Prepared as part of the Alaska Water Resources Evaluation
in cooperation with
ALASKA DEPARTMENT OF NATURAL RESOURCES,
DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS



# SURFACE WATER

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Runoff -- Runoff is that portion of precipitation that leaves an area as streamflow. Average annual runoff in the Copper River basin ranges from less than 5 in. in the lowland areas to more than 54 in. in the high mountain areas (fig. 8). Annual runoff for the entire basin above Chitina averages 24.8 in., or 37,680 $ft^3/s$. The runoff values and pattern shown on the map are based on measured and estimated streamflow and on other factors such as estimated evapotranspiration and area-altitude runoff calculations. The map is intended only to delineate the general areal distribution of runoff from the basin and should not be used to estimate the flow of any specific stream.

Stream Types -- The streams draining the Copper River basin can be classified into two general types: nonglacial streams, which drain lowland and low-altitude mountain areas, and glacial streams, which drain the high-altitude mountains.

Streams in the Copper River Lowland areas (fig. 2), have a relatively low gradient and derive their flow from snowmelt and rain. Streamflow is low from September through March, but with the increased solar radiation and warmer temperatures of April and May, flow reaches a peak. This peak results mainly from melting of snow and channel ice. A general recession in flow then takes place during June, July, and August. About 75 percent of the total annual flow occurs during the open-water period, May through September. Squirrel Creek (fig. 9) northwest of Tonsina is an example of a lowland stream.

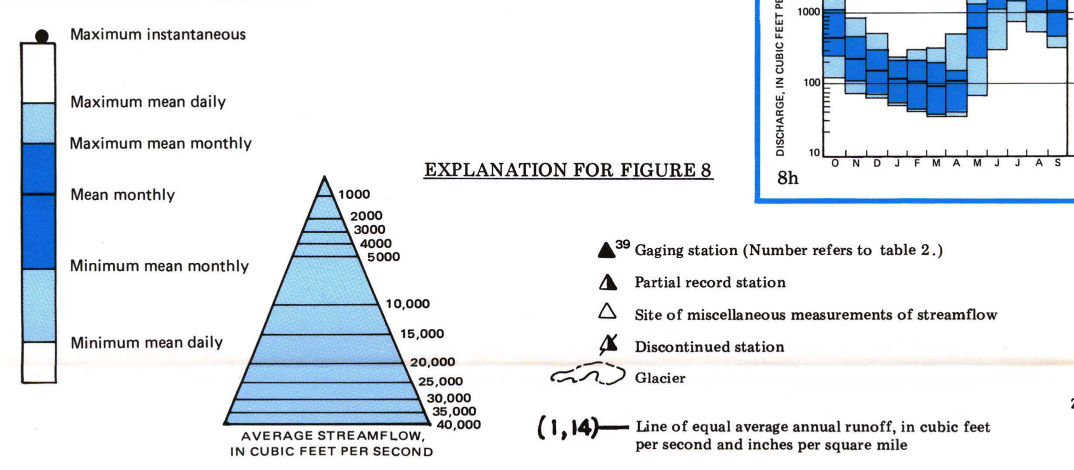
Low-altitude mountain streams are nonglacial, as their drainage basins lie along the mountain flanks at altitudes too low for glaciers to exist. The Little Tonsina River (fig. 9) typifies such streams. Flow of the Little Tonsina increases due to snowmelt from late April through June and then declines during July, August, and September. About 80 percent of the total annual flow takes place between May and September, the open-water period.

High-altitude mountain streams (glacial) exhibit the greatest seasonal variability of flow. About 88 percent of their total annual flow takes place during the approximately 5-month open-water period (May through September). High flows usually occur in July (fig. 9) when the highest seasonal temperatures cause maximum melting of glacier ice and snow.

The production of meltwater from a glaciated basin appears to be closely related to annual precipitation. This relation can be seen by comparing the cumulative departure of average annual flow of glacier-fed Tonsina River (fig. 10) to the departure curve of precipitation for the same period (fig. 4).

In the use and management of water, seasonal streamflow variation is of more concern than long-term variation. Streams throughout the basin experience high flows during the spring and summer and low flows during fall and winter. The seasonal and annual variability of streamflow is illustrated in figures 8a-8i. In general, streamflow in the basin shows the greatest variability in mean annual discharge for nonglacial streams and the least in streams affected by glacial meltwater. Glaciers tend to reduce the variation in annual discharge because they release water from ice and firn storage in dry, warm years and store water as snow and firn during cool, wet years. However, during the relatively dry years of 1969-70 even glacial streams experienced the lowest annual average discharge in the period of record (figs. 8e, 8f, 8h, and 8i).

A typical hydrograph of nonglacial streams, such as the Gulkana River (fig. 11), shows sharp May rises during the spring snowmelt, a general recession during the summer months, and a slight increase in streamflow during the early fall rainy period. In contrast, high flow on glacial streams, such as the Tonsina River, coincides with the peak melting of snow and ice in June, July, and August (fig. 11). Rainfall during these same months may produce even higher discharge when the rivers are already high from glacial runoff.



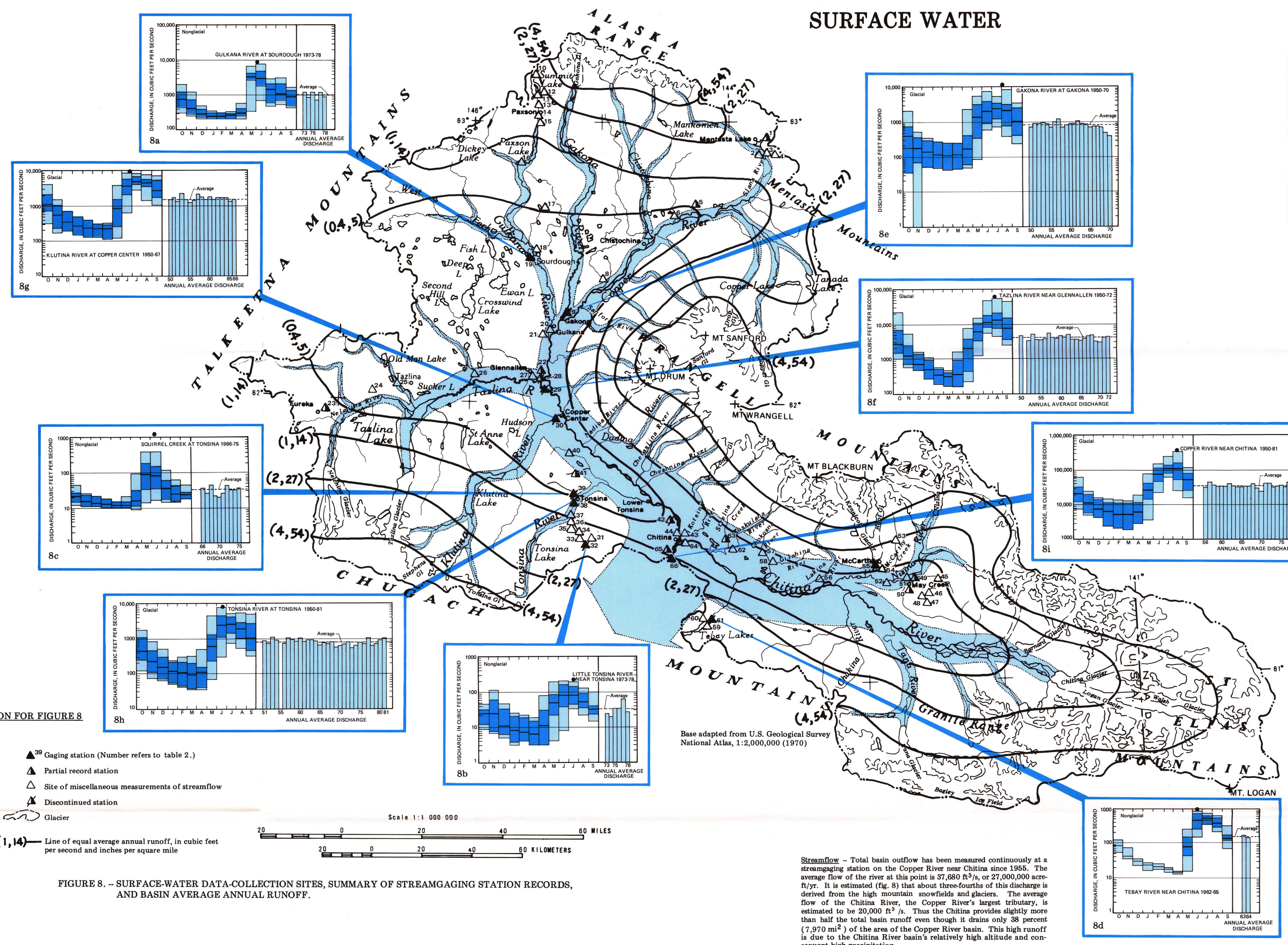




FIGURE 8. -- SURFACE-WATER DATA-COLLECTION SITES, SUMMARY OF STREAMGAGING STATION RECORDS, AND BASIN AVERAGE ANNUAL RUNOFF.

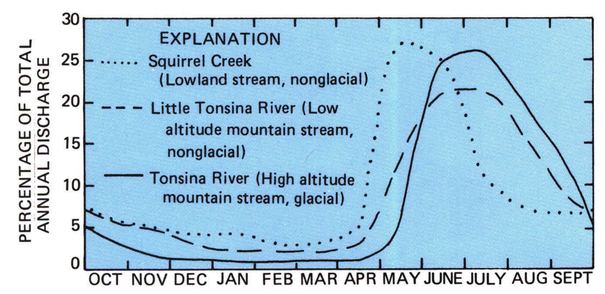



FIGURE 9. -- MEAN MONTHLY DISTRIBUTION OF DISCHARGE OF THREE STREAMS.

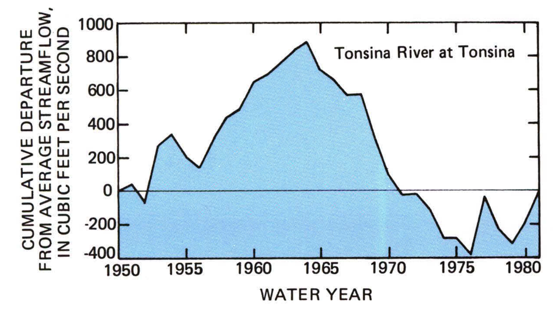



FIGURE 10. -- CUMULATIVE DEPARTURE FROM AVERAGE STREAMFLOW, TONSINA RIVER AT TONSINA.

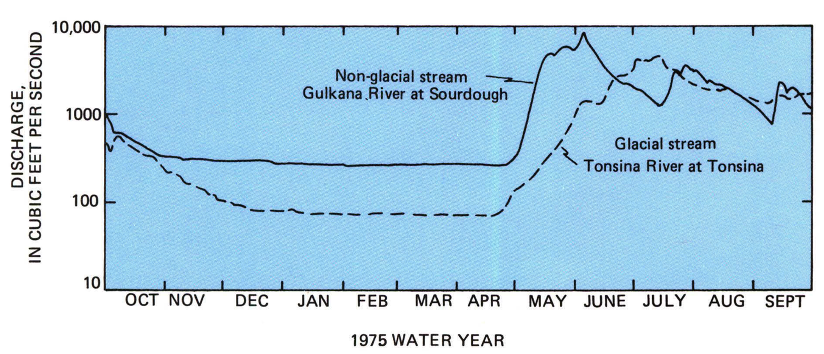



FIGURE 11. -- COMPARISON OF MEAN DAILY DISCHARGE OF A GLACIAL VS. NON-GLACIAL STREAM.

TABLE 2. -- SUMMARY OF SURFACE-WATER GAGING STATIONS (G), PARTIAL-RECORD STATIONS (P), AND SITES OF MISCELLANEOUS MEASUREMENTS OF STREAMFLOW (M)

[e - estimated; b - minimum measured discharge; g - glacier-dammed lake breakout; I - intermittent; D - daily]

| Map No. (See fig. 8) | Station No. | Stream | Drainage area (mi²) | Period of record water years | Average discharge (ft³/s) | Runoff (in/yr) | Maximum observed discharge Date | Discharge in (ft³/s) | Discharge in (ft³/s)/mi² | Minimum observed discharge Date | Discharge in (ft³/s) | Discharge in (ft³/s)/mi² | Chemical | Temperature | Sediment | Biological |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15198500 | Station Creek near Mentasta | 15.3 | P1970-81 | -- | -- | July 1977 | 309 | 20.2 | -- | -- | -- | I | I | -- | -- |
| 2 | | Slana River | 333 | M1970-81 | e500 | e20 | Aug. 11, 1971 | 3,790 | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | | Slana Slough | -- | M1970-81 | -- | -- | Aug. 11, 1971 | 1,650 | -- | -- | -- | -- | -- | -- | -- | -- |
| 4 | | Mabel Creek | -- | M1970-81 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 5 | 15199000 | Copper River Tributary near Slana | 4.32 | P1963-81 | -- | -- | June 1980 | 205 | 47.5 | -- | -- | -- | I | I | -- | -- |
| 6 | | Indian Creek near Chistochina | 113 | M1963, 1964 | e80 | e10 | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 7 | | Chistochina River near Chistochina | 610 | M1948, 1951, 1952, 1971 | e830 | e18 | Aug. 1971 | e40,000 | 65.6 | -- | -- | -- | I | I | -- | -- |
| 8 | | Tulsona Creek near Gakona | 91.9 | M1974, 1977-82 | e60 | e9 | -- | -- | -- | Mar. 30, 1982 July 28, 1982 | 38 | 0.41 | I | I | -- | -- |
| 9 | 15200000 | Gakona River at Gakona | 620 | G1948, 1949-70, P1971-74 | 866 | 19 | Aug. 10, 1971 | 10,500 | 16.9 | Mar. 25, 1953 | No flow | -- | D | D | I | I |
| 10 | 15200160 | Gunn Creek near Paxson | 49.6 | M1973, 1974 | e150 | e40 | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 11 | 15200165 | Gulkana River near Paxson | 75.2 | M1973, 1974 | e200 | e37 | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 12 | 15200170 | Fish Creek near Paxson | 9.69 | M1972-74 | e20 | e29 | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 13 | 15200190 | Gulkana River near Paxson | -- | M1973, 1974 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 14 | 15200200 | Gulkana River near Paxson | -- | M1970, 1974 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 15 | 15200210 | Onemile Creek near Paxson | 9.45 | M1973, 1974 | e14 | e20 | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 16 | 15200220 | Gulkana River near Paxson | -- | M1974 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 17 | 15200260 | Haggard Creek near Sourdough | 13.6 | M1973, 1974 | e7 | e7 | -- | -- | -- | -- | -- | -- | I | I | -- | I |
| 18 | 15200270 | Sourdough Creek at Sourdough | 68.0 | M1970-77 | e18 | e4 | May 1972 | 1,270 | 18.7 | Mar. 29, 1982 | 0.011 | 0.00016 | I | I | -- | I |
| 19 | 15200280 | Gulkana River at Sourdough | 1,770 | G1973-78 | 1,063 | 8.17 | June 2, 1977 | 9,170 | 5.18 | Dec. 6, 1973-Apr. 12, 1974 | 200 | 0.11 | I | D | I | I |
| 20 | 15200400 | Gulkana River at Gulkana | 1,970 | M1948, 1949, 1954, 1957, 1959, 1960-62, 1965, 1970, 1971 | e1,200 | e8 | June 3, 1964 | 16,300 | 8.27 | Mar. 15, 1971 | b130 | 0.066 | I | I | I | I |
| 21 | 15200500 | Bear Creek near Gulkana | 3.67 | M1973, 1974 | e2 | e7 | -- | -- | -- | Apr. 15, 1974 | b0.29 | 0.079 | I | I | -- | I |
| 22 | 15201000 | Dry Creek near Glennallen | 11.4 | P1963-81 | e3 | e4 | May 12, 1972 | 546 | 47.9 | Many days | No flow | -- | I | I | -- | I |
| 23 | 15201100 | Little Nelchina River Tributary near Eureka | 7.81 | P1965-81 | e2 | e4 | May 29, 1977 | 127 | 16.3 | -- | -- | -- | I | I | -- | -- |
| 24 | | Cache Creek near Eureka | -- | M1970 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 25 | | Mendeltna Creek near Glennallen | 196 | M1970, 1972-76, 1982 | e100 | e7 | -- | -- | -- | Mar. 29, 1982 | 76.8 | 0.39 | I | I | -- | -- |
| 26 | | Tolsona Creek near Glennallen | 180 | M1948, 1982 | e60 | e5 | -- | -- | -- | Mar. 30, 1982 | No flow | -- | I | I | -- | -- |
| 27 | 15201895 | Moose Creek at Glennallen | 177 | M1948, 1973, 1974, 1982 | e70 | e5 | -- | -- | -- | Apr. 15, 1974 | No flow | -- | I | I | -- | I |
| 28 | 15201900 | Moose Creek Tributary at Glennallen | 7.11 | P1963-76 | e3 | e5 | May 12, 1972 | 250 | 35.2 | Many days | No flow | -- | I | I | -- | -- |
| 29 | 15202000 | Tazlina River near Glennallen | 2,670 | G1949-50, 1951, 1952-72 | 4,085 | 20.8 | Aug. 14, 1962 | g60,700 | -- | -- | -- | -- | I | I | I | I |
| 30 | 15206000 | Klutina River at Copper Center | 880 | G1913, 1949-67, P1970 | 1,686 | 26.0 | June 29, 1953 | 9,040 | 10.3 | Apr. 1955 | 110 | 0.12 | D | D | I | I |
| 31 | | Little Tonsina River | -- | M1975 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 32 | 15207800 | Little Tonsina River near Tonsina | 22.7 | M1970-71, G1972-78 | 33.8 | 20.2 | July 20, 1977 | 214 | 9.43 | Mar. 6-Apr. 26, 1974; Jan. 6-10, 1975 | 3.0 | 0.13 | I | D | I | I |
| 33 | | Little Tonsina River | -- | M1975 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 34 | | Little Tonsina River | -- | M1975 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 35 | | Little Tonsina River | -- | M1975 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 36 | | Little Tonsina River | -- | M1971, 1975 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 37 | | Little Tonsina River | -- | M1972 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 38 | 15208000 | Tonsina River at Tonsina | 420 | G1950-81 | 844 | 27.3 | June 17, 1962 | 8,490 | 20.2 | Mar. 11-Apr. 20, 1974 | 35 | 0.083 | D | D | I | I |
| 39 | 15208100 | Squirrel Creek at Tonsina | 70.5 | P1964-65, 1976-77, G1965-75 | 30.9 | 5.95 | June 1964 | 1,200 | 17.0 | Apr. 1-10, 1967 | 9.0 | 0.13 | I | I | I | I |
| 40 | 15208180 | Willow Creek near Copper Center | 46.6 | M1972, 1973 | e20 | e6 | -- | -- | -- | Apr. 5, 1973 | No flow | -- | I | I | -- | I |
| 41 | 15208200 | Rock Creek near Tonsina | 14.3 | P1966-81 | e6 | e6 | May 29, 1977 | 163 | 11.4 | Many days | No flow | -- | I | I | -- | I |
| 42 | 15208500 | Fivemile Creek near Chitina | 13.2 | P1963-68 | e8 | e8 | June 1965 | 412 | 31.2 | -- | -- | -- | -- | -- | -- | -- |
| 43 | | Kotsina River | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 44 | | Copper River above Chitina River | 12,630 | M1960-65, 1982 | 18,000 | e19 | -- | -- | -- | Mar. 7, 1960 | 2,010 | 0.16 | -- | -- | -- | -- |
| 45 | | Dan Creek | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 46 | | White Creek | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 47 | | Rex Creek | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 48 | | Chititu Creek | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 49 | 15209000 | Chititu Creek near May Creek | 30.9 | P1973-81 | e32 | e14 | Aug. 7, 1981 | 970 | 31.4 | -- | -- | -- | I | I | -- | -- |
| 50 | 15209100 | May Creek near May Creek | 10.4 | P1973-81 | e2 | e3 | Aug. 7, 1981 | 168 | 16.2 | -- | -- | -- | I | I | -- | -- |
| 51 | | May Creek | -- | M1973 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 52 | | Nizina River | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 53 | | McCarthy Creek | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 54 | | McCarthy Creek | 75.7 | M1975 | -- | -- | July 1, 1975 | 2,080 | 27.5 | -- | -- | -- | -- | -- | -- | -- |
| 55 | 15210000 | McCarthy Creek | 78.7 | G1913 | -- | -- | June 24, 1913 | 876 | 11.1 | -- | -- | -- | I | I | -- | -- |
| 56 | | Lakina River | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 57 | | Gilahina River | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 58 | | Chokosna River | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 59 | | Tebay River | -- | M1950 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 60 | | Tebay River Tributary | -- | M1950 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 61 | 15211500 | Tebay River near Chitina | 55.4 | G1962-65 | 164 | 40.3 | June 9, 1964 | 946 | 17.1 | Apr. 27, 1963 | b13.4 | 0.24 | I | I | -- | -- |
| 62 | | Kuskulana River | -- | M1913 | -- | -- | -- | -- | -- | -- | -- | -- | I | I | -- | -- |
| 63 | 15211700 | Strelna Creek near Chitina | 23.8 | M1913, P1971-81 | e30 | e17 | June 30, 1977 | 345 | 14.5 | -- | -- | -- | I | I | -- | -- |
| 64 | | Chitina River at mouth | 7,970 | M1960-65, 1982 | e20,000 | e34 | -- | -- | -- | Mar. 17, 1963 | 1,200 | 0.15 | I | I | -- | -- |
| 65 | 15211900 | O'Brien Creek near Chitina | 44.8 | P1970-81 | e58 | e18 | Aug. 7, 1981 | 1,940 | 43.3 | Apr. 23, 1976 | 4.0 | 0.089 | I | I | -- | -- |
| 66 | 15212000 | Copper River near Chitina | 20,600 | G1950, 1953, 1955-81 | 37,680 | 24.8 | Aug. 8, 1981 | 380,000 | 18.4 | Mar. 1-31, 1956 | 2,000 | 0.10 | D | D | D | I |

Streamflow -- Total basin outflow has been measured continuously at a streamgaging station on the Copper River near Chitina since 1955. The average flow of the river at this point is 37,680 $ft^3/s$, or 27,000,000 acre-ft/yr. It is estimated (fig. 8) that about three-fourths of this discharge is derived from the high mountain snowfields and glaciers. The average flow of the Chitina River, the Copper River's largest tributary, is estimated to be 20,000 $ft^3/s$. Thus the Chitina provides slightly more than half the total basin runoff even though it drains only 38 percent (7,970 $mi^2$) of the area of the Copper River basin. This high runoff is due to the Chitina River basin's relatively high altitude and consequent high precipitation.

Streamflow data have been collected at 10 continuous-recording gaging stations, 10 partial-record stations and 46 miscellaneous measurement sites in the Copper River basin (fig. 8). Information regarding these stations and sites -- such as period of record, drainage area, and streamflow characteristics -- is given on table 2.

The mean annual discharge of ungaged streams in the basin can be estimated using a regression analysis equation developed by Scully and Freethey (1980). The equation is based on data from nearby gaged streams and values for basin characteristics such as drainage area and precipitation. Scully and Freethey concluded that estimates of mean annual discharge of glacial streams and large nonglacial streams (drainage areas greater than 100 $mi^2$) are reliable. However, similarly derived estimates for small nonglacial streams are not reliable.

Flow Duration -- Flow-duration curves are commonly used as a means of expressing the variability of streamflow. The curves show frequency distribution of average daily flows for the period of record and the percent of time any flow is equaled or exceeded. The variability of daily flows is shown for glacial (fig. 12) and nonglacial (fig. 13) streams. Various factors affect flow duration, including melting of snow and glacier ice, glacial outburst flooding, climate, geology, and ground-water inflow.

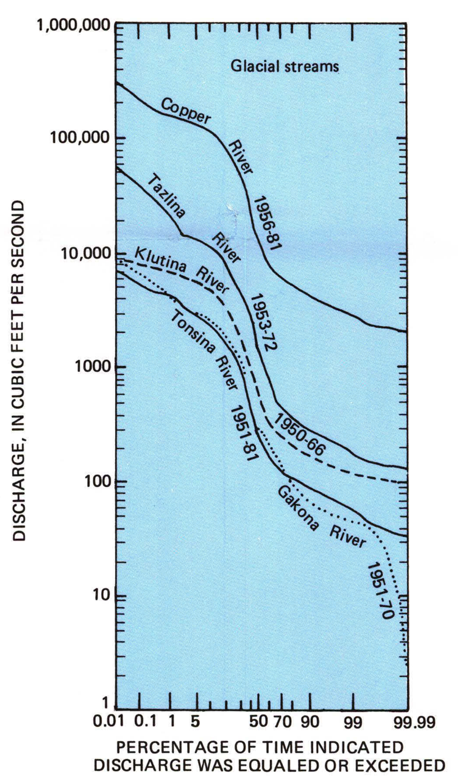



FIGURE 12. -- FLOW-DURATION CURVES FOR FIVE GLACIAL STREAMS.

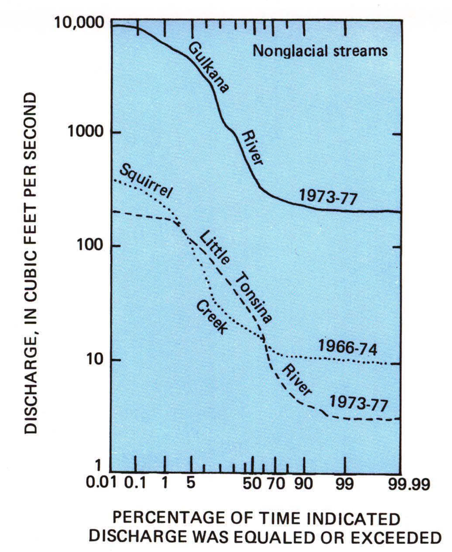



FIGURE 13. -- FLOW-DURATION CURVES FOR THREE NONGLACIAL STREAMS.

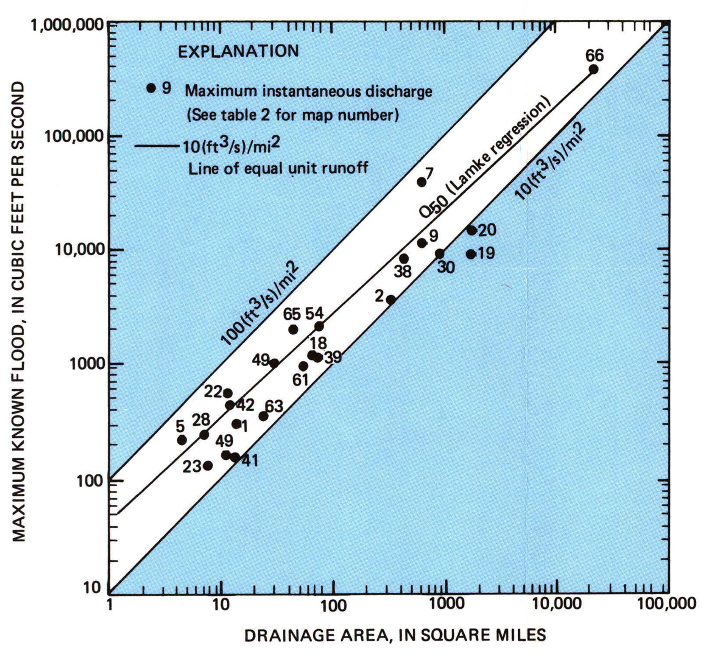



FIGURE 14. -- RELATION BETWEEN MAXIMUM DISCHARGE AND DRAINAGE AREA.

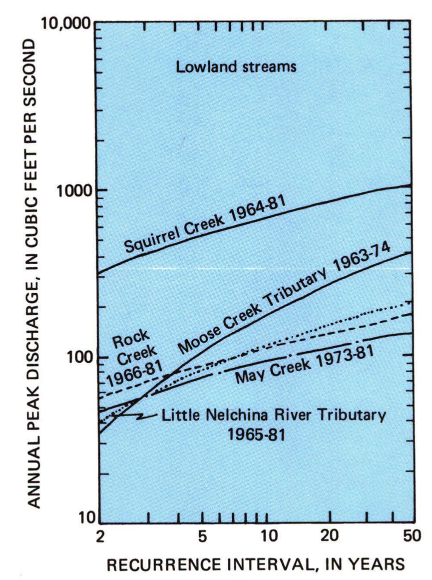



FIGURE 15. -- FLOOD MAGNITUDE AND FREQUENCY FOR SELECTED LOWLAND STREAMS.

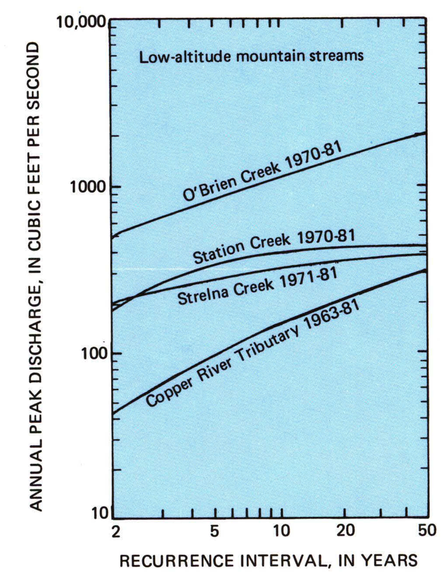



FIGURE 16. -- FLOOD MAGNITUDE AND FREQUENCY FOR SELECTED LOW-ALTITUDE MOUNTAIN STREAMS.

Floods -- Floods on glacial streams coincide with the peak rates of melting of ice and snow in June and July and the rainstorms of late summer and fall. Floods on nonglacial streams in the Copper River Lowland and Gulkana Upland result primarily from snowmelt in the spring and stream overflow in frozen and ice-jammed channels.

The relation of maximum discharge to drainage area for 23 selected streams in the Copper River basin is shown in figure 14. For comparison purposes, a line corresponding to the flood-frequency regression equation of Lamke (1979), is also drawn on the graph. Maximum observed instantaneous runoff rates range from 5 $(ft^3/s)/mi^2$ for lowland drainages to 66 $(ft^3/s)/mi^2$ for mountain basins (table 2).

The peak discharges for recurrence intervals from 2 to 50 years for representative lowland, low-altitude mountains, and high-altitude mountains streams are shown in figures 15, 16, and 17. Recurrence interval is the average period of time (in years) within which a flood of specified magnitude will be equaled or exceeded once. For a given recurrence interval, the probability of a flood of specified magnitude occurring in any one year can be estimated. For example, if the recurrence interval of a flood of specified magnitude is 25 years ($Q_{25}$), the probability that such a flood will occur in any one year is 4 percent (1 chance in 25). For ungaged streams in the study area, the flood discharges for selected recurrence intervals can be estimated using regional flood-flow regression methods given by Lamke (1979).

Comparison of such estimates for a peak discharge that has an average recurrence interval of 50 years ($Q_{50}$) with the $Q_{50}$ calculated from gaging station records is shown in figure 18. The stations used in the analyses were those for which 10 or more years of gaging station data were available. The analysis and results graph (such as figure 18) indicate that the regression method provides reliable estimates for flood flows only for basins larger than 50 $mi^2$.

In addition to runoff from rainfall and "normal" melting of snow and ice, several other events or phenomena may lead to flooding in the Copper River basin. These include stream overflow icings (aufeis) and backwater from ice jams, and release of water temporarily dammed by snow or debris slides. Also, of particular concern, are outburst floods associated with glacier-dammed lakes and (or) rapid subglacial melting by volcanic heat (Post and Mayo, 1971). Mt. Wrangell, a glacier-clad volcano, has shown a major increase in heat flux at its summit during the last decade (Benson and Motyka, 1979). Therefore, it appears that the potential for outburst flooding from subglacial thermal activity does exist. This type of flooding has occurred in other areas of the world, including the State of Washington and Iceland. The areas subject to flooding from glacier-dammed lakes and the effects of subglacial thermal activity are shown in figure 19.

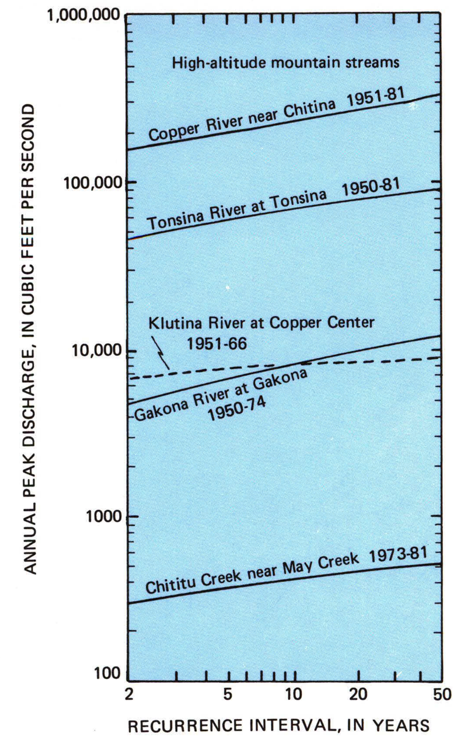



FIGURE 17. -- FLOOD MAGNITUDE AND FREQUENCY FOR SELECTED HIGH-ALTITUDE MOUNTAIN STREAMS.

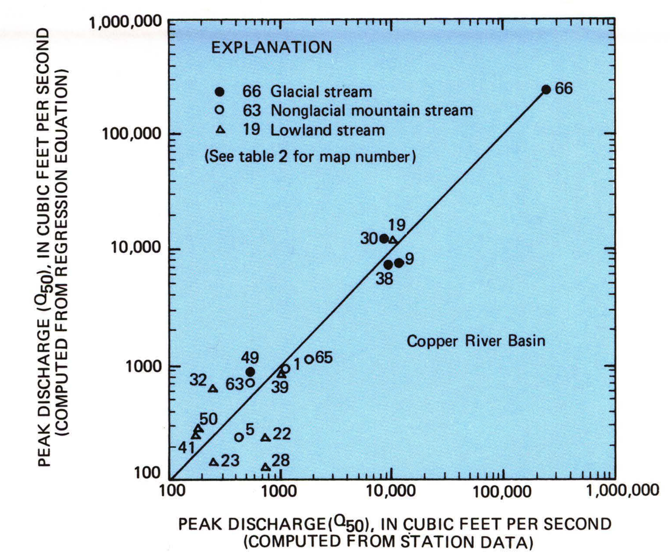



FIGURE 18. -- RELIABILITY OF ESTIMATED Q50 FROM REGRESSION METHOD AT GAGING STATIONS AND PARTIAL-RECORD STATIONS.

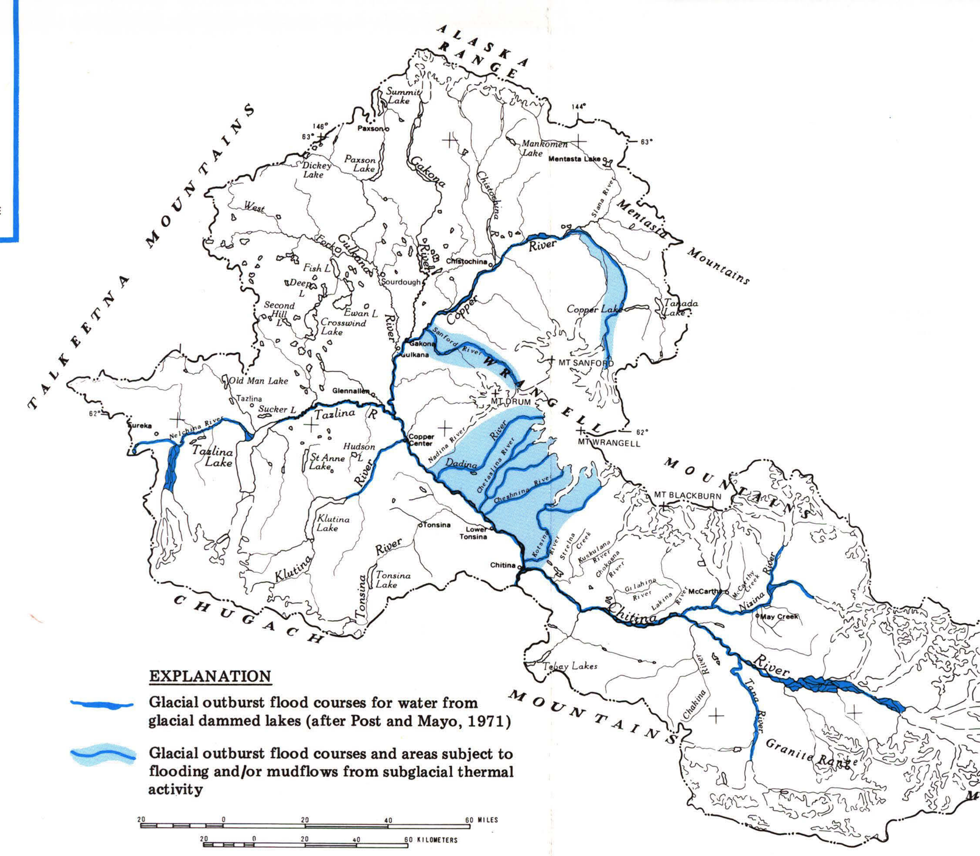



FIGURE 19. -- AREAS SUBJECT TO FLOODING FROM GLACIAL OUTBURSTS.

Low Flow -- Flow in lowland streams is at its minimum during periods of ice cover in late winter (March or April) or during periods of low precipitation in July, August, or September. However, minimum flow in both low-altitude and high-altitude mountain streams occurs during periods of late winter ice cover (March or April). Minimum measured flows of representative streams are listed in table 2. Methods given in Riggs (1972) were used to calculate low-flow frequency characteristics at selected gaging stations and to estimate low-flow characteristics at partial-record stations and miscellaneous measurement sites (table 3). The low-flow analyses were made on a water year basis (October 1 through September 30). Low-flow characteristics for gaging stations with less than 10 years of record and for partial-record stations were estimated by correlation with continuous-record gaging stations for which 10 or more years of record were available.

Accurate estimates of low-flow characteristics at ungaged sites usually cannot be made because low flows are highly dependent on stream-aquifer relationships and on the effects of ice. Acceptable estimates of low-flow characteristics at ungaged sites are possible if a few discharge measurements of base flow are made during successive winter low-flow periods (Riggs, 1973).

TABLE 3. -- ESTIMATES OF MINIMUM DISCHARGE CHARACTERISTICS

[NF indicates no flow; data through 1981 water year]

| Map No. (fig. 8) | Station No. | Station name | Drainage area (mi²) | 7 consecutive days, recurrence interval, in years: 2 | 10 | 20 | 30 consecutive days, recurrence interval, in years: 2 | 10 | 20 |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 15200000 | Gakona River | 620 | 82 | 34 | 27 | 82 | 45 | 39 |
| 18 | 15200270 | Sourdough Creek | 68.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 19 | 15200280 | Gulkana River | 1,770 | 245 | 199 | 187 | 247 | 200 | 188 |
| 22 | 15201000 | Dry Creek | 11.4 | NF | NF | NF | NF | NF | NF |
| 23 | 15201100 | Little Nelchina River Tributary | 7.81 | NF | NF | NF | NF | NF | NF |
| 25 | | Mendeltna Creek | 196 | 28 | 24 | 22 | 28 | 24 | 22 |
| 28 | 15201900 | Moose Creek Tributary | 7.11 | NF | NF | NF | NF | NF | NF |
| 29 | 15202000 | Tazlina River | 2,670 | 266 | 197 | 179 | 277 | 206 | 188 |
| 30 | 15206000 | Klutina River | 880 | 185 | 120 | 110 | 185 | 126 | 112 |
| 32 | 15207800 | Little Tonsina River | 22.7 | 4.4 | 2.8 | 2.6 | 4.7 | 2.9 | 2.7 |
| 38 | 15208000 | Tonsina River | 420 | 84 | 57 | 50 | 86 | 58 | 52 |
| 39 | 15208100 | Squirrel Creek | 70.5 | 11 | 9.3 | 9.0 | 11 | 9.7 | 9.5 |
| 41 | 15208200 | Rock Creek | 14.3 | NF | NF | NF | NF | NF | NF |
| 44 | | Copper River above Chitina River | 12,630 | 2,800 | 1,800 | 1,600 | 2,800 | 1,800 | 1,600 |
| 50 | 15209100 | May Creek | 10.4 | NF | NF | NF | NF | NF | NF |
| 64 | | Chitina River at mouth | 7,970 | 1,800 | 1,200 | 1,100 | 1,800 | 1,200 | 1,100 |
| 65 | 15211900 | O'Brien Creek | 44.8 | 3.0 | 1.2 | 1.0 | 3.0 | 1.4 | 1.2 |
| 66 | 15212000 | Copper River at Chitina | 20,600 | 4,600 | 3,000 | 2,700 | 4,600 | 3,000 | 2,700 |

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# WATER RESOURCES OF THE COPPER RIVER BASIN, ALASKA

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1985