TENTH ANNUAL REPORT

YELLOWSTONE RIVER COMPACT COMMISSION

1961

YELLOWSTONE RIVER COMPACT COMMISSION

408 Federal Building

Helena, Montana

December 21, 1961

His Excellency Jack R. Gage
Governor of the State of Wyoming
Cheyenne, Wyoming

His Excellency Donald G. Nutter
Governor of the State of Montana
Helena, Montana

His Excellency William L. Guy
Governor of the State of North Dakota
Bismarck, North Dakota

Sirs:

Pursuant to Article III of the Yellowstone River Compact, the Commission created according to the terms of said Compact, makes the following tenth annual report on activities for the period ending September 30, 1961.

The tenth annual meeting of the Yellowstone River Compact Commission was held on November 21, 1961. The business of the meeting was conducted by a prearranged telephone conference call because of the convalescence of the Federal representative. The Federal and Montana representatives spoke at Helena, Montana. The Wyoming representative spoke from his office at Cheyenne, Wyoming.

The Commission made no attempt to determine the amount and extent of usage of the percentage allocations of water in the several states. The effort and cost of such determinations was not considered to be justified at the present level of water resource development. The State representatives felt that allocable uses in the upstream states did not exceed proper shares in spite of the low flows experienced. No questions of water use pertinent to the Compact were referred to the Commissioners prior to the annual meeting. A subsequent inquiry regarding the shortage of water in the Clarks Fork Yellowstone River in Montana may be based on inadequate knowledge of the terms of the Compact.

Stream flow was low for the second successive year and except for the Clarks Fork Yellowstone River, was much less than in 1960. Flows at the designated points of measurement ranged from 77 to 13 percent of the average of record. Using the relatively dry decade of 1931-40 as a comparative base, annual flows ranged from 90 to 16 percent. An upturn in flow in September was an encouraging feature. At the close of September, storage in the Bighorn River Basin in Wyoming was about 350,000 acre-feet greater than in 1960.

During the fiscal year ending June 30, 1961, the administrative expense of the Commission was $8,000 of which $4,000 was borne by the Federal

Government. Equal contributions of $2,000 by the State of Montana and Wyoming comprised the remainder. A like budget is in force in the fiscal year ending June 30, 1962.

Respectfully submitted

Earl Lloyd

Earl Lloyd
Commissioner for Wyoming

Fred E. Buck

Fred E. Buck
Commissioner for Montana

Frank Stermitz

Frank Stermitz
Federal Respresentative

Cost:

The work of the Commission has been financed through annual cooperative agreements between the States of Montana and Wyoming and the United States of America.

The expense of the Commission during the fiscal year ending June 30, 1961 is given:

	Total Cost	Borne by United States	Borne by Wyoming	Borne by Montana
Gaging Station Operation, maintenance and construction	$7,000			
Data assembly and administration	1,000			
Total	$8,000	$4,000	$2,000	$2,000

A budget in a like amount and the same proportionate shares is in force for the fiscal year ending June 30, 1962. It is expected that the installation of an auxiliary recording gage for the Bighorn River near Bighorn, Montana can be installed in the current fiscal year. It is needed for better definition of flow when backwater from the Yellowstone River extends for some distance up the Bighorn River. Material and equipment were purchased in the fiscal year ending June 30, 1961. Construction awaits definite location of the interstate highway in this vicinity.

A tentative budget of $8,000 was adopted for the fiscal year which will commence July 1, 1962. It is planned that some items for the improvement of discharge records for the Tongue and Powder Rivers may be undertaken.

Gaging Stations:

Discharge records were generally collected at the designated points of measurement. As this was not practical on the Clarks Fork Yellowstone River, supplementary data was obtained to permit reasonable transfer of data to the designated point. The records of discharge are presented in Appendix B.

The annual flows at the points of measurement were again among the lows of record. In all cases they were substantially less than average for the 1931-40 decade. That decade was considered to be a critically low-flow period at the time the Compact was negotiated. From the standpoint of irrigation, particularly where storage is not available, the distribution of flow was poor. Stream flow was relatively low from early April to mid-May. The period of mountain snow melt was brief and shortages were common in July and August. The upturn of flow in September was too late to be of much value. The bar graphs of Appendix B illustrate the magnitude of flow on an annual basis and provide comparison with previous years.

Diversions:

The Commissioners for Montana and Wyoming were in accord that allocable uses under the Compact did not reach the pro-rata share in either state in the water year. The Compact is intended to allocate only those water uses which have arisen since January 1, 1950. The Commission has kept informed of water right filings and permits since that effective date.

Storage:

In reservoirs completed after January 1, 1950:

Boysen Reservoir on the Wind River, operated by the Bureau of Reclamation, is the principal reservoir in this category, records of which are given in Apprendix C. There was a net gain of 191,000 acre-feet of storage in the water year.

The Bureau of Reclamation made closure of Anchor Dam on Owl Creek on November 21, 1960. The quantity stored and released thereafter was of minor consequence. Data on month-end contents are given in Apprendix C to provide continuity to record which may later be significant.

The Commission is aware of some small reservoirs which properly come within this category. Their aggregate effect is considered to be of insufficient importance to warrant collection of storage data that is not readily available.

In reservoirs existing on January 1, 1950:

Compact allocations are affected by storage in these reservoirs only as it is used for developments completed after January 1, 1950. The extent of that use is considered to be minor. The quantities in storage in principal reservoirs in this category are given in Appendix D as a matter of information.

RULES AND REGULATIONS FOR ADMINISTRATION OF THE YELLOWSTONE RIVER COMPACT

A compact, known as the Yellowstone River Compact between the States of Wyoming, Montana and North Dakota, having become effective on October 30, 1951 upon approval of the Congress of the United States, which apportions the waters of certain interstate tributaries of the Yellowstone River which are available after the appropriative rights existing in the States of Wyoming and Montana on January 1, 1950 are supplied, and after appropriative rights to the use of necessary supplemental water are also supplied as specified in the Compact, the following rules and regulations are adopted subject to the provisions for amendment, revision or abrogation as provided herein.

Article I. Collection of Water Records.

A. It shall be the joint and equal responsibility of the members of the states of Wyoming and Montana to collect, cause to be collected or otherwise furnish records of tributary stream flow at the points of measurement specified in Article V (B) of the Compact, or as near thereto as is physically or economically feasible or justified.

1. Clarks Fork

The gaging station known as Clarks Fork at Edgar, Montana and which is located in SW¼ sec.24, T. 4 S., R. 24 E., shall temporarily be the point of measurement for the Clarks Fork, subject to whatever mutually agreeable corrections to the stream-flow records at this point as may be deemed practical to meet the terms of the Compact.

2. Bighorn River (exclusive of Little Bighorn River)

The gaging station known as the Bighorn River near Custer, Montana and located near the center of sec.10, T.4 N., R.34 E., shall temporarily be the designated point of measurement on that stream. The flow of the Little Bighorn River as measured at the gaging station near Hardin, Montana and located in S½, SE¼ sec.18, T.1 S., R.34 E., shall be considered the point of measurement for that stream, except that if or when satisfactory records are not available, the records for the nearest upstream station with practical corrections for intervening inflow or diversion shall be used.

3. Tongue River

The gaging station known as the Tongue River at Miles City, Montana and located in SE¼ sec.23, T.7 N., R.47 E., shall temporarily be the point of measurement for that stream.

4. Powder River

The gaging station known as the Powder River near Locate, Montana and located in NE¼ sec.26, T.8 N., R.51 E., shall temporarily be the designated point of measurement for that stream.

B. Records of total annual diversion in acre-feet above the points of measurement designated in the Compact for irrigation, municipal and industrial uses developed after January 1, 1950 shall be furnished by the members of the Commission for their respective states, at such time as the Commission deems necessary for interstate administration as provided by the terms of the Compact. Providing that if it be acceptable to the Commission, reasonable estimates thereof may be substituted.

C. Annual records of the net change in storage in all reservoirs, not excluded under Article V (E) of the Compact, above the specified point of measurement specified in the Compact and completed after January 1, 1950, and the annual net change in reservoirs existing prior to January 1, 1950, which is used for irrigation, municipal and industrial purposes developed after January 1, 1950, shall be the primary responsibility of the member of the Commission in whose state such works are located; providing, such data is not furnished by federal agencies under the provisions of Article III (D) of the Compact, or, collected by the Commission.

Article II. Office and Officers.

A. The office of the Commission shall be located, and be that of the United States Geological Survey in Helena, Montana.

B. The Chairman of the Commission shall be the federal representative as provided in the Compact.

C. The Secretary of the Commission shall be as provided for in Article III of these rules.

D. The credentials of each member of the Commission shall be placed on file in the office of the Commission.

Article III. Secretary

A. The Commission, subject to the approval of the Director of the United States Geological Survey, shall enter into cooperative agreements with the U. S. Geological Survey for such engineering and clerical services as may reasonably be necessary for the administration of the Compact. Said agreements shall provide that the Geological Survey shall:

1. Maintain and operate gaging stations at or near the points of measurement specified in Article V (A) of the Compact.

2. Assemble factual information on stream flow, diversion and reservoir storage for the preparation of an annual report to the Governors of the signatory states.

3. Make such investigations and reports as may be requested by the Commission in aid of its administration of the Compact.

4. Act as Secretary to the Commission.

Article IV. Budget

A. At the annual meeting of each even numbered year or prior thereto, the Commission shall adopt a budget for operation during the ensuing biennium beginning July first. Such budget shall set forth the total cost of construction, maintenance and operation of gaging stations, the cost of engineering and clerical aid, and other necessary expenses excepting the salaries and personal expenses of the Commissioners. On odd-numbered years revisions of the budget shall be considered.

B. It shall be the obligation of the Commissioners of the States of Montana and Wyoming to endeavor to secure from the Legislature of their respective states sufficient funds with which to meet the obligations of this Compact, except insofar as provided by the federal government.

Article V. Meetings

An annual meeting of the Commission shall be held on the third Tuesday of each November at some mutually agreeable point in the Yellowstone River Basin for consideration of the annual report for the water year ending the preceding September 30th, and for

the transaction of such other business consistent with its authority; provided that by unanimous consent of the Commission the date and place of the annual meeting may be changed. Other meetings as may be deemed necessary shall be held at a time and place set by mutual agreement, for the transaction of any business consistent with its authority.

No action of the Commission shall be effective until approval by the Commissioners for the States of Wyoming and Montana.

Article VI. Amendments, Revisions and Abrogations.

The Rules and Regulations of the Commission may be amended or revised by a unanimous vote at any meeting of the Commission.

Fred E. Buck
Commissioner for Montana

Earl Lloyd
Commissioner for Wyoming

Attested:

Frank Stermitz
Federal Respresentative

Adopted November 17, 1953
Amended November 16, 1959

MONTHLY SUMMARY OF DISCHARGE

Clarks Fork Yellowstone River at Edgar, Montana

Location.--Lat 45°28'00", long 108°50'30", in SE¼SE¼ sec.23, T.4 S. R.23 E., on right bank just downstream from highway bridge, half a mile east of Edgar and 6 miles upstream from Rock Creek.

Drainage area.--2,032 sq mi, (revised).

Records available.--July 1921 to September 1961. Monthly discharge only for some periods, published in WSP 1309. Records since January 1950, available in annual reports of Yellowstone River Compact Commission.

Gage.--Water-stage recorder. Altitude of gage is 3,440 ft (by barometer). Prior to Sept. 13, 1940, chain gage and Sept. 13, 1940, to Aug. 31, 1953, wire-weight gage, at same site and datum.

Average discharge.--40 years, 1,030 cfs (745,700 acre-ft per year).

Extremes.--Maximum discharge during year, 6,740 cfs June 10 (gage height, 6.90 ft); minimum, 36 cfs Apr. 22 (gage height, 0.46 ft).

1921-61: Maximum discharge observed, 10,900 cfs June 2, 1936 (gage height, 8.62 ft); minimum, that of Apr. 22, 1961.

Remarks.--Records excellent except those for periods of ice effect, which are poor. Upstream diversions for irrigation of about 41,500 acres, of which 840 acres lie below the station. In addition, about 6,300 acres of land lying above station are irrigated by diversions from the adjoining Rock Creek basin. Information similar to that previously given herein for Whitehorse Canal will be found on page 10.

Revisons (water years).--Water Supply Paper 1509: 1924, 1932 (M).

Month	Second-foot days	Maximum	Minimum	Mean	Runoff in Acre-feet
October 1960	10,436	404	188	337	20,700
November	13,233	505	330	441	26,250
December	11,750	430	340	379	23,310
January 1961	11,280	395	315	364	22,370
February	9,532	390	297	340	18,910
March	9,232	346	263	298	18,310
April	3,701	278	38	123	7,340
May	44,033	5,900	37	1,420	87,340
June	122,400	6,170	1,370	4,080	242,800
July	20,728	1,280	180	669	41,110
August	6,837	525	102	221	13,560
September 1961	28,554	4,300	150	952	56,640
Water year 1960-61	291,716	6,170	37	799	578,640

MONTHLY SUMMARY OF DISCHARGE

Clarks Fork Yellowstone River at Edgar, Montana

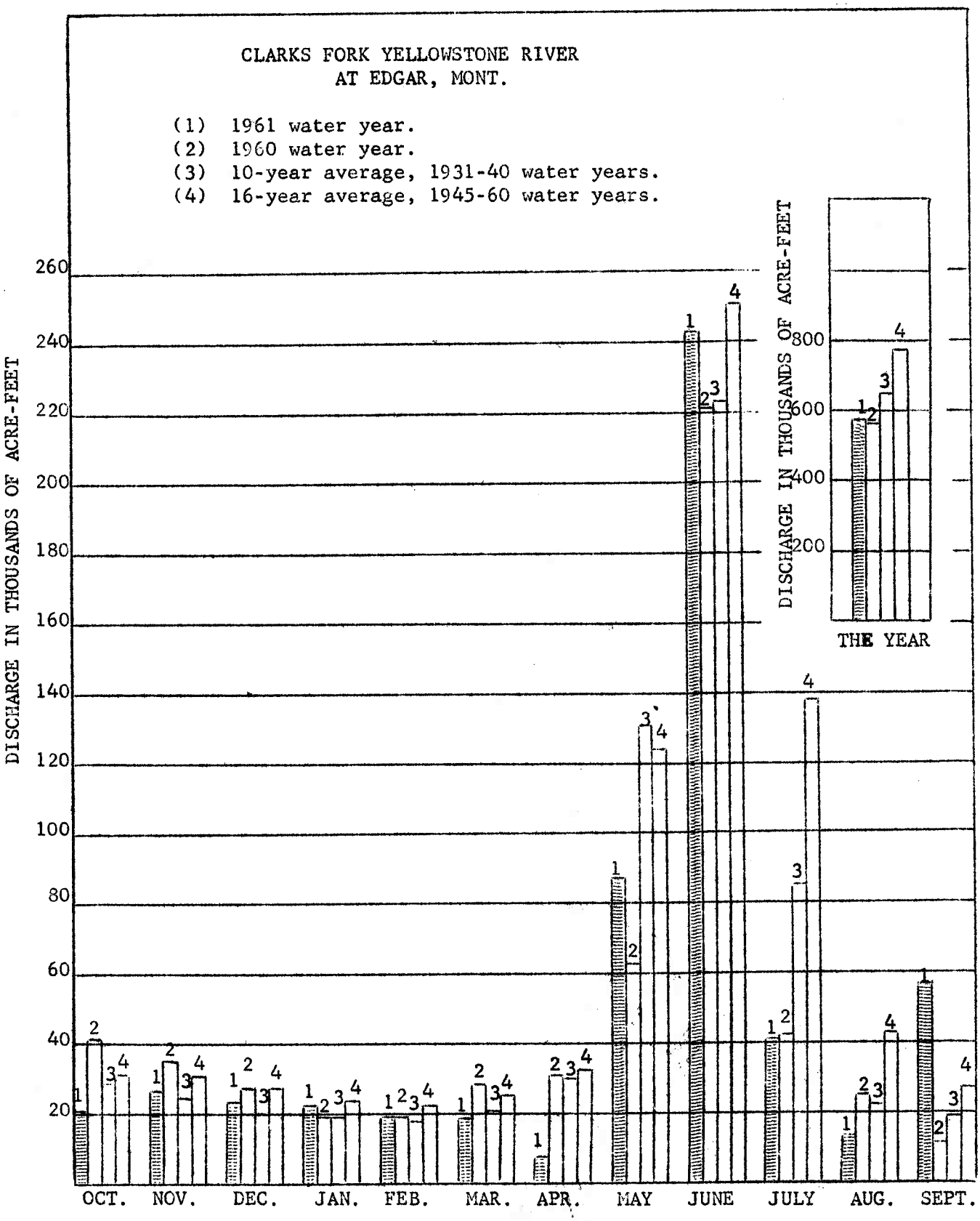
Supplementary Data

The Compact specified the official point of measurement of the Clarks Fork Yellowstone River shall be just above the mouth of Rock Creek about 6 miles downstream from the gaging station at Edgar. The known intervening diversion is the Whitehorse Canal which begins in SW¼ sec.1, T.4 S., R.23 E., about 4 miles downstream from the gaging station. Based upon periodic discharge measurements of the diversion and information on canal operation, that seasonal diversion is estimated at 9,800 acre-feet.

A cableway for discharge measurements was constructed across the Clarks Fork Yellowstone River about half a mile downstream from the Whitehorse Canal in SE¼ sec.1, T.4 S., R.23 E. The periodic measurements of discharge of the stream at this point, those of the Whitehorse Canal and concurrent daily discharge flow at the gaging station are presented. No adjustment has been made to the mean daily flow at Edgar which could be a factor at times of significantly changing stage. The apparent inflow may generally be return flow from irrigated lands served by Rock Creek.

Discharge in cfs at selected points

Date	Clarks Fork at Edgar	Whitehorse Canal	Clarks Fork at SE¼ sec.1	Apparent inflow in reach
Oct. 1, 1960	224	24.6	243	+44
Nov. 11	460	0	481	+21
Dec. 18	350	0	369	+19
Jan. 7, 1961	385	0	410	+25
Feb. 12	353	0	364	+11
Mar. 4	314	0	311	- 3
Apr. 4	266	0	245	-21
May 2	.55	0	62.6	+ 8
May 11	--	24.2	--	--
June 9	6,170	48.9	6,140	+19
July 12	1,010	44.1	988	+22
Aug. 2	162	25.8	182	+46
Sept. 22	1,290	12.0	1,330	+52



Comparison of discharge during 1961 water year with 1960 water year and with average discharge for water years 1931-40 and 1945-60.

MONTHLY SUMMARY OF DISCHARGE

Little Bighorn River near Hardin, Montana

Location.--Lat 45°44', long 107°34', on line between SE¼ sec.18 and NE¼ sec.19, T.1 S., R.34 E., on right bank 425 ft upstream from highway bridge, a quarter of a mile upstream from mouth, and 2.4 miles east of Hardin.

Drainage area.--1,294 sq mi, (revised).

Records available.--June 1953 to September 1961, in reports of the Geological Survey and in annual reports of the Yellowstone River Compact Commission.

Gage.--Water-stage recorder. Altitude of gage is 2,880 ft (by barometer). Prior to Oct. 7, 1953, wire-weight gage on bridge 425 ft downstream at different datum.

Average discharge.-8 years, 181 cfs (131,000 acre-ft per year).

Extremes.--Maximum daily discharge during year, 370 cfs June 1; maximum recorded gage height, 4.85 ft Feb. 6 (backwater from ice); minimum discharge observed 0.2 cfs Aug. 7 (gage height 1.99 ft), result of discharge measurement.

1953-61: Maximum discharge, about 3,000 cfs Mar. 21, 1960; maximum gage height, 11.78 ft Mar. 20, 1960 (backwater from ice); minimum discharge observed, that of Aug. 7, 1961.

Remarks.--Records good except those for periods of ice effect, no gage-height record, or indefinite stage-discharge relation, which are poor. Diversions for irrigation of about 17,000 acres above station. Flow partly regulated since about 1940 by Willow Creek Reservoir (capacity, 23,000 acre-ft).

Month	Second-foot days	Maximum	Minimum	Mean	Runoff in Acre-feet
October 1960	2,419	142	10	78.0	4,800
November	2,858	112	62	95.3	5,670
December	2,628	92	70	84.8	5,210
January 1961	2,694	110	60	86.9	5,340
February	2,978	125	94	106	5,910
March	2,874	100	82	92.7	5,700
April	1,645	82	14	54.8	3,260
May	2,228	330	11	71.9	4,420
June	3,505	370	10	117	6,950
July	263.6	16	2.0	8.50	523
August	76.3	4.8	0.3	2.46	151
September	1,534.7	149	4.6	51.2	3,040
Water year	25,703.6	370	0.3	70.4	50,970

MONTHLY SUMMARY OF DISCHARGE

Bighorn River at Bighorn, Montana

Location.--Lat 46°08'50", long 107°27'20", in NE¼NE¼ sec.33, T.5 N., R.34 E., on right bank just downstream from bridge on U. S. Highway 10, three-quarters of a mile upstream from mouth, 1 mile southwest of Bighorn, and 4 miles east of Custer.

Drainage area.--22,885 sq mi, (revised).

Records available.--May 1945 to September 1961. Published as "near Custer".1945-55. Records since January 1950, available in annual reports of Yellowstone River Compact Commission.

Gage.--Water-stage recorder. Altitude of gage is 2,690 ft (by barometer). May 11 to Dec. 6, 1945, wire-weight gage and Dec. 7, 1945, to Oct. 6, 1955, water-stage recorder, at site 4 miles upstream at different datum.

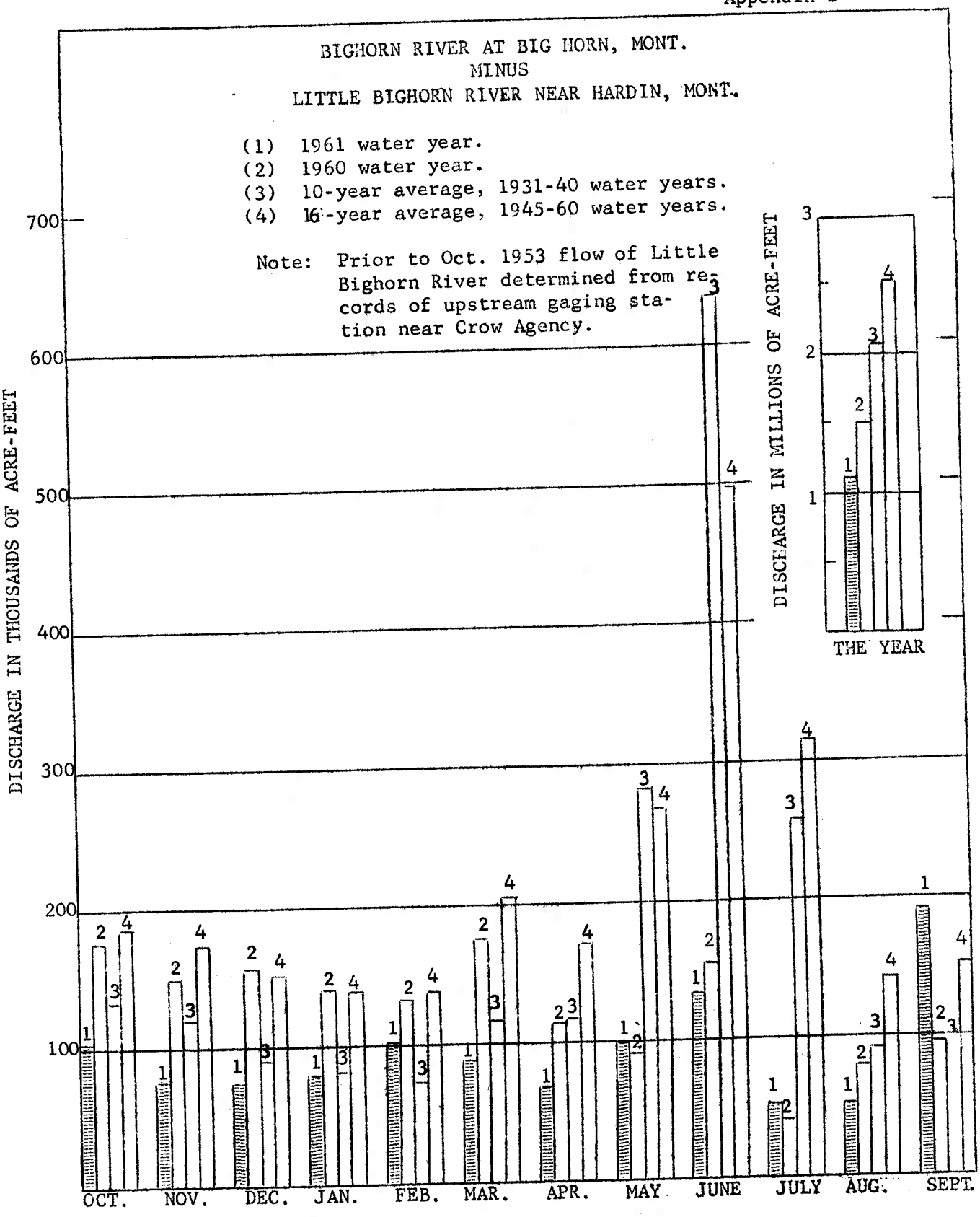
Average discharge.--16 years, 3,558 cfs (2,576,000 acre-ft per year).

Extremes.--Maximum discharge during year, 12,700 cfs Sept. 21 (gage height, 6.80 ft); minimum discharge, 408 cfs May 12 (gage height, 0.58 ft).

1945-61: Maximum discharge, 26,200 cfs June 24, 1947 (gage height 8.79 ft site and datum then in use), from rating curve extended above 12,500 cfs by logarithmic plotting; maximum gage height recorded, 10.65 ft, Mar. 20, 1947 (ice jam), site and datum then in use; minimum discharge, about 275 cfs Nov. 15, 1959.

Remarks.--Records good except those for periods of ice effect, which are poor. Diversions for irrigation of about 465,000 acres above station. Major regulation by 14 reservoirs in Wyoming and 1 in Montana with combined usable capacity of about 1,400,000 acre-ft (see Appendices C and D).

Month	Second-foot days	Maximum	Minimum	Mean	Runoff in Acre-feet
October 1960	54,550	3,590	1,310	1,760	108,200
November	40,700	1,480	1,050	1,357	80,730
December	39,680	1,850	950	1,280	78,700
January 1961	42,850	1,600	950	1,382	84,990
February	54,500	3,000	1,600	1,946	108,100
March	47,720	1,700	1,360	1,539	94,650
April	36,743	1,600	803	1,225	72,880
May	52,032	4,320	462	1,678	103,200
June	71,435	4,710	758	2,381	141,700
July	26,994	2,180	506	871	53,540
August	26,904	1,150	538	868	53,360
September 1961	98,350	10,100	1,090	3,278	195,100
Water year 1960-61	592,458	10,100	462	1,623	1,175,000



Comparison of discharge during 1961 water year with 1960 water year and with average discharge for water years 1931-40 and 1945-60.

MONTHLY SUMMARY OF DISCHARGE

Tongue River at Miles City, Montana

Location.--Lat 46°21', long 105°48', in SE¼ sec.23, T.7 N., R.47 E., on right bank 4 miles south of Miles City and 8 miles upstream from mouth.

Drainage area.--5,379 sq mi, (revised).

Records available.--April 1938 to April 1942, April 1946 to September 1961. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to September 1932. Monthly discharge only for some periods, published in WSP 1309. Records since January 1950, available in annual report of Yellowstone River Compact Commission.

Gage.--Water-stage recorder. Altitude of gage is 2,370 ft (by barometer). April 1938 to April 1942, wire-weight gage at site 8 miles upstream at different datum.

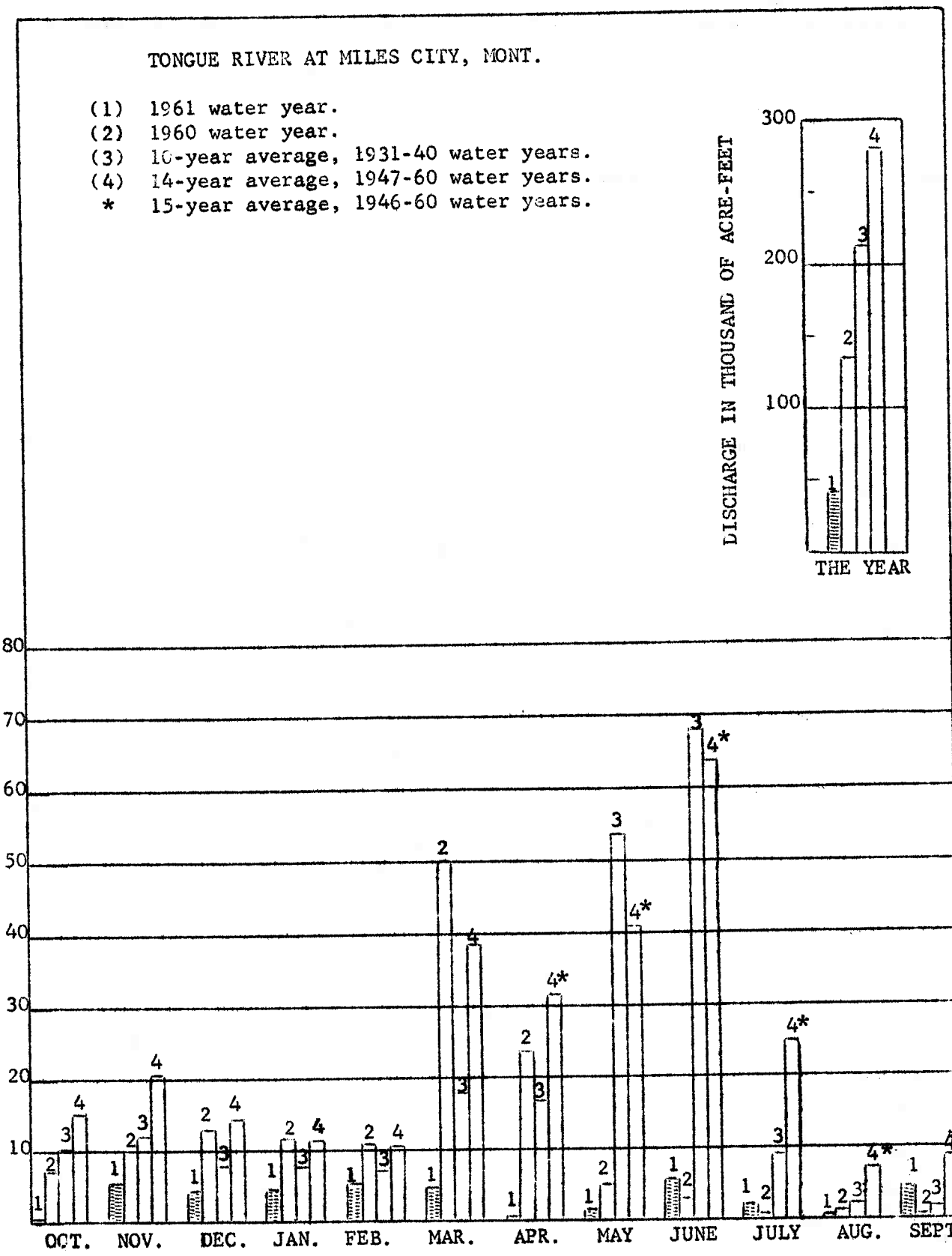
Average discharge.--18 years (1938-41, 1946-61), 341 cfs (246,900 acre-ft per year).

Extremes.--Maximum discharge during year, 1,090 cfs July 30 (gage height, 2.60 ft); minimum discharge observed, 3.0 cfs May 8, 10.

1938-42, 1946-61: Maximum discharge, 12,000 cfs Mar. 6, 1949 (gage height 10.6 ft), float measurement; maximum gage height, 12.27 ft Mar. 19, 1960 (ice jam); no flow July 9-19, Aug. 13, 14, Sept. 28, 1940.

Remarks.--Records fair except those for periods of ice effect, which are poor. Diversions for irrigation of about 90,000 acres above station. Flow regulated by Tongue River Reservoir (Appendix C) and many small reservoirs (combined capacity, about 15,000 acre-ft).

Month	Second-foot days	Maximum	Minimum	Mean	Runoff in Acre-feet
October 1960	320.8	59	3.6	10.3	636
November	2,785	163	20	92.8	5,520
December	2,178	80	58	70.3	4,320
January 1961	2,436	90	69	78.6	4,830
February	2,845	140	81	102	5,640
March	2,473	160	36	79.8	4,910
April	376.0	35	3.9	12.5	746
May	904.2	226	3.6	29.2	1,790
June	2,986.8	195	4.2	99.6	5,920
July	1,053.2	363	8.0	34.0	2,090
August	224.4	26	4.8	7.24	445
September 1961	2,313.0	417	5.4	77.1	4,590
Water year 1960-61	20,895.4	417	3.6	57.2	41,440



Comparison of discharge during 1961 water year with 1960 water year and with average discharge for water years 1931-40 and 1947-60.

MONTHLY SUMMARY OF DISCHARGE

Powder River near Locate, Montana

Location.--Lat 46°26', long 105°18', in NE¼ sec.26, T.8 N., R.51 E., on right bank 50 ft downstream from bridge on U. S. Highway 12 at present site of Locate (5 miles west of former site of Locate), 3 miles upstream from Locate Creek, and 25 miles east of Miles City.

Drainage area.--13,189 sq mi, (revised).

Records available.--March 1938 to September 1961. Records since January 1950 available in annual reports of Yellowstone River Compact Commission.

Gage.--Water-stage recorder and wire-weight gage. Altitude of gage is 2,400 ft (by barometer). Prior to July 11, 1947, wire-weight gage at bridge 50 ft upstream at same datum.

Average discharge.--23 years, 570 cfs (412,700 acre-ft per year).

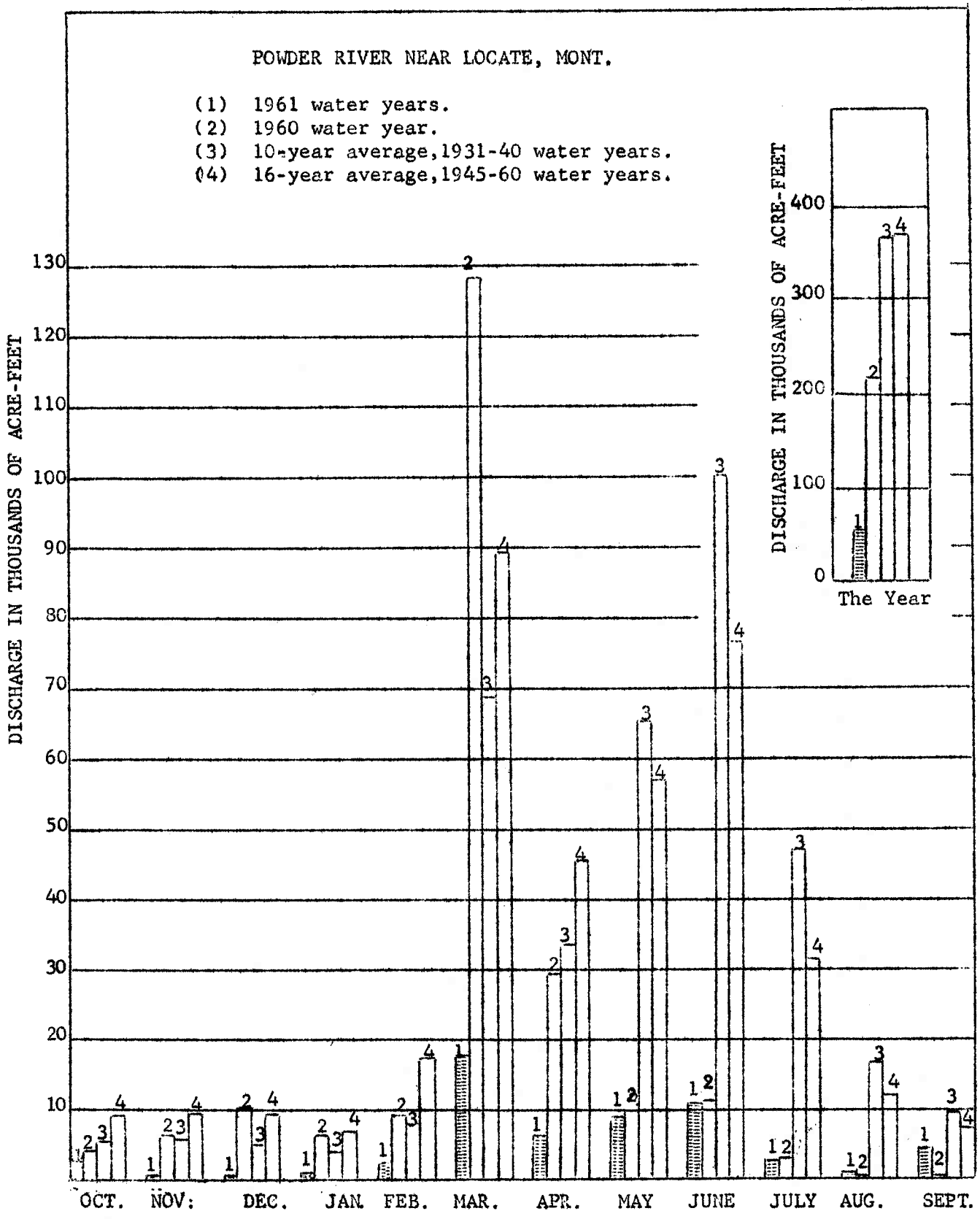
Extremes.--Maximum discharge observed during year, 697 cfs June 2 (gage height, 3.03 ft); maximum gage height observed, 3.45 ft Mar. 2 (backwater from ice); no flow Oct. 1, Sept. 4-8.

1938-61: Maximum discharge observed, 31,000 cfs Feb. 19, 1943 (gage height, 11.23 ft), from rating curve extended above 17,000 cfs; no flow Jan. 16 to Feb. 12, Feb. 22-24, 1950, July 27, Sept. 21-27, Oct. 1, 1960, Sept. 4-8, 1961.

Remarks.--Records good except those for periods of ice effect or no gage-height record, which are poor. Diversions for irrigation of about 52,000 acres above station. Some regulation by tributary reservoirs with combined usable capacity of 36,800 acre-ft.

Revisions (water years).--Water Supply Paper 926: 1939. Water Supply Paper 1309: 1938-39 (M), 1942 (M).

Month	Second foot days	Maximum	Minimum	Mean	Runoff in Acre-ft
October 1960	54.8	3.9	0	1.77	109
November	375.4	25	3.5	12.5	745
December	387	20	8	12.5	768
January 1961	557	27	9	18.0	1,100
February	1,206	60	23	43.1	2,390
March	9,032	376	70	291	17,910
April	3,270	238	28	109	6,490
May	4,412	516	29	142	8,750
June	5,525.2	688	5.1	184	10,960
July	1,401.2	515	1.8	45.2	2,780
August	449.0	94	0.4	14.5	891
September 1961	2,326	462	0	77.5	4,610
Water year 1960-61	28,995.6	688	0	79.4	57,500



Comparison of discharge for 1961 water year with 1960 water year and with average discharge for water years 1931-40 and 1945-60.

RESERVOIRS COMPLETED AFTER JANUARY 1, 1950

BOYSEN RESERVOIR

Water-stage recorder at dam on Wind River, about 21 miles south of Thermopolis, Wyoming. Reservoir formed by earth-fill dam, construction of which began in 1947. Storage began October 11, 1951. Dead storage, 62,000 acre-feet at elevation 4657.0. Usable contents, 758,000 acre-feet at elevation 4725.0 (top of gates). Crest of dam at elevation 4758.

Records given herein represent usable contents. Water is used for irrigation and power development. Allocation for flood control provided. Data furnished by U. S. Bureau of Reclamation.

Extremes.--Maximum usable contents during year, 477,000 acre-feet June 26 (elevation, 4,708.60 ft); minimum, 212,600 acre-feet Oct. 1 (elevation, 4,686.58 ft).

1953-61: Maximum usable contents, 857,400 acre-feet, July 5, 1957 (elevation, 4,729.85 ft); minimum, 189,800 acre-ft March 18, 19, 1956 (elevation, 4,684.18 ft).

Month	Water-Surface elevation in feet	*Contents in Acre-feet	Change in contents during month in acre-feet
September 30, 1960	4,686.58	212,600	
October 31	4,690.21	248,700	+36,100
November 30	4,692.53	272,800	+24,100
December 31	4,693.45	282,700	+ 9,900
January 31, 1961	4,693.82	286,700	+ 4,000
February 28	4,694.69	296,200	+ 9,500
March 31	4,695.43	304,300	+ 8,100
April 30	4,694.19	290,700	-13,600
May 31	4,697.08	323,100	+32,400
June 30	4,708.34	473,100	+150,000
July 31	4,706.36	444,100	-29,000
August 31	4,704.14	412,600	-31,500
September 30, 1961	4,703.45	403,100	- 9,500
Water year 1960-61			+190,500

* Does not include dead storage of 62,000 acre-feet.

RESERVOIRS COMPLETED AFTER JANUARY 1, 1950

ANCHOR RESERVOIR

Water-stage recorder at dam on South Fork Owl Creek, 31 miles west of Thermopolis, Wyoming. Reservoir formed by thin concrete arch dam, construction of which began in 1957. Closure of dam made November 21, 1960. Temporary outlet at elevation 6,304.30 ft still in use. Lowest permanent outlet sill at elevation 6,343.75 ft, total contents, 148 acre-feet. Total contents, 17,420 acre-feet at upper active capacity level of 6,441 ft. Crest of dam at elevation 6,452.5 ft.

Records given in this report are total contents to reflect storage changes below normal dead storage level. Water is to be used for irrigation. Data furnished by U. S. Bureau of Reclamation.

Month	Water-Surface elevation in feet	*Contents in acre-feet	Change in contents during month in acre-feet
September 30, 1960			
October 31	6,304.30	0	
November 30	6,331.26	36	+36
December 31, 1960	6,319.12	7	-29
January 31, 1961	6,306.75	1	-6
February 28	6,330.22	31	+30
March 31	6,336.60	69	+38
April 30	6,304.30	0	-69
May 31	6,304.30	0	0
June 30	6,348.62	230	+230
July 31	6,304.30	0	-230
August 31	6,304.30	0	0
September 30, 1961	6,339.00	89	+89
Water year 1960-61			+89

* Includes dead storage

RESERVOIRS IN EXISTENCE ON JANUARY 1, 1950

The extent, if any, of the use of reservoirs in this category which may be subject to Compact allocations was not determined. As a matter of hydrologic interest, the month-end contents in acre-feet of four reservoirs are given. The first three reservoirs are in the Bighorn River Basin in Wyoming and data on contents were furnished by the U. S. Bureau of Reclamation. Tongue River Reservoir in Montana is operated under the supervision of the Montana State Water Conservation Board which agency furnished operating data.

Contents in Acre-feet

	Bull Lake	Pilot Butte Reservoir	a/Buffalo Bill Reservoir	b/Tongue River c/ Reservoir
September 30, 1960	47,900	3,000	169,800	800
October 31	53,100	7,000	156,900	1,300
November 30	56,000	11,000	167,900	4,300
December 31, 1960	57,100	9,700	172,600	7,200
January 31, 1961	57,700	10,400	175,200	10,800
February 28	57,900	13,500	177,300	16,300
March 31	58,300	24,700	183,400	21,800
April 30	56,600	27,400	165,800	23,900
May 31	80,200	28,400	231,800	34,700
June 30	137,900	27,900	429,000	50,800
July 31	113,500	9,500	366,700	35,800
August 31	85,100	4,200	283,700	23,600
September 30, 1961	89,800	4,600	285,200	21,000
Change in contents during year	+41,900	+1,600	+115,400	+20,200

a/ Revised capacity table based on survey of 1959; previous contents based on survey of 1941.

b/ Contents based upon sedimentation surveys of October, 1948.

c/ Contents generally interpolated from readings made six or less days prior to month end.