SYNTHESIS OF MONTHLY NATURAL FLOWS FOR SELECTED SITES IN THE MUSSELSHELL RIVER BASIN, MONTANA, BASE PERIOD 1929-89

By Kevin C. Vining, Dave R. Johnson, and Charles Parrett

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CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
acre	0.407	hectare
acre-foot	1,233	cubic meter
inch (in.)	25.4	millimeter
square mile (mi^2)	2.59	square kilometer

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

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Abstract

Synthesized monthly natural streamflows were required at 13 sites for use in a streamflow-accounting model to evaluate the effects of various water-allocation schemes on water availability in the Musselshell River Basin in central Montana. Records of monthly streamflow at 14 streamflow-gaging stations were used to synthesize monthly natural flows at tributaries and the 13 synthesis sites. A streamflow-record extension program was used to extend flow records at the 14 gaged sites to a common base period, 1929-89.

To synthesize monthly natural flows at 10 sites on the Musselshell River mainstem, synthesized monthly natural flows at all significant tributary streams were required. Results from a previous study were used to synthesize tributary natural flows. Monthly natural flows at each mainstem site downstream from the first site were synthesized by successively adding monthly natural flows from intervening tributaries to the next upstream mainstem site. Special methods using extended-record flows from gaged tributaries were used to synthesize monthly natural flows at three tributary sites.

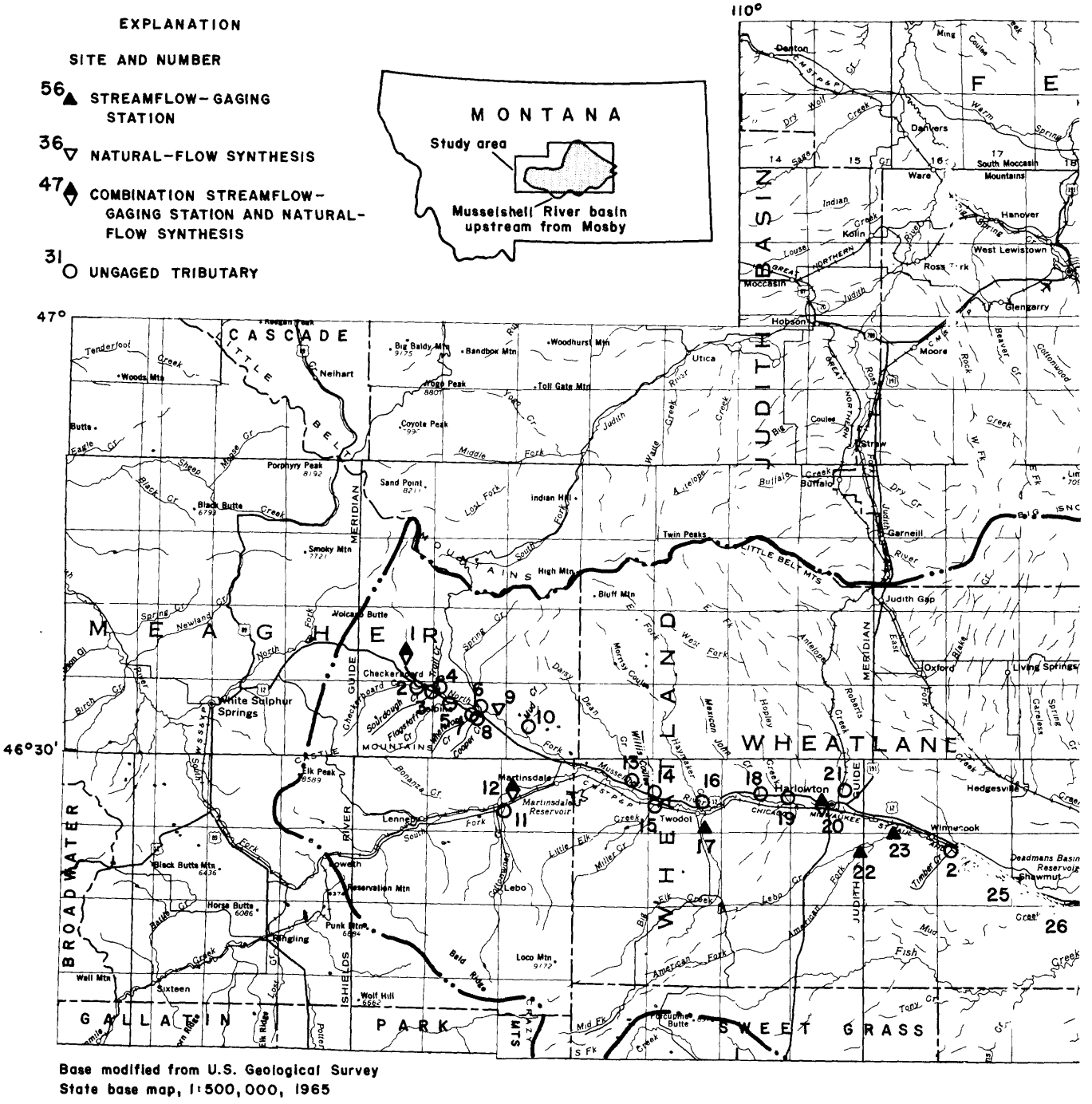
Synthesized mean annual natural flows were found to be greater than mean annual extended-record flows at three selected comparison sites on the Musselshell River. The differences between mean natural and extended-record flows (depletions) at Harlowton and Musselshell were considered to be reasonable given the amount of irrigated acreage upstream from the two sites. The differences at Mosby, the site farthest downstream, was less than at Musselshell, the next upstream site, indicating that the methods of synthesis had error. The synthesis error generally was attributed to the larger natural variability of tributary flows in the lower portion of the Musselshell River Basin.

INTRODUCTION

The Bureau of Reclamation (BOR) is developing a monthly water-accounting model of the Musselshell River Basin in Montana to evaluate the effects of various water-allocation alternatives on water availability at selected sites. To allow comparisons among schemes, a reference data base of monthly natural flows (unaffected by human use) is required at each site. Although recorded streamflow data are available at many of the sites, monthly flows for most sites are affected by irrigation and reservoir storage and cannot be directly used as natural flows. Accordingly, the BOR requested the U.S. Geological Survey (USGS) to synthesize monthly natural flows for the 1929-89 base period at 13 sites in the Musselshell River Basin.

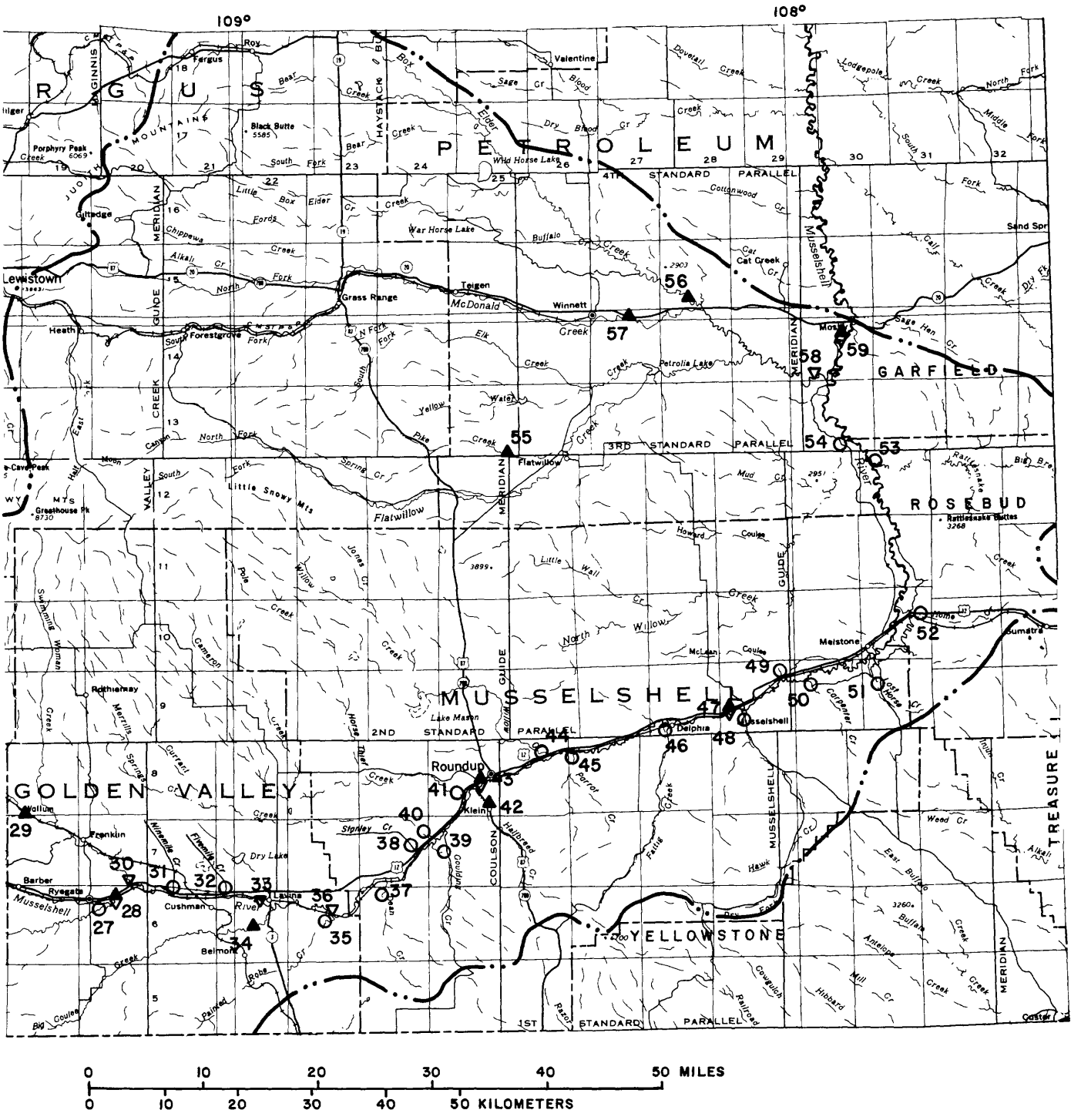
Purpose and Scope

This report, prepared in cooperation with the BOR, presents the synthesized monthly natural flows for 13 selected sites and describes the methods used for synthesis. The methods required the use of streamflow records from 14 USGS streamflow-gaging stations in the basin and monthly streamflow estimates for 48 tributary streams. Seven of the 13 synthesis sites are at USGS streamflow-gaging stations but, for reasons indicated above, data from only 2 stations were directly used to synthesize monthly natural flows. The natural-flow synthesis sites, tributary sites for which monthly natural streamflows were synthesized, and selected streamflow-gaging stations are listed in table 1, and their locations are shown on figure 1. (All tables are presented at the back of the report in the Supplemental Information section.)



Base modified from U.S. Geological Survey
State base map, 1:500,000, 1965

Figure 1. Location of Musselshell River Basin, Montana, selected streamflow-gaging



stations, natural-flow synthesis sites, and ungaged tributary sites.

FIGURE 1 3

A streamflow-record extension program was used to extend streamflow records where necessary to the 1929-89 base period. In general, monthly natural flows at mainstem sites were synthesized by successively adding estimates of intervening tributary flows to synthesized monthly natural flows at each mainstem site, beginning with the mainstem site farthest upstream, North Fork Musselshell River near Delpine (site 1). Although the Musselshell River mainstem commonly is considered to begin at the confluence of the North Fork Musselshell and South Fork Musselshell Rivers, for purposes of clarity in this report, the mainstem of the Musselshell River includes the North Fork Musselshell River. Special methods were used to synthesize monthly natural flows for sites on tributary streams South Fork Musselshell River above Martinsdale (site 12), Careless Creek at mouth, near Ryegate (site 30), and Flatwillow Creek at mouth, near Mosby (site 58).

Description of Study Area

The Musselshell River arises in the Little Belt Mountains where the North Fork Musselshell River has its headwaters and in the Castle and Crazy Mountains where the South Fork Musselshell River has its headwaters. These mountain areas receive approximately 30 in. of precipitation annually (U.S. Soil Conservation Service, 1981), mostly in the form of snow. Most of the streams draining the mountains are perennial. Irrigation is the major use of water in the sparsely populated basin (less than 10,000 inhabitants). Irrigation withdrawals substantially reduce flows of Cottonwood Creek, a major tributary to the South Fork Musselshell River. Irrigation withdrawals from other tributary streams in the basin above the confluence of the North Fork Musselshell River and South Fork Musselshell River are presumed to be relatively minor.

The South Fork Musselshell River joins the North Fork Musselshell River near Martinsdale. Downstream from Martinsdale, the Musselshell River traverses a broad, flat plains area where annual precipitation is about 13 in. (U.S. Soil Conservation Service, 1981). Tributary streams draining the plains are mostly intermittent, and subject to large variations in flow as a result of sporadic, but intense, rainstorms. Irrigation withdrawals from these plains tributary streams, except for Flatwillow Creek, the largest tributary in the plains, are presumed to be minor.

The drainage area of the Musselshell River is about 8,000 mi^2. The river is an important source of water for irrigation of about 47,000 acres of cropland. Although the water supply is marginally adequate in most years, serious shortages of water for irrigation do occur. Shortages occur despite the presence of four State-managed water-storage projects and are reflective of the large natural variability of streamflows.

STREAMFLOW-RECORD EXTENSION

Records from selected streamflow-gaging stations in the Musselshell River Basin were used for various purposes in the natural-flow synthesis process (table 2). Recorded monthly flows at one station were used as synthesized monthly natural flows at one mainstem estimation site (site 1), whereas recorded monthly flows at nine stations were used to synthesize monthly natural flows at tributary sites (sites 12, 17, 23, 29, 34, 42, 55, 56, and 57). Recorded monthly flows at three stations (sites 55, 56, and 57) were added together to synthesize monthly natural flows for one ungaged tributary site (site 58), whereas recorded monthly flows at eight stations (sites 1, 12, 17, 22, 29, 34, 56, and 57) were used to synthesize monthly natural flows at other ungaged tributaries. Records from three mainstem sites (sites 20, 47, and 59) were used to make comparisons between synthesized natural flows and recorded flows. The 14 streamflow-gaging stations whose records were used in the natural-flow synthesis process had various record lengths.

A streamflow record-extension program developed by Alley and Burns (1983) was used to extend short-term and seasonal streamflow records for the 14 gaging stations with various periods of missing record during the 1929-89 base period. This program selects the best nearby base station from all those available to estimate each month of missing record at a gaging station using a regression technique. Thus, if a gaging station has several months of missing record, several 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 gaging stations with flow records for a particular month and year were used to estimate missing flows at other gaging stations for that month and year. Previously estimated flows were not used to estimate other missing flows.

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 regression, but unlike ordinary least-squares regression, MOVE.1 results in an extended flow record with a variance comparable to that of the unextended flow record.

The extension procedure was based on a previous study (Parrett and Johnson, 1989) that used MOVE.1 to extend the records of the same 14 gaging stations to the base period water years 1937-86. In that study, 157 streamflow-gaging stations were used as potential base stations for MOVE.1 (Parrett and Johnson, 1989, table 3). The 157 base stations used in the previous study were used in this study. To permit inclusion of data from stations discontinued before 1929, the procedure was used to estimate all missing monthly streamflow data for the years 1906-1992. After the records were extended, all data prior to 1937 and after 1989 were excluded from the data base. At one gaging station, Flatwillow Creek near Flatwillow (station 06127900), the streamflow regimen changed in about 1930 as a result of substantially increased irrigation diversions. Flow records after 1930 at this site were not used in the streamflow-record extension program to ensure that estimated flows for the 1929-89 base period would be consistent and more representative of natural-flow conditions. Monthly flows for the 1929-89 base period for the 14 gaging stations are hereinafter referred to as extended-record flows.

SYNTHESIS OF NATURAL FLOWS

Synthesized monthly natural flows were required for 10 mainstem sites and 3 tributary sites. Different methods were used to synthesize natural flows at mainstem and tributary sites and are described below.

Mainstem Sites

The method used to synthesize monthly natural flows for sites on the mainstem makes use of a previous study (Parrett and Johnson, 1989) that provided estimates of long-term mean monthly flows for selected Musselshell River tributaries for the base period 1937-86. These estimates of long-term mean monthly flows were used to synthesize monthly natural flows for the 1929-89 base period for most ungaged tributary streams. Natural flows for each mainstem synthesis site downstream from North Fork Musselshell River near Delpine (site 1) were synthesized by successively adding synthesized natural flows on intervening tributary streams to the synthesized natural flows at the closest upstream mainstem site. This method is based on the assumptions that (1) extended-record flows for the uppermost mainstem site, North Fork Musselshell River near Delpine, were equivalent to natural flows, and (2) long-term mean monthly tributary flows estimated by Parrett and Johnson (1989) are equivalent to natural flows. Although the second assumption probably is not true for some tributaries that have significant irrigation, it is considered to be a reasonable assumption overall.

Although this method of estimation required synthesized tributary natural flows, the method did not require estimates of mainstem irrigation withdrawals and return flows. The error involved in the estimation of mainstem irrigation withdrawals and return flows was considered to be greater than the error associated with flow estimation of tributary streams and the assumption that estimated tributary flow is equivalent to natural flow.

Table 3 lists each mainstem synthesis site and the tributary sites whose synthesized monthly natural flows were added to synthesized monthly natural flows at the mainstem site to synthesize monthly natural flows at the next downstream mainstem site. For example, monthly natural flows at Musselshell River near Shawmut (site 25) were synthesized by adding synthesized monthly tributary natural flows for Antelope Creek above Alkali Creek, near Harlowton (site 21); American Fork below Lebo Creek, near Harlowton (site 23); and Timber Creek at mouth, near Harlowton (site 24) to natural flows for the synthesis site, Musselshell River at Harlowton (site 20).

Tributary Sites

Monthly natural flows for each ungaged tributary for the 1929-89 base period were determined from the estimated mean monthly natural flows for each tributary and extended-record flows at a nearby gaged site by use of the following equation:

$$q_{trib\,(i,j)} = \left(\frac{\bar{q}_{trib\,(j)}}{\bar{q}_{gage\,(j)}} \right) \times q_{gage\,(i,j)} \qquad (1)$$

where $q_{trib\,(i,j)}$ is synthesized monthly natural flow of the ungaged tributary for month j in year i of the base period 1929-89;

$\bar{q}_{trib\,(j)}$ is the estimated long-term mean flow for 1937-86 of the ungaged tributary for month j;

$\bar{q}_{gage\,(j)}$ is the long-term mean flow for 1937-86 for the gaged site for month j; and

$q_{gage\,(i,j)}$ is the extended-record flow at the gaged site for month j in year i of the base period 1929-89.

Table 4 lists the Musselshell River tributaries and the corresponding gaged sites used to synthesize tributary monthly natural flows.

Special methods were used to synthesize monthly natural flows for tributary sites on South Fork Musselshell River (site 12), Careless Creek (site 30), and Flatwillow Creek (site 58). For South Fork Musselshell River, irrigation withdrawals from Cottonwood Creek substantially reduce flows past the South Fork Musselshell above Martinsdale (site 12) streamflow-gaging station. Equation 1 was used to synthesize monthly natural flows for Cottonwood Creek at mouth (site 11), because previously estimated mean monthly flows for Cottonwood Creek were considered to be equivalent to natural flows based on a previous study by Parrett and Johnson (1989). The synthesized monthly natural flows for site 11 were added to the extended-record flows at site 12 to synthesize monthly natural flows for South Fork Musselshell River (site 12).

Flows at the mouth of Careless Creek are significantly increased during the irrigation season by flow releases from Deadman's Basin Reservoir, an off-stream reservoir that stores water diverted from the Musselshell River. Water in Deadman's Basin Reservoir is returned to lower reaches of the Musselshell River via the Careless Creek channel. Natural flows at the mouth of Careless Creek (site 30) were assumed to be equivalent to extended-record flows for Careless Creek at Wallum (site 29), a site upstream from the inflow from Deadman's Basin Reservoir.

Flows at the mouth of Flatwillow Creek are significantly reduced during the irrigation season by irrigation withdrawals from the upper reaches of Flatwillow Creek. Extended-record flows for Flatwillow Creek near Flatwillow (site 55) were considered to be equivalent to natural flows. Monthly natural flows at the mouth of Flatwillow Creek (site 58) were synthesized by adding extended-record flows for Flatwillow Creek near Flatwillow (site 55) to extended-record flows for Box Elder Creek near Winnett (site 56) and McDonald Creek at Winnett (site 57), tributaries of Flatwillow Creek downstream from the gage at Flatwillow.

RELIABILITY OF SYNTHESIZED FLOWS

Synthesized monthly natural flows for the 1929-89 base period at the 13 synthesis sites are shown in tables 7-19. Water withdrawals for irrigation from the Musselshell River have occurred for many years prior to the establishment of most streamflow-gaging stations. Lack of streamflow information prior to irrigation activities has resulted in a lack of natural streamflow data for comparison purposes. In general, the synthesized natural flows probably are most reliable in the upper, mountainous portions of the Musselshell River Basin where streamflows generally are more uniform than in the plains. The reliability of synthesis likely decreases downstream because of the increased variability of flow in the Musselshell River and its tributaries, and the increased number of tributaries for which synthesized natural flows were required.

Comparisons were made between synthesized natural flows and extended-record flows at three sites having streamflow-gaging stations: Musselshell River at Harlowton (site 20), Musselshell River at Musselshell (site 47), and Musselshell River at Mosby (site 59). The comparisons were used to make inferences about the overall reliability of the synthesized natural flows.

Values of mean annual flow were calculated from the synthesized monthly natural flows and the extended-record flows at the three comparison sites and are shown in table 5. Also shown in table 5 is the calculated mean annual depletion (difference between mean annual flows calculated from the monthly natural

flows and the extended record flows) at each site and the irrigated acreage upstream from each site. Mean values shown in table 5 are all based on the 1929-89 base period.

The depletions at Harlowton and Musselshell appear reasonable given the amount of irrigated acreage upstream from each site. At Mosby, mean annual depletion is less than that at Musselshell. Because depletion represents water that is consumed and unavailable at downstream sites, depletion must increase, or at least remain constant, in the downstream direction. Also, because irrigated acreage increases from Musselshell to Mosby, the depletion should increase. Thus, the decrease in depletion from Musselshell to Mosby shown in table 5 is anomalous and indicates error in the estimation method.

To help explain the anomalous decrease in depletion shown in table 5, plots of annual synthesized natural flows and extended-record flows were made for the three comparison sites (fig. 2). Figures 2A and 2B show that synthesized natural flows were greater than extended-record flows for all years in the base period at the Harlowton and Musselshell sites. For the site at Mosby, figure 2C shows that synthesized natural flows were greater than extended-record flows for all years except 1942, 1975, 1978, and 1979. Extended-record flows for those 4 years were greater than synthesized natural flows, indicating that the method of synthesis did not provide adequate estimates of tributary flows to match the actual tributary flows that occurred between Musselshell and Mosby. To ascertain the effect that the 4 years of large tributary flows had on the synthesis results, depletions were re-calculated at the three comparison sites excluding all data from 1942, 1975, 1978, and 1979 (table 6). The re-calculated mean annual depletion at Mosby shown in table 6 is greater than the mean annual depletion at Mosby shown in table 5 and greater than the re-calculated depletion at Musselshell shown in table 6. Thus, elimination of 4 years of generally large tributary flow removes the anomalous decrease in depletion between Musselshell and Mosby.

Because the methods for synthesizing monthly natural flows in the Musselshell River depend heavily upon synthesized natural flows in tributaries, errors in synthesis of natural flows in the mainstem are a function primarily of errors in synthesis of natural flows in tributaries. The errors in synthesis of tributary natural flows is greater in the lower portion of the basin where tributary streams generally are intermittent and have monthly flows that are much more variable than monthly flows from tributaries higher in the basin (Parrett and Johnson, 1989, p.14). In addition, many tributary streams are affected by irrigation withdrawals, and the assumption that estimated tributary flows are equivalent to natural flows may result in additional error.

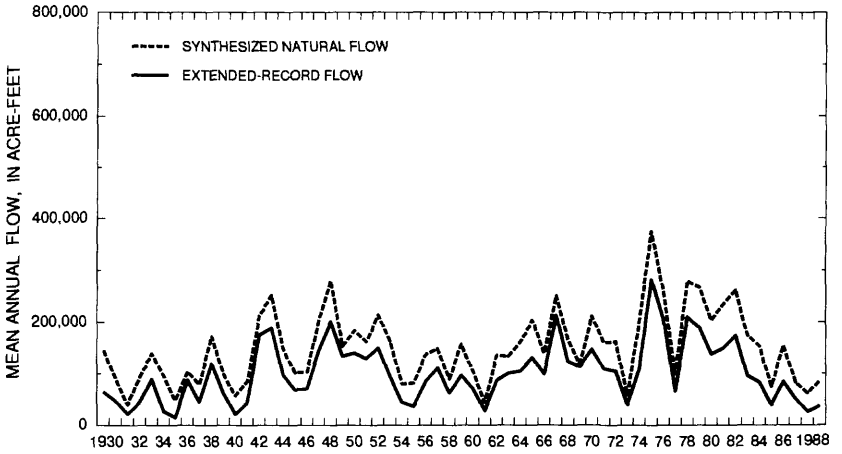
SUMMARY

Synthesized monthly natural streamflows for the base period 1929-89 at 13 selected sites were needed to evaluate various water-allocation alternatives on water availability in the Musselshell River Basin in central Montana. Streamflow records at 14 streamflow-gaging stations were used in the natural-flow synthesis process.

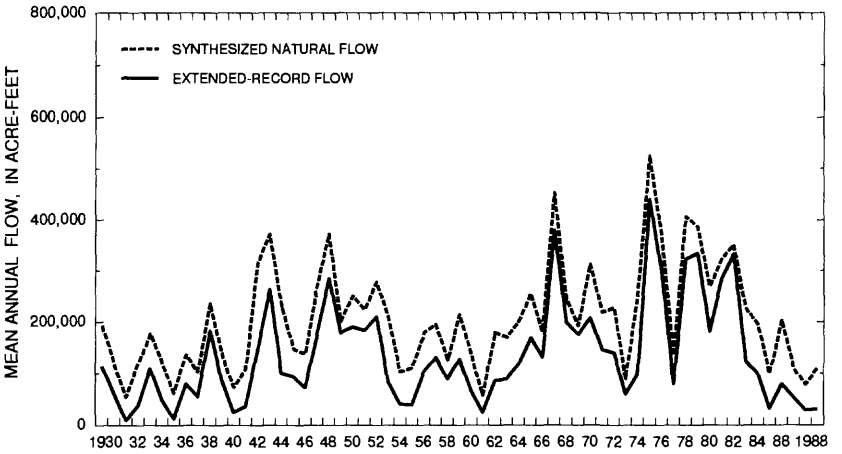
Monthly flow records at 14 gaged sites were extended to the base period using a streamflow record-extension program. The program used the MOVE.1 curve-fitting technique to estimate each month of missing record at each gaged site from recorded data at a nearby base station. Only those base stations with flow records for a particular month and year were used to estimate extended-record flows for that month and year at gaged sites.

The method used to synthesize monthly natural flows at the mainstem sites required the use of synthesized monthly natural flows for Musselshell River tributaries. Estimated long-term mean monthly flows from a previous study (Parrett and Johnson, 1989) were used together with monthly flow data from nearby gaged sites to synthesize monthly natural flows for the base period at tributary sites. Natural flows for each mainstem synthesis site were synthesized by successively adding tributary natural flows to the synthesized natural flows at the closest upstream synthesis site. Monthly natural flows at the mainstem site farthest upstream were considered to be equivalent to the extended-record flows.

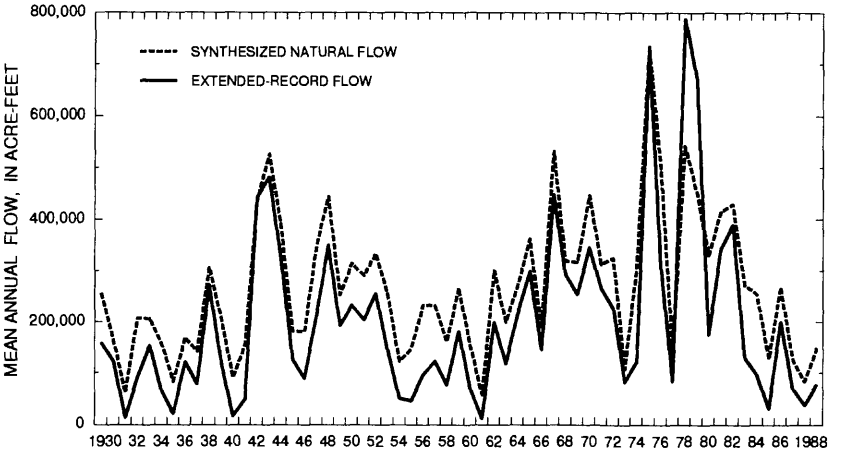
At three synthesis sites on tributaries, different methods for synthesizing natural flows were used. For South Fork Musselshell River above Martinsdale (site 12), monthly natural flows were synthesized by adding monthly natural flows for Cottonwood Creek at mouth, near Martinsdale (site 11) to the extended-record flows at the streamflow-gaging station, South Fork Musselshell River above Martinsdale (site 12). Monthly natural flows at the mouth of Careless Creek



2A. MUSSELSHELL RIVER AT HARLOWTON (SITE 20)



2B. MUSSELSHELL RIVER AT MUSSELSHELL (SITE 47)



2C. MUSSELSHELL RIVER AT MOSBY (SITE 59)

Figure 2. Comparison of extended-record flows with synthesized natural flows for the Musselshell River (2A) at Harlowton, (2B) at Musselshell, (2C) at Mosby.

near Ryegate (site 30) were considered to be equivalent to extended-record flows at Careless Creek at Wallum (site 29), a streamflow-gaging station upstream from the outflow from Deadman's Basin Reservoir. Extended-record flows for three sites (sites 55, 56, and 57) were added together to calculate monthly natural flows for Flatwillow Creek at mouth, near Mosby (site 58).

Comparisons were made between mean annual natural flows calculated from the synthesized monthly natural flows and mean annual flows calculated from monthly flows based on the extended-record at three sites that had streamflow-gaging stations. Annual irrigation depletions at the three sites, calculated as the difference between mean annual natural flows and mean annual extended-record flows, also were compared. Synthesized annual natural flows were greater than annual extended-record flows for all years in the base period at the Harlowton and Musselshell sites, and for all years but 1942, 1975, 1978, and 1979 at the Mosby site. Mean annual depletions at Harlowton and Musselshell appeared reasonable, given the amount of irrigated acreages upstream from each site. At Mosby, however, mean annual depletions were less than at Musselshell. The decreased mean annual depletion from Musselshell to Mosby indicated the presence of error in the synthesis of tributary flow. Depletions at the three comparison sites were recalculated excluding all data from 1942, 1975, 1978, and 1979, and the results showed an increase in mean annual depletions from Musselshell to Mosby.

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Supplemental Information

Table 1. Natural-flow synthesis and tributary sites, and selected streamflow-gaging stations, Musselshell River Basin, Montana

[--, not applicable]

Site no.	Stream name	Streamflow-gaging station no.	Natural-flow synthesis site	Tributary site
1	North Fork Musselshell River near Delpine	06115500	X	--
2	Checkerboard Creek at Checkerboard	--	--	X
3	Sourdough Creek at mouth, near Checkerboard	--	--	X
4	Trail Creek at mouth, near Checkerboard	--	--	X
5	Flagstaff Creek at mouth, near Checkerboard	--	--	X
6	Spring Creek at mouth, near Checkerboard	--	--	X
7	Whetstone Creek at mouth, near Checkerboard	--	--	X
8	Cooper Creek at mouth, near Checkerboard	--	--	X
9	North Fork Musselshell River above North Fork Diversion Canal, near Checkerboard	--	X	--
10	Mud Creek at mouth, near Martinsdale	--	--	X
11	Cottonwood Creek at mouth, near Martinsdale	--	--	X
12	South Fork Musselshell River above Martinsdale	06118500	X	X
13	Daisy Dean Creek at mouth, near Twodot	--	--	X
14	Willis Coulee at mouth, near Twodot	--	--	X
15	Miller Creek near mouth, near Twodot	--	--	X
16	Haymaker Creek at mouth, near Twodot	--	--	X
17	Big Elk Creek at Twodot	06120000	--	X
18	Mexican John Creek at mouth, near Harlowton	--	--	X
19	Hopley Creek at mouth, near Harlowton	--	--	X
20	Musselshell River at Harlowton	06120500	X	--
21	Antelope Creek above Alkali Creek, near Harlowton	--	--	X
22	American Fork near Harlowton	06121000	--	--
23	American Fork below Lebo Creek, near Harlowton	06122000	--	X
24	Timber Creek at mouth, near Harlowton	--	--	X
25	Musselshell River near Shawmut	--	X	--
26	Mud Creek near mouth, near Shawmut	--	--	X
27	Fish Creek near mouth, near Ryegate	--	--	X
28	Musselshell River near Ryegate	06123500[1]	X	--
29	Careless Creek at Wallum	06125500	--	X
30	Careless Creek at mouth, near Ryegate	--	X	X

Table 1. Natural-flow synthesis and tributary sites, and selected streamflow-gaging stations, Musselshell River Basin, Montana (Continued)

Site no.	Stream name	Streamflow-gaging station no.	Natural-flow synthesis site	Tributary site
31	Ninemile Creek at mouth, near Cushman	--	--	X
32	Fivemile Creek at mouth, near Lavina	--	--	X
33	Musselshell River near Lavina	--	X	--
34	Big Coulee Creek near Lavina	06125700	--	X
35	Painted Robe Creek at mouth, near Lavina	--	--	X
36	Musselshell River below Painted Robe Creek, near Lavina	--	X	--
37	Dean Creek near mouth, near Lavina	--	--	X
38	Stanley Creek at mouth, near Roundup	--	--	X
39	Goulding Creek at mouth, near Roundup	--	--	X
40	Currant Creek near Roundup	--	--	X
41	Horse Thief Creek at mouth, near Roundup	--	--	X
42	Halfbreed Creek near Klein	06126470	--	X
43	Musselshell River near Roundup	06126500[1]	X	--
44	Willow Creek at mouth, near Roundup	--	--	X
45	Parrot Creek at mouth, near Roundup	--	--	X
46	Fattig Creek at mouth, near Delphia	--	--	X
47	Musselshell River at Musselshell	06127500	X	--
48	Hawk Creek at Musselshell	--	--	X
49	McLean Coulee at mouth, near Musselshell	--	--	X
50	Carpenter Creek at mouth, near Musselshell	--	--	X
51	Lost Horse Creek at mouth, near Melstone	--	--	X
52	Home Creek near mouth, near Melstone	--	--	X
53	Rattlesnake Creek at mouth, near Mosby	--	--	X
54	North Willow Creek at mouth, near Mosby	--	--	X
55	Flatwillow Creek near Flatwillow	06127900	--	X
56	Box Elder Creek near Winnett	06129000	--	X
57	McDonald Creek at Winnett	06129500	--	X
58	Flatwillow Creek at mouth, near Mosby	--	X	X
59	Musselshell River at Mosby	06130500	X	--
	Total	16	13	48

[1]Recorded streamflow not used for natural flow synthesis.

Table 2. Streamflow-gaging stations whose records were used for various purposes, Musselshell River Basin, Montana

[--, not applicable]

Site no.	Stream name	Stream-flow-gaging station no.	Period of record	Gaging-station record used for indicated purpose			
				Monthly natural-flow synthesis at mainstem site	Monthly natural-flow synthesis at tributary site	Cor-relation	Com-parison
1	North Fork Musselshell River near Delpine	06115500	1940-79	X	--	X	--
12	South Fork Musselshell River above Martinsdale	06118500	1941-79	--	X	X	--
17	Big Elk Creek at Twodot	06120000	1953-56	--	X	X	--
20	Musselshell River at Harlowton	06120500	1907-29; 1930-32; 1933-33; 1934-90	--	--	--	X
22	American Fork near Harlowton	06121000	1907-11; 1913-13: 1924-29; 1930-30; 1931-32	-	--	X	--
23	American Fork below Lebo Creek, near Harlowton	06122000	1946-67	--	X	--	--
29	Careless Creek at Wallum	06125500	1934-42	--	X	X	--
34	Big Coulee Creek near Lavina	06125700	1957-72	--	X	X	--
42	Halfbreed Creek near Klein	06126470	1977-86; 1987-91	--	X	--	--
47	Musselshell River at Musselshell	06127500	1929-32; 1945-79; 1982-89	--	--	--	X
55	Flatwillow Creek near Flatwillow	06127900[1]	1911-32; 1934-56	--	[2]X	--	--
56	Box Elder Creek near Winnett	06129000	1930-32; 1934-38 1958-72	--	[2]X	X	--
57	McDonald Creek at Winnett	06129500	1930-32; 1934-45 1953-56	--	[2]X	X	--
59	Musselshell River at Mosby	06130500	1929-32; 1934-90	--	--	--	X
	Total	14	--	1	9	8	3

[1]Record after 1930 not used because of significantly increased irrigation diversions beginning about 1930.

[2]Records added together to synthesize tributary flows for Flatwillow Creek at mouth, near Mosby (site 58).

Table 3. Mainstem synthesis and tributary sites whose flows are added together to synthesize natural flows, Musselshell River Basin, Montana

[For sites shown between horizontal lines, monthly flows at tributary sites are added to monthly natural flows at mainstem site to calculate monthly natural flows at next downstream site; --, not applicable]

Site no.	Mainstem synthesis site	Site no.	Tributary site
1	North Fork Musselshell River near Delpine		--
	--	2	Checkerboard Creek at Checkerboard
	--	3	Sourdough Creek at mouth, near Checkerboard
	--	4	Trail Creek at mouth, near Checkerboard
	--	5	Flagstaff Creek at mouth, near Checkerboard
	--	6	Spring Creek at mouth, near Checkerboard
	--	7	Whetstone Creek at mouth, near Checkerboard
	--	8	Cooper Creek at mouth, near Checkerboard
9	North Fork Musselshell River above North Fork Diversion Canal, near Checkerboard		--
	--	10	Mud Creek at mouth, near Martinsdale
	--	11	[1]Cottonwood Creek at mouth, near Martinsdale
	--	12	South Fork Musselshell River above Martinsdale
	--	13	Daisy Dean Creek at mouth, near Twodot
	--	14	Willis Coulee at mouth, near Twodot
	--	15	Miller Creek near mouth, near Twodot
	--	16	Haymaker Creek at mouth, near Twodot
	--	17	Big Elk Creek at Twodot
	--	18	Mexican John Creek at mouth, near Harlowton
	--	19	Hopley Creek at mouth, near Harlowton
20	Musselshell River at Harlowton		--
	--	21	Antelope Creek above Alkali Creek, near Harlowton
	--	23	American Fork below Lebo Creek, near Harlowton
	--	24	Timber Creek at mouth, near Harlowton
25	Musselshell River near Shawmut		--
	--	26	Mud Creek near mouth, near Shawmut
	--	27	Fish Creek near mouth, near Ryegate
28	Musselshell River near Ryegate		--
	--	30	[2]Careless Creek at mouth, near Ryegate
	--	31	Ninemile Creek at mouth, near Cushman
	--	32	Fivemile Creek at mouth, near Lavina
33	Musselshell River near Lavina		--
	--	34	Big Coulee Creek near Lavina
	--	35	Painted Robe Creek at mouth, near Lavina

Table 3. Mainstem synthesis and tributary sites whose flows are added together to synthesize natural flows, Musselshell River Basin, Montana (Continued)

Site no.	Mainstem synthesis site	Site no.	Tributary site
36	Musselshell River below Painted Robe Creek, near Lavina		--
	--	37	Dean Creek near mouth, near Lavina
	--	38	Stanley Creek at mouth, near Roundup
	--	39	Goulding Creek at mouth, near Roundup
	--	40	Currant Creek near Roundup
	--	41	Horse Thief Creek at mouth, near Roundup
	--	42	Halfbreed Creek near Klein
43	Musselshell River near Roundup		--
	--	44	Willow Creek at mouth, near Roundup
	--	45	Parrot Creek at mouth, near Roundup
	--	46	Fattig Creek at mouth, near Delphia
47	Musselshell River at Musselshell		--
	--	48	Hawk Creek at Musselshell
	--	49	McLean Coulee at mouth, near Musselshell
	--	50	Carpenter Creek at mouth, near Musselshell
	--	51	Lost Horse Creek at mouth, near Melstone
	--	52	Home Creek near mouth, near Melstone
	--	53	Rattlesnake Creek at mouth, near Mosby
	--	54	North Willow Creek at mouth, near Mosby
	--	58	[3]Flatwillow Creek at mouth, near Mosby
59	Musselshell River at Mosby		--

[1]Tributary to South Fork Musselshell River above Martinsdale (site 12).

[2]Based on extended-record flows for Careless Creek at Wallum (site 29).

[3]Includes extended-record flows for Flatwillow Creek near Flatwillow (site 55), Box Elder Creek near Winnett (site 56), and McDonald Creek at Winnett (site 57).

Table 4. Ungaged tributary sites with corresponding gaged sites used for synthesis, Musselshell River Basin, Montana

Site no.	Tributary site	Site no.	Gaged site used for synthesis	Stream-flow-gaging station no.
2	Checkerboard Creek at Checkerboard	1	North Fork Musselshell River near Delpine	06115500
3	Sourdough Creek at mouth, near Checkerboard	29	Careless Creek at Wallum	06125500
4	Trail Creek at mouth, near Checkerboard	22	American Fork near Harlowton	06121000
5	Flagstaff Creek at mouth, near Checkerboard	22	American Fork near Harlowton	06121000
6	Spring Creek at mouth, near Checkerboard	12	South Fork Musselshell River above Martinsdale	06118500
7	Whetstone Creek at mouth, near Checkerboard	1	North Fork Musselshell River near Delpine	06115500
8	Cooper Creek at mouth, near Checkerboard	1	North Fork Musselshell River near Delpine	06115500
10	Mud Creek at mouth, near Martinsdale	29	Careless Creek at Wallum	06125500
11	Cottonwood Creek at mouth, near Martinsdale	12	South Fork Musselshell River above Martinsdale	06118500
13	Daisy Dean Creek at mouth, near Twodot	29	Careless Creek at Wallum	06125500
14	Willis Coulee at mouth, near Twodot	57	McDonald Creek at Winnett	06129500
15	Miller Creek near mouth, near Twodot	34	Big Coulee Creek near Lavina	06125700
16	Haymaker Creek at mouth, near Twodot	34	Big Coulee Creek near Lavina	06125700
18	Mexican John Creek at mouth, near Harlowton	1	North Fork Musselshell River near Delpine	06115500
19	Hopley Creek at mouth, near Harlowton	34	Big Coulee Creek near Lavina	06125700
21	Antelope Creek above Alkali Creek, near Harlowton	1	North Fork Musselshell River near Delpine	06115500
24	Timber Creek at mouth, near Harlowton	57	McDonald Creek at Winnett	06129500
26	Mud Creek near mouth, near Shawmut	34	Big Coulee Creek near Lavina	06125700
27	Fish Creek near mouth, near Ryegate	34	Big Coulee Creek near Lavina	06125700
31	Ninemile Creek at mouth, near Cushman	17	Big Elk Creek at Twodot	06120000
32	Fivemile Creek at mouth, near Lavina	34	Big Coulee Creek near Lavina	06125700
35	Painted Robe Creek at mouth, near Lavina	1	North Fork Musselshell River near Delpine	06115500
37	Dean Creek near mouth, near Lavina	34	Big Coulee Creek near Lavina	06125700
38	Stanley Creek at mouth, near Roundup	57	McDonald Creek at Winnett	06129500
39	Goulding Creek at mouth, near Roundup	57	McDonald Creek at Winnett	06129500
40	Currant Creek near Roundup	1	North Fork Musselshell River near Delpine	06115500
41	Horse Thief Creek at mouth, near Roundup	34	Big Coulee Creek near Lavina	06125700
44	Willow Creek at mouth, near Roundup	57	McDonald Creek at Winnett	06129500
45	Parrot Creek at mouth, near Roundup	34	Big Coulee Creek near Lavina	06125700
46	Fattig Creek at mouth, near Delphia	34	Big Coulee Creek near Lavina	06125700
48	Hawk Creek at Musselshell	34	Big Coulee Creek near Lavina	06125700
49	McLean Coulee at mouth, near Musselshell	34	Big Coulee Creek near Lavina	06125700
50	Carpenter Creek at mouth, near Musselshell	34	Big Coulee Creek near Lavina	06125700
51	Lost Horse Creek at mouth, near Melstone	34	Big Coulee Creek near Lavina	06125700
52	Home Creek near mouth, near Melstone	34	Big Coulee Creek near Lavina	06125700
53	Rattlesnake Creek at mouth, near Mosby	57	McDonald Creek at Winnett	06129500
54	North Willow Creek at mouth, near Mosby	56	Box Elder Creek near Winnett	06129000

Table 5. Mean annual extended-record and synthesized natural flows, depletions, and irrigated acreage for three sites on the Musselshell River, Montana, base period 1929-89

Site no.	Stream name	Mean annual flow, in acre-feet		Mean annual depletion, in acre-feet	Irrigated acreage upstream from site
		Extended-record	Synthesized natural		
20	Musselshell River at Harlowton	101,000	150,000	49,000	30,100
47	Musselshell River at Musselshell	134,000	206,000	72,000	44,600
59	Musselshell River at Mosby	199,000	268,000	69,000	47,000

Table 6. Mean annual extended-record and synthesized natural flows, depletions, and irrigated acreage for three sites on the Musselshell River, Montana, base period 1929-41, 1943-74,1976-77, 1980-89

Site no.	Stream name	Mean annual flow, in acre-feet		Mean annual depletion, in acre-feet	Irrigated acreage upstream from site
		Extended-record	Natural		
20	Musselshell River at Harlowton	93,000	141,000	48,000	30,100
47	Musselshell River at Musselshell	121,000	191,000	70,000	44,600
59	Musselshell River at Mosby	166,000	249,000	83,000	47,000

Table 7. Synthesized monthly natural flows for North Fork Musselshell River near Delpine, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	300	330	780	710	1,700	1,500	540	390	320	340	420	360	7,700
1930	200	350	360	2,300	1,100	790	460	310	270	300	380	290	7,100
1931	230	230	460	640	510	500	470	200	270	290	420	260	4,500
1932	220	140	330	460	1,300	1,200	760	280	320	310	400	340	6,100
1933	280	220	340	520	1,400	1,500	720	220	210	210	380	350	6,400
1934	290	320	420	1,700	950	1,800	470	180	290	300	510	350	7,600
1935	280	160	370	600	760	610	760	200	270	300	360	280	5,000
1936	180	260	720	650	1,400	590	460	220	270	290	320	270	5,600
1937	140	310	310	460	1,000	800	740	140	270	390	290	270	5,100
1938	200	320	500	710	1,400	1,600	1,100	780	280	310	480	380	8,100
1939	380	260	530	1,300	1,400	630	720	240	280	290	270	330	6,600
1940	230	260	420	740	910	610	420	200	240	280	290	300	4,900
1941	230	190	450	330	320	810	530	260	390	390	370	340	4,600
1942	280	230	270	1,500	1,400	2,600	960	650	460	430	420	380	9,600
1943	360	270	1,100	1,900	1,800	2,300	1,000	800	460	460	460	360	11,300
1944	280	240	300	510	750	1,400	1,100	700	490	440	390	350	7,000
1945	360	280	490	410	570	1,700	750	580	400	410	380	310	6,600
1946	310	220	840	950	1,500	1,400	1,400	770	600	580	530	530	9,600
1947	420	450	1,800	1,700	2,700	2,100	1,000	880	680	640	580	530	13,500
1948	500	350	420	2,100	3,000	3,300	1,700	850	490	440	360	280	13,800
1949	300	300	310	1,500	2,200	2,200	940	840	630	600	520	370	10,700
1950	220	830	660	1,300	1,700	2,200	1,200	980	600	570	460	390	11,100
1951	260	390	570	1,000	2,000	1,700	700	540	520	360	480	410	8,900
1952	350	320	330	1,800	2,600	1,500	740	720	540	500	400	340	10,100
1953	330	340	520	520	950	3,100	1,000	640	460	280	460	440	9,000
1954	310	330	310	660	610	730	400	460	280	390	390	260	5,100
1955	260	170	150	400	680	1,100	740	460	230	260	420	360	5,200
1956	310	280	530	1,200	1,500	1,000	470	410	240	240	330	330	6,800
1957	270	330	420	800	1,500	1,700	950	630	490	470	410	290	8,300
1958	340	320	630	1,100	1,300	1,000	680	610	470	310	420	430	7,600
1959	360	290	390	860	1,200	2,200	1,000	610	490	520	420	350	8,700
1960	310	280	610	1,000	1,300	1,300	490	260	180	180	420	410	6,700
1961	370	320	400	430	490	490	310	200	180	190	230	280	3,900
1962	260	310	420	900	1,200	1,700	660	380	260	250	390	400	7,100
1963	260	370	470	710	1,200	1,300	720	310	210	220	360	360	6,500
1964	410	360	310	690	2,300	2,500	1,000	440	330	280	360	430	9,400
1965	460	380	390	1,800	2,400	2,700	1,400	740	950	970	770	640	13,600
1966	420	460	1,100	900	1,400	890	380	300	230	310	410	370	7,200
1967	370	340	380	940	2,800	3,900	1,500	660	660	810	690	560	13,600
1968	530	670	1,200	980	1,700	2,300	1,100	790	760	740	620	430	11,800
1969	390	410	470	2,400	1,300	620	470	330	300	330	300	340	7,700
1970	390	380	400	1,400	3,100	2,000	790	400	320	490	470	420	10,600
1971	410	360	400	1,500	2,000	1,500	570	340	270	430	430	280	8,500
1972	300	390	1,100	1,000	1,600	1,900	880	540	600	610	430	360	9,700
1973	410	350	440	440	450	320	200	160	180	260	400	330	3,900
1974	440	300	740	1,100	1,500	1,800	580	490	570	330	490	440	8,800
1975	360	370	410	550	2,600	3,300	1,800	1,000	640	510	680	750	13,000
1976	550	520	660	1,400	2,400	1,400	580	340	270	240	470	390	9,200
1977	380	380	600	1,500	610	480	290	220	180	390	490	330	5,900
1978	360	430	920	2,400	3,000	2,300	1,400	780	610	700	500	380	13,800
1979	330	400	650	1,600	2,500	2,600	1,600	890	620	360	450	410	12,400
1980	300	330	420	2,200	1,100	2,600	1,900	1,000	990	420	530	450	12,200

Table 7. Synthesized monthly natural flows for North Fork Musselshell River near Delpine, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	370	420	770	1,600	2,800	2,200	2,300	1,200	840	300	500	380	13,700
1982	390	460	750	830	1,600	2,900	1,900	180	960	560	500	440	11,500
1983	450	430	730	840	1,400	1,100	1,600	730	620	270	520	460	9,200
1984	480	440	500	1,100	1,600	1,300	730	100	400	400	400	330	7,800
1985	330	390	480	1,900	970	390	210	200	420	420	520	410	6,600
1986	400	390	890	1,000	1,400	1,400	810	460	670	280	460	390	8,600
1987	260	330	570	920	740	580	570	240	390	330	340	270	5,500
1988	220	300	360	750	590	530	240	110	270	250	330	290	4,200
1989	250	300	700	1,300	1,300	730	590	420	460	330	460	420	7,300

[1]Values may not total due to rounding.

Table 8. Synthesized monthly natural flows for North Fork Musselshell River above North Fork Diversion Canal near Checkerboard, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	1,300	760	2,300	3,500	10,400	13,500	1,300	740	800	1,700	1,900	710	38,900
1930	360	1,200	1,100	6,300	4,200	2,900	920	540	500	560	730	520	19,800
1931	410	580	950	1,500	1,600	1,800	950	340	460	550	740	500	10,400
1932	380	250	640	1,100	4,700	11,600	1,500	510	530	600	810	640	23,300
1933	490	410	650	1,700	6,900	7,800	1,500	470	420	440	710	680	22,200
1934	560	590	890	3,800	2,800	8,300	940	320	470	620	880	640	20,800
1935	500	280	700	1,400	2,200	2,200	2,000	350	450	610	640	500	11,800
1936	350	460	2,000	2,300	5,800	2,900	930	390	460	530	560	480	17,200
1937	240	560	660	1,600	4,000	3,400	1,800	260	460	1,300	520	460	15,300
1938	350	720	950	1,800	7,000	7,600	4,900	1,400	520	600	1,500	690	28,000
1939	670	470	1,600	3,700	5,200	4,100	1,900	430	500	580	520	540	20,200
1940	410	460	970	1,800	2,800	2,400	950	350	410	600	610	510	12,300
1941	410	410	900	880	1,800	4,500	1,200	490	2,000	1,300	1,200	1,800	16,900
1942	1,300	800	990	6,500	13,500	16,200	3,500	2,100	1,900	2,100	2,000	2,300	53,200
1943	2,000	2,200	3,000	8,000	9,900	17,900	4,400	2,400	1,600	2,000	2,500	2,200	58,100
1944	1,500	790	1,100	3,000	4,100	13,200	5,300	2,900	2,000	2,000	2,000	2,100	40,000
1945	2,000	1,000	1,300	1,300	2,500	8,100	1,900	990	690	810	790	580	22,000
1946	570	450	1,600	2,800	5,700	5,200	3,000	1,300	1,000	1,200	1,000	1,200	25,000
1947	760	870	3,300	4,400	11,500	9,300	2,600	1,600	1,300	1,500	1,200	1,100	39,400
1948	940	680	870	5,300	12,500	16,200	4,600	1,900	1,000	990	760	590	46,300
1949	560	600	830	4,300	8,900	7,300	2,100	1,400	1,100	1,200	970	660	29,900
1950	400	1,400	1,200	3,200	7,000	10,000	3,500	2,000	1,200	1,300	920	780	32,900
1951	490	760	1,200	2,600	8,600	6,700	2,000	1,200	1,100	890	940	790	27,300
1952	650	610	670	5,300	13,900	6,900	2,100	1,400	1,000	970	730	610	34,800
1953	600	650	1,000	1,300	4,900	17,100	2,800	1,100	740	500	810	770	32,300
1954	550	950	700	1,900	2,800	3,400	960	950	460	870	740	460	14,700
1955	450	300	330	3,400	3,800	5,300	2,100	840	400	510	770	690	18,900
1956	570	520	1,400	3,300	7,000	4,200	1,100	870	420	470	620	590	21,100
1957	470	560	810	1,800	7,000	8,200	2,700	1,200	960	1,000	780	570	26,100
1958	610	610	1,300	2,700	5,600	3,700	1,600	1,100	820	630	760	770	20,200
1959	650	540	1,600	2,400	4,800	9,800	2,400	1,100	890	1,100	900	740	26,900
1960	570	520	1,800	2,900	5,000	4,500	1,100	510	360	420	770	740	19,200
1961	650	580	760	950	1,800	1,800	640	340	320	400	450	500	9,200
1962	450	710	910	2,400	7,000	9,000	2,000	1,200	570	690	750	780	26,500
1963	470	1,400	1,200	1,900	6,100	5,800	1,800	580	440	540	700	660	21,600
1964	710	640	610	1,700	9,500	11,200	2,800	1,100	620	630	680	860	31,100
1965	930	1,300	1,100	6,000	10,100	10,900	3,800	1,500	2,100	2,300	1,500	1,300	42,800
1966	850	850	2,600	2,800	6,700	3,400	1,100	570	450	660	760	680	21,400
1967	660	780	940	2,500	10,500	17,300	3,900	1,300	1,200	1,600	1,300	990	43,000
1968	950	1,300	2,300	2,300	5,900	10,400	3,000	1,500	1,400	1,500	1,200	790	32,500
1969	710	760	1,600	6,700	4,700	2,900	2,300	670	590	760	630	630	23,000
1970	680	810	900	3,200	14,800	10,100	2,200	800	690	1,100	890	770	36,900
1971	920	1,900	1,500	4,300	7,900	6,000	1,600	650	590	1,000	890	570	27,800
1972	570	810	3,000	3,100	7,000	7,300	2,200	1,200	1,200	1,400	860	640	29,300
1973	690	640	880	1,200	2,100	2,300	730	430	490	740	910	680	11,800
1974	920	610	1,600	3,300	6,700	9,600	2,000	1,200	1,200	890	980	820	29,800
1975	640	670	830	1,800	10,600	19,900	6,500	2,400	1,500	1,400	1,400	1,500	49,100
1976	1,100	960	1,400	3,800	13,200	7,000	2,100	1,100	850	800	1,000	750	34,100
1977	710	750	1,100	3,600	3,500	2,700	890	510	430	840	930	660	16,600
1978	650	780	2,300	6,100	13,300	10,700	4,500	1,600	1,400	1,600	1,100	750	44,800
1979	570	750	1,800	3,700	11,100	13,000	4,000	1,700	1,200	900	850	790	40,400
1980	570	660	840	4,900	6,300	11,300	4,300	2,100	1,900	1,000	1,100	920	35,900

Table 8. Synthesized monthly natural flows for North Fork Musselshell River above North Fork Diversion Canal near Checkerboard, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	670	790	1,600	3,900	12,300	9,800	5,100	2,300	1,500	1,000	1,500	1,500	42,000
1982	2,100	1,500	1,800	2,700	9,900	18,300	6,600	1,300	2,600	2,700	2,300	2,000	53,800
1983	2,200	1,300	1,900	4,200	7,700	6,000	4,800	2,200	2,000	2,000	1,500	2,000	37,800
1984	1,500	950	1,200	3,300	7,500	7,400	2,000	610	990	1,100	890	650	28,100
1985	600	630	960	4,200	3,700	1,800	520	520	1,000	1,100	1,200	870	17,100
1986	730	810	2,100	2,500	6,100	6,600	2,100	980	1,400	850	970	830	26,000
1987	490	600	1,200	2,100	3,400	2,300	1,500	660	830	840	710	580	15,200
1988	370	540	740	1,700	3,000	2,400	590	290	540	600	670	590	12,000
1989	440	500	1,500	2,800	4,800	3,400	1,500	800	1,000	870	1,100	920	19,600

[1]Values may not total due to rounding.

Table 9. Synthesized monthly natural flows for South Fork Musselshell River above Martinsdale, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	1,200	1,400	6,400	8,400	27,800	30,200	930	1,500	2,200	1,200	2,200	2,100	85,500
1930	660	1,400	2,100	14,900	17,800	13,500	790	460	990	680	1,600	1,100	56,000
1931	800	900	2,100	1,700	4,200	8,700	640	340	450	920	1,100	1,400	23,300
1932	710	480	1,500	4,200	20,400	30,800	75	530	280	1,100	1,600	1,600	63,300
1933	1,200	1,100	790	11,000	48,500	37,900	290	1,000	1,300	1,300	1,700	1,900	108,000
1934	1,900	1,300	3,500	9,000	8,800	36,000	800	430	280	1,700	900	1,400	66,000
1935	1,100	560	1,500	3,700	6,500	9,800	1,400	370	240	1,500	890	850	28,400
1936	1,300	880	1,400	9,500	39,000	21,600	990	490	450	520	970	940	78,000
1937	370	1,300	1,200	11,400	23,600	15,400	470	580	390	2,600	770	580	58,700
1938	660	1,200	1,500	7,600	51,000	39,900	22,000	2,700	1,300	1,100	2,800	1,600	133,000
1939	1,700	1,000	5,200	8,300	24,400	16,800	2,000	660	900	1,300	1,400	480	64,100
1940	820	870	2,400	5,700	9,700	11,800	2,600	440	440	1,700	2,800	750	40,000
1941	890	1,500	2,700	3,800	15,000	27,500	2,900	1,100	2,600	8,300	5,300	3,600	75,200
1942	2,400	1,900	2,400	13,800	44,800	46,500	2,700	1,200	1,800	2,600	2,300	1,900	124,000
1943	1,500	1,700	3,800	36,600	46,900	58,900	6,500	1,900	1,100	1,700	2,200	1,700	165,000
1944	1,000	780	1,400	4,500	19,700	38,400	13,300	1,800	1,200	1,800	1,900	1,300	87,100
1945	1,400	1,100	1,300	1,500	15,000	33,500	3,800	610	750	1,700	2,600	1,600	64,900
1946	1,900	1,300	3,600	13,000	24,400	13,600	2,900	570	1,100	2,700	2,900	5,200	73,200
1947	1,800	2,300	4,100	19,200	51,200	42,600	4,400	1,100	2,500	4,400	3,700	3,400	141,000
1948	2,700	1,900	2,800	18,400	63,800	78,600	18,800	5,400	2,400	2,800	3,000	2,400	203,000
1949	2,000	1,900	4,600	19,500	43,800	24,300	3,300	82	790	2,200	2,000	1,300	106,000
1950	1,000	1,300	440	9,700	39,100	60,200	12,700	4,000	2,200	3,600	2,800	2,100	139,000
1951	1,400	2,000	3,700	10,200	47,400	29,800	7,200	3,200	3,000	3,500	2,900	2,200	117,000
1952	1,900	1,500	1,600	25,700	80,600	31,400	7,100	1,600	1,500	1,700	1,500	1,200	157,000
1953	1,400	1,300	2,400	5,300	20,000	75,200	5,300	1,700	34	370	1,100	1,300	115,000
1954	1,100	1,300	1,800	5,500	19,800	21,000	3,300	560	240	1,000	1,400	840	57,800
1955	680	600	940	3,500	11,200	22,600	7,800	1,300	610	940	1,600	2,000	53,800
1956	1,500	1,300	3,400	10,400	49,200	25,900	3,000	730	510	860	1,200	1,100	99,100
1957	730	710	1,900	4,200	41,500	46,800	10,700	2,300	1,700	2,400	2,200	1,800	117,000
1958	1,200	1,600	3,600	8,200	25,300	8,800	3,000	1,200	800	1,300	1,300	1,400	57,700
1959	1,700	1,200	2,500	6,900	27,600	65,400	7,000	1,400	1,400	3,100	3,100	1,900	123,000
1960	1,600	1,100	7,700	9,400	25,700	19,500	2,000	1,100	1,200	1,700	1,700	1,400	74,100
1961	1,200	1,100	1,600	2,000	9,100	8,100	540	180	430	1,200	1,100	970	27,500
1962	820	1,000	1,900	9,200	35,000	35,000	8,600	3,100	2,400	3,800	2,500	2,300	106,000
1963	1,200	2,300	3,400	5,000	37,100	35,000	5,900	1,300	1,400	2,300	2,200	1,500	98,600
1964	1,300	1,100	1,400	5,000	35,700	57,000	8,100	1,500	1,100	1,900	1,800	2,400	118,000
1965	2,200	2,000	1,300	14,900	39,700	56,000	12,600	4,000	8,800	8,700	4,700	3,300	158,000
1966	2,200	1,600	4,800	11,500	46,200	18,000	4,800	1,300	1,000	1,700	1,900	1,500	96,500
1967	1,400	1,300	3,800	10,000	50,700	96,800	13,800	2,600	1,800	3,000	2,800	1,700	190,000
1968	1,700	3,000	4,400	6,000	26,500	49,500	11,500	3,500	2,900	3,400	3,000	1,600	117,000
1969	1,500	1,700	2,700	21,200	19,400	11,200	8,500	1,900	1,500	2,400	2,500	1,300	75,800
1970	1,200	1,600	2,100	6,100	62,400	64,300	9,700	2,000	2,400	2,900	1,800	1,700	158,000
1971	2,200	3,200	4,000	12,800	42,300	32,800	7,900	1,200	2,000	3,500	2,700	2,000	117,000
1972	1,900	2,600	10,200	10,400	35,800	34,200	5,600	3,300	2,200	2,600	1,800	1,100	112,000
1973	810	1,300	2,300	4,200	4,800	9,700	1,800	1,800	1,400	2,900	3,100	2,400	36,500
1974	4,500	1,900	6,400	15,900	37,800	57,800	9,700	4,800	3,500	3,400	3,100	2,000	151,000
1975	1,400	1,400	2,300	10,000	55,600	159,000	39,700	7,400	4,200	4,700	4,300	4,800	295,000
1976	2,700	1,800	4,200	15,600	92,300	36,400	10,600	5,800	3,800	3,600	2,700	2,200	182,000
1977	2,100	2,000	2,100	8,800	24,400	14,800	4,200	2,200	2,200	2,400	2,000	2,200	69,400
1978	1,700	1,400	7,700	19,500	78,400	61,200	24,000	3,800	4,200	4,300	3,300	2,500	212,000
1979	650	1,700	7,200	11,100	64,200	88,500	14,500	3,900	2,000	3,700	2,100	2,300	202,000
1980	1,600	2,000	2,100	9,800	41,100	65,200	10,000	5,000	3,400	3,900	3,500	3,100	151,000

Table 9. Synthesized monthly natural flows for South Fork Musselshell River above Martinsdale, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	1,600	1,900	5,200	12,900	69,200	52,600	7,400	4,600	2,100	3,400	2,800	2,400	166,000
1982	960	2,200	5,800	15,500	43,900	74,700	22,700	4,800	3,000	3,500	3,300	2,500	183,000
1983	2,800	2,300	5,600	25,100	28,500	22,400	8,600	4,200	3,900	3,100	2,000	1,200	110 000
1984	4,100	2,100	4,700	8,900	24,500	28,900	4,600	6,000	2,100	3,800	2,600	2,100	94 400
1985	1,400	430	2,800	6,500	11,400	6,600	780	2,900	5,000	5,200	6,400	3,500	52.900
1986	1,900	2,400	11,500	6,000	26,900	31,400	6,900	3,500	3,300	4,300	4,300	3,200	106 000
1987	1,000	1,300	3,700	3,300	16,400	10,300	4,400	3,400	3,400	4,000	2,900	2,400	56 500
1988	700	980	2,300	3,300	11,800	9,400	1,300	2,100	1,800	2,700	2,800	2,100	41.300
1989	880	450	5,900	3,700	18,600	13,700	3,400	1,300	4,300	4,300	7,700	4,100	68.300

[1]Values may not total due to rounding.

Table 10. Synthesized monthly natural flows for Musselshell River at Harlowton, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	3,100	3,000	10,500	13,800	40,600	45,800	3,100	2,500	3,200	3,300	4,700	3,500	137,000
1930	1,500	3,500	4,800	23,100	23,900	17,200	2,000	1,300	1,900	1,700	2,900	2,100	85,900
1931	1,600	1,900	3,600	3,900	6,900	11,100	1,900	990	1,200	2,000	2,400	2,200	39,700
1932	1,400	1,100	2,800	6,100	26,800	44,700	2,200	1,300	1,100	2,200	3,000	2,600	95,300
1933	2,100	1,900	2,100	13,700	56,900	48,000	2,400	1,900	2,200	2,300	2,800	3,000	139,000
1934	2,900	2,600	5,300	14,400	12,700	45,900	2,100	950	1,000	2,600	2,200	2,400	95,100
1935	1,900	1,200	2,700	6,000	10,100	12,800	4,200	990	940	2,300	2,000	1,800	46,900
1936	2,000	1,700	4,900	13,400	46,400	25,500	2,200	1,100	1,200	1,400	1,900	1,800	104,000
1937	930	2,200	2,500	13,800	29,200	20,300	2,800	1,100	1,100	4,300	1,600	1,400	81,200
1938	1,400	2,500	3,400	10,600	60,900	50,900	29,700	4,500	2,200	2,400	5,200	3,000	177,000
1939	2,900	1,800	8,400	13,900	32,200	22,700	4,300	1,400	1,600	2,300	2,400	1,400	95,300
1940	1,600	1,800	4,300	8,500	14,000	15,100	3,900	1,000	1,100	3,000	4,000	1,800	60,100
1941	1,700	2,400	4,300	5,500	17,700	34,200	4,500	1,900	5,400	10,700	7,600	6,600	103,000
1942	4,400	3,600	5,100	23,900	63,500	69,700	8,000	4,200	4,100	5,600	5,200	5,500	203,000
1943	4,300	5,500	9,100	48,700	60,800	84,900	13,700	5,500	3,400	4,600	5,600	5,100	251,000
1944	3,300	2,200	3,600	8,700	25,200	58,500	21,900	6,100	4,000	4,600	4,700	4,600	147,000
1945	4,400	3,000	3,900	3,700	18,900	44,700	6,600	1,900	1,900	3,000	4,200	2,700	98,900
1946	3,000	2,300	6,500	17,500	32,300	20,500	6,900	2,100	3,100	5,200	5,000	7,700	112,000
1947	3,400	4,100	10,400	26,400	67,500	56,000	8,200	3,300	4,500	7,100	6,000	5,900	203,000
1948	5,100	3,300	5,100	25,900	81,600	103,000	25,600	8,100	4,100	4,800	4,900	4,000	276,000
1949	3,200	3,000	6,600	26,500	56,300	34,100	5,900	1,800	2,300	4,100	3,800	2,600	150,000
1950	1,900	4,100	3,100	14,400	47,800	74,400	17,800	6,600	4,000	5,900	4,700	3,800	189,000
1951	2,600	3,800	7,100	14,500	60,000	39,600	10,200	5,100	4,800	5,300	4,700	3,700	161,000
1952	3,000	2,900	3,700	33,900	99,200	40,700	10,200	3,400	2,900	3,100	2,800	2,300	208,000
1953	2,700	2,500	4,300	7,400	25,900	98,600	9,600	3,300	1,100	1,400	2,600	2,700	162,000
1954	2,200	3,200	3,300	8,200	23,800	25,400	5,400	2,100	940	2,200	2,700	1,800	81,200
1955	1,700	1,300	1,800	8,700	15,700	31,300	11,500	2,600	1,300	2,000	2,800	3,400	84,100
1956	2,800	2,500	6,600	14,900	62,000	32,900	4,400	1,800	1,100	1,400	1,900	1,800	134,000
1957	1,400	1,400	3,000	6,500	52,700	58,100	13,900	3,800	3,000	3,800	3,200	2,700	154,000
1958	2,200	2,500	5,400	11,300	35,200	14,500	5,100	2,600	1,800	2,100	2,200	2,300	87,200
1959	2,500	1,800	6,400	10,100	34,600	79,900	10,500	2,800	2,600	4,600	4,300	2,900	163,000
1960	2,400	1,800	10,300	13,100	32,700	26,500	3,400	1,800	1,700	2,200	2,600	2,600	101,000
1961	2,000	1,800	2,500	3,100	12,400	11,800	1,400	570	860	1,700	1,700	1,500	41,300
1962	1,300	1,900	3,500	12,500	44,800	47,700	11,200	4,500	3,200	4,700	3,500	3,300	142,000
1963	1,800	4,300	5,000	7,400	46,600	44,500	8,500	2,100	2,100	3,000	3,000	2,200	131,000
1964	2,200	1,900	2,100	7,200	48,200	75,600	12,300	2,900	2,000	2,800	2,700	3,600	164,000
1965	3,400	3,800	2,800	22,500	53,500	73,600	17,600	5,900	11,600	11,500	6,500	4,900	218,000
1966	3,300	2,800	8,800	15,100	54,500	22,200	6,200	2,000	1,600	2,500	2,700	2,300	124,000
1967	2,200	2,200	5,000	12,800	64,400	129,000	19,800	4,600	3,600	5,400	4,800	3,100	257,000
1968	3,300	5,300	7,900	9,500	35,500	64,300	16,100	5,800	5,000	5,700	4,900	2,900	166,000
1969	2,800	2,900	7,500	30,000	28,700	16,500	11,800	3,000	2,400	3,600	3,500	2,200	115,000
1970	2,200	2,800	3,600	9,900	83,100	80,500	13,300	3,300	3,800	4,700	3,200	2,900	213,000
1971	3,800	6,300	6,500	18,500	56,000	43,600	10,200	2,100	3,100	4,900	4,000	2,800	162,000
1972	2,800	4,700	15,400	14,400	47,000	49,300	8,900	5,100	3,800	5,800	4,400	2,300	164,000
1973	2,300	2,600	4,200	6,800	9,000	13,900	3,100	2,400	2,700	4,500	5,400	3,800	60,700
1974	6,200	3,400	9,200	21,100	47,500	75,900	13,000	6,800	5,900	5,300	5,300	3,700	203,000
1975	2,600	2,700	4,300	14,100	72,500	191,000	54,600	11,800	7,400	8,000	8,200	8,300	386,000
1976	5,100	3,900	7,700	22,500	118,000	50,500	14,600	8,000	6,000	6,200	5,500	4,300	252,000
1977	3,600	3,700	4,200	13,700	28,700	18,600	5,400	2,900	3,200	4,300	3,900	3,600	95,800
1978	3,000	3,000	14,000	28,800	97,200	77,100	31,500	6,300	7,400	7,500	5,700	4,300	286,000
1979	1,800	3,300	13,800	16,800	80,200	105,000	19,500	6,300	3,800	5,300	3,800	3,700	263,000
1980	2,700	3,600	4,400	16,500	51,600	82,400	15,600	7,700	6,300	6,100	5,800	5,100	208,000

Table 10. Synthesized monthly natural flows for Musselshell River at Harlowton, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	3,200	3,600	7,800	17,900	89,000	71,600	13,900	7,500	4,100	5,500	5,400	4,700	234,000
1982	3,700	5,000	9,500	20,100	58,700	103,000	33,500	6,800	7,000	7,900	7,200	5,700	268,000
1983	6,200	4,800	9,000	30,800	39,100	33,200	16,700	7,200	7,200	6,900	5,300	4,000	170,000
1984	6,900	4,300	7,200	14,000	37,200	46,300	9,700	7,800	4,600	6,600	5,200	3,500	153,000
1985	2,900	1,900	4,800	12,900	17,200	9,300	1,400	3,600	6,700	7,600	8,300	4,900	81,500
1986	3,400	4,600	15,100	10,100	35,500	43,100	9,800	4,800	7,200	6,500	6,300	4,700	151,000
1987	2,200	2,500	5,700	6,300	20,500	13,100	6,400	4,400	4,800	5,600	4,300	3,400	79,200
1988	1,400	2,000	3,700	5,900	16,500	12,600	2,000	2,400	2,600	3,600	3,900	3,100	59,700
1989	1,600	1,200	8,500	8,000	25,300	18,400	5,100	2,300	5,800	5,800	9,700	5,500	97,200

[1]Values may not total due to rounding.

Table 11. Synthesized monthly natural flows for Musselshell River near Shawmut, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	4,400	4,100	12,300	15,300	43,400	49,000	3,300	2,900	5,300	4,200	5,600	4,300	154,000
1930	2,100	4,100	7,400	25,200	25,200	17,500	2,000	1,600	2,000	2,500	3,700	2,600	95,900
1931	2,200	2,500	4,400	4,700	7,000	11,800	1,900	1,100	1,800	3,000	3,300	2,700	46,400
1932	1,800	1,300	3,600	6,900	28,500	47,700	2,200	1,600	1,400	3,000	3,800	3,400	105,000
1933	2,400	2,500	2,700	15,300	63,500	53,700	2,500	2,700	2,900	3,100	3,400	4,200	159,000
1934	4,000	3,400	6,100	15,800	13,100	46,800	2,200	1,400	1,000	3,300	2,700	2,800	103,000
1935	3,100	1,400	3,600	7,000	10,400	13,300	4,600	1,200	950	2,800	2,300	2,200	52,900
1936	2,500	2,100	6,800	14,400	51,100	27,900	2,200	1,300	1,200	1,900	2,300	2,200	116,000
1937	1,400	3,000	3,300	15,500	31,300	21,800	3,000	1,200	1,100	4,800	1,900	1,900	90,200
1938	2,500	2,800	4,600	11,400	68,000	58,800	34,900	5,200	2,300	3,400	6,500	4,000	204,000
1939	3,900	2,400	12,200	15,500	34,500	24,500	4,900	1,500	1,600	2,900	3,000	2,700	110,000
1940	2,200	2,000	5,500	9,000	14,500	15,800	4,600	1,100	1,100	3,600	5,300	2,200	66,900
1941	2,400	2,600	4,800	6,000	18,700	37,600	5,300	2,200	6,400	12,200	8,800	8,000	115,000
1942	5,800	4,900	6,800	26,100	73,300	81,600	9,700	4,800	4,700	6,300	6,200	6,900	237,000
1943	5,400	7,800	13,200	52,700	69,000	97,700	15,600	7,100	4,100	5,500	6,500	6,400	291,000
1944	4,400	2,700	5,300	9,700	26,200	67,400	26,400	7,700	4,700	5,600	5,500	6,000	172,000
1945	5,700	3,800	5,900	4,400	20,100	50,300	7,900	2,500	2,600	3,900	5,400	3,600	116,000
1946	4,000	3,400	8,400	19,300	34,400	22,900	7,600	2,400	3,500	6,600	6,300	9,400	128,000
1947	4,600	5,600	13,300	28,500	76,500	59,000	8,900	3,700	5,100	8,300	7,100	7,300	228,000
1948	7,000	4,300	7,000	27,000	90,500	127,000	34,200	9,600	4,800	5,800	6,000	4,800	328,000
1949	3,700	3,300	8,700	30,400	60,900	36,800	7,200	2,500	3,200	5,000	4,600	3,000	169,000
1950	2,400	6,300	4,400	15,700	54,700	88,800	21,700	8,400	5,200	7,400	6,500	5,900	227,000
1951	4,300	5,300	10,800	16,600	64,800	44,500	12,600	6,400	6,600	7,300	6,500	5,200	191,000
1952	4,400	4,500	5,700	37,000	109,000	45,200	12,300	4,700	4,000	4,100	3,600	2,900	237,000
1953	3,400	3,200	5,600	8,500	27,200	111,000	10,400	4,000	1,900	2,000	3,300	3,700	184,000
1954	3,200	4,300	4,300	9,400	24,300	26,400	5,900	2,500	1,300	2,600	3,300	2,300	89,800
1955	2,100	1,700	2,500	9,900	16,700	33,400	12,700	3,100	1,700	2,300	3,400	4,200	93,700
1956	3,400	3,600	9,300	16,600	69,300	37,100	5,000	2,300	1,400	1,700	2,500	2,500	155,000
1957	1,800	2,000	4,000	7,400	59,800	69,500	16,200	4,500	3,700	5,000	4,400	3,800	182,000
1958	3,300	3,700	6,900	12,700	40,000	17,600	6,400	2,900	2,100	2,300	3,200	3,200	104,000
1959	3,400	2,500	8,400	11,500	36,900	87,600	11,900	3,200	3,000	5,900	5,500	3,900	184,000
1960	3,200	2,600	11,700	14,200	35,400	29,400	4,400	2,200	1,800	2,700	3,400	3,500	115,000
1961	2,800	2,600	3,200	3,700	12,700	12,300	1,600	700	980	1,900	2,300	2,100	46,900
1962	1,600	2,500	4,300	13,000	48,000	53,800	12,800	5,200	4,200	5,100	4,000	4,300	159,000
1963	2,400	5,600	6,200	8,200	48,400	54,200	10,100	2,400	2,700	3,700	3,600	2,900	150,000
1964	3,000	2,800	3,000	8,000	49,500	84,200	14,500	3,300	2,400	3,100	3,100	4,200	181,000
1965	4,400	4,800	4,200	24,500	57,200	80,600	19,600	6,900	14,900	14,000	8,200	5,900	245,000
1966	4,100	3,500	10,200	16,600	58,600	23,200	6,800	2,300	1,800	2,900	3,500	3,200	137,000
1967	3,000	2,900	6,100	13,800	70,700	162,000	24,500	5,500	4,300	6,000	5,600	4,100	309,000
1968	4,400	7,300	8,800	10,300	38,900	72,100	17,900	6,700	5,800	6,900	5,600	4,300	189,000
1969	4,000	4,200	8,900	31,700	30,700	18,700	14,900	3,800	3,000	4,900	4,500	3,100	132,000
1970	2,900	3,900	4,500	11,000	94,300	89,200	15,000	5,000	4,500	6,200	4,100	4,000	245,000
1971	4,600	8,600	7,900	20,000	61,500	47,000	11,100	3,100	3,600	7,400	5,300	3,600	184,000
1972	3,600	7,200	16,800	15,900	50,900	53,100	9,900	6,800	4,900	7,400	5,500	3,000	185,000
1973	3,100	3,200	5,300	7,800	9,400	14,900	3,600	3,600	3,500	5,300	6,200	4,800	70,700
1974	7,500	4,300	10,500	22,400	50,000	83,800	14,400	8,200	6,900	5,800	6,500	4,800	225,000
1975	3,400	3,500	6,100	16,600	85,700	214,000	61,300	14,300	8,600	10,900	10,200	10,200	445,000
1976	6,900	6,500	9,800	24,000	134,000	56,400	16,300	8,700	7,000	8,900	6,800	5,400	291,000
1977	4,800	5,400	5,500	14,600	30,300	20,200	5,900	3,700	3,400	5,000	4,700	4,600	108,000
1978	3,900	4,100	18,200	30,400	111,000	85,800	34,900	7,400	8,600	8,700	6,900	6,200	326,000
1979	3,200	4,700	17,400	19,100	89,300	117,000	22,700	7,200	4,500	5,700	4,700	5,100	301,000
1980	3,900	5,000	6,200	18,100	56,700	93,400	18,200	9,200	7,400	7,300	6,900	6,000	238,000

Table 11. Synthesized monthly natural flows for Musselshell River near Shawmut, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	4,500	5,100	9,100	19,100	101,000	80,300	15,900	9,200	5,300	6,400	6,300	5,900	268,000
1982	4,600	6,300	11,500	21,600	64,300	116,000	38,800	8,600	8,800	10,500	8,500	7,000	307,000
1983	7,800	5,700	10,400	31,600	42,000	35,800	18,900	9,000	8,500	8,000	6,000	4,800	189,000
1984	8,600	5,400	8,500	15,400	39,500	49,900	10,900	9,100	5,800	7,500	6,100	4,200	171,000
1985	3,400	3,000	5,800	14,000	17,800	9,700	1,600	4,000	7,200	8,500	8,700	5,500	89,200
1986	4,100	6,300	16,700	11,000	38,200	47,200	11,600	5,700	8,500	7,900	7,200	5,800	170,000
1987	3,000	3,500	6,700	7,300	21,700	14,000	7,600	4,900	5,200	6,200	4,800	4,100	89,000
1988	2,100	2,700	4,600	6,500	17,200	13,400	2,400	2,400	2,600	3,600	4,200	3,600	65,300
1989	2,100	1,400	9,700	9,200	26,800	19,700	6,000	3,000	6,200	6,400	10,500	6,400	107,000

[1]Values may not total due to rounding.

Table 12. Synthesized monthly natural flows for Musselshell River near Ryegate, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	4,500	4,100	13,900	17,900	44,400	50,000	3,400	3,100	5,300	4,200	5,700	4,400	161,000
1930	2,200	4,100	8,700	27,900	25,600	17,700	2,000	1,700	2,000	2,600	3,800	2,700	101,000
1931	2,200	2,500	4,600	5,400	7,300	12,000	1,900	1,100	1,800	3,000	3,300	2,800	47,900
1932	1,800	1,400	3,800	7,100	29,000	49,100	2,400	1,600	1,400	3,100	3,900	3,400	108,000
1933	2,500	2,600	2,900	16,200	64,100	54,900	2,700	2,700	2,900	3,200	3,400	4,200	162,000
1934	4,000	3,600	6,400	16,200	13,100	51,000	2,200	1,400	1,000	3,300	2,700	2,800	108,000
1935	3,100	1,400	3,700	7,400	10,400	13,300	4,900	1,200	950	2,800	2,400	2,200	53,800
1936	2,500	2,100	7,600	16,700	53,100	28,900	2,200	1,300	1,200	1,900	2,200	2,200	122,000
1937	1,400	3,000	3,700	16,500	31,800	26,100	3,300	1,200	1,100	4,800	1,900	1,900	96,700
1938	2,500	2,900	5,300	12,200	70,800	66,500	36,200	5,500	2,500	3,500	6,600	4,300	219,000
1939	3,900	2,400	13,700	16,800	35,400	28,000	5,000	1,500	1,700	3,100	3,000	2,700	117,000
1940	2,200	2,100	5,900	9,500	14,500	16,000	4,600	1,100	1,100	3,600	5,300	2,200	68,100
1941	2,400	2,800	5,000	6,300	18,800	40,300	5,300	2,200	6,400	12,400	8,900	8,300	119,000
1942	5,800	5,200	8,300	27,800	79,800	94,000	10,300	5,400	4,700	6,500	6,500	7,200	262,000
1943	5,400	8,000	15,000	56,800	73,800	109,000	16,200	7,300	4,200	5,800	6,700	6,800	315,000
1944	4,500	2,700	6,200	10,600	27,100	79,300	27,600	8,200	4,800	5,600	5,700	6,400	189,000
1945	5,800	3,900	6,900	5,200	20,700	54,600	8,100	2,700	2,700	3,900	5,500	3,600	124,000
1946	4,100	3,500	9,200	20,600	35,100	23,500	7,600	2,400	3,600	6,700	6,300	9,700	132,000
1947	4,900	6,000	16,400	31,400	78,100	60,600	9,000	3,900	5,100	8,400	7,200	8,000	239,000
1948	7,200	4,400	8,000	28,600	92,800	130,000	34,500	9,800	4,900	6,000	6,300	5,200	338,000
1949	3,900	3,300	9,000	33,400	62,300	38,000	7,200	2,500	3,200	5,100	4,700	3,100	176,000
1950	2,500	7,400	5,700	16,700	55,500	90,300	21,900	8,500	5,200	7,600	6,600	6,100	234,000
1951	4,400	5,800	13,600	17,700	66,400	46,200	12,700	6,500	6,600	7,400	6,700	5,300	199,000
1952	4,500	4,900	6,900	41,000	111,000	46,300	12,400	4,800	4,000	4,100	3,700	3,000	247,000
1953	3,500	3,200	5,900	8,800	27,900	113,000	10,500	4,100	1,900	2,100	3,400	3,800	188,000
1954	3,300	4,500	4,500	10,000	25,000	26,600	6,300	2,900	1,300	2,700	3,300	2,400	92,800
1955	2,300	1,700	2,600	12,000	17,800	34,700	13,000	3,200	1,700	2,300	3,400	4,300	99,000
1956	3,600	3,800	11,000	17,600	71,300	38,600	5,100	2,300	1,400	1,700	2,500	2,500	161,000
1957	2,000	2,000	4,300	7,800	61,800	71,500	16,300	4,800	3,800	5,200	4,700	4,100	188,000
1958	3,600	4,000	7,400	13,300	40,400	18,200	6,500	2,900	2,100	2,300	3,300	3,300	107,000
1959	3,400	2,600	11,500	12,900	39,800	91,100	12,500	3,300	3,100	6,000	5,600	3,900	196,000
1960	3,300	2,700	12,400	15,200	36,400	29,900	4,500	2,300	1,800	2,700	3,500	3,500	118,000
1961	2,900	2,700	3,300	3,900	13,000	12,500	1,700	730	1,000	1,900	2,300	2,100	48,000
1962	1,700	2,500	5,300	13,400	48,400	62,400	13,000	5,300	4,300	5,200	4,100	4,400	170,000
1963	2,500	5,900	6,400	8,700	49,700	54,900	10,100	2,500	2,700	3,700	3,700	2,900	154,000
1964	3,000	2,800	3,100	8,800	49,900	87,100	14,700	3,500	2,500	3,200	3,200	4,300	186,000
1965	4,500	5,000	4,500	26,700	58,400	81,600	19,800	7,000	15,000	14,200	8,300	6,100	251,000
1966	4,300	3,600	11,800	18,500	59,800	24,000	7,100	2,400	1,900	2,900	3,600	3,200	143,000
1967	3,100	2,900	6,300	14,600	74,600	249,000	26,500	6,600	4,700	6,700	6,200	4,600	406,000
1968	4,900	8,200	10,100	13,000	42,400	80,100	19,400	7,700	6,200	7,400	6,300	5,000	211,000
1969	4,500	4,500	14,800	34,700	32,400	25,000	15,600	4,300	3,200	5,300	4,900	3,400	153,000
1970	3,100	4,200	5,500	12,400	111,000	101,000	15,600	5,600	4,900	6,800	4,700	4,600	279,000
1971	5,300	9,700	9,400	22,700	63,500	48,700	11,200	3,200	3,800	7,600	5,600	3,800	195,000
1972	3,800	8,600	19,300	18,200	53,100	54,000	10,300	7,400	5,100	7,900	6,100	3,100	197,000
1973	3,300	3,300	5,800	9,500	10,900	15,900	3,800	3,700	3,600	5,300	6,400	4,900	76,400
1974	7,600	4,600	10,900	23,200	51,200	87,900	14,700	8,800	7,600	5,900	7,100	5,000	235,000
1975	3,500	3,600	6,900	21,200	98,800	235,000	64,000	15,500	9,300	11,100	11,900	11,000	492,000
1976	7,200	6,800	12,000	25,800	149,000	63,300	16,900	9,300	7,200	8,900	7,100	6,100	320,000
1977	5,000	5,800	6,000	15,600	31,600	21,000	5,900	3,800	3,500	5,100	4,900	4,800	113,000
1978	4,000	4,200	18,800	35,200	121,000	95,100	36,300	8,000	9,400	9,200	7,200	6,800	355,000
1979	3,300	5,000	20,900	21,300	96,700	127,000	23,300	7,800	4,700	5,900	4,900	5,200	326,000
1980	4,000	5,400	7,600	19,600	58,100	98,600	18,400	9,600	7,500	7,500	7,000	6,200	250,000

Table 12. Synthesized monthly natural flows for Musselshell River near Ryegate, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	4,800	5,400	9,500	19,500	110,000	88,200	16,300	9,600	5,500	6,600	6,500	6,300	288,000
1982	4,900	6,800	13,000	24,200	67,700	126,000	39,800	9,100	9,000	10,900	8,800	7,400	328,000
1983	8,200	6,300	11,200	32,700	44,600	37,700	19,200	9,500	8,700	8,300	6,200	4,800	197,000
1984	8,800	5,900	9,100	16,300	40,800	52,400	11,100	9,500	6,000	7,700	6,300	4,200	178,000
1985	3,700	3,200	6,100	14,800	18,500	10,200	1,600	4,000	7,500	8,700	9,000	5,500	92,800
1986	4,300	7,000	17,400	12,000	39,100	49,200	11,900	6,000	10,100	8,100	7,400	5,800	178,000
1987	3,200	3,600	6,900	8,100	22,300	14,600	7,900	5,000	5,300	6,400	4,900	4,200	92,400
1988	2,200	2,700	4,800	6,900	17,600	14,100	2,400	2,400	2,800	3,600	4,200	3,600	67,300
1989	2,100	1,400	10,100	10,500	27,700	20,100	6,200	3,100	6,400	6,500	10,600	6,400	111,000

[1]Values may not total due to rounding.

Table 13. Synthesized monthly natural flows for Careless Creek at mouth, near Ryegate, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	37	290	1,300	1,100	1,100	490	1,200	61	0	0	0	92	5,700
1930	12	540	770	320	370	24	0	0	0	6	130	0	2,200
1931	18	150	0	24	31	12	0	0	0	0	0	0	240
1932	0	0	0	54	61	4,900	390	98	36	12	12	0	5,600
1933	0	28	1,600	160	480	3,700	200	160	0	0	12	74	6,400
1934	120	190	150	12	0	1,100	0	0	0	0	0	0	1,600
1935	0	0	18	160	0	30	1,100	0	0	0	0	0	1,300
1936	0	0	1,900	800	43	6	0	0	0	0	0	0	2,700
1937	0	0	120	83	6	0	98	0	0	18	0	0	330
1938	0	760	650	18	190	2,600	1,600	6	0	12	0	0	5,800
1939	6	0	1,300	150	230	330	550	0	0	0	0	0	2,600
1940	0	23	420	12	18	200	0	0	18	18	0	0	710
1941	0	0	0	0	0	36	6	0	0	6	380	740	1,200
1942	420	240	2,000	3,100	3,200	4,900	1,300	720	89	440	110	1,300	17,800
1943	790	2,500	1,800	1,600	1,300	11,200	3,200	710	340	380	150	1,300	25,300
1944	520	360	86	1,200	480	9,600	4,300	1,300	510	390	77	1,300	20,100
1945	840	510	680	250	68	1,700	230	0	0	18	170	0	4,500
1946	43	240	490	210	250	330	350	25	120	190	89	740	3,100
1947	92	200	2,300	390	680	590	240	150	77	120	120	110	5,100
1948	130	180	310	170	740	1,200	980	280	120	120	150	25	4,400
1949	43	110	2,900	520	290	490	230	31	110	80	83	18	4,900
1950	0	130	1,200	620	260	860	500	250	220	190	180	240	4,700
1951	100	210	1,400	170	340	570	210	220	400	340	110	0	4,100
1952	74	210	1,500	290	890	500	310	160	150	74	0	37	4,200
1953	100	28	120	24	620	5,400	550	6	0	0	0	12	6,900
1954	6	330	37	150	43	140	12	98	0	43	0	0	860
1955	0	0	0	1,900	680	860	150	18	0	0	0	0	3,600
1956	0	0	770	210	92	6	0	98	0	6	71	68	1,300
1957	18	110	98	360	420	770	410	86	280	230	36	0	2,800
1958	31	180	210	110	180	500	230	120	160	140	6	25	1,900
1959	74	110	5,400	140	55	520	280	140	180	160	83	210	7,400
1960	37	160	1,000	140	180	200	80	140	60	43	0	68	2,100
1961	31	89	0	83	49	36	92	0	65	0	60	6	510
1962	31	78	140	680	750	790	520	98	180	150	0	120	3,500
1963	49	470	260	65	180	580	230	31	180	98	12	6	2,200
1964	31	81	6	36	550	1,100	590	130	290	170	54	280	3,300
1965	250	580	930	290	240	690	480	240	430	390	130	98	4,700
1966	49	170	1,700	220	390	60	410	80	170	180	6	0	3,400
1967	49	140	180	140	200	1,700	830	240	310	270	310	12	4,400
1968	170	280	900	430	460	1,100	550	250	310	250	270	110	5,100
1969	130	210	2,800	700	380	540	710	200	230	230	120	0	6,300
1970	80	180	400	130	1,300	980	340	220	270	220	160	68	4,300
1971	160	980	1,500	570	570	390	260	150	330	230	240	49	5,400
1972	98	470	4,300	24	500	520	230	340	280	230	120	68	7,200
1973	43	160	140	400	470	270	140	0	140	140	300	74	2,300
1974	260	190	120	330	410	620	240	240	290	200	110	74	3,100
1975	74	150	370	870	1,500	1,400	1,200	420	400	420	95	590	7,500
1976	560	410	680	420	1,000	650	380	260	300	230	390	0	5,300
1977	180	270	250	54	260	180	140	80	180	160	150	0	1,900
1978	37	140	19,500	890	1,300	940	980	340	650	420	410	0	25,600
1979	150	270	18,500	0	980	210	430	100	290	250	89	31	21,300
1980	130	240	740	320	330	760	300	270	210	290	140	190	3,500

Table 13. Synthesized monthly natural flows for Careless Creek at mouth, near Ryegate, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	130	270	180	60	1,200	1,000	420	98	220	220	110	86	4,000
1982	49	570	840	550	610	1,200	760	130	400	390	240	74	5,800
1983	290	380	360	560	420	260	170	0	230	230	77	0	3,000
1984	490	280	200	6	250	330	55	140	280	170	150	18	2,400
1985	80	22	86	400	68	95	98	61	65	130	24	0	1,100
1986	61	570	580	420	730	320	250	0	680	310	12	86	4,000
1987	150	56	120	330	360	170	230	190	120	170	65	0	2,000
1988	0	86	80	77	380	6	68	25	0	0	0	0	720
1989	49	28	1,400	230	420	89	12	6	110	140	0	6	2,500

[1]Values may not total due to rounding.

Table 14. Synthesized monthly natural flows for Musselshell River near Lavina, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	4,600	4,400	15,200	19,000	45,500	50,500	4,600	3,100	5,300	4,200	5,700	4,500	167,000
1930	2,200	4,700	9,500	28,200	26,000	17,700	2,000	1,700	2,000	2,600	3,900	2,700	103,000
1931	2,300	2,700	4,600	5,400	7,300	12,000	1,900	1,100	1,800	3,100	3,300	2,800	48,300
1932	1,800	1,400	3,800	7,100	29,000	54,000	2,800	1,700	1,500	3,100	3,900	3,400	114,000
1933	2,500	2,600	4,500	16,300	64,600	58,600	2,900	2,800	2,900	3,200	3,500	4,300	169,000
1934	4,100	3,800	6,600	16,200	13,200	52,000	2,200	1,400	1,000	3,300	2,700	2,800	109,000
1935	3,100	1,400	3,800	7,600	10,400	13,400	6,000	1,200	960	2,800	2,400	2,200	55,300
1936	2,500	2,100	9,500	17,500	53,200	29,000	2,200	1,300	1,200	1,900	2,300	2,200	125,000
1937	1,400	3,000	3,800	16,600	31,900	26,100	3,400	1,200	1,100	4,900	1,900	1,900	97,200
1938	2,500	3,700	6,000	12,200	71,000	69,100	37,800	5,500	2,500	3,500	6,600	4,300	225,000
1939	3,900	2,400	15,000	16,900	35,700	28,400	5,600	1,500	1,700	3,100	3,000	2,700	120,000
1940	2,200	2,100	6,400	9,500	14,600	16,300	4,600	1,100	1,200	3,700	5,300	2,200	69,200
1941	2,500	2,800	5,000	6,300	18,800	40,400	5,400	2,200	6,400	12,400	9,300	9,100	121,000
1942	6,200	5,500	10,400	30,900	83,000	99,000	11,700	6,200	4,800	6,900	6,600	8,600	280,000
1943	6,200	10,500	16,900	58,500	75,000	120,000	19,500	8,000	4,500	6,200	6,800	8,100	340,000
1944	5,100	3,100	6,300	11,800	27,500	89,000	31,900	9,500	5,300	6,000	5,800	7,700	209,000
1945	6,600	4,500	7,600	5,500	20,800	56,300	8,300	2,700	2,700	4,000	5,700	3,600	128,000
1946	4,100	3,700	9,700	20,800	35,400	23,900	8,000	2,400	3,700	7,000	6,500	10,400	136,000
1947	5,000	6,200	18,800	31,800	78,800	61,200	9,300	4,000	5,200	8,500	7,300	8,100	244,000
1948	7,300	4,600	8,300	28,800	93,600	132,000	35,500	10,100	5,000	6,100	6,500	5,200	343,000
1949	4,000	3,400	11,900	34,000	62,600	38,500	7,400	2,500	3,300	5,200	4,800	3,100	181,000
1950	2,600	7,500	7,000	17,300	55,800	91,200	22,400	8,800	5,500	7,800	6,800	6,300	239,000
1951	4,600	6,000	15,000	17,900	66,800	46,800	13,000	6,700	7,000	7,700	6,800	5,300	204,000
1952	4,600	5,100	8,400	41,300	112,000	46,800	12,700	4,900	4,100	4,200	3,700	3,000	251,000
1953	3,700	3,300	6,100	8,900	28,500	119,000	11,100	4,100	1,900	2,100	3,400	3,800	196,000
1954	3,300	4,900	4,600	10,200	25,000	26,700	6,300	3,000	1,400	2,700	3,400	2,400	93,900
1955	2,300	1,700	2,600	13,900	18,500	35,600	13,100	3,200	1,700	2,400	3,400	4,300	103,000
1956	3,600	3,800	11,700	17,800	71,500	38,600	5,100	2,400	1,400	1,700	2,600	2,600	163,000
1957	2,000	2,100	4,400	8,100	62,300	72,300	16,700	4,900	4,100	5,400	4,700	4,100	191,000
1958	3,700	4,100	7,600	13,500	40,600	18,700	6,800	3,100	2,300	2,400	3,300	3,300	109,000
1959	3,500	2,700	16,900	13,000	39,800	91,600	12,800	3,400	3,300	6,200	5,700	4,100	203,000
1960	3,300	2,800	13,400	15,400	36,600	30,100	4,600	2,400	1,900	2,800	3,500	3,600	120,000
1961	2,900	2,800	3,300	3,900	13,000	12,500	1,800	730	1,100	1,900	2,400	2,100	48,400
1962	1,700	2,500	5,400	14,100	49,200	63,200	13,500	5,400	4,400	5,400	4,100	4,500	173,000
1963	2,500	6,400	6,700	8,800	49,900	55,500	10,400	2,500	2,900	3,800	3,700	2,900	156,000
1964	3,100	2,900	3,100	8,800	50,500	88,200	15,300	3,700	2,800	3,400	3,200	4,600	190,000
1965	4,800	5,500	5,400	27,000	58,700	82,400	20,200	7,300	15,500	14,600	8,400	6,200	256,000
1966	4,300	3,800	13,400	18,700	60,200	24,100	7,500	2,400	2,000	3,100	3,600	3,200	146,000
1967	3,100	3,100	6,500	14,700	74,800	250,000	27,300	6,800	5,000	7,000	6,600	4,600	410,000
1968	5,100	8,500	11,000	13,400	42,900	81,300	19,900	8,000	6,500	7,600	6,600	5,100	216,000
1969	4,600	4,700	17,500	35,400	32,800	25,500	16,300	4,500	3,400	5,500	5,000	3,400	159,000
1970	3,200	4,400	5,900	12,500	113,000	103,000	16,000	5,800	5,200	7,000	4,800	4,600	285,000
1971	5,400	10,700	10,900	23,300	64,100	49,200	11,500	3,300	4,100	7,900	5,800	3,900	200,000
1972	3,900	9,100	23,600	18,200	53,700	54,600	10,500	7,800	5,400	8,200	6,200	3,100	204,000
1973	3,400	3,500	5,900	9,900	11,400	16,200	3,900	3,700	3,800	5,500	6,700	5,000	78,900
1974	7,900	4,900	11,000	23,600	51,600	88,600	14,900	9,100	7,900	6,100	7,200	5,100	238,000
1975	3,500	3,800	7,200	22,100	100,000	237,000	65,300	15,900	9,700	11,600	12,000	11,600	500,000
1976	7,800	7,200	12,800	26,200	150,000	64,000	17,300	9,600	7,500	9,200	7,600	6,100	325,000
1977	5,200	6,100	6,300	15,700	31,800	21,200	6,100	3,900	3,700	5,300	5,100	4,800	115,000
1978	4,100	4,400	38,300	36,100	123,000	96,000	37,300	8,400	10,100	9,600	7,700	6,900	382,000
1979	3,500	5,300	39,400	21,300	97,700	127,000	23,700	8,000	5,000	6,200	5,000	5,200	347,000
1980	4,100	5,600	8,300	19,900	58,400	99,400	18,700	9,800	7,700	7,800	7,200	6,400	253,000

Table 14. Synthesized monthly natural flows for Musselshell River near Lavina, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	4,900	5,700	9,700	19,600	111,000	89,300	16,700	9,700	5,700	6,800	6,600	6,400	292,000
1982	4,900	7,300	13,800	24,700	68,400	127,000	40,600	9,200	9,400	11,300	9,000	7,500	333,000
1983	8,500	6,700	11,600	33,200	45,100	38,000	19,500	9,500	8,900	8,600	6,300	4,900	201,000
1984	9,300	6,200	9,400	16,400	41,100	52,800	11,200	9,700	6,300	7,900	6,500	4,200	181,000
1985	3,700	3,200	6,200	15,200	18,600	10,300	1,700	4,100	7,600	8,900	9,000	5,500	94,000
1986	4,400	7,600	18,000	12,400	39,800	49,600	12,200	6,000	10,800	8,400	7,500	5,900	183,000
1987	3,400	3,700	7,100	8,400	22,700	14,700	8,100	5,200	5,500	6,600	5,000	4,200	94,600
1988	2,200	2,800	4,900	7,000	18,000	14,100	2,400	2,500	2,800	3,600	4,200	3,600	68,100
1989	2,100	1,400	11,500	10,700	28,200	20,200	6,200	3,100	6,500	6,600	10,600	6,400	114,000

[1]Values may not total due to rounding.

Table 15. Synthesized monthly natural flows for Musselshell River below Painted Robe Creek, near Lavina, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	4,700	4,700	17,000	19,900	46,300	51,200	4,800	3,300	5,400	4,300	5,800	4,500	172,000
1930	2,200	5,100	10,700	29,500	26,400	18,000	2,100	1,700	2,100	2,800	4,100	2,800	108,000
1931	2,300	3,000	5,200	5,800	7,600	12,200	2,100	1,100	1,900	3,100	3,400	2,900	50,600
1932	1,900	1,600	4,300	7,300	29,600	54,700	3,100	1,800	1,500	3,300	4,100	3,500	117,000
1933	2,500	2,900	5,000	16,700	65,200	59,400	3,400	2,900	2,900	3,300	3,500	4,300	172,000
1934	4,200	4,200	7,300	16,800	13,500	53,500	2,300	1,400	1,100	3,300	2,800	2,900	113,000
1935	3,100	1,600	4,300	7,900	10,700	13,600	6,600	1,200	990	2,900	2,500	2,200	57,600
1936	2,500	2,400	10,800	18,200	54,000	29,400	2,400	1,300	1,300	2,000	2,300	2,300	129,000
1937	1,400	3,200	4,400	16,900	32,300	27,300	3,900	1,300	1,200	4,900	1,900	1,900	101,000
1938	2,500	4,000	7,000	12,600	72,000	71,200	39,500	5,800	2,800	3,700	6,700	4,500	232,000
1939	4,000	2,700	16,400	17,600	36,300	29,300	6,000	1,600	1,800	3,300	3,000	2,700	125,000
1940	2,200	2,300	7,100	9,800	14,800	16,500	4,700	1,200	1,300	3,800	5,300	2,300	71,300
1941	2,500	3,100	5,600	6,500	18,900	41,200	5,600	2,200	6,500	12,600	9,300	9,400	123,000
1942	6,200	5,900	11,500	31,800	85,000	102,000	12,600	6,700	4,900	7,100	6,900	8,900	290,000
1943	6,300	11,000	19,200	60,000	76,700	123,000	20,400	8,300	4,700	6,500	7,000	8,400	352,000
1944	5,200	3,300	7,200	12,200	28,000	91,900	33,400	10,000	5,400	6,100	5,900	8,100	217,000
1945	6,700	4,800	8,700	5,800	21,100	57,700	8,800	2,800	2,900	4,100	5,800	3,700	133,000
1946	4,200	4,000	11,100	21,400	36,000	24,500	8,500	2,600	3,800	7,200	6,600	10,700	141,000
1947	5,200	7,000	22,600	33,000	80,000	62,300	9,700	4,200	5,400	8,700	7,500	8,700	254,000
1948	7,500	5,000	9,300	29,800	95,100	133,000	36,300	10,300	5,100	6,400	6,800	5,600	350,000
1949	4,100	3,700	12,400	35,200	63,600	39,500	7,800	2,600	3,400	5,400	5,000	3,200	186,000
1950	2,700	9,100	8,500	17,900	56,500	92,300	23,000	9,000	5,600	8,000	6,900	6,500	246,000
1951	4,700	6,700	17,300	18,400	67,800	47,700	13,300	6,900	7,100	7,900	7,000	5,500	210,000
1952	4,600	5,700	9,500	42,800	113,000	47,600	13,100	5,100	4,200	4,300	3,800	3,100	257,000
1953	3,800	3,600	6,800	9,100	29,000	120,000	11,600	4,200	1,900	2,200	3,500	3,900	200,000
1954	3,500	5,300	5,100	10,500	25,400	27,000	6,800	3,300	1,400	2,800	3,500	2,400	97,000
1955	2,500	1,900	2,800	14,500	19,000	36,200	13,700	3,400	1,800	2,400	3,500	4,400	106,000
1956	3,800	4,200	13,300	18,400	72,400	39,300	5,400	2,600	1,400	1,700	2,600	2,600	168,000
1957	2,100	2,400	5,000	8,400	63,200	73,300	17,100	5,200	4,300	5,600	5,000	4,400	196,000
1958	3,900	4,600	8,600	13,900	41,100	19,200	7,100	3,200	2,400	2,500	3,400	3,400	113,000
1959	3,600	3,000	19,100	13,600	40,900	93,100	13,800	3,600	3,500	6,300	5,800	4,200	211,000
1960	3,400	3,100	14,500	15,900	37,200	30,600	4,800	2,500	1,900	2,800	3,500	3,700	124,000
1961	3,000	3,100	3,900	4,100	13,200	12,700	1,900	780	1,100	2,000	2,400	2,200	50,400
1962	1,700	2,800	6,500	14,500	49,600	65,600	14,000	5,600	4,500	5,500	4,200	4,700	179,000
1963	2,600	7,000	7,400	9,100	50,600	56,100	10,700	2,600	3,000	3,900	3,800	2,900	160,000
1964	3,100	3,300	3,500	9,200	51,300	89,700	15,800	3,800	2,900	3,500	3,300	4,700	194,000
1965	4,900	6,000	6,100	28,100	59,700	83,500	20,900	7,500	15,700	14,800	8,600	6,400	262,000
1966	4,500	4,300	15,600	19,500	60,900	24,600	8,000	2,500	2,100	3,200	3,700	3,300	152,000
1967	3,200	3,400	7,000	15,200	76,600	269,000	29,800	7,700	5,600	7,700	7,100	5,000	437,000
1968	5,400	9,800	13,200	14,400	44,200	83,700	21,800	8,900	7,100	8,200	7,200	5,600	230,000
1969	4,900	5,300	21,400	36,900	33,600	27,000	17,100	4,900	3,700	5,900	5,400	3,600	170,000
1970	3,300	5,000	6,900	13,200	117,000	106,000	16,900	6,300	5,800	7,600	5,300	5,100	298,000
1971	5,900	11,800	12,300	24,400	65,200	50,000	11,800	3,500	4,300	8,100	6,200	4,100	208,000
1972	4,100	10,400	26,300	19,100	54,700	55,500	11,200	8,300	5,600	8,700	6,700	3,200	214,000
1973	3,600	3,900	6,700	10,500	11,900	16,500	4,200	3,800	4,000	5,600	6,900	5,200	82,800
1974	8,000	5,300	12,100	24,100	52,300	90,100	15,400	9,700	8,800	6,300	7,700	5,300	245,000
1975	3,600	4,200	8,200	23,500	104,000	242,000	68,600	17,000	10,800	11,900	13,400	12,300	520,000
1976	8,100	7,900	14,800	27,100	154,000	65,900	18,100	10,100	7,700	9,300	7,900	6,600	338,000
1977	5,300	6,700	7,300	16,400	32,300	21,600	6,200	4,100	3,900	5,500	5,300	5,000	120,000
1978	4,200	4,900	39,800	38,000	126,000	98,700	39,100	9,000	11,100	10,100	8,000	7,400	396,000
1979	3,600	5,800	42,200	22,300	100,000	130,000	24,900	8,600	5,400	6,400	5,300	5,300	360,000
1980	4,300	6,200	9,600	20,900	59,100	101,000	19,600	10,200	8,100	8,000	7,300	6,700	261,000

Table 15. Synthesized monthly natural flows for Musselshell River below Painted Robe Creek, near Lavina, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	5,100	6,300	10,800	20,200	114,000	91,600	17,900	10,200	6,000	7,000	6,800	6,700	303,000
1982	5,200	8,100	15,500	25,600	69,700	130,000	42,200	9,600	9,800	11,700	9,300	7,800	345,000
1983	8,800	7,600	12,800	33,800	46,100	38,800	20,300	10,000	9,200	8,900	6,400	5,000	208 000
1984	9,500	6,900	10,300	16,900	41,900	53,800	11,700	9,900	6,500	8,100	6,700	4,300	187,000
1985	3,900	3,800	7,000	15,900	19,100	10,600	1,800	4,100	8,000	9,100	9,300	5,600	98 200
1986	4,500	8,400	19,400	12,900	40,500	50,500	12,700	6,300	13,000	8,500	7,700	6,000	190,000
1987	3,600	4,100	7,900	8,800	23,000	15,000	8,700	5,300	5,700	6,900	5,100	4,300	98,400
1988	2,200	3,100	5,400	7,200	18,300	14,400	2,500	2,500	3,000	3,700	4,200	3,600	70,100
1989	2,100	1,700	12,600	11,400	28,800	20,500	6,500	3,300	6,800	6,700	10,700	6,500	118,000

[1]Values may not total due to rounding.

Table 16. Synthesized monthly natural flows for Musselshell River near Roundup, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	4,900	5,100	18,300	20,600	47,500	52,200	5,100	3,500	5,500	4,500	6,000	4,700	178,000
1930	2,300	5,400	11,500	31,300	27,200	18,500	2,300	1,900	2,200	2,900	4,300	2,900	113,000
1931	2,400	3,200	5,900	6,300	7,900	12,600	2,300	1,200	2,000	3,200	3,600	2,900	53,500
1932	2,000	1,800	4,700	7,600	30,500	55,500	3,500	1,900	1,700	3,400	4,300	3,700	121,000
1933	2,600	3,100	5,500	17,200	66,200	60,400	3,800	3,000	3,000	3,400	3,700	4,500	176,000
1934	4,300	4,600	7,900	18,000	14,100	54,700	2,500	1,500	1,200	3,400	3,000	3,000	118,000
1935	3,200	1,700	4,900	8,400	11,200	13,900	6,900	1,300	1,100	2,900	2,600	2,300	60,400
1936	2,500	2,600	12,000	18,800	55,000	29,800	2,600	1,400	1,400	2,100	2,400	2,400	133,000
1937	1,500	3,500	5,000	17,300	33,100	27,800	4,200	1,300	1,300	5,000	2,000	2,000	104,000
1938	2,600	4,300	7,800	13,200	73,100	72,300	40,100	6,100	2,900	3,800	7,000	4,700	238,000
1939	4,200	3,000	17,500	18,700	37,300	29,800	6,300	1,600	2,000	3,400	3,200	2,900	130,000
1940	2,300	2,600	7,700	10,400	15,500	16,900	4,900	1,200	1,500	3,900	5,400	2,400	74,700
1941	2,600	3,300	6,200	6,800	19,100	41,800	5,900	2,300	6,800	12,800	9,600	9,600	127,000
1942	6,400	6,300	12,200	33,000	86,300	104,000	13,200	7,100	5,200	7,400	7,200	9,200	298,000
1943	6,500	11,400	21,100	61,600	78,000	125,000	21,000	8,700	4,900	6,700	7,300	8,600	361,000
1944	5,400	3,600	7,800	12,600	28,600	93,100	34,100	10,400	5,600	6,300	6,200	8,300	222,000
1945	6,900	5,100	9,500	6,100	21,500	58,900	9,200	3,000	3,100	4,200	6,000	3,900	137,000
1946	4,400	4,200	12,400	22,200	37,000	25,400	9,200	2,900	4,200	7,500	6,900	11,000	147,000
1947	5,400	7,500	25,500	34,400	81,900	63,700	10,300	4,600	5,700	9,000	7,800	9,100	265,000
1948	7,900	5,400	10,200	31,400	97,200	136,000	37,100	10,800	5,400	6,700	7,100	5,800	361,000
1949	4,400	4,100	12,900	36,500	65,200	40,800	8,200	3,000	3,700	5,700	5,300	3,400	193,000
1950	2,800	10,000	9,600	19,000	57,700	93,800	23,600	9,400	5,900	8,300	7,200	6,700	254,000
1951	4,900	7,200	18,600	19,200	69,300	48,800	13,700	7,100	7,400	8,100	7,300	5,700	217,000
1952	4,800	6,100	10,200	44,300	115,000	48,600	13,500	5,400	4,500	4,500	4,100	3,300	264,000
1953	4,000	4,000	7,600	9,500	29,600	122,000	12,100	4,500	2,200	2,400	3,700	4,100	206,000
1954	3,700	5,700	5,600	11,100	25,800	27,500	7,100	3,600	1,600	3,000	3,700	2,600	101,000
1955	2,700	2,100	3,100	15,000	19,500	37,000	14,100	3,600	1,900	2,600	3,700	4,600	110,000
1956	4,000	4,500	14,300	19,300	73,500	39,900	5,600	2,700	1,600	1,900	2,900	2,800	173,000
1957	2,300	2,800	5,700	9,000	64,400	74,400	17,600	5,600	4,600	5,900	5,300	4,600	202,000
1958	4,100	5,000	9,600	14,800	42,100	19,900	7,500	3,500	2,600	2,700	3,700	3,600	119,000
1959	3,800	3,300	20,200	14,300	41,800	94,500	14,400	3,900	3,700	6,600	6,100	4,400	217,000
1960	3,600	3,500	15,500	16,700	38,200	31,400	5,000	2,600	2,100	3,000	3,800	3,900	129,000
1961	3,200	3,500	4,400	4,400	13,600	13,100	2,100	880	1,300	2,100	2,600	2,300	53,500
1962	1,900	3,200	7,300	15,100	50,500	66,800	14,400	5,800	4,800	5,600	4,500	4,900	185,000
1963	2,700	7,500	8,100	9,600	51,400	56,900	11,100	2,800	3,200	4,100	4,000	3,100	165,000
1964	3,300	3,700	4,000	9,800	52,800	91,300	16,400	4,100	3,100	3,700	3,600	4,900	201,000
1965	5,100	6,500	6,700	29,500	61,400	85,200	21,600	7,800	16,200	15,200	9,000	6,700	271,000
1966	4,700	4,800	17,300	20,200	61,900	25,100	8,300	2,700	2,300	3,400	3,900	3,500	158,000
1967	3,400	3,800	7,600	15,900	78,600	273,000	30,700	8,200	6,000	8,100	7,500	5,300	448,000
1968	5,800	10,600	15,000	15,200	45,500	85,300	22,600	9,300	7,600	8,600	7,600	5,900	239,000
1969	5,200	5,800	23,100	38,700	34,600	27,500	17,500	5,100	3,900	6,100	5,600	3,800	177,000
1970	3,500	5,400	7,700	14,300	120,000	107,000	17,400	6,500	6,100	8,000	5,600	5,300	307,000
1971	6,200	12,300	13,100	25,500	66,700	51,000	12,200	3,600	4,500	8,400	6,400	4,200	214,000
1972	4,300	11,000	28,200	19,900	55,900	56,700	11,700	8,600	6,000	9,100	7,000	3,400	222,000
1973	3,800	4,300	7,400	10,900	12,300	16,800	4,400	3,900	4,200	5,800	7,200	5,400	86,400
1974	8,200	5,700	13,200	24,900	53,400	91,300	15,800	9,900	9,200	6,400	8,100	5,500	252,000
1975	3,900	4,600	8,900	24,200	106,000	245,000	70,200	17,600	11,300	12,200	14,000	12,700	531,000
1976	8,400	8,500	16,100	28,200	156,000	66,900	18,500	10,400	8,000	9,400	8,200	6,900	346,000
1977	5,500	7,200	8,300	17,500	32,800	21,900	6,400	4,200	4,100	5,700	5,600	5,200	124,000
1978	4,400	5,400	41,200	39,900	128,000	100,000	40,000	9,400	11,600	10,500	8,300	7,700	406,000
1979	3,900	6,300	43,800	23,500	102,000	132,000	25,700	9,100	5,800	6,700	5,600	5,500	370,000
1980	4,500	6,600	10,500	22,500	60,000	103,000	20,500	10,700	8,600	8,200	7,700	6,900	270,000

Table 16. Synthesized monthly natural flows for Musselshell River near Roundup, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	5,300	6,800	12,000	21,400	116,000	93,200	19,000	10,700	6,500	7,200	7,100	6,900	312,000
1982	5,400	8,700	16,800	26,300	70,900	132,000	43,200	9,800	10,300	12,000	9,600	8,100	353,000
1983	9,100	8,100	14,000	34,400	47,200	39,500	21,000	10,300	9,600	9,100	6,700	5,100	214,000
1984	9,800	7,400	11,100	17,800	43,000	54,600	12,000	10,000	6,800	8,300	6,900	4,400	192,000
1985	4,100	4,200	7,700	17,300	19,800	10,800	1,900	4,200	8,200	9,300	9,500	5,700	103,000
1986	4,700	8,900	20,800	13,700	41,500	51,500	13,200	6,500	13,600	8,700	7,900	6,200	197,000
1987	3,800	4,400	8,700	9,500	23,600	15,400	9,000	5,400	6,000	7,000	5,300	4,400	103,000
1988	2,300	3,400	6,000	7,800	18,800	14,800	2,600	2,500	3,100	3,800	4,400	3,700	73,200
1989	2,200	2,000	13,600	12,400	29,700	21,000	6,700	3,400	7,000	6,900	11,000	6,700	123,000

[1]Values may not total due to rounding.

Table 17. Synthesized monthly natural flows for Musselshell River at Musselshell, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	5,000	5,600	20,100	21,800	47,900	52,600	5,100	3,500	5,600	4,500	6,000	4,800	183,000
1930	2,300	5,500	12,600	32,100	27,400	18,600	2,300	1,900	2,200	2,900	4,300	3,000	115,000
1931	2,400	3,400	6,000	6,500	8,000	12,600	2,300	1,200	2,000	3,200	3,600	3,000	54,200
1932	2,000	1,900	4,800	7,700	30,600	56,200	3,600	2,000	1,700	3,400	4,300	3,700	122,000
1933	2,600	3,100	5,600	17,400	66,400	60,500	4,000	3,000	3,000	3,400	3,700	4,500	177,000
1934	4,300	4,900	8,200	18,100	14,100	55,400	2,500	1,500	1,200	3,400	3,000	3,000	120,000
1935	3,200	1,700	5,000	8,500	11,200	13,900	7,300	1,300	1,100	2,900	2,600	2,300	61,000
1936	2,600	2,600	13,400	19,500	55,500	29,900	2,600	1,400	1,400	2,100	2,400	2,400	136,000
1937	1,500	3,500	5,300	17,600	33,200	28,400	4,500	1,300	1,300	5,100	2,000	2,000	106,000
1938	2,600	4,500	8,300	13,400	73,700	73,400	41,600	6,200	3,000	3,800	7,100	4,700	242,000
1939	4,200	3,000	19,000	19,100	37,600	30,400	6,400	1,600	2,000	3,400	3,200	2,900	133,000
1940	2,300	2,600	8,100	10,500	15,500	16,900	4,900	1,200	1,500	4,000	5,500	2,400	75,400
1941	2,600	3,500	6,300	6,900	19,200	42,200	6,000	2,300	6,900	12,900	9,600	9,800	128,000
1942	6,500	6,800	13,700	34,100	89,200	107,000	14,000	7,400	5,200	7,600	7,400	9,400	308,000
1943	6,600	12,200	23,500	63,100	79,400	128,000	21,800	9,000	4,900	6,900	7,500	8,900	372,000
1944	5,500	3,700	8,900	13,200	28,800	95,600	35,500	11,000	5,700	6,400	6,400	8,600	229,000
1945	7,000	5,400	10,700	6,400	21,600	59,600	9,400	3,100	3,100	4,200	6,100	4,000	141,000
1946	4,400	4,500	13,100	22,600	37,200	25,500	9,200	2,900	4,200	7,600	7,000	11,200	149,000
1947	5,600	8,100	28,000	35,800	82,400	64,000	10,500	4,700	5,800	9,100	8,000	9,600	272,000
1948	9,100	5,600	11,600	32,000	97,900	136,000	37,400	10,800	5,500	6,700	7,300	6,100	366,000
1949	4,500	4,100	13,100	37,600	66,300	41,100	8,300	3,000	3,700	5,700	5,400	3,400	196,000
1950	2,900	11,600	10,500	19,500	58,200	94,400	23,700	9,400	5,900	8,300	7,300	6,800	259,000
1951	5,100	7,800	20,700	19,600	70,400	49,200	13,800	7,200	7,500	8,100	7,300	5,700	222,000
1952	4,900	6,800	11,200	45,600	116,000	48,800	13,600	5,400	4,500	4,500	4,100	3,300	269,000
1953	4,000	4,100	7,900	9,600	29,900	123,000	12,200	4,500	2,200	2,400	3,700	4,100	208,000
1954	3,700	6,100	5,800	11,300	26,000	27,500	7,500	3,700	1,600	3,100	3,700	2,600	103,000
1955	2,700	2,100	3,200	16,000	19,900	37,200	14,400	3,700	1,900	2,600	3,700	4,600	112,000
1956	4,000	4,800	15,800	19,600	73,900	40,100	5,700	2,800	1,600	1,900	2,900	2,800	176,000
1957	2,300	2,800	6,000	9,200	64,800	74,700	17,700	5,600	4,600	6,000	5,400	4,800	204,000
1958	4,200	5,300	10,000	15,000	42,200	20,000	7,600	3,500	2,600	2,700	3,700	3,600	120,000
1959	3,800	3,300	23,000	14,600	42,400	95,000	15,000	3,900	3,800	6,700	6,200	4,400	222,000
1960	3,700	3,600	16,300	17,000	38,400	31,500	5,100	2,600	2,100	3,000	3,800	3,900	131,000
1961	3,200	3,600	4,500	4,500	13,600	13,100	2,100	900	1,300	2,100	2,700	2,300	53,900
1962	1,900	3,200	8,100	15,200	50,800	68,100	14,600	5,900	4,900	5,700	4,600	5,000	188,000
1963	2,700	8,000	8,400	9,800	51,800	57,000	11,100	2,800	3,300	4,100	4,100	3,100	166,000
1964	3,400	3,800	4,100	10,000	53,100	91,700	16,600	4,200	3,200	3,800	3,700	4,900	203,000
1965	5,200	6,800	7,200	30,300	61,800	85,400	21,700	7,800	16,500	15,300	9,100	6,700	274,000
1966	4,700	5,000	18,800	20,800	62,200	25,200	8,600	2,700	2,300	3,400	3,900	3,500	161,000
1967	3,400	3,900	7,800	16,100	79,800	284,000	32,700	8,400	6,200	8,300	7,700	5,400	464,000
1968	5,900	11,800	15,900	16,000	46,600	86,500	24,000	9,500	7,800	8,800	7,700	6,000	247,000
1969	5,300	6,300	27,400	39,700	35,600	28,400	18,200	5,200	4,000	6,200	5,700	3,800	186,000
1970	3,500	5,800	8,400	14,600	124,000	109,000	18,100	6,700	6,400	8,100	5,800	5,500	316,000
1971	6,300	13,900	14,200	26,300	67,100	51,500	12,300	3,700	4,700	8,400	6,500	4,300	219,000
1972	4,300	13,000	30,000	20,500	57,000	57,300	12,000	8,700	6,100	9,300	7,200	3,400	229,000
1973	3,800	4,400	7,900	11,400	12,700	16,900	4,600	4,000	4,300	5,800	7,300	5,500	88,600
1974	8,300	6,300	13,800	25,200	53,900	91,800	16,100	10,200	9,500	6,500	8,300	5,600	256,000
1975	4,000	4,800	9,600	25,800	109,000	248,000	74,400	18,000	11,700	12,400	14,500	13,100	545,000
1976	8,500	8,900	17,800	28,700	159,000	67,800	19,100	10,700	8,200	9,500	8,400	7,200	354,000
1977	5,600	7,800	8,700	17,800	33,100	22,000	6,500	4,300	4,200	5,800	5,600	5,300	127,000
1978	4,500	5,600	42,800	41,200	131,000	102,000	41,800	9,600	12,000	10,700	8,500	7,900	418,000
1979	4,000	6,700	46,500	24,200	104,000	133,000	26,300	9,300	5,900	6,800	5,700	5,600	378,000
1980	4,500	7,200	11,600	23,000	60,600	104,000	20,800	11,000	8,700	8,400	7,800	7,100	275,000

Table 17. Synthesized monthly natural flows for Musselshell River at Musselshell, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	5,500	7,300	12,500	21,700	121,000	95,100	19,500	11,000	6,500	7,300	7,200	7,000	322,000
1982	5,500	9,500	18,200	27,100	71,700	134,000	44,200	9,900	10,500	12,200	9,800	8,200	361,000
1983	9,100	9,000	14,600	34,700	47,800	39,700	21,400	10,400	9,800	9,200	6,800	5,200	218,000
1984	9,800	8,000	11,600	18,000	43,300	55,000	12,200	10,100	7,000	8,400	7,000	4,400	195,000
1985	4,100	4,600	8,000	17,500	19,900	10,900	1,900	4,200	8,400	9,400	9,600	5,800	104,000
1986	4,800	10,000	21,600	14,000	42,000	51,800	13,500	6,600	14,300	8,800	8,000	6,400	202,000
1987	3,900	4,600	9,000	9,900	23,800	15,500	9,300	5,500	6,200	7,200	5,400	4,500	105,000
1988	2,300	3,400	6,200	7,900	18,900	14,800	2,600	2,500	3,200	3,800	4,400	3,700	73,700
1989	2,200	2,000	13,900	12,900	30,100	21,100	6,900	3,500	7,100	6,900	11,000	6,700	124,000

[1] Values may not total due to rounding.

Table 18. Synthesized monthly natural flows for Flatwillow Creek at mouth, near Mosby, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	1,000	4,700	5,100	6,900	8,800	10,900	470	500	1,500	1,100	830	1,100	42,900
1930	610	1,800	3,500	5,700	6,400	290	49	380	260	1,000	740	560	21,300
1931	490	580	730	660	410	200	270	410	340	950	900	280	6,200
1932	310	580	1,000	1,500	1,300	47,700	2,600	1,500	260	740	890	360	58,700
1933	580	470	5,300	1,800	5,700	5,400	460	630	760	760	750	720	23,300
1934	730	1,200	1,400	4,600	2,300	15,900	770	150	200	480	460	420	28,600
1935	380	470	700	1,900	6,200	3,000	2,100	810	200	260	670	730	17,400
1936	670	520	10,400	2,300	2,500	1,900	220	210	290	370	460	490	20,300
1937	420	450	1,100	1,100	3,400	15,300	3,900	230	210	490	320	430	27,400
1938	440	540	9,500	2,000	8,200	7,500	17,900	870	1,200	950	1,500	1,100	51,700
1939	1,100	610	13,800	3,800	4,600	25,800	2,900	300	300	410	460	540	54,600
1940	570	650	1,100	2,100	3,300	2,700	540	200	300	360	370	470	12,700
1941	520	520	520	1,300	2,800	8,000	1,600	400	1,500	1,600	1,400	1,700	21,900
1942	1,200	1,500	4,300	7,400	20,000	25,200	18,800	1,300	910	930	1,200	1,500	84,200
1943	1,500	5,100	9,900	8,000	9,500	30,500	27,000	1,500	720	1,100	1,700	1,400	97,900
1944	1,100	1,100	14,400	3,200	10,200	33,500	39,400	3,000	1,700	1,300	1,400	1,500	112,000
1945	1,700	1,600	3,300	1,900	5,600	9,100	2,500	410	610	770	1,200	1,200	29,900
1946	1,300	2,000	2,000	2,400	3,700	2,300	1,300	250	660	2,000	2,400	2,300	22,600
1947	2,000	1,600	14,600	7,500	8,400	8,500	5,400	1,500	760	1,200	1,900	2,300	55,700
1948	6,700	2,300	5,100	4,400	9,700	12,900	7,100	1,300	710	1,300	1,900	1,800	55,200
1949	1,200	990	13,300	5,200	11,300	5,700	1,600	220	710	900	980	800	42,900
1950	830	1,400	2,300	3,400	9,900	15,100	3,700	1,200	920	1,600	1,600	1,600	43,600
1951	2,000	6,400	5,700	3,900	14,300	9,600	3,900	1,300	1,600	1,700	1,400	1,400	53,200
1952	1,400	1,600	15,600	6,000	14,300	3,900	1,800	370	210	610	930	720	47,400
1953	1,000	890	1,100	2,300	6,400	19,300	3,300	530	400	380	650	820	37,100
1954	790	1,700	1,100	1,700	3,000	3,800	1,200	650	160	200	370	360	15,000
1955	230	230	4,300	3,400	5,300	4,200	2,100	870	170	280	1,400	1,300	23,800
1956	650	580	7,000	3,300	15,400	16,900	1,500	660	240	330	1,500	850	48,900
1957	330	290	6,500	1,600	2,900	1,200	1,900	870	1,600	710	920	2,600	21,400
1958	1,200	1,800	2,800	2,500	6,800	9,400	4,000	1,100	480	2,100	730	2,900	35,800
1959	1,100	1,000	14,400	1,600	180	3,000	2,100	420	220	1,100	3,500	1,600	30,200
1960	700	460	4,900	2,800	1,000	1,200	980	200	400	220	730	480	14,100
1961	290	260	330	65	280	120	350	470	280	86	370	140	3,000
1962	590	690	980	2,800	13,800	57,300	1,400	2,100	1,800	1,100	1,500	1,600	85,700
1963	200	7,200	2,600	1,200	3,600	1,200	2,200	580	1,500	610	2,400	830	24,100
1964	560	370	440	2,100	13,600	9,800	22,000	1,900	1,100	1,300	1,600	1,900	56,700
1965	360	3,800	4,300	9,500	13,000	8,800	8,500	1,000	5,300	3,300	1,500	1,800	61,200
1966	1,200	1,100	7,300	1,700	5,100	1,400	470	330	250	160	370	960	20,300
1967	1,900	2,500	2,500	1,200	5,500	17,900	15,600	1,400	1,500	330	690	650	51,700
1968	750	1,300	3,200	4,100	19,800	13,800	5,400	1,400	2,500	3,600	2,100	1,900	59,900
1969	1,200	2,200	17,200	24,900	14,700	4,500	38,900	1,600	740	2,700	3,400	2,600	115,000
1970	1,100	960	970	1,100	61,800	17,700	11,300	1,900	2,500	1,100	1,900	1,600	104,000
1971	1,900	16,000	10,700	11,000	7,600	9,400	11,900	1,300	2,300	1,800	1,300	1,200	76,400
1972	1,900	2,000	10,100	7,000	32,900	11,200	4,200	1,900	2,000	2,600	2,200	1,900	79,900
1973	500	1,200	830	2,900	1,600	2,400	1,000	220	1,100	310	1,100	1,300	14,500
1974	280	1,400	2,100	7,600	13,300	3,900	8,700	2,200	2,800	250	770	1,200	44,500
1975	1,800	1,800	2,900	3,300	12,600	46,900	53,000	5,500	3,400	4,500	7,500	6,200	149,000
1976	3,000	7,000	4,000	9,000	11,000	76,500	8,300	3,100	3,800	1,800	2,100	2,100	132,000
1977	1,600	1,500	860	560	1,800	880	340	310	180	570	1,100	380	10,100
1978	440	640	9,200	2,900	10,400	9,300	36,800	2,600	7,700	1,400	1,300	760	83,400
1979	680	880	5,600	6,400	29,500	9,300	1,500	720	540	570	690	540	56,900
1980	1,100	1,400	1,300	1,900	9,500	6,800	9,000	1,300	650	3,100	1,900	3,300	41,300

Table 18. Synthesized monthly natural flows for Flatwillow Creek at mouth, near Mosby, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	1,800	1,500	1,000	1,800	24,300	18,700	7,600	1,700	410	570	610	320	60,300
1982	600	1,400	2,500	2,700	18,900	12,200	6,600	2,000	2,700	2,300	2,100	1,400	55,400
1983	1,800	1,600	3,600	2,300	12,500	10,300	3,700	2,000	2,700	1,900	4,500	1,400	48,300
1984	2,400	2,300	5,200	4,200	17,500	3,700	1,100	2,700	8,300	3,600	2,100	1,600	54,700
1985	1,600	4,100	980	1,800	3,800	820	170	300	470	1,800	2,200	1,600	19,600
1986	1,500	8,000	5,600	590	9,800	13,600	2,200	870	860	1,900	1,500	1,600	48,000
1987	1,400	1,200	1,300	1,300	3,300	840	660	290	1,700	390	580	280	13,200
1988	380	350	470	400	1,000	300	170	4,500	150	110	180	200	8,200
1989	250	480	3,300	2,800	4,200	3,100	440	1,700	460	470	730	910	18,800

[1]Values may not total due to rounding.

Table 19. Synthesized monthly natural flows for Musselshell River at Mosby, Montana, in acre-feet

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1929	6,500	19,000	32,900	32,400	58,500	67,600	5,700	4,700	8,200	7,600	6,900	6,400	256,000
1930	2,900	7,800	19,200	39,700	35,500	18,900	2,400	3,300	2,600	22,000	5,200	3,600	163,000
1931	2,900	4,400	7,300	7,300	8,500	12,800	2,500	1,600	2,300	4,100	4,500	3,200	61,400
1932	2,300	2,800	6,000	9,300	32,300	125,000	6,800	6,700	2,000	5,000	5,500	4,200	208,000
1933	3,300	3,700	13,200	19,500	72,700	66,800	4,600	3,700	3,800	4,500	4,600	5,400	206,000
1934	5,100	6,800	9,800	23,500	16,500	77,800	3,300	1,600	1,400	3,900	3,500	3,400	157,000
1935	3,600	2,200	5,800	10,700	18,700	17,400	10,100	3,500	1,300	3,200	3,400	3,100	83,000
1936	3,200	3,200	35,000	22,600	58,100	31,900	2,800	1,600	1,700	2,400	2,900	2,900	168,000
1937	1,900	4,000	7,100	18,800	36,600	49,600	9,500	1,600	1,500	5,800	2,300	2,500	141,000
1938	3,100	5,300	21,400	15,600	82,700	82,100	64,200	7,100	5,200	4,900	8,900	6,000	307,000
1939	5,300	3,700	41,300	23,800	42,600	66,800	9,900	2,000	2,400	3,900	3,600	3,500	209,000
1940	2,900	3,300	10,200	12,800	18,900	19,800	5,500	1,500	1,800	4,400	5,800	2,900	89,800
1941	3,100	4,100	6,900	8,200	21,900	52,800	7,600	2,800	8,900	14,600	11,100	12,100	154,000
1942	7,900	9,400	22,700	46,100	118,000	147,000	38,000	10,300	6,500	9,600	9,100	11,500	436,000
1943	8,500	25,900	46,700	75,100	91,100	175,000	56,200	11,900	6,000	9,000	9,900	10,900	526,000
1944	6,900	5,800	33,300	18,800	41,800	146,000	85,500	17,400	8,600	8,400	8,200	10,900	392,000
1945	9,200	8,600	19,100	8,900	27,400	70,700	12,300	3,600	3,800	5,100	7,600	5,600	182,000
1946	5,900	8,800	17,300	25,600	41,200	28,100	10,700	3,300	4,900	10,000	9,900	14,200	180,000
1947	8,000	10,500	50,100	48,200	91,800	74,000	17,400	7,400	6,600	10,800	10,600	13,400	349,000
1948	18,800	9,400	25,000	38,000	109,000	153,000	45,600	12,300	6,400	8,200	9,800	8,500	444,000
1949	6,100	5,300	31,000	45,500	82,000	48,600	10,000	3,300	4,500	6,700	6,500	4,300	254,000
1950	3,900	14,200	13,700	24,600	70,000	114,000	28,000	10,900	7,000	10,300	9,400	8,800	315,000
1951	7,700	17,700	28,500	24,900	88,900	60,500	18,100	8,700	9,200	10,100	9,200	7,400	291,000
1952	6,400	9,800	32,900	53,800	136,000	54,100	15,600	6,000	4,700	5,400	5,200	4,200	334,000
1953	5,200	5,200	9,300	12,300	37,300	150,000	16,200	5,100	2,600	3,000	4,400	5,000	256,000
1954	4,700	9,000	7,500	13,400	29,100	31,700	8,900	5,500	1,900	3,400	4,100	3,000	122,000
1955	3,000	2,300	9,100	23,300	27,500	43,000	16,800	5,400	2,100	2,900	5,100	6,000	147,000
1956	4,800	5,600	28,300	23,600	89,900	57,300	7,400	3,700	1,900	2,500	4,600	3,700	233,000
1957	2,700	3,100	15,800	11,300	68,100	76,200	19,800	6,600	6,300	7,400	6,800	7,900	232,000
1958	5,600	7,300	14,200	18,400	49,200	29,400	11,900	4,700	3,100	5,200	4,700	6,500	160,000
1959	4,900	4,400	48,100	16,900	42,900	98,200	17,300	4,400	4,100	8,000	10,600	6,500	266,000
1960	4,500	4,100	25,500	20,800	39,700	32,700	6,200	2,900	2,500	3,300	4,600	4,400	151,000
1961	3,500	3,900	4,800	4,600	13,900	13,200	2,500	1,500	1,600	2,200	3,100	2,500	57,300
1962	2,500	4,500	10,000	18,100	69,200	141,000	16,400	11,300	7,500	7,300	6,500	6,800	301,000
1963	3,000	19,600	12,800	11,500	56,800	58,600	13,400	3,400	5,300	4,900	6,600	4,000	200,000
1964	4,000	4,200	4,600	12,300	71,600	106,000	39,400	7,800	4,300	5,400	5,500	7,000	272,000
1965	6,000	13,900	15,500	47,700	80,100	95,300	30,900	9,000	23,100	19,900	11,200	9,600	362,000
1966	6,400	6,200	32,200	23,400	67,700	26,700	9,200	3,000	2,500	3,600	4,500	4,600	190,000
1967	5,500	6,700	10,500	17,400	88,100	313,000	49,200	10,200	8,000	9,000	8,700	6,200	533,000
1968	6,900	13,600	19,700	20,500	68,400	107,000	30,100	11,300	11,000	13,200	10,300	8,100	320,000
1969	6,700	8,600	49,700	67,200	54,200	34,700	59,400	7,000	4,900	9,000	9,300	6,600	317,000
1970	4,700	7,000	9,800	16,200	203,000	132,000	29,600	9,000	9,900	9,600	7,900	7,700	446,000
1971	9,100	37,600	28,100	38,800	75,100	64,400	24,300	5,000	7,800	10,300	7,900	5,500	314,000
1972	6,400	15,500	43,200	28,900	93,900	73,800	16,400	10,800	8,300	12,700	9,900	5,400	325,000
1973	4,600	5,600	9,600	15,200	14,700	19,800	5,700	4,200	5,700	6,400	8,700	7,000	107,000
1974	8,800	9,600	19,000	33,100	68,400	96,100	25,600	13,200	13,000	6,800	9,500	7,200	310,000
1975	6,100	7,300	13,900	33,100	126,000	296,000	149,000	25,000	16,100	17,800	23,900	20,200	734,000
1976	11,900	19,100	23,500	39,300	172,000	146,000	27,700	14,700	13,200	11,900	10,900	9,900	500,000
1977	7,700	11,200	9,900	18,900	35,400	23,500	7,000	4,700	4,500	6,600	6,900	6,000	142,000
1978	5,300	7,400	66,300	46,100	146,000	113,000	86,400	12,900	27,000	12,900	10,500	9,300	543,000
1979	5,100	8,900	56,100	35,000	137,000	145,000	28,200	10,400	6,700	8,100	6,800	6,300	454,000
1980	5,800	10,000	14,500	26,700	72,100	115,000	30,700	13,100	9,700	11,900	10,300	10,900	331,000

Table 19. Synthesized monthly natural flows for Musselshell River at Mosby, Montana, in acre-feet (Continued)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL[1]
1981	8,000	10,300	15,500	25,100	158,000	124,000	28,400	13,800	7,100	8,500	8,300	7,400	414,000
1982	6,600	12,200	24,600	31,200	91,200	148,000	51,500	12,100	14,300	15,500	12,700	10,000	430,000
1983	11,600	11,100	18,900	37,300	60,800	50,200	25,800	12,500	13,600	11,900	11,900	6,700	272,000
1984	12,600	11,100	17,800	22,500	61,000	59,500	13,500	12,900	16,100	12,600	9,600	6,200	255,000
1985	5,900	9,700	10,100	19,600	23,800	11,700	2,100	4,600	9,100	11,500	12,000	7,400	128,000
1986	6,600	23,800	32,500	15,200	54,200	66,600	16,000	7,600	16,400	11,500	9,800	8,600	269,000
1987	5,600	6,600	12,200	12,100	28,300	16,700	10,200	5,900	8,700	8,200	6,200	4,800	126,000
1988	2,700	3,800	7,300	8,400	20,000	15,200	2,800	7,100	3,500	3,900	4,600	4,100	83,400
1989	2,500	2,700	18,200	17,100	35,800	24,900	7,400	5,300	7,800	7,600	12,100	8,000	149,000

[1]Values may not total due to rounding.

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