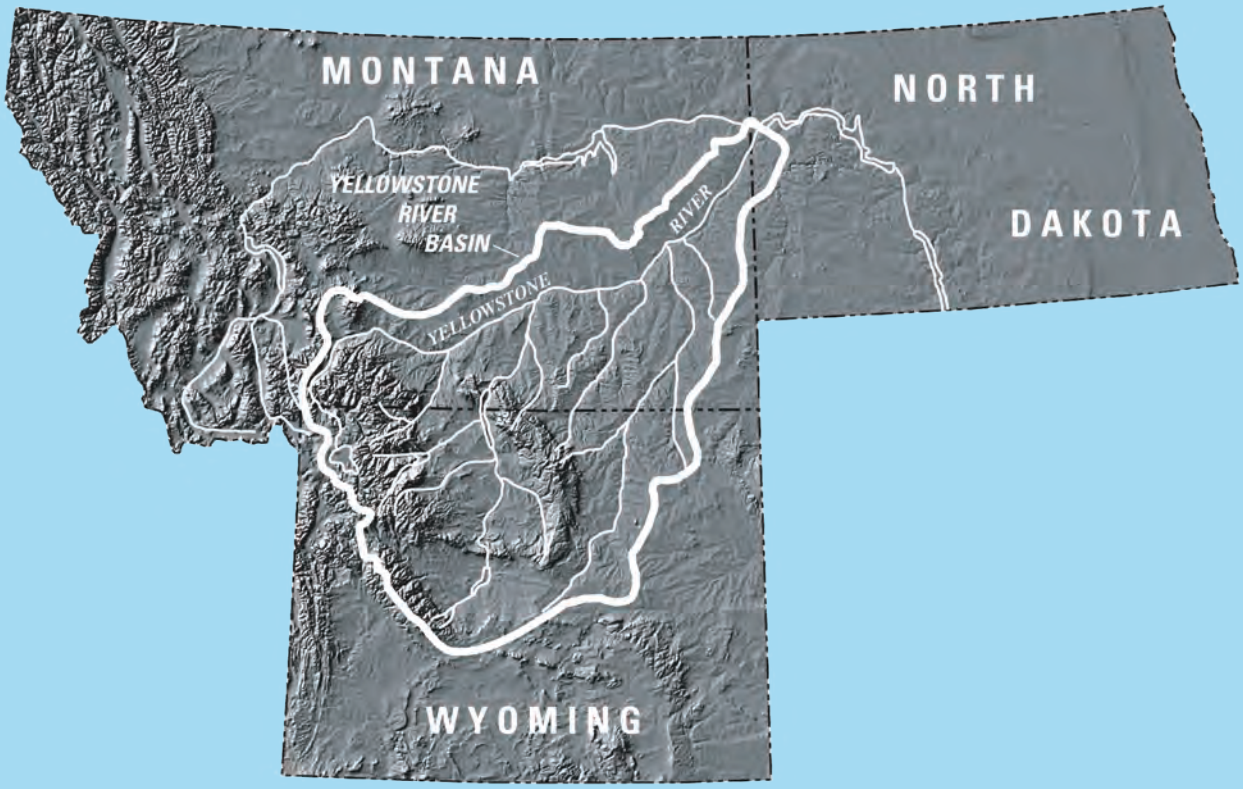
YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING **MONTANA** **NORTH DAKOTA**



SIXTY-SIXTH ANNUAL REPORT
2017

Yellowstone River Compact Commission

Sixty-Sixth Annual Report

2017

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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
acre	4,047	square meter (m^2)
acre	0.4047	hectare (ha)[1]
acre	0.4047	square hectometer (hm^2)
acre	0.004047	square kilometer (km^2)
square mile (mi^2)	2.590	square kilometer (km^2)
	Volume	
cubic foot per second per day (ft^3/s-day)	2,447	cubic meter (m^3)
cubic foot per second per day (ft^3/s-day)	0.0002447	cubic hectometer (hm^3)
cubic foot (ft^3)	0.02832	cubic meter (m^3)
acre-foot (acre-ft)	1,233	cubic meter (m^3)
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
acre-foot (acre-ft)	0.000001233	cubic kilometer (km^3)
	Flow rate	
acre-foot per year (acre-ft/yr)	1,233	cubic meter per year (m^3/yr)
acre-foot per year (acre-ft/yr)	0.001233	cubic hectometer per year (hm^3/yr)
acre-foot per year (acre-ft/yr)	0.000001233	cubic kilometer per year (km^3/yr)
cubic foot per second (ft^3/s)	28.32	liter per second (L/s)
cubic foot per second (ft^3/s)	28.32	cubic decimeter per second (dm^3/s)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
feet per year (ft/yr)	0.3048	meter per year
gallons per minute (gal/min)	0.06309	liter per second

[1]The unit hectare is used with the International System of Units (SI), which is in common everyday use throughout the world. See: Taylor, B.E., and Thompson, Ambler, eds., 2008, The International System of Units (SI): U.S. Department of Commerce, NIST Special Publication 330, 92 p., available online at http://www.nist.gov/pml/pubs/sp330/.

YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING	UNITED STATES	MONTANA
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STATE ENGINEER	CHAIRMAN	ADMINISTRATOR
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Honorable Matthew Mead
Governor of the State of Wyoming
Cheyenne, Wyoming 82002

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Helena, Montana 59620

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Governor of the State of North Dakota
Bismarck, North Dakota 58501

Dear Governors:

Pursuant to Article III of the Yellowstone River Compact, the Commission submits the following sixty-sixth annual report of activities for the period ending September 30, 2017.

Minutes of December 7, 2017

Members of the Yellowstone River Compact Commission convened December 7, 2017, at 8:00 a.m. via teleconference and webinar. In attendance were Mr. John Kilpatrick, U.S. Geological Survey (USGS), Charmain and Federal Representative; Mr. Pat Tyrrell, Wyoming State Engineer's Office (WSEO) and Commissioner for Wyoming; and Mr. Jan Langel, Montana Department of Natural Resources and Conservation (DNRC) and Commissioner for Montana. Also in attendance were Ms. Beth Callaway, Mr. Loren Smith, Mr. David Schroeder, and Mr. Steve Wolff, WSEO; Mr. Charles Dalby, Mr. Kevin Smith, Mr. Mark Elison, and Mr. Brian Bramblett (DNRC); Mr. Chris Brown and Mr. Sean Towles, Wyoming Attorney General's Office; Mr. Bill Schuh, North Dakota State Water Commission; Mr. Bret Callaway, Wyoming Department of Environmental Quality (WYDEQ); Ms. Melissa Schaar, Montana Department of Environmental Quality (MTDEQ); Ms. Brenda Lindley-Paul, Tongue River Water Users' Association; Mr. Clayton Jordan, U.S. Bureau of Reclamation (USBR); and Mr. Kirk Miller and Mr. Seth Davidson, USGS.

Mr. Kilpatrick welcomed the attendees and introduced the members of the Commission: Mr. John Kilpatrick, Federal Representative (Appendix A); Mr. Jan Langel, Commissioner for Montana; Mr. Pat Tyrrell, Commissioner for Wyoming; and Mr. Seth Davidson, Secretary for the Commission.

Mr. Kilpatrick stated he had a discussion with the Commissioners regarding the recent use of a transcriptionist producing a verbatim account of the annual Commission meetings. In the interest of conserving limited state funds, the Commissioners agreed with discontinuing this practice and returning to the older model of a general summary of the meeting captured in the minutes.

There were no additions to the agenda and the agenda was accepted by the Commissioners.

Mr. Miller presented a slide (Appendix B) detailing the operational cost for fiscal year (FY) 2018. Estimated future costs will drop in FY2020 due to removing transcriptionist costs. This savings will prevent inflation cost increases until FY2021.

Mr. Langel motioned that the budget be approved. Mr. Tyrrell made an amendment to the motion to approve the FY2018 and FY2019 budgets and accept the FY2020 through FY2022 budgets as recommendations.

The amended motion was accepted by the Commissioners.

Regarding the Montana v. Wyoming litigation, Mr. Brown reported that the Summary Judgment Decision from the Special Master was released on December 20, 2016. The Decision decided the cross motions for Summary Judgment on the Remedies phase that both States had filed. The Second Interim Report approved by the Supreme Court found that Wyoming was liable for 1,356 ac-ft of water from 2004 and 2006. The Special Master's Summary Judgement Decision granted Wyoming's motion regarding damages and found that Montana was entitled to either monetary damages based on the value of water that the Northern Cheyenne had for sale or the repayment of 1,356 ac-ft of water. Montana elected to receive the monetary option. The Special Master determined that Montana was not entitled to disgorgement damages or injunctive relief.

Mr. Brown continued that the Special Master's Summary Judgement Decision granted Montana's motion for further clarification with regard to the right to fill Tongue River Reservoir. That right was determined to be 72,500 ac-ft, the constructed pre-1950 capacity of the reservoir. The Special Master also found that Montana was a prevailing party for purposes of costs, but only for those costs incurred through February 10, 2010 and found that Montana was not entitled to its cost after that date. The Special Master invited the States to come up with a Proposed Judgment Decree by February 2017. Unfortunately, the States were not able to agree on a Joint Decree. Montana filed a Proposed Judgement Decree on February 10, 2017 and Wyoming filed a Proposed Judgement Decree on February 27, 2017. Montana filed a bill of costs the State incurred through February 10, 2010 with a sum of about $67,000. Wyoming does not object to those costs. The Special Master held a hearing on May 1, 2017 regarding the potential contents of the Decree. The Special Master took those into consideration for a few months and released a Proposed Draft Decree and a proposed Final Interim Report on November 2, 2017. Both States have provided feedback on these documents with regard to clarity.

Mr. Brown concluded that there are a few points where the States differ on what should be contained within the Final Decree and the Special Master will need to resolve those differences. The next step is for the Special Master to file the Report and the Proposed Decree with the Supreme Court. At that time both States will have the opportunity to take exception to the Supreme Court. If there are exceptions, and the Supreme Court decides to hear those exceptions, the case will continue. If there are no exceptions, then the Supreme Court will most likely accept the proposed Final Decree and Report and the case will be done.

Mr. Miller presented a slide (Appendix C) of the streamflow during WY2017.

Mr. Davidson presented a slide (Appendix D) of the contents of the seven largest reservoirs within the Yellowstone River Basin.

Mr. Loren Smith asked why USGS content values differed from WSEO calculations.

Mr. Davidson replied that historically the Annual Report calculates usable storage. In keeping with that tradition, dead storage has been subtracted from the total contents.

Mr. Schroeder reported on administration highlights for Division II. Mr. John Mumm was appointed as a new water commissioner for Piney Creek and Clear Creek and Brian Lozier, was appointed for Little Goose Creek. Lake DeSmet began filling during spring run-off reaching the historical maximum carry-over on May 8, 2017 and filling all the Piney Creek rights ahead of the irrigation season. Total flow for the Piney Creek at Kearny, WY streamgage was 74,500 acre-ft. This was 151% of a 32 year average. Releases from Lake DeSmet began on July 21, from Kearney Lake Reservoir on July 26, and from Willow Park Reservoir on July 27. Strong run-off and little regulation kept Cloud Peak Reservoir full and allowed the reservoir to spill into water year 2018. Bull Creek Reservoir, part of Wyoming Governor Matt Mead's "10-in-10" reservoir projects, is still on the table, but far from realization. Estimated price is $100-120 million. The project would divert water from Clear Creek into Bull Creek providing 14,500 ac-ft for irrigation, municipal water-supply, and late season fish flows. Clear Creek peaked on June 13. The total flow at Clear Creek at Buffalo City Park was 68,130 acre-ft which is 206% of a 31 year average. Clear Creek in District 2 was regulated on September 1 near Buffalo; however no regulation was required downstream due to irrigation return flows. No irrigation releases from Healy Reservoir were necessary this year. French Creek was regulated on July 24. Rock Creek peaked on June 13 and had a seasonal total of 38,240 acre-ft. This was 163% of a 33 year average. Irrigators on Rock Creek voluntarily reduced imported water from South Piney Creek to prevent a full call for regulation, instead ordering stored waters from Willow Park and Cloud Peak Reservoirs. This prevented Rock Creek from going into regulation, which is abnormal.

Mr. Schroeder stated that NRCS has designed a project to repair Dull Knife Reservoir. The reservoir was filled and immediately began spilling, in anticipation of the project. The Dull Knife Irrigation District could not afford the repairs and asked NRCS to reduce the scope of the project. This project is expected to proceed in WY2018. Because of Dull Knife Reservoir releases, the North Fork and Upper Powder were not regulated. Crazy Woman Creek did not go into regulation. Montana did not make a call to fill Tongue River Reservoir, and the Tongue River in Wyoming did not go into regulation in 2017. The reservoir filled and spilled on May 12. The USGS streamgage Tongue River at State Line near Decker peaked on May 19, 2017 at 3,860 cfs. Wolf Creek peaked on May 14 and went into regulation on August 29, 2017. The Riverton NWS Office supplied a precipitation sensor for the streamgage on Wolf Creek. WSEO is attempting to collect more weather and precipitation data in the foothills. In 2016, WSEO secured funding from the Governor's Office to install five pressure transducers for high elevation reservoir monitoring. At the end of 2016, the headgate of Dome Lake Reservoir was left open and all active storage was drained from the reservoir. The pressure transducer was ripped from its housing and no data is available from the site for 2017. The installation was repaired/replaced in October 2017 and data should be available next year.

Mr. Schroeder continued by reporting that Big Goose Creek went into regulation on July 25. Total flow for Big Goose Creek above PK Ditch was 73,310 acre-ft which is 139% of a 17 year average. Total flow for Little Goose Creek in Canyon was 47,890 acre-ft which is 118% of a 32 year average. The peak for both creeks occurred on June 9. Little Goose Creek was regulated on August 9 for a call by the Colorado Colony Ditch. Little Goose Creek is heavily appropriated and can be heavily regulated, however releases from mountain reservoirs avoided any further regulation for the water year. Big Horn Reservoir continued to operate under a storage restriction issued by the State Engineer in 2015. The reservoir could only be filled to seven feet below spill because of some cracking and foundation seepage observed in 2015. Repairs have been completed and the storage restriction is expected to be lifted for 2018. Wyoming Water Development is funding a Level I watershed study on Goose Creek. Entech Engineers in Sheridan have held several public meetings and are identifying projects/issues for a Level II study. In the summer of 2016, the Division II Office issued orders for measuring devices along Prairie Dog Creek with a deadline of June 1, 2017. There are two users out of compliance due to petitions to the Board of Control. Peak flow on Prairie Dog Creek was on May 2 with a total flow of 17,865 acre-ft. This was 153% of a 37 year average.

Prairie Dog Creek was not regulated as Kearney Lake Reservoir released water to reach historical winter carry-over volume.

Mr. Schroeder summarized by saying that 2017 was a good year to train new water commissioners. Streamflows were 115-200% of normal and many creeks saw little to no regulation.

Mr. Loren Smith continued with a report on Division III. The Big Horn River set records in WY2017 with most water coming from the Wind River Range and the west side of the Big Horn Basin. Streamflows ranged from 90% of normal on the east side tributaries of Medicine Lodge, Paint Rock, and Tensleep Creeks to over 300% of normal in the Upper Wind and Gooseberry drainages and the west side tributaries. Record flows were observed all year. Carryover in the reservoirs is still above recommended levels; Buffalo Bill Reservoir, for example, is still four feet over the November target. Four streams in Division III went into regulation, with a normal year being 15-20 streams. The Greybull River went into regulation on July 29 for reservoir deliveries. Gooseberry Creek was regulated August 3. Regulation typically starts as soon as run-off is over on Gooseberry Creek. Medicine Lodge and Paint Rock Creeks were regulated on August 24, about 2 months later than normal. No calls for regulation were received on the Popo Agie River drainages. No call for reservoir deliveries from Christina Lake was made. The Wind River Reservation also had no calls this year. USBR has gone out for bid on the Bull Lake spillway repair and should begin 2018. Reduced elevations, similar to 2016, are expected. The increase in reservoir levels in 2017 was due to Bull Lake being drained to assess the necessary repairs. All the reservoirs in Division III are essentially full.

Mr. Tyrrell asked for a report on Riverton Valley Irrigation District.

Mr. Loren Smith replied that the Riverton Valley Canal diverts water from the Wind River through the town of Riverton. The canal typically runs 130-150 cfs. On June 19, the river came out of its banks and began bypassing the headgate. WSEO measured approximately 1000 cfs in the canal just before it breeched. Three weeks later a contractor rebuilt a quarter mile of the canal that had washed out and an 800 feet long dike to force the river back to its natural channel. The canal was inoperable for those three weeks. The irrigation district is working with FEMA to make permanent repairs with the total reconstruction cost expected to be around $3 million.

Mr. Kevin Smith asked for more information on the Big Goose Creek and Little Goose Creek studies.

Mr. Schroeder responded that a Level I study is a broad overview of the study area. The two public meetings took place at the Sheridan Public Library. Little Goose Creek irrigator delivery system concerns have been the primary focus. Colorado Colony is one of the largest irrigation diversions with many laterals, including Metz Ditch. The City of Sheridan is also present at the meetings and is looking for solutions for municipal water storage. The Level I report identifying specific projects for a Level II study is expected soon. No projects have been earmarked.

Mr. Kevin Smith asked for the definitions of Level I and Level II studies.

Mr. Tyrrell replied that a Level I study is a high level look at identifying the issues, while a Level II study is a feasibility study. A Level III study is the construction phase.

Mr. Langel reported on the administration highlights for Montana. Southeastern MT Region issued five new water right permits in the Billings area and 1 on the Powder River. 14 groundwater certificates were issued; nine in Billings, one in the Clarks Fork Basin, one in Big Horn Basin, and three in the Powder. Seven water rights changes were made; 4 in Billings and 3 in Tongue River basin.

Mr. Elison added that some of the activity was a transition of coal-bed methane wells being signed over to farmers and ranchers for water wells if the water quality was appropriate.

Mr. Langel continued by saying a drought caused an expensive fire season that contributed to additional budget shortfalls in Montana. The legislative session and a special session in Montana called for a 15% reduction in the DNRC budget. Cuts to the state special revenue account that is used to manage state water projects were also made. DNRC will not be filling any vacant positions and equipment, travel, and training funding is limited. As a result of these budget constraints, MT has stopped cost-sharing on seven streamgages around the State. Pryor Creek near Huntley, MT within the Yellowstone River Basin was one of the gages cut.

Mr. Kevin Smith reported that Tongue River Reservoir was just over 50,000 total storage acre-ft at the beginning of water year 2018. Outflows were kept at 220-250 cfs, but dropped to 177 cfs at the end of November. The reservoir is currently at 48,482 acre-ft. The intent is to maintain the reservoir storage at its no lower than its current level. The Tongue River Basin is at 87% of normal snowpack. Cooney Reservoir total storage was 20,825 ac-ft on Oct. 1, 2018 and is currently 21,583 ac-ft. Outflows are set at 64 cfs. Telemetry has been added to Cooney Reservoir and that data is now available online.

Mr. Schroeder asked about the three water right changes and for details of Montana's process of converting CBM facilities.

Mr. Elison replied that the changes were surface water rights on the Tongue to bring new pivot sprinkler irrigation systems into compliance from old flood irrigation systems with no change in use. Operators with CBM wells that no longer produce gas are signing the wells over to the landowners. Those landowners are filing for water use permits.

Ms. Callaway reported on the progress of the Technical Advisory Committee (TAC). The TAC was assigned the task of identifying existing and potential forecasting tools to assist in the administration of the Tongue River under the terms of the Yellowstone River Compact and Special Master's findings. The primary focus has been streamflow forecasting tools with regard to total volume in April-June and improving forecasting scale during low flow periods. The TAC has had discussions with Mr. Lucas Zukiewicz with the MT NRCS snow survey group. Mr. Zukiewicz has explained some of the tools NRCS has available and continues to work closely with the TAC in finding possible solutions. The TAC is also pursuing options with NWS.

Ms. Callaway continued that in August 2017 the TAC had a call with Mr. Kevin Low, Mr. Gregg Schalk, and Mr. Scott Dummer from the NWS Missouri Basin River Forecast Center. The highlights of the call were that a new 90-day probabilistic volumetric forecasting point could be added for the Tongue River at State Line sometime in the 2017-2018 fiscal year. It would include a 90-day and weekly distribution exceedance probability chart. There is a similar forecast point currently available located on Goose Creek at Sheridan.

The details of the NWS model were also discussed. The ensemble streamflow prediction model uses 30 years of historical temperature, precipitation, and snow-water equivalent observations, along with current and forecasted temperature, precipitation, and soil moisture balanced against streamflow observations. Remote sensing of evapotranspiration and larger climate teleconnections are not currently incorporated into NWS forecasts.

The NWS forecasts natural flows and issues a text-based June -September streamflow forecast online. Tongue River at Dayton is the nearest forecast point for this report. However, natural flows forecasts can be modified to forecast regulated flow which could be used for the new Tongue River forecast point. Another possible solution discussed with the NWS is a web-based customization tool of streamflow volume forecasts for the public that is in development.

Mr. Loren Smith asked if the new forecast point is intended to report lowland runoff rather than the mountain snow packs.

Ms. Callaway replied that is the general idea. The TAC continues to look for solutions to minimize gaps in data between high elevations and Tongue at State Line.

Mr. Dalby added that the NWS emphasizes forecasts for high and flood flows. However, the models can be manipulated to produce better scale in dry years. Mr. Dalby stated that NRCS seems a more promising option for developing new forecasting tools.

Ms. Callaway concluded that the TAC will continue to work with the NRCS and NWS to create and improve forecasting tools and data points.

Mr. Kilpatrick asked if this is the primary task that has been referred to the TAC by the Commissioners.

Ms. Callaway responded that it is and the TAC's response is contingent upon the NWS and NRCS availability.

Mr. Kilpatrick asked if the Commissioners could assist in any way to ensure that outside agencies are supporting the TAC.

Ms. Callaway responded that the outside agencies are giving the necessary support, but there is a need to be creative while the work progresses.

Mr. Dalby added that NRCS has worked to include the TAC in discussions of the tools it develops despite the time it takes from other NRCS priorities.

Mr. Tyrrell commented that progress is being made as quickly as possible. Wyoming has struggled to find funding for new SNOTEL sites and the fact that the Tongue River Basin is keeping up is promising. Wyoming receives as much forecasting support from the NWS in the Tongue River as any other basin in the State. Mr. Tyrrell concluded that forecasting is not a perfect science, but the way forward is to obtain the best forecast information possible. With those forecasts available, regulation will occur when necessary and will not when unnecessary.

Mr. Kilpatrick stated that the Commissioners could request additional resources on the TAC's behalf.

Mr. Langel reported that DNRC continues to provide post-decree assistance to the Montana Water Court with cases that are unresolved. These cases are in numerous basins that have been issued preliminary decrees. Preliminary decrees are one decree basins that have contemporary claims examination that the Water Court ordered to have reexamined under new standards. In 2012, the Water Court issued an order for DNRC to review basins decreed with a temporary preliminary decree to ensure that water distribution issues are addressed and statewide standards are applied. This involves 8 drainages and 16,000 water rights within the Yellowstone Basin. Part of this reexamination effort is to standardize source names, diversion sites, ditch names, and means of diversion. Once this reexamination is complete, future rights will be more effectively administered.

The Clarks Fork of the Yellowstone Basin was decreed on April 7, 2017; it contains 2485 individual rights and currently is in the Objection Phase that allows users to object to a water right that has been issued. A Counter-Objection will follow with the Water Court resolving the objections.

The 2017 Montana Legislative session passed House Bill 110 which allows for the filing of pre-1973 water right claims for instream stock use, instream domestic use, and domestic groundwater. These were previously exempt from the claim filing period. DNRC has sent notice to every unique property owner in the state, resulting in 350,000 mailings. The notice also established a set deadline for the filing of previously exempt claims of June 30, 2019.

Mr. Tyrrell reported that Wyoming has one division, Division III, with a general adjudication. Wyoming adjudicates water rights individually through a proof process and the Board of Control (consisting of the State Engineer

and the four superintendents), sits as a quasi-judicial board and adjudicates water rights at its quarterly meetings. Occasionally, Board of control actions may be protested or objected to which may be appealed and then progress into the judicial system. As of the fall of 2015, the general adjudication in Division III saw its final decree.

Mr. Schroeder commented that during the 2017 Legislative Session the Wyoming Legislature approved a bill that raised the individual proof fees on appropriators from $25 to $70. Because of the sharp increase the WSEO made a large effort to get water rights permits that were outstanding or in process adjudicated before the deadline.

Mr. Schroeder further commented as CBM continues to scale back, the WSEO is working to transition groundwater wells and reservoirs to landowners for stock purposes in most cases. No new CBM impoundments were inspected. 77 stock and larger reservoirs were inspected in the Powder and Tongue River Basins and 71 were approved. The 1977 safety of dams law allowed for the routine inspection of facilities that exceed certain capacities or dam heights. Division II holds over half of the Safety of Dams inventory and staff inspected 101 dams. 117 reservoirs were finalized; 53 reservoirs were adjudicated and 64 stock reservoirs were endorsed by the Board of Control. Endorsement is similar to adjudication; however endorsements are not certified or set in order to the County. 61 pump and pipeline water rights were adjudicated along with 6 ditch enlargements and 8 groundwater rights. Also approved or dismissed were 24 surface water rights and 0 ground water rights.

Mr. Tyrrell commented that Division II includes the Powder, Tongue, Little Powder, Belle Fourche, South Fork Cheyenne, and Little Missouri River drainages.

Mr. Schroeder clarified that the numbers presented today were only for tributaries of the Yellowstone River.

Mr. Dalby asked about the reason for the dismissed water rights.

Mr. Schroeder stated that most were approved and only one was dismissed as a voluntary withdrawal of petition.

Mr. Loren Smith reported that due to the completed general adjudication in Division III individual adjudication these days is rare. In 2017 there were 85 surface water proofs: 32 for reservoirs (28 larger reservoirs with stock and additional use and 4 stock reservoirs) and 53 ditch/pipeline/pumps were adjudicated. One instream flow permit was adjudicated in the Greybull River drainage. There were 44 groundwater adjudications within the basin. All stock and domestic wells were adjudicated through the general adjudication. 39 dam safety inspections were conducted. 39 surface water and 11 groundwater petitions making changes to the water rights, were finalized through the Board of Control.

Mr. Tyrrell added that petitions are typically for a change in means of conveyance, change in point of diversion, change in place of use, and, rarely, a change of use.

Mr. K. Smith asked for more explanation of the dam safety inspections.

Mr. Tyrrell responded that depending on the size and hazard rating of the reservoir different methods of inspection are performed. Many of the WSEO field staff are trained to do inspections. In addition, WSEO has a Safety of Dams staff that entails two licensed professional engineers supervised by a PE in the Cheyenne office. Those staff are often performing inspections and reviewing plans for reconstruction or rehabilitation of dams. At times, landowners may need to hire consultants or professional engineers for design and construction purposes, but WSEO staff will do the inspection.

Mr. K. Smith asked if the same priority dates are used for enlargements.

Mr. Loren Smith replied that the priority date for an enlargement is set when the application is received in Cheyenne and is administered separately from the original priority date.

Mr. Tyrrell reported on the three initiatives of the Wyoming Governor's Water Strategy that impacted the WSEO. The first concerned groundwater management in Laramie County. A public process was initiated three years ago that resulted in an order from the State Engineer on April 1, 2015. This order provided instructions on how to manage future development, adding meters, and ordering adjudication in Laramie County. The second initiative was a re-work of the field hydrographer/commissioner manual. This manual outlines guidance for water commissioners as they execute their duties and is publicly available on the WSEO website. The third initiative is called "Credible Streamflow and Climate Data". This initiative allowed WSEO to purchase equipment for the remote elevation gaging stations of five reservoirs in the Bighorn Mountains, the addition of four new weather stations to the State's Wyoming Weather and Climate Network, and investment into the research of a MODIS-based snow product with University of Colorado – Boulder (CU).

Ms. Callaway reported on the MODIS-based snow product contract. WSEO has been working with the Institute of Artic and Alpine Research (INSTAAR) at CU which has developed a proprietary methodology for estimating snow-water equivalent (SWE) across a spatial extent. The current streamflow forecasts provided by NRCS rely on in-situ SWE measurements at SNOTEL sites. The purpose of this contract is to see how INSTAAR's methodology compares with past SNOTEL measurements and evaluate future uses for this information. This methodology provides a regressed blend of satellite-based SWE reconstruction and additional parameters such as physiographic information and snow sensor observations. This model has produced graphical and tabular data that indicates peak SWE as of April 1st for wet, dry, and average years as well as a comparison of the SWE distribution among sub-watersheds. As part of the analysis, INSTAAR compared the model with nearby SNOTEL data and identified the Upper Tongue River, the West Fork Big Goose Creek, and the Upper East Fork Big Goose Creek HUV-8 watersheds as areas that could benefit from additional instrumentation and/or measurements. How this information pertains to non-average years of SWE will be discussed with INSTAAR in future conversations. This study has spurred conversations with other agencies (NRCS, USBR, and NWS) for how this data could be helpful for the streamflow forecasts they provide.

Mr. Kilpatrick asked if the intent is to identify locations for additional data collection.

Ms. Callaway replied that the goal was to gain a better idea of the spatial distribution of SWE and with that information identify areas that could benefit from more instrumentation and measurements. INSTAAR has recommended verification of SWE using ground penetrating radar.

Mr. Kilpatrick asked if the intent is to train a MODIS based model of SWE to drive a streamflow prediction model and if so what will be done with that data.

Mr. Tyrrell replied that if the results of the study prove valuable and funding continues, the WSEO would provide the data to other agencies for improved forecasting.

Mr. Davidson asked the Commission for input and suggestions for Table 10 of the Annual Report.

The Commission discussed Table 10 at great length.

The Commissioners moved to change footnote 2 to "Includes dead storage and rounded to the tens of acre-foot" and to task the Technical Advisory Committee with examining Table 10 and presenting a recommendation to the Commissioners at the 2018 Technical Meeting in April 2018. The motion passed.

Mr. Brown asked the Commissioners if the purpose of that motion was to accept the table, and if so, then he recommended his Commissioner to accept the table for informational purposes only and not for the accuracy of the information in it as some of the information may be changed.

Mr. Tyrrell asked if the values in the total capacity column had changed since last years' report.

Mr. Davidson, Mr. Schroeder, and Mr. Loren Smith replied that numbers had been updated through the years due to errors.

Mr. Tyrrell commented that he is not proposing to change any numbers in the table that the WSEO has not reviewed, but to note that the "Total Capacity" column is rounded.

Mr. Brown noted the importance of ensuring that the information presented is accurate to avoid misunderstandings. Issues with past Annual Reports lead to confusion about Tongue River Reservoir.

Mr. Brown continued that according to the rules of the Commission, the only information necessary to present is the change in contents between years; however if the Commission decides to provide additional information, they are free to do so.

Mr. Kilpatrick thanked Mr. Brown for his insight and asked if any of the Commissioners would like to revise the previous motion.

Mr. Tyrrell replied that he is comfortable with the motion and clarified that the information provided by WSEO for inclusion in table 10 have been reviewed by the superintendents and reflect the accuracy of those numbers to the best of their knowledge.

Mr. Kilpatrick asked if the original motion with clarification stood. Commissioners Langel and Tyrrell agreed that it did.

Mr. Schroeder noted that the December 2016 Summary Judgement Report from the Special Master delineated the pre-compact contents of Tongue River Reservoir as 72,500 ac-ft and the post-compact contents as 6,571 ac-ft. Accordingly, these are the numbers that he is reporting for the Annual Report.

Mr. Davidson asked the Commission if a footnote in the next report or an errata sheet cataloging errors from the 2016 Annual Report forward is the Commission's preferred method for handling errors.

Mr. Kilpatrick asked if this was an issue for values that impact the current year's report or a matter of correcting historic reports.

Mr. Davidson replied that the more pressing issue is to correct errors from the previous report that impact the current report.

Mr. Kilpatrick proposed footnoting corrections in the current report or compiling an errata sheet for one year prior.

Mr. Tyrrell noted that most errors appear to be created from using provisional data and proposed that a section titled "Corrections to the Prior Year's Report" be added to the Annual Report. This section would correct the error in the previous report and explain the reason for the error. This would allow an acknowledgement of an error that is discovered after publication and be more formal than a footnote.

Mr. Dalby added that the "Total Contents" column of table 10 in the 2015 report contained many errors.

Mr. Davidson explained those were the result of footnote denotations not printing as superscripts.

Ms. Callaway recommended adding a line item to the Agenda for the review the previous year's Annual Report to provide an opportunity for discussion and have context for changes documented in the minutes.

A motion was made to add a new section in the Annual Report to document errors and correct errors found in previous reports. The motion carried.

Mr. Kilpatrick asked for public comment.

Ms. Lindley-Paul appreciated Mr. Brown's reporting of the Montana v Wyoming case.

The Commissioners agreed to hold the next Technical Advisory Committee meeting on April 12, 2018 in Billings, MT and the next Yellowstone River Compact Commission Annual Meeting on December 6, 2018 in Billings, MT.

The meeting was adjourned at 12:00 pm.

Patrick T. Tyrrell
Commissioner for Wyoming

Jan Langel
Commissioner for Montana

John M. Kilpatrick
Chairman and Federal Representative

Appendix A

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Office of the Director
Reston, Virginia 20192

NOV 08 2016

In Reply Refer To:
Mail Stop 100
GS17000145

Mr. Tim Davis
Montana Commissioner for the Yellowstone
River Compact Commission
Montana Department of Natural Resources and Conservation
1625 11th Avenue
Helena, Montana 59620

Dear Mr. Davis:

The Yellowstone River Compact (Compact) between Montana, North Dakota, and Wyoming specifies that the Director of the U.S. Geological Survey (USGS) shall appoint the Federal representative to the Yellowstone River Compact Commission (Commission) who shall act as Chairman of the Commission. Since the Compact's ratification, the USGS Director has exercised that responsibility each time the seated "Federal" member has left the Commission.

The current Federal representative and Chair, Mr. Mark T. Anderson, retired from the USGS on September 30, 2016, but is now a rehired annuitant. Mr. Anderson will Chair the annual meeting of the Commission to be held December 1, 2016. As Director of the USGS, I have selected Mr. John M. Kilpatrick, Director of the USGS Wyoming-Montana Water Science Center (WY-MT WSC) to succeed Mr. Anderson. Mr. Kilpatrick's appointment is effective January 1, 2017.

Since his transfer to the USGS Montana District in 1996, Mr. Kilpatrick has, in different roles, led USGS water-related efforts in Montana and later Wyoming. Between 1996 and 2008, Mr. Kilpatrick was the Assistant Director and Studies Section Chief of the Montana Water Science Center. Between 2008 and 2014, he was Director of the Montana Water Science Center. In 2013, Mr. Kilpatrick was asked by USGS Executive Leadership to merge the existing Water Science Centers in Wyoming and Montana into a single new Center. As Director of the WY-MT WSC, Mr. Kilpatrick provides scientific leadership, develops programs, and maintains cooperative relationships with partner agencies in both Wyoming and Montana. Mr. Kilpatrick is experienced in interjurisdictional water issues, representing the USGS and the United States on several international committees including serving as the Field Representative of the U.S. Accredited Officer for the St. Mary and Milk Rivers under the Boundary Waters Treaty with Canada and as the U.S. Co-Chair of the Poplar River Bi-Lateral Monitoring Committee. He is a graduate of the University of Arkansas with B.S. and M.S. degrees in Geology.

If you have questions or need further information, please contact Mr. Kilpatrick at (406) 457-5902 or by email at jmkilpat@usgs.gov.

Sincerely,

Suzette M. Kimball
Director

Identical letter sent to:

Mr. Patrick T. Tyrrell, Wyoming State Engineer
Wyoming Commissioner for the Yellowstone River Compact Commission

Appendix B

Yellowstone River Compact Commission Budget

FY 2018 costs

Clarks Fork Yellowstone River at Edgar	$16,530
Little Bighorn River near Hardin	16,530
Bighorn River above Tullock Creek, near Bighorn	16,530
Tongue River at Miles City	16,530
Powder River near Locate	16,530
Report	37,450
	$120,100

WSEO	$33,575
MDNRC	$33,575
USGS	$52,950

Estimated future cost

Year	WSEO	MDNRC	USGS	Total
FY2019	$33,575	$33,575	$52,950	$120,100
FY2020	$32,675	$32,675	$49,950	$115,300
FY2021	$33,665	$33,655	$49,950	$117,280
FY2021	$34,665	$34,655	$49,950	$119,260

Appendix C

Streamflow during WY 2017

1. Clarks Fork Yellowstone at Edgar minus diversions to White Horse Canal
   - 1,081,720 acre-ft
   - 6th largest of 79 years
   - 144 percent of average
   - Record low year was WY 2001 with 466,660 acre-ft

2. Bighorn River near Bighorn minus Little Bighorn River and adjusted for change in contents in Bighorn Lake
   - 4,508,880 acre-ft
   - Record high year
   - 178 percent of average
   - Record low year (with adjustments) was WY 2002 with 923,000 acre-ft

3. Tongue River at Miles City
   - 431,205 acre-ft
   - 17th largest of 60 years
   - 120 percent of average
   - Record low year was WY 1961 with about 41,400 acre-ft

4. Powder River near Locate
   - 476,185 acre-ft
   - 28th largest of 79 years
   - 116 percent of average
   - Record low year was WY 2004 with about 57,400 acre-ft

Total adjusted streamflow in the four rivers in WY 2017 was 6,497,990 acre-ft

Compare to 2,932,200 acre-ft in WY 2016 and 4,308,700 acre-ft in WY 2015

Appendix D

Storage in main reservoirs as of September 30, 2017

Reservoirs completed after January 1, 1950

Bighorn Lake
996,800 acre-ft (change of 72,100 acre-ft)

Boysen Reservoir
676,900 acre-ft (change of 92,100 acre-ft)

Anchor Reservoir
1,110 acre-ft (change of 626 acre-ft)

Reservoirs existing on January 1, 1950

Bull Lake
119,800 acre-ft (change of 82,200 acre-ft)

Pilot Butte Reservoir
15,300 acre-ft (change of 10,600 acre-ft)

Buffalo Bill Reservoir
528,200 acre-ft (change of 106,900 acre-ft)

Tongue River Reservoir
49,500 acre-ft (change of 7,812 acre-ft)

Total usable contents of the reservoirs at the end of WY 2017 was 2,380,000 acre-ft, compared to 2,015,000 acre-ft at the end of WY 2016, and 2,097,000 acre-ft at the end of WY 2015.

Storage in additional reservoirs as of September 30, 2017

Total usable contents of additional reservoirs at the end of WY 2017 was 419,300 acre-ft.

General Report

Operation and Budget

Work funded by the Yellowstone River Compact Commission, that to date has been primarily concerned with the collection of required hydrologic data, has been funded through cooperative arrangements whereby Montana and Wyoming each bear an equal share of the cost, and the remaining cost is borne by the United States. Salaries and necessary expenses of the State and U.S. Geological Survey representatives to the Commission and the cost to other agencies of collecting hydrologic data are not considered as expenses of the Commission.

The expenses of the Commission during Federal fiscal year 2017 were $119,000, in accordance with the budget adopted for the year.

Estimated budgets for Federal fiscal years 2018 and 2019 were approved, and the budgets for fiscal years 2020, 2021, and 2022 were tentatively adopted subject to the availability of appropriations. The budgets for the 5 fiscal years are summarized as follows:

Fiscal year	Budget by agency			Total budget
	Wyoming State Engineer	Montana Department of Natural Resources and Conservation	U.S. Geological Survey	
2018	$33,575	$33,575	$52,950	$120,100
2019	$33,575	$33,575	$52,950	$120,100
2020	$32,675	$32,675	$49,950	$115,300
2021	$33,665	$33,665	$49,950	$117,280
2022	$34,665	$34,665	$49,950	$119,260

Streamflow-Gaging Station Operation

Operation of five streamflow-gaging stations at the measuring sites specified in the Yellowstone River Compact continued in water year 2017 with satisfactory records collected at each station. Streamflow-gaging stations, along with reservoir-content stations, are shown on a map of the Yellowstone River Basin at the end of this report.

The Commission is primarily interested in the streamflow near the mouths of the Clarks Fork Yellowstone River, Bighorn River, Tongue River, and Powder River. Even though the Little Bighorn River is not covered by the Yellowstone River Compact, the compact covers the water in the Bighorn River minus the Little Bighorn River (plus streamflow of Agency Canal); thus, the streamflow from the Little Bighorn River and Agency Canal is subtracted from the streamflow of the Bighorn River. In addition, the Bighorn River streamflow is adjusted monthly with change in contents of Bighorn Lake. During water year 2017, annual streamflow was above normal (defined in this report as 80 to 120 percent of average) at all streamflow-gaging stations. The rank of the annual streamflow, with the lowest annual streamflow having a rank of 1, is displayed in the following table:

Station number	Streamflow-gaging station	Percentage of average streamflow for water year 2017[1]	Rank of annual streamflow by water year		Year of lowest annual streamflow (rank equals 1)	Number of years of annual record
			2017	2016		
06208500	Clarks Fork Yellowstone River at Edgar, Montana, minus diversions to White Horse Canal	144	73	6	2001	79
06294500	Bighorn River above Tullock Creek, near Bighorn, Montana, minus Little Bighorn River near Hardin, Montana (06294000), plus Agency Canal Tailwaste near Hardin, Montana; and adjusted for change in contents in Bighorn Lake	189	64	24	2002	64
06308500	Tongue River at Miles City, Montana	124	56	8	1961	74
06326500	Powder River near Locate, Montana	116	52	9	2004	79

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

Tabulation of streamflow records for water year 2017 (tables 1–5) and graphical comparisons of statistical distribution of monthly and annual streamflow and of annual departures from mean annual streamflow (figures 1–4) are provided in the "Summary of Discharge for Yellowstone River Compact Streamflow-Gaging Stations" section. The tabulated streamflow records do not account for depletions for irrigation and other uses unless otherwise noted.

Diversions

No diversions were regulated by the Commission during water year 2017.

Reservoir Contents

Reservoirs Completed After January 1, 1950

As a matter of record and general information, month-end contents data (tables 6–8) and descriptions of these reservoirs are given in the "Month-End Contents for Yellowstone River Compact Reservoirs Completed after January 1, 1950" section. Boysen Reservoir, located on the Wind River and operated by the Bureau of Reclamation, began the water year with 624,900 acre-feet (acre-ft) in contents and ended the water year with 717,000 acre-ft. Anchor Reservoir, located on South Fork Owl Creek and operated by the Bureau of Reclamation, began the water year with an estimated 548 acre-ft in contents and ended the water year with 1,170 acre-ft. Bighorn Lake, which is a Bureau of Reclamation storage project on the Bighorn River and is the largest lake in the Yellowstone River Basin, contained 942,400 acre-ft of contents at the beginning of the water year and 1,014,600 acre-ft at the end of the water year.

Reservoirs Existing on January 1, 1950

As a matter of record and general information, month-end contents data for the four reservoirs in existence on January 1, 1950, upstream from the points of measurement, are given in table 9 in the "Month-End Contents for Yellowstone River Compact Reservoirs Existing on January 1, 1950" section. The reservoirs are Bull Lake, Pilot Butte Reservoir, and Buffalo Bill Reservoir operated by the Bureau of Reclamation; and Tongue River Reservoir, operated under the supervision of the Water Resources Division of the Montana Department of Natural Resources and Conservation. These data are pertinent to allocation under Article V, Section C, Item 3 of the compact.

Annual Contents of Reservoirs

Information on reservoir contents at the end of the current (2017) and previous water years for the 7 reservoirs listed above plus 38 additional reservoirs that have contents greater than 1,000 acre-ft was compiled at the request of the Commission. The information is provided in table 10 in the "Water-Year-End Contents for Yellowstone River Compact Reservoirs or Lakes" section.

Summary of Discharge for Yellowstone River Compact Streamflow-Gaging Stations

06208500 Clarks Fork Yellowstone River at Edgar, Montana

LOCATION.—Lat 45°27′56.57″, long 108°50′38.78″ referenced to North American Datum of 1983, in SE¼SE¼SE¼ 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.—2,034 mi^2.

PERIOD OF RECORD.—July 1921 to September 1969, October 1986 to present.

REVISED RECORDS.—Water Supply Paper (WSP) 1509: 1924; 1932, maximum discharge. WSP 1729: Drainage area. Water Data Report MT–04–1: Drainage area.

GAGE.—Water-stage recorder. Elevation of gage is 3,460 ft, referenced to the National American Vertical Datum of 1988. Prior to August 31, 1953, nonrecording gage located at same site and elevation.

REMARKS.—Diversions for irrigation include about 41,500 acres, of which about 840 acres lie 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. **Discharge values and summary statistics given herein have the diversions to White Horse Canal subtracted.**

Table 1. Daily mean discharge for Clarks Fork Yellowstone River at Edgar, Montana (06208500), minus diversions to White Horse Canal, October 2016 through September 2017.

[e, estimated; —, no data; Max, maximum; Min, minimum; Acre-ft, acre-foot]

Day	Daily-mean discharge, in cubic feet per second											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	e378	e1,400	e470	e534	e345	e456	e797	e1,000	5,360	3,490	1,240	318
2	e373	e1,250	e473	e512	e359	e433	e773	e1,000	6,590	3,460	1,150	302
3	e448	e1,120	e499	e495	e360	e439	e886	e1,000	7,290	3,500	1,100	309
4	e692	e1,030	e444	e493	e360	e431	e813	e1,020	7,630	3,600	1,040	322
5	e751	e989	e504	e524	e350	e435	e732	e1,290	7,900	3,840	989	322
6	e662	e913	e446	e543	e339	e440	e704	e2,100	8,560	4,080	953	309
7	e623	e856	e225	e576	e338	e430	e693	e3,040	8,590	4,230	922	297
8	e597	e824	e157	e633	e356	e407	e778	e3,920	8,570	4,010	e867	302
9	e584	e785	e193	e686	e539	e413	e933	e4,300	8,900	3,700	e776	302
10	e587	e762	e283	e699	e1,400	e419	e969	e4,310	8,420	3,470	e737	309
11	e597	e739	e352	e635	e2,100	e415	e827	e4,290	6,440	3,330	e705	317
12	e594	e706	e431	e574	e1,240	e486	e797	e4,810	4,840	3,250	e682	302
13	e590	e704	e427	e526	e984	e499	e794	5,440	4,980	3,150	e682	309
14	e605	e684	e446	e495	e851	e488	e894	e5,190	4,900	2,920	e676	365
15	e624	e660	e447	e474	e749	e495	e1,160	e4,230	4,000	2,660	e726	582
16	e640	e668	e389	e459	e728	e549	e1,030	e3,610	3,470	2,630	831	958
17	e834	e701	e301	e444	e723	e638	e979	e3,320	5,840	e2,620	750	864
18	e819	e678	e311	e425	e684	e672	e1,050	e3,160	6,980	e2,550	699	e847
19	e750	e608	e393	e409	e725	e643	e989	e2,660	5,920	2,330	652	e836
20	e743	e571	e484	e393	e749	e851	e1,020	e2,270	5,820	2,120	605	e834
21	e707	e645	e533	e372	e589	e949	e1,100	e2,000	7,030	2,010	582	e935
22	e694	e649	e541	e359	e573	e848	e1,220	e1,950	8,080	1,810	540	e1,370
23	e708	e637	e558	e359	e555	e838	e1,110	2,050	7,500	1,640	509	e1,430
24	e716	e588	e559	e352	e507	e918	e1,140	2,430	5,700	1,540	503	e1,220
25	e704	e582	e552	e341	e476	e800	e1,240	3,810	4,730	1,410	508	e1,200
26	e689	e536	e557	e342	e450	e819	e1,200	3,660	4,450	1,450	492	e1,090
27	e712	e535	e568	e337	e417	e762	e1,190	2,900	4,650	1,320	459	e1,030
28	e727	e538	e581	e318	e464	e773	e1,280	2,400	4,720	1,320	419	e1,090
29	e802	e543	e583	e307	—	e743	e1,170	2,660	4,610	1,290	377	e1,120
30	e1,130	e517	e579	e313	—	e757	e1,040	3,410	3,990	1,540	320	e1,090
31	e1,180		e563	e327	—	e778	—	4,330	—	1,420	316	—
Total	**21,260**	**22,420**	**13,850**	**14,260**	**18,310**	**19,020**	**29,310**	**93,560**	**186,500**	**81,690**	**21,810**	**20,880**
Mean	**686**	**747**	**447**	**460**	**654**	**614**	**977**	**3,018**	**6,215**	**2,635**	**703**	**696**
Max	**1,180**	**1,400**	**583**	**699**	**2,100**	**949**	**1,280**	**5,440**	**8,900**	**4,230**	**1,240**	**1,430**
Min	**373**	**517**	**157**	**307**	**338**	**407**	**693**	**1,000**	**3,470**	**1,290**	**316**	**297**
Acre-ft	**42,170**	**44,460**	**27,470**	**28,280**	**36,320**	**37,730**	**58,130**	**185,600**	**369,800**	**162,000**	**43,250**	**41,420**

Summary statistics		
	Water year 2017	**Water years 1921–2017***
Annual total	542,800	—
Annual mean	1,487	1,034
Annual runoff (acre-ft)	1,076,500	748,580

*During periods of operation (water years 1921–69, 1987 to current year [2017]).

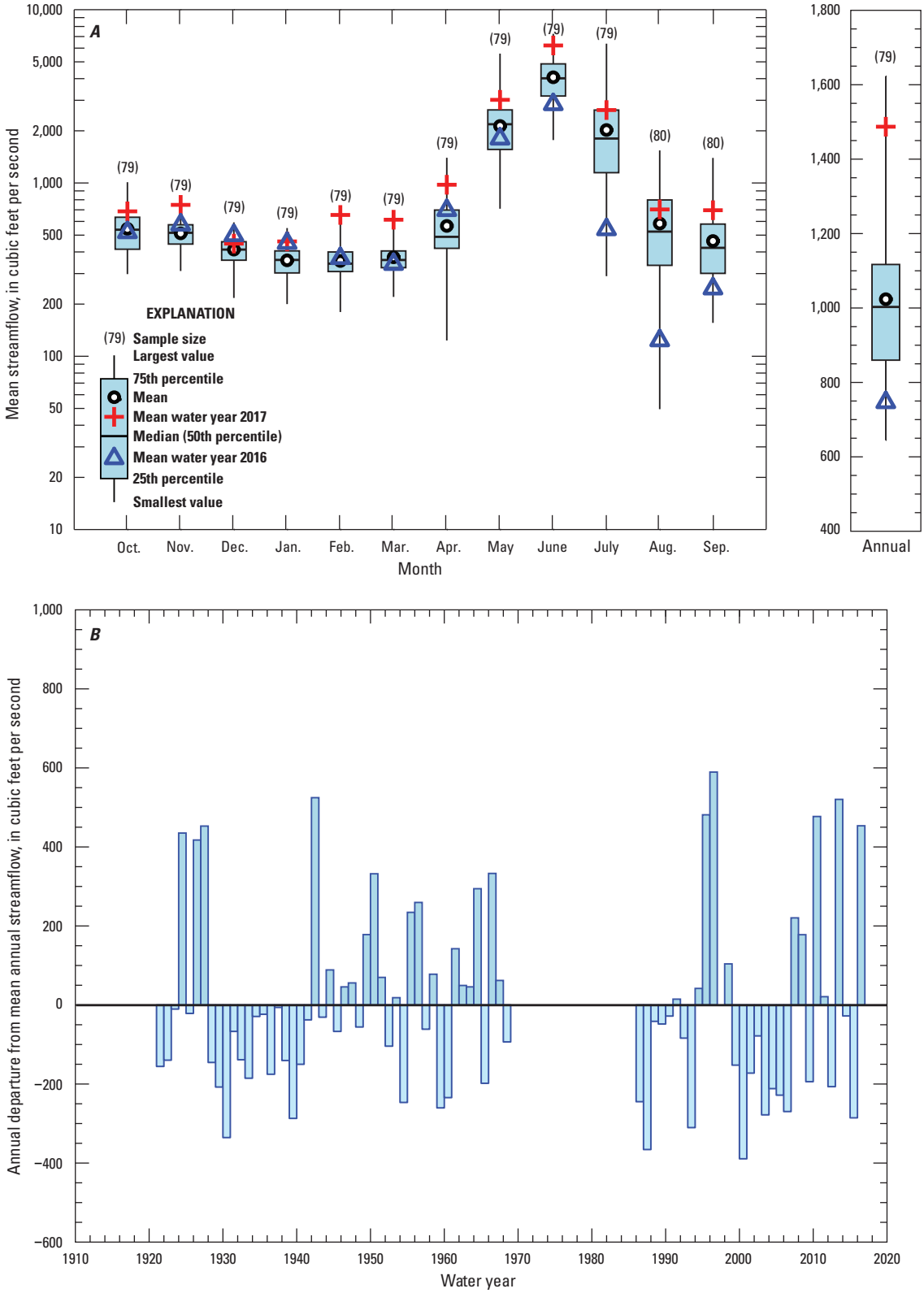

Figure 1. Streamflow data for Clarks Fork Yellowstone River at Edgar, Montana (06208500), minus diversions to White Horse Canal, water years 1921–2017. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

06294000 Little Bighorn River near Hardin, Montana

LOCATION.—Lat 45°44′08.47″, long 107°33′26.89″ referenced to North American Datum of 1983, in SE¼NE¼NE¼ 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 from 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 present.

REVISED RECORDS.—Water Data Report MT–86–1: 1978.

GAGE.—Water-stage recorder. Elevation of gage is 2,882.29 ft, referenced to the National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to October 7, 1953, nonrecording gage located at site 0.4 mi downstream. October 7, 1953 to May 6, 1963, water-stage recorder located at site 0.3 mi downstream. May 6, 1963 to November 6, 1963, nonrecording gage located at site 0.4 mi downstream. All locations had different elevations. November 7, 1963 to August 15, 1976, water-stage recorder located at site 35 ft downstream at present elevation. August 15, 1976 to September 30, 1979, water-stage recorders were located on each bank downstream from Sarpy Road Bridge and were used depending on control conditions.

REMARKS.—Streamflow partly regulated by Willow Creek Reservoir (also known as Lodge Grass Reservoir, capacity 22,900 acre-ft). Diversions for irrigation include 20,980 acres upstream from station. **Discharge values and summary statistics given herein include the streamflow of terminal wasteway of Agency Canal.**

Table 2. Daily mean discharge for Little Bighorn River near Hardin, Montana (06294000), October 2016 through September 2017.

[e, estimated; —, no data; Max, maximum; Min, minimum; Acre-ft, acre-foot]

Day	Daily-mean discharge, in cubic feet per second											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	e138	206	e124	e103	e95.7	e267	294	1,240	682	215	92.7	95.4
2	e132	184	e122	e97.6	e85.5	e251	677	1,230	770	194	108	90.6
3	e136	175	e123	e93.2	e78.9	e239	557	1,150	951	179	104	85.4
4	e200	167	e125	e88.3	e78.4	e233	416	862	993	176	108	88
5	e222	161	e120	e85.8	e80.0	e232	451	713	963	168	123	87.7
6	e243	157	e69.2	e82.4	e84.5	e232	423	660	989	163	127	84
7	e216	153	e96.2	e79.2	e106	e232	371	725	998	157	122	89.8
8	e187	151	e119	e77.2	e130	e233	336	882	940	150	124	91.2
9	e170	149	e137	e76.9	e140	e235	349	1,150	859	152	116	78.8
10	e158	148	e149	e77.1	e137	e238	440	1,150	844	149	103	70.5
11	e155	147	e155	e76.7	e167	e231	604	1,040	775	135	87.4	64.5
12	e151	145	e157	e76.7	e222	223	709	992	715	141	87.7	71.7
13	e154	144	e156	e76.7	e270	216	613	996	641	150	83.1	74.4
14	e157	143	e150	e76.6	e299	218	480	1,130	597	156	88.8	70.8
15	e162	144	e142	e76.4	e326	257	401	1,370	531	157	96.1	86.4
16	e160	145	e133	e76.2	e358	286	369	1,380	463	130	96.5	137
17	e152	150	e125	e75.9	e400	340	348	1,260	403	126	107	177
18	145	155	e122	e75.5	e448	334	337	1,180	403	129	98.9	185
19	147	163	e122	e75.4	e479	308	333	1,520	390	127	87.5	183
20	146	150	e121	e75.3	e482	272	331	1,610	356	122	84.5	158
21	143	141	e122	e75.1	e469	264	322	1,140	328	123	86.7	151
22	141	157	e121	e74.8	e451	271	317	986	302	129	78.2	159
23	139	168	e121	e74.7	e418	285	313	896	283	123	71.6	152
24	139	191	e121	e74.2	e382	292	317	824	292	114	73.4	156
25	137	186	e121	e73.9	e349	372	354	715	283	106	76.3	163
26	136	172	e120	e74.0	e320	365	483	733	246	95	86.3	165
27	135	160	e119	e74.0	e298	305	756	777	229	86.4	99.4	159
28	134	157	e118	e74.2	e286	297	953	733	218	85.6	108	153
29	153	154	e116	e74.1		291	2,130	675	209	81.7	83.7	144
30	156	e135	e114	e76.3		293	1,550	669	209	102	75.5	139
31	213		e109	e88.2		301		670		107	97.2	
Total	**4,957**	**4,758**	**3,869**	**2,456**	**7,440**	**8,413**	**16,330**	**31,060**	**16,860**	**4,229**	**2,982**	**3,610**
Mean	**160**	**159**	**125**	**79.2**	**266**	**271**	**544**	**1,002**	**562**	**136**	**96.2**	**120**
Max	**243**	**206**	**157**	**103**	**482**	**372**	**2130**	**1610**	**998**	**215**	**127**	**185**
Min	**132**	**135**	**69.2**	**73.9**	**78.4**	**216**	**294**	**660**	**209**	**81.7**	**71.6**	**64.5**
Acre-ft	**9,832**	**9,437**	**7,675**	**4,871**	**14,760**	**16,690**	**32,400**	**61,600**	**33,450**	**8,388**	**5,914**	**7,161**

Summary statistics		
	Water year 2017	**Water years 1954–2017**
Annual total	107,000	—
Annual mean	293.1	274.2
Annual runoff (acre-ft)	212,200	198,500

06294500 Bighorn River above Tullock Creek, near Bighorn, Montana

LOCATION.—Lat 46°07′28.10″, long 107°28′07.65″ referenced to North American Datum of 1983, in SE¼SE¼NE¼ 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.—22,419 mi^2. Area at site used October 7, 1955, to September 30, 1981, 22,885 mi^2.

PERIOD OF RECORD.—October 1981 to present. Previously published as "06294700 Bighorn River at Bighorn, MT" from 1956–81, and as "06294700 Bighorn River near Custer" from 1945–55. Streamflows are equivalent at all sites.

GAGE.—Water-stage recorder. Elevation of gage is 2,700 ft, referenced to the North American Vertical Datum of 1988. May 11, 1945, to December 6, 1945, nonrecording gage, and December 7, 1945, to October 6, 1955, water-stage recorder located 1.7 mi upstream at different elevation. October 7, 1955, to September 30, 1981, located at site 2.3 mi downstream at different elevation.

REMARKS.— After November 1965, streamflow has been regulated by Bighorn Lake (usable contents, 1,312,000 acre-ft). Major regulation prior to November 1965 occurred from 14 reservoirs in Wyoming and 1 in Montana with combined usable contents of about 1,400,000 acre-ft. Diversion for irrigation of about 445,200 acres occurs upstream from the station.

Table 3. Daily mean discharge for Bighorn River above Tullock Creek, near Bighorn, Montana (06294500), October 2016 through September 2017.

[e, estimated; —, no data; Max, maximum; Min, minimum; Acre-ft, acre-foot]

Day	Daily-mean discharge, in cubic feet per second											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	2,510	3,280	2,940	e2,800	3,250	5,070	9,720	13,800	15,200	10,000	6,760	3,050
2	2,550	3,160	2,970	e2,800	e3,010	5,650	9,870	13,800	15,200	9,970	6,350	3,040
3	3,270	2,900	3,010	e2,800	e3,130	6,140	10,200	14,300	15,300	9,940	5,910	3,020
4	3,590	2,780	3,040	e2,790	e3,190	6,350	9,940	14,400	15,200	9,840	5,410	3,000
5	3,860	2,800	3,090	e2,790	e3,260	6,390	9,950	14,200	15,000	9,780	4,830	3,010
6	3,740	2,830	3,030	e2,790	3,240	6,500	10,200	14,100	14,700	9,920	4,440	3,050
7	3,200	2,850	3,010	e2,800	3,280	6,450	10,600	14,100	14,300	10,000	4,270	3,020
8	3,050	2,800	e2,990	e2,800	3,330	6,750	10,700	14,400	14,100	10,000	4,210	3,020
9	2,950	2,690	e2,960	e2,810	3,470	7,370	10,900	14,600	13,800	9,930	4,160	3,020
10	2,940	2,730	e2,980	e2,810	4,080	7,510	11,300	14,900	13,400	9,850	4,030	3,000
11	2,940	2,750	2,990	e2,810	6,240	7,490	11,700	14,800	13,100	9,780	3,920	2,980
12	2,950	2,780	3,030	e2,830	4,740	7,480	11,600	14,700	12,900	9,880	3,900	3,020
13	2,950	2,820	3,060	e2,940	4,140	7,470	11,600	14,600	12,700	10,000	3,880	3,060
14	2,980	2,860	3,040	e3,000	4,210	7,840	11,500	14,700	12,100	9,920	3,890	3,120
15	3,000	2,790	3,040	e3,000	4,100	8,530	11,300	14,800	11,400	9,870	3,810	3,390
16	3,020	2,590	e3,080	e3,000	4,470	8,850	11,200	14,900	10,900	9,820	3,600	3,410
17	3,040	2,660	e3,090	e2,990	5,050	8,830	11,200	14,900	10,200	9,790	3,380	3,370
18	3,060	2,690	e3,100	e3,000	5,310	8,790	11,200	14,800	9,990	10,000	3,250	3,460
19	3,080	2,710	e3,100	e3,010	4,990	8,740	11,200	14,900	10,000	10,100	3,230	3,440
20	3,080	2,730	e3,100	e3,010	4,890	8,680	11,400	15,300	9,890	9,990	3,210	3,600
21	3,120	2,740	e3,110	e3,020	4,920	8,680	11,900	14,900	9,810	9,650	3,190	3,900
22	3,150	2,790	e3,110	e3,020	5,280	8,700	12,200	14,900	9,680	9,390	3,110	4,300
23	3,170	2,920	2,950	e3,030	4,710	9,040	12,200	15,200	9,660	9,340	3,090	4,540
24	3,200	3,030	2,770	e3,030	4,570	9,260	12,200	15,400	9,540	9,260	3,010	4,760
25	3,230	3,050	e2,770	3,030	4,570	9,320	12,300	15,300	9,450	8,920	3,000	4,830
26	3,270	3,070	e2,770	3,030	4,390	9,330	12,500	15,300	9,470	8,480	3,000	4,730
27	3,310	3,080	e2,780	3,020	4,320	9,220	13,100	15,300	9,420	8,250	2,990	4,580
28	3,170	3,100	2,790	3,010	4,560	9,240	13,500	15,200	9,490	7,940	3,020	4,600
29	3,100	3,040	2,790	3,030	—	9,260	14,500	15,200	9,480	7,370	3,020	4,540
30	3,160	2,920	e2,790	3,070	—	9,530	14,900	15,100	9,800	7,170	3,040	4,500
31	3,330	—	e2,800	3,270	—	9,730	—	15,200	—	7,150	3,060	—
Total	**96,970**	**85,940**	**92,080**	**91,140**	**118,700**	**248,200**	**346,600**	**458,000**	**355,200**	**291,300**	**120,000**	**108,400**
Mean	**3,128**	**2,864**	**2,970**	**2,940**	**4,239**	**8,006**	**11,550**	**14,770**	**11,840**	**9,397**	**3,870**	**3,612**
Max	**3,860**	**3,280**	**3,110**	**3,270**	**6,240**	**9,730**	**14,900**	**15,400**	**15,300**	**10,100**	**6,760**	**4,830**
Min	**2,510**	**2,590**	**2,770**	**2,790**	**3,010**	**5,070**	**9,720**	**13,800**	**9,420**	**7,150**	**2,990**	**2,980**
Acre-ft	**192,300**	**170,500**	**182,600**	**180,800**	**235,400**	**492,300**	**687,400**	**908,400**	**704,500**	**577,800**	**238,000**	**214,900**

Summary statistics		
	Water year 2017	**Water years 1967–2017**
Annual total	2,412,000	—
Annual mean	6,609	3,725
Annual runoff (acre-ft)	4,785,000	2,697,000

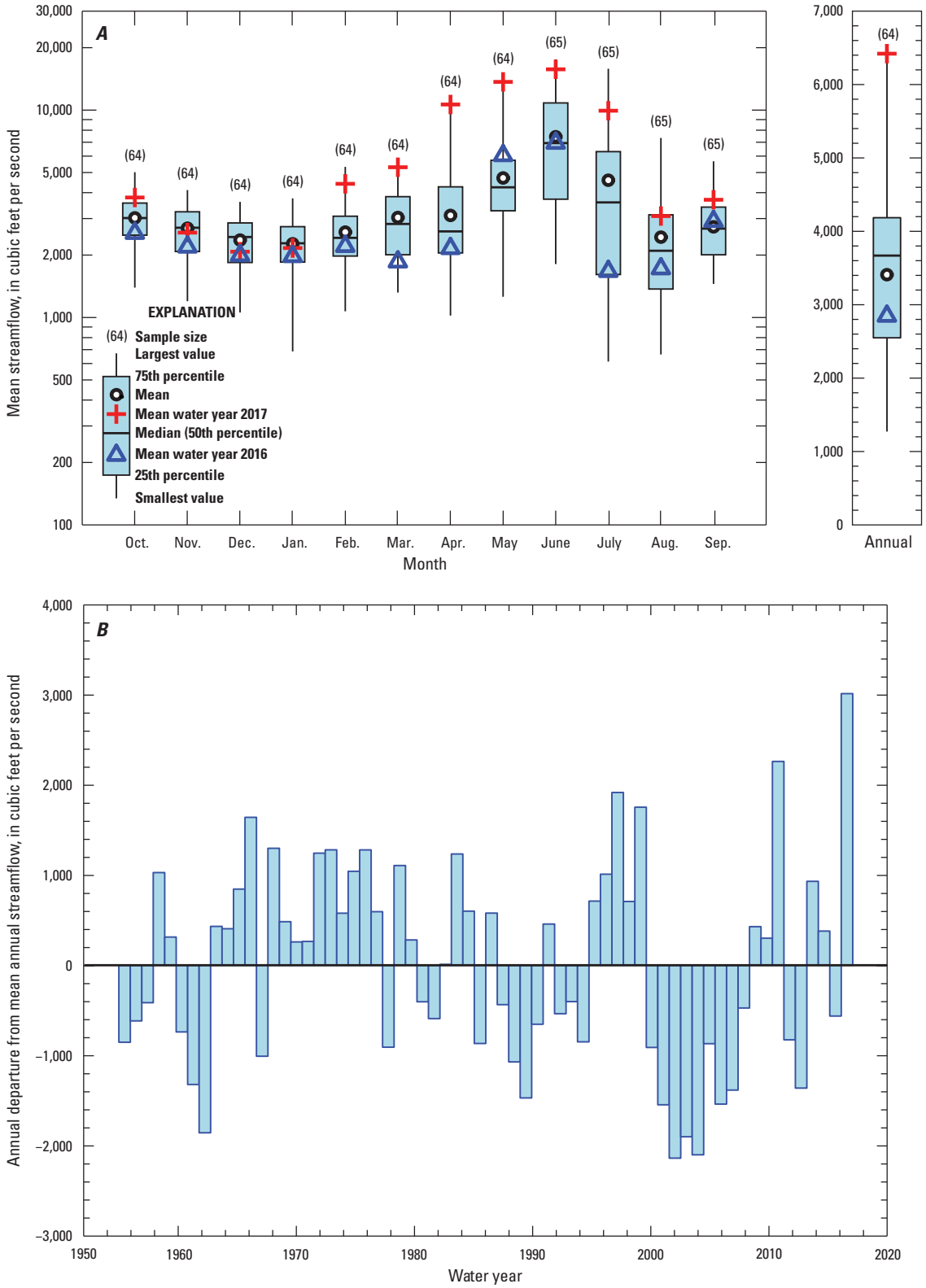

Figure 2. Streamflow data for Bighorn River above Tullock Creek, near Bighorn, Montana (06294500), minus Little Bighorn River near Hardin, Montana (06294000), plus Agency Canal Tailwaste near Hardin, Montana; and adjusted for change in contents in Bighorn Lake, water years 1954–2017. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

06308500 Tongue River at Miles City, Montana

LOCATION.—Lat 46°23′04.54″, long 105°50′43.88″ referenced to North American Datum of 1983, in SE¼SE¼SE¼ 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 before October 4, 1995, 5,379 mi^2.

PERIOD OF RECORD.—April 1938 to April 1942, April 1946 to present. 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 October 4, 1995, at site 2.5 mi upstream from present site. Streamflows at present site are equivalent with streamflows at site operated from 1946. Monthly discharge only for some periods, published in Water Supply Paper (WSP) 1309.

REVISED RECORDS.—WSP 1729: Drainage area.

GAGE.—Water-stage recorder. Elevation of gage is 2,351.40 ft, referenced to the North American Vertical Datum of 1988. April 1938 to April 1942, nonrecording gage located at site 8 mi upstream from present site at different elevation. April 1946 to September 30, 1963, located at elevation 1.00 ft higher than present site. October 4, 1995, gage was moved 2.5 mi downstream.

REMARKS.—Streamflow is regulated by Tongue River Reservoir (station 06307000) with total capacity of 79,071 acre-ft, and many small reservoirs in Wyoming with combined capacity of about 15,000 acre-ft. Diversions for irrigation include about 100,800 acres upstream from station.

Table 4. Daily mean discharge for Tongue River at Miles City, Montana (06308500), October 2016 through September 2017.

[e, estimated; —, no data; Max, maximum; Min, minimum; Acre-ft, acre-foot]

Day	Daily-mean discharge, in cubic feet per second											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	195	206	e148	e145	e145	e288	527	956	1,730	698	119	113
2	193	198	e145	e145	e146	e290	539	969	1,710	600	106	123
3	197	192	e147	e144	e148	e329	542	1,040	1,720	533	114	115
4	207	190	e149	e144	e151	e346	548	1,110	1,750	465	123	112
5	238	188	e151	e143	e155	e337	593	1,140	1,850	394	151	108
6	249	188	e154	e143	e161	e280	631	1,200	1,960	337	138	114
7	240	187	e156	e143	e169	e318	652	1,210	2,050	253	144	116
8	226	187	e158	e143	e183	e396	674	1,210	2,160	217	160	120
9	219	187	e158	e143	e195	e313	735	1,230	2,310	206	153	116
10	216	186	e159	e143	e206	e256	923	1,250	2,460	173	137	130
11	216	186	e159	e143	e218	e259	1,040	1,200	2,440	184	123	124
12	217	185	e158	e143	e238	e279	951	1,200	2,430	174	108	128
13	217	185	e158	e143	e264	e284	890	1,220	2,430	131	86.2	98.8
14	217	185	e157	e143	e289	e319	886	1,190	2,260	101	87.2	90.8
15	218	185	e157	e143	e316	e358	861	1,300	2,070	103	119	132
16	217	184	e157	e143	e351	e588	847	1,690	1,960	88.8	121	223
17	215	182	e157	e143	e459	e823	844	2,010	1,840	113	102	235
18	217	183	e156	e143	e570	536	854	2,210	1,660	145	101	244
19	234	184	e155	e143	e674	448	880	2,200	1,510	147	99	223
20	218	187	e154	e143	e741	438	1,020	2,210	1,440	146	107	203
21	213	185	e154	e143	e722	427	1,020	2,380	1,420	133	113	195
22	212	176	e153	e143	e709	404	910	2,570	1,310	122	122	211
23	211	173	e152	e143	e662	405	893	2,330	1,220	115	133	214
24	208	e173	e151	e143	e586	408	962	2,100	1,150	107	124	230
25	208	e174	e150	e143	e510	403	983	1,950	1,080	87.7	118	246
26	208	e173	e149	e143	e437	424	926	1,900	1,030	86.3	111	254
27	208	e170	e149	e143	e338	425	965	1,790	1,000	92.4	107	252
28	209	e165	e147	e143	e300	430	912	1,850	965	87	102	242
29	211	e160	e147	e143	—	442	896	1,910	941	89	120	235
30	217	e154	e147	e143	—	474	899	1,870	805	89.4	114	236
31	221	—	e146	e144	—	503	—	1,770	—	96.5	103	—
Total	**6,692**	**5,457**	**4,738**	**4,440**	**10,040**	**12,230**	**24,800**	**50,170**	**50,660**	**6,314**	**3,665**	**5,184**
Mean	**216**	**182**	**153**	**143**	**359**	**395**	**827**	**1,618**	**1,689**	**204**	**118**	**173**
Max	**249**	**206**	**159**	**145**	**741**	**823**	**1040**	**2570**	**2460**	**698**	**160**	**254**
Min	**193**	**154**	**145**	**143**	**145**	**256**	**527**	**956**	**805**	**86.3**	**86.2**	**90.8**
Acre-ft	**13,270**	**10,830**	**9,398**	**8,807**	**19,920**	**24,260**	**49,200**	**99,500**	**100,500**	**12,520**	**7,270**	**10,280**

Summary statistics		
	Water year 2017	Water years 1938–2017*
Annual total	184,400	—
Annual mean	505	420
Annual runoff (acre-ft)	365,600	304,100

*During periods of operation (April 1938 to April 1942, April 1946 to current year [2017]).

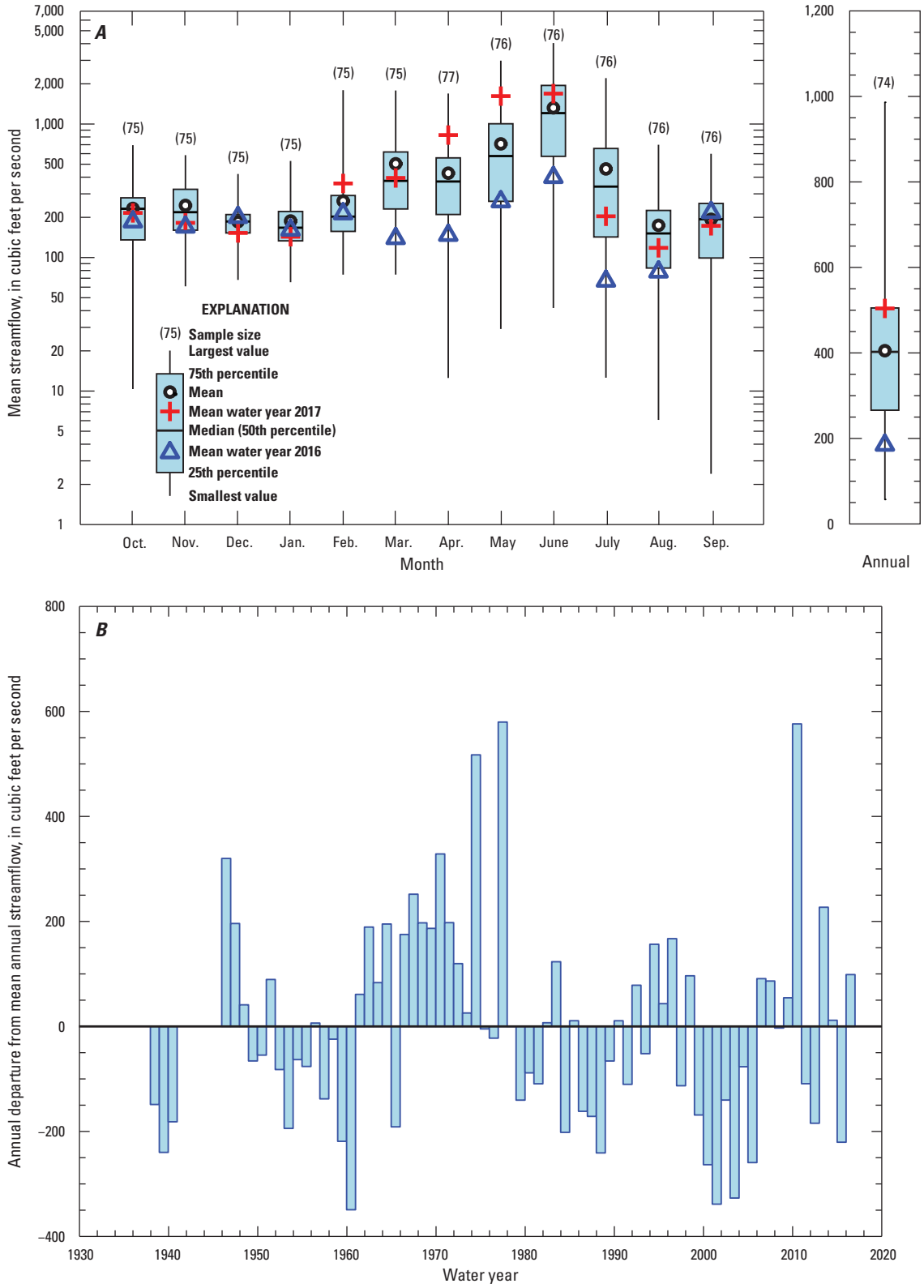

Figure 3. Streamflow data for Tongue River at Miles City, Montana (06308500), water years 1938–2017. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

06326500 Powder River near Locate, Montana

LOCATION.—Lat 46°25′45.97″, long 105°18′37.19″ referenced to North American Datum of 1983, in SW¼SW¼SE¼ 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.—13,060 mi^2.

PERIOD OF RECORD.—March 1938 to present.

REVISED RECORDS.— Water Supply Paper (WSP) 926: 1939. WSP 1309: 1938–39, maximum discharge. WSP 1729: Drainage area. Water Data Report MT–04–1: Drainage area.

GAGE.—Water-stage recorder. Elevation of gage is 2,384.7 ft, referenced to the National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to July 11, 1947, nonrecording gage located at bridge 1.5 mi upstream, and July 11, 1947, to September 30, 1965, water-stage recorder located at site near upstream bridge at different elevation. October 1, 1965, to October 4, 1966, nonrecording gage, and October 5, 1966, to March 21, 1978, water-stage recorder located at present site and elevation. March 22, 1978, to April 23, 1981, water-stage recorder located 1.5 mi upstream at different elevation, April 24 to August 20, 1981, water-stage recorder located at present site and elevation, and August 21, 1981, to September 30, 1981, water-stage recorder located 1.5 mi upstream at different elevation. October 1, 1981, to April 5, 1995, water-stage recorder located at site 1.5 mi downstream at different elevation. April 7, 1995 to present, water-stage recorders located on each bank and used depending on control conditions.

REMARKS.—Some regulation occurs by three reservoirs in Wyoming with combined usable contents of 36,800 acre-ft. Diversions for irrigation include about 101,800 acres upstream from station.

Table 5. Daily mean discharge for Powder River near Locate, Montana (06326500), October 2016 through September 2017.

[e, estimated; —, no data; Max, maximum; Min, minimum; Acre-ft, acre-foot]

Day	Daily-mean discharge, in cubic feet per second											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	520	e280	e283	e180	e201	e734	663	2,150	2,120	780	e60.8	e50.3
2	435	e278	e278	e162	e202	743	627	2,070	2,040	734	e57.3	e53.4
3	396	273	e264	e137	e200	729	606	2,120	2,090	677	e57.1	e52.6
4	e339	261	e257	e151	e200	812	598	2,530	2,090	647	e55.6	e51.0
5	e297	257	e212	e153	e203	829	593	2,430	2,280	595	e54.8	e46.5
6	e272	e262	e171	e144	e205	806	627	2,180	2,180	578	e54.2	44.4
7	252	e263	e164	e149	e213	745	612	1,840	2,160	506	e53.8	40.3
8	e246	266	e178	e157	e212	780	794	1,710	2,400	465	e57.6	e37.1
9	e264	272	e176	e147	e211	742	895	1,750	2,450	425	e57.2	34.7
10	e288	e272	e196	e125	e212	702	882	1,960	2,460	367	e57.1	e32.5
11	e265	271	e194	e113	e210	578	830	2,380	2,290	321	e59.2	e30.7
12	271	268	e193	e133	e209	595	822	2,730	2,460	290	e57.5	e30.4
13	258	e270	e184	e147	e208	584	785	2,780	2,370	270	e55.8	e30.6
14	e246	e273	e191	e152	e217	531	783	2,710	2,400	240	e53.2	e31.4
15	e246	e269	e193	e151	e229	725	703	2,680	2,310	221	e60.9	73.6
16	e246	e270	e185	e148	e363	1,040	662	3,090	2,860	224	62.4	195
17	e250	e264	e177	e149	e532	958	709	3,100	2,780	251	e64.2	151
18	330	e279	e170	e153	e572	789	663	3,020	2,630	260	e62.8	143
19	265	288	e168	e156	e545	709	690	2,930	2,140	259	e69.3	123
20	269	293	e162	e158	e620	705	1,010	3,070	2,050	277	e70.1	112
21	e234	e302	e165	e165	e857	645	1,780	3,130	1,850	e229	e63.8	96
22	e221	e304	e166	e168	e984	610	1,110	2,820	1,560	e176	e49.2	106
23	223	e312	e165	e164	e1,030	603	913	2,700	1,400	130	e42.5	144
24	218	e297	e169	e167	e985	621	861	2,560	1,340	e106	e38.1	171
25	214	296	e168	e171	e916	662	795	2,460	1,350	e97.5	e36.3	186
26	215	348	e171	e166	e856	704	859	2,350	1,220	93.8	e37.2	190
27	230	346	e171	e169	e819	677	1,280	2,280	1,100	e91.2	e45.0	195
28	e253	333	e174	e175	e781	661	1,380	2,490	974	e86.1	44.8	194
29	e255	e347	e182	e178	—	667	1,480	2,330	913	e78.4	38.9	198
30	274	e313	e177	e185	—	645	1,920	2,300	809	67.5	e31.4	214
31	e265	—	e184	e190	—	654	—	2,200	—	e64.5	e38.2	—
Total	**8,557**	**8,627**	**5,888**	**4,863**	**12,989**	**21,980**	**26,930**	**76,850**	**59,080**	**9,607**	**1,646**	**3,058**
Mean	**276**	**288**	**190**	**157**	**464**	**709**	**898**	**2,479**	**1,969**	**310**	**53.1**	**102**
Max	**520**	**348**	**283**	**190**	**1,030**	**1,040**	**1,920**	**3,130**	**2,860**	**780**	**70.1**	**214**
Min	**214**	**257**	**162**	**113**	**200**	**531**	**593**	**1710**	**809**	**64.5**	**31.4**	**30.4**
Acre-ft	**16,970**	**17,110**	**11,680**	**9,646**	**25,770**	**43,610**	**53,420**	**152,400**	**117,200**	**19,050**	**3,265**	**6,064**

Summary statistics		
	Water year 2017	**Water years 1939–2017**
Annual total	240,100	—
Annual mean	658	565
Annual runoff (acre-ft)	476,200	409,500

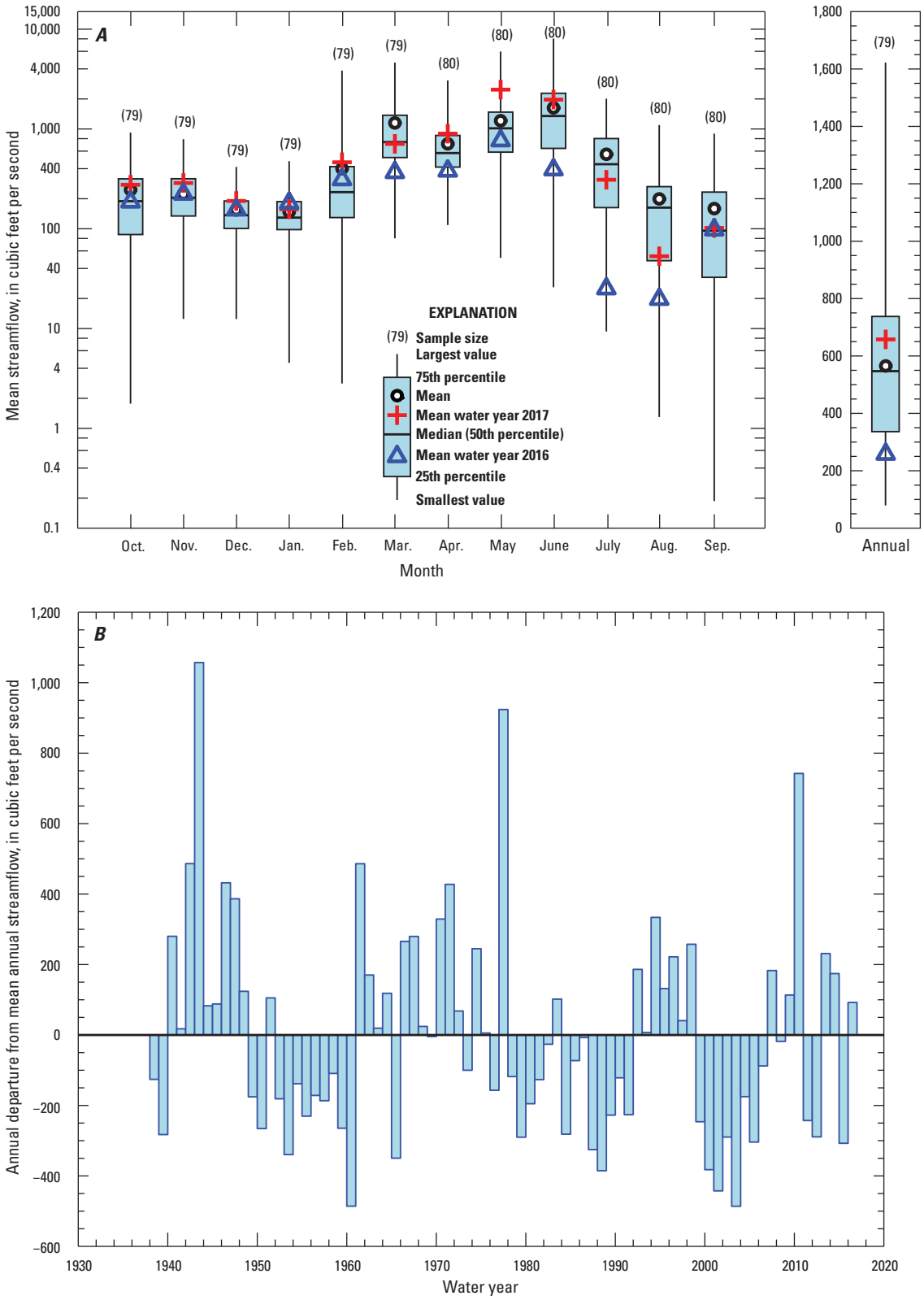

Figure 4. Streamflow data for Powder River near Locate, Montana (06326500), water years 1939–2017. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

Month-End Contents for Yellowstone River Compact Reservoirs Completed after January 1, 1950

06258900 Boysen Reservoir, Wyoming

LOCATION.—Lat 43°25′00″, long 108°10’37″ referenced to North American Datum of 1927, in NW¼NW¼ 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 present.

GAGE.—Water-stage recorder. Datum of gage is referenced to the National Geodetic Vertical Datum of 1929 (levels by Bureau of Reclamation).

REMARKS.—Reservoir is formed by rock-fill dam completed in October 1951. Storage began October 11, 1951. The elevation at the top of dead pool (outlet and penstock invert pipe) is 4,657.00 ft and contents of 40,080 acre-ft. The elevation at the top of inactive contents is 4,685.00 ft and contents 219,200 acre-ft. The elevation of the top of the joint-use pool (top of spillway gate) is 4,725.00 ft and contents of 741,600 acre-ft. Top of exclusive flood control is 4,732.20 ft and contents of 892,200 acre-ft. Top of Crest of dam is at elevation 4,758.00 ft. Water used for power production, flood control, irrigation, and recreation.

COOPERATION.—Elevations and contents table furnished by Bureau of Reclamation. Data available at https://www.usbr.gov/gp-bin/arcweb_boyr.pl.

EXTREMES FOR PERIOD OF RECORD.—Maximum daily contents, 922,400 acre-ft, July 6, 1967, elevation, 4,730.83 ft; minimum daily contents since normal use of water started, 235,700 acre-ft, September 24, 2002; minimum elevation, March 18, 1956, 4,684.18 ft.

Table 6. Month-end contents for Boysen Reservoir, Wyoming.

[—, no data]

Date	Water-surface elevation, in feet	Contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2016	4,718.65	624,900	—
October 31, 2016	4,719.99	648,200	23,300
November 30, 2016	4,720.71	661,000	12,800
December 31, 2016	4,719.79	644,700	−16,300
January 31, 2017	4,718.99	630,700	−14,000
February 29, 2017	4,720.67	660,300	29,600
March 31, 2017	4,718.26	618,300	−42,000
April 30, 2017	4,707.95	465,000	−153,300
May 31, 2017	4,709.32	483,400	18,400
June 30, 2017	4,728.71	816,900	333,500
July 31, 2017	4,724.46	731,100	−85,800
August 31, 2017	4,722.45	692,900	−38,200
September 30, 2017	4,723.73	717,000	24,100
2017 water year	**—**	**—**	**92,100**

06260300 Anchor Reservoir, Wyoming

LOCATION.—Lat 43°39′50″, long 108°49′27″ referenced to North American Datum of 1927, 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, Wyoming.

DRAINAGE AREA.—131 mi^2.

PERIOD OF RECORD.—November 1960 to present.

GAGE.—Water-stage recorder. Datum of gage is referenced to the National Geodetic Vertical Datum of 1929 (Bureau of Reclamation bench mark).

REMARKS.—Reservoir is formed by concrete-arch dam completed in 1960. The elevation of the dead pool (invert of river outlet) is 6,343.75 ft and contents of 66 acre-ft. The top of the active conservation pool is 6,441.0 ft and contents of 17,230 acre-ft. Water is used for flood control, recreation, and irrigation of land in Owl Creek Basin. Anchor Reservoir was built to have contents of 17,410 acre-ft, but sinkholes within the area contained by the dam prevent filling the reservoir to the designed volume, and at present, only 9,252 acre-ft have been adjudicated, with the remaining capacity having been removed from the permit.

COOPERATION.—Elevations and contents table furnished by Bureau of Reclamation. Data available at https://www.usbr.gov/gp-bin/arcweb_ancr.pl.

EXTREMES FOR PERIOD OF RECORD.—Maximum daily contents, 9,250 acre-ft., July 3, 1967, elevation, 6,418.52 ft; no contents on many days some years.

Table 7. Month-end contents for Anchor Reservoir, Wyoming.

[—, no data]

Date	Water-surface elevation, in feet	Contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2016	6,363.29	548	—
October 31, 2016	6,370.76	966	418
November 30, 2016	6,369.47	881	−85
December 31, 2016	6,365.48	653	−228
January 31, 2017	6,361.70	480	−173
February 28, 2017	6,365.23	600	120
March 31, 2017	6,369.38	875	275
April 30, 2017	6,376.79	1,429	554
May 31, 2017	6,401.65	4,770	3,340
June 30, 2017	6,411.52	7,060	2,290
July 31, 2017	6,409.12	6,294	−761
August 31, 2017	6,385.63	2,320	−3,970
September 30, 2017	6,373.63	1,170	−1,150
2017 water year	**—**	**—**	**622**

06286400 Bighorn Lake near St. Xavier, Montana

LOCATION.—Lat 45°18′27″, long 107°57′26″ referenced to North American Datum of 1927, in SW¼SE¼ 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 mi².

PERIOD OF RECORD.—November 1965 to present (month-end contents only). Prior to October 1969, published as "Yellowtail Reservoir." Records of daily elevations and contents on file at the U.S. Geological Survey, Wyoming-Montana Water Science Center in Helena, Montana.

GAGE.—Water-stage recorder located in powerhouse control room. Elevation of gage is 3,296.5 ft, referenced to the National Geodetic Vertical Datum of 1929 (levels by Bureau of Reclamation).

COOPERATION.—Elevations and contents table furnished by Bureau of Reclamation. Data available at https://www.usbr.gov/gp-bin/arcweb_bhr.pl.

REMARKS.—Reservoir is formed by thin concrete-arch dam; construction began in 1961 and was completed in 1967. Storage began November 3, 1965. The elevation of the dead pool is 3,296.50 ft, contents of 17,724 acre-ft. The top of the inactive conservation pool is 3,547.00 ft, contents of 469,910 acre-ft. The elevation of spillway crest is 3,593.00 ft. The top of the exclusive flood pool (top of gates) is 3,657.00 ft, contents of 1,278,896 acre-ft. The top of the surcharge pool is 3,660.00 ft, contents of 1,331,725 acre-ft. All elevations are referenced to the National Geodetic Vertical Datum of 1929. Water is used for power production, flood control, irrigation, and recreation.

EXTREMES FOR PERIOD OF RECORD.—Maximum daily contents, 1,365,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum daily contents since first filling, 519,400 acre-ft, March 11, 2003, elevation 3,572.81 ft.

Table 8. Month-end contents for Bighorn Lake, Montana.

[—, no data]

Date	Water-surface elevation, in feet	Contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2016	3,633.20	924,700	—
October 31, 2016	3,637.74	975,200	50,500
November 30, 2016	3,637.03	966,900	−8,300
December 31, 2016	3,632.70	919,600	−47,300
January 31, 2017	3,628.11	876,700	−42,900
February 28, 2017	3,630.79	900,900	24,200
March 31, 2017	3,610.90	751,500	−149,400
April 30, 2017	3,607.08	729,800	−21,700
May 31, 2017	3,605.78	722,700	−7,100
June 30, 2017	3,638.62	985,800	263,100
July 31, 2017	3,641.88	1,027,200	41,400
August 31, 2017	3,638.54	984,800	−42,400
September 30, 2017	3,639.52	996,800	12,000
2017 water year	**—**	**—**	**72,100**

Month-End Contents for Yellowstone River Compact Reservoirs Existing on January 1, 1950

The extent, if any, to which the use of reservoirs in this section 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 in table 9. Three of the reservoirs (Bull Lake, Pilot Butte Reservoir, and Buffalo Bill Reservoir) are in the Bighorn River Basin, Wyo., with contents data furnished by the Bureau of Reclamation. The contents of Buffalo Bill Reservoir were increased in 1992 from 456,600 to 644,500 acre-ft (listed as 646,565 acre-ft 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, who furnished the water-level data and the reservoir-contents table. The contents of Tongue River Reservoir increased from 68,040 to 79,071 acre-ft in 1999.

Table 9. Month-end contents for Yellowstone River Compact reservoirs existing on January 1, 1950.

Date	Contents, in acre-feet[1]			
	06224500 Bull Lake	Pilot Butte Reservoir	06281500 Buffalo Bill Reservoir	06307000 Tongue River Reservoir
September 30, 2016	38,300	7,400	421,300	42,400
October 31, 2016	29,700	29,800	441,300	45,100
November 30, 2016	37,400	29,500	470,100	49,100
December 31, 2016	40,600	29,400	475,900	49,900
January 31, 2017	43,300	29,400	481,400	50,200
February 28, 2017	46,800	29,400	483,200	60,300
March 31, 2017	52,400	29,500	457,100	64,700
April 30, 2017	60,900	29,700	357,400	67,200
May 31, 2017	85,600	28,900	331,900	81,200
June 30, 2017	128,000	28,600	624,500	76,200
July 31, 2017	149,000	28,300	632,400	67,200
August 31, 2017	141,900	25,800	583,800	54,800
September 30, 2017	120,500	18,000	528,200	50,200
Change in contents during water year 2017	**82,200**	**10,600**	**106,900**	**7,800**

[1]Pre-compact water rights and post-compact water rights for these reservoirs are presented in table10, “Water-year-end contents for Yellowstone River Compact reservoirs or lakes.”

Water-Year-End Contents for Yellowstone River Compact Reservoirs or Lakes

Water-year-end contents for additional reservoirs of interest to the Yellowstone River Compact are listed in table 10.

Table 10. Water-year-end contents for Yellowstone River Compact reservoirs or lakes.

[Contents are in acre-feet. Reservoirs or lakes are listed in alphabetical order by drainage basin. —, no data or not available]

Reservoir or lake name	Pre-compact 1950 water right	Post-compact 1950 water right	Total permitted water right	Contents on September 30, 2017	Contents on September 30, 2016	Change in contents[1]
Clarks Fork Yellowstone River Basin						
Cooney Reservoir[2]	28,230	0	28,230	21,000	14,100	6,900
Glacier Lake[2]	4,200	0	4,200	—	—	—
Bighorn River Basin						
(Lake) Adelaide Reservoir[3]	1,449	3,315	4,764	1,230	428	802
Anchor Reservoir[4,5]	0	9,252	9,252	1,174	548	626
Bighorn Lake[5]	0	1,116,000	1,116,000	1,014,600	942,400	72,200
Boysen Reservoir[5]	757,851	0	757,851	717,000	624,900	92,100
Buffalo Bill Reservoir[5]	456,640	187,940	644,580	528,200	421,300	106,900
Bull Lake[5]	151,951	0	151,951	120,500	38,300	82,200
Christina Reservoir[3]	3,860	0	3,860	3,860	260	3,600
Corral Reservoir[3]	0	1,027	1,027	608	711	−103
Diamond Creek Dike Reservoir[3]	0	18,378	18,378	314	237	77
Enterprise Reservoir[3]	1,494	204	1,698	307	28	279
Fairview Extension Reservoir[3]	791	620	1,411	1,290	1,410	−120
Greybull Valley Reservoir[3]	0	33,169	33,169	21,010	9,340	11,670
Harrington Reservoir[3]	315	887	1,202	800	1,200	−400
Lake Cameahwait Reservoir[3]	0	6,683	6,683	6,680	6,680	0
Lake Creek Reservoir[3]	1,373	0	1,373	655	460	195
Lodge Grass Reservoir[6]	22,900	0	22,900	14,100	13,900	200
Lower Sunshine Reservoir[3]	0	58,748	58,748	47,640	35,700	11,940
Newton Reservoir[3]	4,525	0	4,525	1,008	556	452
Perkins and Kinney Reservoir[3]	1,202	0	1,202	1,097	704	393
Pilot Butte Reservoir[5]	34,600	0	34,600	18,000	7,400	10,600
Sage Creek Reservoir[3]	440	2,345	2,785	2,785	2,700	85
Shell Reservoir[3]	1,949	0	1,949	1,017	269	748
Shoshone Lake Reservoir[3]	4,560	5,181	9,741	9,740	0	9,740
Upper Sunshine Reservoir[3]	52,988	0	52,988	46,660	29,150	17,510
Teapot Reservoir[3]	1,578	0	1,578	0	0	0
Ten Sleep Reservoir[3]	3,509	0	3,509	3,509	3,510	−1
Wiley Reservoir[3]	689	331	1,020	920	1,020	−100
Worthen Meadow Reservoir	0	1,504	1,504	1,504	1,350	154

Table 10. Water-year-end contents for Yellowstone River Compact reservoirs or lakes.—Continued

[Contents are in acre-feet. Reservoirs or lakes are listed in alphabetical order by drainage basin. —, no data or not available]

Reservoir or lake name	Pre-compact 1950 water right	Post-compact 1950 water right	Total permitted water right	Contents on September 30, 2017	Contents on September 30, 2016	Change in contents[1]
Powder River Basin						
Cloud Peak Reservoir[3]	3,398	173	3,571	3,570	0	3,570
Dull Knife Reservoir[3]	0	4,345	4,345	35	546	−511
Healy Reservoir[3,7]	0	5,140	5,140	3,490	2,170	1,320
Kearney Lake Reservoir[3]	1,854	4,470	6,324	1,820	0	1,820
Lake DeSmet[3,8]	37,515	197,472	234,987	162,340	155,260	7,080
Muddy Guard Reservoirs[3,9]	0	2,336	2,336	924	344	580
Posy No. 1 Reservoir[3]	0	1,537	1,537	1,400	765	635
Tie Hack Reservoir	1,647	788	2,435	2,440	2,260	180
Willow Park Reservoir[3]	4,457	0	4,457	981	1,810	−829
Tongue River Basin						
Big Horn Reservoir[3]	2,749	1,875	4,624	0	210	−210
Dome Reservoirs[3,10]	1,843	188	2,031	923	627	296
Park Reservoir[3]	7,347	3,015	10,362	3,950	2,880	1,070
Sawmill Lakes Reservoir[3]	0	1,275	1,275	722	687	35
Tongue River Reservoir[2]	72,500	6,571	79,071	50,200	42,400	7,800
Twin Lakes Reservoir[11]	1,180	2,232	3,412	2,811	2,826	−15

[1]Change in contents is derived from subtracting the previous water year's contents from the current water year's contents.

[2]Reservoir managed and contents provided by the State of Montana.

[3]Private reservoir. Contents provided by the State of Wyoming.

[4]Anchor Reservoir was built to have a usable content of 17,410 acre-feet, but sinkholes and constructed dikes within the area contained by the dam prevent filling the reservoir to the designed volume. At present, only 9,252 acre-feet have been adjudicated, with the remaining capacity having been eliminated from the permit.

[5]Reservoir managed and contents provided by the Bureau of Reclamation.

[6]Lodge Grass Reservoir (Willow Creek Dam) managed and contents provided by Bureau of Indian Affairs.

[7]Reservoir managed and contents provided by the State of Wyoming.

[8]Reservoir managed by Johnson County, Wyoming, and the State of Wyoming. Contents provided by the State of Wyoming.

[9]Data are combined contents of Muddy Guard No. 1 and Muddy Guard No. 2 Reservoirs.

[10]Data are combined contents of Dome Lake and Dome Lake No. 1 Reservoir.

[11]Data are combined contents of Twin Lakes No. 1 and Twin Lakes No. 2 Reservoirs.

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 authorrity; 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: _____

Errata from the Sixty-Fifth Annual Report 2016

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Station description for 06294500 Bighorn River above Tullock Creek, near Bighorn, Montana.

06294500 Bighorn River above Tullock Creek, near Bighorn, Montana

LOCATION.—Lat 46°07′28.10″, long 107°28′07.65″ referenced to North American Datum of 1983, in SE¼SE¼NE¼ 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.

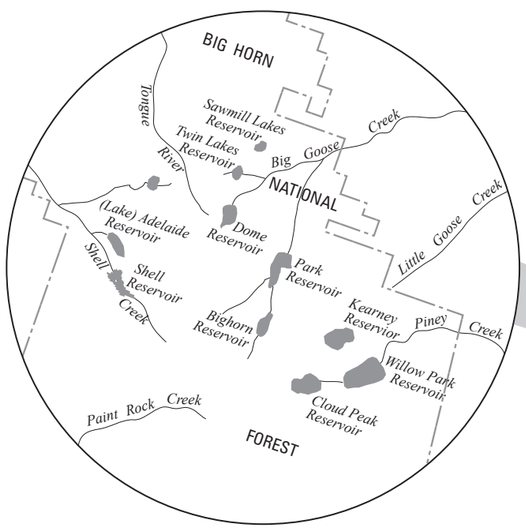
DRAINAGE AREA.—22,419 mi^2. Area at site used October 7, 1955, to September 30, 1981, 22,885 mi^2.

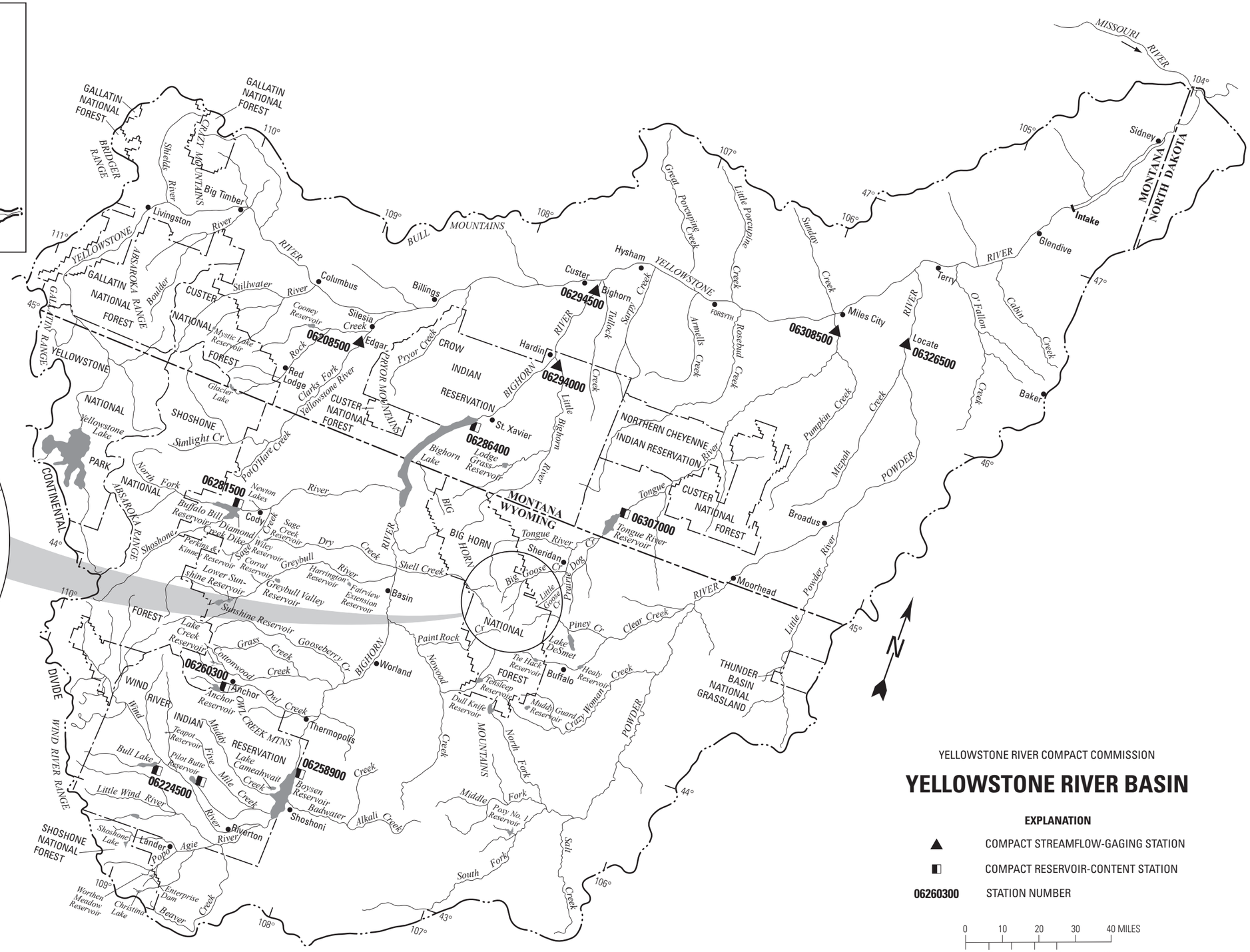
PERIOD OF RECORD.—October 1981 to present. Previously published as “06294700 Bighorn River at Bighorn, MT” from 1956–81, and as “06294700 Bighorn River near Custer” from 1945–55. Streamflows are equivalent at all sites.

GAGE.—Water-stage recorder. Elevation of gage is 2,700 ft, referenced to the North American Vertical Datum of 1988. May 11, 1945, to December 6, 1945, nonrecording gage, and December 7, 1945, to October 6, 1955, water-stage recorder located 1.7 mi upstream at different elevation. October 7, 1955, to September 30, 1981, located at site 2.3 mi downstream at different elevation.

REMARKS.— After November 1965, streamflow has been regulated by Bighorn Lake (usable contents, 1,312,000 acre-ft). Major regulation prior to November 1965 occurred from 14 reservoirs in Wyoming and 1 in Montana with combined usable contents of about 1,400,000 acre-ft. Diversion for irrigation of about 445,200 acres occurs upstream from the station.

LOCATION MAP





YELLOWSTONE RIVER COMPACT COMMISSION

YELLOWSTONE RIVER BASIN

EXPLANATION

▲ COMPACT STREAMFLOW-GAGING STATION

◧ COMPACT RESERVOIR-CONTENT STATION

06260300 STATION NUMBER

0 10 20 30 40 MILES

0 10 20 30 40 KILOMETERS