SYNTHESIS OF NATURAL FLOWS AT SELECTED SITES IN AND NEAR THE MILK RIVER BASIN, MONTANA, 1928-89

By Lawrence E. Cary and Charles Parrett

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 95-4022

Prepared in cooperation with the
BUREAU OF RECLAMATION

Helena, Montana
March 1995

U.S. DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

Gordon P. Eaton, Director

For additional information write to:

District Chief
U.S. Geological Survey
428 Federal Building
301 South Park Avenue
Drawer 10076
Helena, MT 59626-0076

Copies of this report may be purchased from:

U.S. Geological Survey
Earth Science Information Center
Open-File Reports Section
Box 25286, Mail Stop 517
Denver Federal Center
Denver, CO 80225

CONTENTS

ILLUSTRATIONS

TABLES

TABLES--Continued

CONVERSION FACTORS

Multiply	By	To obtain
acre	0.4047	hectare
acre-foot (acre-ft)	1,233	cubic meter
cubic foot per second (ft^3/s)	0.028317	cubic meter per second
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer

SYNTHESIS OF NATURAL FLOWS AT SELECTED SITES IN AND NEAR THE MILK RIVER BASIN, MONTANA, 1928-89

By Lawrence E. Cary and Charles Parrett

Abstract

Natural monthly streamflows were synthesized for the years 1928-89 at 2 sites in the St. Mary River Basin and 11 sites in the Milk River Basin in north-central Montana. The sites are represented as nodes in a streamflow accounting model being developed by the Bureau of Reclamation for the Milk River Basin. Recorded flows at most sites have been affected by human activities, including reservoir storage and irrigation diversions. The flows at the model nodes were corrected for the effects of these activities to obtain synthesized flows. Recorded data at some sites do not include the entire study period, or are only seasonal. The synthesized flows at these sites were extended using a statistical technique.

The methods of synthesis varied, depending on upstream activities and information available. Flows at sites in the St. Mary River Basin and at Milk River at Eastern Crossing of International Boundary previously had been synthesized. However, at one St. Mary River site and at Milk River at Eastern Crossing, previously synthesized total natural flow for the period November through March or April needed to be disaggregated into monthly flows. The flows at mainstem sites downstream from the Milk River at Eastern Crossing were synthesized by adding synthesized natural runoff from intervening drainage areas to natural flows for Milk River at Eastern Crossing. Natural runoff from intervening drainage areas was estimated by multiplying recorded flows at selected index gaging stations on tributary streams by the ratio of the intervening drainage area to the combined drainage area of the index stations. The recorded flows for Milk River at Western Crossing of International Boundary and for Peoples Creek near Dodson, Montana, were assumed to be natural flows.

Selected results were compared with recorded near-natural flows from a representative mountain stream and a representative plains stream, and with recorded flows near the mouth of the Milk River. The monthly distribution of synthesized natural flows compared favorably with the distributions from the representative streams. The synthesized annual flows at the mouth compared favorably with the recorded flows near the mouth when the effects of upstream irrigation were considered.

INTRODUCTION

The Bureau of Reclamation (BOR) is developing a monthly streamflow accounting model to evaluate the effects of various water-allocation schemes on water availability at selected locations in the Milk River Basin in Montana. To make comparisons between schemes, a consistent data set of natural flows (unaffected by human use) is required. Accordingly, the BOR needs natural monthly flows at 13 sites for the base period 1928-89. Of the 13 sites (table 1), hereinafter referred to as nodes, 2 are in the St. Mary River Basin and 11 are in the Milk River Basin (fig. 1). Because six of the nodes are at U.S. Geological Survey (USGS) streamflow-gaging stations and because the USGS has synthesized natural flows for international apportionment purposes at several nodes in the study area, the BOR requested that the USGS synthesize monthly natural flows for use in the model.

This report, which was prepared in cooperation with the BOR, presents the results of the synthesis of natural flows for the 1928-89 base period for 13 nodes. Because the amount of streamflow and water-use data for the nodes varied, several methods were used to synthesize natural flows. The study area includes the St. Mary River Basin in Montana and the Milk River Basin. The Milk River originates along the east side of the St. Mary River Basin boundary in northwest Montana, flows northeast into Alberta, Canada, and then flows eastward for about 110 mi before reentering Montana (fig. 1). The river continues flowing in a southeasterly direction until it joins the Missouri River downstream from Fort Peck Lake near Nashua in northeastern Montana.

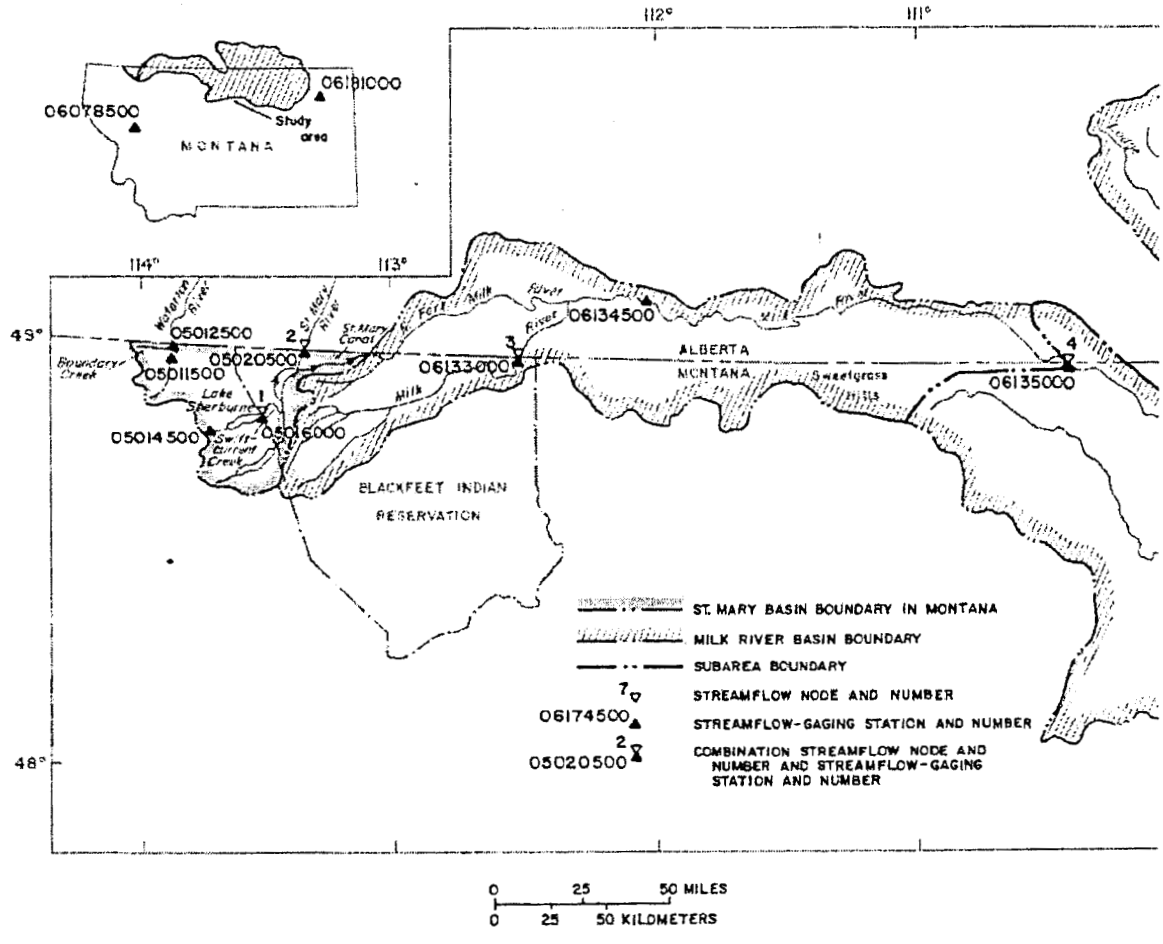
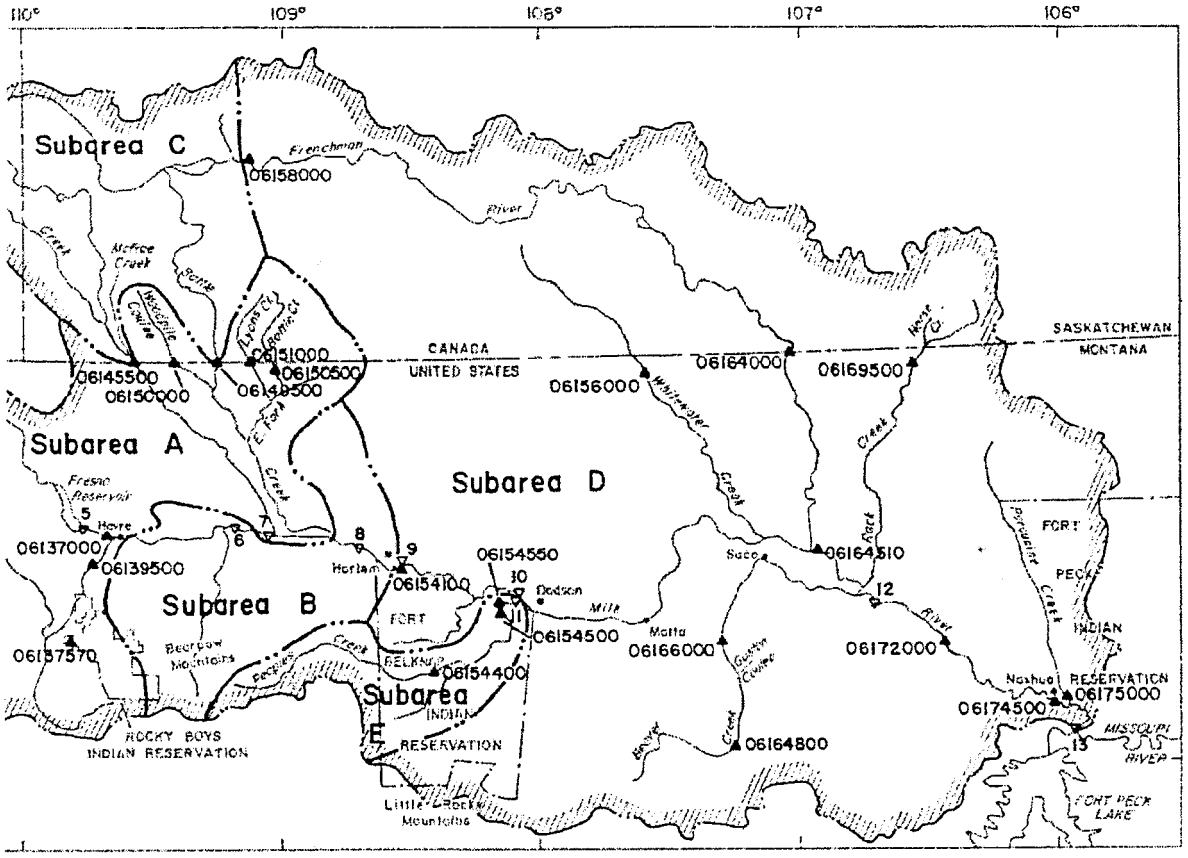


Figure 1. Location of the St. Mary River Basin in Montana and Milk River Basin, streamflow accounting-



model nodes, and streamflow-gaging stations used in data synthesis and extension of records.

Table 1. Streamflow accounting-model nodes and associated streamflow-gaging stations in the St. Mary and Milk River Basins, Montana

[--, no data]

Node no.	Node name	Gaging station no.	Period of record since 1928
1	Swiftcurrent Creek at Sherburne	05016000	1928-81; 1984-89[1]
2	St. Mary River at International Boundary	05020500	1928-89
3	Milk River at Western Crossing of International Boundary	06133000	1931-89[1]
4	Milk River at Eastern Crossing of International Boundary	06135000	1928-89[1]
5	Milk River below Fresno Reservoir	--	--
6	Milk River at Ft. Belknap diversion dam	--	--
7	Milk River at Paradise diversion dam	--	--
8	Milk River at Harlem pumping plant	--	--
9	Milk River near Harlem	06154100[2]	1959-69; 1983-89
10	Milk River upstream from Peoples Creek	--	--
11	Peoples Creek at mouth	06154500[3]	1951-73; 1982-88
12	Milk River at Vandalia diversion dam	--	--
13	Milk River at mouth	--	--

[1]Monthly data are available only for March-October.
[2]Station data were not used to synthesize natural flows.
[3]Streamflow-gaging station, Peoples Creek near Dodson, Mont., is located about 7 mi upstream from node.

The Milk River drains about 23,000 mi^2 in the United States and Canada, including mountains and plains areas. From the headwaters in the mountains to Fresno Reservoir, the tributaries drain plains areas and the Sweetgrass Hills. From Fresno Reservoir to the confluence of Peoples Creek, the tributaries joining from the south drain the Bearpaw and Little Rocky Mountains, whereas tributaries joining from the north drain plains areas. From the confluence of Peoples Creek to the mouth of the river, the tributaries joining from the north and south drain plains areas.

The major use of water in the Milk River Basin in both the United States and Canada is for irrigation. Some of the water used in the basin is from a transbasin diversion from the St. Mary River drainage in Montana. Water from Swiftcurrent Creek, a tributary to the St. Mary River, is stored in Lake Sherburne and released during the irrigation season to supplement flow of the St. Mary River. Water is diverted from the St. Mary River via the St. Mary Canal into the North Fork of the Milk River near the International Boundary.

Water is diverted from the Milk River and its tributaries for irrigation and municipal supply and is stored in reservoirs for future use. The largest reservoir (103,000 acre-ft) is Fresno Reservoir on the mainstem Milk River in Montana. Numerous smaller reservoirs are located on tributaries.

SYNTHESIS OF NATURAL F OWS

At five nodes where gaged fl data were available, natural flows for the periods c record had either been previously synthesized by t U.S. Geological Survey and Water Survey of Canad (USGS/WSC) or were considered to be the same as recorded flows (D.B. Hanson, U.S. Geological Su y, written commun., 1992). For the remaining eig nodes, a method developed by the Montana Rese d Water Rights Compact Commission (MRWRC that used flow records from selected (index) gagi tations was used to synthesize natural flows (Rober . Levitan, Montana Reserved Water Rights Com ct Commission, written commun., 1990). Becaus ome gaging stations at nodes and some index ga ng stations were operated seasonally and because t gaging stations had variable record lengths, a stream ow record-extension program was used to estimat nissing monthly flows within the base period.

Nodes 1 and 2 are in the St. lary River Basin where water use is negligible. Ho ver, Swiftcurrent Creek at Sherburne (node 1) and Mary River at International Boundary (node 2) are fected by regulation of Lake Sherburne. In addition irrigation-season flows at node 2 are affected by div sions into the St. Mary Canal which supplies the Mil River with irrigation water. Monthly natural flows for nodes 1 and 2 were previously synthesized by the USGS/WSC for

March or April thr
addition, total nat
of record for Nove
synthesized for no
ber through March
monthly natural fl
ratios of recorded

Nodes 3-13
node in the Milk R
Crossing of Inter
upst am water us
ulate Therefore
ber) fl s recorde
Milk R ver at W
Boundary (06133(
flows for n de 3.

For M lk R
tional Boun ry (
period of rec rd f
viously synth size
total flow for ea
through February,
was determined b
for November thr
base period was d
multiplying total f
total flow for the
determined from a
tion, Milk River
which is operated

Monthly na
from node 5 to
method develope
flows at node 9.
RCC was b
he interver
adding
nat ws at n
inter g draina
are areas (A,
is nd historic
l runoff fro
g recorded or
re index gagin
ased on the ratio
to the combined
For example, if t
drainage area of
monthly runoff fr
500 mi^2, recorde
be added togeth
obtain synthesize
The index station
the associated dra

October for the base period. In
low for each year for the period
through March was previously
Total natural flow for Novem-
ch year was disaggregated into
by multiplying the total by the
ly flows to recorded total flow.
the Milk River Basin. The first
Basin is Milk River at Western
al Boundary (node 3), where
egligible and flows are not reg-
easonal (March through Octo-
he streamflow-gaging station,
n Crossing of International
were considered to be natural

: Eastern Crossing of Interna-
), monthly natural flows for the
ch through October were pre-
he USGS/WSC. In addition,
ar for the period November
h was assumed to be natural,
SGS. At this node, total flow
February for each year in the
egated into monthly flows by
y the ratios of monthly flow to
November through February
ream, streamflow-gaging sta-
k River, Alberta (06134500),
ound.

lows for all mainstem nodes
3 were synthesized using a
e MRWRCC for synthesis of
method developed by the
n synthesizing natural runoff
ainage area between nodes 4
noff to previously synthesized
The MRWRCC divided the
a between nodes 4 and 9 into
d C) based on runoff character-
v data (fig. 1). Total monthly
h subarea was synthesized by
esized monthly flows at one or
ions and an adjustment factor
al drainage area of the subarea
ge areas of the index stations.
ndex stations with a combined
mi^2 were used to synthesize
subarea with a drainage area of
ws for the index stations would
d multiplied by (500/200) to
tural runoff from the subarea.
d for each subarea, along with
areas, are listed in table 2. The

intervening drainage area for each subarea, by node, is listed in table 3.

This method was used for the synthesis of natural flows at Milk River nodes because it eliminated the need to consider mainstem reservoir regulation or diversions. Application of the method to nodes between nodes 4 and 9 required some adjustment because the intervening drainage areas included only portions of subareas A, B, and C. Application of the method to Milk River nodes downstream from node 9 required the delineation of two additional subareas (D and E).

Subarea A comprises generally low-runoff-producing plains where streams commonly flow only intermittently. Index stations within subarea A (table 2) having recorded flows that were considered to be near-natural and generally representative of total runoff from subarea A were Woodpile Coulee near International Boundary (06150000), East Fork Battle Creek near International Boundary (06150500), and Lyons Creek at International Boundary (06151000). In addition, Whitewater Creek near International Boundary (06156000) was selected to be an index station for subarea A, even though it is located in a different subarea, because its runoff characteristics were considered to be similar to those of most streams in subarea A. The total drainage area of subarea A is 3,661 mi^2 (table 3). The total drainage area of the four index stations is 674 mi^2. Total natural runoff for any month from subarea A was thus the combined flow for that month from the four index stations times (3,661/674).

Although subarea B is mostly plains, it includes the Bearpaw Mountains which produce more runoff than do the plains. The single index station (table 2) having flows that were considered to be near-natural and most representative of runoff from subarea B is Peoples Creek near Dodson (06154500) which is located in subarea E. The total drainage area of subarea B is 1,628 mi^2 (table 3), and the drainage area of the index station is 670 mi^2. Total natural runoff for any month from subarea B was thus calculated as the recorded flow for that month at the index station times (1,628/670).

Subarea C includes the drainage basins of Lodge Creek below McRae Creek at the International Boundary (06145500) and Battle Creek at the International Boundary (06149500). Although recorded flows at these sites have been affected by upstream use, storage, and diversions, natural flows have previously been synthesized by the Canada Department of Environment (Environment Canada) for the period 1911-69 (Water Planning and Management Branch, 1972) and by the USGS/WSC for the period 1961-89. The total

Table 2. Index stations and drainage areas for each subarea, Montana and Alberta and Saskatchewan, Canada

Subarea	Station number	Station name	Contributing drainage area, in square miles
A	06150000	Woodpile Coulee near International Boundary	60.2
	06150500	East Fork Battle Creek near International Boundary	89.5
	06151000	Lyons Creek at International Boundary	66.7
	06156000[1]	Whitewater Creek near International Boundary	458
		Total for index stations representing subarea A (Index A)	674
B	06154500[2]	Peoples Creek near Dodson	670
		Total for index station representing subarea B (Index B)	670
C	06145500	Lodge Creek below McRae Creek, at International Boundary	738
	06149500	Battle Creek at International Boundary	619
		Total for index stations in subarea C (Index C)	1,357
D	06166000	Beaver Creek below Guston Coulee, near Saco	1,208
	06169500	Rock Creek below Horse Creek, near International Boundary	328
	06175000	Porcupine Creek at Nashua	725
	06164000	Frenchman River at International Boundary	1,787
		Total for index stations in subarea D (Index D)	4,048
E	06154500	Peoples Creek near Dodson	670
		Total for index station in subarea E (Index E)	670

[1]Station located in subarea D.
[2]Station located in subarea E.

Table 3. Intervening drainage areas in Montana and Alberta and Saskatchewan, Canada, from Milk River at Eastern Crossing of International Boundary to mouth of the Milk River, Montana

Model node no.	Model node name	Intervening drainage areas within specified subareas (square miles)				
		A	B	C	D	E
4	Milk River at Eastern Crossing of International Boundary	0	0	0	0	0
5	Milk River below Fresno Reservoir	960	0	0	0	0
6	Milk River at Ft. Belknap diversion dam	2,488	502	0	0	0
7	Milk River at Paradise diversion dam	2,646	660	0	0	0
8	Milk River at Harlem pumping plant	3,661	1,326	1,357	0	0
9	Milk River near Harlem	3,661	1,628	1,357	0	0
10	Milk River upstream from Peoples Creek	3,661	1,628	1,357	635	0
12	Milk River at Vandalia diversion dam	3,661	1,628	1,357	10,400	670
13	Milk River at mouth	3,661	1,628	1,357	12,620	670

drainage area of subarea C is 1,357 mi^2 and is coincident with the combined drainage areas of the two index stations (tables 2 and 3). Total natural runoff for any month from subarea C is thus the combined synthesized natural flow for that month from the two index stations.

Subarea D consists of the intervening Milk River drainage between node 9 and the mouth, except for the drainage area of Peoples Creek, and comprises generally low-runoff-producing plains. Index stations (table 2) having recorded flows that are considered to be near-natural and generally representative of streams draining subarea D are Beaver Creek below Guston Coulee, near Saco (station 06166000), Rock Creek below Horse Creek, near International Boundary (station 06169500), and Porcupine Creek at Nashua (station 06175000). In addition, Frenchman River at International Boundary (station 06164000), although heavily used and regulated upstream, was used as an index station because the USGS/WSC had previously synthesized natural flows for water apportionment purposes for the period 1937-89.

Subarea E, which is drained only by Peoples Creek, is separate from subarea D because it includes part of the Bearpaw Mountains and because Peoples Creek near Dodson (06154500) is a separate node (node 11) for which synthesized natural flows were required. Peoples Creek is thus used as an index station for both subareas B and E.

Natural runoff for any month at a node between node 4 and the mouth was synthesized using the following equation:

$$\begin{aligned}\text{Runoff} = {} & (\text{Area A} / \text{Index A}) \times QA \\ & + (\text{Area B} / \text{Index B}) \times QB \\ & + (\text{Area C} / \text{Index C}) \times QC \\ & + (\text{Area D} / \text{Index D}) \times QD \\ & + (\text{Area E} / \text{Index E}) \times QE \qquad (1)\end{aligned}$$

where Areas A, B, C, D, and E are the portions of intervening drainage area within subareas A, B, C, D, and E, respectively. Index A, B, C, D, and E are the combined drainage areas of the index stations for subareas A, B, C, D, and E, respectively. QA, QB, QC, QD, and QE are the combined flows of the index stations in subareas A, B, C, D, and E, respectively.

To illustrate the use of equation 1, assume that the combined flow for some month for the 4 index stations in subarea A is 30 ft^3/s. For the same month, the flow for the index station for subarea B and E is 25 ft^3/s, the combined flow for the 2 index stations for subarea C is 110 ft^3/s, and the combined flow for the 4 index stations for subarea D is 140 ft^3/s. To synthesize natural runoff for the area between nodes 4 and 10, the portion of intervening area within each subarea is determined from table 3 as follows:

Area A = 3,661 square miles
Area B = 1,628 square miles
Area C = 1,357 square miles
Area D = 635 square miles
Area E = 0 square miles

Because none of subarea E is included in the intervening drainage area between nodes 4 and 10, subarea E is not a part of subsequent calculations.

From table 2, the combined drainage areas of the index stations in subareas A, B, C, and D are as follows:

Index A = 674 square miles
Index B = 670 square miles
Index C = 1,357 square miles
Index D = 4,048 square miles

From equation 1, natural runoff for the intervening drainage area between nodes 4 and 10 for the specified month is computed as follows:

$$\begin{aligned}\text{Runoff} = {} & (3{,}661/674) \times 30.0 + (1{,}628/670) \times \\ & 25.0 + (1{,}357/1{,}357) \times 110 + \\ & (635/4{,}048) \times 140 \\ = {} & (5.43) \times 30.0 + (2.43) \times \\ & 25.0 + (1.00) \times 110 + 0.157 \times (140) \\ = {} & 163 + 60.8 + 110 + 22.0 \\ = {} & 356\ ft^3/s.\end{aligned}$$

STREAMFLOW RECORD EXTENSION

To extend short-term and seasonal flow records to the 1928-89 base period, a streamflow record-extension program developed by Alley and Burns (1983) was used. This program selects the best nearby (base) station from all those available in a region to estimate, using a regression technique, each month of missing record at a node. Thus, if a node has several months of missing record, several different base stations may be used for estimating missing flows. The criterion for selection is to use the base station that results in the smallest standard error of prediction for that month. Only stations with flow record for a particular month and year were used to estimate missing flows at other nodes for that month and year; previously estimated flows were not used to estimate other missing flows. Flow records were extended to the 1928-89 base period at 3 nodes and 10 index stations used to synthesize natural flow at nodes in the St. Mary and Milk River Basins.

The regression technique used in the streamflow record-extension program is the MOVE.1 (Maintenance of Variance Extension, Type 1) curve-fitting technique described by Hirsch (1982). This technique is analogous to ordinary least-squares (OLS) regression, but MOVE.1, unlike OLS regression, results in an extended flow record with a variance comparable to that of the unextended flow record.

To extend flow records at the nodes and index stations, 24 stations were used as base stations in the record-extension program (table 4 at the back of the report). Included in the list of base stations are some nodes for which both recorded and natural-flow data are available. Based on the selection criteria, the recorded flow data were used to estimate missing record at some nodes, and the synthesized natural flows were used to estimate missing record at other nodes.

Because the synthesized natural-flow records for Lodge Creek below McRae Creek at International Boundary (06145500) and Battle Creek at International Boundary (06149500) were computed by two sources, the streamflow record-extension program was used at each node to ensure that natural flows would be consistent for the 1928-89 base period. The MOVE.1 technique was thus used at each node to regress natural flows determined by Environment Canada against natural flows determined by the USGS/WSC in order to extend natural-flow record determined by the USGS/WSC. For convenience in the use of the streamflow record-extension program, synthesized natural-flow records at streamflow-gaging stations were assigned the same station numbers as the gages except for the last two digits. The last two digits of station numbers for natural-flow records synthesized by Environment Canada were 99, whereas the last two digits of station numbers for natural-flow records synthesized by the USGS/WSC were 88. Thus, for example, the station number assigned to the natural-flow record for Battle Creek that was synthesized by Environment Canada was 06145599, and the station number assigned to the natural-flow record at this station that was synthesized by the USGS/WSC was 06145588.

The results of streamflow synthesis are presented in tables 5-17 at the back of the report. One table was prepared for each node and shows the synthesized total monthly flow volume, in acre-feet, for each calendar year of the base period.

RELIABILITY OF RESULTS

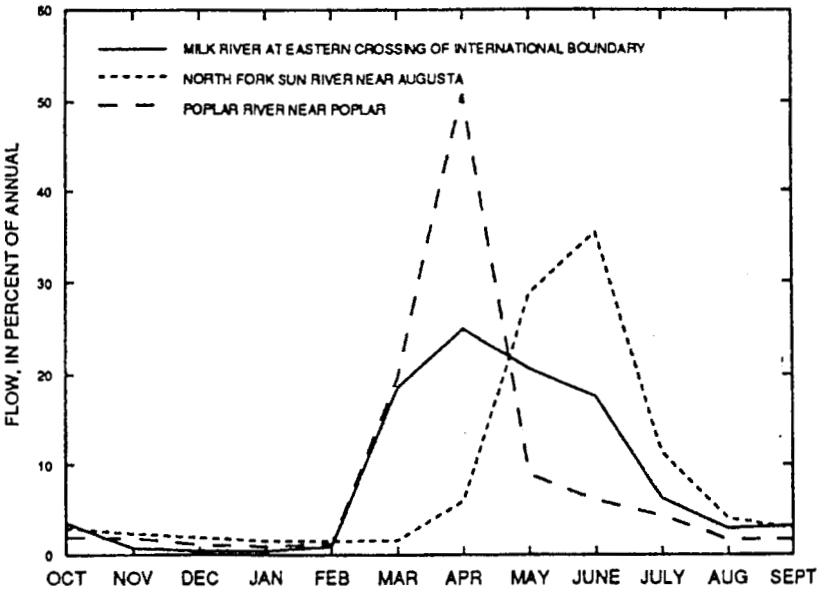
Owing to man's activities in the Milk River Basin that predate the establishment of streamflow-gaging stations, no data were available to which the results of the synthesis of natural flows could be directly compared. However, some qualitative comparisons could be made based on the seasonal distribution of flows from a typical mountain stream and a typical plains stream that were little affected by irrigation. In addition, a comparison between synthesized and historical flows near the mouth of the Milk River provided insight as to the correctness of the magnitude and distribution of synthesized natural flows.

Reservoir releases and irrigation-return flows weeks or months after the water was diverted or stored result in an alteration in the monthly distribution of flows. However, the monthly distribution of synthesized natural flows should be similar to the monthly distribution of flows from similar streams that are not affected by diversions or storage.

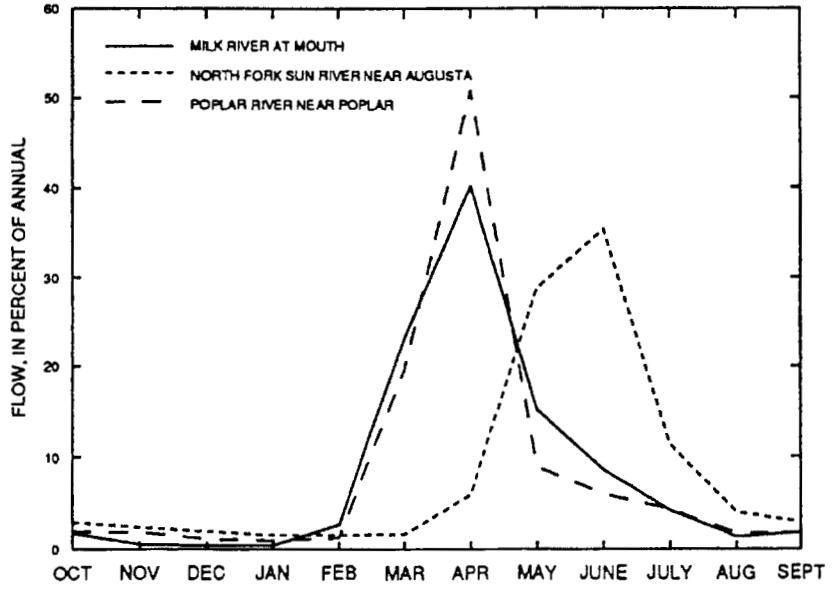
Monthly flow distributions for the North Fork Sun River near Augusta, Mont. (06078500), a station on a mountain stream, and the Poplar River near Poplar, Mont. (06181000), a station on a plains stream, were compared with the monthly distributions of synthesized natural flows for two nodes on the Milk River. Neither comparison station has significant upstream irrigation diversions. A small reservoir provides some control of the flows of a tributary to the Poplar River, but its effect on monthly distribution of flow is believed to be minor.

Dimensionless monthly flows were computed for the two comparison stations and for the natural-flow records for Milk River at Eastern Crossing of International Boundary (node 4) and Milk River at mouth (node 13) by dividing the means of the monthly flows by the mean annual flow. A graphical comparison of the dimensionless monthly flows at the comparison stations to the dimensionless monthly natural flows at the two Milk River nodes is shown in fig. 2. As shown in figure 2A, the Milk River at Eastern Crossing of International Boundary (node 4) has a monthly distribution of flows that is intermediate between the distributions of the North Fork Sun and Poplar Rivers. The distribution was similar to those for both the North Fork Sun River and Poplar River from about August through January. The increase in flow owing to spring runoff for the Milk River at Eastern Crossing is similar to that of the Poplar River. From March through July the distribution is generally intermediate between the two comparison stations. The distribution of synthesized natural flows for Milk River at mouth (node 13) is similar to that of the Poplar River throughout the year, indicating that the synthesized natural flows are typical of natural flows of a plains stream.

Finally, the means of synthesized monthly natural flows for the Milk River at mouth (node 13) were compared to the means of recorded monthly flows for the streamflow-gaging station, Milk River at Nashua (station 06174500) for the period of gaged record



A. Comparison for Milk River at Eastern Crossing of International Boundary (node 4)



B. Comparison for Milk River at mouth (node 13)

Figure 2. Distribution of dimensionless monthly natural flows for two accounting-model nodes on the Milk River compared to distribution of dimensionless monthly flows for the North Fork Sun River near Augusta, Mont., and Poplar River near Poplar, Mont.

(1941-90). As shown in figure 3, recorded flows were larger than synthesized flows for October through January, probably as a result of irrigation return flows. Synthesized flows were larger than recorded flows from February through June, probably because of the storage of spring runoff in the numerous reservoirs in the basin. From July through September, the hydrographs are nearly the same, indicating that the diversion of water from the St. Mary River Basin and the release of stored water about equaled the water consumptively used by irrigation in the Milk River Basin.

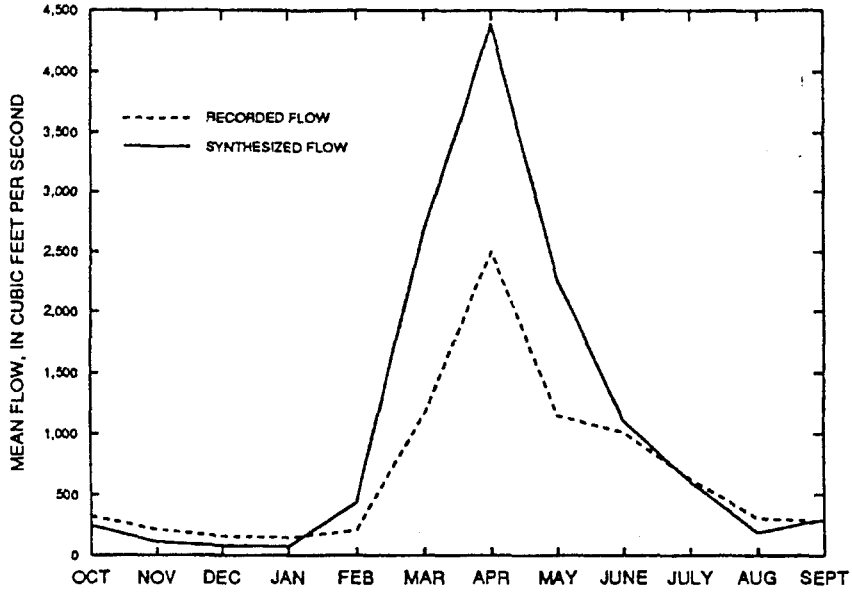


Figure 3. Comparison of means of synthesized monthly natural flows for the Milk River at mouth (accounting-model node 13) with means of recorded monthly flows for Milk River at Nashua (station 06174500).

SUMMARY

Natural monthly streamflows were synthesized for 2 sites in the St. Mary River Basin and 11 sites in the Milk River Basin in north-central Montana. The sites are represented as nodes in a streamflow accounting model being developed by the Bureau of Reclamation. The data were synthesized for 1928-89. The methods of synthesis varied depending on the degree of human activities upstream and data availability.

Flows at nodes in the St. Mary River Basin were affected by storage in Lake Sherburne, and flows at the node St. Mary River at International Boundary also were affected by diversion into the St. Mary Canal. Natural flows were previously synthesized by the USGS/WSC for March or April through October. In addition, total flow for November through March had been synthesized for the St. Mary River at International Boundary. The total flow was disaggregated into monthly flows by multiplying the total by the ratios of recorded monthly flows to recorded total flow.

The recorded flows of the Milk River at Western Crossing of International Boundary were assumed to be the natural flows. Water use and flow regulation upstream from the seasonal streamflow-gaging station were considered to be negligible.

Natural flows for the Milk River at Eastern Crossing of International Boundary were previously synthesized by the USGS. Total flows for November through February were disaggregated to monthly mean flows using percentages computed from recorded winter flows for Milk River at Milk River, Alberta.

The flows at the main-stem nodes downstream from Eastern Crossing were synthesized by adding the synthesized runoff from subareas to natural flows for Milk River at Eastern Crossing. Natural runoff was synthesized by adding the flows from index stations and multiplying by a drainage-area ratio. Flows for Peoples Creek, a tributary to the Milk River, were assumed to be natural flows.

A streamflow record-extension program was used to extend short-term and seasonal flow records to the 1928-89 base period. Flow records were extended at 3 nodes and 10 index stations in the St. Mary and Milk River Basins.

Although the results could not be verified independently, two comparisons were made to check the validity of the results. Dimensionless monthly flows at two nodes, Milk River at Eastern Crossing of International Boundary and Milk River at mouth, were compared with dimensionless monthly flows from a mountain stream (North Fork Sun River) and a plains stream (Poplar River) that were little affected by human use. The monthly distribution of natural flows for Milk River at Eastern Crossing of International Boundary was intermediate between distributions of flow for the mountain and plains streams. The monthly distribution of natural flows for Milk River at mouth resembled that of a plains stream. Synthesized monthly natural flows at the mouth were also compared to recorded flows at Nashua. Synthesized flows were smaller than recorded flows for October through January and were larger than recorded flows for February through June. Synthesized and recorded flows were about the same for July through September. Differences are probably attributable to storage and irrigation effects.

REFERENCES CITED

Alley, W.M., and Burns, A.W., 1983, Mixed-station extension of monthly streamflow records: American Society of Civil Engineers, Journal of Hydraulic Engineering, v. 109, no. 10, p. 1,272-1,284.

Hirsch, R.M., 1982, A comparison of four streamflow record extension techniques: Water Resources Research, v. 18, no. 4, p. 1,081-1,088.

Water Planning and Management Branch, 1972, Water use and water supply studies of Battle and Lodge Creek basins: Canada Department of the Environment, v. 1 and 2, 223 p.

Supplemental Data

Table 4. Streamflow-gaging stations used in extension of monthly streamflow records at accounting-model nodes and index stations in the St. Mary and Milk River Basins

Station whose record was extended		Stations used in extension	
No.	Name	No.	Name
05016000	Swiftcurrent Creek at Sherburne	05011500	Waterton River near International Boundary
		05012500	Boundary Creek at International Boundary
		05014500	Swiftcurrent Creek at Many Glacier
		05020500	St. Mary River at International Boundary
06133000	Milk River at Western Crossing of International Boundary	05020500	St. Mary River at International Boundary
		06133500	North Fork Milk River above St. Mary Canal, near Browning
		06134500	Milk River at Milk River, Alberta
		06174500	Milk River at Nashua
06145588	Lodge Creek below McRae Creek, at International Boundary, natural flows (USGS)	06145599	Lodge Creek below McRae Creek, at International Boundary, natural flows (Environment Canada)
		06149599	Battle Creek at International Boundary, natural flows (Environment Canada)
		06150000	Woodpile Coulee near International Boundary
		06154100	Milk River near Harlem
		06156000	Whitewater Creek near International Boundary
		06169500	Rock Creek below Horse Creek, near International Boundary
		06174500	Milk River at Nashua
06149588	Battle Creek at International Boundary, natural flows (USGS)	06145588	Lodge Creek below McRae Creek, at International Boundary, natural flows (USGS/WSC)
		06149599	Battle Creek at International Boundary, natural flows (Environment Canada)
		06169500	Rock Creek below Horse Creek, near International Boundary
06150000	Woodpile Coulee near International Boundary	06145588	Lodge Creek below McRae Creek, at International Boundary, natural flows (USGS/WSC)
		06151000	Lyons Creek at International Boundary
		06154100	Milk River near Harlem
		06164088	Frenchman River at International Boundary, natural flows (USGS/WSC)
		06169500	Rock Creek below Horse Creek, near International Boundary

Table 4. Streamflow-gaging stations used in extension of monthly streamflow records at accounting-model nodes and index stations in the St. Mary and Milk River Basins (Continued)

Station whose record was extended		Stations used in extension	
No.	Name	No.	Name
06150500	East Fork Battle Creek near International Boundary	06145588	Lodge Creek below McRae Creek, at International Boundary, natural flows (USGS/WSC)
		06150000	Woodpile Coulee near International Boundary
		06151000	Lyons Creek at International Boundary
		06154100	Milk River near Harlem
		06174500	Milk River at Nashua
06151000	Lyons Creek at International Boundary	06174500	Milk River at Nashua
06154500	Peoples Creek near Dodson	06135088	Milk River at Eastern Crossing of International Boundary, natural flows (USGS/WSC)
		06139500	Big Sandy Creek near Havre
		06140500	Milk River at Havre
		06145599	Lodge Creek below McRae Creek, at International Boundary, natural flows (Environment Canada)
		06149599	Battle Creek at International Boundary, natural flows (Environment Canada)
		06151000	Lyons Creek at International Boundary
		06154100	Milk River near Harlem
		06164800	Beaver Creek above Dix Creek, near Malta
		06166000	Beaver Creek below Guston Coulee, near Saco
		06169500	Rock Creek below Horse Creek, near International Boundary
		06174500	Milk River at Nashua
		06175000	Porcupine Creek at Nashua
06156000	Whitewater Creek near International Boundary	06139500	Big Sandy Creek near Havre
		06145588	Lodge Creek below McRae Creek, at International Boundary, natural flows (USGS/WSC)
		06149588	Battle Creek at International Boundary, natural flows (USGS/WSC)
		06151000	Lyons Creek at International Boundary
		06154100	Milk River near Harlem
		06164088	Frenchman River at International Boundary, natural flows (USGS/WSC)
		06164800	Beaver Creek above Dix Creek, near Malta
06164088	Frenchman River at International Boundary, natural flows (USGS)	06149588	Battle Creek at International Boundary, natural flows (USGS/WSC)
		06149599	Battle Creek at International Boundary, natural flows (Environment Canada)
		06149500	Battle Creek at International Boundary
		06174500	Milk River at Nashua

Table 4. Streamflow-gaging stations used in extension of monthly streamflow records at accounting-model nodes and index stations in the St. Mary and Milk River Basins (Continued)

Station whose record was extended		Stations used in extension	
No.	Name	No.	Name
06166000	Beaver Creek below Guston Coulee, near Saco	06149588	Battle Creek at International Boundary, natural flows (USGS/WSC)
		06151000	Lyons Creek at International Boundary
		06154500	Peoples Creek near Dodson
		06164088	Frenchman River at International Boundary, natural flows (USGS/WSC)
		06164800	Beaver Creek above Dix Creek, near Malta
		06169500	Rock Creek below Horse Creek, near International Boundary
06169500	Rock Creek below Horse Creek, near International Boundary	06135088	Milk River at Eastern Crossing of International Boundary, natural flows (USGS/WSC)
		06139500	Big Sandy Creek near Havre
		06145588	Lodge Creek below McRae Creek, at International Boundary, natural flows (USGS/WSC)
		06149588	Battle Creek at International Boundary, natural flows (USGS/WSC)
		06151000	Lyons Creek at International Boundary
		06154100	Milk River near Harlem
		06154500	Peoples Creek near Dodson
		06156000	Whitewater Creek near International Boundary
		06164088	Frenchman River at International Boundary, natural flows (USGS/WSC)
		06174500	Milk River at Nashua
06175000	Porcupine Creek at Nashua	06135088	Milk River at Eastern Crossing of International Boundary, natural flows (USGS/WSC)
		06139500	Big Sandy Creek near Havre
		06140500	Milk River at Havre
		06145588	Lodge Creek below McRae Creek, at International Boundary, natural flows (USGS/WSC)
		06151000	Lyons Creek at International Boundary
		06154100	Milk River near Harlem
		06154500	Peoples Creek near Dodson
		06164088	Frenchman River at International Boundary, natural flows (USGS/WSC)
		06169500	Rock Creek below Horse Creek, near International Boundary
		06174500	Milk River at Nashua

Table 5. Synthesized streamflow volumes for Swiftcurrent Creek at Sherburne, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	5,300	2,970	8,020	10,400	59,500	38,400	31,700	11,500	4,640	15,100	8,240	4,170	200,000
1929	2,160	1,760	3,600	5,360	34,200	30,900	17,600	8,420	3,630	4,180	2,530	1,520	116,000
1930	1,630	3,640	4,790	25,000	30,700	34,200	17,700	8,920	4,280	4,860	3,110	1,810	141,000
1931	1,070	2,020	2,100	2,900	34,000	26,100	13,600	9,900	6,310	7,930	3,750	3,520	113,000
1932	1,870	3,790	8,130	7,630	38,900	37,100	18,000	10,200	4,400	9,220	4,790	4,090	148,000
1933	3,410	1,490	1,850	6,860	50,600	61,900	27,400	12,900	9,100	17,600	17,900	8,650	220,000
1934	10,700	7,120	7,800	32,000	52,900	34,600	17,200	8,980	3,450	5,170	14,700	5,340	200,000
1935	5,260	6,800	5,670	7,780	29,800	35,800	22,900	11,200	6,310	4,430	1,590	1,340	139,000
1936	1,560	667	2,390	8,200	31,500	31,100	14,100	6,330	2,680	2,460	1,420	2,280	105,000
1937	2,000	1,710	2,080	3,450	31,700	25,100	42,800	8,300	4,340	5,350	7,020	2,910	137,000
1938	2,280	2,100	2,670	15,700	42,200	40,200	18,600	8,050	5,650	5,600	4,280	3,080	150,000
1939	2,560	1,830	4,990	7,400	36,700	22,500	16,500	7,750	4,820	3,200	1,410	2,140	112,000
1940	1,990	1,330	2,100	9,810	51,000	23,200	10,700	4,920	8,090	5,780	2,550	2,470	124,000
1941	1,950	1,280	2,240	9,400	22,600	20,000	12,200	5,040	12,000	10,500	5,030	8,970	111,000
1942	3,660	2,170	2,120	13,600	27,900	36,800	23,200	9,590	7,740	3,940	4,860	3,820	139,000
1943	2,280	2,240	1,520	19,600	30,300	4,600	31,500	9,280	4,760	5,040	2,800	1,800	158,000
1944	972	1,290	1,430	6,900	23,400	20,000	9,410	7,990	6,780	5,230	3,320	2,100	88,800
1945	1,670	1,500	1,810	3,510	38,600	42,300	18,800	6,090	8,090	6,520	10,100	3,230	142,000
1946	2,500	1,840	3,110	16,200	40,500	37,400	20,800	8,180	6,840	8,420	6,650	3,620	156,000
1947	3,270	3,390	5,610	12,600	40,400	35,100	21,200	9,900	8,450	20,500	9,880	5,900	176,000
1948	4,970	2,070	1,820	8,680	43,200	54,800	16,900	9,590	4,170	3,320	2,930	2,770	155,000
1949	2,510	2,190	2,700	9,820	37,400	27,000	13,100	7,320	9,460	5,530	10,100	9,110	136,000
1950	3,850	3,450	3,950	5,240	33,600	61,900	38,600	14,200	6,190	20,100	12,900	9,250	213,000
1951	5,740	6,310	3,810	12,500	43,200	38,700	35,000	12,600	17,000	18,000	5,530	3,940	202,000
1952	2,570	2,620	1,960	16,700	32,000	29,900	18,600	11,400	6,010	2,890	2,340	2,320	129,000
1953	6,150	4,680	3,320	10,400	37,500	59,500	31,700	12,200	6,720	4,060	6,770	4,830	188,000
1954	3,140	3,120	3,010	5,590	46,500	47,400	41,900	17,000	11,300	12,700	9,680	6,200	208,000
1955	4,260	2,650	2,690	3,580	20,600	49,000	28,900	11,100	5,530	15,200	9,500	5,510	159,000
1956	4,190	2,590	3,190	8,270	44,100	43,600	24,700	11,000	6,720	9,840	5,470	4,780	127,000
1957	3,070	2,750	3,700	6,010	51,100	36,000	14,300	7,130	4,170	5,530	4,860	2,740	141,000
1958	1,360	1,790	2,450	6,660	44,800	33,000	14,300	8,490	8,750	7,990	6,910	5,220	142,000
1959	6,040	2,950	2,150	12,300	31,200	53,800	26,900	11,300	19,800	16,700	8,290	6,030	197,000
1960	1,700	1,690	3,270	10,600	25,100	43,400	20,800	9,720	6,660	4,060	4,930	4,240	136,000
1961	3,730	3,270	3,070	8,090	40,200	48,100	17,300	8,790	5,240	11,800	5,770	4,320	160,000
1962	3,040	2,300	1,780	15,500	28,700	31,900	15,300	9,780	6,430	9,900	8,820	8,140	142,000
1963	2,530	5,130	3,140	8,390	26,900	46,800	24,900	7,130	4,760	5,350	4,630	3,610	143,000
1964	2,100	1,530	1,330	2,920	31,100	74,400	23,500	7,810	9,340	12,300	4,780	2,830	174,000
1965	2,310	2,380	2,210	10,000	32,400	51,400	24,800	11,500	7,140	8,730	4,340	3,260	161,000
1966	2,540	1,560	2,710	10,800	34,500	40,800	22,500	8,790	4,400	6,330	5,070	3,780	144,000
1967	2,570	2,790	1,600	3,210	39,500	52,000	29,200	9,900	2,680	5,780	8,530	3,170	16,1000
1968	4,080	3,380	5,530	6,660	30,100	43,000	21,900	11,800	17,900	9,720	6,810	3,180	164,000
1969	2,670	1,550	1,480	13,800	31,500	40,500	21,200	7,750	2,800	8,610	4,860	2,450	139,000
1970	2,040	1,730	1,540	2,260	39,700	60,700	15,500	9,040	5,000	4,060	2,880	2,610	147,000

Table 5. Synthesized streamflow volumes for Swiftcurrent Creek at Sherburne, Montana, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	2,960	3,340	2,280	9,640	48,000	47,200	30,400	14,300	7,020	4,550	4,240	2,430	176,000
1972	1,470	1,780	8,730	9,220	43,800	55,600	31,400	15,200	8,990	4,920	2,790	2,080	186,000
1973	2,610	1,430	1,840	4,940	29,800	38,000	14,900	8,550	5,120	4,670	12,600	4,000	128,000
1974	8,450	3,280	3,810	10,800	30,700	63,100	33,100	14,000	4,050	2,580	2,650	1,770	178,000
1975	1,400	1,040	1,170	1,840	26,100	73,200	37,800	12,800	10,200	9,960	9,420	8,810	194,000
1976	3,620	2,220	1,600	10,400	41,400	27,800	28,800	18,000	9,220	2,950	1,920	1,770	150,000
1977	1,460	1,360	1,350	8,930	21,200	19,600	10,600	10,300	10,900	4,980	5,090	3,480	99,200
1978	1,740	1,200	2,770	10,400	33,100	44,200	28,800	15,200	11,500	4,490	4,530	1,370	159,000
1979	1,030	1,070	3,140	4,940	38,600	33,800	17,300	7,320	3,810	2,830	1,870	3,220	119,000
1980	1,840	1,510	2,150	15,500	40,100	29,600	15500	9,280	10,800	6,150	9,250	9,190	151,000
1981	5,310	2,930	3,140	10,600	40,200	34,800	24,000	10,800	4,460	3,500	2,830	2,920	146,000
1982	2,530	4,080	2,710	4,670	31,300	46,900	29,800	10,900	6,330	6,950	3,500	2,400	152,000
1983	2,700	2,000	3,850	8,420	24,600	29,700	27,500	10,600	5,620	3,550	9,070	2,550	130,000
1984	8,160	2,180	1,780	8,150	23,900	36,200	19,000	7,500	8,990	6,700	4,490	1,940	129,000
1985	1,210	655	1,170	12,800	36,200	33,800	14,300	8,980	14,600	14,700	12,100	1,780	152,000
1986	2,070	4,070	10,300	13,900	32,000	30,800	15,000	6,700	7,260	9,100	7,430	3,230	142,000
1987	1,900	1,670	5,170	16,200	34,100	21,800	19,100	11,600	5,410	2,030	1,270	3,070	123,000
1988	1,440	1,390	2,890	16,800	31,400	25,100	9,650	4,920	3,270	11,100	6,960	2,960	118,000
1989	2,500	1,520	1,660	14,000	31,200	45,300	21,000	13,800	10,700	7,320	18,900	5,860	174,000

Table 6. Synthesized streamflow volumes for St. Mary River at International Boundary, 1928-1989, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	20,000	10,300	25,300	32,500	227,000	175,000	160,000	56,600	30,500	53,100	26,100	12,600	829,000
1929	7,750	7,220	12,400	18,700	113,000	152,000	78,200	30,300	17,300	17,800	8,210	7,010	470,000
1930	7,380	14,100	15,700	87,900	149,000	148,000	77,700	31,400	22,000	19,300	12,100	5,960	591,000
1931	4,610	7,940	8,180	13,300	120,000	109,000	48,900	36,400	27,600	18,100	16,200	13,900	425,000
1932	8,050	15,700	29,800	33,700	154,000	172,000	86,600	36,600	18,300	14,800	20,300	16,900	607,000
1933	14,400	7,610	8,360	24,800	108,000	258,000	133,000	47,100	29,300	42,100	57,400	27,400	758,000
1934	33,800	25,000	24,700	103,000	212,000	174,000	71,000	33,200	19,200	16,500	63,600	19,100	795,000
1935	17,200	22,800	13,800	23,300	113,000	162,000	93,200	38,700	23,000	14,400	6,430	6,090	534,000
1936	5,900	3,050	8,490	36,700	149,000	128,000	50,600	25,800	15,000	9,960	5,240	7,870	445,000
1937	6,640	7,160	7,070	15,900	110,000	223,000	86,600	29,200	17,700	17,500	21,200	13,100	556,000
1938	11,600	9,270	10,100	41,400	161,000	198,000	99,700	31,400	21,400	19,800	17,200	9,840	630,000
1939	8,050	7,550	16,700	38,100	140,000	102,000	65,700	28,200	17,400	11,600	8,570	8,980	453,000
1940	6,760	5,000	8,550	22,700	114,000	107,000	45,300	23,500	25,400	25,500	8,930	7,990	401,000
1941	6,210	4,500	5,170	21,700	82,000	85,000	54,000	22,100	30,900	39,000	22,100	39,800	413,000
1942	14,300	9,550	8,550	40,200	116,000	165,000	112,000	46,400	31,300	24,400	19,100	16,000	603,000
1943	9,470	9,830	8,920	73,800	123,000	221,000	165,000	49,800	22,400	20,200	12,100	7,930	724,000
1944	4,610	5,060	6,580	11,700	78,300	97,200	49,700	33,000	25,200	23,000	14,400	9,720	359,000
1945	7,260	7,500	7,500	9,100	123,000	201,000	89,500	28,100	28,900	25,900	32,500	13,200	574,000
1946	9,530	8,780	12,800	39,200	145,000	163,000	92,200	35,100	29,500	32,000	27,500	14,700	609,000
1947	13,100	14,900	16,700	54,300	168,000	154,000	100,000	40,400	31,300	76,900	29,100	16,500	715,000
1948	9,590	7,360	8,790	37,000	182,000	326,000	96,900	46,600	19,600	16,400	8,330	5,720	765,000
1949	5,170	7,050	9,160	31,300	144,000	135,000	60,900	29,000	31,700	24,800	29,800	28,300	536,000
1950	13,800	11,200	13,100	27,500	121,000	270,000	194,000	67,600	29,300	57,100	48,600	33,000	887,000
1951	21,300	20,200	18,200	48,700	207,000	204,000	199,000	69,400	71,900	85,500	31,800	16,900	994,000
1952	11,400	10,600	12,200	57,700	148,000	131,000	88,100	51,600	24,300	16,200	8,030	5,660	565,000
1953	15,700	18,400	14,800	37,800	167,000	329,000	155,000	54,500	26,100	17,400	16,800	10,500	863,000
1954	9,900	13,000	12,300	25,900	199,000	216,000	196,000	67,600	45,900	45,300	36,100	19,500	887,000
1955	9,040	8,000	6,580	15,900	91,700	223,000	138,000	49,100	21,600	49,800	28,000	24,800	666,000
1956	14,300	9,380	12,500	31,200	172,000	216,000	125,000	50,900	26,200	31,500	18,300	12,500	719,000
1957	8,490	9,500	10,600	16,400	219,000	175,000	66,200	29,400	18,000	20,400	21,100	10,800	606,000
1958	6,210	9,330	11,100	23,900	169,000	169,000	72,700	34,200	28,700	32,500	22,300	24,500	604,000
1959	20,500	13,300	12,900	41,800	130,000	241,000	131,000	49,100	61,600	60,200	36,500	22,700	821,000
1960	13,100	9,320	13,700	40,900	85,300	181,000	98,600	39,700	22,300	14,600	13,900	10,800	544,000
1961	8,550	12,200	13,100	24,700	137,000	225,000	81,400	34,800	24,200	40,500	19,200	10,600	630,000
1962	9,100	12,400	9,280	48,000	113,000	154,000	77,800	44,800	25,900	31,700	28,600	24,000	579,000
1963	11,800	23,500	11,600	20,700	108,000	202,000	105,000	34,100	24,100	16,700	13,000	9,960	581,000
1964	6,210	8,280	6,830	11,800	122,000	382,000	129,000	41,100	35,300	43,300	21,800	12,000	819,000
1965	9,530	12,300	12,300	39,600	131,000	247,000	125,000	53,800	37,700	37,400	22,600	15,100	743,000
1966	12,700	8,550	12,000	46,700	131,000	201,000	109,000	40,800	26,900	22,200	17,700	15,000	643,000
1967	11,400	11,300	10,600	16,600	152,000	270,000	152,000	49,100	23,000	18,900	28,000	15,100	758,000
1968	14,300	16,800	20,400	17,300	117,000	192,000	98,000	48,100	62,800	49,300	27,200	14,300	678,000
1969	13,000	10,200	14,300	54,900	125,000	182,000	103,000	31,000	19,200	28,200	18,300	9,900	609,000
1970	8,360	8,110	9,100	11,500	150,000	271,000	87,400	36,300	24,200	18,000	11,900	13,000	649,000

Table 6. Synthesized streamflow volumes for St. Mary River at International Boundary, 1928-1989, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	11,800	18,600	12,100	34,300	179,000	219,000	140,000	64,700	26,600	26,600	17,900	10,300	760,000
1972	7,560	11,000	39,700	44,700	170,000	259,000	141,000	75,000	35,800	28,100	13,700	9,590	834,000
1973	11,400	10,800	9,220	16,100	106,000	152,000	67,700	31,400	19,200	14,800	32,500	16,400	487,000
1974	25,800	18,000	13,100	32,800	123,000	271,000	159,000	59,600	30,200	13,100	10,400	9,410	766,000
1975	6,640	7,110	7,010	9,820	108,000	379,000	188,000	64,900	40,100	40,600	34,400	41,100	926,000
1976	18,800	14,000	12,100	43,300	161,000	130,000	123,000	73,100	31,800	18,000	9,400	8,300	643,000
1977	6,830	6,940	6,580	20,300	80,200	80,500	44,600	41,600	43,500	18,800	14,500	18,400	383,000
1978	9,280	7,280	9,470	33,100	130,000	183,000	132,000	62,400	54,600	25,900	19,000	11,400	678,000
1979	6,580	6,720	17,200	28,300	153,000	169,000	80,700	32,200	21,100	10,900	7,910	10,400	545,000
1980	7,130	6,100	4,980	47,500	180,000	149,000	66,000	36,300	45,100	27,200	28,300	24,300	622,000
1981	28,200	16,100	11,800	32,700	180,000	156,000	103,000	42,200	18,800	13,500	8,930	7,750	620,000
1982	5,720	11,100	12,900	17,400	104,000	212,000	128,000	48,900	22,700	22,400	14,100	9,350	609,000
1983	8,920	7,280	8,920	21,800	92,200	133,000	97,200	42,500	22,000	11,100	23,300	9,590	478,000
1984	21,200	8,340	4,980	25,900	78,000	148,000	88,500	38,900	28,100	26,000	17,000	8,180	493,000
1985	6,640	5,330	3,870	32,000	140,000	160,000	63,900	35,300	58,400	54,200	48,900	13,200	622,000
1986	11,300	20,400	39,900	51,900	110,000	157,000	63,300	29,200	31,100	35,800	26,100	13,200	589,000
1987	10,100	7,890	12,900	48,700	154,000	104,000	88,100	53,200	27,600	11,000	6,250	7,260	531,000
1988	5,530	6,500	6,390	48,900	120,000	117,000	47,300	22,700	12,000	34,700	27,000	11,900	459,000
1989	9,530	7,280	9,720	44,000	128,000	209,000	107,000	57,400	51,700	32,300	79,100	32,100	766,000

Table 7. Synthesized streamflow volumes for Milk River at Western Crossing of International Boundary, 1928-1989, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	1,640	380	15,800	13,400	20,600	7,400	21,500	8,760	988	1,750	411	105	92,800
1929	43	17	9,970	15,400	22,000	6,400	5,410	1,610	71	2,260	161	55	63,400
1930	6.1	2,490	8,420	21,900	13,900	6,370	1,970	824	280	1,190	54	80	57,400
1931	25	33	2,320	3,840	2,100	530	166	228	405	578	71	0	10,300
1932	0	345	5,850	6,660	7,930	4,850	947	596	303	689	18	0	28,200
1933	0	0	2,170	8,750	15,200	6,840	1,490	572	684	1,200	220	0	37,200
1934	105	1,440	9,040	17,600	10,500	11,600	2,710	633	982	2,220	71	0	56,900
1935	49	2,050	2,470	20,200	11,400	4,650	947	295	393	658	0	0	43,100
1936	0	0	3,060	13,200	3,540	976	0	12	0	0	0	0	20,700
1937	0	0	621	15,400	10,300	14,300	1,520	547	494	861	0	0	44,000
1938	0	0	4,760	10,500	12,200	7,020	4,800	1,080	559	928	309	0	42,200
1939	0	0	6,520	5,390	3,280	2,380	191	0	0	129	214	898	19,000
1940	135	426	2,700	5,270	2,410	399	221	12	0	301	934	590	13,400
1941	406	355	1,480	2,470	818	1,860	1,020	12	351	615	666	1,090	11,100
1942	228	317	1,330	14,600	8,120	11,200	2,820	1,540	1,330	1,110	2,040	978	45,600
1943	824	733	6,940	18,400	14,900	19,200	5,890	1,710	1,060	1,330	2,370	1,170	74,600
1944	769	690	959	3,530	1,440	1,170	295	49	0	86	934	510	10,400
1945	406	1,060	1,530	2,520	4,810	8,810	1,690	105	321	670	464	461	22,800
1946	473	1,380	2,960	4,240	4,270	2,870	1,130	178	744	1,650	417	523	20,800
1947	744	600	17,300	18,300	14,700	7,850	2,260	1,450	2,170	2,320	1,070	873	69,700
1948	664	339	1,570	29,800	22,900	45,300	11,200	4,210	1,800	2,080	1,960	381	122,000
1949	135	128	2,410	16,400	8,610	3,310	1,150	178	571	1,610	506	184	35,200
1950	123	189	2,430	22,800	26,900	22,600	9,280	3,040	1,300	2,080	684	486	92,000
1951	418	439	4,590	30,200	31,000	30,300	21,400	8,730	10,000	8,180	2,730	1,450	149,000
1952	818	1,950	9,780	32,800	14,300	6,490	3,340	1,540	1,120	1,220	1,610	830	75,800
1953	658	733	3,210	26,700	27,700	52,200	8,790	3,330	2,300	2,230	1,890	1,290	131,000
1954	1,010	4,870	4,560	22,300	36,300	16,000	5,280	3,090	2,960	3,810	2,640	2,130	105,000
1955	1,190	983	2,200	17,500	27,500	11,800	7,380	1,460	774	1,540	1,840	1,450	75,600
1956	1,230	1,020	6,020	13,000	18,600	8,990	7,750	2,850	1,370	1,430	1,150	959	64,300
1957	750	811	4,430	13,000	21,100	8,990	1,350	437	881	1,490	1,390	984	55,600
1958	805	600	2,720	16,400	5,850	6,960	3,530	855	655	1,400	643	824	41,200
1959	492	572	7,870	17,000	20,500	9,220	2,690	805	1,090	2,230	994	1,420	65,000
1960	646	2,100	17,600	6,550	12,400	3,590	744	547	0	301	893	590	46,000
1961	590	555	4,180	4,390	10,600	2,960	664	80	179	1,060	565	264	26,100
1962	301	461	7,010	15,900	6,640	3,300	609	295	137	633	768	842	36,900
1963	529	5,500	2,710	3,250	3,190	4,670	2,560	6.1	0	0	887	670	24,000
1964	670	656	1,340	7,200	20,800	32,600	4,620	1,130	2,240	2,350	684	916	75,300
1965	781	855	6,150	31,400	17,500	15,900	5,340	1,600	3,280	1,990	4,200	2,240	91,300
1966	1,260	1,110	9,470	11,400	7,990	17,000	5,020	1,610	958	1,880	1,360	1,020	60,100
1967	916	883	7,260	12,700	41,800	26,500	5,280	1,400	589	1,290	833	1,280	101,000
1968	861	1,130	6,460	6,780	12,300	9,580	2,660	1,980	5,880	3,640	2,550	1,150	55,000
1969	750	977	5,610	36,600	8,050	13,900	6,150	615	309	1,560	1,020	1,280	76,800
1970	781	739	1,420	7,140	24,700	11,600	2,580	879	768	1,170	1,340	996	54,100

Table 7. Synthesized streamflow volumes for Milk River at Western Crossing of International Boundary, 1928-1989, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	947	5,340	3,860	20,600	19,900	11,100	3,460	652	869	1,290	1,130	658	69,800
1972	627	529	44,100	17,000	23,500	15,400	6,330	2,850	1,840	2,000	1,130	523	116,000
1973	560	889	3,790	5,310	5,150	1,830	49	0	0	0	780	535	18,900
1974	7,260	3,590	4,130	14,400	15,200	7,260	2,360	1,210	720	993	2,390	1,740	61,300
1975	1,250	544	892	8,450	35,900	35,200	11,600	4,080	2,270	4,210	5,550	2,650	11,300
1976	2,160	3,380	7,690	15,700	13,700	6,190	1,970	1,860	339	842	1,550	916	56,300
1977	627	1,980	683	4,590	1,430	184	0	18	83	492	393	369	10,900
1978	701	500	29,500	9,700	14,100	10,200	6,040	3,430	7,740	2,260	2,620	1,700	88,500
1979	1,130	1,030	18,900	18,700	19,100	6,250	1,600	603	232	572	1,130	1,120	70,400
1980	885	667	2,310	15,100	9,780	8,630	1,150	1,230	1,050	1,460	922	689	43,800
1981	953	1,270	3,980	5,070	17,900	9,280	2,400	750	149	1,090	827	738	44,400
1982	394	672	2,060	23,400	11,800	7,970	2,640	184	256	1,150	1,300	855	52,700
1983	978	5,100	3,790	3,490	3,900	1,130	455	12	0	0	643	141	19,600
1984	498	529	1,770	2,580	1,460	1,200	55	0	0	61	315	283	8,760
1985	271	317	2,850	8,390	4,920	4,110	68	18	2,580	4,480	643	701	29,300
1986	990	1,230	8,670	6,250	7,320	2,540	437	0	1,010	1,690	6,280	3,780	40,200
1987	2,750	3,670	3,900	9,580	3,490	1,190	2,720	2,020	1,190	1,280	625	1,270	33,700
1988	646	587	2,240	7,260	4,350	1,310	172	0	0	0	488	443	17,500
1989	307	239	5,620	9,220	5,850	13,200	3,220	2,230	2,280	1,970	1,120	805	46,100

Table 8. Synthesized streamflow volumes for Milk River at Eastern Crossing of International Boundary, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	16,100	6,970	68,400	36,400	28,500	27,500	37,000	9,040	9,220	8,490	7,120	3,570	258,000
1929	2,590	2,210	27,100	40,800	38,700	37,000	2,840	55	1,300	3,950	4,070	2,670	163,000
1930	1,890	21,000	25,900	35,800	25,900	9,280	2,370	1,390	3,940	3,330	2,810	3,170	137,000
1931	2,260	2,500	7,990	6,550	4,100	4,470	2,280	3,730	3,640	0	2,760	842	41,100
1932	1,030	5,830	15,200	16,400	14,700	22,800	2,730	2,110	2,750	1,620	2,160	695	88,000
1933	588	1,230	16,400	38,000	28,500	11,400	438	0	0	3,420	4,880	1,290	106,000
1934	3,380	15,100	22,500	21,700	16,500	22,700	4,750	1,200	4,660	3,580	5,660	3,780	126,000
1935	8,520	17,900	12,400	34,800	19,000	7,620	3,420	1,680	768	2,380	79	143	109,000
1936	66	17	20,800	29,900	7,010	5,270	738	2,410	839	793	1,950	207	70,000
1937	62	62	4,240	34,800	19,100	23,700	5,040	601	2,130	3,980	1,090	560	95,300
1938	883	512	28,100	24,400	25,800	15,400	9,720	2,020	3,820	1,710	3,430	676	116,000
1939	397	235	12,900	7,850	4,500	10,000	3,830	1,510	2,290	812	2,130	159	46,600
1940	38	17	19,100	16,200	9,840	4,120	5,290	885	2,370	1,740	2,430	283	62,300
1941	183	226	6,270	4,580	4,190	6,960	2,160	849	1,360	1,990	1,290	1,770	31,800
1942	366	1,330	5,080	31,500	15,100	24,100	6,270	689	1,980	3,830	1,740	1,980	93,900
1943	524	1,140	21,800	36,800	21,000	25,200	7,500	2,050	1,200	3,880	4,210	1,400	127,000
1944	766	1,190	3,310	8,630	3,780	3,830	1,920	2,250	1,080	898	1,030	800	29,500
1945	319	659	13,700	4,770	8,300	14,100	2,320	12	1,010	2,480	1,360	1,330	50,300
1946	750	1,390	11,500	5,610	6,890	8,570	2,900	941	2,680	5,710	1,540	1,080	49,500
1947	1,000	3,580	73,200	41,200	23,700	13,600	2,720	3,710	5,190	4,990	2,390	1,720	177,000
1948	1,980	631	10,200	66,600	40,500	57,500	20,200	7,260	1,090	5,430	3,930	2,350	218,000
1949	1,200	942	8,300	23,900	15,600	5,450	1,250	71	863	4,330	3,120	1,120	66,100
1950	65	700	8,300	38,000	31,100	28,400	10,500	4,270	750	2,530	4,640	1,690	131,000
1951	1,350	959	32,600	59,500	47,800	52,800	35,100	15,400	19,500	17,700	12,900	7,950	304,000
1952	5,140	9,360	59,000	85,100	30,300	13,400	7,810	3,170	2,390	3,420	3,360	3,400	226,000
1953	3,550	4,590	10,100	48,300	52,000	117,000	18,500	4,950	3,470	6,010	5,210	3,670	277,000
1954	2,500	8,930	9,960	44,100	44,400	24,000	5,920	6,270	8,570	7,190	4,470	2,880	169,000
1955	1,180	1,330	5,600	48,100	53,500	20,500	27,500	474	2,130	5,000	1,830	2,520	170,000
1956	1,890	2,350	18,800	29,100	24,500	13,700	14,800	7,930	2,800	4,100	4,550	1,480	126,000
1957	1,150	2,810	26,700	22,800	29,700	15,500	928	1,700	3,490	6,890	4,900	2,940	120,000
1958	1,900	3,440	12,400	67,800	11,800	12,900	5,190	824	1,580	3,620	3,120	3,310	128,000
1959	2,310	2,380	42,900	31,400	27,600	15,700	5,210	1,690	3,170	4,720	3,880	4,860	146,000
1960	2,050	2,500	46,300	18,300	26,100	5,620	492	1,130	922	2,490	2,090	1,820	110,000
1961	2,150	2,780	7,560	5,190	15,800	7,020	461	504	1,060	3,350	2,320	619	48,800
1962	2,400	4,470	18,100	22,500	9,720	6,430	1,110	18	2,230	1,430	1,560	1,400	71,400
1963	628	10,400	6,700	3,490	4,950	6,900	4,640	916	1,510	1,650	762	483	43,000
1964	424	1,260	2,720	15,900	45,300	43,400	8,420	2,650	3,470	6,030	3,900	1,830	135,000
1965	757	5,900	19,800	101,000	30,400	46,200	15,900	3,970	8,450	7,560	4,140	4,380	248,000
1966	683	1,810	29,800	23,800	14,700	28,900	11,700	4,160	1,920	6,950	3,500	2,550	130,000
1967	2,670	4,780	39,000	41,400	109,000	47,200	7,190	3,170	1,720	4,510	4,070	2,860	268,000
1968	2,760	5,710	24,800	13,500	22,100	16,400	7,810	6,950	11,100	13,200	7,110	4,430	136,000
1969	1,600	2,500	57,600	72,600	19,200	18,600	18,400	1,570	2,020	4,610	4,170	2,570	205,000
1970	945	2,160	16,000	17,600	32,100	21,500	5,070	3,500	4,340	3,810	3,880	1,280	112,000

Table 8. Synthesized streamflow volumes for Milk River at Eastern Crossing of International Boundary, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	1,750	17,700	13,200	32,000	26,900	20,100	6,150	3,380	3,730	3,870	3,360	524	133,000
1972	126	212	72,600	30,000	32,700	26,600	10,200	8,120	5,450	5,240	2,920	711	195,000
1973	1,710	2,750	12,200	8,210	9,100	4,240	1,570	2,230	3,270	965	778	971	48,000
1974	4,210	1,740	16,000	24,100	23,800	18,300	7,010	4,410	2,490	4,180	2,030	1,130	109,000
1975	483	217	1,000	40,000	104,000	70,800	24,300	12,600	5,550	10,400	4,500	5,020	279,000
1976	7,190	6,950	25,300	21,600	21,700	12,500	9,650	6,760	553	3,080	2,930	2,300	121,000
1977	1,660	3,050	6,760	9,280	5,800	4,720	2,930	2,380	1,690	2,210	985	729	42,200
1978	740	1,040	93,500	33,700	27,700	16,000	14,700	17,000	18,900	6,130	3,360	3,070	236,000
1979	847	800	91,000	45,300	45,100	13,700	4,660	2,720	2,370	2,240	1,280	1,890	212,000
1980	804	1,690	12,700	22,500	17,300	18,100	4,930	4,840	4,790	3,650	2,080	1,840	95,300
1981	2,930	5,170	12,600	9,040	37,600	22,600	8,550	3,170	2,280	4,270	2,880	1,240	112,000
1982	207	381	18,800	54,100	27,200	25,900	6,760	4,160	1,920	2,710	1,390	1,040	145,000
1983	1,100	1,840	7,320	6,550	10,600	6,310	6,760	3,200	4,210	1,050	738	224	49,900
1984	331	2,250	7,870	4,370	4,890	3,670	1,860	3,460	2,910	769	1,190	457	34,000
1985	60	52	7,810	8,570	9,650	9,640	2,580	2,310	8,030	7,380	2,070	769	58,900
1986	3,000	34,800	22,800	7,800	19,900	9,160	3,650	1,980	10,400	3,870	1,900	1,790	121,000
1987	1,040	2,000	7,690	16,400	5,660	4,740	7,260	6,390	5,190	2,210	2,040	1,230	61,800
1988	167	724	6,270	12,100	5,310	5,930	2,700	3,460	1,280	277	709	443	39,400
1989	219	133	25,600	15,200	16,900	25,200	10,100	3,160	5,150	1,750	5,550	3710	113,000

Table 9. Synthesized streamflow volumes for Milk River below Fresno Reservoir, Montana, 1928-89, in acre feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	16,100	6,970	84,400	51,400	28,600	27,600	39,100	9,210	9,260	8,520	7,120	3,570	292,000
1929	2,590	2,200	27,200	41,200	39,200	37,500	2,840	55	1,300	3,970	4,070	2,660	165,000
1930	1,890	21,200	40,900	42,200	26,000	9,290	2,460	1,390	3,950	3,330	2,810	3,170	159,000
1931	2,260	2,500	8,020	6,570	4,110	4,940	2,430	3,740	3,650	6.1	2,760	842	41,800
1932	1,030	5,830	16,100	16,700	14,800	23,500	2,740	2,110	2,760	1,640	2,150	695	90,000
1933	590	1,230	16,400	38,000	28,500	11,600	480	37	6.0	3,430	4,880	1,290	106,000
1934	3,380	15,700	24,500	21,900	16,500	22,700	4,750	1,200	4,670	3,590	5,660	3,790	128,000
1935	8,520	17,800	16,500	39,800	19,000	7,620	5,120	1,680	774	2,390	77	141	119,000
1936	68	17	20,900	42,000	7,020	5,270	738	2,410	839	799	1,960	209	82,200
1937	61	61	4,910	39,400	19,100	23,700	5,050	603	2,170	3,990	1,090	560	101,000
1938	885	511	33,500	27,100	26,200	16,000	10,100	2,020	3,820	1,710	3,430	676	126,000
1939	400	233	36,500	7,940	4,690	13,400	3,860	1,510	2,290	818	2,130	160	73,900
1940	37	17	19,100	37,500	10,600	4,560	5,290	885	2,370	1,750	2,430	283	84,800
1941	184	228	21,100	4,670	4,210	7,020	2,280	849	1,360	1,990	1,290	1,760	46,900
1942	369	1,330	8,200	32,400	15,100	27,500	6,540	689	1,990	3,840	1,740	1,990	102,000
1943	523	1,140	50,700	39,000	21,100	25,200	7,530	2,050	1,200	3,880	4,210	1,400	158,000
1944	769	1,190	6,060	8,750	3,810	3,860	2,360	5,370	1,080	904	1,020	799	36,000
1945	320	661	16,800	4,790	8,320	14,100	2,320	12	1,010	2,480	1,360	1,330	53,600
1946	750	1,390	17,400	5,630	6,890	8,950	2,900	941	2,680	5,720	1,540	1,080	55,900
1947	1,000	3,580	78,400	42,500	23,700	13,600	2,720	3,710	5,190	4,990	2,390	1,720	184,000
1948	1,970	633	10,200	66,700	40,500	57,500	20,200	7,260	1,090	5,430	3,930	2,360	218,000
1949	1,200	944	8,360	23,900	15,600	5,450	1,250	74	863	4,330	3,120	1,120	66,200
1950	61	700	8,300	67,300	31,100	28,500	10,500	4,270	750	2,540	4,640	1,680	160,000
1951	1,350	961	32,600	66,600	49,200	52,800	35,100	15,400	19,500	17,700	12,900	7,950	312,000
1952	5,140	9,360	59,000	190,000	30,600	13,400	8,260	3,170	2,400	3,420	3,360	3,400	332,000
1953	3,550	4,590	10,600	48,500	52,600	117,000	18,600	4,950	3,470	6,010	5,210	3,660	279,000
1954	2,500	8,920	10,000	59,200	44,500	24,200	5,930	6,360	8,600	7,270	4,470	2,880	185,000
1955	1,180	1,330	10,800	71,900	54,300	20,900	47,400	603	2,140	5,020	1,830	2,520	220,000
1956	1,890	2,350	19,100	29,800	24,700	13,700	14,800	7,930	2,800	4,100	4,550	1,480	127,000
1957	1,150	2,810	27,200	26,900	29,700	15,500	1,160	1,700	3,490	6,890	4,900	2,940	124,000
1958	1,900	3,440	22,700	71,500	11,800	12,900	5,190	824	1,580	3,620	3,120	3,310	142,000
1959	2,310	2,380	49,700	32,000	27,600	17,100	5,260	1,690	3,170	4,730	3,880	4,860	155,000
1960	2,050	2,500	64,900	18,700	26,700	5,620	492	1,130	922	2,500	2,080	1,820	129,000
1961	2,150	2,780	15,400	5,220	15,800	7,450	461	504	1,060	3,360	2,320	621	57,100
1962	2,400	4,480	24,000	22,900	9,730	6,650	11,100	61	2,230	1,450	1,560	1,400	88,000
1963	627	10,500	7,330	3,550	4,970	6,940	4,640	916	1,510	1,660	762	486	43,800
1964	424	1,250	2,720	16,000	45,300	43,400	8,420	2,650	3,480	6,040	3,900	1,830	135,000
1965	756	5,900	19,800	107,000	30,500	46,300	16,000	3,970	8,460	7,580	4,140	4,380	255,000
1966	683	1,810	40,900	24,400	14,800	28,900	11,700	4,160	1,920	6,950	3,500	2,550	142,000
1967	2,660	4,780	44,700	56,500	115,000	47,300	7,190	3,170	1,720	4,520	4,070	2,850	294,000
1968	2,760	5,710	24,900	13,500	22,200	16,400	7,810	6,950	11,100	13,200	7,110	4,430	136,000
1969	1,590	2,500	57,600	86,500	19,400	18,600	18,500	1,570	2,020	4,610	4,170	2,570	220,000
1970	947	2,150	16,600	17,700	32,200	21,600	5,070	3,500	4,340	3,810	3,880	1,280	113,000

Table 9. Synthesized streamflow volumes for Milk River below Fresno Reservoir, Montana, 1928-89, in acre feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	1,750	17,700	13,200	32,500	27,000	20,100	6,150	3,380	3,730	3,890	3,360	523	133,000
1972	129	213	74,400	30,000	32,700	26,600	10,200	8,120	5,450	5,250	2,920	713	197,000
1973	1,710	2,750	12,300	8,270	9,120	4,250	1,570	2,230	3,270	972	780	972	48,200
1974	4,210	1,740	27,900	28,500	29,300	18,400	7,010	4,410	2,500	4,190	2,030	1,130	131,000
1975	486	217	1,030	44,100	106,000	72,300	24,700	13,500	5,570	10,400	4,500	5,020	288,000
1976	7,190	6,950	35,800	21,700	21,700	12,500	9,650	6,760	553	3,090	2,930	2,310	131,000
1977	1,660	3,050	6,810	9,350	5,820	4,730	2,930	2,380	1,690	2,220	988	732	42,400
1978	738	1,040	95,400	58,600	28,300	16,000	14,700	17,000	18,900	6,140	3,360	3,070	263,000
1979	849	800	101,000	50,400	45,400	14,500	7,450	2,720	2,370	2,250	1,280	1,890	231,000
1980	805	1,690	15,000	22,600	17,300	18,100	4,930	4,840	4,790	3,650	2,090	1,850	97,600
1981	2,940	5,170	12,600	9,050	37,700	22,600	8,550	3,180	2,280	4,280	2,890	1,240	112,000
1982	215	389	19,200	74,800	28,700	28,300	6,770	4,170	1,920	2,720	1,400	1,050	170,000
1983	1,110	1,850	7,320	6,550	10,700	6,310	7,140	3,210	4,210	1,060	744	234	50,500
1984	338	2,260	7,880	4,380	4,900	3,730	1,860	3,470	2,910	775	1,200	467	34,200
1985	68	61	7,820	8,570	9,660	9,650	2,580	2,310	8,040	7,380	2,080	775	59,000
1986	3,010	34,800	45,400	7,800	21,700	9,510	3,700	1,990	28,500	3,890	1,910	1,800	164,000
1987	1,050	2,000	9,560	16,500	5,710	4,820	7,280	6,400	5,190	2,220	2,050	1,240	64,000
1988	178	731	6,280	12,100	5,350	5,930	2,710	3,460	1,280	283	720	449	39,500
1989	228	139	25,600	15,200	16,900	25,200	10,100	3,170	5,150	1,760	5,560	3,720	113,000

Table 10. Synthesized streamflow volumes for Milk River at Ft. Belknap diversion dam, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	16,100	6,980	118,000	81,000	29,400	29,700	43,800	10,100	9,370	8,880	7,120	3,790	364,000
1929	2,600	2,210	32,800	43,600	43,100	40,100	3,360	68	1,370	4,100	4,080	2,830	180,000
1930	1,890	21,600	69,600	55,900	26,100	9,600	2,920	1,430	4,020	3,480	2,810	3,360	203,000
1931	2,270	2,500	9,800	6,650	4,140	5,740	2,690	3,760	3,720	25	2,770	867	44,900
1932	1,030	5,840	21,200	17,600	15,000	25,200	2,960	2,120	2,830	1,740	2,160	701	98,400
1933	590	1,230	19,300	38,800	29,700	12,200	885	98	77	3,450	4,890	1,330	113,000
1934	3,380	16,500	31,100	22,800	16,500	23,200	4,780	1,210	4,740	3,610	5,670	3,890	137,000
1935	8,530	17,900	24,700	49,300	19,200	7,970	7,830	1,690	845	2,400	83	172	140,000
1936	74	23	22,700	63,900	7,130	5,330	744	2,420	899	818	1,970	209	106,000
1937	148	139	6,470	47,700	19,200	26,000	8,020	603	2,240	4,010	1,090	560	106,000
1938	972	994	43,100	32,200	27,500	20,100	11,400	2,050	3,960	1,790	3,590	756	148,000
1939	523	328	78,000	8,160	5,820	35,400	6,220	1,510	2,290	842	2,160	246	141,000
1940	86	109	27,300	74,900	12,800	5,700	5,400	885	2,370	1,760	2,430	307	134,000
1941	184	311	49,700	5,300	4,580	11,600	2,590	916	1,380	2,270	1,680	1,820	82,300
1942	369	3,140	17,200	43,500	18,200	33,900	7,120	793	2,020	4,110	2,010	2,080	134,000
1943	553	35,600	102,000	44,100	23,600	28,400	8,850	2,110	1,200	4,060	4,360	1,560	256,000
1944	2,810	3,530	11,200	9,920	4,310	6,280	4,190	10,400	1,120	1,160	1,210	922	57,100
1945	381	4,330	23,100	7,380	11,400	33,000	4,020	55	1,140	2,620	1,480	1,330	90,200
1946	750	6,400	28,300	5,930	8,020	9,780	3,010	1,140	2,710	6,310	1,660	1,190	75,200
1947	1,000	3,750	101,000	47,900	24,700	14,800	2,820	3,810	5,280	5,560	2,610	1,800	215,000
1948	1,990	1,040	19,600	85,100	48,600	59,200	20,500	7,960	1,130	6,070	4,370	2,360	258,000
1949	1,200	1,090	8,970	25,500	19,800	6,360	1,370	80	899	4,480	3,250	1,170	74,200
1950	86	822	10,000	120,000	32,100	28,800	10,500	4,640	774	2,640	4,780	1,730	217,000
1951	1,600	1,290	39,700	81,200	52,200	52,900	35,300	15,400	19,700	17,800	13,000	8,230	338,000
1952	5,190	12,500	76,300	379,000	32,400	14,300	9,490	3,250	2,420	3,500	3,390	3,400	545,000
1953	3,550	4,620	12,200	48,900	60,200	133,000	21,100	5,420	3,500	6,110	5,690	4,060	308,000
1954	2,660	11,100	11,100	87,700	46,000	25,600	6,390	6,600	8,940	7,760	4,890	3,220	222,000
1955	1,270	1,420	22,700	124,000	67,000	24,800	80,900	1,010	2,190	5,110	1,910	2,520	335,000
1956	1,890	2,350	21,000	32,100	25,400	13,800	14,900	7,940	2,800	4,110	4,550	1,480	132,000
1957	1,150	2,840	29,400	34,400	30,500	15,800	1,560	1,700	3,520	6,890	4,920	2,960	136,000
1958	1,900	3,750	40,600	77,700	11,800	12,900	5,190	824	1,580	3,620	3,120	3,470	167,000
1959	2,320	2,380	67,900	33,900	27,900	19,800	5,560	1,690	3,240	4,860	3,920	4,950	178,000
1960	2,190	2,810	102,000	20,600	28,500	6,220	781	1,180	952	2,530	2,090	1,820	171,000
1961	2,150	2,780	28,000	5,310	16,200	8,290	461	504	1,060	3,380	2,320	621	71,100
1962	2,400	4,600	35,000	23,600	10,400	7,380	27,700	154	2,230	1,480	1,560	1,420	118,000
1963	633	15,600	9,150	4,000	5,230	7,120	4,770	922	1,550	1,680	762	486	51,900
1964	473	1,270	2,750	16,200	49,500	47,300	9,030	2,860	3,730	6,430	4,250	1,890	146,000
1965	756	7,590	21,300	140,000	39,102	52,300	21,800	5,150	10,300	8,730	4,990	4,950	317,000
1966	750	1,900	70,700	27,300	15,500	29,200	11,800	4,240	1,920	6,950	3,530	2,610	176,000
1967	2,790	5,160	68,300	85,000	128,000	49,300	7,670	3,340	2,930	5,050	4,450	3,110	365,000
1968	4,450	7,760	27,200	14,600	22,600	17,600	8,010	7,360	11,500	13,600	7,430	4,580	147,000
1969	1,600	2,500	66,800	114,000	22,000	22,200	23,500	1,920	2,090	5,150	4,810	3,170	270,000
1970	1,030	2,600	21,400	20,300	53,800	30,900	6,670	3,880	4,660	4,480	4,440	1,590	156,000

Table 10. Synthesized streamflow volumes for Milk River at Ft. Belknap diversion dam, Montana, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	4,700	33,100	19,800	37,100	28,200	20,700	6,300	3,380	3,730	3,920	3,480	529	165,000
1972	129	230	80,700	31,100	33,300	30,500	10,400	8,120	5,450	5,330	3,140	732	209,000
1973	1,710	2,790	13,300	10,500	10,400	5,080	1,720	2,230	3,280	1,030	833	978	53,800
1974	5,820	2,150	49,200	37,100	58,900	33,900	9,140	6,700	3,620	4,220	2,640	2,670	216,000
1975	726	428	1,950	57,200	138,000	90,100	32,500	17,400	7,120	10,500	4,860	5,570	367,000
1976	7,620	8,660	55,800	22,800	21,900	12,700	9,700	6,830	577	3,120	2,990	2,330	155,000
1977	1,700	4,430	7,510	10,200	6,040	4,860	2,950	2,460	1,890	2,270	1,040	781	46,100
1978	805	1,060	130,000	104,000	42,800	19,200	19,800	17,200	19,600	6,180	3,590	3,090	367,000
1979	1,010	1,350	179,000	69,700	57,900	17,300	12,500	2,820	2,490	2,280	1,390	2,180	349,000
1980	842	2,130	2,1300	23,800	17,400	18,100	4,940	4,880	4,810	3,890	2,150	1,920	106,000
1981	2,960	5,200	12,800	9,490	37,900	22,900	8,590	3,230	2,300	4,400	2,960	1,310	114,000
1982	228	2,790	24,500	109,000	33,500	40,900	8,160	4,290	1,960	3,230	1,720	1,290	231,000
1983	1,290	2,090	7,840	6,980	12,200	6,440	13,600	3,310	4,220	1,090	863	258	60,200
1984	523	3,260	8,770	5,020	5,160	3,900	1,880	3,490	2,910	793	1,210	486	37,400
1985	80	1,030	9,030	9,420	9,960	9,760	2,600	2,490	8,290	8,270	2,430	867	64,200
1986	3,290	41,800	86,700	9,290	51,300	15,900	5,680	2,240	78,900	12,900	4,770	4,650	317,000
1987	2,100	2,830	14,500	20,100	7,040	5,850	7,760	6,670	5,360	2,460	2,390	1,380	78,500
1988	203	828	6,870	12,500	5,820	5,950	2,720	3,480	1,280	301	732	467	41,100
1989	240	156	26,300	16,100	17,300	25,800	10,300	3,220	5,170	1,850	5,680	3,790	116,000

Table 11. Synthesized streamflow volumes for Milk River at Paradise diversion dam, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	16,100	6,980	123,000	85,300	29,600	30,300	44,600	10,300	9,400	8,980	7,120	3,870	376,000
1929	2,600	2,210	34,600	44,200	44,200	40,700	3,540	74	1,400	4,140	4,080	2,880	185,000
1930	1,890	21,700	73,600	58,100	26,100	9,700	3,040	1,440	4,040	3,530	2,810	3,420	209,000
1931	2,270	2,500	10,400	6,660	4,140	5,840	2,720	3,760	3,740	25	2,770	873	45,700
1932	1,030	5,840	22,500	17,900	15,000	25,400	3,030	2,120	2,850	1,770	2,160	701	100,000
1933	596	1,230	20,100	39,100	30,100	12,400	996	105	101	3,450	4,890	1,350	114,000
1934	3,390	16,600	32,500	23,000	16,500	23,300	4,800	1,210	4,760	3,610	5,670	3,920	139,000
1935	8,530	17,900	25,900	50,600	19,200	8,080	8,120	1,690	869	2,400	83	184	144,000
1936	74	23	23,300	66,800	7,160	5,350	744	2,420	916	818	1,980	209	110,000
1937	178	167	6,740	48,800	19,200	26,700	8,960	603	2,250	4,010	1,090	560	119,000
1938	996	1,150	44,300	32,900	27,800	21,300	11,700	2,060	4,000	1,820	3,650	781	152,000
1939	560	355	83,100	8,200	6,110	41,300	6,960	1510	2,290	849	2,170	277	154,000
1940	105	144	29,900	79,600	13,200	5,910	5,430	885	2,370	1,760	2,430	314	142,000
1941	184	333	53,700	5,460	4,690	13,100	2,660	941	1,380	2,360	1,800	1,840	88,400
1942	369	3,720	19,000	46,700	19,200	34,900	7,210	830	2,030	4,200	2,090	2,120	142,000
1943	566	46,600	108,000	45,000	24,500	29,400	9,270	2,130	1,200	4,120	4,420	1,600	277,000
1944	3,460	4,270	11,900	10,300	4,460	7,050	4,620	11,000	1,130	1,240	1,270	959	61,600
1945	400	5,500	24,000	8,190	12,400	39,000	4,560	74	1,180	2,660	1,520	1,330	101,000
1946	750	8,000	29,700	6,020	8,380	9,910	3,050	1,210	2,720	6,490	1,700	1,230	79,200
1947	1,000	3,820	107,000	49,200	24,900	15,200	2,850	3,840	5,310	5,750	2,690	1,830	223,000
1948	1,990	1,170	22,600	91,000	51,200	59,700	20,500	8,190	1,150	6,280	4,500	2,360	271,000
1949	1,200	1,140	9,140	26,100	21,100	6,650	1,400	86	910	4,530	3,300	1,190	76,700
1950	92	861	10,500	127,000	32,400	28,900	10,500	4,770	785	2,670	4,830	1,750	226,000
1951	1,680	1,400	42,000	83,400	52,700	52,900	35,300	15,400	19,700	17,900	13,000	8,320	344,000
1952	5,200	13,400	81,800	404,000	32,900	14,500	9,720	3,270	2,430	3,530	3,400	3,400	577,000
1953	3,550	4,630	12,500	48,900	62,400	137,000	21,900	5,560	3,510	6,150	5,840	4,180	31,7000
1954	2,710	11,700	11,400	91,600	46,400	26,000	6,540	6,640	9,040	7,900	5,020	3,330	228,000
1955	1,300	1,440	24,800	132,000	70,800	26,000	84,900	1,090	2,210	5,130	1,940	2,520	354,000
1956	1,890	2,350	21,500	32,600	25,500	13,900	14,900	7,940	2,800	4,120	4,550	1,480	134,000
1957	1,150	2,850	30,000	35,500	30,700	15,800	1,600	1,700	3,530	6,890	4,920	2,970	138,000
1958	1,900	3,850	42,800	78,500	11,800	12,900	5,190	824	1,580	3,620	3,120	3,530	170,000
1959	2,320	2,380	71,400	34,300	28,000	20,200	5,640	1,690	3,270	4,890	3,930	4,970	183,000
1960	2,240	2,900	107,000	21,000	28,900	6,410	873	1,200	964	2,540	2,090	1,820	178,000
1961	2,150	2,780	29,400	5,340	16,300	8,410	461	504	1,060	3,380	2,320	621	72,700
1962	2,400	4,640	36,400	23,600	10,600	7,530	29,600	172	2,230	1,480	1,560	1,430	122,000
1963	633	17,300	9,510	4,140	5,300	7,160	4,820	928	1,560	1,680	762	486	54,200
1964	492	1,270	2,770	16,300	50,800	48,500	9,220	2,930	3,810	6,540	4,360	1,910	149,000
1965	756	8,130	21,800	149,000	41,900	54,200	23,600	5,530	10,800	9,090	5,260	5,130	335,000
1966	769	1,930	76,400	28,000	15,700	29,200	11,900	4,260	1,920	6,950	3,530	2,630	183,000
1967	2,830	5,280	74,000	89,000	130,000	50,000	7,830	3,390	3,310	5,210	4,580	3,190	379,000
1968	4,990	8,420	27,900	14,900	22,700	18,000	8,080	7,490	11,600	13,700	7,530	4,630	150,000
1969	1,600	2,500	69,700	118,000	22,800	23,300	25,100	2,040	2,110	5,320	5,020	3,370	281,000
1970	1,060	2,750	22,800	21,200	60,600	33,900	7,180	4,000	4,750	4,690	4,620	1,690	169,000

Table 11. Synthesized streamflow volumes for Milk River at Paradise diversion dam, Montana, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	5,650	38,000	22,000	38,300	28,600	21,000	6,350	3,380	3,730	3,920	3,520	529	175,000
1972	129	236	82,100	31,500	33,500	31,700	10,400	8,120	5,450	5,360	3,200	744	212,000
1973	1,710	2,800	13,500	11,200	10,700	5,340	1,770	2,230	3,280	1,050	851	984	55,500
1974	6,330	2,280	52,000	38,400	66,500	38,900	9,830	7,430	3,970	4,240	2,830	3,170	236,000
1975	799	494	2,240	60,000	148,000	95,300	34,900	18,300	7,600	10,500	4,970	5,750	389,000
1976	7,770	9,200	58,600	23,100	22,000	12,800	9,720	6,840	583	3,120	3,020	2,340	159,000
1977	1,710	4,880	7,720	10,400	6,100	4,890	2,950	2,490	1,960	2,280	1,060	793	47,200
1978	824	1,060	140,000	110,000	47,200	20,200	21,400	17,300	19,800	6,190	3,660	3,090	391,000
1979	1,060	1,530	200,000	74,100	61,700	17,900	13,100	2,850	2,530	2,290	1,430	2,280	381,000
1980	855	2,270	22,500	24,200	17,400	18,100	4,950	4,900	4,810	3,970	2,170	1,950	108,000
1981	2,970	5,220	12,900	9,630	38,000	23,000	8,600	3,250	2,300	4,440	2,990	1,330	115,000
1982	234	3,560	26,000	113,000	34,500	44,100	8,600	4,330	1,980	3,400	1,810	1,360	243,000
1983	1,340	2,170	8,010	7,110	12,600	6,480	15,600	3,340	4,220	1,110	899	264	63,100
1984	578	3,570	9,060	5,230	5,230	3,930	1,880	3,490	2,910	793	1,220	486	38,400
1985	86	1,340	9,410	9,690	10,100	9,800	2,600	2,550	8,370	8,550	2,540	898	65,900
1986	3,380	44,000	92,300	9,760	60,100	17,800	6,300	2,320	88,800	15,800	5,680	5,560	352,000
1987	2,440	3,090	15,400	21,200	7,450	6,150	7,900	6,750	5,410	2,530	2,490	1,420	82,300
1988	209	857	7,050	12,600	5,950	5,960	2,720	3,480	1,280	307	732	467	41,600
1989	246	156	26,500	16,400	17,400	25,900	10,300	3,230	5,180	1,880	5,720	3,810	117,000

Table 12. Synthesized streamflow volumes for Milk River at Harlem pumping plant, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	16,100	6,980	170,000	145,000	34,600	36,400	51,600	12,300	10,300	10,900	7,130	4,170	505,000
1929	2,610	2,220	43,600	69,300	61,000	46,400	5,100	92	1,480	4,830	4,080	3,090	244,000
1930	1,900	25,100	115,000	112,000	29,700	10,900	4,020	1,530	4,140	4,350	2,820	3,680	315,000
1931	2,280	2,510	13,800	7,920	4,400	6,450	3,040	3,780	3,830	31	2,770	904	51,700
1932	1,040	6,480	33,600	27,700	17,700	28,000	3,610	2,120	2,930	2,280	2,170	707	128,000
1933	603	1,240	29,900	52,000	37,300	13,800	2,560	148	184	3,460	4,890	1,410	147,000
1934	3,390	19,400	53,100	32,000	16,800	24,500	4,870	1,210	4,840	3,620	5,680	4,060	173,000
1935	8,530	17,900	44,300	78,800	23,800	8,820	10,000	1,700	952	2,410	89	228	197,000
1936	80	29	25,700	116,000	8,650	5,410	750	2,420	994	824	1,980	209	163,000
1937	295	272	8,390	62,700	19,400	29,700	12,900	603	2,290	4,020	1,090	560	142,000
1938	1,110	1,790	61,500	41,100	30,500	27,500	14,700	2,100	4,180	1,930	3,860	885	191,000
1939	726	478	146,000	12,200	7,910	68,900	10,800	1,510	2,290	873	2,210	394	254,000
1940	172	265	40,800	176,000	21,400	8,200	5,770	1,610	2,390	1,800	2,430	344	261,000
1941	184	444	107,000	9,960	6,500	21,300	6,070	1,730	1,450	2,830	2,300	1,910	162,000
1942	369	6,120	28,700	70,700	25,600	53,400	11,700	1,990	2,450	5,010	2,450	2,250	211,000
1943	609	92,200	192,000	75,400	29,800	34,400	11,100	2,200	1,200	4,350	4,610	1,800	449,000
1944	6,160	7,350	17,600	16,200	5,640	10,400	10,000	15,200	1,180	1,610	1,520	1,120	94,100
1945	480	10,300	41,100	13,000	17,100	64,000	6,790	135	1,340	2,830	1,670	1,330	160,000
1946	750	14,600	50,300	8,770	10,100	10,600	3,200	1,480	2,760	7,290	1,860	1,380	113,000
1947	1,000	4,040	142,000	64,000	27,900	17,000	2,980	4,370	5,430	6,510	2,990	1,930	280,000
1948	2,000	1,710	35,200	140,000	66,300	62,200	20,800	9,270	1,210	7,120	5,080	2,360	353,000
1949	1,200	1,350	10,000	29,400	26,600	7,840	1,550	98	958	4,700	3,470	1,250	88,400
1950	123	1,020	12,800	204,000	35,200	29,400	10,500	5,490	839	2,800	5,020	1,820	309,000
1951	2,020	1,840	51,300	117,000	74,000	56,200	36,300	21,300	21,500	19,300	13,200	8,680	423,000
1952	5,260	17,500	105,000	784,000	49,200	18,100	13,000	3,760	2,920	4,020	3,450	3,400	1,010,000
1953	3,560	4,660	15,200	55,100	87,400	190,000	27,800	7,740	4,090	7,050	6,470	4,700	413,000
1954	2,910	14,500	14,100	140,000	53,600	32,700	8,490	9,310	11,600	10,600	5,560	3,770	308,000
1955	1,410	1,560	37,800	256,000	130,000	38,800	138,000	4,550	3,990	7,220	2,050	2,520	625,000
1956	1,890	2,350	28,000	51,600	31,400	15,500	18,400	10,200	3,570	5,200	4,550	1,480	174,000
1957	1,150	2,890	33,900	71,800	41,600	18,500	3,580	3,750	4,140	8,080	4,940	3,000	197,000
1958	1,900	4,250	62,800	128,000	13,800	13,700	5,770	1,760	1,580	3,760	3,120	3,740	244,000
1959	2,340	2,380	97,600	48,700	31,300	23,500	7,560	1,890	3,360	5,810	3,970	5,100	234,000
1960	2,420	3,310	165,000	32,000	37,900	8,050	1,600	1,810	1,010	2,570	2,090	1,820	259,000
1961	2,150	2,780	42,700	6,240	17,200	9,150	461	504	1,060	3,380	2,320	621	88,500
1962	2,400	4,820	50,400	28,700	11,800	23,100	41,800	283	2,230	1,500	1,560	1,460	170,000
1963	639	24,000	13,900	10,900	6,140	7,770	14,600	941	1,620	1,680	762	486	83,400
1964	560	1,290	2,820	19,700	66,800	56,900	11,200	3,300	4,180	7,210	4,810	1,990	181,000
1965	756	10,300	23,800	256,000	66,200	91,600	44,200	7,160	16,600	12,300	6,380	5,880	542,000
1966	855	2,050	138,000	56,300	22,400	33,400	13,400	5,200	2,430	7,700	3,570	2,710	288,000
1967	2,990	5,780	104,000	157,000	215,000	59,400	14,300	4,540	5,340	6,630	5,080	3,520	583,000
1968	7,220	11,100	38,700	20,800	25,400	22,600	9,170	8,440	12,700	15,100	7,940	4,830	184,000
1969	1,600	2,510	84,100	191,000	28,100	28,600	32,200	2,610	2,240	6,270	5,860	4,160	389,000
1970	1,160	3,340	29,200	53,200	107,000	50,300	11,400	4,940	5,320	5,970	5,350	2,100	279,000

Table 12. Synthesized streamflow volumes for Milk River at Harlem pumping plant, Montana, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	9,560	58,300	31,400	73,300	35,600	25,500	7,240	3,470	3,850	4,430	3,680	535	257,000
1972	129	259	117,000	36,300	36,100	45,000	11,800	8,980	5,640	5,980	3,490	775	271,000
1973	1,720	2,860	18,900	17,100	14,300	8,290	2,080	2,320	3,340	1,190	922	996	74,000
1974	8,450	2,820	72,800	61,700	115,000	62,600	13,600	11,200	5,530	4,610	3,630	5,200	367,000
1975	1,120	778	3,600	97,000	225,000	132,000	47,100	25,500	10,700	12,100	5,450	6,470	566,000
1976	8,340	11,400	105,000	39,500	23,300	16,300	10,200	7,320	631	3,570	3,110	2,380	231,000
1977	1,760	6,710	10,400	13,500	7,460	5,360	3,360	2,600	2,270	2,360	1,140	861	57,800
1978	910	1,080	185,000	185,000	71,800	25,500	29,300	17,600	22,500	7,030	3,970	3,110	553,000
1979	1,290	2,250	327,000	122,000	88,600	21,900	17,600	3,420	2,890	2,720	1,580	2,660	594,000
1980	904	2,860	30,000	31,000	18,700	19,300	5,160	5,170	4,840	4,700	2,260	2,040	127,000
1981	2,990	5,250	15,400	11,000	40,400	25,900	9,260	3,380	2,330	4,590	3,080	1,400	125,000
1982	240	6,730	32,800	167,000	48,800	74,100	12,300	4,890	2,340	5,130	2,230	1,660	358,000
1983	1,560	2,480	12,600	10,800	21,000	6,800	26,800	3,820	4,250	1,840	1,040	295	93,200
1984	812	4,870	12,300	8,430	5,820	4,530	1,910	3,490	2,910	799	1,230	504	47,600
1985	92	2,610	14,400	29,800	18,100	10,600	2,820	2,790	9,260	10,600	3,010	1,010	105,000
1986	3,740	53,300	172,000	15,900	104,000	27,600	10,300	2,890	205,000	35,900	10,100	9,640	651,000
1987	3,950	4,470	50,400	41,900	13,000	8,850	9,020	8,600	6,050	3,590	2,960	1,650	154,000
1988	277	1,010	9,780	19,100	8,260	6,510	2,860	3,520	1,340	326	744	473	54,200
1989	252	161	28,000	23,000	18,900	29,100	10,900	3,370	5,360	2,300	5,910	3,940	131,000

Table 13. Synthesized streamflow volumes for Milk River near Harlem, Montana, 1928-1989, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	16,200	6,990	175,000	148,000	35,000	37,500	52,500	12,600	10,400	11,100	7,130	4,300	517,000
1929	2,610	2,220	46,900	70,300	62,900	47,400	5,410	98	1,520	4,890	4,080	3,190	251,000
1930	1,900	25,100	114,000	117,000	29,700	11,100	4,210	1,560	4,180	4,430	2,820	3,790	320,000
1931	2,280	2,510	14,800	7,940	4,400	6,470	3,040	3,780	3,860	31	2,770	916	52,800
1932	1,050	6,480	35,800	28,100	17,800	28,300	3,730	2,120	2,970	2,320	2,170	707	131,000
1933	603	1,240	31,600	52,500	37,900	14,000	2,750	148	220	3,460	4,890	1,440	151,000
1934	3,390	19,400	55,100	32,400	16,800	24,700	4,890	1,210	4,880	3,620	5,680	4,130	176,000
1935	8,530	17,900	45,300	79,700	23,800	9,020	10,000	1,700	988	2,410	95	246	200,000
1936	80	29	26,800	117,000	8,700	5,440	750	2,420	1,030	824	1,980	209	166,000
1937	344	317	8,680	63,200	19,400	31,100	14,600	603	2,290	4,020	1,090	560	146,000
1938	1,170	2,080	62,100	41,600	30,800	29,400	15,200	2,120	4,270	1,980	3,960	928	196,000
1939	799	533	148,000	12,300	8,410	78,900	12,200	1,510	2,290	879	2,230	443	268,000
1940	203	322	45,800	178,000	22,000	8,460	5,830	1,610	2,390	1,800	2,430	357	269,000
1941	184	494	110,000	10,200	6,710	24,000	6,150	1,770	1,450	2,990	2,530	1,940	168,000
1942	369	7,210	31,100	76,500	27,500	54,100	11,800	2,050	2,460	5,170	2,610	2,310	223,000
1943	627	195,000	113,000	76,400	31,300	36,200	11,900	2,230	1,200	4,460	4,710	1,890	478,000
1944	7,380	8,750	18,100	16,800	5,920	11,900	10,700	15,300	1,200	1,760	1,630	1,190	101,000
1945	510	12,600	41,800	14,500	18,900	75,300	7,810	160	1,420	2,910	1,740	1,330	179,000
1946	750	17,600	51,100	8,930	10,800	10,800	3,270	1,600	2,780	7,630	1,930	1,450	119,000
1947	1,000	4,150	150,000	65,900	28,500	17,800	3,030	4,430	5,480	6,840	3,120	1,970	292,000
1948	2,000	1,960	40,800	151,000	71,100	63,200	21,000	9,700	1,230	7,510	5,340	2,360	377,000
1949	1,200	1,440	10,300	30,300	29,100	8,380	1,620	98	976	4,780	3,550	1,290	93,100
1950	141	1,090	13,800	208,000	35,700	29,600	10,500	5,720	857	2,850	5,110	1,850	315,000
1951	2,170	2,040	55,600	119,000	74,500	56,300	36,400	21,300	21,500	19,300	13,200	8,850	430,000
1952	5,290	19,400	797,000	115,000	49,900	18,600	13,300	3,800	2,930	4,060	3,470	3,400	1,036,000
1953	3,560	4,680	15,700	55,200	91,400	198,000	29,300	8,010	4,110	7,110	6,760	4,940	429,000
1954	3,010	15,800	14,800	143,000	54,400	33,400	8,750	9,360	11,800	10,800	5,810	3,970	315,000
1955	1,470	1,620	40,000	265,000	137,000	40,800	139,000	4,670	4,020	7,260	2,100	2,520	645,000
1956	1,890	2,350	28,800	52,300	31,600	15,600	18,400	10,200	3,570	5,210	4,550	1,480	176,000
1957	1,150	2,900	34,800	72,500	42,100	18,700	3,590	3,750	4,160	8,080	4,940	3,010	200,000
1958	1,900	4,440	63,700	128,000	13,800	13,700	5,770	1,760	1,580	3,760	3,120	3,850	245,000
1959	2,360	2,380	102,000	49,300	31,500	23,800	7,700	1,890	3,400	5,880	3,990	5,150	239,000
1960	2,510	3,490	169,000	32,700	38,500	8,400	1,770	1,840	1,020	2,580	2,100	1,820	266,000
1961	2,150	2,780	42,700	6,270	17,400	9,250	461	504	1,060	3,380	2,320	621	88,900
1962	2,400	4,890	51,300	28,800	12,200	23,400	42,100	295	2,230	1,500	1,560	1,470	172,000
1963	646	27,000	14,400	11,200	6,270	7,850	14,700	947	1,650	1,680	762	486	87,500
1964	590	1,300	2,830	19,900	69,300	59,200	11,600	3,430	4,330	7,430	5,020	2,030	187,000
1965	756	11,400	24,700	270,000	71,200	95,100	47,700	7,860	17,600	13,000	6,890	6,220	573,000
1966	892	2,100	146,000	57,500	22,800	33,600	13,500	5,240	2,430	7,700	3,590	2,740	298,000
1967	3,070	6,000	113,000	159,000	218,000	60,600	14,600	4,640	6,070	6,940	5,310	3,680	601,000
1968	8,230	12,300	40,100	21,400	25,600	23,300	9,290	8,690	12,900	15,300	8,130	4,920	190,000
1969	1,610	2,510	89,600	194,000	29,400	30,800	35,100	2,830	2,280	6,580	6,250	4,530	406,000
1970	1,210	3,620	31,500	54,700	120,000	55,800	12,300	5,170	5,500	6,360	5,690	2,280	304,000

Table 13. Synthesized streamflow volumes for Milk River near Harlem, Montana, 1928-1989, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	11,300	67,500	35,400	75,500	36,400	25,900	7,320	3,470	3,850	4,430	3,760	541	275,000
1972	129	270	119,000	36,900	36,400	47,300	11,900	8,980	5,640	6,010	3,610	787	277,000
1973	1,720	2,890	19,400	18,400	15,100	8,780	2,180	2,320	3,340	1,220	952	1,000	77,200
1974	9,410	3,070	74,200	62,600	127,000	71,800	14,900	12,500	6,190	4,630	4,000	6,120	397,000
1975	1,260	905	4,130	243,000	141,000	101,000	51,500	27,000	11,600	12,200	5,670	6,800	605,000
1976	8,610	235,000	12,500	107,000	40,000	23,400	16,400	10,200	7,350	643	3,580	3,140	2,390
1977	1,780	7,540	10,800	13,900	7,580	5,420	3,370	2,650	2,400	2,370	1,170	892	59,900
1978	947	1,080	204,000	188,000	80,000	27,400	32,400	17,700	22,900	7,050	4,110	3,120	589,000
1979	1,380	2,580	364,000	129,000	95,700	22,800	17,900	3,470	2,960	2,730	1,640	2,830	647,000
1980	922	3,130	31,600	31,700	18,700	19,300	5,170	5,200	4,850	4,850	2,280	2,080	130,000
1981	3,010	5,270	15,500	11,200	40,500	26,000	9,280	3,400	2,340	4,650	3,110	1,430	126,000
1982	240	8,160	35,500	168,000	50,200	79,300	13,200	4,950	2,370	5,430	2,420	1,800	371,000
1983	1,660	2,620	12,900	11,000	21,800	6,860	30,300	3,870	4,250	1,860	1,100	301	98,500
1984	916	5,460	12,900	8,810	5,970	4,570	1,910	3,490	2,910	799	1,230	504	49,400
1985	92	3,190	15,100	30,300	18,200	10,700	2,820	2,880	9,410	11,100	3,210	1,060	108,000
1986	3,900	57,500	176,000	16,800	120,000	31,100	11,500	3,040	218,000	41,300	11,800	11,300	702,000
1987	4,580	4,960	51,600	44,000	13,700	9,380	9,280	8,750	6,150	3,730	3,150	1,720	161,000
1988	289	1,060	10,100	19,200	8,500	6,520	2,860	3,520	1,340	332	744	473	55,000
1989	252	161	28,400	23,600	19,100	29,300	11,000	3,390	5,370	2,350	5,970	3,970	133,000

Table 14. Synthesized streamflow volumes for Milk River upstream from Peoples Creek, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	16,300	7,040	177,000	240,000	36,700	39,200	53,900	13,100	10,600	11,500	7,180	4,370	617,000
1929	2,670	2,260	47,900	80,000	65,700	50,800	5,890	172	1,560	5,110	4,130	3,250	269,000
1930	1,960	25,400	162,000	182,000	31,000	11,800	4,490	1,650	4,230	4,650	2,870	3,860	436,000
1931	2,340	2,550	15,800	9,240	4,750	6,630	3,110	3,840	3,900	86	2,820	972	56,000
1932	1,090	6,530	37,300	32,000	18,900	30,900	3,920	2,200	2,990	2,510	2,220	762	141,000
1933	652	1,280	33,000	58,800	39,900	14,500	3,070	221	274	3,530	4,940	1,490	162,000
1934	3,460	21,900	63,900	37,000	17,100	25,200	4,970	1,290	4,900	3,680	5,730	4,190	193,000
1935	8,610	17,900	51,000	108,000	25,300	9,430	10,700	1,760	1,010	2,460	137	307	236,000
1936	129	75	26,900	158,000	9,490	5,610	836	2,490	1,060	904	2,030	258	208,000
1937	394	361	9,100	75,900	19,600	31,200	14,700	658	2,360	4,080	1,140	615	160,000
1938	1,220	2,120	68,200	49,100	31,900	34,100	16,100	2,180	4,300	2,030	4,010	984	216,000
1939	855	578	203,000	14,600	9,140	85,000	12,500	1,580	2,330	972	2,290	529	334,000
1940	215	357	46,300	198,000	26,800	9,900	6,120	1,890	2,420	1,870	2,520	418	297,000
1941	221	528	117,000	14,800	7,500	24,500	6,490	1,890	1,480	3,060	2,600	2,050	182,000
1942	387	7,230	35,100	81,800	28,200	58,500	14,700	2,470	2,650	5,490	2,790	2,410	242,000
1943	701	113,000	205,000	96,600	33,100	37,800	13,100	2,280	1,220	4,760	4,920	2,000	515,000
1944	7,450	8,810	21,100	24,600	6,600	12,500	11,300	15,400	1,540	2,080	1,720	1,240	114,000
1945	547	12,600	46,400	16,200	19,500	75,900	7,830	166	1,430	3,170	1,780	1,380	187,000
1946	793	17,800	55,600	10,900	11,300	13,400	3,600	1,600	2,800	7,630	1,980	1,510	129,000
1947	1,080	4,300	153,000	76,600	30,000	18,400	3,290	4,690	5,520	7,100	3,230	2,050	310,000
1948	2,070	1,990	42,000	155,000	73,400	63,800	21,900	10,100	1,250	7,510	5,520	2,400	387,000
1949	1,220	1,460	11,100	32,700	29,500	8,500	1,640	111	994	4,820	3,600	1,310	96,900
1950	148	1,110	13,900	226,000	37,900	30,400	10,800	6,170	875	2,950	5,170	1,910	337,000
1951	2,210	2,070	56,100	135,000	86,200	57,300	36,900	21,800	21,800	20,100	13,300	8,950	462,000
1952	5,310	20,400	121,000	861,000	61,500	19,700	15,700	4,240	3,170	4,700	3,500	3,420	1,120,000
1953	3,570	4,700	16,700	57,400	101,000	203,000	30,700	8,450	4,180	7,480	6,930	5,090	449,000
1954	3,080	16,600	15,600	155,000	56,500	35,500	9,290	11,200	12,200	13,300	5,960	4,110	339,000
1955	1,510	1,660	44,200	290,000	163,000	45,500	148,000	5,590	4,260	8,030	2,150	2,550	715,000
1956	1,900	2,370	30,900	58,000	33,900	16,500	19,000	10,600	3,700	5,450	4,580	1,500	188,000
1957	1,160	2,930	37,000	76,500	44,000	19,000	3,640	3,760	4,210	8,260	4,970	3,040	209,000
1958	1,910	4,540	66,400	138,000	14,600	14,000	5,780	1,760	1,590	3,850	3,140	3,920	259,000
1959	2,370	2,380	109,000	53,000	32,500	28,900	8,100	1,900	3,410	6,540	4,020	5,200	257,000
1960	2,560	3,660	184,000	37,500	41,200	8,650	1,970	1,890	1,050	2,600	2,120	1,830	289,000
1961	2,160	2,800	45,100	6,930	17,700	9,530	461	529	1,090	3,380	2,340	633	92,600
1962	2,420	4,940	53,800	34,200	13,200	25,300	46,600	455	2,340	1,810	1,580	1,490	188,000
1963	652	28,700	20,800	13,700	6,970	10,200	15,500	1,150	1,750	1,720	780	498	103,000
1964	615	1,310	3,110	21,700	71,300	59,900	12,000	3,450	4,350	7,450	5,140	2,070	192,000
1965	769	11,900	25,200	288,000	88,100	97,300	50,500	8,180	18,600	13,500	7,170	6,410	615,000
1966	922	2,170	156,000	62,700	24,700	34,400	14,100	5,920	2,490	7,770	3,620	2,790	317,000
1967	3,120	6,100	116,000	176,000	236,000	61,900	15,000	4,990	6,400	7,460	5,430	3,740	642,000
1968	8,300	12,600	48,500	22,900	26,700	23,900	9,500	9,030	13,400	15,600	8,190	4,960	203,000
1969	1,670	2,620	93,000	213,000	34,300	31,500	38,000	3,140	2,420	7,340	6,460	4,720	438,000
1970	1,250	3,760	33,200	70,900	133,000	57,700	13,300	5,630	5,630	6,540	5,880	2,390	339,000

Table 14. *Synthesized streamflow volumes for Milk River upstream from Peoples Creek, Montana, 1928-89, in acre-feet* (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	12,200	72,500	37,500	84,500	39,000	26,700	7,560	3,620	3,870	4,540	3,820	553	296,000
1972	135	288	127,000	38,300	37,700	48,600	12,200	9,210	5,850	6,470	3,700	805	290,000
1973	1,730	2,920	21,800	19,800	16,000	9,910	2,460	2,410	3,360	1,260	1,020	1,050	83,800
1974	9,970	3,430	76,800	77,400	136,000	73,200	15,700	13,200	6,400	5,000	4,210	6,270	428,000
1975	1,360	955	4,350	110,000	261,000	142,000	52,900	27,800	12,200	13,500	5,800	7,050	639,000
1976	9,000	13,700	132,000	48,700	24,800	18,600	11,600	8,090	726	3,730	3,190	2,450	276,000
1977	1,860	7,930	11,500	15,300	8,180	5,660	3,500	2,770	2,460	4,700	1,230	978	66,100
1978	1,040	1,170	220,000	202,000	86,100	28,100	34,400	17,900	23,800	7,240	4,400	3,340	629,000
1979	1,520	2,720	374,000	147,000	107,000	23,700	19,500	3,810	3,060	2,850	1,840	3,070	690,000
1980	1,010	3,200	33,400	35,700	19,200	19,700	5,290	5,370	4,960	4,990	2,470	2,160	138,000
1981	3,140	15,200	16,600	11,600	41,100	26,700	9,640	3,430	2,350	4,650	3,210	1,510	139,000
1982	277	9,520	43,300	185,000	55,300	85,100	14,300	5,270	2,510	5,740	2,620	1,930	411,000
1983	1,780	2,860	14,900	13,000	24,300	7,240	32,500	4,150	4,280	1,960	1,190	357	108,000
1984	984	5,760	13,800	9,810	6,250	5,140	1,910	3,490	2,910	805	1,290	547	52,700
1985	117	3,480	16,200	35,000	19,100	11,000	2,830	2,910	9,470	11,500	3,380	1,130	116,000
1986	4,020	59,700	196,000	17,900	130,000	32,000	12,400	3,170	229,000	45,400	12,800	12,300	755,000
1987	4,970	6,540	59,500	49,400	14,400	9,930	10,200	9,210	6,280	3,830	3,360	1,850	179,000
1988	320	1,110	10,700	20,300	8,940	6,780	3,430	3,530	1,340	332	797	529	58,100
1989	289	194	30,700	26,000	20,100	30,300	11,100	3,420	5,410	2,360	6,130	4,070	140,000

Table 15. Synthesized streamflow volumes for Peoples Creek at mouth, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	6.1	5.8	10,600	7,380	738	2,440	1,840	799	77	400	6.0	301	24,600
1929	6.1	5.6	7,320	2,260	4,180	2,080	676	18	77	148	6.0	215	17,000
1930	6.1	5.6	6,390	4,640	68	399	424	55	77	178	6.0	258	12,500
1931	6.1	5.6	2,340	48	0	60	6.1	6.1	77	0	6.0	31	2,580
1932	6.1	5.8	4,800	774	166	595	283	6.1	77	105	6.0	6.1	6,830
1933	6.1	5.6	3,690	1,070	1,480	571	443	6.1	77	0	6.0	61	7,410
1934	6.1	5.6	4,490	714	0	565	49	6.1	77	0	6.0	141	6,060
1935	6.1	5.6	2,150	2,080	166	446	6.1	6.1	77	0	6.0	43	5,000
1936	6.1	5.8	2,400	3,510	123	60	6.1	6.1	77	0	0	0	6,190
1937	117	106	676	1,250	123	3,030	3,940	0	0	0	0	0	9,240
1938	117	666	1,230	1,010	861	4,280	1,050	43	184	111	220	105	9,880
1939	166	122	4,730	113	1,110	22,300	3,070	0	0	12	42	117	31,700
1940	68	127	10,900	4,520	1,410	583	117	0	0	0	0	31	17,800
1941	0	111	6,520	655	461	6,070	178	92	0	350	512	74	15,000
1942	0	2,440	5,350	12,900	4,120	1,430	191	141	24	350	357	135	27,500
1943	43	46,000	6,520	2,140	3,380	4,050	1,720	74	0	240	202	203	64,600
1944	2,710	3,110	984	1,310	615	3,150	1,480	49	48	320	250	160	14,200
1945	80	4,890	1,600	3,390	4,120	25,100	2,280	61	167	178	155	0	42,000
1946	0	6,660	1,910	351	1,480	298	154	271	42	738	161	154	12,200
1947	0	233	19,300	4,280	1,230	1,610	129	129	119	738	303	105	28,200
1948	12	546	12,500	24,500	10,600	2,140	307	922	60	861	577	0	53,100
1949	0	205	738	2,140	5,530	1,190	154	12	48	172	179	68	10,400
1950	31	161	2,280	8,330	1,230	387	0	504	36	111	190	68	13,300
1951	338	444	9,470	4,280	1,050	101	184	18	113	92	143	369	16,600
1952	61	4,140	23,000	27,400	1,720	1,070	676	80	12	86	48	0	58,300
1953	6.1	33	1,110	214	8,790	19,800	3,260	615	42	141	655	523	35,100
1954	209	2,830	1,410	5,710	1,780	1,550	578	129	381	486	547	449	16,100
1955	117	117	4,800	18,600	15,200	4,460	2,340	258	54	86	113	0	46,200
1956	0	0	1,720	1,490	467	125	129	12	6.0	25	0	0	3,970
1957	0	39	2,030	1,490	922	327	18	0	42	6.1	18	31	4,920
1958	0	411	2,030	470	18	0	0	0	0	0	0	221	3,150
1959	18	0	9,530	1,430	394	774	307	0	95	148	48	123	12,900
1960	191	408	9,470	1,550	1,230	774	387	68	42	25	6.0	0	14,100
1961	0	0	141	71	406	202	0	0	0	0	0	0	821
1962	0	172	1,970	36	799	506	738	31	0	0	0	31	4,280
1963	6.1	6,720	1,110	506	283	167	184	12	60	0	0	0	9,040
1964	68	17	49	262	5,470	5,120	799	283	321	492	458	80	13,400
1965	0	2,220	2,030	31,000	11,100	7,910	7,690	1,600	2,380	1,480	1,130	738	69,300
1966	86	122	15,900	2,620	799	327	160	105	0	0	36	80	20,300
1967	166	500	19,400	5,890	6,390	2,680	615	221	1,610	676	512	338	39,000
1968	2,280	2,760	3,010	1,370	510	1,670	271	547	411	492	422	203	13,900
1969	6.1	5.6	12,200	6,780	3,070	4,700	6,460	480	95	676	833	799	36,100
1970	111	611	5,170	3,330	28,500	12,200	2,090	498	417	861	774	412	54,900
1971	3,940	20,500	8,790	5,000	1,600	893	178	0	0	0	167	6.1	41,100
1972	0	23	4,490	1,370	676	5,180	234	0	0	86	286	31	12,400
1973	6.1	56	1,050	2,920	1,600	1,070	197	0	18	61	71	12	7,050
1974	2,150	544	3,200	2,020	27,800	20,600	2,830	3,010	1,490	31	833	2,030	66,500
1975	320	283	1,170	8,630	38,700	20,500	9,720	3,380	2,020	105	482	738	86,000

REVISED

Table 15. Synthesized streamflow volumes for Peoples Creek at mouth, Montana, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1976	584	2,300	4,180	1,130	240	238	61	80	30	18	89	37	8,990
1977	49	1,830	861	952	252	143	25	111	274	43	77	68	4,690
1978	86	17	41,900	7,560	18,100	4,170	6,760	240	952	37	309	18	80,200
1979	221	722	83,000	14,800	15,900	1,960	738	129	155	18	149	387	118,000
1980	49	575	3,690	1,550	141	0	18	61	24	301	71	86	6,560
1981	18	28	258	565	258	417	31	55	24	141	83	68	1,950
1982	0	3,170	6,030	1,550	3,140	11,700	1,840	141	65	676	411	295	29,000
1983	215	305	676	547	1,780	149	7,870	111	18	31	137	18	11,900
1984	228	1,320	1,170	833	320	95	0	0	0	0	0	6.1	3,970
1985	0	1,280	1,600	1,130	381	137	0	215	315	1,170	458	105	6,790
1986	357	9,330	7,130	1,960	35,400	7,740	2,520	326	28,600	12,000	3,810	3,810	113,000
1987	1,410	1,110	2,580	4,520	1,660	1,190	578	332	220	301	422	172	14,500
1988	18	109	738	411	547	6.0	0	0	0	6.1	0	0	1,840
1989	0	0	922	1,250	424	595	215	49	30	105	143	74	3,810

REVISED

Table 16. Synthesized streamflow volumes for Milk River at Vandalia diversion dam, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	17,800	7,850	228,000	1,620,000	64,100	67,000	77,200	20,900	14,500	18,000	8,040	5,710	2,150,000
1929	3,590	2,950	69,900	228,000	112,000	105,000	13,800	1,330	2,340	8,530	4,890	4,480	557,000
1930	2,850	30,000	837,000	1,210,000	50,900	22,700	9,200	3,050	5,160	8,160	3,610	5,130	2,190,000
1931	3,250	3,240	32,400	28,800	10,100	9,090	4,090	4,750	4,520	965	3,560	1,880	107,000
1932	1,950	7,310	64,100	91,800	36,200	70,200	6,950	3,300	3,430	5,460	2,950	1,610	295,000
1933	1,460	1,970	58,100	155,000	70,400	22,400	8,300	1,340	1,140	4,650	5,720	2,460	333,000
1934	4,410	58,800	200,000	107,000	22,700	33,000	6,310	2,510	5,300	4,660	6,540	5,280	457,000
1935	9,760	19,000	139,000	531,000	48,100	15,900	21,000	2,790	1,400	3,250	875	1,240	794,000
1936	941	788	31,000	768,000	21,500	8,060	2,120	3,470	1,610	2,070	2,760	1,010	844,000
1937	1,270	1,150	16,100	267,000	22,700	36,200	20,500	1,550	3,390	4,960	1,870	1,460	378,000
1938	2,180	3,450	161,000	164,000	47,900	109,000	32,000	3,050	4,990	2,930	4,960	1,980	537,000
1939	1,840	1,380	1,040,000	49,100	21,300	199,000	21,200	2,660	2,840	2,340	3,220	1,920	1,350,000
1940	480	1,010	65,400	507,000	101,000	32,200	10,500	6,070	2,890	2,890	3,830	1,330	735,000
1941	799	1,080	227,000	84,400	19,800	38,000	11,800	3,790	1,850	4,490	4,060	3,740	400,000
1942	713	10,100	101,000	175,000	43,700	126,000	58,300	9,000	5,680	10,800	5,890	4,030	551,000
1943	1,860	160,000	376,000	404,000	63,600	65,500	32,700	2,970	1,450	9,400	8,290	3,900	1,130,000
1944	11,200	12,800	67,700	144,000	17,500	25,200	21,400	17,700	6,720	7,350	3,290	2,120	337,000
1945	1,150	18,900	117,000	44,000	33,100	111,000	10,300	314	1,830	7,250	2,610	2,090	350,000
1946	1,440	27,700	125,000	41,400	21,200	53,800	8,780	1,960	3,060	8,390	2,760	2,430	297,000
1947	2,160	6,820	219,000	242,000	54,800	30,500	7,270	8,660	6,150	11,800	5,020	3,380	597,000
1948	3,010	2,980	72,100	247,000	118,000	74,000	36,500	16,600	1,540	8,360	8,730	3,090	592,000
1949	1,510	1,860	23,400	69,600	41,500	11,400	1,940	258	1,270	5,680	4,510	1,760	165,000
1950	357	1,530	17,600	503,000	72,000	43,400	15,100	13,400	1,140	4,570	6,340	2,770	681,000
1951	3,190	3,070	73,000	381,000	264,000	73,900	43,500	30,200	26,900	31,700	14,300	10,800	956,000
1952	5,730	40,700	234,000	1,860,000	238,000	37,900	52,900	11,000	6,870	14,400	4,000	3,620	2,510,000
1953	3,760	5,040	33,400	91,400	247,000	291,000	54,700	15,800	5,190	13,100	10,100	7,800	778,000
1954	4,310	31,100	29,100	350,000	90,400	68,600	18,000	39,200	18,300	51,800	8,740	6,740	716,000
1955	2,200	2,430	113,000	683,000	571,000	120,000	271,000	19,800	8,030	19,700	2,980	3,010	1,820,000
1956	2,050	2,660	63,400	146,000	69,700	30,400	27,200	16,500	5,660	8,970	4,960	1,830	380,000
1957	1,300	3,300	72,600	139,000	74,400	24,800	4,400	3,840	4,980	10,900	5,340	3,540	348,000
1958	2,070	6,420	109,000	287,000	26,600	18,600	5,840	1,850	1,690	5,260	3,380	5,220	474,000
1959	2,610	2,530	224,000	110,000	48,300	106,000	14,400	1,990	3,610	16,600	4,520	5,980	540,000
1960	3,570	6,560	420,000	112,000	83,400	13,300	5,340	2,650	1,480	2,940	2,410	2,050	656,000
1961	2,330	2,980	80,200	16,900	23,200	13,900	492	928	1,620	3,400	2,590	855	149,000
1962	2,590	5,790	93,700	116,000	29,700	55,700	114,000	2,930	4,090	6,520	1,840	1,850	435,000
1963	855	61,600	119,000	53,100	17,800	45,700	28,100	4,230	3,340	2,290	1,050	719	338,000
1964	1,070	1,580	7,180	49,900	106,000	76,100	18,300	4,000	4,920	8,230	7,450	2,640	287,000
1965	947	22,100	34,500	578,000	353,000	137,000	99,800	14,500	35,800	22,000	12,500	9,980	1,320,000
1966	1,500	3,210	329,000	144,000	53,800	47,100	22,300	16,100	3,430	8,780	4,220	3,500	637,000
1967	4,010	8,100	185,000	424,000	514,000	84,400	21,100	10,500	12,900	16,000	7,750	5,060	1,290,000
1968	11,700	19,300	178,000	46,400	42,700	34,200	12,900	14,600	21,500	19,500	9,310	5,690	416,000
1969	2,630	4,200	156,000	508,000	111,000	47,300	87,600	8,180	4,590	19,400	10,500	8,510	969,000
1970	1,920	6,590	64,000	317,000	359,000	98,800	29,900	13,100	7,910	10,200	9,460	4,450	922,000

Table 16. Synthesized streamflow volumes for Milk River at Vandalia diversion dam, Montana, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	29,800	168,000	78,000	226,000	80,800	40,900	11,400	5,720	4,120	6,280	4,870	812	657,000
1972	301	633	250,000	60,100	58,200	74,400	17,800	12,600	8,960	13,400	5,280	1,180	502,000
1973	1,940	3,480	60,000	43,500	32,500	28,000	6,950	3,760	3,590	1,840	2,210	1,850	190,000
1974	20,400	9,410	120,000	302,000	296,000	115,000	31,300	26,500	10,900	10,600	8,210	10,500	960,000
1975	3,190	1,990	8,890	259,000	580,000	183,000	84,300	42,900	22,700	33,900	8,130	11,500	1,240,000
1976	15,500	33,700	512,000	180,000	46,500	51,500	33,100	19,100	2,050	6,000	4,010	3,390	907,000
1977	3,140	15,600	23,600	36,700	17,600	9,340	5,560	4,640	3,750	39,800	2,120	2,290	164,000
1978	2,490	2,430	499,000	417,000	196,000	42,000	72,100	21,300	37,600	10,300	9,200	6,780	1,320,000
1979	3,910	5,410	609,000	437,000	289,000	38,300	44,700	8,950	4,710	4,740	4,970	6,980	1,460,000
1980	2,470	5,000	64,300	96,800	26,400	26,300	7,270	8,090	6,630	7,620	5,280	3,570	260,000
1981	5,130	164,000	34,200	17,400	49,400	37,100	15,000	3,990	2,590	4,880	4,680	2,690	341,000
1982	904	33,200	167,000	438,000	136,000	184,000	33,500	10,200	4,590	11,200	6,040	4,270	1,030,000
1983	3,810	6,800	46,600	43,200	63,000	13,000	72,900	8,500	4,670	3,390	2,690	1,130	270,000
1984	2,290	11,700	29,300	25,700	10,800	13,700	2,020	3,540	2,910	861	2,340	1,160	106,000
1985	467	9,290	34,800	107,000	32,600	16,600	2,980	3,630	10,700	18,300	6,320	2,210	245,000
1986	6,200	102,000	518,000	36,700	309,000	52,800	28,900	5,520	433,000	120,000	31,700	30,400	1,680,000
1987	12,200	31,500	181,000	135,000	26,900	19,300	24,700	16,500	8,410	5,670	6,910	4,010	472,000
1988	769	1,910	20,700	36,200	16,100	10,800	12,100	3,710	1,340	338	1,670	1,360	107,000
1989	898	705	65,700	63,200	35,500	45,600	13,700	3,900	6,060	2,660	8,660	5,610	252,000

Table 17. Synthesized streamflow volumes for Milk River at mouth, Montana, 1928-89, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1928	18,200	8,030	237,000	1,940,000	70,100	72,800	82,100	22,500	15,400	19,400	8,230	5,950	2,500,000
1929	3,800	3,100	73,300	261,000	122,000	117,000	15,400	1,590	2,510	9,280	5,050	4,710	618,000
1930	3,060	31,000	989,000	1,450,000	55,400	25,100	10,200	3,360	5,350	8,920	3,770	5,360	2,590,000
1931	3,450	3,400	35,700	33,200	11,400	9,630	4,310	4,960	4,650	1,160	3,730	2,080	118,000
1932	2,140	7,490	69,100	105,000	40,200	79,100	7,580	3,550	3,510	6,110	3,120	1,810	329,000
1933	1,640	2,130	63,000	177,000	77,000	24,000	9,400	1,590	1,320	4,910	5,900	2,670	371,000
1934	4,620	67,200	230,000	123,000	23,900	34,600	6,600	2,790	5,370	4,880	6,720	5,500	516,000
1935	10,000	19,300	159,000	627,000	53,300	17,300	23,400	3,030	1,480	3,420	1,040	1,440	920,000
1936	1,120	949	31,400	907,000	24,200	8,600	2,400	3,700	1,720	2,340	2,930	1,190	988,000
1937	1,440	1,310	17,500	311,000	23,300	36,600	20,900	1,750	3,630	5,170	2,040	1,650	426,000
1938	2,370	3,600	182,000	190,000	51,400	125,000	35,400	3,240	5,100	3,110	5,130	2,180	608,000
1939	2,020	1,540	1,240,000	56,900	23,800	220,000	22,500	2,910	2,960	2,660	3,420	2,210	1,580,000
1940	523	1,130	67,200	577,000	118,000	37,200	11,500	7,020	3,000	3,120	4,140	1,540	831,000
1941	928	1,180	250,000	100,000	22,500	39,700	12,900	4,210	1,930	4,740	4,270	4,110	447,000
1942	787	10,100	114,000	194,000	46,300	142,000	68,200	10,500	6,360	11,900	6,520	4,370	615,000
1943	2,110	160,000	413,000	474,000	69,800	70,900	36,700	3,110	1,500	10,400	9,020	4,290	1,250,000
1944	11,500	13,000	78,100	170,000	19,800	27,400	23,400	18,200	7,890	8,490	3,590	2,290	384,000
1945	1,270	19,300	133,000	49,500	35,300	113,000	10,400	338	1,880	8,140	2,760	2,260	378,000
1946	1,590	28,500	140,000	48,300	23,100	62,900	9,930	1,990	3,120	8,390	2,890	2,610	333,000
1947	2,400	7,350	229,000	278,000	60,200	32,900	8,150	9,540	6,270	12,700	5,360	3,650	656,000
1948	3,230	3,080	76,200	262,000	126,000	75,900	39,700	17,800	1,590	8,360	9,330	3,250	627,000
1949	1,580	1,900	26,000	77,500	42,900	11,800	1,970	289	1,320	5,840	4,680	1,850	178,000
1950	400	1,590	17,900	564,000	79,500	46,300	16,100	15,000	1,190	4,920	6,560	2,960	757,000
1951	3,340	3,190	74,600	437,000	304,000	77,600	45,000	32,100	28,100	34,400	14,500	11,100	1,060,000
1952	5,810	44,300	254,000	2,080,000	277,000	41,800	61,300	12,500	7,710	16,600	4,110	3,670	2,810,000
1953	3,790	5,110	37,000	99,200	278,000	307,000	59,400	17,300	5,410	14,400	10,700	8,300	846,000
1954	4,540	33,700	31,800	393,000	97,800	75,700	19,900	45,600	19,600	60,400	9,250	7,240	798,000
1955	2,330	2,580	128,000	768,000	660,000	136,000	299,000	22,900	8,880	22,300	3,140	3,120	2,060,000
1956	2,080	2,730	70,500	166,000	77,800	33,500	29,100	17,900	6,100	9,760	5,050	1,900	422,000
1957	1,340	3,380	80,200	153,000	81,100	26,000	4,570	3,870	5,150	11,500	5,430	3,640	379,000
1958	2,110	6,760	119,000	321,000	29,400	19,700	5,850	1,880	1,710	5,580	3,430	5,470	522,000
1959	2,660	2,570	248,000	122,000	51,800	123,000	15,700	2,010	3,630	18,800	4,620	6,120	602,000
1960	3,750	7,130	471,000	129,000	92,700	14,100	6,010	2,810	1,560	3,010	2,480	2,100	736,000
1961	2,370	3,030	88,100	19,200	24,300	14,900	498	1,020	1,740	3,400	2,650	904	162,000
1962	2,630	5,950	102,000	134,000	33,300	62,500	130,000	3,490	4,490	7,600	1,900	1,920	490,000
1963	898	67,500	141,000	62,000	20,300	53,700	31,000	4,930	3,700	2,420	1,110	769	389,000
1964	1,160	1,640	8,100	56,300	113,000	78,600	19,500	4,060	4,970	8,300	7,870	2,760	306,000
1965	990	24,000	36,100	637,000	411,000	145,000	109,000	15,600	39,200	23,700	13,500	10,600	1,470,000
1966	1,610	3,420	365,000	162,000	60,300	49,900	24,100	18,400	3,640	9,010	4,350	3,650	706,000
1967	4,180	8,440	196,000	480,000	576,000	88,900	22,400	11,700	14,000	17,700	8,160	5,280	1,430,000
1968	12,000	20,200	207,000	51,500	46,300	36,200	13,600	15,800	23,300	20,300	9,470	5,810	462,000
1969	2,840	4,560	168,000	574,000	128,000	49,900	97,400	9,220	5,060	22,000	11,300	9,190	1,080,000
1970	2,050	7,100	69,900	373,000	404,000	105,000	33,200	14,700	8,340	10,800	10,100	4,830	1,040,000

Table 17. Synthesized streamflow volumes for Milk River at mouth, Montana, 1928-89, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971	32,900	185,000	85,200	257,000	90,000	43,900	12,200	6,200	4,180	6,670	5,080	867	729,000
1972	338	708	277,000	64,300	62,700	79,100	19,000	13,400	9,670	14,900	5,580	1,250	548,000
1973	1,990	3,600	68,500	48,300	35,900	31,900	7,940	4,060	3,640	1,960	2,470	2,030	212,000
1974	22,300	10,600	129,000	352,000	326,000	119,000	34,200	28,900	11,600	11,900	8,940	11,000	1,070,000
1975	3,540	2,160	9,650	291,000	644,000	188,000	89,200	45,500	24,700	38,500	8,540	12,300	1,360,000
1976	16,900	37,800	598,000	209,000	51,400	58,900	37,900	21,700	2,340	6,510	4,180	3,600	1,050,000
1977	3,420	17,000	26,200	41,400	19,700	10,200	6,020	5,040	3,990	47,800	2,310	2,580	185,000
1978	2,800	2,710	553,000	464,000	217,000	44,200	79,200	22,000	40,500	11,000	10,200	7,560	1,450,000
1979	4,400	5,860	644,000	500,000	327,000	41,200	50,200	10,100	5,050	5,170	5,650	7,780	1,610,000
1980	2,790	5,280	70,600	110,000	28,000	27,800	7,720	8,690	7,010	8,150	5,910	3,870	286,000
1981	5,580	198,000	38,100	18,600	51,200	39,400	16,200	4,110	2,640	4,910	5,000	2,940	387,000
1982	1,050	37,900	194,000	495,000	154,000	204,000	37,500	11,300	5,060	12,300	6,720	4,730	1,160,000
1983	4,230	7,640	53,600	49,900	71,400	14,300	80,300	9,460	4,750	3,710	3,000	1,300	304,000
1984	2,550	12,800	32,600	29,100	11,800	15,600	2,040	3,550	2,910	873	2,580	1,300	118,000
1985	553	10,300	38,700	123,000	35,600	17,900	3,010	3,750	10,900	19,600	6,880	2,430	273,000
1986	6,610	110,000	590,000	40,600	342,000	55,800	32,100	5,970	473,000	134,000	35,100	33,700	1,860,000
1987	13,500	37,000	208,000	154,000	29,300	21,200	27,900	18,100	8,840	6,020	7,630	4,460	536,000
1988	867	2,070	22,800	39,700	17,500	11,800	14,000	3,740	1,340	338	1,870	1,550	118,000
1989	1,040	822	73,400	71,400	38,900	49,000	14,300	4,000	6,190	2,710	9,200	5,950	277,000

☆ U.S. GOVERNMENT PRINTING OFFICE: 1995 - 673-211 / 00034 REGION NO. 8

Publications Warehouse

Search bibliographic citations and obtain USGS products

Warehouse Citation

Previous Citation ● Viewing Record #2 Return to Full Listing >>

Note: Online document links are below citation

USGS Series:	Water-Resources Investigation
Report Number:	95-4022
Title:	Synthesis of natural flows at selected sites in and near the Milk River basin, Montana, 1928-89
Edition:	-
Language:	ENGLISH
Author(s):	Cary, L. E.; Parrett, Charles
Year:	1995
Originating office:	
USGS Library Call Number:	(200) WRi no.95-4022
Physical description:	iv, 42 p. :ill., map ;28 cm.
ISBN:	

- **View document as .DJVU *Requires plug-in***
  Download free Lizardtech plug-in now. Plug-in provides searchable text, section 508 compliant accessibility, advanced navigation , and print controls.
- **View document as group of images. No plug-in required.**

Copies of original may be available
For more information or ordering assistance, call 1-888-ASK-USGS (1-888-275-8747), http://ask.usgs.gov contact any USGS Earth Science Information Center (ESIC), or write:

USGS Information Services
Box 25286
Denver, CO 8022

U.S. Department of the Interior

Hardcopy Availability
Copies May be Available. Call 1-888-ASK-USGS for more information.
Price: (call)
Order Form (pdf)

Product Information
Maps
Digital Maps and Data
Aerial Photographs
Satellite Imagery
Real-Time Data
Software
Biology Publications
Products Beyond the Pubs Warehouse
USGS Store
Earth Explorer
Ordering USGS Products
Library Sources for USGS products
Publications of the USGS (from AGI GeoRef)
Minerals Periodicals
Further Information
1-888-ASK-USGS

FIRSTGOV
TAKE PRIDE IN AMERICA