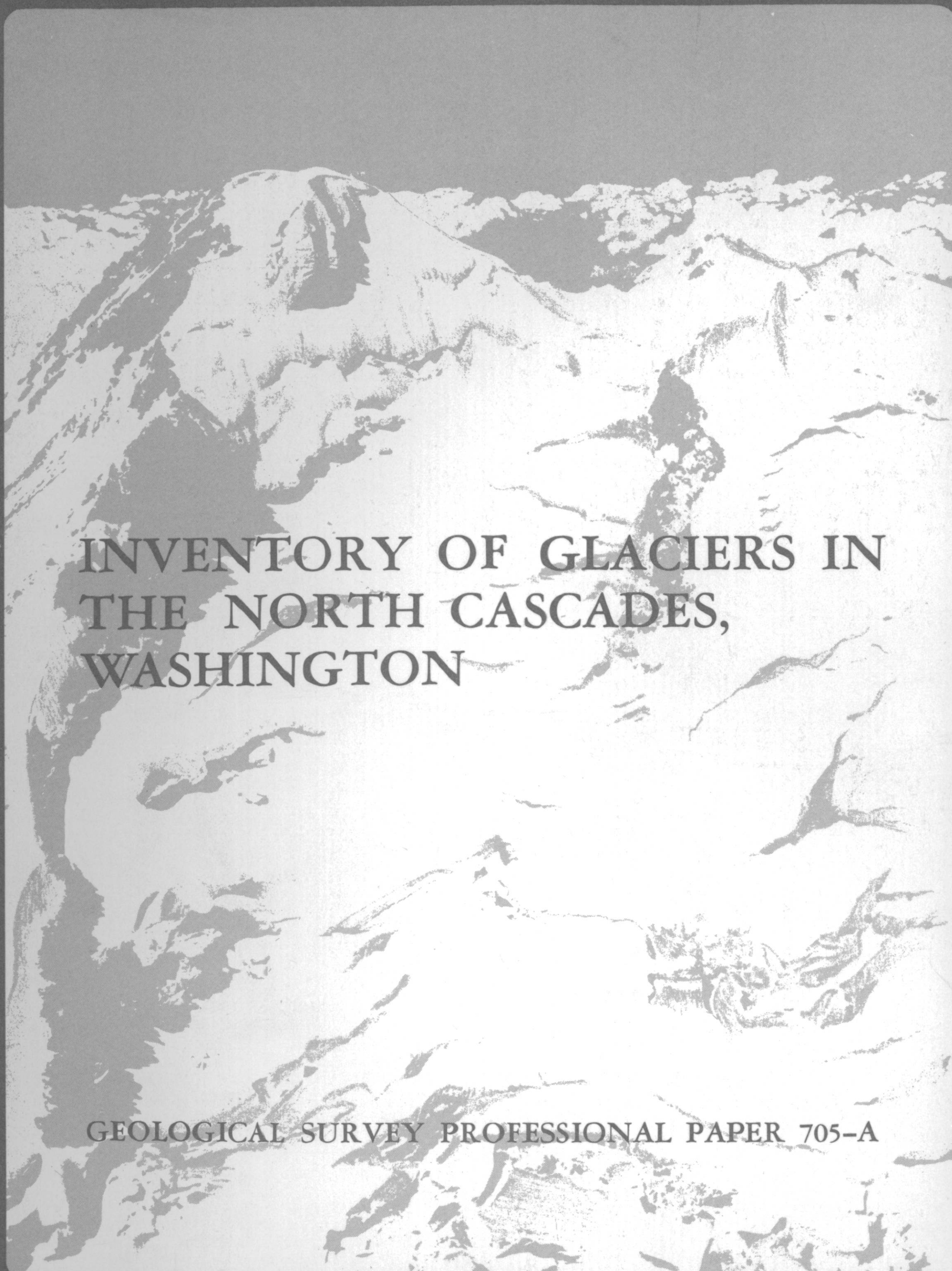
INVENTORY OF GLACIERS IN THE NORTH CASCADES, WASHINGTON



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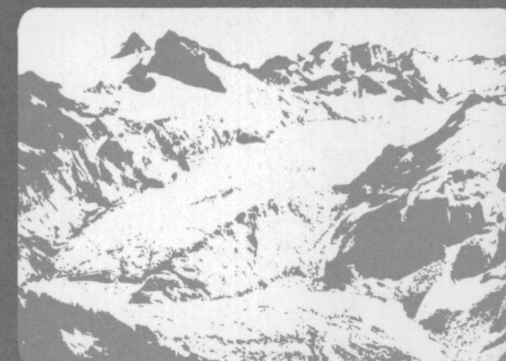

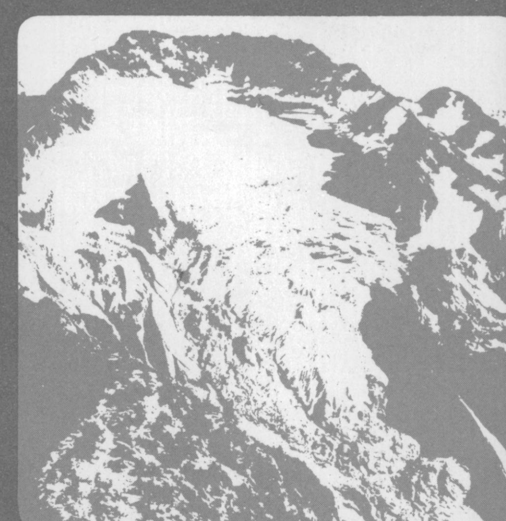

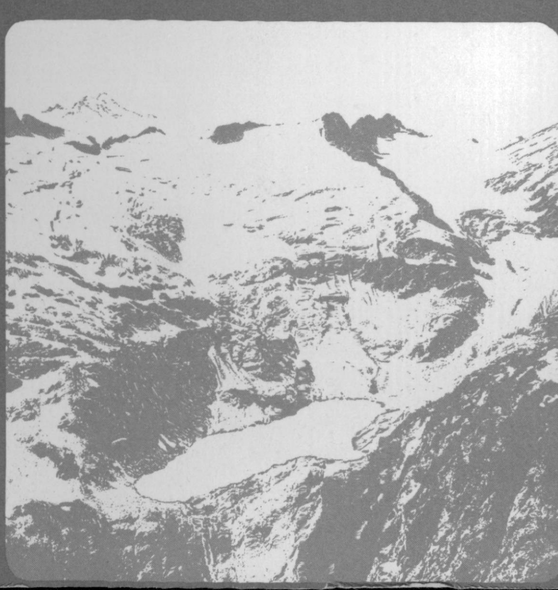

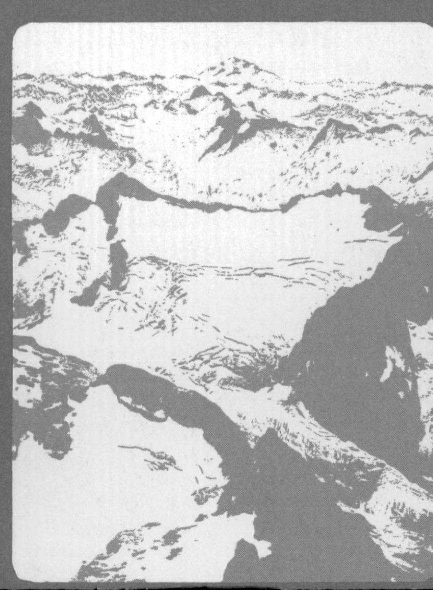

Post and others—INVENTORY OF GLACIERS IN THE NORTH CASCADES, WASHINGTON—Geological Survey Professional Paper 705–A

Inventory of Glaciers in the North Cascades, Washington

By AUSTIN POST, DON RICHARDSON,
WENDELL V. TANGBORN, and F. L. ROSSELOT

GLACIERS IN THE UNITED STATES

GEOLOGICAL SURVEY PROFESSIONAL PAPER 705-A

A contribution to the International Hydrological Decade

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INVENTORY OF GLACIERS IN THE NORTH CASCADES, WASHINGTON

By AUSTIN POST, DON RICHARDSON, WENDELL V. TANGBORN, and F. L. ROSSELOT

ABSTRACT

Perennial bodies of ice in the North Cascades having areas of at least 0.1 km^2 (square kilometer) are tabulated and classified. The inventory, a contribution to the International Hydrological Decade, includes 756 glaciers, covering 267 km^2, about half of the glacier area in the United States south of Alaska. Listings include each glacier's location, drainage basin, area, length, orientation, altitude, and classification as to form, source, surface, nature of terminus, and activity. These glaciers contribute annually about 800 million cubic meters of water to streamflow in the State of Washington.

INTRODUCTION

The first census of glaciers in this country described glaciers on the higher volcanic peaks of the Cascade Range (Russell, 1885). Russell (1897) later recognized that there also were glaciers in the nonvolcanic mountains of the North (or Northern) Cascade Range, known popularly as the North Cascades. Because of the remoteness and inaccessibility of the interior of this mountainous area, the extent of the glacier cover was not recognized for many decades. Recent attempts at a glacier census were more complete owing to aerial photographs and better maps. An inventory taken by Meier (1961) included 519 glaciers in the North Cascades, covering a total area of 252 km^2 (square kilometers).

A comprehensive inventory is now appropriate as part of a program of the International Hydrological Decade (1965–74).[1] Objectives of the IHD, outlined at the first meeting of its Coordinating Council in 1965, include a "world inventory of perennial ice and snow masses" (Resolution I–12). The world inventory is being taken under the technical direction of a working group of the International Commission of Snow and Ice of the International Association of Scientific Hydrology (IASH). This program provides a synoptic look at an estimated 80 percent (the frozen part) of the world's fresh water resources. It also provides important background data for the Permanent Service on the Fluctuations of Glaciers, recently established at Zürich, Switzerland.

This census of glaciers in the North Cascades is the first American contribution to the "world inventory of perennial ice and snow masses." It has been estimated (Meier, 1961) that 77 percent of the glacier area in the United States south of Alaska occurs in the State of Washington and that 63 percent of that glacier area is in the North Cascades. Thus, the present inventory covers about half of the glacier area in the United States south of Alaska. Later inventories will cover other glacierized areas of the country.

[1] The International Hydrological Decade (IHD) is a cooperative program of many countries working individually and collectively to advance the knowledge of water and hydrological processes. UNESCO is a coordinating agency for the IHD.

THE NORTH CASCADES SETTING

As defined by Fenneman (1931, p. 422) and others, the range comprises all the mountains between Snoqualmie Pass on the south and the Fraser River (in Canada) on the north. The North Cascades are bordered by the Puget Sound lowland on the west and the Columbia and Okanogan Rivers on the east. This report covers the glacierized American parts of the range and includes the Wenatchee Mountains west of Blewett Pass, the Entiat and Chelan Mountains, and the mountains west of the Methow and Chewack Rivers (pl. 1). This encompasses an area of about 20,000 km^2—180 km in length from north to south and 140 km in maximum width.

The North Cascades are characterized by great vertical relief (pl. 1). Most ridges and peaks, typically sharp-crested and rugged, are separated by narrow, steep-walled valleys whose floors are generally less than 1,000 m (meters) above sea level, even near their headwaters. In many valleys, relief changes of 2,000 m occur in a horizontal distance of less than 5,000 m.

Two volcanoes, Mount Baker (3,285 m) and Glacier Peak (3,213 m), stand conspicuously above the general level of the surrounding peaks, which average about 2,500 m in altitude. Of the 20 nonvolcanic peaks that are above 2,700 m, Bonanza Peak (2,899 m) is the highest. Only a few of the higher peaks are on the Cascade divide, a hydrologic boundary that divides the State of Washington into two distinct parts. In much of the North Cascades the divide is so obscure that it is difficult to recognize among the seemingly random jumble of mountain peaks.

Present-day glaciers cover the slopes of higher peaks, cling to the sides of steep ridges, or occupy high-level cirques. The floors and lower slopes of valleys are heavily forested but, at altitudes near timberline, natural alpine parks contain some of the region's most magnificent scenery. Scenic, recreational, and scientific possibilities of the region have resulted in the creation of the North Cascades National Park, Lake Chelan and Ross Lake National Recreation Areas, and the Glacier Peak and Pasayten National Wilderness areas. Large hydroelectric developments include Ross, Diablo, and Gorge Dams on the Skagit River; Lake Shannon and Baker Lake on the Baker River; and Lake Chelan. Storage dams also impound Spada, Cle Elum, Kachess, and Keechelus Lakes.

Access to the region is provided by two cross-State highways—Interstate 90, which crosses Snoqualmie Pass, and U.S. 2, which crosses Stevens Pass—and by dead-end roads leading into the larger valleys. The North Cascades Highway, now under construction, will provide access to some of the most scenic areas. Commercial boats ply Lake Chelan, and several other large lakes are accessible to float planes.

The oldest rocks of the North Cascades are a metamorphic-plutonic complex that formed before Middle Devonian time. The predominant outcrops in the range are schists and migmatites, probably pre-Jurassic in age, and intrusive rocks which date from Cretaceous and Tertiary time. The present altitude of the range is largely a result of uparching that occurred during the late Cenozoic period. The arching, with a north-south trend, was associated with displacements on normal and thrust faults. During the Pleistocene, the volcanoes of Mount Baker and Glacier Peak were superimposed on terrain grossly similar to that of today (Grant, 1969).

All the high mountains have been repeatedly sculptured by glaciation during the Pleistocene, and their present ruggedness is due largely to ice modification of a highland already maturely dissected by streams and rivers. During each major glacial episode all high peaks and ridges were accumulation areas for glaciers that descended the major stream valleys. The northern part of the area was invaded by the Cordilleran Ice Sheet which covered most of the Skagit and Methow River drainages. Most of the westward-draining valley glaciers probably joined a lobe of this ice sheet in the Puget Sound lowland during early and middle Pleistocene time (Crandell, 1965). All the larger natural lakes, such as Chelan, Wenatchee, Cle Elum, Kachess, and Keechelus, are retained by moraine dams or are in basins that were overdeepened by ice erosion.

DEFINITION OF A GLACIER

A glacier may be roughly defined as an accumulation, on land, of perennial ice that slowly flows by creep because of its own weight. An exact definition, however, is more complicated because (1) even thick accumulations of winter or seasonal snow, as well as tiny ice bodies on cliffs, exhibit flow properties, (2) perennial ice that shows no clear evidence of flow may cover large areas, (3) formerly active glaciers may stagnate and cease to show evidence of flow, and (4) perennial ice accumulations fed by avalanches from active hanging glaciers often exhibit little motion. Recognition of active-glacier ice is sometimes difficult when it is concealed by seasonal snow. Even where some moving ice is evident, defining the boundaries of individual glaciers presents problems for several of the reasons listed above.

For this study, a glacier is defined as any perennial ice that has an area of at least 0.10 km^2. Included are (1) active glaciers, (2) ice patches derived from direct snow accumulation, wind drift, or snow avalanches, without regard for evidence of glacier flow, and (3) relict ice from former active glaciers. Ice patches derived from avalanching of ice from hanging glaciers are considered to be part of the parent glacier.

PRESENT GLACIERS

There are mountain glaciers of many diverse forms in the North Cascades (pls. 2 and 3). The most common are small ice patches scattered widely throughout the range. Next most common are glaciers on steep, irregular slopes (pl. 3*A*, *B*, *C*, *D*, *F*, *G*). Many cirque glaciers (pl. 3*E*, *H*, *I*) are present; Boston Glacier (pl. 3*E*) covers 7 km^2 and is the largest single glacier of this type. McAllister, Honeycomb, and South Cascade Glaciers are small valley glaciers. Seven slope glaciers that diverge from a common ice cap on Mount Baker cover an area of

35 km². Small ice fields consisting of contiguous glaciers of various forms are around Eldorado and Dome Peaks and south of Glacier Peak. The longest glaciers in the North Cascades are the Deming (4.7 km) and Park (4.7 km) on Mount Baker and Honeycomb (4.8 km) near Glacier Peak.

COMPILATION METHOD

This report has been compiled by utilizing aerial photographs and large-scale topographic maps recently published by the Geological Survey. In areas for which these are not available, planimetric maps compiled by the U.S. Forest Service were used. The glacier boundaries were determined from vertical and oblique aerial photographs taken when little snow remained from the previous winter. Information obtained from the photographs was augmented by personal observations. The outlines of the glaciers were traced on the maps and their geographical coordinates determined (pl. 2). Each glacier was classified as to type, form, source, surface, nature of terminus, and activity, using a somewhat modified form of a standard glacier inventory guide recommended by the International Commission of Snow and Ice (UNESCO/IASH, 1970). These data were placed on computer punchcards. The tabulation scheme and computer compilation program were designed for all types of glaciers occurring in the United States; thus, not all these categories have been used in this particular study.

LIST OF GLACIERS

The resulting glacier tabulation is shown as table 1, the headings for which are explained below:

BASN gives the location in four digits, each denoting a subdivision, as follows from left to right:

First digit. The number 2 signifies the State of Washington.

Second digit. The major river basins are delineated as follows:

1 Fraser and Nooksack Rivers
2 Skagit River
3 Stillaguamish and Snohomish Rivers
4 Columbia River

Third digit. Indicates a secondary river basin.

Fourth digit. Indicates a tertiary drainage basin of one or more smaller streams.

GL refers to individual glaciers, numbered in a clockwise direction, in each subbasin.

LAT and **LONG** refer to the latitude and longitude of the glacier, in degrees and minutes. Where several very small glaciers are close enough to fall under the same coordinates, the order in which the numbers appear on plate 2 aids in identification.

AREA indicates the area of the glacier, in square kilometers.

A gives the probable accuracy of the area determination in three categories:

1 Excellent (95 percent). Derived from recent topographic maps of 1:62,500 or larger or from U.S. Forest Service planimetric maps of scale 1:31,680.
2 Good (not used in this report).
3 Fair (5 percent). Where derivation was from modern maps that do not show the glaciers or topography in detail or where aerial photography of good quality was not available.

0 indicates the orientation of the glaciers based on an 8-point compass rose, with 1 as north, 2 northeast, and so on. The orientation represents an average where varying directions of flow are present.

LNTH gives the length of the glaciers, in kilometers.

CLASS indicates classification of the glaciers by a series of five digits, reading as follows from left to right:

First digit. Glacier form:

0 Insufficient information to classify
1 Outlet glacier from a large ice sheet (not used in this report)
2 Valley glacier, simple
3 Valley glacier, branched
4 Branch of another glacier (not used in this report)
5 Icecap on summit or ridge crest
6 Cirque or niche
7 Slope or irregular topography
8 Small ice or snow patch
9 Cirque glacier associated with active rock glacier below (not used in this report)

Second digit. Snow or ice accumulation source:

0 Insufficient information to classify
1 Direct snowfall and minor drift snow
2 Primarily drift snow
3 Avalanche snow

Third digit. Surface conditions:

0 Insufficient information to classify
1 Not appreciably crevassed
2 Moderately crevassed
3 Severely crevassed

4 Moderately crevassed in upper part of glacier but inactive in terminal area

Fourth digit. Type of terminus:

0 Insufficient information to classify
1 Expanded foot, piedmont glaciers (not used in this report)
2 Calving in salt or fresh water
3 Coalescing, noncontributing tributary to a large glacier (not used in this report)
4 Hanging, little reconstructed ice in valley below
5 Hanging, perennial reconstructed ice in valley below
6 Ends on moderate to gentle slopes

Fifth digit. Terminal activity:

0 Insufficient information to classify
1 Rapid retreat
2 Slight retreat
3 Stationary
4 Slight advance
5 Rapid advance
6 Possible surge (not used in this report)
7 Known surge (not used in this report)
8 Small-scale avalanching
9 Infrequent large-scale avalanching; may be periodic

TOP lists the altitude of the highest point of the glacier, not including snow chimneys or ice patches of little area.[2]

BOT lists the bottom altitude, generally the terminus.[2] Where active glaciers discharge over cliffs to perennial avalanche ice in the valley below, the lowest altitudes of the avalanche ice is indicated.

ACC lists the mean altitude of the snow accumulation area.[2]

ABL lists the mean altitude of the ablation area.[2]

FRN shows the mean firn-line altitude (average lowest altitude of the seasonal snow remaining at the end of the summer melt season).[2] The data shown were derived from averaging 3 or more years' information.

E indicates the probable accuracy of the altitude figures in columns ACC, ABL, and FRN. Number 1, indicating areas measured by planimeter and computed, is not used in this report. Number 2 indicates that glacier outlines on maps of a scale 1:62,500 or larger and a contour interval of 30 m or less were checked or adjusted by plotting from recent aerial photographs. On these maps the accumulation and ablation areas were then outlined, and the mean altitude of each was estimated by observing which contour line most nearly divided the area in half. Where 0 appears, usable data were not available.

[2]Altitude is given in meters. Where 0 appears, insufficient information was available to obtain a meaningful figure.

SUMMARY OF DATA

The present inventory lists 756 glaciers that cover 267 km^2—538 of these (220 km^2) are west of the Cascade divide and 218 (47 km^2) are east of the divide.[3]

Within the boundaries of North Cascades National Park, 318 glaciers cover an area of 117 km^2; this may be compared with 87 km^2 of glaciers in Mount Rainier National Park and still smaller ice-covered areas in all other national parks except Mount McKinley National Park, Alaska.

Glacier areas and volumes are tabulated by size categories in table 2. Using data for South Cascade

TABLE 2.—*Glacier areas and volumes by size categories*

Size category (km^2)	Number of glaciers	Area (km^2)	Assumed thickness (m)	Volume (km^3)
0 — 0.5	629	77	20	1.5
.5— 1	68	50	40	2.0
1 — 2	35	50	65	3.2
2 — 5	19	62	90	5.6
5 —10	5	28	120	3.4
Total ----------	756	267	---	15.7

and Blue Glaciers and other inventories, values of mean thickness were assumed for glaciers in each size class. Thickness data are available for only one glacier in the North Cascades, South Cascade Glacier, which has a mean thickness of 83 m for the main trunk glacier and is 2.6 km^2 in area (Meier and Tangborn, 1965, p. 564). The Blue Glacier, in the Olympic Mountains of Washington, has an area of 4.3 km^2 and a mean thickness of 133 m (LaChapelle, 1965, p. 613). Thickness values in table 2 are based on these data and a compromise between the assumed values for small glaciers given in Canadian (Ommanney and others, 1969) and Russian (Avsiuk and Kotlyakov, 1967) inventories. Most (83 percent) of the glaciers in the North Cascades are small, less than 0.5 km^2, but these glaciers contribute only 29 percent of the total area and only 10 percent of the total volume. It is interesting to note that each size category (arranged in a geometric

[3] The glaciers Nos. 2455-3—2455-9 and 2463-1—2463-7, shown on plates 1 and 2, were discovered too late to be included in table 1 and the data analysis. The combined area of these small glaciers is about 1 km^2.

progression), except the largest, contributes a roughly equal share to the total glacier area.

Of all the glaciers in this inventory, those classified as ice or snow patches make up 47 percent; those on a slope or irregular topography, 30 percent; and those occupying cirques or niches, 19 percent. The largest glaciers in the North Cascades are classified as valley glaciers. Although in numbers these represent only 2 percent of the inventory, they account for 17 percent of the total glacierized area.

Eighty-one percent of the glaciers are nourished directly by snowfall and minor amounts of drift snow. Fifteen percent are small deposits of ice and snow at the base of steep gullies where most of the snow accumulates as a result of avalanches. Two percent are fed primarily by drift snow. Insufficient information was available for classifying 2 percent of the glaciers either by type or by source of snow.

MEAN ALTITUDE AND ORIENTATION OF GLACIERS

The western slopes and crests of the Cascade Range are subject to heavy precipitation in winter as moisture-bearing storms sweep in from the North Pacific Ocean. As these storms rise and pass over the mountains, most of their moisture is released as rain or snow (fig. 1). Temperatures are usually moderate at all times of the year. At higher altitudes snow flurries may accompany summer storms and, in winter, rain may occur occasionally, even on the higher peaks. Under normal conditions fall, winter, and spring temperatures are cool enough to permit extremely heavy snow accumulation at altitudes above 1,000 m. At Mount Baker Lodge, where annual precipitation averages 2,790 mm (millimeters), snow on the ground has been measured to a depth of 7.6 m. At South Cascade Glacier, 3,800 mm average annual precipitation has been measured, and snow depths may exceed 10 m in April and May. East of the divide, temperatures are more extreme, and precipitation decreases sharply. At Stehekin the average annual precipitation is 864 mm, while at Chelan (at the eastern edge of the mountains) it is only 277 mm.

Glaciers in the contiguous Western States are related to precipitation and latitude on a regional basis. Glacier altitudes are lower toward the north and toward the Pacific coast (Meier, 1961). In limited areas such as the North Cascades, which present a wide variety of topographic forms, these relationships become obscured by local effects of glacier orientation and exposure. Between lat 47° and 49°N., north- and northeast-facing glaciers of the North Cascades receive far less solar radiation than glaciers flowing south and southwest. Glaciers in deep north- and northeast-facing cirques are further protected; snow is also swept into these glacier basins from slopes exposed to the prevailing south and southwest winds. Thus, under otherwise similar topographic conditions, the largest percentage of glaciers lies on north- and northeast-facing slopes (fig. 2). Glaciers draining south are generally much smaller (fig. 2). Other local anomalous situations occur. On the exposed slopes of Mount Baker and Glacier Peak, the mean altitudes of glaciers are exceptionally high relative to those of other glaciers in the vicinity. Some unusually low mean altitudes of glaciers are also found, generally where snow and ice masses are sheltered by high protective cliffs, such as at the Entiat glaciers (Nos. 2432–1—2432–5).

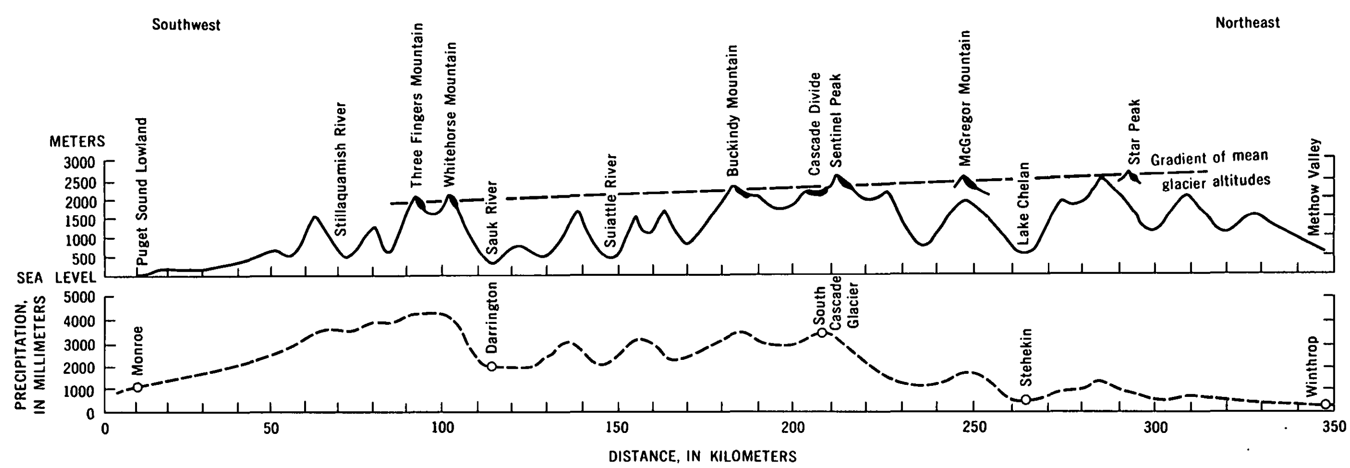

FIGURE 1.—Southwest-northeast profile across the North Cascades showing topography, precipitation, and gradient of mean glacier altitudes. Short, heavier segments on topographic profile indicate glaciers. Precipitation is indicated by circles where measured and by dashed line where inferred from streamflow records.

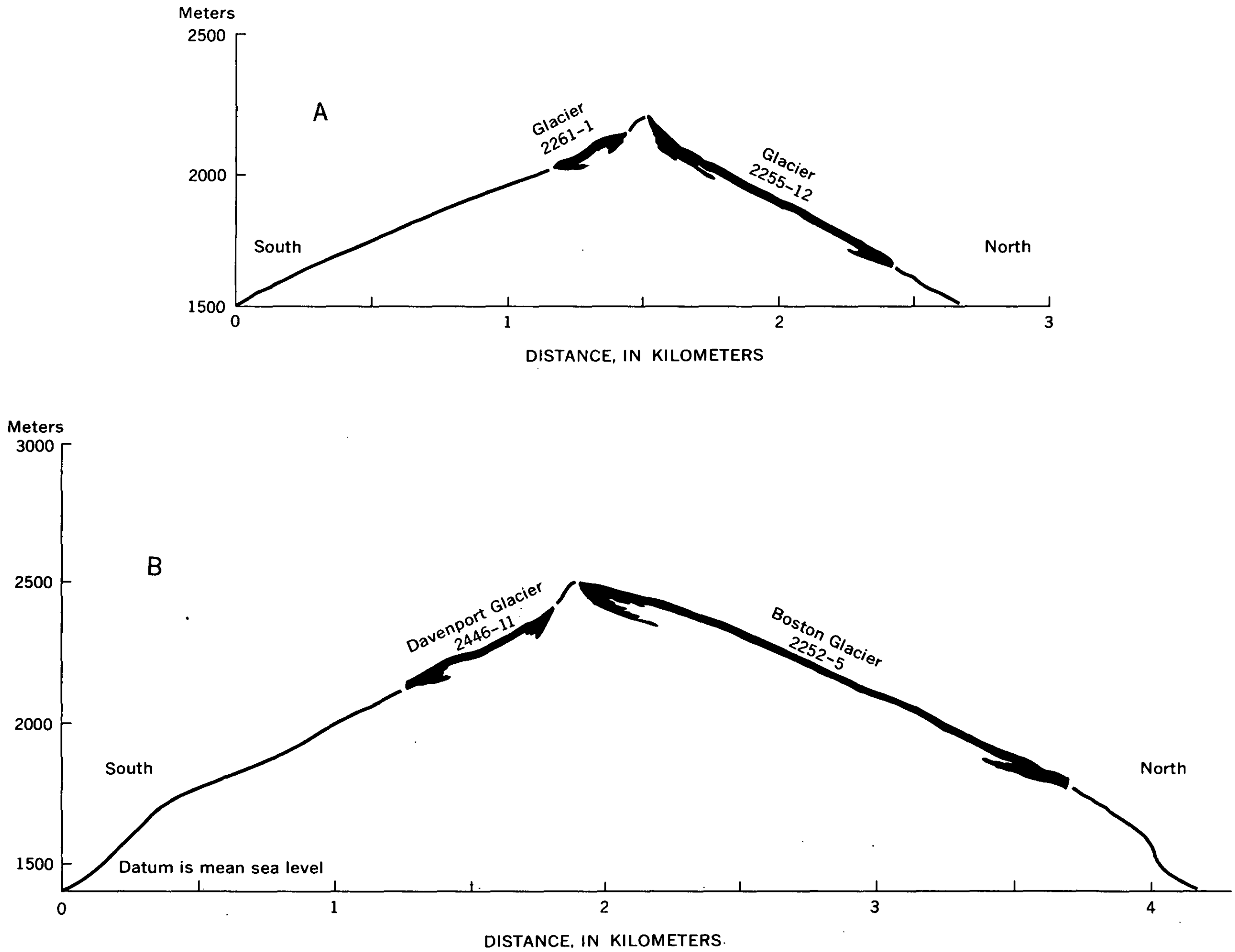

FIGURE 2.—North-south profiles between (*A*) Marble Creek and McAllister Creek and (*B*) Basin Creek and Skagit Queen Creek, showing the effect of orientation on glacier size.

The heavy snow accumulation west of the Cascade divide has resulted in a few glaciers being situated below the regional timberline. South Cascade Glacier, which has a mean altitude of 1,875 m, is the lowest large glacier in the North Cascades. Trees grow on slopes above the accumulation area of this glacier. The other extreme is found well east of the Cascade divide at the southeast extremity of the Stuart Range, where the Snow Creek glaciers (Nos. 2242-3—2242-7) have a mean altitude of 2,493 m, the highest mean altitude of any glaciers in the North Cascades.

The mean altitude of selected glaciers and the annual precipitation on a southwest-northeast profile across the range are shown in figure 1. The distribution of glacier mean altitudes is shown in figure 3*A*. Glacier orientation and the configuration of cirque walls, the occurrence of snow avalanches, and the efficiency of a basin to trap wind-drifted snow are not uniform throughout the area so it is virtually impossible to construct a consistent map of glacier altitudes. The altitudes of selected glaciers of relatively uniform characteristics are shown in figure 3*B*; note how low these altitudes are in comparison with those of the relatively unprotected glaciers on the volcanic cones of Glacier Peak (GP) and Mount Baker (MB).

Orientations of the glaciers, by drainage basin, are shown in figure 4. North or northeast orientations are favored in most areas. Some drainage basins show very different orientation patterns (for example, basin 213). These orientation anomalies result from high-altitude topography which favors glacier development in more exposed quadrants.

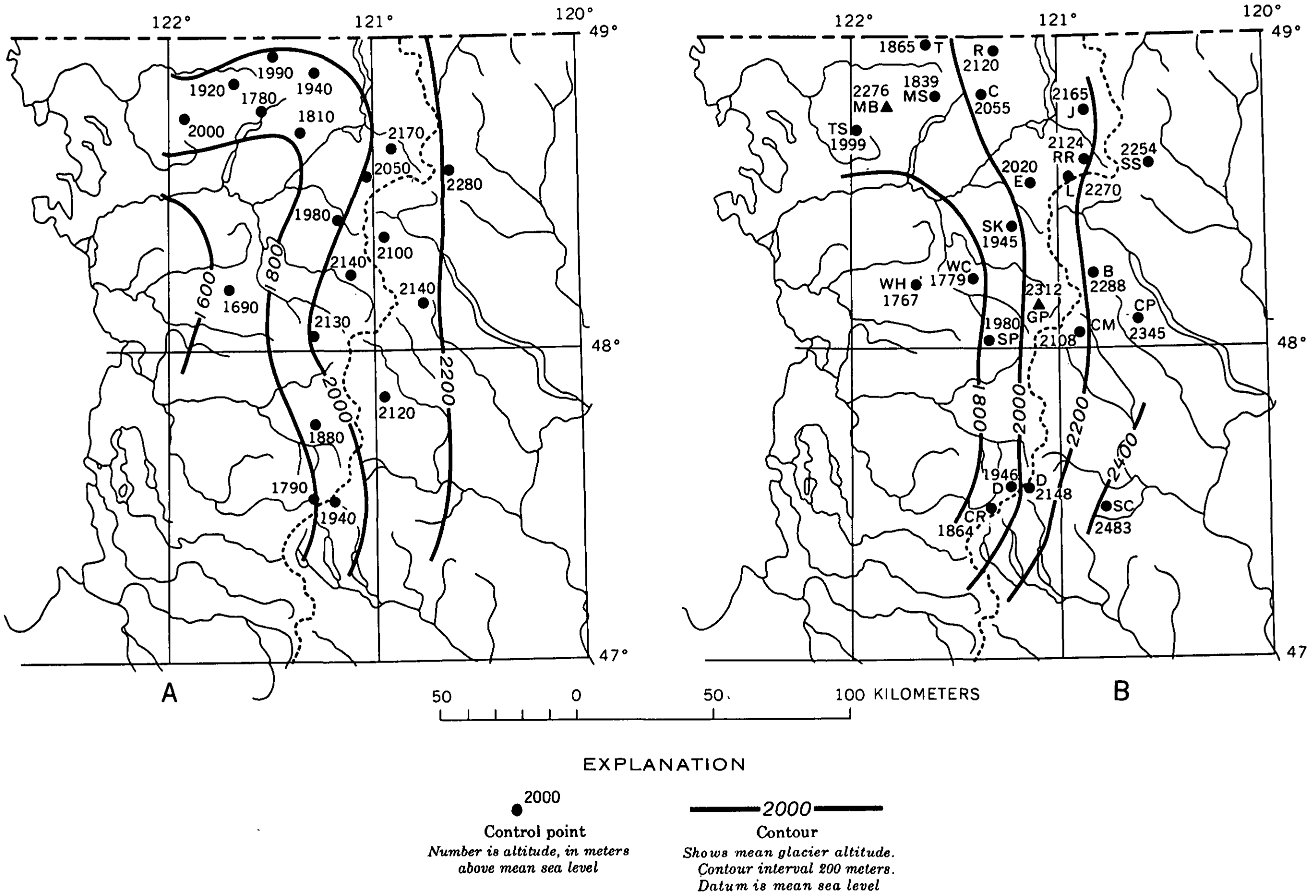

FIGURE 3.—Mean altitudes of glaciers. The dotted line is the Cascade divide. *A*, Distribution of mean glacier altitudes. All mean glacier altitudes within each secondary drainage basin have been averaged and weighted by area; plotting points are the centroids of glacier area in each basin. Although smooth contours can be drawn, a large amount of scatter exists. *B*, Mean altitudes of glaciers in selected glacierized areas. Solid dots represent north- and east-facing glaciers in cirques where there is no appreciable avalanching of snow or ice at the base. Glaciers on the volcanic cones (solid triangles) show mean altitudes about 300 m higher. Areas are identified as follows: B, Bonanza Peak; C, Mount Challenger; CM, Clark Mountain; CP, Cardinal Peak; CR, Chimney Rock; D, Mount Daniel (two points); E, Eldorado Peak; GP, Glacier Peak; J, Jack Mountain; L, Mount Logan; MB, Mount Baker; MS, Mount Shuksan; R, Mount Redoubt; RR, Ragged Ridge; SC, Snow Creek; SK, Snow King Mountain; SP, Sloan Peak; SS, Silver Star Mountain; T, Tommyhoi Mountain; TS, Twin Sisters; WC, White Chuck Mountain; WH, Whitehorse Mountain.

RECENT ACTIVITY

Measurements by K. B. Bengtson revealed that the terminus of the Coleman Glacier on Mount Baker began to advance in 1949 (Harrison, 1961). Prior to this, all North Cascades glaciers had been rapidly retreating for several decades, as is clearly demonstrated by extensive barren recently exposed ground near the lower margins of the glaciers. Hubley (1956) reported that 37 of 54 glaciers observed in the North Cascades between 1953 and 1955 were definitely advancing.

Since 1955 most of the glaciers that Hubley observed have maintained terminal positions fairly close to those of 1955; two, the Coleman and Roosevelt, have made significant further advances. The Deming, Boulder, Inspiration, and Boston Glaciers have made small gains, as have three others on Glacier Peak. Four less active glaciers (Lynch, White Chuck, South Cascade, and "Banded") have continued to retreat, and six stagnant, relict ice masses have undergone considerable losses. Aside from the last two groups, most of the glaciers of the North Cascades appear to have been in equilibrium with climatic conditions during the past decades.

Several glaciers demonstrate rather remarkable flow properties. Most unusual of these is "Spillway"

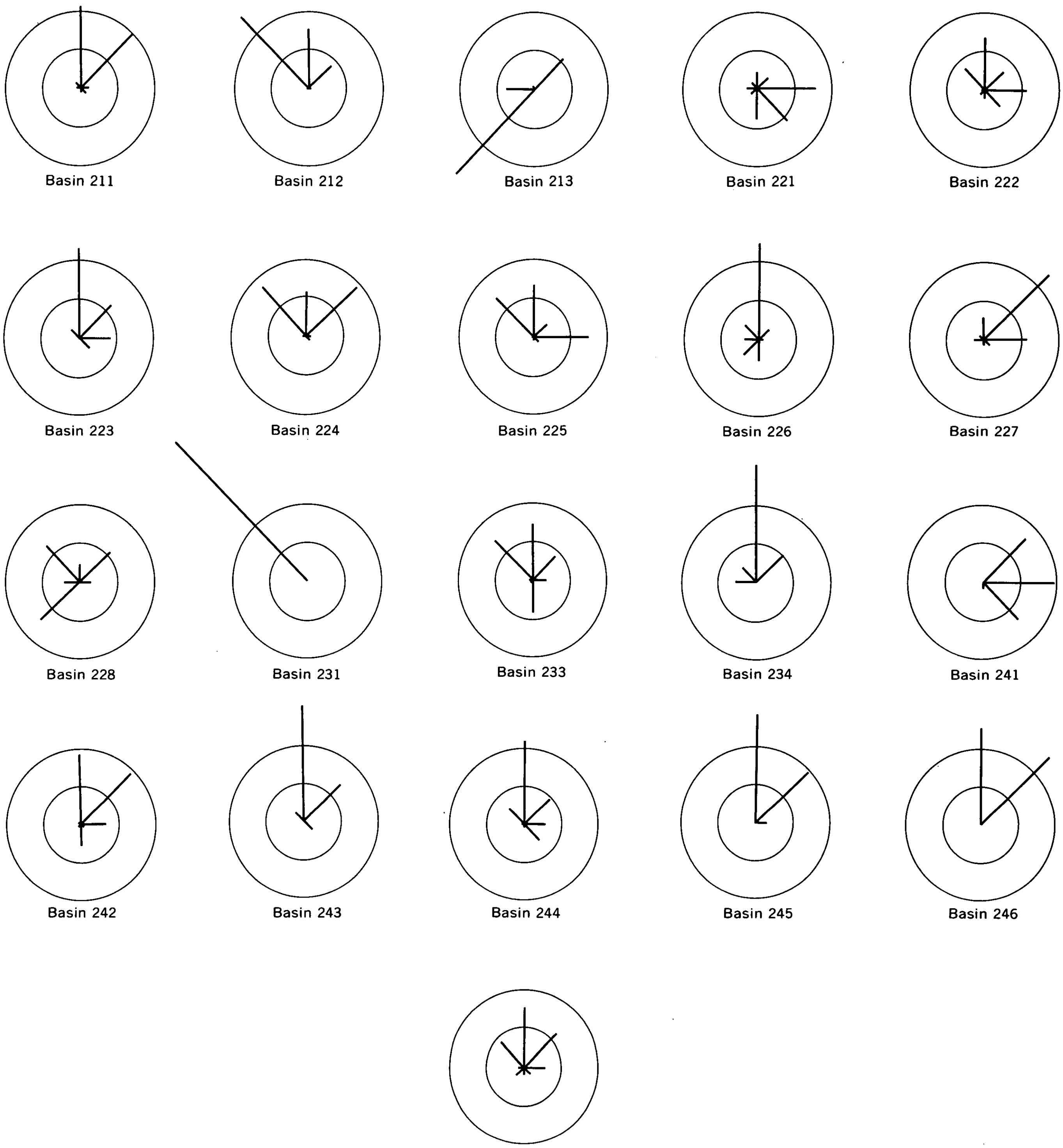

FIGURE 4.—Orientation of glaciers, by drainage basin. Length of bar indicates percentage of glaciers having that orientation. Circles represent 20 and 40 percent. Basin numbers are the first three digits of the identification numbers in table 1 and on plate 2.

Glacier (No. 2214–3). Every 2 to 4 years most of this small glacier becomes unstable and avalanches down a steep slope. These movements, however, are not regarded as true glacier surges.

Crevassed, steeply pitched hanging glaciers, common in the North Cascades, present unusual hazards as large avalanches may occur at any time. A spectacular ice avalanche occurs frequently on Johannesberg Mountain where the small hanging glacier (No. 2262–13) has spilled ice over an area as large as 0.5 km^2.

A more comprehensive analysis of recent glacier changes in the North Cascades will appear in another hydrologic report.

HYDROLOGIC SIGNIFICANCE

An important effect of glaciers on streamflow in the North Cascades can be shown by comparing runoff from glacierized and nonglacierized drainage basins during years of contrasting climate (Tangborn, 1968). The greatest combined snow and ice melt in the mountains occurs during July and August (Meier, 1969) when precipitation is generally at a minimum. Because the annual snowpack has largely melted by the end of July and streamflow from this source is much reduced, the most critical months for Pacific Northwest water users are August and September. During these months the runoff from glaciers has the greatest significance.

Two contrasting years were 1964 and 1966. In 1964, the winter snowpack was above average, the summer was wet and cool, and ice ablation on glaciers was low. The glaciers that year gained in mass. In 1966, weather conditions were just the opposite, and nearly all North Cascades glaciers lost mass.

In table 3 the contribution of glaciers to runoff during August and September of 1964 and 1966 is given for a west-slope basin (Thunder Creek) and an east-slope basin (Stehekin River). A nonglacierized basin (South Fork Nooksack River) on the west slope is shown for comparison.

In 1964, runoff from glaciers was low for two reasons: the cool wet weather reduced the heat input by solar radiation and eddy convection, and the persisting reflective cover of the previous winter's snow on glaciers further reduced the efficiency of melting by solar radiation. The melting of glacier ice contributed only 13 percent of the August and September flow of Thunder Creek and 5 percent of the Stehekin River discharge. The source of most of the runoff was from precipitation and the melting of the abnormally heavy snowpack.

TABLE 3.—*Volumes of August and September runoff, in million cubic meters, at selected river basins in the North Cascades, 1964 and 1966*

[One million cubic meters equals 811 acre-feet]

Source of runoff	South Fork Nooksack River basin, no glaciers		Thunder Creek basin, 38.6 km^2 glaciers (14.2 percent of basin area)		Stehekin River basin, 30.5 km^2 glaciers (3.4 percent of basin area)	
	1964	1966	1964	1966	1964	1966
Glacier ice melt	--	--	14	41	9	36
Glacier snowmelt	--	--	30	38	27	27
Nonglacier snowmelt	35	16	19	30	62	44
Precipitation (rain) and base flow	43	11	44	11	71	27
Total August and September runoff	78	27	107	120	169	134
Percentage of basin runoff from glaciers, August and September (snow and ice melt)	0	0	41	66	21	47

During the autumn of 1966 the seasonal snowpack was nearly depleted, and what little snow remained was restricted to small high-altitude patches and to the snow remaining in the accumulation areas of glaciers. Late-summer base flow and rainfall runoff in nonglacierized basins was very low—only one-quarter of the 1964 amount in the South Fork Nooksack River basin. However, the melting of glacier ice was very effective in sustaining the flow of both Thunder Creek and the Stehekin River. For Thunder Creek basin, total runoff during August and September was actually greater in 1966 than in 1964. Glacier melt contributed an estimated 34 percent of Thunder Creek discharge and 27 percent of the flow in the Stehekin River.

The effect of all glaciers on streamflow in the North Cascades can be estimated. Snow- and ice-melt data obtained during more than a decade of research at South Cascade Glacier show that the average yearly ablation is about 3.5 m of water. An average figure for all the glaciers is somewhat less than this because South Cascade Glacier lies at a lower altitude than most of the North Cascade glaciers. Assuming an average annual ablation of 3 m, the glaciers in the North Cascades, which cover an area of 267 km^2, contribute annually about 800 million cubic meters (650,000 acre-feet) of water to streamflow in Washington. When it is considered that nearly two-thirds of this water is released during the warmest part of summer and that the greatest ice melt occurs during years that are abnormally dry, the importance of glaciers in the North Cascades is evident. A more detailed analysis of the contribution of glaciers to streamflow in the North Cascades will appear in another hydrologic report.

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TABLE 1

TABLE 1.—*Glaciers of the North Cascades*

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ALTITUDES ACC	ABL	FRN E	NAME
2111	1	49 0	121 40	.1	1	5	.3	81163	1850	1830	0	0	1840-0	
2111	2	48 58	121 42	.1	1	4	.3	81163	2130	2060	0	0	2040-0	
2111	3	48 58	121 42	.1	1	4	.2	81163	2190	2130	0	0	2160-0	
2111	4	48 59	121 42	.6	1	1	.8	71243	2190	1740	2040	1890	1950 2	
2112	1	48 56	121 37	.1	1	3	.3	83163	1510	1400	0	0	0-0	
2112	2	48 56	121 37	.1	1	3	.2	81163	1770	1710	0	0	0-0	
2112	3	48 56	121 37	.1	1	3	.2	81163	1800	1710	0	0	0-0	
2112	4	48 57	121 37	.1	1	2	.3	81163	1710	1550	0	0	0-0	
2112	5	48 59	121 38	.1	1	4	.2	81163	2070	1950	0	0	0-0	
2112	6	48 59	121 38	.1	1	4	.2	81163	2160	1950	0	0	0-0	
2112	7	48 59	121 38	.1	1	1	.3	61243	2160	2040	0	0	0-0	
2112	8	48 59	121 38	.1	1	8	.3	63243	1860	1680	0	0	0-0	
2112	9	48 59	121 38	.2	1	1	.6	61353	2160	1710	0	0	0-0	
2112	10	48 59	121 39	.9	1	1	1.0	61363	2130	1490	1890	1740	1780 2	
2112	11	49 0	121 39	.3	1	2	.6	63363	1860	1580	0	0	0-0	
2113	1	48 58	121 31	.1	1	1	.2	81163	0	0	0	0	0-0	
2113	2	48 54	121 33	.1	1	2	.5	81163	1490	1300	0	0	0-0	
2113	3	48 56	121 34	.1	1	1	.2	81163	1950	1810	0	0	0-0	
2113	4	48 56	121 34	.1	1	2	.3	81163	1950	1710	0	0	0-0	
2113	5	48 56	121 34	.1	1	2	.5	81163	1480	1360	0	0	0-0	
2113	6	48 56	121 34	.1	1	2	.6	81163	1940	1540	0	0	0-0	
2113	7	48 57	121 35	.2	1	2	.3	81163	1890	1680	0	0	0-0	
2114	1	48 56	121 27	.1	1	2	.3	81163	1950	1800	0	0	0-0	
2114	2	48 56	121 28	.2	1	2	.2	81163	2070	1740	0	0	0-0	
2114	3	48 57	121 28	.1	1	2	.2	81163	1950	1770	0	0	0-0	
2114	4	48 57	121 28	.1	1	2	.2	81163	1920	1830	0	0	0-0	
2114	5	48 57	121 28	.1	1	2	.5	81163	1950	1740	0	0	0-0	
2114	6	48 57	121 28	.1	1	2	.3	81163	1920	1800	0	0	0-0	
2114	7	48 59	121 28	.1	1	1	.2	81163	2010	1890	0	0	0-0	
2114	8	49 0	121 28	.2	1	2	.3	61163	2070	1860	0	0	0-0	
2114	9	49 0	121 28	.1	1	1	.3	81163	2190	2010	0	0	0-0	
2114	10	49 0	121 28	.1	1	8	.2	81163	0	0	0	0	0-0	
2114	11	49 0	121 28	.1	1	5	.3	81163	2160	1980	0	0	0-0	
2114	12	48 59	121 29	.1	1	1	.2	81163	2030	1870	0	0	0-0	
2114	13	49 0	121 29	.1	1	1	.5	81163	2070	1860	0	0	0-0	
2114	14	48 58	121 30	.1	1	4	.2	81163	0	0	0	0	0-0	
2114	15	48 58	121 30	.1	1	1	.3	83163	1870	1630	0	0	0-0	
2114	16	48 59	121 31	.1	1	8	.2	81163	2090	1890	0	0	0-0	
2115	1	48 59	121 15	.1	1	6	.6	81163	2440	2330	0	0	0-0	
2115	2	48 59	121 15	.1	1	8	.2	81163	0	0	0	0	0-0	
2115	3	48 59	121 15	.1	1	5	.2	81163	0	0	0	0	0-0	
2115	4	48 58	121 15	.1	1	7	.5	81163	0	0	0	0	0-0	
2115	5	48 58	121 15	.1	1	8	.3	81163	0	2070	0	0	0-0	
2115	6	48 58	121 16	2.5	1	2	2.6	71252	2500	1740	2190	2010	2100 2	REDOUBT
2115	7	48 58	121 17	1.0	1	1	1.3	61363	2530	1890	2130	2000	2040 2	
2115	8	48 58	121 18	.4	1	2	1.3	61363	2380	1780	0	0	0-0	
2115	9	48 58	121 19	.2	1	2	.8	81163	2390	1900	0	0	0-0	
2115	10	48 58	121 19	.3	1	2	1.1	81163	2160	1680	0	0	0-0	
2116	1	48 57	121 18	.1	1	7	.3	81163	2380	2260	0	0	0-0	
2116	2	48 57	121 18	.1	1	7	.3	81163	0	0	0	0	0-0	
2116	3	48 56	121 19	.2	1	1	.3	63263	1950	1710	0	0	0-0	
2116	4	48 56	121 20	.3	1	1	.5	63163	1890	1490	0	0	0-0	
2117	1	48 53	121 22	.1	1	2	.3	81163	2000	1900	0	0	0-0	
2117	2	48 54	121 22	.1	1	1	.2	81163	1980	1860	0	0	0-0	
2118	1	48 52	121 23	.3	1	1	.8	61363	2100	1650	0	0	0-0	
2118	2	48 52	121 23	.2	1	1	.5	61363	1860	1580	0	0	0-0	
2118	3	48 52	121 24	.1	1	1	.3	81163	1740	1550	0	0	0-0	
2118	4	48 52	121 25	.5	1	1	.5	61363	1830	1520	0	0	0-0	
2118	5	48 53	121 26	.1	1	3	.2	82163	1570	1510	0	0	0-0	
2119	1	48 52	121 27	.3	1	3	.6	71263	2010	1740	0	0	0-0	
2119	2	48 52	121 28	.1	1	1	.5	61163	1980	1830	0	0	0-0	
2119	3	48 52	121 30	.1	1	1	.2	82163	0	0	0	0	0-0	
2119	4	48 52	121 31	.1	1	1	.2	82163	1830	1650	0	0	0-0	
2119	5	48 52	121 31	.2	1	1	.2	82163	2070	1780	0	0	0-0	

64 GLACIERS 12.0 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2121	1	48 56	121 38	.2	1	1	1.0	81163	1890	1550	0	0	0-0	
2121	2	48 56	121 38	.1	1	1	.2	81163	1950	1890	0	0	0-0	
2122	1	48 52	121 32	.5	1	1	.5	71263	2160	1830	0	0	0-0	
2122	2	48 52	121 33	.1	1	2	.2	82163	1950	1800	0	0	0-0	
2122	3	48 52	121 33	.1	1	1	.5	83163	2010	1770	0	0	0-0	
2122	4	48 53	121 34	.1	1	2	.2	82163	1950	1860	0	0	0-0	
2122	5	48 53	121 34	.1	1	2	.6	83163	1710	1510	0	0	0-0	
2122	6	48 53	121 34	.1	1	2	.6	83163	1920	1580	0	0	0-0	
2122	7	48 53	121 35	.1	1	1	.5	82163	1950	1710	0	0	0-0	
2122	8	48 53	121 35	.1	1	2	.3	82163	2040	1830	0	0	0-0	
2122	9	48 53	121 35	.2	1	2	.5	73263	1900	1650	0	0	0-0	
2122	10	48 54	121 35	.1	1	2	.3	73263	1830	1650	0	0	0-0	
2122	11	48 54	121 36	.1	1	2	.2	83163	1830	1650	0	0	0-0	
2122	12	48 54	121 36	.3	1	8	1.3	63263	2070	1490	0	0	0-0	
2123	1	48 51	121 32	.1	3	7	.2	81163	2010	1950	0	0	0-0	
2123	2	48 50	121 32	.5	1	8	.8	71263	2070	1710	1920	1770	1830 2	
2123	3	48 50	121 32	.4	1	8	.3	71263	1800	1580	1710	1600	1620 2	
2123	4	48 50	121 34	2.9	1	2	1.9	61353	2320	1040	1920	1550	1650 2	NOOKSACK
2123	5	48 51	121 34	.1	1	2	.2	71263	1890	1620	1780	1680	1710 2	WEST NOOKSACK
2123	6	48 51	121 35	1.6	1	8	2.1	71352	2560	1190	0	0	1950 2	PRICE
2123	7	48 50	121 36	.2	1	1	.6	73243	2470	1580	0	0	0-0	
2124	1	48 50	121 36	.8	1	8	1.4	71353	2590	1460	0	0	0-0	
2124	2	48 50	121 37	.4	1	1	.6	71363	2160	1250	1770	1650	1710 2	
2124	3	48 50	121 38	.2	1	1	.3	61263	1800	1550	0	0	0-0	
2124	4	48 50	121 38	.1	1	1	.3	81163	1710	1490	0	0	0-0	
2125	1	48 51	121 42	.1	3	1	.2	81163	1680	1550	0	0	0-0	
2126	1	48 50	121 44	.1	1	1	.3	71263	0	0	0	0	0-0	
2126	2	48 49	121 45	.4	1	1	.5	71163	1890	1710	0	0	0-0	
2126	3	48 49	121 46	1.0	1	8	1.3	71263	2070	1620	1830	1690	1740 4	"SHOLES"
2126	4	48 48	121 48	4.1	1	1	3.4	71362	2900	1430	2130	1770	1890 4	MAZAMA
2126	5	48 49	121 49	.2	1	3	.8	71163	2160	1890	0	0	0-0	
2126	6	48 49	121 48	.2	1	3	.5	71163	2010	1830	0	0	0-0	
2126	7	48 49	121 48	.1	1	2	.3	81163	2010	1890	0	0	0-0	
2126	8	48 49	121 49	.6	1	1	.6	71263	2260	1860	0	0	0-0	
2126	9	48 49	121 50	.2	1	2	.2	71263	2070	1860	0	0	0-0	
2126	10	48 50	121 51	.1	1	1	.3	82163	2070	1920	0	0	0-0	
2127	1	48 48	121 50	.2	1	7	.3	61263	2190	2010	0	0	0-0	"BASTILE"
2127	2	48 48	121 51	4.1	1	8	3.9	71364	3260	1400	2380	1890	2070 4	ROOSEVELT
2127	3	48 47	121 52	5.2	1	1	3.2	71264	2190	1400	2380	1890	2070 4	COLEMAN
2127	4	48 47	121 52	.8	1	6	.8	71264	2190	1890	2100	1980	2040 4	

40 GLACIERS 26.2 TOTAL AREA

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2131	1	48 47	121 52	.9	1	7	1.6	61262	2590	1800	2260	1980	2070 4	THUNDER
2131	2	48 46	121 52	.2	1	7	.6	61263	2130	1860	0	0	0-0	
2131	3	48 46	121 52	.1	1	8	.2	83163	2440	2130	0	0	0-0	
2131	4	48 46	121 52	.1	1	7	.2	71263	2350	2290	0	0	0-0	
2131	5	48 45	121 51	4.5	1	6	4.8	21364	3260	1340	2440	1740	2070 4	DEMING
2132	1	48 42	121 58	.6	1	2	1.3	61263	1890	1360	1770	1650	1680 4	
2132	2	48 43	121 59	.9	1	2	1.0	71263	1800	1620	1770	1660	1690 4	

7 GLACIERS 7.2 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
											ALTITUDES			
2211	1	48 45	121 50	5.0	1	5	3.9	21364	3050	1650	2440	2010	2160 4	EASTON
2211	2	48 45	121 48	1.6	1	4	1.9	21363	2960	1800	2260	1950	2040 4	
2211	3	48 46	121 47	3.4	1	3	3.5	21364	3260	1490	2350	1770	1920 4	BOULDER
2211	4	48 47	121 47	5.1	1	3	4.5	21364	3260	1250	2410	1860	2130 4	PARK
2211	5	48 47	121 45	.1	1	2	.5	71163	1650	1460	0	0	0-0	
2211	6	48 47	121 46	.1	1	2	.5	71263	1890	1650	0	0	0-0	
2211	7	48 48	121 46	.1	1	2	.3	61364	1740	1520	0	0	0-0	
2211	8	48 48	121 46	1.5	1	3	2.7	71263	2290	1340	1920	1580	1710 4	
2211	9	48 48	121 47	.2	1	4	.5	81163	2040	1680	0	0	0-0	
2211	10	48 49	121 46	.1	1	5	.2	82163	1980	1770	0	0	0-0	
2212	1	48 48	121 43	.2	3	2	.5	81163	1740	1550	0	0	0-0	
2212	2	48 49	121 44	.2	1	2	1.0	81163	1740	1430	0	0	0-0	
2212	3	48 49	121 40	.1	3	1	.3	81163	1630	1550	0	0	0-0	
2212	4	48 50	121 37	.8	1	6	1.8	71353	2440	1520	2290	1660	2190 2	CURTIS
2212	5	48 49	121 37	.1	1	7	.6	71243	2320	1780	0	0	0-0	
2212	6	48 49	121 37	.1	1	7	.2	71263	2270	2130	0	0	0-0	
2213	1	48 49	121 36	3.2	1	4	3.1	71353	2560	1130	2230	1890	2010 2	SULPHIDE
2213	2	48 49	121 35	2.3	1	4	3.2	71353	2650	1130	2350	2040	2090 2	CRYSTAL
2213	3	48 49	121 34	.1	1	5	.3	81163	1950	1830	0	0	0-0	
2213	4	48 49	121 33	.1	1	5	.2	71263	2100	1920	0	0	0-0	
2214	1	48 49	121 33	.1	1	3	.6	63363	1950	1580	0	0	0-0	
2214	2	48 50	121 31	.1	1	2	.2	81163	2120	1710	0	0	0-0	
2214	3	48 50	121 31	.3	1	2	1.0	62363	2100	1580	0	0	0-0	"SPILLWAY"
2214	4	48 51	121 32	.1	1	2	.2	81163	1770	1680	0	0	0-0	
2214	5	48 51	121 31	.2	1	4	.8	81163	2130	1770	0	0	0-0	
2214	6	48 52	121 30	.1	1	6	.2	81163	1650	1400	0	0	0-0	
2215	1	48 51	121 27	.4	1	3	1.3	73253	1920	1130	0	0	0-0	
2215	2	48 51	121 27	.1	1	4	.2	81163	1890	1770	0	0	0-0	
2215	3	48 50	121 22	.2	1	7	1.4	63353	1980	1280	0	0	0-0	
2215	4	48 50	121 23	.1	1	1	.2	81163	1650	1580	0	0	0-0	
2216	1	48 50	121 22	.1	1	6	.6	81163	2260	2040	0	0	0-0	
2216	2	48 50	121 21	.1	1	6	.5	81163	2320	2070	0	0	0-0	
2216	3	48 50	121 21	.8	1	6	1.3	71263	2320	1890	0	0	0-0	
2216	4	48 49	121 21	.1	1	7	.2	73263	2130	1770	0	0	0-0	
2216	5	48 48	121 21	.2	3	8	.5	63363	1870	1580	0	0	0-0	
2216	6	48 48	121 23	.2	1	1	.8	71263	2040	1680	0	0	0-0	
2217	1	48 48	121 24	.3	1	8	.3	71263	2070	1890	0	0	0-0	
2217	2	48 45	121 23	.3	3	1	.8	63263	1680	1520	0	0	0-0	
2217	3	48 45	121 24	.2	1	2	.5	83163	1580	1460	0	0	0-0	
2217	4	48 45	121 25	.5	1	1	.5	71263	1950	1580	0	0	0-0	
2217	5	48 44	121 26	.1	1	8	.5	81163	1950	1680	0	0	0-0	
2217	6	48 45	121 26	.2	1	8	.5	61163	1620	1480	0	0	0-0	
2217	7	48 44	121 27	.1	1	1	.3	83163	1390	1330	0	0	0-0	
2217	8	48 44	121 28	.1	1	2	.2	81163	1830	1680	0	0	0-0	
2217	9	48 44	121 28	.1	1	1	.8	61263	1830	1430	0	0	0-0	
2217	10	48 44	121 29	.1	3	2	.3	82163	2040	1830	0	0	0-0	
2217	11	48 45	121 28	.1	1	2	.6	83163	1580	1310	0	0	0-0	
2217	12	48 45	121 29	.1	1	2	.3	81163	2010	1840	0	0	0-0	
2217	13	48 45	121 29	.1	1	4	.3	81163	1830	1660	0	0	0-0	
2217	14	48 46	121 28	.3	1	4	.5	71163	2190	1860	0	0	0-0	
2218	1	48 46	121 27	.2	1	1	.5	81163	1920	1720	0	0	0-0	
2218	2	48 46	121 28	.1	1	1	.2	81163	1950	1830	0	0	0-0	
2218	3	48 46	121 29	.1	1	8	.5	61263	1950	1550	0	0	0-0	
2218	4	48 46	121 29	.2	1	1	1.0	71363	2160	1680	0	0	0-0	
2218	5	48 46	121 29	.3	1	1	.6	71263	2070	1800	0	0	0-0	
2218	6	48 45	121 29	.1	1	8	.3	81163	1890	1740	0	0	0-0	
2218	7	48 45	121 29	.1	1	8	.2	81163	2070	1940	0	0	0-0	
2218	8	48 44	121 29	.2	1	8	.5	81163	1980	1860	0	0	0-0	
2218	9	48 44	121 30	1.0	3	7	1.1	71163	2070	1740	0	0	0-0	
2219	1	48 40	121 32	.5	1	1	1.4	61162	2040	1650	0	0	0-0	
2219	2	48 40	121 31	.1	1	7	.2	81163	2150	2000	0	0	0-0	
2219	3	48 39	121 33	.4	1	2	.5	63163	1740	1540	0	0	0-0	
2219	4	48 39	121 34	.4	1	2	1.1	71163	1810	1460	0	0	0-0	

63 GLACIERS 33.6 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT		LONG		AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN	E	NAME
											A L T I T U D E S						
2221	1	48	40	121	30	1.0	1	3	1.4	71000	2130	1710	0	0	0	-0	
2221	2	48	40	121	30	.4	1	5	.6	63162	1710	1580	0	0	0	-0	
2221	3	48	39	121	29	.1	1	7	.6	81163	1860	1620	0	0	0	-0	
2222	1	48	39	121	29	.1	3	3	.5	81163	1830	1460	0	0	0	-0	
2222	2	48	39	121	29	.1	3	2	.3	81163	1770	1650	0	0	0	-0	
2222	3	48	40	121	29	.1	1	4	.3	81163	1710	1620	0	0	0	-0	
2222	4	48	40	121	29	.1	1	3	.5	81163	1890	1680	0	0	0	-0	
2222	5	48	40	121	30	.8	1	1	1.4	61263	2010	1580	0	0	0	-0	
2222	6	48	40	121	30	.9	1	1	1.1	71263	2100	1540	0	0	0	-0	
2222	7	48	41	121	31	.1	1	1	.3	81163	1920	1770	0	0	0	-0	
2222	8	48	44	121	29	.4	1	3	.8	71263	2010	1650	0	0	0	-0	
2222	9	48	44	121	26	.1	1	4	.3	81163	1980	1710	0	0	0	-0	
2222	10	48	44	121	23	.1	1	7	.3	83163	1830	1520	0	0	0	-0	
2223	1	48	42	121	21	.4	1	3	1.1	61353	1920	1280	0	0	0	-0	
2223	2	48	43	121	21	.4	1	1	.6	61363	1740	1370	0	0	0	-0	
2223	3	48	43	121	22	.1	1	1	.6	63163	1710	1460	0	0	0	-0	
2223	4	48	44	121	22	.1	1	1	.2	83163	1460	1310	0	0	0	-0	
2223	5	48	44	121	22	.2	1	2	.6	61343	2070	1580	0	0	0	-0	
2223	6	48	45	121	22	.2	1	4	.6	71363	1980	1580	0	0	0	-0	
2223	7	48	45	121	22	.1	1	2	.2	73263	1580	1370	0	0	0	-0	
2223	8	48	45	121	23	.2	1	2	.5	73363	1710	1460	0	0	0	-0	
2223	9	48	47	121	22	.2	1	2	.5	71263	2070	1800	0	0	0	-0	
2223	10	48	48	121	21	.1	1	3	.3	61263	1870	1680	0	0	0	-0	
2223	11	48	48	121	21	.1	1	4	.2	61263	1830	1710	0	0	0	-0	
2223	12	48	48	121	19	.2	1	4	.3	73243	1950	1680	0	0	0	-0	
2223	13	48	46	121	18	.2	1	6	.3	73163	2190	1980	0	0	0	-0	
2223	14	48	46	121	17	.5	1	4	.8	71343	2190	1920	0	0	0	-0	
2223	15	48	46	121	16	.2	1	5	.6	71263	2190	1970	0	0	0	-0	
2223	16	48	46	121	16	.2	1	6	.6	63163	1840	1680	0	0	0	-0	
2224	1	48	44	121	12	.3	1	2	.5	63343	1580	1220	0	0	0	-0	
2224	2	48	44	121	12	.2	1	1	.3	61263	2040	1770	0	0	0	-0	
2224	3	48	44	121	15	.1	1	2	.3	73343	1710	1460	0	0	0	-0	
2224	4	48	45	121	15	.1	1	4	.3	81163	2070	1860	0	0	0	-0	
2224	5	48	45	121	15	.1	1	2	.5	73243	1950	1710	0	0	0	-0	
2224	6	48	46	121	15	.1	1	2	1.0	73363	1920	1340	0	0	0	-0	
2224	7	48	46	121	16	.2	1	1	1.1	73363	1950	1340	0	0	0	-0	
2224	8	48	46	121	16	.2	1	3	.5	71163	1920	1600	0	0	0	-0	
2225	1	48	39	121	9	1.2	1	8	2.6	71263	2440	1710	2190	1860	1950	2	LADDER CREEK
2225	2	48	39	121	10	.2	1	8	.8	71263	2190	1860	0	0	0	-0	
2226	1	48	35	121	11	.1	1	8	.3	81163	2130	2010	0	0	0	-0	
2226	2	48	34	121	13	.1	1	1	.2	71263	1770	1650	0	0	0	-0	
2226	3	48	35	121	16	.1	1	3	.3	71163	2040	1770	0	0	0	-0	
2227	1	48	35	121	16	.1	1	8	.2	81163	2010	1860	0	0	0	-0	

43 GLACIERS 10.6 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

									ALTITUDES					
BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
2231	1	48 47	121 17	.6	1	1	.6	71353	2190	1620	0	0	0-0	
2231	2	48 47	121 18	.9	1	2	1.9	73353	2380	1310	0	0	0-0	
2231	3	48 48	121 18	.1	1	4	.3	81163	2290	2010	0	0	0-0	
2231	4	48 48	121 18	.1	1	4	.6	61363	2040	1710	0	0	0-0	
2231	5	48 48	121 18	.6	1	4	1.1	71343	2500	1830	0	0	0-0	
2232	1	48 50	121 16	.1	3	8	.3	81163	2070	1580	0	0	0-0	
2232	2	48 49	121 17	.2	1	8	1.0	73253	2160	1490	0	0	0-0	
2232	3	48 49	121 18	.4	1	1	.8	71343	2130	1710	0	0	0-0	
2232	4	48 49	121 19	1.3	1	2	2.6	73353	2470	1220	0	0	0-0	
2232	5	48 50	121 20	1.0	1	3	1.6	73353	2230	1250	0	0	0-0	
2232	6	48 50	121 20	.2	1	3	.3	71363	2260	1980	0	0	0-0	
2232	7	48 51	121 19	.9	1	3	1.1	71263	2230	1800	0	0	0-0	
2233	1	48 51	121 19	.6	1	1	.6	71263	2190	1920	0	0	0-0	
2233	2	48 51	121 21	3.4	1	1	2.7	71352	2440	1460	2100	1650	1830 2	CHALLENGER
2233	3	48 51	121 22	.2	1	4	.5	71163	2230	1950	0	0	0-0	
2233	4	48 52	121 22	.3	1	2	.6	73363	2010	1620	0	0	0-0	
2233	5	48 55	121 18	.1	1	5	.3	81163	2070	1980	0	0	0-0	
2234	1	48 55	121 17	.1	1	2	.3	73343	2040	1770	0	0	0-0	
2234	2	48 55	121 17	.1	1	2	.6	73343	2190	1800	0	0	0-0	
2234	3	48 55	121 17	.1	1	2	.3	73343	2040	1770	0	0	0-0	
2234	4	48 55	121 17	.1	1	2	.2	73343	2070	1800	0	0	0-0	
2234	5	48 56	121 18	.2	1	2	.3	73343	2070	1800	0	0	0-0	
2234	6	48 56	121 18	.1	1	2	.2	81163	2100	1980	0	0	0-0	
2234	7	48 57	121 17	.3	1	4	.8	71263	2350	2160	0	0	0-0	
2234	8	48 57	121 16	.1	1	6	.5	81163	2320	2190	0	0	0-0	
2235	1	48 56	121 14	.1	1	2	.3	81163	0	0	0	0	0-0	
2235	2	48 56	121 15	.4	1	1	.5	73243	2410	1950	0	0	0-0	
2235	3	48 57	121 15	.2	1	2	1.0	61243	2320	1890	0	0	0-0	
2235	4	48 58	121 15	.2	1	4	.3	81163	0	0	0	0	0-0	
2236	1	48 58	121 13	.1	1	1	.6	73263	0	0	0	0	0-0	
2236	2	48 58	121 13	.1	1	2	.8	63263	0	0	0	0	0-0	
2236	3	48 58	121 14	.2	1	3	.6	73263	0	0	0	0	0-0	
2236	4	48 59	121 14	.2	1	3	.3	73243	0	0	0	0	0-0	
2236	5	48 59	121 14	.1	1	8	.2	71263	0	0	0	0	0-0	
2236	6	48 59	121 15	.9	1	1	1.8	21222	0	0	0	0	0-0	
2236	7	48 59	121 15	.2	1	3	.5	81163	0	0	0	0	0-0	
2236	8	49 0	121 13	.3	1	2	.5	61343	0	0	0	0	0-0	
2236	9	49 0	121 14	.1	1	1	.5	61263	0	0	0	0	0-0	
2236	10	49 0	121 14	.5	1	1	.6	61343	0	0	0	0	0-0	
2236	11	49 0	121 15	.3	1	8	.8	61263	2530	2070	0	0	0-0	
2236	12	48 59	121 16	.2	1	8	.3	61263	2320	1860	0	0	0-0	
2237	1	48 56	121 8	.1	1	1	.6	83163	0	0	0	0	0-0	
2237	2	48 56	121 9	.6	1	1	.8	61343	0	0	0	0	0-0	
2237	3	48 56	121 10	.1	1	8	.5	63263	0	0	0	0	0-0	

44 GLACIERS 16.8 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2242	1	48 59	120 51	.1	1	7	.2	83263	0	0	0	0	0-0	
2242	2	48 59	120 52	.1	1	8	.5	83263	0	0	0	0	0-0	
2242	3	48 59	120 52	.1	1	1	.3	83263	0	0	0	0	0-0	
2244	1	48 44	120 54	.2	1	8	.6	61221	2350	1950	0	0	0-0	
2244	2	48 45	120 55	.4	1	2	.6	71262	0	0	0	0	0-0	JERRY
2244	3	48 45	120 55	.1	1	2	.3	82163	0	0	0	0	0-0	
2244	4	48 47	120 57	.5	1	2	1.6	71353	0	0	0	0	0-0	
2244	5	48 47	120 58	1.8	1	8	1.9	61363	2500	1830	0	0	0-0	
2245	1	48 46	120 57	.1	1	5	.2	83263	0	0	0	0	0-0	
2245	2	48 46	120 57	.2	1	4	.5	71363	0	0	0	0	0-0	
2246	1	48 30	120 47	.1	1	1	.2	83163	2070	1980	0	0	0-0	
2246	2	48 31	120 48	.2	1	2	.5	61161	2280	1950	0	0	0-0	LEWIS
2246	3	48 31	120 49	.1	1	4	.5	81163	2470	2290	0	0	0-0	
2246	4	48 32	120 48	.1	1	3	.2	73263	2130	1830	0	0	0-0	
2246	5	48 32	120 48	.1	1	2	.2	81163	2260	2040	0	0	0-0	
2246	6	48 32	120 49	.1	1	1	.2	81163	2190	1980	0	0	0-0	
2246	7	48 33	120 49	.1	1	2	.2	81163	2120	1980	0	0	0-0	
2246	8	48 35	120 51	.2	1	2	.5	61163	2090	1890	0	0	0-0	
2246	9	48 35	120 51	.1	1	3	.5	71163	2270	2010	0	0	0-0	
2246	10	48 40	120 55	.1	1	2	.2	81163	2000	1900	0	0	0-0	
2247	1	48 35	120 52	.5	1	8	1.0	71364	2410	1890	2190	2010	2100 2	MESAHCHIE
2247	2	48 35	120 53	.3	1	8	.8	71363	2410	1950	0	0	0-0	
2247	3	48 35	120 54	.9	1	2	1.4	71364	2440	1920	2260	2120	2190 2	KATSUK
2247	4	48 35	120 54	.1	1	2	.3	61263	2190	1830	2120	2060	2090 2	
2247	5	48 35	120 54	.2	1	1	.3	81163	2260	1870	0	0	0-0	
2247	6	48 35	120 55	.9	1	1	.8	71362	2530	1870	0	0	0-0	KIMTAH
2247	7	48 35	120 56	.1	1	8	.5	81163	2130	1860	0	0	0-0	
2247	8	48 36	120 59	.1	1	2	.3	81163	2210	2060	0	0	0-0	
2247	9	48 36	120 59	.1	1	2	.2	81163	2210	2100	0	0	0-0	
2247	10	48 36	120 59	.1	1	1	.5	81163	2210	2010	0	0	0-0	
2247	11	48 36	120 59	.1	1	2	.3	81163	2190	2040	0	0	0-0	
2247	12	48 37	121 0	.1	1	1	.5	81163	2190	1950	0	0	0-0	
2247	13	48 40	120 58	.1	1	1	.2	81163	2040	1890	0	0	0-0	
2247	14	48 40	120 57	.2	1	1	.3	61263	2190	1890	0	0	0-0	
2248	1	48 42	121 2	.1	1	2	.6	81163	2210	1970	0	0	0-0	

35 GLACIERS 8.2 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

									ALTITUDES					
BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
2251	1	48 33	120 50	.1	1	8	.5	71163	2320	2010	0	0	0-0	
2251	2	48 33	120 50	.1	1	8	.3	83163	1920	1840	0	0	0-0	
2251	3	48 33	120 50	.1	1	1	.2	83163	1920	1800	0	0	0-0	
2251	4	48 33	120 50	.1	1	1	.2	61163	2260	2070	0	0	0-0	
2251	5	48 33	120 51	.2	1	1	.5	61263	2320	2060	0	0	0-0	
2251	6	48 32	120 52	.1	1	1	.6	71263	2190	1830	0	0	0-0	
2251	7	48 32	120 55	.3	1	1	.3	71163	2320	2100	2230	2160	2190 2	
2251	8	48 32	120 55	.4	1	1	.5	81263	2260	1980	2130	2040	2090 2	
2251	9	48 32	120 56	.9	1	3	1.4	71363	2710	1830	2380	2130	2290 2	DOUGLAS
2251	10	48 33	120 56	.1	1	3	.3	61263	2380	2010	0	0	0-0	
2251	11	48 33	120 57	.3	1	8	1.1	71253	2230	1740	0	0	0-0	
2251	12	48 33	120 57	.1	1	1	.3	71163	2350	2070	0	0	0-0	
2251	13	48 33	120 57	.3	1	1	.3	71163	2290	1950	0	0	0-0	
2251	14	48 33	120 57	.8	1	8	1.4	61263	2710	2070	2440	2180	2320 2	"BANDED"
2251	15	48 32	120 58	1.1	1	8	2.4	71163	2620	1950	0	0	0-0	FREMONT
2252	1	48 31	120 57	.2	1	6	.3	81160	2320	2240	0	0	0-0	
2252	2	48 30	120 57	.2	1	8	.5	81100	2160	1920	0	0	0-0	
2252	3	48 30	120 59	.2	1	2	.5	61263	2060	1710	0	0	0-0	THUNDER CREEK
2252	4	48 30	121 0	.2	1	1	.3	61263	2190	1970	0	0	0-0	
2252	5	48 30	121 1	7.0	1	1	2.4	61344	2650	1520	2230	1890	2040 2	BOSTON
2253	1	48 32	121 3	.1	1	8	.3	71263	2360	2040	0	0	0-0	
2253	2	48 32	121 3	.5	1	8	.5	71263	2380	2010	0	0	0-0	
2253	3	48 31	121 4	1.9	1	8	1.4	71353	2440	1370	2100	1770	1950 2	FORBIDDEN
2253	4	48 31	121 5	.2	1	1	.5	71263	2070	1800	0	0	0-0	
2253	5	48 31	121 6	.2	1	1	.3	71263	2070	1860	0	0	0-0	
2253	6	48 32	121 7	5.1	1	3	2.9	71243	2700	1480	2260	1890	2010 2	INSPIRATION
2253	7	48 33	121 6	.7	1	5	.5	71163	2440	2010	0	0	0-0	
2253	8	48 33	121 5	.1	1	4	.3	81163	2260	1980	0	0	0-0	
2253	9	48 33	121 6	1.9	1	3	1.3	71253	2550	1650	2290	1980	2130 2	KLAWATTI
2253	10	48 34	121 5	1.6	1	4	2.3	21262	2410	1720	2270	1950	2120 2	NORTH KLAWATTI
2254	1	48 34	121 4	.1	1	1	.6	81163	2190	1860	0	0	0-0	
2254	2	48 34	121 4	.2	1	2	.5	81163	2410	2010	0	0	0-0	
2254	3	48 35	121 4	.2	1	3	.8	61243	2190	1800	0	0	0-0	
2255	1	48 35	121 5	1.2	1	2	1.4	61162	2380	1830	2190	1890	1980 2	
2255	2	48 36	121 5	.1	1	1	.3	81163	2010	1860	0	0	0-0	
2255	3	48 35	121 6	.1	1	7	.3	81163	2320	2230	0	0	0-0	
2255	4	48 35	121 6	.6	1	8	.6	71163	2440	1800	0	0	0-0	
2255	5	48 35	121 7	.2	1	1	.3	61163	2230	1890	0	0	0-0	
2255	6	48 35	121 8	.2	1	2	.8	61122	2070	1550	0	0	0-0	
2255	7	48 35	121 7	.1	1	6	.5	81163	2290	2070	0	0	0-0	
2255	8	48 35	121 7	.1	1	5	.5	81163	2320	2100	0	0	0-0	
2255	9	48 34	121 7	5.4	1	8	3.9	31262	2530	1200	2260	1540	2010 2	MCALLISTER
2255	10	48 34	121 9	.3	1	2	1.3	71263	2130	1650	0	0	0-0	
2255	11	48 34	121 9	.2	1	2	.6	71263	2000	1580	0	0	0-0	
2255	12	48 34	121 10	.8	1	2	1.0	71263	2180	1650	0	0	0-0	
2255	13	48 34	121 10	.2	1	2	.8	71263	2000	1650	0	0	0-0	
2255	14	48 35	121 11	.3	1	2	.6	81163	2090	1710	0	0	0-0	
2256	1	48 38	121 6	.2	1	8	1.1	61163	1980	1460	0	0	0-0	
2256	2	48 39	121 8	3.0	1	3	3.5	71262	2440	1650	2190	1860	1980 2	NEVE
2257	1	48 40	121 8	.9	1	1	1.6	61162	2190	1770	2030	1870	1950 2	COLONIAL
2257	2	48 40	121 9	.2	1	3	.5	81163	2190	1950	0	0	0-0	

51 GLACIERS 39.3 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT		LONG		AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
												A L T I T U D E S				
2261	1	48	34	121	10	.1	1	6	.3	81163	2230	2070	0	0	0-0	
2261	2	48	34	121	10	.1	1	6	.3	81163	2230	2030	0	0	0-0	
2261	3	48	33	121	9	.8	1	6	1.1	61162	2500	1940	0	0	0-0	
2261	4	48	33	121	9	.2	1	6	.6	71163	2380	2100	0	0	0-0	
2261	5	48	33	121	8	.5	1	6	1.1	71163	2440	1860	0	0	0-0	
2261	6	48	32	121	8	.1	1	7	.3	81163	2240	1950	0	0	0-0	
2261	7	48	31	121	9	.2	1	7	.5	73163	1920	1600	0	0	0-0	
2261	8	48	31	121	9	.8	1	8	1.1	71263	2130	1460	0	0	0-0	
2261	9	48	31	121	10	.3	1	1	.5	71263	2120	1780	0	0	0-0	
2261	10	48	34	121	16	.3	1	4	.6	61162	1980	1830	0	0	0 1	"MONOGRAM"
2262	1	48	31	121	10	.1	1	6	.3	81163	2190	1950	0	0	0-0	
2262	2	48	31	121	9	.1	1	4	.3	81163	2040	1920	0	0	0-0	
2262	3	48	31	121	8	1.5	1	5	1.1	71262	2360	1890	2260	2040	2160 2	ELDORADO
2262	4	48	31	121	6	.1	1	5	.3	81163	2150	2070	0	0	0-0	
2262	5	48	31	121	5	.1	1	7	.3	61263	2130	1950	0	0	0-0	
2262	6	48	31	121	5	.1	1	7	.3	61263	2260	2010	0	0	0-0	
2262	7	48	30	121	4	.3	1	5	.6	61263	2300	2010	0	0	0-0	
2262	8	48	30	121	4	.2	1	5	.8	61263	2420	2040	0	0	0-0	
2262	9	48	30	121	3	.9	1	7	1.1	61263	2610	2040	2380	2190	2290 2	"QUIEN SABE"
2262	10	48	28	121	4	.1	1	1	.3	71163	1870	1650	0	0	0-0	
2262	11	48	28	121	4	.1	1	1	.3	71163	1950	1740	0	0	0-0	
2262	12	48	28	121	5	.2	1	1	1.3	73253	2070	1100	0	0	0-0	
2262	13	48	28	121	6	.3	1	1	1.0	61343	2530	1780	0	0	0-0	
2263	1	48	28	121	6	.1	1	6	.2	81163	2010	1830	0	0	0-0	
2263	2	48	26	121	3	.1	1	8	.5	81163	2190	2000	0	0	0-0	
2263	3	48	25	121	3	1.0	1	1	2.4	21262	2420	1370	2130	1740	2010 2	MIDDLE CASCADE
2263	4	48	25	121	4	.3	1	1	1.0	71243	2390	1800	0	0	0-0	
2263	5	48	25	121	4	.1	1	8	.5	61263	2260	1980	0	0	0-0	
2263	6	48	25	121	4	.1	1	8	.3	61263	2410	2130	0	0	0-0	
2263	7	48	25	121	4	.1	1	8	.3	61263	2290	2070	0	0	0-0	
2263	8	48	25	121	5	.1	1	8	.3	61163	2130	1890	0	0	0-0	
2264	1	48	25	121	4	.1	1	5	.5	81163	2300	2070	0	0	0-0	
2264	2	48	25	121	4	.1	1	6	.3	81163	2380	2190	0	0	0-0	
2264	3	48	23	121	4	.1	1	8	.3	81163	2260	2070	0	0	0-0	
2264	4	48	22	121	3	.2	1	8	.5	81163	2410	2070	0	0	0-0	
2264	5	48	21	121	3	.1	1	7	.5	81163	2330	2040	0	0	0-0	
2264	6	48	22	121	3	2.9	1	1	3.9	21222	2180	1620	1970	1750	1860 2	SOUTH CASCADE
2264	7	48	22	121	4	.5	1	1	.8	71243	2230	1780	0	0	0-0	
2264	8	48	22	121	8	.6	1	2	1.0	61162	2130	1690	0	0	0-0	
2264	9	48	23	121	8	.1	1	3	.5	83162	1830	1650	0	0	0-0	
2264	10	48	23	121	8	.1	1	1	.3	81163	1780	1650	0	0	0-0	
2264	11	48	23	121	9	.1	1	2	.3	81163	1950	1810	0	0	0-0	
2264	12	48	24	121	10	.1	1	1	.5	81163	2060	1770	0	0	0-0	
2264	13	48	24	121	10	.1	1	1	.6	81163	2040	1710	0	0	0-0	
2265	1	48	22	121	10	.2	1	8	.6	81163	1920	1570	0	0	0-0	
2265	2	48	22	121	12	.8	1	1	1.0	71263	2130	1520	0	0	0-0	
2265	3	48	22	121	13	.1	1	2	.3	83163	1720	1580	0	0	0-0	
2265	4	48	22	121	14	.1	1	1	.3	81163	1890	1630	0	0	0-0	
2265	5	48	22	121	14	.1	1	2	.5	81163	1800	1580	0	0	0-0	
2266	1	48	24	121	14	.1	1	2	.3	81163	1980	1800	0	0	0-0	
2266	2	48	24	121	15	1.3	1	1	1.0	71252	2160	1540	0	0	0-0	
2266	3	48	24	121	16	.2	1	2	.5	81163	2120	1860	0	0	0-0	
2266	4	48	24	121	16	.1	1	3	.3	81163	2160	1940	0	0	0-0	
2267	1	48	25	121	16	.3	1	2	.8	71163	2190	1890	0	0	0-0	
2267	2	48	25	121	17	.8	1	1	1.4	71262	2230	1660	0	0	0-0	
2268	1	48	27	121	19	.1	1	1	.5	81163	1940	1750	0	0	0-0	
2268	2	48	27	121	19	.1	1	3	.3	81163	1970	1840	0	0	0-0	
2268	3	48	24	121	18	.3	1	1	.5	81163	2130	1840	0	0	0-0	
2268	4	48	24	121	19	.1	1	1	.5	81163	1810	1680	0	0	0-0	
2269	1	48	24	121	17	.1	1	4	.3	81163	2160	2040	0	0	0-0	
2269	2	48	24	121	17	.1	1	5	.3	81163	2010	1940	0	0	0-0	
2269	3	48	24	121	17	.5	1	6	1.1	61162	1970	1770	0	0	0-0	
2269	4	48	23	121	20	.3	1	8	1.6	61163	1890	1490	0	0	0-0	
2269	5	48	23	121	21	.1	1	7	.6	71163	1890	1650	0	0	0-0	

64 GLACIERS 19.4 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

										ALTITUDES				
BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
2271	1	48 22	121 19	.2	1	3	.5	81163	2000	1770	0	0	0-0	
2271	2	48 23	121 18	.1	1	3	.5	83163	1400	1330	0	0	0-0	
2271	3	48 21	121 13	.1	1	7	.2	61163	2040	1900	0	0	0-0	
2271	4	48 21	121 13	.1	1	5	.3	81163	2130	2010	0	0	0-0	
2271	5	48 21	121 12	.1	1	6	.5	81163	2130	1980	0	0	0-0	
2271	6	48 20	121 12	.1	1	7	.2	81163	2120	1980	0	0	0-0	
2271	7	48 19	121 13	.1	1	8	.3	81163	1950	1810	0	0	0-0	
2272	1	48 19	121 13	.1	1	4	.2	83163	1720	1650	0	0	0-0	
2272	2	48 20	121 12	.1	1	3	.3	81163	2100	1900	0	0	0-0	
2272	3	48 20	121 11	.2	1	3	.5	61163	2070	1860	0	0	0-0	
2272	4	48 21	121 12	.8	1	2	.6	61263	2160	1580	1970	1770	1870 2	
2272	5	48 22	121 8	.1	1	2	.6	83163	1890	1620	0	0	0-0	
2272	6	48 21	121 4	.1	1	7	.2	83163	1770	1710	0	0	0-0	
2272	7	48 20	121 4	.1	1	8	.3	71163	2070	1890	0	0	0-0	
2272	8	48 20	121 4	.1	1	8	.3	71163	2240	2100	0	0	0-0	
2272	9	48 20	121 4	.1	1	7	.3	71163	2260	2010	0	0	0-0	
2272	10	48 19	121 5	1.0	1	1	1.0	61263	2290	1770	2150	1950	2070 2	"SPIRE"
2272	11	48 19	121 6	.1	1	1	.5	81163	1950	1680	0	0	0-0	
2272	12	48 19	121 6	.1	1	1	.3	81163	2010	1950	0	0	0-0	
2273	1	48 19	121 5	.2	1	5	.2	81163	2230	2130	0	0	0-0	
2273	2	48 19	121 4	.1	1	5	.6	81163	2380	2100	0	0	0-0	
2273	3	48 19	121 4	.1	1	6	.3	81163	2350	2260	0	0	0-0	
2273	4	48 19	121 4	.1	1	5	.6	81163	2320	2010	0	0	0-0	
2273	5	48 19	121 3	.1	1	5	.3	81163	2350	2130	0	0	0-0	
2273	6	48 18	121 2	1.1	1	7	1.4	61263	2680	2010	2410	2270	2330 2	DOME
2273	7	48 18	121 2	.1	1	5	.8	81163	2510	2160	0	0	0-0	
2273	8	48 18	121 1	.2	1	5	.8	81163	2380	1950	0	0	0-0	
2273	9	48 18	121 1	.1	1	6	.6	81163	2350	2030	0	0	0-0	
2273	10	48 18	121 0	.3	1	5	.8	71163	2390	2070	0	0	0-0	
2273	11	48 15	121 0	.1	1	7	.5	81163	2240	2030	0	0	0-0	
2273	12	48 15	121 1	.3	1	1	.6	61263	2040	1860	0	0	0-0	
2273	13	48 15	121 2	.2	1	1	.6	61263	2180	1950	0	0	0-0	
2274	1	48 10	120 55	.1	1	2	.3	83163	2010	1740	0	0	0-0	
2274	2	48 10	120 56	.2	1	1	.5	83162	1890	1620	0	0	0-0	
2274	3	48 10	120 56	.1	3	1	.3	83163	2070	1920	0	0	0-0	
2275	1	48 7	120 57	.1	1	8	.2	81121	2070	2000	0	0	0-0	
2275	2	48 7	120 58	.1	1	2	.3	81163	2160	1920	0	0	0-0	
2275	3	48 7	120 59	.1	1	2	.3	81163	2070	1920	0	0	0-0	
2275	4	48 5	121 0	.1	1	1	.3	81163	2160	2100	0	0	0-0	
2275	5	48 5	121 1	.4	1	2	.5	71263	2380	2160	0	0	0-0	"MOTH"
2275	6	48 5	121 1	.1	1	1	.5	71263	2290	1860	0	0	0-0	
2275	7	48 5	121 2	.1	1	1	.5	71263	2290	1920	0	0	0-0	
2275	8	48 5	121 3	3.7	1	2	4.7	21261	2440	1680	2230	1920	2040 2	HONEYCOMB
2276	1	48 5	121 4	.1	1	1	.5	81163	2190	2070	0	0	0-0	
2276	2	48 5	121 4	.1	1	1	.5	81163	2190	1980	0	0	0-0	
2276	3	48 5	121 5	2.9	1	2	2.7	71262	2470	1650	2260	2040	2130 2	SUIATTLE
2276	4	48 5	121 6	.6	1	3	1.1	71162	2320	2040	0	0	0-0	
2276	5	48 6	121 6	1.3	1	4	1.8	71162	2680	2070	0	0	0-0	
2276	6	48 6	121 5	1.6	1	3	2.4	71343	3050	2070	2680	2260	2380 2	COOL
2276	7	48 7	121 5	2.5	1	3	4.2	21363	3140	1680	2590	2100	2260 2	CHOCOLATE
2276	8	48 7	121 5	1.1	1	3	2.1	71264	2830	1920	2380	2040	2160 2	"NORTH GUARDIAN"
2276	9	48 8	121 5	1.2	1	2	2.6	71263	2870	1890	2530	2190	2320 2	DUSTY
2277	1	48 8	121 6	.2	1	1	.6	71163	2160	1920	0	0	0-0	
2277	2	48 8	121 6	1.3	1	2	2.6	71263	3050	1830	2410	2090	2190 4	"ERMINE"
2277	3	48 9	121 7	1.3	1	2	2.7	61263	2560	1770	2290	1980	2070 4	VISTA
2278	1	48 9	121 7	.1	1	2	.5	81163	2090	1950	0	0	0-0	
2278	2	48 8	121 7	.6	1	2	1.0	61263	2470	1920	0	0	0-0	PTARMIGAN
2278	3	48 9	121 9	.3	1	2	.6	61121	1950	1830	0	0	0-0	MILK LAKE
2279	1	48 10	121 11	.1	1	7	.3	81163	1920	1890	0	0	0-0	
2279	2	48 10	121 12	.3	1	8	.6	81163	1890	1740	0	0	0-0	
2279	3	48 12	121 25	.1	1	3	.3	81163	1860	1580	0	0	0-0	
2279	4	48 13	121 25	.4	1	1	.8	61263	1800	1550	0	0	0-0	

62 GLACIERS 27.2 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ALTITUDES ACC	ABL	FRN E	NAME
2281	1	48 8	121 8	1.5	1	8	2.4	21263	3080	1950	0	0	0-0	KENNEDY
2281	2	48 7	121 8	.9	1	8	2.6	21263	3110	1920	0	0	0-0	SCIMITAR
2281	3	48 7	121 8	.1	1	8	.3	81163	2380	2190	0	0	0-0	
2281	4	48 7	121 8	.5	1	7	1.0	71263	2960	2500	0	0	0-0	
2281	5	48 6	121 8	.3	1	7	.8	71263	2440	2130	0	0	0-0	
2282	1	48 6	121 7	.3	1	6	1.1	71263	3140	2440	0	0	0-0	
2282	2	48 5	121 8	.1	1	2	.5	81163	2230	1950	0	0	0-0	
2282	3	48 4	121 7	3.1	1	6	2.1	71161	2410	1920	2230	2060	2160 2	WHITE CHUCK
2282	4	48 5	121 12	.2	3	1	.5	61163	2070	1800	0	0	0-0	
2283	1	48 7	121 17	.1	3	3	.5	81163	1890	1800	0	0	0-0	
2283	2	48 7	121 18	.1	3	1	.5	81163	1920	1820	0	0	0-0	
2283	3	48 7	121 18	.1	3	7	.6	81163	1710	1580	0	0	0-0	
2283	4	48 8	121 18	.1	3	2	.6	81163	1890	1650	0	0	0-0	
2283	5	48 8	121 19	.1	3	2	.6	81163	1890	1650	0	0	0-0	
2283	6	48 8	121 18	.2	3	2	.3	81163	1940	1770	0	0	0-0	
2283	7	48 9	121 23	.1	1	1	1.3	81163	1950	1400	0	0	0-0	
2284	1	47 58	121 20	.6	1	2	1.8	61263	2160	1400	0	0	0-0	CADET
2284	2	47 59	121 20	.1	1	2	.3	81163	1950	1650	0	0	0-0	
2284	3	47 59	121 20	.1	1	3	.8	71143	1980	1520	0	0	0-0	
2284	4	47 59	121 20	.4	1	3	.8	61263	1710	1310	0	0	0-0	
2284	5	48 2	121 20	.1	1	3	.5	81263	2130	1890	0	0	0-0	
2284	6	48 3	121 20	.9	1	2	.8	71363	2190	1770	0	0	0-0	SLOAN
2284	7	48 3	121 20	.1	1	1	.3	81163	2130	1920	0	0	0-0	
2285	1	48 0	121 21	.1	1	1	.5	83163	1220	1070	0	0	0-0	
2285	2	48 0	121 21	.1	1	2	.3	61253	2000	1830	0	0	0-0	
2285	3	48 0	121 21	.1	1	1	.2	81163	1660	1490	0	0	0-0	
2285	4	48 0	121 22	.1	1	2	.5	81163	1870	1600	0	0	0-0	
2285	5	48 0	121 22	.1	1	8	.2	81163	1890	1750	0	0	0-0	
2285	6	48 0	121 23	.3	1	8	1.3	61163	1680	1190	0	0	0-0	
2285	7	48 1	121 23	.3	1	2	.8	81163	1950	1520	0	0	0-0	
2286	1	47 58	121 21	.1	1	8	.3	83163	1830	1660	0	0	0-0	
2286	2	47 58	121 21	.1	1	8	.5	83163	1550	1420	0	0	0-0	
2286	3	47 58	121 21	.2	1	1	.3	61263	1980	1720	0	0	0-0	
2286	4	47 58	121 22	.2	1	7	.6	71263	2040	1740	0	0	0-0	

34 GLACIERS 11.7 TOTAL AREA

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ALTITUDES ACC	ABL	FRN E	NAME
2311	1	48 13	121 41	.6	1	8	1.8	71243	2040	1370	0	0	0-0	"WHITEHORSE"
2311	2	48 12	121 40	.1	1	8	.2	81163	1690	1600	0	0	0-0	
2311	3	48 11	121 41	.1	1	8	.2	81163	1950	1830	0	0	0-0	
2311	4	48 10	121 41	.1	1	8	.2	81163	1950	1830	0	0	0-0	
2311	5	48 10	121 42	.5	1	8	1.1	71263	1920	1490	0	0	0-0	"THREE FINGERS"

5 GLACIERS 1.4 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

										ALTITUDES					
BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
2331	1	48 1	121 31	.2	3	8	1.3	81163	1650	1100	0	0	0-0	
2332	1	47 57	121 21	.1	1	3	.3	81163	1920	1830	0	0	0-0	
2332	2	47 57	121 21	.1	1	3	.2	71243	2030	1950	0	0	0-0	
2332	3	47 58	121 21	.1	1	3	.3	72263	2420	1920	0	0	0-0	
2332	4	47 58	121 21	.9	1	5	1.6	21262	1740	1430	1660	1570	1620 2	COLUMBIA
2332	5	47 58	121 20	.1	1	6	.5	71263	2010	1830	0	0	0-0	
2332	6	47 58	121 20	.1	1	7	.2	81163	2130	1980	0	0	0-0	
2332	7	47 58	121 20	.1	1	3	.3	71263	2230	1980	0	0	0-0	
2332	8	47 58	121 19	.1	1	3	.5	83163	1430	1260	0	0	0-0	
2332	9	47 58	121 18	.1	1	2	.3	81163	1570	1460	0	0	0-0	
2334	1	47 35	121 11	.1	1	1	.6	61163	2190	2000	0	0	0-0	
2334	2	47 34	121 11	.9	1	1	1.6	71222	2390	1890	2190	1900	2010 2	LYNCH
2334	3	47 35	121 11	.1	1	8	.2	83163	2130	1860	0	0	0-0	
2334	4	47 34	121 12	.3	1	1	1.1	61163	1980	1660	0	0	0-0	
2334	5	47 34	121 12	.8	1	2	1.1	71163	2290	1860	0	0	0-0	
2334	6	47 35	121 13	.2	1	1	.6	81162	2130	1870	0	0	0-0	
2334	7	47 35	121 14	1.3	1	8	2.4	71162	2230	1680	0	0	0-0	HINMAN
2334	8	47 34	121 15	.1	1	1	.2	61163	1770	1650	0	0	0-0	
2334	9	47 33	121 17	.1	1	1	.3	61163	1800	1660	0	0	0-0	

19 GLACIERS 5.7 TOTAL AREA

										ALTITUDES					
BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
2342	1	47 32	121 16	.1	1	8	.3	81163	1950	1780	0	0	0-0	
2342	2	47 32	121 16	.1	1	1	.5	83163	1710	1520	0	0	0-0	
2342	3	47 32	121 16	.1	1	2	.6	81163	1870	1630	0	0	0-0	
2342	4	47 31	121 17	.5	1	1	1.6	71162	2130	1720	0	0	0-0	
2342	5	47 30	121 18	.1	1	7	.2	73163	1950	1740	0	0	0-0	
2342	6	47 29	121 19	.1	1	2	.5	81163	2100	1870	0	0	0-0	

6 GLACIERS 1.0 TOTAL AREA

										ALTITUDES					
BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
2413	1	47 29	121 19	.2	1	3	.5	81163	2070	1800	0	0	0-0	
2413	2	47 29	121 18	.2	1	3	.3	81163	2070	1780	0	0	0-0	
2413	3	47 30	121 18	.2	1	4	.5	81163	2100	1830	0	0	0-0	
2413	4	47 30	121 17	.1	1	4	.6	81163	1860	1460	0	0	0-0	
2413	5	47 30	121 17	.4	1	4	1.3	71243	2070	1480	0	0	0-0	
2413	6	47 31	121 17	.1	1	3	.3	83163	1770	1600	0	0	0-0	
2413	7	47 31	121 17	.2	1	2	.6	71243	2260	1950	0	0	0-0	
2413	8	47 31	121 16	.1	1	5	.2	81163	1460	1420	0	0	0-0	
2414	1	47 32	121 15	.1	1	3	.3	81163	1710	1580	0	0	0-0	
2415	1	47 34	121 10	.2	1	3	.6	61162	2120	1900	0	0	0-0	
2415	2	47 34	121 10	.1	1	3	.2	81163	2320	2160	0	0	0-0	
2415	3	47 34	121 10	.1	1	3	.2	81163	2350	2100	0	0	0-0	
2415	4	47 34	121 10	.5	1	2	.8	71263	2410	1950	0	0	0-0	
2415	5	47 35	121 10	.1	1	2	.2	81163	2160	2010	0	0	0-0	

14 GLACIERS 2.3 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2422	1	47 28	120 47	.1	1	2	.2	81163	2330	2210	0	0	0-0	
2422	2	47 29	120 49	.2	1	1	.3	81163	2470	2300	0	0	0-0	
2422	3	47 28	120 49	.2	1	2	.5	81162	2530	2320	0	0	0-0	
2422	4	47 28	120 49	.1	1	1	.3	81162	2510	2360	0	0	0-0	
2422	5	47 28	120 49	.1	1	1	.3	61122	2530	2350	0	0	0-0	
2422	6	47 29	120 49	.1	1	3	.2	81163	2640	2510	0	0	0-0	SNOW CREEK GLACIERS
2422	7	47 29	120 50	.2	1	2	.5	81162	2610	2380	0	0	0-0	
2422	8	47 29	120 50	.1	1	1	.6	61162	2440	2070	0	0	0-0	
2422	9	47 29	120 50	.1	1	1	.6	61262	2380	1980	0	0	0-0	
2422	10	47 28	120 52	.1	1	1	.3	81163	2260	2030	0	0	0-0	
2422	11	47 29	120 53	.1	1	2	.6	61263	2380	1980	0	0	0-0	
2422	12	47 29	120 54	.1	1	2	.6	61243	2380	1940	0	0	0-0	
2422	13	47 29	120 54	.1	1	1	.5	61263	2390	1970	0	0	0-0	
2422	14	47 29	120 54	.1	1	1	.2	61263	2380	2190	0	0	0-0	
2424	1	47 42	120 56	.1	1	3	.2	81163	2440	2190	0	0	0-0	
2426	1	47 58	120 59	.1	1	8	.2	81163	2130	1950	0	0	0-0	
2426	2	47 58	121 0	.1	1	1	.2	81163	2070	1980	0	0	0-0	
2426	3	47 57	121 1	.1	1	1	.2	81163	2070	2010	0	0	0-0	
2426	4	47 57	121 1	.1	1	1	.3	81163	2070	2000	0	0	0-0	
2426	5	47 57	121 2	.1	1	1	.2	81163	2150	2070	0	0	0-0	
2426	6	48 1	121 5	.1	1	1	.2	81163	2070	1890	0	0	0-0	
2426	7	48 1	121 6	.1	1	1	.3	61263	2130	1980	0	0	0-0	
2426	8	48 1	121 6	.3	1	1	.8	61263	2130	1860	0	0	0-0	
2426	9	48 1	121 7	.1	1	1	.3	81163	1980	1860	0	0	0-0	
2426	10	48 3	121 6	1.2	1	5	1.6	71162	2360	2100	2270	2160	2190 2	WHITE RIVER
2426	11	48 3	121 5	.3	1	3	1.0	61121	2230	2100	0	0	0-0	
2426	12	48 4	121 5	.3	1	3	.6	71263	2470	2190	0	0	0-0	
2426	13	48 4	121 2	.1	1	3	.3	71163	2260	2160	0	0	0-0	
2427	1	48 3	120 57	.8	1	2	1.9	71363	2500	1770	0	0	0-0	CLARK
2427	2	48 3	120 57	.1	1	2	.2	81163	2190	2130	0	0	0-0	
2427	3	48 3	120 58	1.4	1	2	1.9	71363	2500	1800	0	0	0-0	RICHARDSON
2427	4	48 4	120 58	.1	1	3	.5	81163	2040	1810	0	0	0-0	
2427	5	48 4	120 58	.1	1	3	1.0	81163	2010	1770	0	0	0-0	
2427	6	48 4	120 59	.7	1	2	1.8	71263	2440	1980	0	0	0-0	"PILZ"
2427	7	48 4	121 0	1.4	1	1	1.4	61363	2380	1830	0	0	0-0	BUTTERFLY
2427	8	48 5	121 1	.1	1	2	.5	71263	2380	2190	0	0	0-0	
2427	9	48 5	120 55	.1	1	6	.6	81163	2470	2380	0	0	0-0	
2428	1	48 4	120 54	.1	1	3	.2	81163	2260	2160	0	0	0-0	
2428	2	48 4	120 54	.3	1	1	.2	81163	2240	1830	0	0	0-0	
2428	3	48 6	120 54	.1	1	3	.5	61243	2320	1980	0	0	0-0	
2428	4	48 6	120 55	.1	1	1	.5	81163	1890	1710	0	0	0-0	
2428	5	48 10	120 53	.1	1	4	.2	81163	2350	2230	0	0	0-0	

42 GLACIERS 9.7 TOTAL AREA

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2431	1	48 6	120 46	.1	3	1	.5	81163	2160	1950	0	0	0-0	
2431	2	48 6	120 46	.1	3	1	.3	81163	2190	2030	0	0	0-0	
2431	3	48 6	120 47	.1	3	8	.5	81163	2040	1860	0	0	0-0	
2431	4	48 6	120 47	.1	3	1	.3	81163	2260	2090	0	0	0-0	
2431	5	48 7	120 48	.1	3	1	.3	81163	2260	2100	0	0	0-0	
2431	6	48 8	120 48	.1	3	2	.3	81163	2330	2190	0	0	0-0	
2432	1	48 8	120 47	.1	1	1	.3	81163	2290	2070	0	0	0-0	
2432	2	48 8	120 47	.2	1	1	.5	71263	2320	2130	0	0	0-0	
2432	3	48 8	120 48	.2	1	1	.5	71363	2500	2100	0	0	0-0	ENTIAT GLACIERS
2432	4	48 9	120 48	.3	1	2	.5	83163	2100	1860	0	0	0-0	
2432	5	48 9	120 48	.1	1	4	.3	72363	2290	2100	0	0	0-0	

11 GLACIERS 1.4 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

									ALTITUDES					
BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	TOP	BOT	ACC	ABL	FRN E	NAME
2441	1	48 6	120 36	.1	1	2	.8	81163	2380	2070	0	0	0-0	
2441	2	48 6	120 37	.2	1	2	.6	61163	2560	2130	0	0	0-0	
2441	3	48 8	120 40	.1	1	1	.5	81163	2320	2160	0	0	0-0	
2442	1	48 10	120 48	.2	1	2	.5	61263	2470	2160	0	0	0-0	
2442	2	48 10	120 48	.2	1	3	.8	71263	2290	1920	0	0	0-0	
2442	3	48 11	120 48	.1	1	1	.2	61263	2230	2010	0	0	0-0	
2442	4	48 10	120 48	.1	1	1	.3	81163	2620	2320	0	0	0-0	
2442	5	48 9	120 49	.1	1	1	.6	81163	2530	2130	0	0	0-0	
2442	6	48 11	120 51	.1	1	3	.2	81163	2380	2160	0	0	0-0	
2442	7	48 11	120 51	.1	1	3	.5	61163	2470	2290	0	0	0-0	
2442	8	48 12	120 50	.1	1	8	.3	81163	2070	1970	0	0	0-0	
2442	9	48 12	120 51	.1	1	1	.6	81163	2320	2060	0	0	0-0	
2442	10	48 12	120 51	.1	1	8	.2	81163	2190	2100	0	0	0-0	
2442	11	48 11	120 52	.1	1	8	.5	81163	2530	2290	0	0	0-0	
2442	12	48 10	120 53	.1	1	8	.3	81162	2290	1980	0	0	0-0	
2442	13	48 10	120 54	.5	1	1	.8	61262	2130	1860	0	0	0-0	LYMAN
2442	14	48 10	120 54	.3	1	2	.6	71263	2350	2160	0	0	0-0	
2442	15	48 11	120 55	.1	1	2	.2	71263	2190	2070	0	0	0-0	"HANGING"
2442	16	48 13	120 54	.1	1	4	.3	81163	2350	2260	0	0	0-0	
2442	17	48 14	120 52	.6	1	4	.6	61363	2620	2290	0	0	0-0	ISELLA
2442	18	48 14	120 51	.8	1	3	1.1	61363	2560	2100	0	0	0-0	MARY GREEN
2442	19	48 15	120 51	.1	1	5	.2	81163	2500	2230	0	0	0-0	
2442	20	48 15	120 51	.1	1	3	.3	71263	2190	2040	0	0	0-0	
2442	21	48 15	120 52	2.1	1	1	1.3	61363	2590	1830	0	0	0-0	COMPANY
2442	22	48 14	120 49	.2	3	3	.5	61263	2380	2230	0	0	0-0	
2442	23	48 17	120 46	.1	1	2	.2	81163	2290	2180	0	0	0-0	
2443	1	48 23	120 52	.1	1	1	.5	81163	2230	1920	0	0	0-0	
2443	2	48 16	120 53	1.1	1	1	1.6	71353	2510	1650	0	0	0-0	DARK
2443	3	48 14	120 54	.3	1	1	.5	61263	2260	2070	0	0	0-0	GRANT
2443	4	48 13	120 55	.1	1	8	.5	81163	2230	2070	0	0	0-0	
2443	5	48 15	120 58	.1	1	4	.6	81163	1890	1800	0	0	0-0	
2443	6	48 16	120 58	.1	1	1	.3	81163	2160	2010	0	0	0-0	
2443	7	48 15	120 59	.3	1	2	.3	63162	1770	1650	0	0	0-0	
2443	8	48 18	121 0	.3	1	4	.8	71263	2380	2120	0	0	0-0	
2444	1	48 19	120 57	.1	1	2	1.1	81163	2120	1580	0	0	0-0	
2444	2	48 19	120 59	.1	1	1	.8	81163	1810	1650	0	0	0-0	
2444	3	48 19	120 59	.3	1	2	.6	71263	2470	2000	2270	2120	2240 2	BLUE
2444	4	48 19	121 0	.2	1	8	.5	81163	2160	1920	0	0	0-0	
2444	5	48 19	121 0	.1	1	8	.3	81163	2260	2070	0	0	0-0	
2444	6	48 18	121 0	.1	1	6	.2	81163	2410	2190	0	0	0-0	
2444	7	48 19	121 1	4.7	1	1	3.7	21462	2680	1520	2190	1840	2040 2	CHICKAMIN
2444	8	48 19	121 3	1.6	1	1	2.1	61353	2360	1450	2130	1890	1980 2	DANA
2444	9	48 19	121 4	.9	1	2	1.4	71263	2470	1860	2230	2000	2070 2	
2444	10	48 20	121 4	.1	1	3	.3	81163	2260	2070	0	0	0-0	
2444	11	48 20	121 4	.1	1	4	.2	81163	2230	2010	0	0	0-0	
2444	12	48 21	121 4	.1	1	3	.3	81163	2040	1890	0	0	0-0	
2444	13	48 21	121 3	.1	1	6	.5	81163	2010	1890	0	0	0-0	
2444	14	48 21	121 2	.1	1	4	.6	81163	2240	1860	0	0	0-0	
2444	15	48 21	121 2	.2	1	4	1.0	71243	2410	1890	0	0	0-0	
2444	16	48 21	121 1	.2	1	4	.5	71263	2230	1950	0	0	0-0	
2444	17	48 22	121 1	.3	1	3	.6	71263	2320	1950	0	0	0-0	
2445	1	48 22	121 1	.1	1	8	.3	81163	1690	1620	0	0	0-0	
2445	2	48 22	121 1	.1	1	1	.3	81163	2010	1890	0	0	0-0	
2445	3	48 22	121 2	.2	1	2	.5	71263	2260	1980	0	0	0-0	
2445	4	48 22	121 2	2.0	1	8	2.1	71353	2440	1540	2260	1950	2010 2	LE CONTE
2445	5	48 23	121 3	.3	1	3	.6	71163	2290	1920	0	0	0-0	
2445	6	48 24	121 4	.1	1	3	.2	81163	2070	1970	0	0	0-0	
2445	7	48 25	121 3	.2	1	5	.3	81163	2360	2070	0	0	0-0	
2445	8	48 24	121 2	.2	1	4	.5	71263	2360	2100	0	0	0-0	
2445	9	48 24	121 1	.1	1	4	.5	81163	2100	1870	0	0	0-0	
2445	10	48 25	121 1	.1	1	5	.5	61263	2010	1710	0	0	0-0	
2445	11	48 25	121 1	.3	1	1	.8	71363	2190	1800	0	0	0-0	
2445	12	48 25	121 2	.3	1	1	.5	71363	2240	1860	0	0	0-0	SPIDER

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT	LONG	AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2445	13	48 25	121 3	.1	1	2	.2	81163	2230	2090	0	0	0-0	
2445	14	48 25	121 2	.1	1	3	.3	83163	2000	1860	0	0	0-0	
2445	15	48 25	121 2	.1	1	2	.5	83163	1740	1570	0	0	0-0	
2445	16	48 25	121 1	.1	1	3	.8	83163	1430	1250	0	0	0-0	
2445	17	48 25	121 0	.1	1	2	.3	83163	1250	1100	0	0	0-0	
2445	18	48 26	121 2	.1	1	5	.2	83163	2120	2040	0	0	0-0	
2445	19	48 26	121 2	.1	1	3	.3	81163	2100	1950	0	0	0-0	
2445	20	48 26	121 1	.1	1	4	.5	81163	1970	1740	0	0	0-0	
2446	1	48 26	120 59	.1	1	1	.2	61163	2010	1830	0	0	0-0	
2446	2	48 26	121 2	.4	1	1	1.0	71263	2350	1830	0	0	0-0	S
2446	3	48 26	121 1	.2	1	3	.6	83163	1720	1370	0	0	0-0	
2446	4	48 27	121 1	.1	1	4	.5	81163	1710	1520	0	0	0-0	
2446	5	48 27	121 2	.1	1	4	.3	81163	2090	1920	0	0	0-0	
2446	6	48 27	121 2	.1	1	4	.5	81163	1980	1750	0	0	0-0	
2446	7	48 27	121 2	.2	1	1	.8	71243	1980	1540	0	0	0-0	YAWNING
2446	8	48 27	121 3	.1	1	2	.6	71263	2120	1660	0	0	0-0	
2446	9	48 27	121 3	.3	1	2	.6	61163	2120	1810	0	0	0-0	
2446	10	48 29	121 2	.2	1	5	.6	71163	2620	2240	0	0	0-0	SAHALE
2446	11	48 29	121 2	.4	1	4	.6	61263	2420	2070	2320	2190	2260 2	DAVENPORT
2446	12	48 29	121 0	.1	1	7	.3	81163	2270	2150	0	0	0-0	
2446	13	48 29	121 0	.1	1	7	.8	82163	2300	2090	0	0	0-0	
2446	14	48 28	120 59	.1	1	6	.5	81163	2240	2100	0	0	0-0	
2446	15	48 28	120 58	.1	1	5	.3	81163	2390	2240	0	0	0-0	
2446	16	48 28	120 58	.1	1	2	.2	73143	2180	2090	0	0	0-0	
2446	17	48 28	120 58	.1	1	1	.2	73243	1950	1770	0	0	0-0	
2446	18	48 29	120 59	.1	1	2	.3	73243	2030	1780	0	0	0-0	
2446	19	48 29	120 59	.1	1	2	.3	83163	1620	1510	0	0	0-0	
2446	20	48 29	120 59	.3	1	2	.6	71363	2260	1770	0	0	0-0	
2446	21	48 29	121 0	.3	1	4	1.4	71363	2620	1770	2440	2240	2350 2	BUCKNER GLACIERS
2446	22	48 30	120 59	.3	1	4	.8	71363	2500	1980	2360	2160	2290 2	
2446	23	48 29	120 56	.1	1	4	.3	81163	2560	2360	0	0	0-0	
2446	24	48 29	120 55	.1	1	6	.5	81163	2500	2190	0	0	0-0	
2446	25	48 29	120 55	.1	1	7	.3	81163	2440	2330	0	0	0-0	
2447	1	48 29	120 53	.1	1	3	.3	81163	2180	2010	0	0	0-0	
2447	2	48 29	120 53	.1	1	2	.3	81163	2320	2100	0	0	0-0	
2447	3	48 29	120 54	.7	1	2	.6	73343	2380	1770	2060	1920	1980 2	GOODE
2447	4	48 29	120 55	.3	1	2	.8	73343	2470	1860	0	0	0-0	
2447	5	48 30	120 55	.1	1	1	.5	73243	1770	1510	0	0	0-0	
2447	6	48 30	120 55	.1	1	3	.6	73243	1950	1550	0	0	0-0	
2447	7	48 30	120 56	.1	1	8	.3	71163	2500	2300	0	0	0-0	
2447	8	48 30	120 56	1.0	1	2	1.1	71463	2440	1870	0	0	0-0	WYTHE
2447	9	48 31	120 57	.2	1	3	.3	63163	2130	1980	0	0	0-0	
2447	10	48 31	120 57	.6	1	4	1.9	71163	2590	1490	0	0	0-0	
2447	11	48 32	120 49	.1	1	8	.5	81163	2470	2190	0	0	0-0	
2447	12	48 32	120 49	.3	1	8	1.0	63353	2440	1770	0	0	0-0	
2447	13	48 30	120 48	.1	1	8	.3	81163	2320	2100	0	0	0-0	
2447	14	48 30	120 49	.1	1	1	.5	81163	2210	1980	0	0	0-0	
2448	1	48 30	120 45	.1	1	3	.3	81163	1950	1860	0	0	0-0	
2448	2	48 30	120 45	.1	1	2	.2	81163	2260	2160	0	0	0-0	
2448	3	48 29	120 45	.3	3	1	.5	61163	2290	2070	0	0	0-0	LYALL
2448	4	48 29	120 44	.1	3	3	.3	83163	0	0	0	0	0-0	
2448	5	48 24	120 46	.1	1	1	.2	81163	2090	1980	0	0	0-0	
2448	6	48 24	120 46	.1	1	1	.5	61163	2230	2000	0	0	0-0	
2448	7	48 25	120 47	.1	1	1	.3	71163	2290	2040	0	0	0-0	
2448	8	48 25	120 47	.2	1	1	.8	71263	2320	1890	0	0	0-0	SANDALEE GLACIERS
2448	9	48 25	120 47	.2	1	1	.8	71263	2320	1970	0	0	0-0	
2448	10	48 25	120 48	.3	1	1	.6	71263	2410	2090	0	0	0-0	
2448	11	48 25	120 48	.1	1	1	.5	83163	2230	1950	0	0	0-0	

121 GLACIERS 31.3 TOTAL AREA

TABLE 1.—*Glaciers of the North Cascades*—Continued

BASN	GL	LAT		LONG		AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2451	1	48	15	120	26	.1	3	1	.2	81163	0	0	0	0	0-0	
2453	1	48	31	120	29	.1	3	1	.3	83063	2320	2070	0	0	0-0	
2453	2	48	31	120	29	.2	3	1	.8	71063	2560	2190	0	0	0-0	
2453	3	48	33	120	34	.2	1	2	.6	81163	2360	1980	0	0	0-0	
2453	4	48	33	120	35	.2	1	2	.6	71263	2530	2230	0	0	0-0	
2453	5	48	33	120	35	.2	1	1	.8	71263	2560	2090	0	0	0-0	
2453	6	48	33	120	35	.1	1	1	.3	81163	2360	2190	0	0	0-0	
2453	7	48	34	120	36	.1	1	1	.2	83163	2060	1950	0	0	0-0	
2454	1	48	35	120	42	.1	1	2	.3	81163	2270	2070	0	0	0-0	
2454	2	48	35	120	42	.1	1	1	.5	63163	2240	2030	0	0	0-0	
2454	3	48	36	120	42	.1	1	2	.5	63163	2190	2040	0	0	0-0	
2454	4	48	36	120	44	.1	1	2	.3	83163	2320	2150	0	0	0-0	
2454	5	48	36	120	44	.1	1	1	.2	83163	2160	2010	0	0	0-0	
2455	1	48	44	120	34	.1	1	3	.3	81163	2420	2330	0	0	0-0	
2455	2	48	44	120	37	.1	1	1	.3	61163	2320	2190	0	0	0-0	

15 GLACIERS 1.4 TOTAL AREA

BASN	GL	LAT		LONG		AREA	A	O	LNTH	CLASS	ALTITUDES TOP	BOT	ACC	ABL	FRN E	NAME
2465	1	48	59	120	51	.1	1	2	.6	81163	0	0	0	0	0-0	
2465	2	48	59	120	51	.1	1	3	.3	83263	0	0	0	0	0-0	

2 GLACIERS .2 TOTAL AREA

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