                                                                                                                                                 | 49 | 5.5 | 53 | 4.3        | 62         | 3.4        | 70         |
| 67       | Indian Creek, 1962-66, 73                                                                                      | SE, SE 22 30/8        | 8.33                             | 8.9                                                                                                                                                 | 13 | 8.3 | 13 | 8.1        | 13         | 7.9        | 13         |
| 68       | Tumwater Creek, 1952-53, 61                                                                                    | SE, NE 4 30/6         | 5.59                             | 1.0                                                                                                                                                 | 9  | .9  | 9  | .8         | 9          | .8         | 9          |
| 69       | Ennis Creek, 1952-53, 61                                                                                       | NE, SW 12 30/6        | 7.92                             | 2.9                                                                                                                                                 | 10 | 2.6 | 10 | 2.4        | 10         | 2.3        | 10         |
| 70       | Morse Creek, 1899-1901, 1925, 61                                                                               | SW, SW 8 30/5         | --                               | 16                                                                                                                                                  | 28 | 13  | 28 | 11         | 28         | 10         | 28         |
| 71       | Siebert Creek near Port Angeles (12047500), 1954-69                                                            | SW, NE 23 30/5        | 15.5                             | 2.6                                                                                                                                                 | 5  | 2.2 | 5  | 2.1        | 6          | 2.0        | 6          |
| 72       | McDonald Creek, 1952-53, 61                                                                                    | SE, SE 18 30/4        | 21.3                             | 6.6                                                                                                                                                 | 16 | 5.9 | 16 | 5.5        | 16         | 5.3        | 16         |
| 73       | Dungeness River, 1945-47                                                                                       | 30 29/3               | --                               | 110                                                                                                                                                 | 5  | 94  | 7  | 87         | 7          | 82         | 8          |
| 74       | Dungeness River near Sequim (12048000), 1925-73                                                                | NW, NE 13 29/4        | 156                              | 120                                                                                                                                                 | 3  | 96  | 4  | 87         | 5          | 80         | 6          |
| 75       | Canyon Creek, 1952-53, 61                                                                                      | SE, NW 12 29/4        | 11.9                             | 2.0                                                                                                                                                 | 16 | 1.6 | 16 | 1.5        | 16         | 1.4        | 16         |
| 75.5     | Jimmy-Come-Lately Creek, 1952-53, 61                                                                           | SE, NE 13 29/3        | 14.6                             | 1.3                                                                                                                                                 | 25 | 1.1 | 25 | 1.0        | 25         | 1.0        | 25         |
| 76       | Salmon Creek, 1942-43                                                                                          | NE, SE 23 29/2        | 16.7                             | 1.7                                                                                                                                                 | 29 | 1.4 | 29 | 1.3        | 29         | 1.2        | 29         |
| 77       | Snow Creek near Maynard (12050500), 1954-72                                                                    | NE, NE 11 28/2        | 11.2                             | 2.3                                                                                                                                                 | 6  | 1.8 | 7  | 1.6        | 8          | 1.5        | 9          |

TABLE 3.--7-day low-flow-frequency data for all sites--Continued

| Site no.<br>on<br>plate 1 | Name of stream or streamflow station,<br>station number (in parenthesis) and<br>period of low-flow record | Location <sup>1</sup> | Drainage<br>area<br>(mi <sup>2</sup> ) | Magnitude (ft <sup>3</sup> /s) and standard error of esti-<br>mate (percent) of 7-day low flows for indicated<br>probabilities of nonexceedance, in percent |       |      |       |      |       |      |       |
|---------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|-------|------|-------|------|-------|
|                           |                                                                                                           |                       |                                        | 50                                                                                                                                                          |       | 20   |       | 10   |       | 5    |       |
|                           |                                                                                                           |                       |                                        | Flow                                                                                                                                                        | Error | Flow | Error | Flow | Error | Flow | Error |
| 78                        | Andrews Creek, 1952, 61                                                                                   | NW, SW 1 28/2         | 7.33                                   | (a)                                                                                                                                                         | 72    | (a)  | 72    | (a)  | 72    | (a)  | 72    |
| 79                        | Ludlow Creek, 1952-53, 61                                                                                 | SE, SE 18 28/1        | 13.5                                   | 3.1                                                                                                                                                         | 6     | 3.0  | 6     | 2.9  | 6     | 2.9  | 6     |
| 80                        | East Fork Chimacum Creek, 1954, 61                                                                        | NW, NE 14 29/1        | 6.42                                   | 1.4                                                                                                                                                         | 16    | 1.3  | 16    | 1.2  | 17    | 1.2  | 19    |
| 81                        | Howe Creek, 1952-53, 61                                                                                   | SE, SE 21 28/2        | 2.10                                   | .6                                                                                                                                                          | 14    | .4   | 18    | .4   | 22    | .3   | 26    |
| 82                        | Little Quilcene River, 1953-57                                                                            | NE 14 27/2            | 19.6                                   | 9.8                                                                                                                                                         | 17    | 7.1  | 20    | 5.8  | 21    | 5.1  | 22    |
| 83                        | Big Quilcene River, 1925-26                                                                               | SE, SE 22 27/2        | 66.4                                   | 40                                                                                                                                                          | 10    | 30   | 10    | 25   | 11    | 22   | 12    |
| 84                        | Dosewallips River near Brinnon<br>(12053000), 1932-49                                                     | SW 24 26/3            | 93.5                                   | 110                                                                                                                                                         | 5     | 92   | 5     | 85   | 6     | 79   | 7     |
| 85                        | Dosewallips River, 1970                                                                                   | NE, NE 29 26/2        | 99.9                                   | 150                                                                                                                                                         | 7     | 130  | 8     | 120  | 9     | 110  | 9     |
| 86                        | Rocky Brook, 1951                                                                                         | NW, NW 28 26/2        | --                                     | 1.5                                                                                                                                                         | 16    | 1.3  | 16    | 1.2  | 16    | 1.1  | 16    |
| 87                        | Dosewallips River, 1970                                                                                   | SE, SE 34 26/2        | 115                                    | 150                                                                                                                                                         | 4     | 130  | 5     | 120  | 6     | 110  | 6     |
| 88                        | Duckabush River near Brinnon<br>(12054000), 1940-73                                                       | NW, SW 1 25/3         | 66.5                                   | 72                                                                                                                                                          | 4     | 59   | 5     | 52   | 6     | 48   | 7     |
| 89                        | Fulton Creek, 1951                                                                                        | NE, NE 31 25/2        | --                                     | .8                                                                                                                                                          | 9     | .7   | 9     | .6   | 9     | .6   | 9     |
| 90                        | Waketick Creek, 1951                                                                                      | NE 23 24/3            | --                                     | 1.0                                                                                                                                                         | 27    | .8   | 32    | .7   | 35    | .7   | 38    |
| 91                        | Hamma Hamma River near Eldon<br>(12054500), 1940-73                                                       | SE, NW 7 24/3         | 51.3                                   | 60                                                                                                                                                          | 6     | 49   | 6     | 44   | 7     | 40   | 8     |
| 92                        | Jefferson Creek near Eldon<br>(12054600), 1959-71                                                         | SE, SE 7 24/3         | 21.6                                   | 13                                                                                                                                                          | 6     | 11   | 7     | 10   | 8     | 9.3  | 9     |
| 93                        | Jorsted Creek, 1951                                                                                       | NE, SW 34 24/3        | --                                     | 3.9                                                                                                                                                         | 13    | 3.6  | 16    | 3.4  | 21    | 3.2  | 24    |
| 94                        | Lilliwaup Creek, 1925-26, 31, 43, 51                                                                      | SE, NW 19 23/3        | --                                     | 11                                                                                                                                                          | 13    | 10   | 13    | 9.6  | 13    | 9.2  | 13    |
| 95                        | North Fork Skokomish River below<br>Staircase Rapids near Hoodport<br>(12056500), 1926-73                 | NW 4 23/5             | 57.2                                   | 64                                                                                                                                                          | 6     | 45   | 7     | 37   | 9     | 31   | 10    |
| 96                        | North Fork Skokomish River near<br>Hoodport (12057500), 1914-25                                           | NW, SW 5 23/4         | 93.7                                   | 120                                                                                                                                                         | 8     | 100  | 8     | 91   | 9     | 85   | 10    |
| 96                        | North Fork Skokomish River near<br>Hoodport (12057500), 1914-25                                           | NW, SW 5 22/4         | 93.7                                   | 99                                                                                                                                                          | 18    | 38   | 37    | 19   | 56    | 10   | 77    |
| 97                        | Deer Meadow Creek near Hoodport<br>(12058000), 1954-73 <sup>6</sup>                                       | NW, NW 8 22/4         | 1.83                                   | .5                                                                                                                                                          | 9     | .4   | 11    | .3   | 13    | .3   | 15    |
| 98                        | North Fork Skokomish River near<br>Potlatch (12059500), 1945-73 <sup>7</sup>                              | NE, NW 7 21/4         | 117                                    | 7.3                                                                                                                                                         | 7     | 4.9  | 12    | 3.8  | 17    | 3.0  | 22    |
| 99                        | South Fork Skokomish River near<br>Potlatch (12060000), 1925-64                                           | NE, NW 22 22/5        | 63.4                                   | 81                                                                                                                                                          | 5     | 64   | 8     | 55   | 10    | 48   | 12    |
| 100                       | South Fork Skokomish River near<br>Union (12060500), 1933-73                                              | SW, NE 2 21/5         | 76.3                                   | 88                                                                                                                                                          | 3     | 76   | 3     | 71   | 4     | 67   | 4     |
| 101                       | Vance Creek, 1955-57                                                                                      | SE, SE 4 21/5         | 15.6                                   | 19                                                                                                                                                          | 37    | 17   | 37    | 16   | 37    | 16   | 37    |
| 102                       | Vance Creek, 1951                                                                                         | SW, NW 18 21/4        | --                                     | 10                                                                                                                                                          | 17    | 9.3  | 20    | 8.9  | 22    | 8.6  | 24    |
| 103                       | Skokomish River near Potlatch<br>(12061500), 1945-73 <sup>8</sup>                                         | SE, NW 15 21/4        | 227                                    | 180                                                                                                                                                         | 3     | 160  | 3     | 150  | 3     | 140  | 4     |
| 104                       | Purdy Creek, 1956-60                                                                                      | NW, NW 22 21/4        | 1.43                                   | 10                                                                                                                                                          | 26    | 9.2  | 28    | 8.8  | 30    | 8.4  | 31    |
| 105                       | Shumocher Creek, 1951-52                                                                                  | SW 7 21/2             | 12.2                                   | 5.9                                                                                                                                                         | 19    | 5.5  | 21    | 5.3  | 22    | 5.2  | 23    |
| 106                       | Sherwood Creek, 1951                                                                                      | SE, NE 34 22/2        | --                                     | .1                                                                                                                                                          | 120   | .1   | 120   | .1   | 120   | .1   | 120   |
| 107                       | Sherwood Creek, 1943, 51                                                                                  | SE, SE 20 22/1        | --                                     | 9.2                                                                                                                                                         | 22    | 8.1  | 22    | 7.6  | 22    | 7.3  | 22    |
| 108                       | Campbell Creek, 1943, 51                                                                                  | SW, NW 13 20/3        | --                                     | .6                                                                                                                                                          | 26    | .5   | 26    | .4   | 26    | .4   | 26    |
| 109                       | Goldsborough Creek near Shelton<br>(12076500), 1953-71                                                    | NW, NW 22 20/4        | 39.3                                   | 21                                                                                                                                                          | 3     | 19   | 3     | 18   | 4     | 17   | 5     |
| 110                       | Goldsborough Creek, 1943, 51                                                                              | SE, NW 19 20/3        | 44.8                                   | 6.1                                                                                                                                                         | 22    | 5.2  | 27    | 4.9  | 30    | 4.5  | 32    |
| 111                       | Mill Creek, 1943, 51                                                                                      | SE, NE 30 20/3        | 19.5                                   | 13                                                                                                                                                          | 6     | 12   | 6     | 11   | 6     | 11   | 7     |

TABLE 3.--7-day low-flow-frequency data for all sites--Continued

| Site no.<br>on<br>plate 1 | Name of stream or streamflow station,<br>station number (in parenthesis) and<br>period of low-flow record | Location <sup>1</sup> | Drainage<br>area<br>(mi <sup>2</sup> ) | Magnitude (ft <sup>3</sup> /s) and standard error of estimate (percent) of 7-day low flows for indicated probabilities of nonexceedance, in percent |    |     |    |            |            |            |            |
|---------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|----|------------|------------|------------|------------|
|                           |                                                                                                           |                       |                                        | 50                                                                                                                                                  | 20 | 10  | 5  | Flow Error | Flow Error | Flow Error | Flow Error |
| 112                       | Skookum Creek, 1953-58                                                                                    | SW,NW 19 19/3         | 17.2                                   | 1.8                                                                                                                                                 | 16 | 1.6 | 18 | 1.5        | 19         | 1.4        | 20         |
| 113                       | Kennedy Creek near Kamilche<br>(12078400), 1961-71 <sup>9</sup>                                           | SW,NE 1 18/4          | 17.4                                   | 2.7                                                                                                                                                 | 7  | 2.2 | 9  | 2.0        | 11         | 1.8        | 12         |
| 114                       | McLane Creek, 1951                                                                                        | NW,SW 19 18/2         | --                                     | 2.0                                                                                                                                                 | 12 | 1.8 | 14 | 1.7        | 16         | 1.6        | 17         |

<sup>1</sup>The locations are abbreviated. For example, the complete location for site 2 is Southwest  $\frac{1}{4}$ , Northeast  $\frac{1}{4}$ , Section 25, Township 23 North (all are north), Range 10 West (all are west).

<sup>2</sup>Flow affected by natural storage in Quinault Lake.

<sup>3</sup>Occasional slight regulation from flash dam.

<sup>4</sup>Water diverted through Glines Canyon powerhouse and returned to river upstream from station. Flow partly regulated by Lake Mills 4.9 miles upstream.

<sup>5</sup>Flow regulated at Lake Cushman since October 1925 for power by city of Tacoma.

<sup>6</sup>Nearly all of the flow of McTaggart Creek is included.

<sup>7</sup>Entire flow of river normally diverted at Cushman Dam No. 2 to supply power plant which discharges into Hood Canal. Main flow of McTaggart Creek is diverted through Deer Meadow Creek into Cushman Reservoir No. 2 and may bypass this station. Flow regulated by Lake Cushman and by pondage in Cushman Reservoir No. 2 from which spill and releases are infrequent.

<sup>8</sup>Flow partly regulated at Lake Cushman and Cushman Reservoir No. 2. See footnote 7.

<sup>9</sup>Slight regulation from fishway at Summit Lake 5.5 miles upstream.

<sup>a</sup>Low flow estimated to be greater than zero but less than or equal to 0.05 ft<sup>3</sup>/s.

## SUMMARY AND CONCLUSIONS

The seasonal distribution of streamflow, as shown by the data from long-term stations, follows three patterns. Streamflow from lowland basins is distributed seasonally similar to the distribution of precipitation, with peak flows in winter and low flows in summer. Distribution of streamflow from the higher elevation mountain basins depends on the percentage of precipitation stored as snow and the timing of the snowmelt periods. Discharge of these mountain streams peaks both in winter and spring, with the lowest discharge occurring in late summer-early fall. The low-flow data from long-term stations indicate no long-term trend in low flow but do suggest that low flows generally were lower in the relatively dry 1940's than in the relatively wet period from about 1950 to 1973.

Low flows at 116 stations were estimated either from correlation of data from a short-term station with data from an appropriate long-term station, or from frequency analyses of low flows at long-term stations. Water users may use these data to estimate the availability of water in streams on the Olympic Peninsula during critical periods of low flow.

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