YELLOWSTONE RIVER

COMPACT COMMISSION

FORTY-SEVENTH ANNUAL REPORT

1998

YELLOWSTONE RIVER COMPACT COMMISSION
DENVER FEDERAL CENTER, BUILDING 53, ROOM H-2102
LAKEWOOD, COLORADO 80225

Honorable Jim Geringer
Governor of the State of Wyoming
Cheyenne, Wyoming 82002

Honorable Marc Racicot
Governor of the State of Montana
Helena, Montana 59620

Honorable Edward T. Schafer
Governor of the State of North Dakota
Bismarck, North Dakota 58501

Dear Sirs:

Pursuant to Article III of the Yellowstone River Compact, the Commission submits the following forty-seventh annual report of activities for the period ending September 30, 1998.

Members of the Yellowstone River Compact Commission convened their forty-seventh Annual Meeting on January 6, 1999 at 9:30 a.m. in Cody, Wyoming. In attendance were Mr. James Kircher, Chairman and Federal Representative; Mr. Gordon W. Fassett, Wyoming State Engineer; and Mr. Jack Stults, Administrator, Water Resources Division, Montana Department of Natural Resources and Conservation. Also in attendance were Ms. Sue Lowry, Wyoming State Engineer's Office; Mr. Craig Cooper and Mr. Don Englert, Wyoming Board of Control, Water Division III; Mr. Mike Whitaker, Wyoming Board of Control, Water Division II; Mr. Keith Kerbel and Mr. Glen McDonald, Montana Department of Natural Resources and Conservation; Ms. Faye Bergan, Montana Reserved Water Rights Compact Commission; Ms. Karen Fagg, MSE-HKM Associates; Ms. Jill Morrison, Powder River Basin Resource Council; Mr. Michael Millstein, Billings Gazette; and Mr. Tom L. Quinn and Mr. Robert E. Davis, U.S. Geological Survey.

All attendees introduced themselves.

Mr. Davis presented information on budgets for the program of data collection and preparation of the annual report. The program for the Yellowstone River Compact Commission for fiscal year 1998 cost $53,400. The program is estimated to cost $55,500 for fiscal year 1999, $58,000 for fiscal year 2000, $60,600 for fiscal year 2001, and $63,300 for fiscal year 2002. One-fourth of the cost of the program is provided by the State of Wyoming, one-fourth is provided by the State of Montana, and one-half is provided by the U.S. Geological Survey through the Federal-State cooperative program. The Commission accepted the proposed budget for fiscal year 1999. Estimates for fiscal years 2000-2002, which represent annual increases of approximately 4 percent, met with general approval. Mr. Fassett asked about the level of confidence in the estimates for fiscal years 2000-2002. Mr. Davis stated that they likely are within 1 percent of actual costs.

Mr. Davis reported that streamflow during water year 1998 was 99 percent of average for the Clarks Fork Yellowstone River, 115 percent of average for the Bighorn River, 70 percent of average for the Tongue River, and 103 percent of average for the Powder River. Total adjusted streamflow in the 4 rivers was 4,380,700 acre-feet during water year 1998. Bighorn Lake had the same amount of water in storage at the end of water year 1998 as at the end of water year 1997. Boysen Reservoir, Bull Lake, Pilot Butte Reservoir, Buffalo Bill Reservoir, and

Tongue River Reservoir had less water in storage at the end of water year 1998 than at the end of water year 1997. Anchor Reservoir had more water in storage. The total water in storage in these reservoirs decreased 80,596 acre-feet during water year 1998. The decrease represents 3.4 percent of the usable water in storage at the end of water year 1997.

Mr. Kircher asked if any discussion of the Rules for Resolution of Disputes was needed. Mr. Fassett and Mr. Stults stated that no discussions were needed at this time.

Mr. Fassett reported that discussions between the Shoshone and Arapahoe Tribes of the Wind River Indian Reservation and Federal and State interests are continuing. Quantification issues generally have been resolved. However, issues of water management and administration are still being discussed. Major points of discussion include the marketing of the reserved water rights and the use of those rights for purposes other than those originally intended. Mr. Fassett also stated that administration issues for Walton Rights involving 230 claimants were the subject of a recent trial. A decision by the Special Master is expected soon, but any decision is likely to be appealed. Mr. Fassett also stated that investments by the State of Wyoming are being considered to increase the storage capacity of Ray Lake near Lander from about 10,000 acre-feet to about 30,000 acre-feet and to rehabilitate major irrigation canal systems constructed by the Bureau of Indian Affairs in the Reservation. Mr. Fassett added that Federally funded rehabilitation of Washakie Dam is expected to occur this year. The rehabilitation is for safety purposes and will not increase the current storage capacity of about 8,000 acre-feet. The dam is located upstream of the town of Fort Washakie on the South Fork of the Little Wind River. Mr. Stults inquired about water-marketing issues. Mr. Fassett replied that, at present, reserved water rights cannot be marketed off the Reservation, but that issue is being discussed. Ms. Bergan stated that compacts with Indian tribes in Montana generally have provided for water marketing within State law, but Congressional approval for recent compact agreements is pending and is the subject of considerable discussion.

Mr. Fassett reported that the Dry Fork pumped hydroelectric project is continuing, but no construction activity is anticipated for the near future. The Federal Energy Regulatory Commission is preparing an Environmental Impact Statement for the project, which involves many concerns, including water rights for downstream users and the Crow Tribe. Opposition to the project, particularly at the local level, appears to be strong. The State of Wyoming has no strong position but has issued an instream-flow water right downstream on the Little Bighorn River.

Ms. Lowry reported on the Wyoming Water Conservation Program, which is a joint effort between the State of Wyoming and the Bureau of Reclamation. Mr. Ron Vore has been selected to serve as the Wyoming State Engineer's Water Conservation Officer. His responsibilities are to promote voluntary water conservation, coordinate efforts with related programs, and recommend future directions for the program. Mr. Stults stated that Montana has provisions for use of salvage water, which is water that is conserved and would otherwise be irretrievably lost. The salvaged water can be used for increased development or for instream flow.

Mr. Fassett reported on the Wyoming Water Planning Program, which was authorized in 1997 to study the feasibility of a new water-planning process for Wyoming. A proposal for a new process will be submitted to the 1999 Wyoming legislature. The proposed process calls for assemblage of relevant data for each major basin; the use of technology to help organize, interpret, and update the data; and the formation of basin advisory groups to define local concerns. Funding for the process is anticipated to be about $1,000,000 per year. Assemblage of data is expected to take about 5 years and would involve the private sector as well as State government. Details of the program are available on the Internet at http://waterplan.state.wy.us/ . Mr. Stults described the new Montana Ground Water Plan. The preparers of the plan found the Montana statutes generally are adequate to deal with current issues but more communication and coordination of activities are needed. Basin planning groups are active and coordinate through the Montana Watershed Coordination Council. The Montana Department of Natural Resources and Conservation provides technical assistance as needed. Details about the plan are available on the Internet at http://www.dnrc.state.mt.us/wrd/home.htm and at http://water.montana.edu/docs/watersheds/MTwtshds.htm .

Mr. Fassett reported that coalbed methane development in Wyoming has increased significantly. An estimated 2,000 wells for coalbed methane development in the Powder River Basin have been permitted and as many as 40 companies are involved. The Bureau of Land Management is anticipating requests for permits for numerous wells and is preparing an Environmental Impact Statement for development on Federal lands. Coalbed methane development appears to be long term and involves a relatively large total quantity of water, although individual well discharges typically are 10 to 100 gallons per minute. Concerns related to the development include the overall impacts on the ground-water resource, dewatering of aquifers used for water supplies, safety and health issues, and issues of beneficial use of water. The water currently produced generally is of acceptable quality for most uses. Mr. Kerbel reported that similar development is occurring in southeastern Montana and that similar concerns have been expressed. Ms. Morrison reported that significant expansion of development is anticipated. She described detrimental effects that have occurred elsewhere and expressed concern that similar effects could occur in the Powder River Basin. Mr. Stults inquired about the Wyoming permitting process. Mr. Fassett stated that permits are for a limited time and have various conditions and reporting requirements.

Mr. Stults and Mr. Kerbel reported that the Montana Statewide Adjudication process is continuing. Adjudication of water rights for the Billings area along the Yellowstone River was recently completed and adjudication for the Clarks Fork basin is nearing completion. Adjudications for the Miles City area, the Bighorn and Little Bighorn River basins, the Tongue River basin, and the lower Yellowstone River basin will be completed in the future. Mr. Fassett asked if issues are mostly related to administration rather than quantification. Mr. Stults replied that administration has not been a major issue for State-based rights. Mr. Kerbel explained the benefit of education in ensuring proper utilization of water rights and diversions.

Mr. Stults reported that negotiations with the Crow Tribe are continuing, and asked Ms. Bergan and Ms. Fagg to describe recent developments. Ms. Bergan described the role and nature of the Reserved Water Rights Compact Commission in negotiation, rather than litigation, of water rights and stated that all settlements need to be approved by the Montana Attorney General and the Montana legislature. Ms. Fagg described a recent comprehensive proposal by the Crow Tribe involving water rights, coal severance taxes, treaty rights to the Yellowstone River, and riparian rights along the Bighorn River. Agreements for settlement are hoped to be reached within the next 4 months before the end of the current legislative session. Existing water rights in Montana on fee land would be recognized, free storage rights in Bighorn Lake would be requested, and existing water rights in Wyoming would be recognized with Crow Tribal rights being subordinate to them. Revenue from power production at Yellowtail Dam and other downstream structures would be requested in exchange for deauthorization of 5 currently authorized irrigation projects on the Reservation. The tribe would be allowed to market water in accordance with Montana law. The settlement negotiations will need to include Montana, Wyoming, and Federal interests. Mr. Fassett expressed the willingness of Wyoming to participate in discussions.

Mr. Quinn explained the basis of the overall USGS National Water Quality Assessment (NAWQA) and of the Yellowstone River Basin NAWQA project. The project began in 1997. Intensive data collection will occur in 1998, 1999, and 2000, followed by long-term, less-intensive data collection. Interpretation of data and preparation of reports will occur in 2001 and 2002. Existing data have been compiled and descriptions of that data and the environmental setting have been prepared. Data-collection activities for the next few years include monitoring of surface-water quality and biology at indicator and integrator sites, analysis of ground water in subunits of the Bighorn River basin and the Wind River basin, and an assessment of the effects of land use on a subunit yet to be determined. Ecological studies will determine biological characteristics to help assess water quality. Modeling of some water-quality characteristics, such as sediment, is planned. Details of the project are available at http:// wyoming.usgs.gov/YELL/yell.html .

Mr. McDonald reported that the Tongue River Reservoir Rehabilitation project is very near completion. Enlargement of the reservoir capacity from 66,000 acre-feet to 80,000 acre-feet is an important part of the water-

rights compact with the Northern Cheyenne Tribe. Rehabilitation significantly lessens the probability of dam failure. Completion is scheduled for May 1999.

Mr. Fassett reported that the enlargement of Twin Lakes for the Sheridan area water supply is completed. The Tie Hack Municipal Reservoir project for Buffalo in the Bighorn Mountains also is completed.

Mr. Fassett reported that construction of Greybull Valley Dam began in 1998 and is scheduled for completion in 2000. The offstream reservoir will have a capacity of about 30,000 acre-feet for water diverted from the Greybull River between Meeteetse and Greybull. The water will be used for agricultural purposes in the Greybull Valley Irrigation District, which consists of about 70,000 acres.

Mr. Kircher inquired about interest in a field trip in 1999. Mr. Stults expressed interest, particularly to visit a coalbed methane production site. Mr. Fassett concurred. Mr. Kircher recommended including a NAWQA monitoring site and relevant reservoir sites, such as Greybull Valley Reservoir and Tongue River Reservoir. July 20-22, 1999 was proposed as a tentative time frame. Ms. Lowry, Mr. Kerbel, and Mr. Kircher will coordinate the trip.

Ms. Lowry distributed an information pamphlet from the Missouri River Basin Association and briefly described recent activities.

The next annual meeting was tentatively scheduled for November 30, 1999 in Billings.

The meeting was adjourned at 1:05 p.m.

Gordon W. Fassett
Commissioner for Wyoming

Jack Stults
Commissioner for Montana

James E. Kircher
Chairman and Federal Representative

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Cost of operation and budget

The work funded by the Yellowstone River Compact Commission, which to date has been primarily concerned with the collection of required hydrologic data, has been financed through cooperative arrangements whereby Montana and Wyoming each bear one-fourth of the cost and the remaining one-half is borne by the United States. The salaries and necessary expenses of the State and U.S. Geological Survey representatives, and the cost to other agencies of collecting hydrologic data, are not considered as expenses of the Commission.

The expense of the Commission during fiscal year 1998 was $53,400, in accordance with the budget adopted for the year.

The budgets for fiscal years 1999, 2000, 2001, and 2002 were tentatively adopted subject to the availability of appropriations.

The budgets for the five fiscal years are summarized as follows:

October 1, 1997, to September 30, 1998 (fiscal year 1998):	
Estimate of continuation of existing streamflow-gaging programs	$53,400
October 1, 1998, to September 30, 1999 (fiscal year 1999):	
Estimate of continuation of existing streamflow-gaging programs	$55,500
October 1, 1999, to September 30, 2000 (fiscal year 2000):	
Estimate of continuation of existing streamflow-gaging programs	$58,000
October 1, 2000, to September 30, 2001 (fiscal year 2001):	
Estimate of continuation of existing streamflow-gaging programs	$60,600
October 1, 2001, to September 30, 2002 (fiscal year 2002):	
Estimate of continuation of existing streamflow-gaging programs	$63,300

Streamflow-gaging station operation

Gaging stations at the measuring sites specified in the Yellowstone River Compact were continued in operation and satisfactory discharge records were collected at each station. Locations of streamflow-gaging and reservoir stations are shown on a map of the Yellowstone River Basin at the end of the report.

During water year 1998, annual streamflow was normal[1] in three of the four reporting Yellowstone River tributaries. Streamflow in the Tongue River was below normal.

Station number	Measurement site	Percent of average[2]
06208500	Clarks Fork Yellowstone River at Edgar, Mont., minus diversions to White Horse Canal	99
06294500	Bighorn River above Tullock Creek, near Bighorn, Mont., minus Little Bighorn River near Hardin, Mont. Adjusted for change in contents in Bighorn Lake	115
06308500	Tongue River at Miles City, Mont.	70
06326500	Powder River near Locate, Mont.	103

[1]The "normal" range is 80 to 120 percent of average.

[2]Average is based on period of record at station.

Tabulation of streamflow data for water year 1998 and graphical comparisons with average flows for the preceding year and for selected base periods are given in the section "Summary of discharge for Compact streamflow-gaging stations."

Diversions

No diversions were regulated by the Commission during the year. The Commissioners considered the need to develop procedures to administer water in accordance with the provisions of the Compact.

Storage in reservoirs

Reservoirs completed after January 1, 1950

Bighorn Lake, a Bureau of Reclamation project on the Bighorn River, and the largest storage project in the basin, contained 1,032,000 acre-feet at the beginning of the year and 1,032,000 acre-feet at the end of the year. Daily contents ranged from 817,200 acre-feet on May 9, 1998 to 1,088,000 acre-feet on August 6, 1998. Boysen Reservoir, located on the Wind River and operated by the Bureau of Reclamation, began the year with 616,600 acre-feet in storage and ended the year with 595,500 acre-feet. Monthend and year-end contents and a description of these reservoirs are given in the section "Monthly summary of contents for Compact reservoirs completed after January 1, 1950." The Commission is cognizant of other reservoirs in the Yellowstone River basin and considers their aggregate effect to be insufficient to warrant the collection of storage data at this time.

Reservoirs existing on January 1, 1950

As a matter of record and general information, monthend contents are given later in the report for reservoirs in existence upstream from the points of measurement on January 1, 1950. These data are pertinent to allocation under Article V, Section C, Item 3 of the Compact.

SUMMARY OF DISCHARGE FOR COMPACT STREAMFLOW-GAGING STATIONS

06208500 Clarks Fork Yellowstone River at Edgar, Mont.

LOCATION.--Lat 45°27'58", long 108°50'35", in SE$^1/_4$SE$^1/_4$SE$^1/_4$ sec.23, T.4 S., R.23 E., Carbon County, Hydrologic Unit 10070006, on right bank 400 ft downstream from county bridge, 0.5 mi east of Edgar, 6 mi upstream from Rock Creek, and at river mile 22.1.

DRAINAGE AREA.--2,032 mi^2.

PERIOD OF RECORD.--July 1921 to September 1969, October 1986 to current year.

REVISED RECORDS.--WSP 1509: 1924, 1932(M). WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,460 ft above sea level, from topographic map. Prior to Aug. 31, 1953, nonrecording gage at same site and datum.

REMARKS.--Records good except those for the estimated daily discharges, which are poor. Diversions for irrigation of about 41,500 acres, of which about 840 acres lies downstream from the station. In addition, about 6,300 acres of land upstream from the station are irrigated by diversions from the adjoining Rock Creek basin. Several observations of water temperature and specific conductance were made during the year. Figures of discharge given herein have the flow of White Horse Canal subtracted.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	813	775	564	351	e380	364	410	1030	2420	3610	1910	299
2	780	797	569	355	e380	370	421	1220	2500	4320	1730	263
3	773	746	558	298	e340	383	434	1370	2950	5120	1610	252
4	796	732	552	373	e360	401	449	1680	2950	5520	1460	229
5	803	737	540	463	e380	393	498	1770	2470	5130	1330	232
6	774	720	e500	429	e400	378	491	1890	2070	4680	1230	244
7	760	714	532	373	e420	355	463	1980	1860	4290	1070	246
8	839	739	601	374	e420	e340	438	2010	1800	4090	991	258
9	902	781	547	301	e420	e340	435	1940	1760	3880	906	262
10	870	736	527	302	e420	e320	425	1820	1760	3660	838	241
11	861	676	511	285	e420	e300	411	1730	1880	3690	789	255
12	892	610	450	e320	e400	e340	406	1590	2130	3560	732	290
13	877	592	477	e360	e400	375	415	1350	3020	3250	623	475
14	830	e550	536	e440	e380	380	434	1450	4020	2880	553	664
15	807	e575	523	e460	e380	390	423	1230	4110	2600	521	540
16	800	586	547	e480	e380	399	427	1020	4020	2330	499	503
17	815	597	480	e460	e380	401	409	876	3730	2110	478	472
18	812	612	e460	e440	e380	396	394	841	3180	1960	503	461
19	808	637	e460	e420	e380	376	383	674	3080	1880	642	482
20	801	630	e440	425	e380	362	375	611	4820	1780	612	491
21	789	623	e420	421	e380	357	379	806	4260	1640	736	496
22	771	617	e420	391	e400	356	373	1620	3840	1520	716	511
23	757	603	e400	e380	e420	376	444	2040	3810	1380	826	501
24	759	581	e400	e400	390	413	638	1700	3980	1320	680	493
25	761	603	e410	e400	384	443	818	1460	4090	1250	585	509
26	722	600	415	e400	383	503	746	1600	4480	1180	515	513
27	690	585	464	e400	370	478	644	2350	4600	1090	466	534
28	744	590	492	e380	367	476	612	2790	3750	1030	408	571
29	729	584	586	e380	---	469	565	2540	3210	1240	378	568
30	706	570	387	e380	---	429	716	2670	3300	1590	342	538
31	699	---	374	e380	---	417	---	2760	---	2040	325	---
TOTAL	24540	19498	15142	12021	10894	12080	14476	50418	95850	85620	25004	12393
MEAN	792	650	488	388	389	390	483	1626	3195	2762	807	413
MAX	902	797	601	480	420	503	818	2790	4820	5520	1910	664
MIN	690	550	374	285	340	300	373	611	1760	1030	325	229
AC-FT	48680	38670	30030	23840	21610	23960	28710	100000	190100	169800	49600	24580

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1998, BY WATER YEAR (WY)*

MEAN	537	503	409	351	350	367	564	2115	4104	2073	632	487
MAX	1010	777	593	512	584	554	1398	5578	7256	4771	1541	1395
(WY)	1942	1928	1996	1997	1963	1943	1943	1928	1996	1943	1951	1941
MIN	298	311	217	200	180	220	123	757	1768	290	49.5	156
(WY)	1956	1936	1937	1922	1922	1924	1961	1968	1987	1988	1988	1988

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1921 - 1998*	
ANNUAL TOTAL	598138		377936			
ANNUAL MEAN	1639		1035		1042	
HIGHEST ANNUAL MEAN					1623	1997
LOWEST ANNUAL MEAN					668	1988
HIGHEST DAILY MEAN	10500	Jun 11	5520	Jul 4	10600	Jun 2 1936
LOWEST DAILY MEAN	200	Jan 13	229	Sep 4	37	May 11 1961
ANNUAL SEVEN-DAY MINIMUM	304	Jan 11	245	Sep 4	43	Apr 18 1961
INSTANTANEOUS PEAK FLOW			5950	Jul 4	11100	Jun 12 1997
INSTANTANEOUS PEAK STAGE			7.01	Jul 4	9.30	Jun 12 1997
INSTANTANEOUS LOW FLOW			173	Jan 9	36	Apr 22 1961
ANNUAL RUNOFF (AC-FT)	1186000		749600		755100	
10 PERCENT EXCEEDS	4410		2710		2870	
50 PERCENT EXCEEDS	745		569		471	
90 PERCENT EXCEEDS	420		370		275	

*--During period of operation (water years 1921-69, 1987 to current year).
e--Estimated.

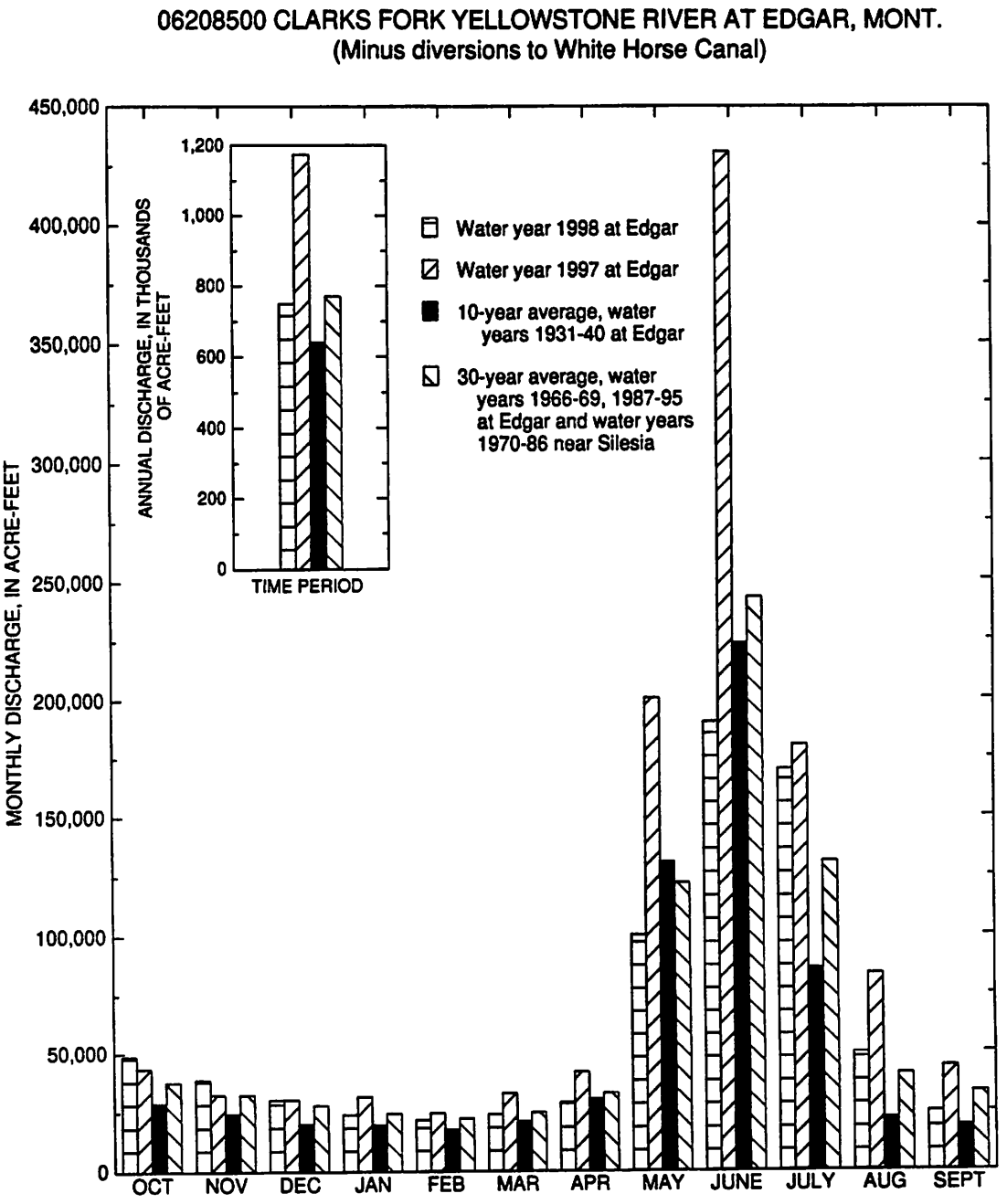


Figure 1. Comparison of discharge of the Clarks Fork Yellowstone River during water year 1998 with discharge during water year 1997 and with 10-year and 30-year average discharges.

06294000 Little Bighorn River near Hardin, Mont.

LOCATION.--Lat 45°44'09", long 107°33'24", in SE$^1/_4$NE$^1/_4$NE$^1/_4$ sec.19, T.1 S., R.34 E., Big Horn County, Hydrologic Unit 10080016, on left bank 50 ft downstream from bridge on Sarpy Road, 0.2 mi upstream of terminal wasteway of Agency Canal, 0.6 mi upstream from mouth, and 2.3 mi east of Hardin.

DRAINAGE AREA.--1,294 mi^2.

PERIOD OF RECORD.--June 1953 to current year.

REVISED RECORDS.--WDR MT-86-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 2,882.29 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to Oct. 7, 1953, nonrecording gage at site 0.4 mi downstream. Oct. 7, 1953 to May 6, 1963, water-stage recorder at site 0.3 mi downstream. May 6, 1963 to Nov. 6, 1963, nonrecording gage at site 0.4 mi downstream. All at different datums. Nov. 7, 1963 to Aug. 15, 1976, water-stage recorder at site 35 ft downstream at present datum. Aug. 15, 1976 to Sept. 30, 1979, water-stage recorders were located on each bank downstream of Sarpy Road bridge and were used depending on control conditions.

REMARKS.--Water-discharge records good except those for estimated daily discharges, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity 23,000 acre-ft). Diversions for irrigation of 20,980 acres upstream from station. Figures of discharge given herein include flow of terminal wasteway of Agency Canal. U. S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	153	183	176	294	e120	e130	264	197	417	462	172	100
2	156	186	e150	264	e120	e120	251	212	399	427	163	93
3	160	179	e120	220	e120	e100	236	235	408	410	181	79
4	161	175	e130	e210	e120	e100	224	247	448	430	209	71
5	159	174	e130	e190	e120	e100	213	264	455	527	333	73
6	161	173	e130	e190	e120	e100	214	285	427	405	291	78
7	164	170	135	e190	e120	e100	237	309	393	377	229	84
8	192	174	e140	e190	e120	e110	267	325	488	334	202	89
9	210	176	e180	e170	e120	e110	269	330	659	327	185	84
10	236	176	e170	e130	e120	e130	254	323	620	303	173	70
11	213	173	e130	e90	e110	e150	233	313	536	265	190	66
12	204	160	143	e100	e110	e170	217	284	505	265	162	73
13	202	e130	153	e100	e110	e200	212	258	523	259	145	93
14	202	e120	156	e110	e110	e200	211	221	674	240	140	111
15	192	e130	213	e110	e110	232	212	188	741	221	133	153
16	198	e140	240	e120	e110	254	208	194	734	198	132	151
17	196	e160	238	e120	e120	319	208	198	745	178	137	134
18	189	e170	e230	e120	e120	362	213	199	760	167	136	126
19	189	e180	e220	e120	e130	322	210	202	732	157	129	133
20	189	194	e190	e120	e130	261	201	201	751	147	125	134
21	187	186	e170	e120	e140	239	194	240	812	136	115	138
22	187	177	e170	e110	e140	242	192	309	734	103	109	155
23	184	166	e160	e120	e140	261	184	385	685	91	120	163
24	183	186	e170	e120	e140	294	179	455	661	94	116	154
25	190	e170	e170	e130	e140	315	179	395	650	112	104	148
26	196	e160	e170	e130	e140	330	190	393	631	139	106	148
27	189	e170	e180	e120	e140	303	198	440	594	142	102	148
28	190	173	e200	e120	e140	276	202	412	573	138	95	151
29	196	177	247	e115	---	272	198	410	527	131	100	150
30	184	172	271	e110	---	271	193	413	492	136	107	145
31	186	---	279	e110	---	280	---	422	---	153	106	---
TOTAL	5798	5060	5561	4463	3480	6653	6463	9259	17774	7474	4747	3495
MEAN	187	169	179	144	124	215	215	299	592	241	153	117
MAX	236	194	279	294	140	362	269	455	812	527	333	163
MIN	153	120	120	90	110	100	179	188	393	91	95	66
AC-FT	11500	10040	11030	8850	6900	13200	12820	18370	35250	14820	9420	6930

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 1998, BY WATER YEAR (WY)

MEAN	158	156	138	144	208	327	327	629	857	281	125	134
MAX	276	248	223	366	610	987	748	2852	1981	1333	382	267
(WY)	1979	1979	1979	1975	1971	1972	1965	1978	1968	1975	1975	1978
MIN	67.6	84.6	68.7	71.6	70.3	92.7	54.8	71.9	117	8.50	2.46	19.1
(WY)	1957	1986	1962	1988	1989	1961	1961	1961	1961	1961	1961	1960

e--Estimated.

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1954 - 1998	
ANNUAL TOTAL	129672		80227			
ANNUAL MEAN	355		220		290	
HIGHEST ANNUAL MEAN					676	1975
LOWEST ANNUAL MEAN					70.4	1961
HIGHEST DAILY MEAN	1940	Jun 9	812	Jun 21	15800	May 20 1978
LOWEST DAILY MEAN	60	Jan 12	66	Sep 11	.30	Aug 5 1961
ANNUAL SEVEN-DAY MINIMUM	81	Jan 10	78	Sep 5	.40	Aug 3 1961
INSTANTANEOUS PEAK FLOW			1230	Jul 5	a22600	May 19 1978
INSTANTANEOUS PEAK STAGE			4.12	Jul 5	b11.78	Mar 20 1960
INSTANTANEOUS LOW FLOW			66	Sep 12	c.20	Aug 7 1961
ANNUAL RUNOFF (AC-FT)	257200		159100		210200	
10 PERCENT EXCEEDS	856		411		633	
50 PERCENT EXCEEDS	194		179		169	
90 PERCENT EXCEEDS	100		110		80	

a--Gage height, 11.20 ft.
b--Site and datum then in use, backwater from ice.
c--Determined by discharge measurement.
e--Estimated.

06294500 Bighorn River above Tullock Creek, near Bighorn, Mont.

LOCATION.--Lat 46°07'29", long 107°28'06", in $SE^1/_4SE^1/_4NE^1/_4$ sec.3, T.4 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank 1.9 mi upstream from Tullock Creek, 3.6 mi southwest of Bighorn, 4.5 mi southeast of Custer, and at river mile 3.0.

DRAINAGE AREA.--22,414 mi^2. Area at site used Oct. 7, 1955, to Sept. 30, 1981, 22,885 mi^2.

PERIOD OF RECORD.--October 1981 to current year. Previously published as "06294700 Bighorn River at Bighorn, MT" 1956-81, and as "near Custer" 1945-55. Flows are equivalent at all sites.

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft above sea level, from topographic map. May 11, 1945 to Dec. 6, 1945, nonrecording gage, and Dec. 7, 1945 to Oct. 6, 1955, water-stage recorder 1.7 mi upstream at different datum. Oct. 7, 1955 to Sept. 30, 1981, at site 2.3 mi downstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Bighorn Lake beginning November 1965 (usable capacity, 1,356,000 acre-ft). Major regulation prior to November 1965 by 14 reservoirs in Wyoming and 1 in Montana with combined usable capacity of about 1,400,000 acre-ft. Diversion for irrigation of about 445,200 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4590	5530	3160	e2950	3970	4120	4460	5700	3630	5680	4720	4360
2	4730	5570	3250	e2950	3980	4130	4660	5730	3540	5340	4750	4310
3	4980	5570	3210	e2950	3960	4130	4790	5960	3480	5500	4900	4310
4	5050	5640	3210	e2950	3920	4170	5030	6010	3540	6060	5100	4290
5	5110	5470	3190	e2950	3840	4140	5010	5960	3570	6970	5510	4310
6	5200	4910	3070	3010	3850	4060	5040	5800	3510	7200	5830	4360
7	5250	4320	2780	3090	3820	4100	5030	e5800	3450	7250	5750	4320
8	5280	3830	2790	3100	3820	4050	5120	e5500	3860	7620	5780	4260
9	5380	3500	2840	3200	3800	4060	5100	e5000	4090	7640	5730	4200
10	5370	3480	2920	e3200	3810	4100	5220	e4800	4080	7570	5650	4160
11	5440	3470	2850	e2500	3900	4000	5510	e4600	4080	7470	5580	4130
12	5600	3460	2850	e3000	4080	3870	5510	e4450	4080	7400	5490	4200
13	5630	3470	2870	e3200	4110	3840	5500	4350	4140	7370	5390	4230
14	5750	3430	2890	e3200	4110	3890	5430	3870	4430	7080	5330	4130
15	5840	3250	2920	e3200	4080	3970	5480	3470	4270	6900	5350	4130
16	5570	2870	e2900	e3200	4120	4040	5490	3430	4170	6840	5330	4110
17	4820	2930	e2900	e3200	4090	4180	5500	3380	4130	6840	5300	3980
18	3870	2990	e2900	e3200	4050	4260	5460	3370	4200	6850	5280	4220
19	3360	3010	e2900	e3400	4030	4180	5460	3320	4100	6820	5250	4760
20	2970	2990	e2900	3410	4060	4160	5420	3260	4120	6790	5100	4690
21	2460	3050	e2900	3390	4090	4250	5430	3270	4130	6460	4950	4680
22	2050	3040	e2900	3370	4260	4280	5450	3500	4080	5660	4690	4670
23	2050	3010	e2900	3380	4200	4280	5290	e3500	4030	4760	4530	4830
24	3400	3050	e2900	3370	4190	4320	5450	e3500	4070	3950	4460	5010
25	3240	3140	e2900	3390	4230	4340	5430	e3550	3980	4000	4380	e5000
26	4080	3080	e2950	3420	4180	4360	5450	e3600	4150	3990	4320	e5000
27	4130	3150	e2950	3600	4150	4360	5430	3610	4750	4010	4360	e5000
28	4520	3130	e2950	3870	4140	4320	5380	3550	5370	4170	4290	e5000
29	5400	3160	e2950	3880	---	4370	5640	3520	5840	4510	4350	5000
30	5460	3180	e2950	3840	---	4350	5720	3590	5810	4570	4390	5010
31	5510	---	e2950	3890	---	4370	---	3660	---	4640	4360	---
TOTAL	142090	110680	91500	101260	112840	129050	158890	132610	124680	187910	156200	134660
MEAN	4584	3689	2952	3266	4030	4163	5296	4278	4156	6062	5039	4489
MAX	5840	5640	3250	3890	4260	4370	5720	6010	5840	7640	5830	5010
MIN	2050	2870	2780	2500	3800	3840	4460	3260	3450	3950	4290	3980
AC-FT	281800	219500	181500	200800	223800	256000	315200	263000	247300	372700	309800	267100

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1998, BY WATER YEAR (WY)

MEAN	3273	3363	3193	3060	3241	3770	3616	4448	7189	5513	2891	2900
MAX	5546	5599	4907	5478	5314	6580	7881	9102	15180	19090	6972	4952
(WY)	1972	1974	1968	1968	1971	1972	1997	1947	1948	1967	1997	1973
MIN	1391	1223	1280	1382	1843	908	1063	1304	1050	707	868	1009
(WY)	1990	1978	1961	1961	1966	1966	1966	1966	1966	1960	1961	1966

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1945 - 1998	
ANNUAL TOTAL	2087340		1582370			
ANNUAL MEAN	5719		4335		3853	
HIGHEST ANNUAL MEAN					5594	1997
LOWEST ANNUAL MEAN					1623	1961
HIGHEST DAILY MEAN	15000	Jun 19	7640	Jul 9	50000	May 20 1978
LOWEST DAILY MEAN	2050	Oct 22	2050	Oct 22	400	Apr 4 1967
ANNUAL SEVEN-DAY MINIMUM	2790	Oct 19	2790	Oct 19	528	May 6 1961
INSTANTANEOUS PEAK FLOW			a7790	Jul 8	c59200	May 20 1978
INSTANTANEOUS PEAK STAGE			b7.97	Jan 16	b14.21	Apr 2 1965
INSTANTANEOUS LOW FLOW					d275	Nov 15 1959
ANNUAL RUNOFF (AC-FT)	4140000		3139000		2791000	
10 PERCENT EXCEEDS	8260		5650		6450	
50 PERCENT EXCEEDS	5220		4160		3250	
90 PERCENT EXCEEDS	3010		2960		1840	

SUMMARY STATISTICS	WATER YEARS 1946 - 1961*		WATER YEARS 1967 - 1997**	
ANNUAL MEAN	3358		3965	
HIGHEST ANNUAL MEAN	5501	1947	5594	1997
LOWEST ANNUAL MEAN	1623	1961	1999	1989
HIGHEST DAILY MEAN	25700	Jun 23 1947	50000	May 20 1978
LOWEST DAILY MEAN	462	May 12 1961	400	Apr 4 1967
ANNUAL SEVEN-DAY MINIMUM	528	May 6 1961	843	Nov 18 1977
INSTANTANEOUS PEAK FLOW	f26200	Jun 24 1947	59200	May 20 1978
INSTANTANEOUS PEAK STAGE	b10.65	Mar 20 1947	14.15	May 20 1978
INSTANTANEOUS LOW FLOW	d275	Nov 15 1959		
ANNUAL RUNOFF (AC-FT)	2578000		2872000	
10 PERCENT EXCEEDS	6200		6390	
50 PERCENT EXCEEDS	2810		3500	
90 PERCENT EXCEEDS	1500		2000	

*--Prior to construction of Yellowtail Dam.
**--After completion of Yellowtail Dam.
a--Gage height, 4.52 ft.
b--Backwater from ice. Stage may have been higher during period of no gage-height record.
c--Gage height 14.15 ft, at different site and datum.
d--About, result of freezeup.
e--Estimated.
f--Gage height, 8.79 ft, at different site and datum.

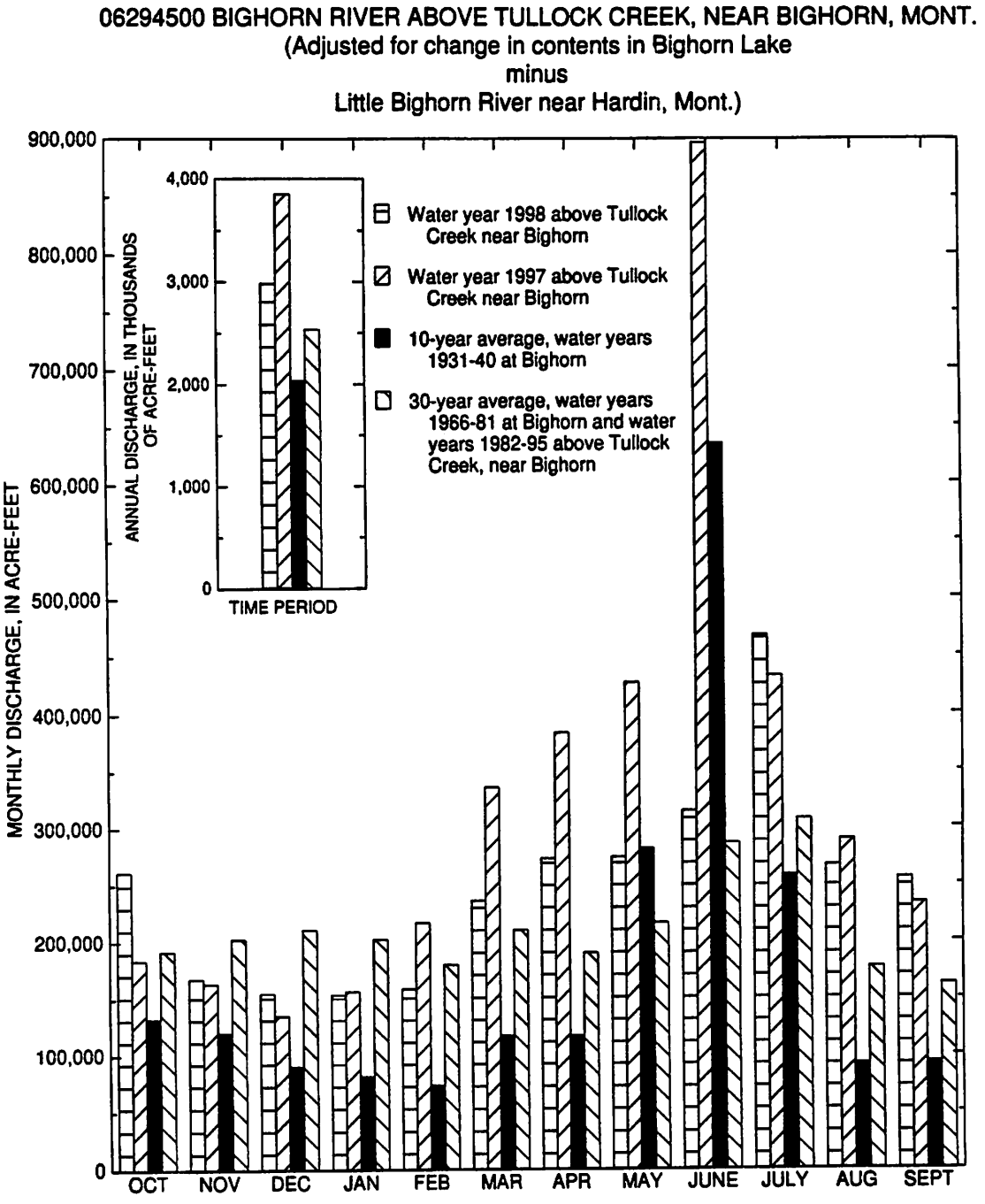


Figure 2. Comparison of discharge of the Bighorn River during water year 1998 with discharge during water year 1997 and with 10-year and 30-year average discharges.

06308500 Tongue River at Miles City, Mont.

LOCATION.--Lat 46°23'05", long 105°50'41", in $SE^1/_4SE^1/_4SE^1/_4$ sec. 4, T.7 N., R.47 E., Custer County, Hydrologic Unit 10090102, on right bank 1.5 mi south of Miles City and at river mile 2.3.

DRAINAGE AREA.--5,397 mi^2. Area at site used prior to Oct. 4, 1995, 5,379 mi^2.

PERIOD OF RECORD.--April 1938 to April 1942, April 1946 to current year. Published as "near Miles City" April 1938 to April 1942. Not equivalent to records published as "near Miles City" May 1929 to October 1932. April 1946 to Oct. 4, 1995, at site 2.5 mi upstream. Flows at present site are equivalent with site operated from 1946. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,360 ft above sea level, from topographic map. April 1938 to April 1942, nonrecording gage at site 8 mi upstream at different datum. April 1946 to Sept. 30, 1963, at datum 1.00 ft higher. Oct. 4, 1995, gage was moved 2.5 miles downstream.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulation by Tongue River Reservoir (station 06307000), and many small reservoirs in Wyoming (combined capacity about 15,000 acre-ft). Diversions for irrigation of about 100,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	412	290	e260	e200	e220	e200	392	360	76	827	82	409
2	426	282	e240	e150	e200	e190	366	357	83	834	128	377
3	409	286	e200	e130	e210	e180	371	355	91	815	249	346
4	190	288	e150	e150	e220	e160	368	351	86	720	285	337
5	113	288	e110	e200	e230	e150	373	263	78	762	214	360
6	90	298	e120	e210	e240	e140	392	207	89	802	189	357
7	81	312	e130	e210	e250	e150	367	203	92	739	165	384
8	77	325	e150	e190	e240	e140	369	312	105	672	147	397
9	98	336	e140	e170	e240	e140	371	509	135	625	135	388
10	129	330	e140	e130	e250	e130	363	549	142	606	139	384
11	164	331	e160	e110	e260	e150	368	567	146	444	160	396
12	194	e270	e190	e90	e270	e180	377	564	138	401	150	431
13	242	e240	e180	e130	e280	e210	340	551	142	320	109	418
14	217	e190	e170	e150	e270	e250	421	440	150	260	147	376
15	251	e140	e180	e170	e260	e260	424	290	176	210	148	368
16	594	e120	e200	e160	e250	e340	423	183	152	163	186	360
17	1010	e120	e210	e150	e290	e480	409	149	189	141	240	333
18	715	e130	e190	e170	e320	e460	392	146	175	116	267	324
19	479	e140	e170	e160	e340	e380	379	123	161	79	243	414
20	419	e150	e180	e160	e360	e380	372	85	155	77	266	521
21	322	e160	e190	e160	e320	430	371	90	154	71	311	655
22	357	e170	e180	e160	e280	460	372	95	180	65	346	723
23	344	e180	e180	e150	e260	599	372	74	570	64	399	737
24	334	e180	e190	e180	e250	660	365	66	843	59	399	749
25	331	e170	e220	e190	e240	579	371	66	812	53	327	790
26	327	e180	e250	e200	e230	513	364	58	825	64	348	865
27	320	e180	e260	e210	e220	484	365	52	847	59	394	953
28	315	e200	e240	e230	e210	431	365	59	857	59	341	982
29	314	e220	e220	e240	---	410	364	56	855	70	354	985
30	310	e240	e210	e260	---	488	367	53	849	73	369	806
31	297	---	e220	e240	---	455	---	61	---	84	405	---
TOTAL	9881	6746	5830	5410	7210	10179	11313	7294	9353	10334	7642	15925
MEAN	319	225	188	175	258	328	377	235	312	333	247	531
MAX	1010	336	260	260	360	660	424	567	857	834	405	985
MIN	77	120	110	90	200	130	340	52	76	53	82	324
AC-FT	19600	13380	11560	10730	14300	20190	22440	14470	18550	20500	15160	31590

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1998, BY WATER YEAR (WY)*

MEAN	246	258	194	194	287	555	458	724	1301	486	188	208
MAX	694	585	423	502	1794	1783	1693	2983	3825	2207	700	599
(WY)	1972	1942	1950	1975	1971	1971	1965	1978	1978	1975	1975	1968
MIN	10.3	60.9	68.0	78.6	102	79.8	12.5	29.2	48.6	12.6	6.08	2.40
(WY)	1961	1989	1990	1961	1961	1961	1961	1961	1960	1960	1949	1938

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1938 - 1998*	
ANNUAL TOTAL	214791		107117			
ANNUAL MEAN	588		293		422	
HIGHEST ANNUAL MEAN					986	1978
LOWEST ANNUAL MEAN					57.2	1961
HIGHEST DAILY MEAN	3000	Feb 19	1010	Oct 17	9290	Jun 15 1962
LOWEST DAILY MEAN	55	Jan 27	52	May 27	.00	Jul 9 1940
ANNUAL SEVEN-DAY MINIMUM	73	Jan 10	58	May 25	.00	Jul 9 1940
INSTANTANEOUS PEAK FLOW			1250	Jun 24	a13300	Jun 15 1962
INSTANTANEOUS PEAK STAGE			4.60	Jun 24	13.27	Mar 19 1960
INSTANTANEOUS LOW FLOW					b.00	Jul 9 1940
ANNUAL RUNOFF (AC-FT)	426000		212500		305600	
10 PERCENT EXCEEDS	1200		556		974	
50 PERCENT EXCEEDS	459		240		230	
90 PERCENT EXCEEDS	150		94		72	

*--During period of operation (April 1938 to April 1942, April 1946 to current year).
a--At previous site and datum.
b--Also occurred on several other days in 1940.
e--Estimated.

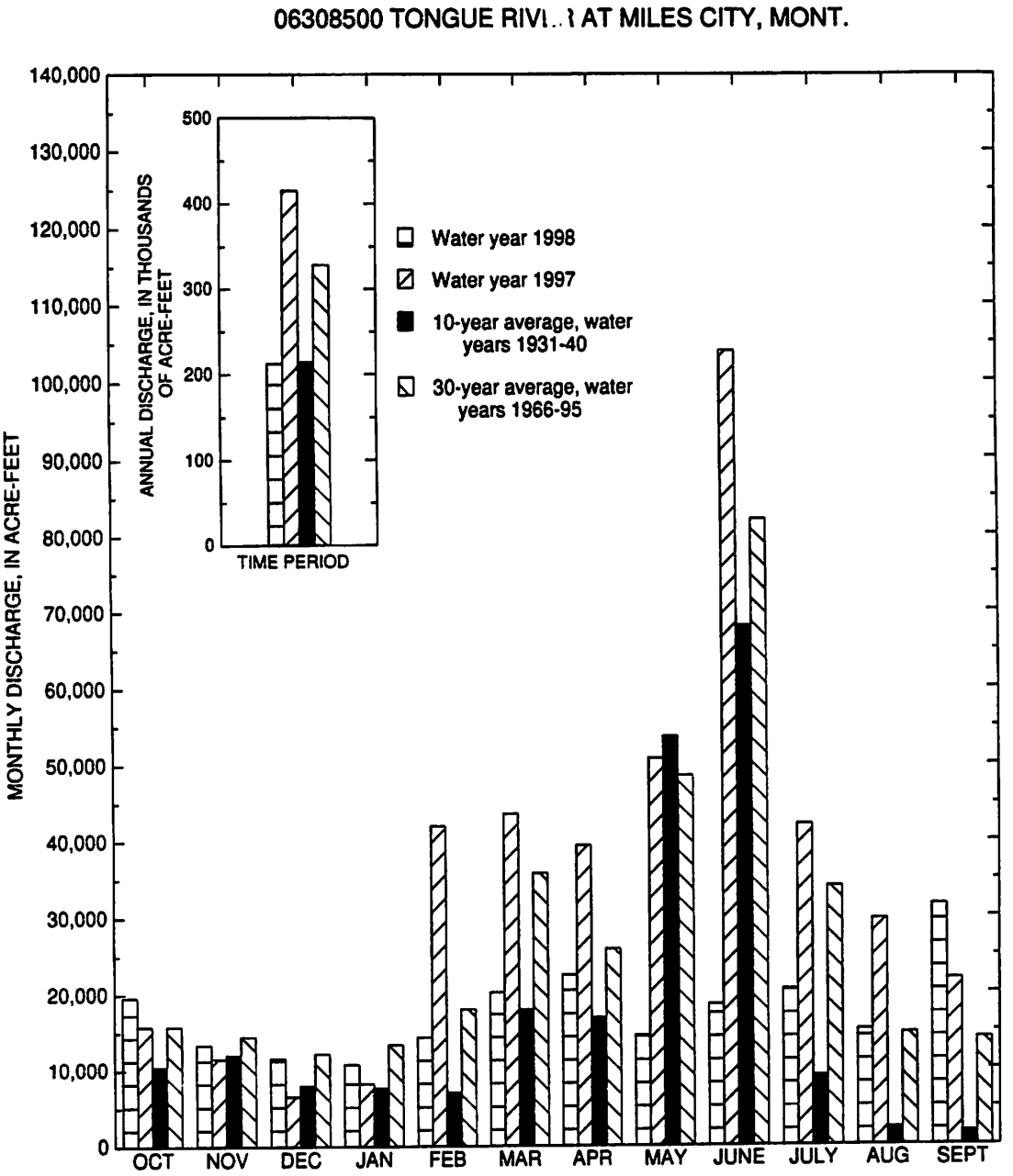


Figure 3. Comparison of discharge of the Tongue River during water year 1998 with discharge during water year 1997 and with 10-year and 30-year average discharges.

06326500 Powder River near Locate, Mont.

LOCATION.--Lat 46°25'48", long 105°18'34", in $SW^1/_4SW^1/_4SE^1/_4$ sec. 23, T.8 N., R.51 E., Custer County, Hydrologic Unit 10090209, on left bank at downstream side of bridge on U.S. Highway 12, 0.1 mi west of Locate, and 25 mi east of Miles City, and at river mile 29.4.
DRAINAGE AREA.--13,189 mi^2.
PERIOD OF RECORD.--March 1938 to current year.
REVISED RECORDS.--WSP 926: 1939. WSP 1309: 1938-39 (M). WSP 1729: Drainage area.
GAGE.--Water-stage recorder. Datum of gage is 2,384.79 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage at bridge 1.5 mi upstream, and July 11, 1947 to Sept. 30, 1965, water-stage recorder at site near upstream bridge at different datum. Oct. 1, 1965 to Oct. 4, 1966, nonrecording gage, and Oct. 5, 1966 to Mar. 21, 1978, water-stage recorder at present site and datum. Mar. 22, 1978 to Apr. 23, 1981, water-stage recorder 1.5 mi upstream at different datum, Apr. 24 to Aug. 20, 1981, water-stage recorder at present site and datum, and Aug. 21, 1981 to Sept. 30, 1981, water-stage recorder 1.5 mi upstream at different datum. Oct. 1, 1981 to Apr. 5, 1995 water-stage recorder at site 1.5 miles downstream at different datum. Apr. 7, 1995 to present, water-stage recorders located on each bank and used depending on control conditions.
REMARKS.--Discharge records fair except those for estimated daily discharges, which are poor. Some regulation by three reservoirs in Wyoming with combined usable capacity of 36,800 acre-ft. Diversions for irrigation of about 101,800 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e500	463	e260	e270	e280	e250	1130	1130	890	1020	88	236
2	491	422	e250	e240	e270	e240	1070	1100	853	1130	140	211
3	502	426	e230	e200	e280	e230	971	1090	862	1050	202	188
4	505	455	e220	e210	e290	e230	929	1220	785	1190	404	171
5	442	504	e210	e220	e300	e230	938	1450	735	1200	891	151
6	404	487	e200	e220	e310	e230	962	1660	712	1820	780	131
7	397	470	e210	e210	e320	e240	975	1670	717	1820	924	113
8	421	471	e220	e170	e310	e240	947	1660	722	1580	1630	93
9	454	483	e230	e160	e300	e230	897	1630	704	1460	e1500	107
10	426	449	e240	e140	e300	e210	848	1690	629	1440	e1300	104
11	419	398	e240	e120	e310	e210	827	1760	707	1250	e1100	114
12	425	389	e250	e100	e330	e300	801	1620	853	1030	e900	97
13	414	420	e260	e110	e350	e340	847	1530	982	917	e700	107
14	442	e340	e270	e150	e340	e400	815	1460	1020	834	538	135
15	442	e250	e260	e210	e330	e500	729	1310	1060	726	548	128
16	452	e200	e260	e200	e340	e700	697	1320	973	661	502	100
17	487	e230	e280	e200	e330	e900	725	1300	1060	586	476	951
18	464	e260	e260	e210	e320	e1200	e800	1260	1130	479	547	1020
19	387	e250	e240	e200	e340	e1400	e900	1200	1070	393	485	872
20	381	e240	e240	e200	e370	e1600	e1100	1170	1070	330	464	709
21	394	e240	e250	e200	e380	e1400	1270	1210	1100	273	681	589
22	369	e240	e240	e200	e390	e1300	1260	1190	1160	214	581	485
23	371	e250	e240	e190	e380	e1200	1120	1290	1360	171	510	439
24	359	e270	e240	e230	e370	e1100	1080	1230	1370	136	591	417
25	355	e270	e230	e250	e360	e1100	1080	1290	1280	114	546	381
26	366	e260	e240	e260	e320	1220	1070	1310	1170	103	461	373
27	364	e270	e250	e270	e280	1330	974	1210	1290	72	393	394
28	373	e280	e240	e280	e250	1280	982	1070	1210	76	320	464
29	410	e260	e250	e290	---	1320	1060	929	1160	46	295	484
30	440	e250	e250	e300	---	1350	1170	935	1140	64	281	418
31	432	---	e260	e290	---	1250	---	934	---	112	258	---
TOTAL	13088	10197	7520	6500	9050	23730	28974	40828	29774	22297	19036	10182
MEAN	422	340	243	210	323	765	966	1317	992	719	614	339
MAX	505	504	280	300	390	1600	1270	1760	1370	1820	1630	1020
MIN	355	200	200	100	250	210	697	929	629	46	88	93
AC-FT	25960	20230	14920	12890	17950	47070	57470	80980	59060	44230	37760	20200

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1998, BY WATER YEAR (WY)

MEAN	250	213	148	142	449	1292	757	1168	1673	591	226	173
MAX	921	427	417	476	3850	4627	3063	5970	8045	2015	1096	898
(WY)	1941	1987	1942	1981	1943	1972	1965	1978	1944	1993	1941	1941
MIN	1.77	12.5	12.5	4.53	2.82	80.2	109	142	123	14.4	1.30	.19
(WY)	1961	1961	1961	1950	1950	1950	1961	1961	1966	1988	1988	1960

SUMMARY STATISTICS	FOR 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1939 - 1998	
ANNUAL TOTAL	305290		221176			
ANNUAL MEAN	836		606		590	
HIGHEST ANNUAL MEAN					1622	1944
LOWEST ANNUAL MEAN					79.4	1961
HIGHEST DAILY MEAN	4800	Mar 20	1820	Jul 6	26000	Feb 19 1943
LOWEST DAILY MEAN	100	Jan 27	46	Jul 29	.00	Jan 16 1950
ANNUAL SEVEN-DAY MINIMUM	127	Jan 11	80	Jul 26	.00	Jan 16 1950
INSTANTANEOUS PEAK FLOW			a unknown		31000	Feb 19 1943
INSTANTANEOUS PEAK STAGE			b unknown		b12.20	Mar 16 1978
INSTANTANEOUS LOW FLOW			42	Jul 30	c.00	
ANNUAL RUNOFF (AC-FT)	605500		438700		427400	
10 PERCENT EXCEEDS	1800		1270		1380	
50 PERCENT EXCEEDS	512		421		240	
90 PERCENT EXCEEDS	210		200		42	

a--Peak not determined but occurred during snowmelt runoff or Aug. 9, 10.
b--Backwater from ice.
c--On many days in 1950, 1960-61, and 1988.
e--Estimated.

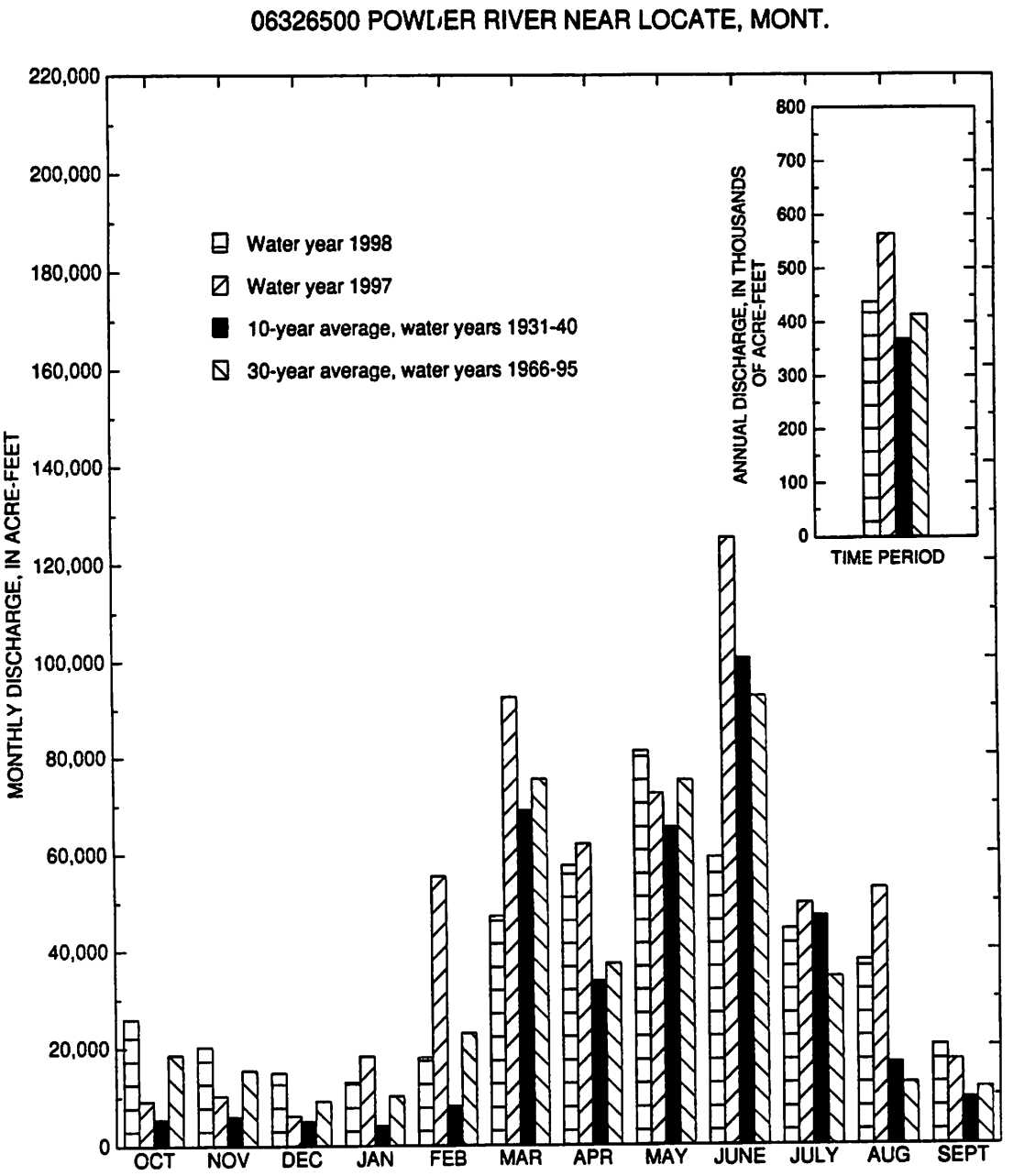


Figure 4. Comparison of discharge of the Powder River during water year 1998 with discharge during water year 1997 and with 10-year and 30-year average discharges.

MONTHLY SUMMARY OF CONTENTS FOR COMPACT RESERVOIRS COMPLETED AFTER JANUARY 1, 1950

06258900 Boysen Reservoir, Wyo.

LOCATION.--Lat 43°25'00", long 108°10'37", in NW1/4NW1/4 sec. 16, T.5 N., R.6 E., Fremont County, Hydrologic Unit 10080005, at dam on Wind River and 13 mi north of Shoshoni, Wyoming.

DRAINAGE AREA.--7,700 mi^2.

PERIOD OF RECORD.--October 1951 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is feet above sea level (levels by Bureau of Reclamation).

REMARKS.--Reservoir is formed by rock-fill dam completed in October 1951. Storage began Oct. 11, 1951. Usable capacity, 701,500 acre-ft between elevation 4,657.00 ft, invert of penstock pipe, and 4,725.00 ft, top of spillway gate. Dead storage, 40,080 acre-ft below elevation 4,657.00 ft. Prior to Jan. 1, 1966, usable capacity was 757,800 acre-ft and dead storage was 62,000 acre-ft at same elevations. Between January 1966 and October 1996, usable capacity was 742,100 acre-ft and dead storage was 59,880 acre-ft, at same elevations. Crest of dam is at elevation 4,758.00 ft. Figures given herein represent usable contents. Water used for irrigation, flood control, and power development.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 862,500 acre-ft, July 6, 7, 1967, elevation, 4,730.83 ft; minimum daily contents since normal use of water started, 191,900 acre-ft, Mar. 18, 19, 1956, elevation, 4,684.18 ft, capacity table then in use.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 707,600 acre-ft, July 9, 10, elevation, 4,725.31 ft; minimum daily contents, 460,400 acre-ft, May 26, elevation, 4,710.56 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 1997	4,720.47	616,600	---
October 31	4,719.27	595,500	-21,100
November 30	4,720.00	608,300	+12,800
December 31	4,718.89	588,900	-19,400
January 31, 1998	4,717.72	569,100	-19,800
February 28	4,716.61	551,000	-18,100
March 31	4,715.26	529,600	-21,400
April 30	4,711.42	472,600	-57,000
May 31	4,711.06	467,400	-5,200
June 30	4,722.31	650,200	+182,800
July 31	4,724.97	700,900	+50,700
August 31	4,722.28	649,600	-51,300
September 30, 1998	4,719.27	595,500	-54,100
1998 water year			-21,100

06260300 Anchor Reservoir, Wyo.

LOCATION.--Lat 43°39'50", long 108°49'27", in sec. 26, T.43 N., R.100 W., Hot Springs County, Hydrologic Unit 10080007, at dam on South Fork Owl Creek, 2 mi downstream from Middle Fork, 3 mi southeast of Anchor, and 32 mi west of Thermopolis.

DRAINAGE AREA.--131 mi^2.

PERIOD OF RECORD.--November 1960 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is feet above sea level (Bureau of Reclamation benchmark).

REMARKS.--Reservoir is formed by concrete arch dam completed in 1960. Usable capacity, 17,160 acre-ft between elevation 6,343.75 ft, invert of river outlet, and 6,441.00 ft, spillway crest, including 68 acre-ft below elevation 6,343.75 ft. Prior to Oct. 1, 1971, usable capacity was 17,280 acre-ft, including 149 acre-ft below the invert. Figures given herein represent usable contents. Water is used for irrigation of land in Owl Creek basin.

COOPERATION.--Records furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily contents, 9,250 acre-ft, July 4, 1967, elevation, 6,418.52 ft; no usable storage on many days some years.

EXTREMES FOR CURRENT YEAR.--Maximum daily contents, 5,960 acre-ft, July 14, elevation, 6,407.60 ft; minimum daily contents, 163 acre-ft, many days, elevation, 6,350.70 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 1997	6,360.00	414	---
October 31	6,352.50	202	-212
November 30	6,351.50	181	-21
December 31	6,350.70	163	-18
January 31, 1998	6,350.70	163	0
February 28	6,351.60	183	+20
March 31	6,362.50	514	+331
April 30	6,369.20	864	+350
May 31	6,382.50	1,970	+1,106
June 30	6,392.20	3,190	+1,220
July 31	6,397.00	3,940	+750
August 31	6,370.00	915	-3,025
September 30, 1998	6,365.00	628	-287
1998 water year			+214

06286400 Bighorn Lake near St. Xavier, Mont.

LOCATION.--Lat 45°18'27", long 107°57'26", in $SW^1/_4SE^1/_4$ sec.18, T.6 S., R.30 E., Big Horn County, Hydrologic Unit 10080010, in block 13 of Yellowtail Dam on Bighorn River, 1.3 mi upstream from Grapevine Creek, 15.5 mi southwest of St. Xavier, and at river mile 86.6.

DRAINAGE AREA.--19,626 mi^2.

PERIOD OF RECORD.--November 1965 to current year (monthend contents only). Prior to October 1969, published as "Yellowtail Reservoir." Records of daily elevations and contents on file in Helena district office.

GAGE.--Water-stage recorder in powerhouse control room. Datum of gage is referenced to sea level (levels by Bureau of Reclamation).

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961; completed in 1967. Storage began Nov. 3, 1965. Usable capacity, 1,312,000 acre-ft, between elevation 3,296.50 ft, river outlet invert, and 3,657.00 ft, top of flood control. Elevation of spillway crest, 3,593.00 ft. Normal maximum operating level, 1,097,000 acre-ft, elevation, 3,640.00 ft. Minimum operating level, 483,400 acre-ft, elevation, 3,547.00 ft. Dead storage, 16,010 acre-ft, below elevation 3,296.50 ft. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, and recreation.

COOPERATION.--Elevations and capacity table furnished by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,346,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum since first filling, 641,900 acre-ft, Apr. 14, 1989, elevation 3,583.30 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,088,000 acre-ft, Aug. 6, elevation, 3,642.60 ft; minimum, 817,200 acre-ft, May 9 and 10, elevation, 3,614.50 ft.

Month	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 1997	3,638.21	1,032,000	--
October 31	3,637.45	1,023,000	-9,000
November 30	3,633.69	980,900	-42,100
December 31	3,632.15	964,800	-16,100
January 31, 1998	3,628.14	926,000	-38,800
February 28	3,621.28	867,600	-58,400
March 31	3,620.37	860,400	-7,200
April 30	3,616.40	830,700	-29,700
May 31	3,620.27	859,700	+29,000
June 30	3,631.86	961,900	+102,200
July 31	3,641.32	1,071,000	+109,100
August 31	3,638.62	1,037,000	-34,000
September 30, 1998	3,638.18	1,032,000	-5,000
1998 water year			0

MONTHLY SUMMARY OF CONTENTS FOR COMPACT RESERVOIRS EXISTING ON JANUARY 1, 1950

The extent, if any, of the use of reservoirs in this section which may be subject to Compact allocations was not determined. As a matter of hydrologic interest the monthend usable contents in acre-feet of four reservoirs are given. The first three reservoirs are in the Bighorn River basin, Wyoming, and data on contents were furnished by the Bureau of Reclamation. The Tongue River Reservoir in Montana is operated under the supervision of the Water Resources Division of the Montana Department of Natural Resources and Conservation, which furnished the water level data.

	Usable contents, in acre-feet			
Month	06224500 Bull Lake	Pilot Butte Reservoir	06281500 Buffalo Bill Reservoir	06307000 Tongue River Reservoir
September 30, 1997	120,700	26,970	566,500	6,650
October 31	102,800	24,670	555,900	5,940
November 30	97,840	24,360	554,000	5,820
December 31	97,170	24,340	544,900	5,940
January 31, 1998	96,420	23,770	535,800	5,090
February 28	95,220	23,710	525,900	7,050
March 31	94,660	23,830	518,400	9,660
April 30	95,460	26,070	491,300	9,880
May 31	116,200	20,140	496,700	25,050
June 30	143,000	25,720	621,600	49,860
July 31	147,500	22,970	633,500	40,400
August 31	138,600	21,390	580,800	28,790
September 30, 1998	114,900	19,830	520,500	5,880
Change in contents during water year	-5,800	-7,140	-46,000	-770

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, is administered under the following rules and regulations 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 streamflow 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 near Silesia, Montana and located in NW1/4 SE1/4 sec. 1, T. 4 S., R. 23 E., shall be the point of measurement for the Clarks Fork.

2. Bighorn River (exclusive of Little Bighorn River)

The gaging station known as the Bighorn River above Tullock Creek, near Bighorn, Montana, and located in SE1/4 SE1/4 NE1/4 sec. 3, 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 SE1/4 NE1/4 NE1/4 sec. 19, 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 NE1/4 NE1/4 SE1/4 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 NW1/4 SW1/4 sec. 14, 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 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 are 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 at the office of the Chairman of the Commission.

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.

B. The Geological Survey shall 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 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.

Gary Fritz
Commissioner for Montana

George L. Christopulos
Commissioner for Wyoming

ATTESTED:

L. Grady Moore
Federal Representative

Adopted November 17, 1953
Amended December 16, 1986

RULES FOR THE RESOLUTION OF DISPUTES OVER THE ADMINISTRATION OF THE YELLOWSTONE RIVER COMPACT

December 19, 1995

Section I. General Framework

According to Article III(F) of the Yellowstone River Compact.

"In case of the failure of the representatives of Wyoming and Montana to unanimously agree on any matter necessary to the proper administration of this compact, then the member selected by the director of the United States Geological Survey shall have the right to vote upon the matters in disagreement and such points of disagreement shall then be decided by a majority vote of the representatives of the states of Wyoming and Montana and said member selected by the director of the United States geological survey, each being entitled to one vote."

Section II. Purpose and Goal

A. The purpose of these rules is to clarify and more fully develop the dispute resolution process outlined in Section I.

B. The goal of the dispute resolution process outlined in these rules is to encourage joint problem solving and consensus building. It consists of three phases -- unassisted negotiation, facilitation, and voting.

C. Any agreement reached through this process is binding on Montana, Wyoming, and the United States Geological Survey (USGS).

D. Either state can initiate the dispute resolution process defined in Sections IV, V, and VI, and the other state is obligated to participate in good faith. The states agree that the issues pursued under this dispute resolution process shall be both substantive and require timely resolution.

Section III. Consensus

A. In the process of administering the Yellowstone River Compact, the representatives from Montana and Wyoming agree to seek consensus.

B. For purposes of this rule, consensus is defined as an agreement that is reached by identifying the interests of Montana and Wyoming and then building an integrative solution that maximizes the satisfaction of as many of the interests as possible. The process of seeking consensus does not involve voting, but a synthesis and blending of alternative solutions.

Section IV. Unassisted Negotiation

A. In all situations, the representatives from Montana and Wyoming shall first attempt to seek consensus through unassisted negotiation. The federal representative will not serve as chairperson in the unassisted negotiation process.

B. During a negotiation process, the representatives from Montana and Wyoming shall identify issues about which they differ, educate each other about their needs and interests, generate possible resolution options, and collaboratively seek a mutually acceptable solution.

C. To help facilitate negotiations, the representatives from Montana and Wyoming in cooperation with the USGS agree to share technical information and develop joint data bases. Other data sources may also be used.

D. The USGS shall serve as technical advisor in the two-state negotiations.

Section V. Facilitation

A. If the representatives from Montana and Wyoming are not able to reach consensus through unassisted negotiation, they shall each identify, articulate, and exchange, in writing, the unresolved issues.

B. The representatives from Montana and Wyoming shall then jointly appoint a facilitator to assist in resolving the outstanding dispute. If the representatives from Montana and Wyoming cannot identify a mutually acceptable facilitator, the representative appointed by the USGS shall appoint a facilitator.

C. A facilitator, for purposes of this rule, is defined as a neutral third party that shall help the representatives from Montana and Wyoming communicate, negotiate, and reach agreements voluntarily. The facilitator is not empowered to vote or render a decision.

D. The facilitator shall assist the representatives from Montana and Wyoming in developing appropriate ground rules for each facilitated session including establishing a deadline for completion of the facilitation process, setting an appropriate agenda, identifying issues, collecting and analyzing technical information, developing options, packaging agreements, and preparing a written agreement. The facilitator reserves the right to meet privately with each representative during the facilitation process.

Section VI. Voting

A. If, and only if, the representatives from Montana and Wyoming are unable to reach consensus with the assistance of a facilitator, then a dispute may be settled by voting.

B. The representatives from Montana and Wyoming, along with the representative appointed by the director of the USGS, are each entitled to one vote.

C. If the USGS representative does not vote in accordance with Article III, then the director of the USGS will select, with concurrence from Wyoming and Montana, a neutral third party to vote.

D. If the representative appointed by the director of the USGS is not involved in the steps outlined in Sections IV and V, each state shall have the opportunity to present appropriate information to that representative. This information may be presented through both oral presentations and written documents. All information will be shared with the other state.

The representative of the USGS may also consult the facilitator referenced in Section V in an attempt to resolve any disputes.

E. The USGS shall pay the expenses of the representative appointed by the director of the USGS.

F. Points of disagreement shall be resolved by a majority vote.

Section VII. Funding

A. The USGS will pay one-half and the states of Montana and Wyoming shall each pay one-quarter of the expenses of the facilitator, which shall not exceed $10,000, unless agreed to by both states and the USGS.

Section VIII. Amendments

A. These rules may be amended or revised by a unanimous vote of the Commission.

Section IX. Execution

These rules for the resolution of disputes over the administration of the Yellowstone River Compact are hereby executed on the date indicated below.

Gary Fritz
Commissioner for Montana

Gordon W. Fassett
Commissioner for Wyoming

William F. Horak
Federal Representative

July 22, 1996
Date

RULES FOR ADJUDICATING WATER RIGHTS ON INTERSTATE DITCHES

Article I. Purpose

The purpose of this rule is to determine and adjudicate, in accordance with the laws of Montana and Wyoming, those pre-Compact (January 1, 1950) water rights diverting from the Powder, Tongue, Bighorn and Clarks Fork Rivers and their tributaries where the point of diversion is in one State and the place of use is in the other State which have not yet been adjudicated.

Article II. Authority

In accordance with the Yellowstone River Compact, the State of Montana and the State of Wyoming, being moved by consideration of interstate comity, desire to remove all causes of present and future controversy between the States and between persons in one State and persons in another State with respect to these interstate ditches. Article III (E) of the Compact provides the Yellowstone River Compact Commission with the authority "...to formulate rules and regulations and to perform any act which they may find necessary to carry out the provisions of this Compact...."

Article III. Definitions

The terms defined in the Yellowstone River Compact apply as well as the following definitions:

1. "Acre-feet" means the volume of water that would cover 1 acre of land to a depth of 1 foot.

2. "Cfs" means a flow of water equivalent to a volume of 1 cubic foot that passes a point in 1 second of time and is equal to 40 miners inches in Montana.

3. "Interstate Ditches" shall include ditches and canals which convey waters of the Bighorn, Tongue, Powder, and Clarks Fork Rivers and their tributaries across the Wyoming-Montana State line where the water is diverted in one State and the place of use is in the other State.

4. "Department of Natural Resources and Conservation," hereafter called the "Department," means the administrative agency and Department of the Executive Branch of the Government of Montana created under Title II, Chapter 15, MCA which has the responsibility for water administration in that State.

5. "Water Court" means a Montana District Court presided over by a water judge, as provided for in Title III, Chapter 7, MCA.

6. "State Engineer" shall be the current holder of the position created by the Wyoming Constitution as Chief Water Administration Official for the State of Wyoming.

7. "Board of Control," hereinafter called the "Board," is defined as the constitutionally created water management agency in Wyoming composed of the four Water Division Superintendents and the State Engineer.

8. "Superintendent" is the member of the Board who is the water administration official for the Water Division where the interstate ditch is located. (The two Water Divisions in the Yellowstone River drainage are Water Division Numbers Two and Three.)

9. "Date of Priority" shall mean the earliest date of actual beneficial use of water, unless evidence and circumstances pertaining to a particular claim establish an earlier date.

10. "Point of Diversion" is defined to be the legal land description by legal subdivision, section, township, and range of the location of the diversion structure for an interstate ditch from a natural stream channel.

11. "Place of Use" is defined to be the legal land description (legal subdivision, section, township, and range) of the lands irrigated by an interstate ditch.

12. "Person" is defined as an individual, a partnership, a corporation, a municipality or any other legal entity, public or private.

13. "Claimant" is defined as any person claiming the use of water from an interstate ditch as herein defined.

Article IV. Procedures

The procedures for determining and adjudicating water rights associated with interstate ditches shall be categorized as follows: (A) Where the point of diversion is in Wyoming and place of use in Montana, and (B) Where the point of diversion is in Montana and place of use in Wyoming.

A. Wyoming Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim. (A sample form for this purpose is attached.)

2. The Yellowstone River Compact Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone Compact Commission, which, when found to be correct and complete, will be forwarded to the Board for verification.

4. Upon receipt of the form, the Board shall forward it to the appropriate Superintendent, who, in cooperation with the Department, will validate the information including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The Superintendent and the Department will utilize aerial photography and other information to have prepared a reproducible map showing the location of the ditch system, lands irrigated, point of diversion, etc., of the claim.

5. After the validation procedure, the Superintendent will hold a hearing, after appropriate notice and advertisement, at which time the claimant shall describe, in detail, the use that has been made of the water and the lands that are being irrigated, establish a priority date, etc. Costs incurred in advertising shall be paid by the claimant. If a single hearing is held to consider several claims, the costs of advertising shall be shared equally among the claimants. Anyone who opposes the claim shall appear and state the reasons, if any, for opposition to the claim. If there is no opposition to the claim, cost incurred in holding the hearing shall be paid by the claimant. If protestants do appear and oppose the claim, hearing costs will be paid 50 percent by the claimant and 50 percent by the protestant, or if there is more than one protestant, the remaining 50 percent shall be shared equally among the protestants.

6. At the conclusion of the hearing, the Superintendent shall forward the record to the Yellowstone River Compact Commission with his findings and recommendations. The Yellowstone River Compact Commission will make the

determination of the amount of the right, the location, and the priority date, and then send the record to the Board.

7. The Board shall review the record and integrate it into its water rights system. Upon entry of the record by the Board, the information shall be forwarded to the Department and the Chairman of the Yellowstone River Compact Commission.

8. Upon the entry of the right into the Board's records, it will have the following attributes:

   a. The right will be a Wyoming water right with a priority date as established by this procedure.

   b. The amount of the right will be determined as provided by Wyoming law.

B. Montana Procedure

1. The Yellowstone River Compact Commission will provide a claim form to be completed by the claimant that will describe the location and point of diversion and land being irrigated, the priority date claimed, method of irrigation and such other information required to describe the claim.

2. The Commission will send the claim form to water users on the interstate ditches.

3. Water users will complete the claim form and file it with the Yellowstone River Compact Commission, which, when found to be correct and complete, will be forwarded to the Department for verification.

4. Upon receipt of the form, the Department, in cooperation with the Wyoming State Engineer's Office, will validate the information, including the use that has been made of the water, the number of acres and location of lands being irrigated, the priority date, and all other relevant information. The appropriate Superintendent and the Department will utilize aerial photographs and other information to have prepared a reproducible map showing the location of the ditch system, land irrigated, point of diversion, etc., of the claim.

5. The Department will then forward the record to the Yellowstone River Compact Commission with its findings and recommendations. Upon approval by the Commission, the record shall be submitted to the Montana Water Court for adjudication. A duplicate record will be forwarded to the Wyoming State Engineer's Office, the Board, and the Chairman of the Yellowstone River Compact Commission upon adjudication.

6. Upon adjudication of the right by the Montana Water Court, it will have the following attributes:

   a) The right will be a Montana water right with a priority date as established by this procedure.

   b) The amount of the right will be determined as provided by Montana law.

Article V. Exclusions

A. These rules recognize the limitation in Article VI of the Yellowstone River Compact regarding Indian water rights.

B. These rules shall not be construed to determine or interpret the rights of the States of Wyoming and Montana to the waters of the Little Bighorn River.

Article VI. Claim Form Submission Period

All claims must be submitted to the Yellowstone River Compact Commission, c/o District Chief, United States Geological Survey, 821 E. Interstate, Bismarck, ND 58501, within 90 calendar days after the claimant has received the claim form from the Commission. The blank claim form will be sent certified mail to the water user and the submission period of 90 calendar days will begin with the next day following receipt of the form, as evidenced by the certified mail receipt card. For good cause shown in writing, an extension of time beyond the 90 days for submittal may be obtained from the Commission.

YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING	UNITED STATES	MONTANA
GORDON W. FASSETT STATE ENGINEER HERSCHLER BUILDING 4TH FLOOR EAST CHEYENNE, WYOMING 82002 (307) 777-7354	WILLIAM F. HORAK CHAIRMAN U.S. GEOLOGICAL SURVEY 821 E. INTERSTATE AVENUE BISMARCK, NORTH DAKOTA 58501 (701) 250-4601	GARY FRITZ ADMINISTRATOR, WATER RESOURCES DIVISION DEPT. OF NATURAL RESOURCES & CONSERVATION 1520 EAST SIXTH AVENUE HELENA, MONTANA 59620 (406) 444-6603

YELLOWSTONE RIVER COMPACT COMMISSION

CLAIM FORM FOR INTERSTATE DITCHES

1. Name of ditch or canal: _____

2. Source of water supply: _____

   Tributary of _____

3. Name of claimant: _____

   Address _____

   City _____ State _____ Zip Code _____

   Home Phone No. _____ Business Phone No. _____

4. Person completing form: _____

   Address _____

   City _____ State _____ Zip Code _____

   Home Phone No. _____ Business Phone No. _____

5. Method of irrigation: _____

6. Point of diversion: County _____ State _____

   Headgate located in the ___¼ ___¼, Section ____, T.___R.____

   (a) Description of headgate: (Briefly describe the materials and general features, date constructed or last known work, general condition.) _____

   _____

   _____

(b) Describe water measuring device: _____

_____ _____

_____

(c) If the point of diversion is in Montana:

1. What flow rate has been claimed?

_____ ☐ cubic feet per second

☐ gallons per minute

☐ miner's inches

2. What volume of water has been claimed?

_____ acre-feet

7. Dimensions of ditch at headgate: Width at top (at waterline) _____ feet; width at bottom _____ feet; side slopes (vertical:horizontal) _____:_____; depth of water _____ feet; grade _____ feet per mile.

8. Place of use and acres irrigated: County_____ State ____ Give legal subdivisions of land owned by you on which water is being used (acres claimed): An example field is shown in the first line.

T.	R.	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	MW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
58N	95W	18			25.1											10.2			35.3

9. Describe any additional uses of water claimed from the ditch: _____

10. Date of first beneficial use of water (priority date) on lands described above for _____ Ditch is _____ (mo/day/yr) and shall be the same for all lands claimed on this form.

11. Has irrigation water been diverted onto all lands shown in the above tabulation each year since completion of works?__ If not, state exceptions and reasons therefore: _____

_____

_____

12. Attach documentary evidence or affidavits showing your ownership or control of the above lands, as well as the historic use of water on these lands. _____

_____

_____

13. What permit or claim numbers have been assigned to known records filed with either the Wyoming State Engineer's Office or the Montana Department (DNRC) for irrigating the above lands? _____

_____

_____

14. Have personnel in the Wyoming State Engineer's Office or the Montana Department (DNRC) been contacted to obtain the information given in No. 13? ( ) Yes ( ) No

15. Describe any flumes or pipelines in the ditch conveyance system: _____

_____

_____

16. Describe ordinary annual period of use: _____ to _____
(mo/day) (mo/day)

_____.

17. Attach copies of aerial photographs, U. S. Geological Survey maps or other such documents showing the ditch and lands irrigated that give evidence to this claim and may be useful to the Commission.

* * * * * * * * * *

State of _____)
) SS
State of _____)

I, _____, having been duly sworn, depose and say that I, being of legal age and being the claimant of this claim for a water right, and the person whose name is signed to it as the claimant, know the contents of this claim and the matters and things stated there are correct.

_____

_____

Subscribed and sworn before me, this ____day of _____, 19__.

_____
Notary Public

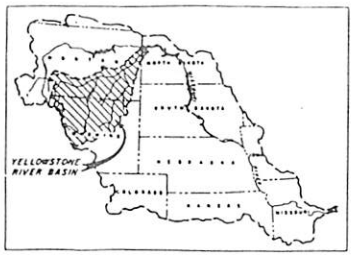
Residing at: _____

My commission expires: _____

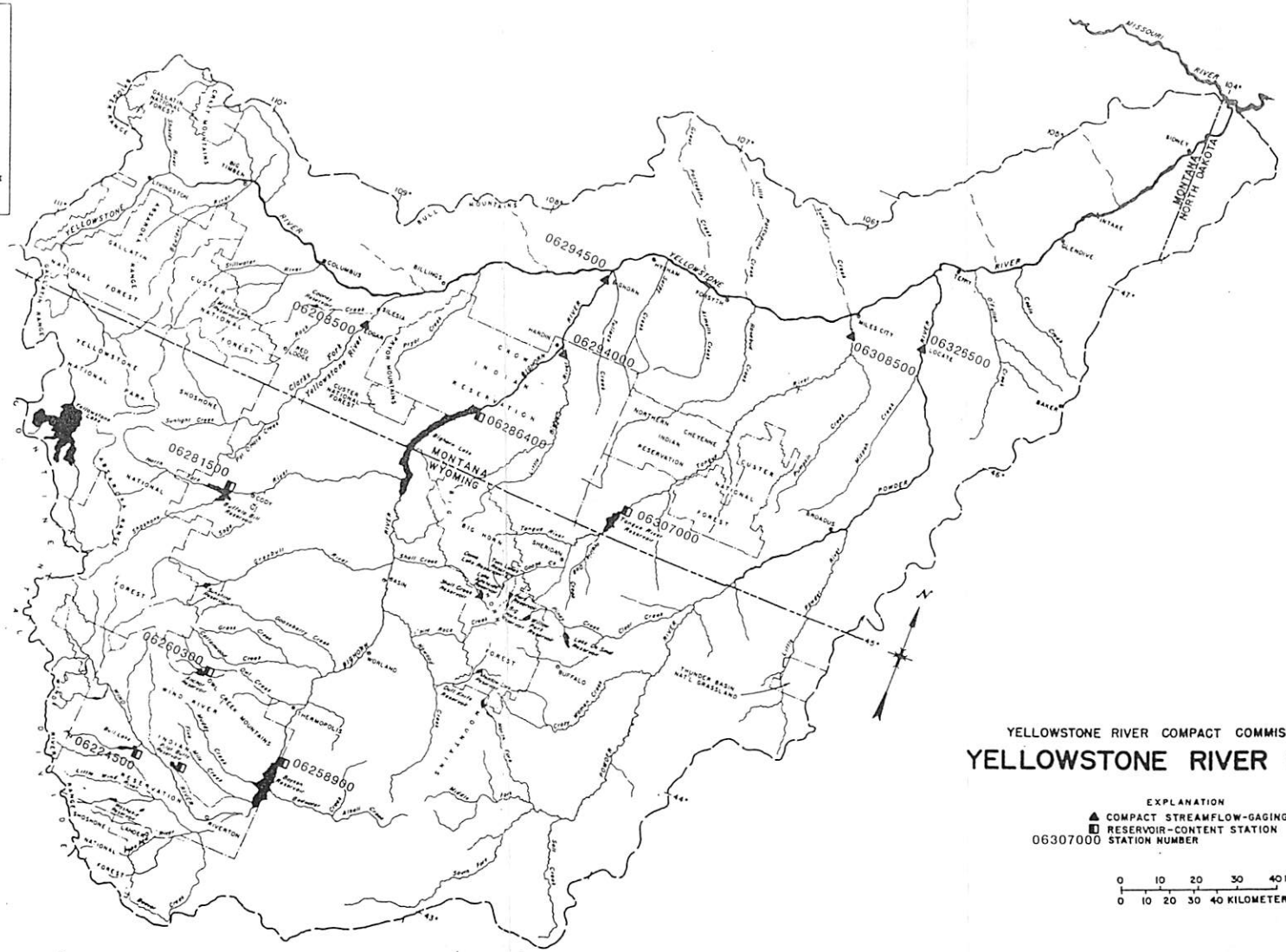
CONVERSION TABLE

Multiply inch-pound units	By	To obtain SI units
	Length	
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
	Area	
acres	4,047	square meters (m^2)
	0.4047	*hectares (ha)
	0.4047	square hectometer (hm^2)
	0.004047	square kilometers (km^2)
square miles (mi^2)	2.590	square kilometers (km^2)
	Volume	
cfs-day or second-foot day (ft^3/s-day)	2,447	cubic meters (m^3)
	0.002447	cubic hectometers (hm^3)
cubic feet	0.02832	cubic meters
acre-feet (acre-ft)	1,233	cubic meters (m^3)
	0.001233	cubic hectometers (hm^3)
	0.000001233	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	28.32	liters per second (L/s)
	28.32	cubic decimeters per second (dm^3/s)
	0.02832	cubic meters per second (m^3/s)
acre-feet per year (acre-ft/yr)	1,233	cubic meters per year (m^3/yr)
	0.001233	cubic hectometers per year (hm^3/yr)
	0.000001233	cubic kilometers per year (km^3/yr)

*The unit hectare is approved for use with the International System (SI) for a limited time. See National Bureau of Standards Special Bulletin 330, p. 12, 1977 edition.



LOCATION MAP



YELLOWSTONE RIVER COMPACT COMMISSION

YELLOWSTONE RIVER BASIN

EXPLANATION

▲ COMPACT STREAMFLOW-GAGING STATION

◧ RESERVOIR-CONTENT STATION

06307000 STATION NUMBER

0 10 20 30 40 MILES

0 10 20 30 40 KILOMETERS

MAP SHOWING LOCATIONS OF COMPACT STREAMFLOW-GAGING AND RESERVOIR-CONTENT STATIONS