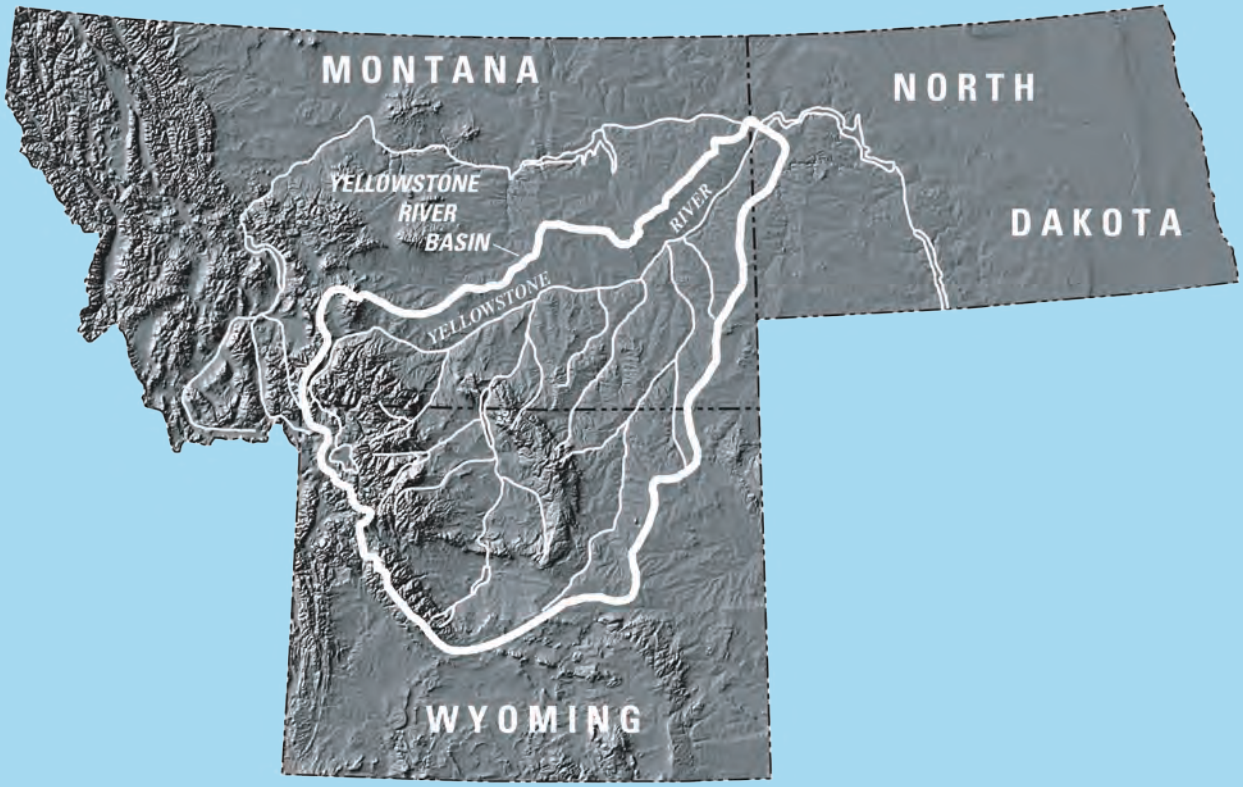
YELLOWSTONE RIVER COMPACT COMMISSION

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



FIFTY-NINTH ANNUAL REPORT
2010

Yellowstone River

Compact Commission

Fifty-Ninth Annual Report

2010

Contents

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

Figures

Tables

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

Conversion Factors

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	
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)
cubic foot per second per day [(ft^3/s)/d)]	2,447	cubic meter (m^3)
cubic foot per second per day [(ft^3/s)/d)]	0.0002447	cubic hectometer (hm^3)
cubic foot (ft^3)	0.02832	cubic meter (m^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)
foot per year (ft/yr)	0.3048	meter per year (m/yr)
gallon per minute (gal/min)	0.06309	liter per second (L/s)

[1] The unit hectare is used with the International System of Units (SI), which is in common 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://physics.nist.gov/Pubs/SP330/sp330.pdf.*

YELLOWSTONE RIVER COMPACT COMMISSION
1608 Mountain View Road
Rapid City, South Dakota 57702

Honorable Matthew Mead
Governor of the State of Wyoming
Cheyenne, Wyoming 82002

Honorable Brian Schweitzer
Governor of the State of Montana
Helena, Montana 59620

Honorable Jack Dalrymple
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 fifty-ninth annual report of activities for the period ending September 30, 2010.

Minutes of December 8, 2010

Members of the Yellowstone River Compact Commission convened December 8, 2010, at 8:30 a.m. at the Rock Creek Resort in Red Lodge, Mont. In attendance were Mr. Mark Anderson, U.S. Geological Survey (USGS), Chairman and Federal Representative; Ms. Mary Sexton, Director, Montana Department of Natural Resources and Conservation (DNRC) and Commissioner for Montana; and Mr. Patrick Tyrrell, Wyoming State Engineer and Commissioner for Wyoming. Also in attendance were Ms. Sue Lowry, Mr. Loren Smith, and Mr. Carmine LoGuidice, Wyoming State Engineer's Office (SEO); Mr. Peter Michael, Wyoming Attorney General's Office; Mr. Chuck Dalby, Mr. Kevin Smith, and Ms. Kim Overcast, Montana DNRC; Ms. Jennifer Anders, Montana Attorney General's Office; Mr. Art Compton, Montana Department of Environmental Quality (DEQ); Mr. Scott Guenthner, and Mr. Tim Felchle, Bureau of Reclamation; and Mr. John Kilpatrick, Mr. David Mott, and Mr. Wayne Berkas, USGS.

Mr. Mark Anderson has been newly appointed by the Director of the USGS as the Chairman and Federal Representative to the Commission (Attachment A). Mr. Anderson is the Director of the USGS South Dakota Water Science Center.

Mr. Anderson called the meeting to order and presented the agenda. He asked if anyone had any additions to the agenda.

Mr. Tyrell replied that he and Commissioner Sexton had a resolution of appreciation for Mr. William Horak (previous Chairman and Federal Representative to the Yellowstone River Compact Commission) and made a motion that the resolution be included in the minutes (Attachment B). Ms. Sexton seconded the motion, and the motion carried. The resolution reads: "Whereas, William Horak served as Chairman to the Yellowstone River Compact Commission for six years; and whereas, the Yellowstone River Compact Commission was established by the Yellowstone River Compact of 1950; and, whereas, the Yellowstone River Compact was entered into by the

State of North Dakota, the State of Montana and the State of Wyoming who desired to further interstate comity and remove all causes of present and future controversy between those states and the persons in those states with respect to the waters of the Yellowstone River and its tributaries, and to provide for equitable division and apportionment of those waters and to encourage the beneficial use and development thereof; and, whereas, the Commissioners and advisors of the Yellowstone River Compact Commission recognize that Bill Horak resigned from the position of Chairman of the Yellowstone River Compact June 30, 2010, after serving in that position since December 2004 and wish to acknowledge him and this resolution. Now, therefore, be it resolved that the Yellowstone River Compact Commission, at their meeting held in Red Lodge, Montana on December 8, 2010, do hereby express their gratitude and appreciation for the untiring service and participation rendered by Bill Horak in addressing the many water resource problems that were confronted and addressed by the Commission during Mr. Horak's tenure as Chairman; and, be it further resolved the Commission wishes Bill Horak its best wishes, good health, and much satisfaction and enjoyment of life in whatever endeavors he is now and in the future may undertake; and, be it further resolved that the Federal Representative and Chairman of the Yellowstone River Compact Commission is hereby directed to send a copy of this resolution to Mr. Horak and to the U.S. Geological Survey. Approved, by unanimous action of the Yellowstone River Compact Commission this 8th day of December 2010 at Red Lodge, Montana."

Ms. Lowry pointed out that Mr. Horak previously served as Chairman from 1990 through 1997. His total years of service as Chairman are 14 years.

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

Mr. Berkas distributed copies of the draft 2010 Yellowstone River Compact Commission report to Wyoming and Montana and asked that they review the report and provide comments and changes back to Mr. Berkas by June 1, 2011. The Commissioners requested an electronic copy of the 2010 report to be sent via email.

Mr. Berkas said that he hoped to distribute printed copies of the 2009 report at this meeting, but a reviewer discovered an anomaly in table 10 of the report. The problem is with Anchor Reservoir in Wyoming. Mr. Smith added that the reservoir was constructed to store 17,410 acre-ft. Unfortunately, the reservoir leaks and is unable to actually store 17,410 acre-ft. Presently only 9,250 acre-ft has been adjudicated with the remaining 8,150 acre-ft to be adjudicated only if the leaks can be plugged. Mr. Berkas hopes to distribute the report in early 2011.

Mr. Anderson asked the USGS to discuss the annual budgets.

Mr. Berkas supplied a handout showing the operational cost for fiscal year (FY) 2011 and the estimated budget for FY2012 through 2014. For FY2011, the cost to operate each of the five streamgages is $16,000, and the cost to put together the annual report is $48,000. The total cost is $128,000 with Wyoming providing $32,000, Montana providing $32,000, and the USGS providing $64,000. The estimated budget for FY2012, FY2013, and FY2014 is $134,000, $125,000, and $128,000, respectively. There is a reduction in cost between FY2012 and FY2013 due to the cost of moving from two meetings per year to one meeting per year. Also, the USGS anticipated a 3-percent increase each year for cost-of-living. There is a possibility that the cost-of-living increase will be less than 3 percent next year; thus, the true cost for FY2012 may be less than estimated.

Mr. Tyrrell moved to accept the budget, and Ms. Sexton seconded the motion. The motion passed.

Mr. Anderson asked the USGS to discuss streamflow and reservoir conditions during the 2010 water year.

Mr. Berkas supplied a handout of annual flow statistics for the 2010 water year. Streamflow was normal (within 80 and 120 percent of average) at three sites monitored by the Commission. Annual streamflow at Clarks Fork Yellowstone River at Edgar was 82 percent of average, and ranked 16th lowest of 72 years. The annual stream-

flow at Bighorn River near Bighorn (adjusted for the flow of the Little Bighorn River and change of contents in Bighorn Lake) was 111 percent of average and ranked 32nd lowest of 57 years. The annual streamflow at Tongue River at Miles City was 115 percent of average and ranked 44th lowest of 67 years. The annual streamflow at Powder River near Locate was 121 percent of average and ranked 51st lowest of 72 years. Total adjusted streamflow of the four rivers in water year 2010 was 4,119,100 acre-ft, compared to 4,342,200 acre-ft in water year 2009 and 4,445,400 acre-ft in water year 2008.

Reservoir storage in the reservoirs historically monitored and reported for the Commission increased in two reservoirs (Anchor Reservoir and Tongue River Reservoir) and decreased in five reservoirs (Bighorn Lake, Boysen Reservoir, Bull Lake, Pilot Butte Reservoir, and Buffalo Bill Reservoir). The contents and the amounts of increase are listed in the annual report. The total usable contents of these reservoirs at the end of water year 2010 was 2,160,000 acre-ft, compared to 2,295,000 acre-ft in water year 2009 and 2,265,000 acre-ft in water year 2008. Storage in other reservoirs in the four river basins at the end of water year 2010 was 308,800 acre-ft, an increase of 11,200 acre-ft from the end of water year 2009.

Mr. Tyrrell questioned the volume listed for Tongue River Reservoir.

Mr. Kevin Smith replied that the usable content of Tongue River Reservoir is 79,070 acre-ft, and the volume listed by Mr. Berkas is the usable contents in the reservoir on September 30, 2010.

Mr. Anderson asked who provided the reservoir contents information.

Mr. Berkas replied that the Bureau of Reclamation provides the contents for the Bureau of Reclamation reservoirs, the private reservoirs in Wyoming are provided by the Wyoming State Engineer Superintendents (Mr. LoGuidice and Mr. Loren Smith), and the Montana reservoirs were provided by Mr. Dalby of Montana DNRC.

Ms. Lowry asked Mr. Berkas when the States would be billed for their part of the budget.

Mr. Berkas replied that each State has signed a funding agreement for 2011 and each State would be billed quarterly.

Ms. Lowry replied that the State fiscal year does not match up with the Federal fiscal year; thus, they should be aware of that issue.

Mr. Berkas replied that the agreement between the USGS and Montana is on the State fiscal year (July through June), while the agreement with Wyoming is on the Federal fiscal year (October through September). Next year (2012), the agreement can change to a State fiscal year with Wyoming.

Mr. Anderson asked Wyoming to discuss water-year administration highlights.

Mr. Tyrrell replied that Wyoming suffered through a pretty good year. It started out dry, returned to normal in the spring, rain and snow caused flooding in June, then it again became dry in late summer. Luckily, there was good storage in the reservoirs to augment flows later in the year.

Mr. Loren Smith replied that there was not much administration in the Bighorn Basin. The Greybull River is notoriously short of available water and some administration was required. Gooseberry Creek (a small creek on the west side of the basin) went into regulation in March, out of regulation in April, and back into regulation in July through October. Bennett and Rocky Creeks (in the Clarks Fork Yellowstone River drainage) were in regulation early in the year before snowmelt runoff reached the area. When runoff reached the area, all users were satisfied and administration was lifted. Paint Rock Creek (on the east side of the Bighorn River Basin) required some regu-

lation. There are no reservoirs on Paint Rock Creek, so users have to rely on natural flows, and some upstream users are junior to downstream users.

Owl Creek was regulated this year. Owl Creek is interesting because appropriators within the Owl Creek District get to exchange water to satisfy junior water rights out of Owl Creek and storage from Anchor Reservoir while senior Owl Creek rights use Bighorn River water rights. A pump system moves water upstream and the senior users, with an exchange water right, have access to the pumped water. During a typical year, users get two turns at the exchange water. This year (2010), the District went through five rounds of exchanging water. During the first part of June, Anchor Reservoir had about 7,000 acre-ft of storage, more than usual for this time of year. Due to the lack of precipitation after July, the storage in the reservoir decreased to 300 acre-ft by the end of September.

The reservoirs were drafted hard this year because the precipitation came in May, and the snow melted out early. The lack of precipitation in July prevented replenishment of the reservoirs.

No administration occurred in the Lander area. Flooding occurred in the Lander area that washed out some of the diversions. The Middle Fork Popo Agie River flows through Lander and nearly produced the peak flow of record. The Little Wind River near Riverton at the USGS gage reached the second highest peak flow of record of 13,300 ft^3/s on June 9, 2010. The highest peak flow of 14,700 ft^3/s occurred on June 17, 1963.

Outflow from Boysen Reservoir reached 7,600 ft^3/s and the Wyoming SEO received many phone calls from concerned landowners. People are getting accustomed to low releases from Boysen Reservoir. The Wyoming SEO considers a safe channel capacity in the Wind River below Boysen Reservoir to be 12,000 ft^3/s; now, they are getting calls when the flow reaches 7,000 ft^3/s.

Mr. Anderson asked if the high flows were caused by snowmelt or rain.

Mr. Loren Smith replied both. The snow pack just began to melt when a storm dropped about 3 ft of wet snow and then it began to rain. The Wyoming SEO lost a few gages. The USGS lost two gages.

Mr. LoGuidice said that similar conditions occurred in the Tongue and Powder River Basins. The Bighorn Mountains also received a lot of snow, but did not receive as much rain. When the snow melted it sustained the flows longer than usual.

The main stem of the Tongue River was not regulated during the year. The same is true for Big Goose Creek. Flows in Little Goose Creek decreased in July and water was let out of mountain storage facilities to augment the flow. Wolf Creek was not regulated until September.

In the Powder River Basin, Clear Creek began regulation in July and Piney Creek began regulation in August. The operators of the bigger reservoirs in the mountains began dumping water late in the year to prepare for winter, and most of the streams had plenty of water. French Creek and Rock Creek, tributaries to Clear Creek, began regulation in July. The main stem of the Powder River had flows near 150 percent of normal for the season, and no regulation was needed.

Mr. Anderson asked Montana to discuss water-year administration highlights.

Ms. Sexton replied that before they begin discussing administration, she wanted to apprise the Commission about a fish-passage project on the Yellowstone River at Intake. The project involves the U.S. Army Corps of Engineers, Montana DNRC, and Montana Fish, Wildlife and Parks. The project is scheduled to be completed in 2012.

Also, the Yellowstone River Conservation District Council is looking at cumulative effects in the Yellowstone River. They have developed a project-management plan and plan to look at the hydrologic characteristics of the

tributaries to the Yellowstone River focusing on the last 10 years of drought. The project is sponsored by the U.S. Army Corps of Engineers.

Ms. Sexton announced that Mr. Keith Kerbel from the Montana DNRC-Billings office has retired, and that Ms. Kim Overcast will be replacing him. Ms. Overcast comes from the Glasgow office where she was involved with water permitting and water rights. Also, Montana DNRC has selected Mr. Tim Davis as the new Water Resources Division Administrator. Mr. Davis comes from outside of Montana DNRC and has been working with various non-profit organizations for the past 10 years. He has vast experience with the Montana Legislature.

Mr. Kevin Smith continued by stating that Montana DNRC was concerned in early spring with runoff projections being 50 percent of normal. Then snow and rain in May filled the reservoirs. Cooney Reservoir (usable contents of 28,140 acre-ft) filled and remained full for about 2 months. Tongue River Reservoir filled and spilled for about 6 weeks. Regulation began on the Tongue River in July.

Mr. Anderson asked for a summary from the 2010 Yellowstone River Technical Committee meeting.

Mr. Dalby reported that the Yellowstone River Technical Committee met on April 13, 2010, in Billings. At the meeting, Mr. Meyer and Mr. Keiser from National Resources Conservation Service (NRCS) reported that the snowpack in the mountains was between 50 and 70 percent of normal. The Committee members thought that drought conditions may occur in the basin, but late snow and early rain changed the forecasted conditions.

Ms. Elizabeth Meredith from Montana Bureau of Mines and Geology reported on the groundwater monitoring program in the Powder River structural basin. The monitoring program began in the 1970s as a result of coal-mining activities. Recently, additional wells were added to the monitoring network as a result of coal-bed methane (CBM) production. Data collected from the wells are available in data reports from the Montana Bureau of Mines and Geology.

Mr. Ken Frasier with Montana Fish, Wildlife and Parks reported on fish studies in the Bighorn River downstream from Yellowtail Dam.

The committee discussed the criteria for including reservoirs in the Commission's annual report. The committee decided to include reservoirs with usable contents of 1,000 acre-ft or more, and exclude reservoirs with usable contents of less than 1,000 acre-ft.

Mr. Berkas added that he had passed out a table listing reservoirs that will be included in the 2011 annual report. He asked that each State review the layout of the information in the table and provide him feedback before the next Commission meeting.

Mr. Dalby commented that the committee discussed the Yellowstone River Compact Commission's Web site as to what should be posted on the site and who would pay to maintain the Web site. Currently, the Web site is maintained by the USGS.

Mr. Anderson commented that he reviewed the Commission's Web site and discovered some posted documents were not faithful to the original documents. In an effort to provide an electronic document, typos were made and not corrected. Those errors will be corrected. He wondered if the Web site was the official document repository of the Yellowstone River Compact Commission.

Mr. Berkas replied that Yellowstone River Technical Committee agreed that all current information be posted on the Commission's Web site (annual reports and minutes). A main reason the USGS is maintaining the Web site is to archive the documents. The committee has not yet agreed to scan all previous annual reports and post those on the Web site.

Ms. Lowry said that the Commissioners agreed that the Yellowstone River Technical Committee meeting minutes would be posted on the Yellowstone River Compact Commission Web site.

Mr. Anderson asked that the Yellowstone River Technical Committee be given the task of clearly defining what should be posted on the Web site. Ms. Sexton agreed with Mr. Anderson.

Mr. LoGuidice said that he noticed that table 10 of the draft 2010 report (previously distributed to the States) listed reservoirs with less than 1,000 acre-ft. Would those reservoirs be removed?

Mr. Berkas replied that those reservoirs will remain in the 2010 annual report, but would be removed from the 2011 annual report.

Ms. Anders said that table 10 in the annual report has a footnote that reads "Wyoming disagrees with the term 'Compact Reservoirs' as used throughout this report. Wyoming's acceptance of this annual report should not be considered as Wyoming's acceptance of the use of that term." She wondered if it is still an appropriate objection given the status of the current litigation.

Mr. Tyrrell replied that Wyoming insisted on that footnote a few years ago because none of the reservoirs are listed in the Compact. While that verbiage crept into the annual report, Wyoming's inability to remove it does not mean that they accept it because Wyoming does not believe it is an accurate term. Although litigation is ongoing, Wyoming believes the litigation has not resolved anything; thus, Wyoming requests the footnote remain.

Mr. Michael added that there has been some resolution of reservoir issues by the Special Masters report. Currently, the report has not been adopted by the U.S. Supreme Court, so none of it is official. He did not think that the Special Master's report would resolve some issues involving priority dates with respect to reservoirs. The Wyoming Attorney General's Office would advise Wyoming to keep the footnote.

Ms. Lowry said that the issue is the title for table 10 is "Water-year-end contents for Yellowstone River Compact reservoirs or lakes." If "Yellowstone River Compact" were removed from the table title, Wyoming would agree to remove footnote 1.

Mr. Tyrrell agreed that Ms. Lowry made a good point, but "Compact Reservoir" is used throughout the annual report. Wyoming believes the Compact does not identify "Compact Reservoirs," but Montana does. A compromise was struck with the footnote.

Mr. Anderson suggested that the Commission wait to hear what the U.S. Supreme Court rules before they resolve this issue. Ms. Sexton agreed.

Mr. Michael noted that listed usable contents listed for the Tongue River Reservoir were 79,070 acre-ft and all of those contents are pre-compact 1950 water rights. Wasn't there an expansion to the reservoir in the 1990s?

Mr. Kevin Smith replied that the Tongue River Reservoir was expanded from about 68,000 acre-ft to 79,070 acre-ft in 1997. The expansion was made to accommodate the Northern Cheyenne Tribe water right agreed to in the Northern Cheyenne Tribe Compact, and this water right is pre-1950.

Mr. Anderson asked Wyoming to address CBM development in Wyoming.

Mr. Tyrrell provided a list of the number of CBM reservoirs filed and permitted in the Yellowstone River drainage and a graph showing the number of CBM reservoirs approved in the Yellowstone River drainage from 2003

through 2010. Mr. Tyrrell noted that the amount of new development has decreased due, in part, to the economy and the price of natural gas. Also, many of the smaller companies are consolidating into the larger companies.

Currently, there are 199 filings for temporary reservoirs in the Tongue River, Little Powder River, and Powder River Basins that represent about 2,730 acre-ft of storage, or about 13.7 acre-ft per reservoir. There are 2,608 permitted CBM reservoirs with a total storage of 38,473 acre-ft, or about 14.8 acre-ft per reservoir. The graph shows the number of permitted reservoirs in the Powder River Basin has decreased significantly.

Mr. Anderson asked if the listed volumes are consumptive uses?

Mr. Tyrrell replied that the listed volumes are the physical capacity of the reservoir. Some of the reservoirs may have a consumptive use associated with them. Primarily, the water stays in the reservoir and does not have a listed use. Wyoming Department of Environmental Quality (DEQ) monitors for seepage and if the reservoir discharges. Water leaving the reservoir needs to meet discharge requirements.

Mr. Tyrrell handed out another graph that showed the number of CBM well applications received from January 1997 through August 2010. He noted that few well applications were received after 2008. This echoes the down-swing of the CBM industry. Mr. Tyrrell commented that the Wyoming SEO has issued permits for more than 44,000 CBM wells. There are probably less than 15,000 producing wells. In some cases the permitted well was not drilled, in which case the permit eventually gets canceled.

Ms. Sexton asked if someone was still looking at the life of a producing well?

Mr. Tyrrell replied that at the end of 2007, the Wyoming SEO began looking at the necessity of a well. We began requiring producers to "show cause" that a well is needed. If a well was producing a lot of water but little gas, the producer needed to explain why that well was needed to produce gas. Over the years, between 1,000 to 2,000 wells have been subjected to the "show cause" effort, and the permits for many of those wells have been canceled or suspended. Newly permitted wells have 5 years to produce gas. After 5 years, the permit is reviewed and if the well is not producing gas, the owner of the permit will have to explain how they intend to get the beneficial use (production of gas) from the well, or the well permit will be subject to cancellation. An interesting discovery during the inquiry was that many CBM wells had been plugged and abandoned but the operator had not notified the Wyoming SEO. When this was discovered, they thanked the owner and canceled the permit for that well.

Ms. Sexton asked if any of those owners applied for a beneficial use other than the production of gas if gas was not being produced?

Mr. Tyrrell replied that the beneficial use of a CBM permitted well could be converted to a different use, such as a stock well, but the Wyoming Oil and Gas Commission still has a permit on the original well completed in a mineral-producing zone. The Oil and Gas Commission could deny the switch. Essentially, there is a process. It could be that the owner never realized a beneficial use for the CBM well, so they could cancel that permit and refile on that well for a different beneficial use.

Mr. Anderson asked Montana to address CBM development in Montana.

Mr. Compton replied that there about 880 producing CBM wells and three permits for discharge of produced water to streams. Two of the permits produce about 2,000 gal/min of water. This year, the Montana Supreme Court ruled that all CBM-produced water had to be treated. Currently, the produced water is treated to water-quality-based standards. The ruling stated that the discharge water needed to be treated to technology-based

standards and Montana DEQ had to rewrite the discharge standards. The owners of the permits, Fidelity Exploration and Production, will be given 12 months to meet the standard.

Mr. Anderson asked what treatment is applied to the water?

Mr. Compton replied that it is ion-exchange desalination focusing on sodium.

Mr. Anderson asked how the brine from the desalination process is treated?

Mr. Compton replied that the brine is injected into a couple of injection wells in northern Wyoming. Disposal of the by-product from ion-exchange and reverse osmosis is a problem and currently injection wells are being used, but it is expensive.

Mr. Compton continued to say that Wyoming DEQ's CBM Produced Water Working Group has been busy attempting to address the Wyoming Environmental Quality Council's (EQC) issues with the way Wyoming DEQ permits water quality. The working group consists of a broad range of members: land owners, industry, State agencies. Wyoming DEQ assembled the working group because the Wyoming EQC rejected the Tier 2 approach for establishing sodium and salinity limits in Wyoming pollutant-discharge elimination-system permits. The Tier 2 approach was based on the chemistry of the soil along the receiving reach and assumed that the existing chemical properties of the soil could be reflected in the discharge water authorized to discharge into that drainage. That approach was soundly rejected by Wyoming EQC and their consultants, so Wyoming DEQ is trying to come up with an agricultural-protection policy and a permitting policy that will pass peer review and review from Wyoming EQC.

The working group proposed recommendations to Wyoming DEQ and Wyoming DEQ hoped there was enough consensus within the working group to go ahead with a few permits under the new policy. The recommendations are heavy on monitoring requirements. Industry is not happy with the recommendations because of the expense of monitoring. Currently, there are no firm conclusions about whether or not to start issuing permits under the new policy.

The greatest area of concern, and perhaps where the most adverse impacts may occur, are with ephemeral tributaries. Continuous direct discharges to perennial waterways seem to be less of a concern. The major issue of the working group is perennializing ephemeral tributaries, causing an elevated water table, waterlogging the soils, and replacing the forage base in the ephemeral draw. Landowners claim that the ephemeral draws provide the best grass. The technical advisory team for Wyoming DEQ claim that perennializing the ephemeral draws will replace the high-value forage grasses with more moisture-tolerant and more salt-tolerant grasses like foxtail, cord grass, and cattails, that have significantly less forage value. When CBM-produced-water discharges cease, the salt tolerant species will die off leaving a weed issue. The technical team felt that it will take about 10 years before the high-value forbs will start to colonize these draws. The loss of a forage base for about 10 years is a serious concern to landowners.

The majority of the CBM-produced-water discharges occur in areas of ephemeral draws, and the primary tool for managing these discharges is on-channel ponds in these draws. The working group is struggling with how to best manage discharges in ephemeral areas. One answer is for CBM-produced-water discharges to mimic the natural regime, and that is extremely difficult to accomplish. The ephemeral draws support high-value grasses because the draws host flashy high flows that infiltrate into the soil and leach salts from the root zone. Then the soils dry. A perennial supply of water will elevate the water table, the soils will remain wet, and the salinity and sodium will increase.

Montana DEQ is presently drafting a procedure for discharging CBM-produced water to an ephemeral tributary (lower Hanging Woman Creek). The procedure would require the CBM producer to use seasonal discharges. Montana DEQ acknowledges that seasonal discharges will not truly mimic the natural hydrologic cycle and questions remain to be answered. The big unknowns are—will seasonal discharges leach salts, will the soils dry out, and will the high-value grasses remain?

Ms. Sexton added that there have been attempts in Montana to get beneficial-use permits for water from CBM wells. Due to recent court cases, all water has to be treated before a beneficial-use permit can be applied to the water.

Mr. Tyrrell thanked Mr. Compton for reporting on the Wyoming DEQ's CBM-Produced Water Working Group and on Wyoming DEQ activities. He continued to say that the number of wells producing water and the volume of water discharged today is considerably less than 5 years ago. So, while Wyoming is struggling with and interested in solving the CBM-produced-water discharge problem, there is much less water coming out of the CBM wells.

Mr. Anderson asked Montana to discuss Montana's statewide water-rights adjudication.

Ms. Sexton said that about 30 years ago, Montana began a statewide water-rights adjudication. About 5 years ago, the adjudication was accelerated with about 56,000 claims to examine. Currently, there are 5,000 claims remaining. The claims are examined by Montana DNRC. After the examination, the claim goes to the Water Court, which issues a preliminary decree. The preliminary decree is open for objections in the judicial process. After the objections are resolved, the Court issues a final decree.

According to legislation passed 5 years ago, examination of claims is to be completed by 2015. The Water Court is to complete final decrees by 2020. There is some discussion as to whether this is possible, but Montana DNRC is hopeful that the process will be far enough along for the Court to place a Commissioner in the different drainages and the water rights can be enforced. They are hoping to have final decrees on all drainages within the next 15 to 20 years.

Mr. Anderson asked how Montana is dealing with Indian water rights?

Ms. Sexton replied that Montana is working on a compact with the Crow Tribe and the Federal government has recently provided a settlement to the Crow Tribe. The second to last Indian compact is with the Blackfeet Tribe, and it will soon go to the U.S. Congress. The last compact is with the Confederated Salish and Kootenai Tribes, and Montana hopes to be completed with that compact within 2 years.

Mr. Tyrrell asked if the adjudication documents, such as water-right claims, are available on the Web.

Ms. Overcast replied that the decrees are being put on the Web. They hope to have all of the decrees on the Web within 2 years.

Mr. Anderson asked Wyoming to discuss Wyoming's water-rights adjudication.

Mr. Tyrrell replied that the water-rights adjudication process in each State is different. Montana is working on a statewide adjudication process, while water-rights in Wyoming are adjudicated individually. When an individual gets a permit to build a facility, and they put water to a beneficial use, they request a "Proof" form from the Wyoming SEO. Someone from the Wyoming SEO will visit the facility to prove the water was actually put to beneficial use in the manner requested. The "Proof" form is advertised, and if nobody objects, the water right becomes adjudicated. Essentially, that is how all water rights in Wyoming are adjudicated, however, a general

adjudication occurred in the Bighorn and Wind River Basins that started around 1977. That adjudication is essentially complete, but there are a few issues remaining to be resolved.

Mr. Loren Smith reported that the Wyoming SEO is submitting about 100 "Proof of Construction or Appropriation" forms every 6 months for the Bighorn and Clarks Fork Yellowstone River Basins that are adjudicated during one of two meetings each year. Stock reservoirs do not have to be adjudicated, but some landowners want their stock ponds adjudicated.

Mr. Dalby asked if the Wyoming SEO issued an end date for the adjudication in the Bighorn and Wind River Basins.

Mr. Loren Smith replied that they have given end dates many times and still issues occur. He has a few issues on his desk, and he hopes when they are resolved; the adjudication will be finished.

Mr. Tyrrell commented that an appropriator can file a protest, and if the final ruling is not in favor of the appropriator, the appropriator can continue to appeal until he gets a favorable ruling or he or she quits. So, an identified end date may be difficult to attain.

Ms. Sexton asked Mr. Tyrrell if Wyoming would consider a general adjudication.

Mr. Tyrrell replied that he felt that a general adjudication would not be easy. Wyoming has a general adjudication statute, and they could pursue a general adjudication in other basins, but they would need a compelling reason to pursue a general adjudication. The primary reason for a general adjudication in the Bighorn and Wind River Basin was the existence of the Indian tribes. Also, there is a Federal presence with the Bureau of Reclamation, Bureau of Land Management, and the U.S. Forest Service. The Bighorn and Wind River Basins are the only areas in the State that have a general adjudication.

Ms. Sexton asked Mr. Tyrrell if there were other basins where there were water-right issues.

Mr. Tyrrell replied that there were other basins with water rights that were adjudicated in a different way. For example the North Platte River Basin has a decree agreed upon by Nebraska and Wyoming. The decree was established in 1945 and resettled in 2001. That basin is fully appropriated, so if someone wants a new water right, they need to buy and retire an old water right.

Mr. LoGuidice reported that the Wyoming SEO adjudicated 47 surface-water rights in 2010 in the Belle Fourche, Cheyenne, Powder, and Tongue River Basins, with the majority being in the Powder and Tongue River Basins. Also, they inspected 107 stock reservoirs that were not adjudicated.

Mr. Anderson asked Montana to update the Commission on the Compact with the Crow Tribe.

Ms. Sexton reported that on November 30, 2010, the U.S. Congress ratified the Compact between the Crow Tribe, Montana, and the United States. The Montana State Legislature ratified the Compact in 1999. The Compact still needs to be approved by the Crow Tribe. Upon passage by the Crow Tribe, the Water Court will issue the settlement as a preliminary decree. The process allows for objections before it becomes a final decree.

The bill passed by the U.S. Congress authorizes $460 million of Federal money for the settlement and the State of Montana contributed $15 million for the settlement:

- 130 million dollars is for improving the Crow irrigation project,
- 260 million dollars is for construction of municipal-drinking water and industrial-water systems,

- 4.7 million dollars is for Compact administration,
- 20 million dollars is for energy development projects,
- 47 million dollars is for ongoing operations, and
- 10 million dollars is for ongoing costs.

Mr. Anderson asked the Bureau of Reclamation to update the Commission on the water supply in Bighorn Lake.

Mr. Felchle reported that the elevation of Bighorn Lake is currently at 3,626 ft, 86 percent full. Normal pool elevation for Bighorn Lake is 3,640 ft. The lake elevation is currently about 96 percent of average for this time of year. The Bureau of Reclamation decided to set fall and winter releases from Yellowtail Dam at 2,370 ft^3/s, and they hope to maintain that discharge and meet their target winter and spring elevation. Inflow into Bighorn Lake is about 80 percent of average and is attributed to releases from Boysen and Buffalo Bill Reservoirs.

Mr. Dalby asked if the three Bureau of Reclamation reservoirs in the Bighorn River Basin (Boysen Reservoir, Buffalo Bill Reservoir, and Bighorn Lake) filled in the last 3 years.

Mr. Felchle replied that all three reservoirs filled during the past 3 years. Last year, some of the reservoirs had water in the exclusive pool, preventing flooding downstream. The U.S. Army Corps of Engineers estimated that the benefits from Yellowtail Dam, that provides local flood control as well as flood control in the Missouri River system from Fort Peck Dam to Sioux City, Iowa, were estimated to be about $9,215,600 this year.

Mr. Dalby asked Mr. Felchle if he could comment on the management of Yellowtail Dam, where the Bureau of Reclamation would leave more water in Bighorn Lake over the winter.

Mr. Felchle replied that there is some controversy between Montana and Wyoming concerning the management of Yellowtail Dam. An “Issues Group” was formed of stakeholders and representatives from both States. Mr. Dalby’s issue is one of the many issues the group is considering. Currently, nothing has been finalized.

Mr. Tyrrell asked what is the spring target for Bighorn Lake?

Mr. Felchle said the target lake elevation for the end of March is 3,618 ft. With a large structure like Yellowtail Dam and the uncertainties of inflow through the fall and winter, they expect an end of March lake elevation between 3,617 and 3,621 ft. A lot of factors go into their analysis and they try to maintain a constant release from Yellowtail Dam.

Mr. Anderson announced the USGS is embarking on a program to do water availability assessments of principal aquifers in the United States. Some are currently underway. One of the next areas to be studied will be called the upper Cretaceous/Lower Tertiary Aquifer Study that includes Montana, North Dakota, South Dakota, and Wyoming. The study should last from 4 to 5 years.

Mr. Anderson asked if there were other comments or issues to be discussed.

Ms. Sexton said that in light of a new Federal Representative to the Commission, and because it has been about 20 years since the last discussion of this issue, at the next meeting, Montana would like to discuss the role of the Federal Representative and voting to break a tie.

Mr. Tyrrell replied that in the interest of removing cause of future debate, the role of the Federal Representative (Commissioner Chairman) and voting within the constraints of the Compact should be discussed.

Mr. Anderson replied that he has read the Compact and the Compact is clear that the Chairman (Federal Representative) can cast the deciding vote. It has been the policy of the USGS to remain neutral and not take sides on State's matters. The USGS is willing to discuss this topic at the next meeting.

Ms. Lowry pointed out that past discussions regarding the Chairman casting the deciding vote led to the inclusion of the document "Rules for the Resolution of Disputes over the Administration of the Yellowstone River Compact" that is included in the annual report. This document was agreed to by the Commissioners in 1996, but, obviously was not ratified by the U.S. Congress.

Mr. Anderson commented that the USGS has an active role in other Compacts, such as the lower Colorado River. In that case, the Secretary of the Department of the Interior is the Water Master for that Compact. Any changes to this Compact would require congressional ratification. There may be room within the current wording of the Compact for all to reach an agreement, with advice from legal counsel.

Mr. Anderson asked to set a date for the next meeting.

Ms. Lowry replied that the Yellowstone River Technical Committee will meet on April 12, 2011, within the Bighorn or Clarks Fork Yellowstone River Basins in Wyoming.

The Commissioners agreed to have the Yellowstone River Compact Commission meeting on December 6, 2011, at an unnamed location within the Tongue or Powder River Basins in Wyoming.

Mr. Anderson adjourned the meeting at 11:30 a.m.

Patrick T. Tyrrell

Commissioner for Wyoming

Mary Sexton

Commissioner for Montana

Mark T. Anderson

Chairman and Federal Representative

Appendix A

United States Department of the Interior

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

In Reply Refer To:
Mail Stop 100
#GS00000900

JUL 15 2010

Ms. Mary Sexton
Commissioner for Montana
Yellowstone River Compact Commission
Montana Department of Natural Resources
1625 11th Avenue
Helena, Montana 59620

Dear Ms. Sexton:

The Yellowstone River Compact (Compact) specifies that the Director of the U.S. Geological Survey (USGS) shall select one 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 a seated "Federal" member has left the Commission.

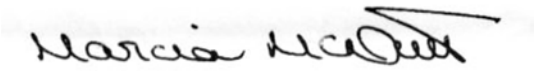
The current Federal member and Chair, William F. Horak, retired from the USGS on July 2, 2010. I have selected Mark T. Anderson, Director of the USGS South Dakota Water Science Center (SD WSC) to succeed Mr. Horak. Mr. Anderson's appointment is effective immediately. He will Chair the annual meeting of the Commission to be held during late 2010.

As Director of the SD WSC in Rapid City since 2006, Mr. Anderson is responsible for the water resources activities conducted by the USGS in South Dakota. He provides scientific leadership, develops programs, and maintains cooperative relationships with partner agencies in the State. Prior to 2006, Mr. Anderson was the Associate Director of the USGS Arizona Water Science Center in Tucson for 15 years. While there, he represented the USGS on the Upper San Pedro Partnership, a local, watershed-based organization dedicated to finding solutions to the municipal groundwater pumping threats to the San Pedro River. For these efforts, he received the Department of the Interior's Cooperative Conservation Award. He also worked on groundwater overdraft, storage depletion, and land subsidence of Arizona basin fill aquifers. To help address flow and sediment-transport problems on the Colorado River in the Grand Canyon, he directed aspects of the first controlled-flood experiment on the Colorado River below Glen Canyon Dam, in 1996. For these efforts, Mr. Anderson accepted the Secretary of the Interior's "Unit Award for Excellence in Service," as a member of the USGS scientific team that conducted the controlled flood experiment on the Colorado River in the Grand Canyon.

From 1999 through 2001, Mr. Anderson was a senior policy analyst at the Office of Science and Technology Policy in the Executive Office of the President. Mr. Anderson is the author of USGS Circular 1261 entitled "Water Availability for the Western United States – Key Scientific Challenges." He is a graduate and adjunct faculty member of the South Dakota School of Mines and Technology with degrees in Chemistry (BS-1974) and Civil Engineering (MS-1980).

If you have questions or need further information, please contact Mr. Anderson at (605) 394-3220 or by email at manders@usgs.gov.

Sincerely,



Marcia McNutt
Director

Identical letter sent to:

Mr. Patrick Tyrrell, Wyoming Commissioner

Appendix B

RESOLUTION of the Yellowstone River Compact Commission

In Appreciation of the Contributions of

William F. Horak

WHEREAS, William Horak served as Chairman to the Yellowstone River Compact Commission for six years; and,

WHEREAS, the Yellowstone River Compact Commission was established by the Yellowstone River Compact of 1950; and,

WHEREAS, the Yellowstone River Compact was entered into by the State of North Dakota, the State of Montana and the State of Wyoming who desired to further interstate comity and to remove all causes of present and future controversy between those states and the persons in those states with respect to the waters of the Yellowstone River and its tributaries, and to provide for an equitable division and apportionment of those waters and to encourage the beneficial use and development thereof; and,

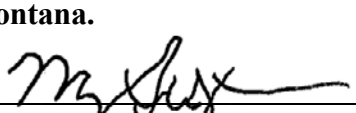
WHEREAS, the Commissioners and advisors of the Yellowstone River Compact Commission recognize that Bill Horak resigned from the position of Chairman of the Yellowstone River Compact Commission June 30, 2010 after serving in that position since December 2004 and wish to acknowledge him in this resolution.

NOW, THEREFORE, BE IT RESOLVED that the Yellowstone River Compact Commission, at their meeting held in Red Lodge, Montana on December 8, 2010, do hereby express their gratitude and appreciation for the untiring service and participation rendered by Bill Horak in addressing the many water resource problems that were confronted and addressed by the Commission during Mr. Horak's tenure as Chairman; and,

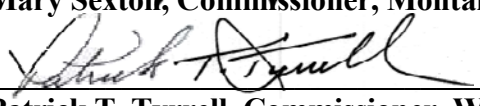
BE IT FURTHER RESOLVED that the Commission wishes Bill Horak its best wishes, good health, much satisfaction and enjoyment of life in whatever endeavors he is now and in the future may undertake; and,

BE IT FURTHER RESOLVED that the Federal Representative and Chairman of the Yellowstone River Compact Commission is hereby directed to send a copy of this Resolution to Mr. Bill Horak and to the U.S. Geological Survey.

APPROVED, by unanimous action of the Yellowstone River Compact Commission this 8th day of December, 2010 at Red Lodge, Montana.



Mary Sexton, Commissioner, Montana



Patrick T. Tyrrell, Commissioner, Wyoming

General Report

Cost of Operation and Budget

Work funded by the Yellowstone River Compact Commission, which to date has been primarily concerned with the collection of required hydrologic data, has been financed through cooperative arrangements whereby Montana and Wyoming each bear one-fourth of the cost, and the remaining one-half is borne by the United States. 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 2010 were $109,000, in accordance with the budget adopted for the year. Estimated budgets for Federal fiscal years 2011, 2012, 2013, and 2014 were tentatively adopted subject to the availability of appropriations. The listed costs for 2011 and 2012 are based on two meetings per year that occurred in 2007 and 2008. Because Montana and Wyoming operate on biennium budgets that are offset from each other, the cost for two meetings per year could not be realized until after three years notice to the two States. The cost for the additional meetings began in 2010 and will continue through 2012. The reduction in cost in 2013 reflects one meeting per year. The budgets for the four fiscal years are summarized as follows:

October 1, 2010, to September 30, 2011 (fiscal year 2011):	
Estimate for continuation of existing streamflow-gaging programs	$128,000
October 1, 2011, to September 30, 2012 (fiscal year 2012):	
Estimate for continuation of existing streamflow-gaging programs	$134,000
October 1, 2012, to September 30, 2013 (fiscal year 2013):	
Estimate for continuation of existing streamflow-gaging programs	$125,000
October 1, 2013, to September 30, 2014 (fiscal year 2014):	
Estimate for continuation of existing streamflow-gaging programs	$128,000

Streamflow-Gaging Station Operation

Operation of five streamflow-gaging stations at the measuring sites specified in the Yellowstone River Compact continued in water year 2010 with satisfactory records collected at each station. Locations of 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 flow 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. Thus, the flow from the Little Bighorn River is subtracted from the flow of the Bighorn River. In addition, the Bighorn River flow is adjusted monthly with change in storage of Bighorn Lake. During water year 2010, annual streamflow near the mouth of the four rivers of interest was normal[2] at three streamflow-gaging stations and above normal at one streamflow-gaging station:

Station number	Streamflow-gaging station	Percent of average streamflow for water year 2010[1]	Rank of annual streamflow		Year of lowest annual streamflow (rank equals 1)	Number of years of annual record
			2010 water year	2009 water year		
06208500	Clarks Fork Yellowstone River at Edgar, Mont., minus diversions to White Horse Canal	82	16	59	2001	72
06294500	Bighorn River above Tullock Creek, near Bighorn, Mont., minus Little Bighorn River near Hardin, Mont. (06294000), adjusted for change in contents in Bighorn Lake	111	32	35	2002	57
06308500	Tongue River at Miles City, Mont.	115	44	35	1961	67
06326500	Powder River near Locate, Mont.	121	51	37	2004	72

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

[2] The "normal" range defined in this report is 80 to 120 percent of average.

Tabulation of streamflow records for water year 2010 (tables 1–5) and graphical comparisons of statistical distribution of monthly and annual streamflow, and annual departures from mean annual streamflow (figs. 1–4) are provided in the section "Summary of Discharge for Yellowstone River Compact Streamflow-Gaging Stations." 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 2010.

Reservoir Contents

Reservoirs Completed after January 1, 1950

As a matter of record and general information, month-end usable contents data (tables 6–8) and descriptions of these reservoirs are given in the section "Month-End Contents for Yellowstone River Compact Reservoirs Completed after January 1, 1950." Boysen Reservoir, located on the Wind River and operated by the Bureau of Reclamation, began the water year with 619,500 acre-ft in usable contents and ended the water year with 599,100 acre-ft. Anchor Reservoir, located on South Fork Owl Creek and operated by the Bureau of Reclamation, began the water year with 325 acre-ft in usable contents and ended the water year with an estimated 350 acre-ft. Bighorn Lake, a Bureau of Reclamation storage project on the Bighorn River that is the largest in the Yellowstone River Basin, began the year with 1,045,000 acre-ft in usable contents and ended the year with 944,900 acre-ft.

Reservoirs Existing on January 1, 1950

As a matter of record and general information, month-end usable contents data for the four reservoirs in existence on January 1, l950, upstream from the points of measurement, are given in table 9 in the section "Month-End Contents for Yellowstone River Compact Reservoirs Completed after January 1, 1950." The reservoirs are Bull Lake, operated by the Bureau of Reclamation; Pilot Butte Reservoir, operated by the Bureau of Reclamation; 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 about the contents of 23 other reservoirs for water year 2010 and 2009 also was compiled at the request of the Commission. The information is provided in table 10 in the section "Water-Year-End Contents for Yellowstone River Compact Reservoirs or Lakes."

Summary of Discharge for Yellowstone River Compact Streamflow-Gaging Stations

06208500 Clarks Fork Yellowstone River at Edgar, Mont.

LOCATION.--Lat 45°27′58″, long 108°50′35″ referenced to North American Datum of 1927, in SE ¼ SE ¼ SE ¼ 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.--2,022 mi².

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 Geodetic Vertical Datum of 1929. Prior to August 31, 1953, nonrecording gage located at same site and elevation.

REMARKS.--Records are good except for estimated daily discharges, which are poor. 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. U.S. Geological Survey satellite telemeter is located at the station. Several unpublished observations of water temperature and specific conductance were made during the year. **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, Mont. (06208500), minus diversions to White Horse Canal, October 2009 through September 2010.

[Discharge is in cubic foot per second. Abbreviations: Ac-ft, acre-feet; e, estimated; Max, maximum; Min, minimum; WY, water year Symbol: ---, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	377	591	499	e370	e340	363	333	512	1,380	4,480	692	405
2	413	584	507	e380	e340	366	317	462	1,570	4,550	655	362
3	439	577	447	e390	e340	372	315	405	1,950	4,110	601	378
4	436	565	e360	e390	e350	373	299	344	3,880	3,370	561	417
5	537	559	e310	e380	e350	378	302	322	6,290	2,690	522	368
6	610	544	e250	e340	e350	382	294	322	7,150	2,190	496	373
7	575	554	e220	e330	e340	368	292	330	6,570	1,870	526	360
8	611	562	e240	e350	e320	357	295	315	6,790	1,520	539	321
9	620	549	e250	e360	e290	356	283	272	5,640	1,340	534	268
10	608	536	e280	e360	e280	356	286	258	4,950	1,410	530	289
11	586	501	e300	e350	e300	346	284	252	4,760	1,580	618	303
12	565	533	e320	e350	e330	339	274	279	3,860	1,700	537	305
13	580	556	e280	e350	e330	330	287	286	3,090	1,740	511	331
14	618	554	e280	e340	e320	334	299	241	2,570	1,810	578	337
15	642	494	e330	e350	e330	335	324	223	2,660	1,560	582	343
16	649	513	e400	e360	e350	327	304	257	3,550	1,300	489	354
17	640	489	e400	e350	e350	320	297	336	5,480	1,230	417	354
18	613	540	e390	e350	e330	326	380	575	4,590	1,290	345	369
19	641	547	e400	e350	e310	344	455	1,070	3,390	1,330	256	403
20	663	538	e420	e350	e270	345	505	1,470	3,240	1,290	218	388
21	661	532	e420	e350	e260	328	577	1,510	3,590	1,130	188	369
22	648	526	e400	e350	e270	316	653	1,320	3,770	1,020	168	356
23	635	529	e380	e350	e300	317	882	1,070	3,640	878	177	356
24	631	513	e380	e350	e330	323	902	835	3,470	737	166	359
25	604	509	e370	e340	e350	314	731	878	3,680	704	156	349
26	600	527	e350	e330	e360	308	757	751	3,960	668	141	339
27	576	521	e350	e340	e360	306	629	628	4,130	623	142	304
28	584	513	e350	e330	355	311	576	802	4,240	687	152	286
29	585	506	e350	e320	---	302	606	1,700	4,190	664	166	280
30	567	494	e350	e340	---	307	561	2,200	4,270	698	185	376
31	537	---	e360	e350	---	325	---	1,790	---	712	300	---
Total	18,051	16,056	10,943	10,900	9,105	10,474	13,299	22,015	122,300	50,881	12,148	10,302
Mean	582	535	353	352	325	338	443	710	4,077	1,641	392	343
Max	663	591	507	390	360	382	902	2,200	7,150	4,550	692	417
Min	377	489	220	320	260	302	274	223	1,380	623	141	268
Ac-ft	35,800	31,850	21,710	21,620	18,060	20,780	26,380	43,670	242,600	100,900	24,100	20,430

Table 1. Daily mean discharge for Clarks Fork Yellowstone River at Edgar, Mont. (06208500), minus diversions to White Horse Canal, October 2009 through September 2010.—Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921–2010, BY WATER YEAR (WY)*												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Mean	538	503	406	351	349	364	551	2,101	4,029	1,990	587	462
Max	1,010	777	593	512	584	554	1,398	5,578	7,256	4,771	1,541	1,395
(WY)	(1942)	(1928)	(1996)	(1997)	(1963)	(1943)	(1943)	(1928)	(1996)	(1943)	(1951)	(1941)
Min	298	310	217	200	180	220	123	710	1,768	290	49.5	156
(WY)	(1956)	(1936)	(1937)	(1922)	(1922)	(1924)	(1961)	(2010)	(1987)	(1988)	(1988)	(1988)

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

SUMMARY STATISTICS						
	Calendar Year 2009		**Water Year 2010**		**Water Years 1921–2010***	
Annual total	443,052		306,474			
Annual mean	1,214		840		1,020	
Highest annual mean					1,623	1997
Lowest annual mean					644	2001
Highest daily mean	7,730	May 31	7,150	Jun 6	10,600	Jun 2, 1936
Lowest daily mean	140	Jan 24	141	Aug 26	37	May 11, 1961
Annual seven-day minimum	203	Jan 23	157	Aug 23	43	Apr 18, 1961
Maximum peak flow			8,090	Jun 5	11,100	Jun 12, 1997
Maximum peak stage			8.01	Jun 5	9.30	Jun 12, 1997
Instantaneous low flow					36	Apr 22, 1961
Annual runoff (ac-ft)	878,800		607,900		739,300	
10 percent exceeds	4,590		1,830		2,810	
50 percent exceeds	488		388		465	
90 percent exceeds	300		285		270	

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

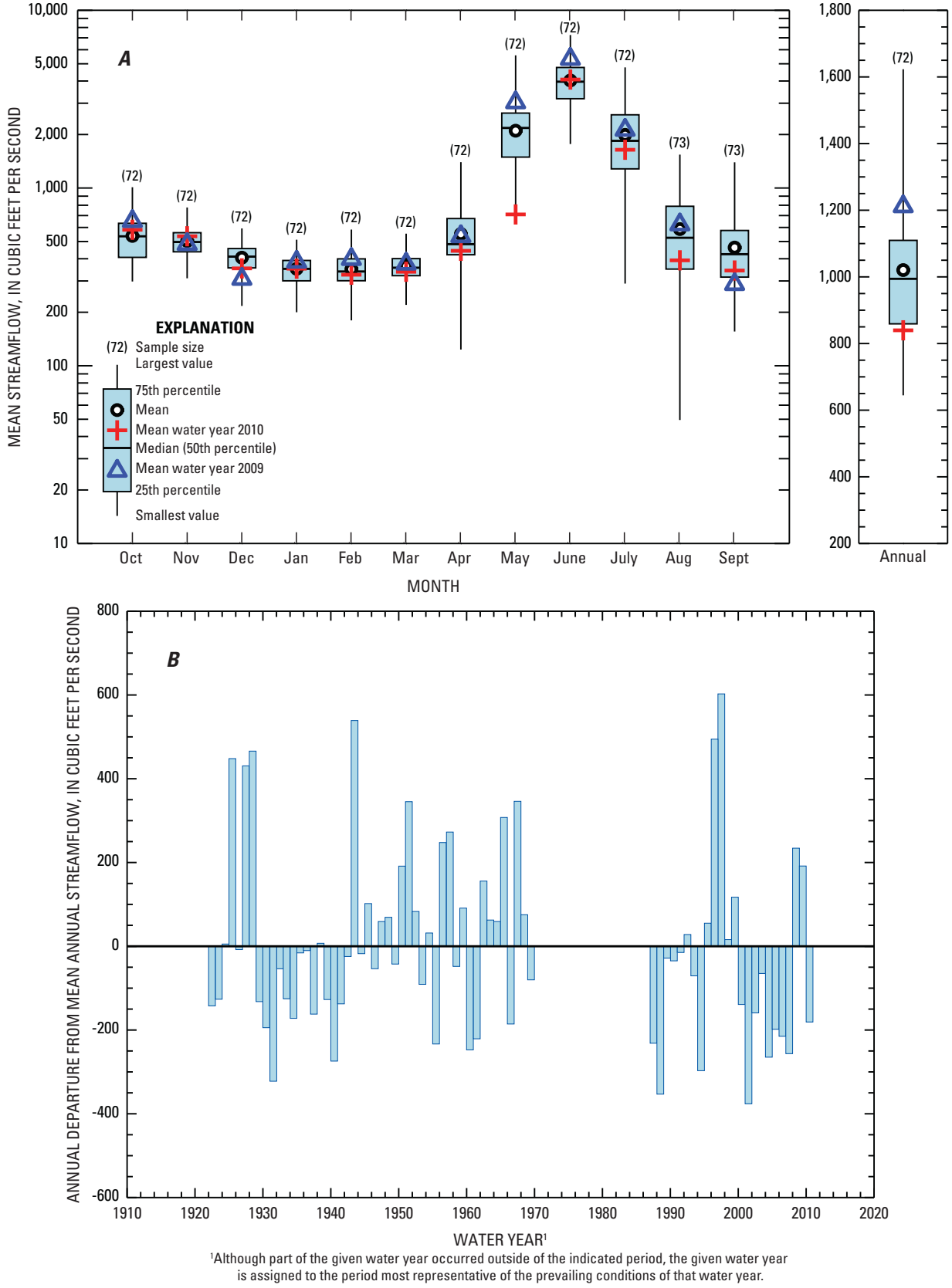


Figure 1. Streamflow data for Clarks Fork Yellowstone River at Edgar, Mont. (06208500), minus diversions to White Horse Canal, water years 1921–2010. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

06294000 Little Bighorn River near Hardin, Mont.

LOCATION.--Lat 45°44′09″, long 107°33′24″ referenced to North American Datum of 1927, in SE ¼ NE ¼ NE ¼ 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 mi².

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.--Records are good except for estimated daily discharges, which are poor. Flow partly regulated by Willow Creek Reservoir (capacity 23,000 acre-ft). Diversions for irrigation of about 20,980 acres occurs upstream from station. **Discharge values and summary statistics given herein include the flow of terminal wasteway of Agency Canal**. U.S. Geological Survey satellite telemeter is located at the station. Several unpublished observations of water temperature and specific conductance were made during the year.

Table 2. Daily mean discharge for Little Bighorn River near Hardin, Mont. (06294000), October 2009 through September 2010.

[Discharge is in cubic foot per second. Abbreviations: Ac-ft, acre-feet; e, estimated; Max, maximum; Min, minimum; WY, water year Symbol: ---, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	105	161	e130	e90	e80	e120	154	245	840	624	127	202
2	128	164	e120	e100	e100	e140	163	257	772	668	134	199
3	139	162	e100	e100	e100	e140	168	290	790	609	130	189
4	141	159	e100	e100	e100	e140	171	335	872	558	120	187
5	149	158	e110	e100	e100	e120	170	302	1,000	526	129	174
6	159	157	e100	e90	e100	e130	163	273	1,150	510	144	169
7	167	159	e90	e70	e90	e140	166	259	1,240	490	140	168
8	167	157	e80	e90	e80	e141	163	255	1,150	474	134	169
9	168	155	e80	e110	e70	e141	166	297	1,200	445	134	171
10	166	155	e90	e120	e80	e131	166	337	1,260	410	127	186
11	163	153	e100	e120	e90	e142	e163	364	1,390	379	117	187
12	147	155	e120	e120	e90	e162	159	469	1,580	356	e114	187
13	146	158	e100	e120	e80	e173	154	599	1,650	348	108	184
14	150	158	e80	e120	e80	e173	151	827	1,470	328	124	180
15	162	e150	e90	e120	e80	e173	147	540	1,280	306	147	181
16	187	e140	e90	e120	e90	175	143	389	1,180	272	151	152
17	170	e140	e100	e120	e90	177	140	334	1,210	257	139	146
18	165	e140	e100	e120	e90	174	140	316	1,350	241	134	150
19	160	e140	e100	e110	e80	171	140	327	1,500	233	124	150
20	161	e140	e100	e110	e80	165	140	377	1,250	181	112	150
21	162	e140	e100	e110	e80	159	142	422	1,120	178	106	149
22	161	e140	e100	e100	e80	159	141	481	1,090	205	141	152
23	159	e140	e90	e80	e90	162	154	507	1,110	188	153	158
24	160	e140	e80	e90	e100	162	173	495	1,180	162	157	166
25	172	e140	e80	e90	e110	164	241	552	1,010	153	175	175
26	167	e140	e90	e90	e110	170	253	751	929	145	163	173
27	170	e140	e100	e80	e110	170	232	732	875	140	137	177
28	164	e140	e90	e90	e110	165	220	584	823	146	135	150
29	166	e140	e100	e100	---	160	206	639	738	151	154	130
30	165	e140	e100	e100	---	156	219	872	667	145	181	129
31	160	---	e100	e90	---	154	---	991	---	135	198	---
Total	4,906	4,461	3,010	3,170	2,540	4,809	5,108	14,418	33,676	9,963	4,289	5,040
Mean	158	149	97.1	102	90.7	155	170	465	1,123	321	138	168
Max	187	164	130	120	110	177	253	991	1,650	668	198	202
Min	105	140	80	70	70	120	140	245	667	135	106	129
Ac-ft	9,730	8,850	5,970	6,290	5,040	9,540	10,130	28,600	66,800	19,760	8,510	10,000

Table 2. Daily mean discharge for Little Bighorn River near Hardin, Mont. (06294000), October 2009 through September 2010.—Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954–2010, BY WATER YEAR (WY)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Mean	151	149	131	135	191	296	299	594	820	257	116	125
Max	276	248	223	366	610	987	748	2,852	1,981	1,333	382	267
(WY)	(1979)	(1979)	(1979)	(1975)	(1971)	(1972)	(1965)	(1978)	(1968)	(1975)	(1975)	(1978)
Min	60.7	82.6	65.6	50.5	68.5	71.1	54.8	71.9	117	8.50	2.46	19.1
(WY)	(2002)	(2002)	(2002)	(2005)	(2005)	(2002)	(1961)	(1961)	(1961)	(1961)	(1961)	(1960)

SUMMARY STATISTICS						
	Calendar Year 2009		**Water Year 2010**		**Water Years 1954–2010**	
Annual total	92,581		95,390			
Annual mean	254		261		272	
Highest annual mean					676	1975
Lowest annual mean					70.4	1961
Highest daily mean	1,130	Jun 8	1,650	Jun 13	15,800	May 20, 1978
Lowest daily mean	80	Jan 24	70	Jan 7	0.30	Aug 5, 1961
Annual seven-day minimum	90	Dec 22	81	Feb 8	0.40	Aug 3, 1961
Maximum peak flow			[a]1,760	Jun 12	[b]22,600	May 19, 1978
Maximum peak stage			5.04	Jun 12	[c]11.78	Mar 20, 1960
Instantaneous low flow					[d]0.20	Aug 7, 1961
Annual runoff (ac-ft)	183,600		189,200		196,900	
10 percent exceeds	631		650		593	
50 percent exceeds	166		155		160	
90 percent exceeds	100		90		73	

[a] Includes flow from Agency Canal.

[b] Gage height, 11.20 ft.

[c] Site and datum then in use.

[d] Result of discharge measurement.

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

LOCATION.--Lat 46°07′29″, long 107°28′06″ referenced to North American Datum of 1927, in SE ¼ SE ¼ NE ¼ sec.3, T.4 N., R.34 E., Treasure County, Hydrologic Unit 10080015, on right bank 1.9 mi upstream from Tullock Creek, 3.6 mi southwest of Bighorn, 4.5 mi southeast of Custer, and at river mile 3.0.

DRAINAGE AREA.--22,414 mi². Area at site used October 7, 1955, to September 30, 1981, 22,885 mi².

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. Flows are equivalent at all sites.

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft, referenced to the National Geodetic Vertical Datum of 1929. 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.--Records are good except for estimated daily discharges, which are poor. After November 1965, flow 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. U.S. Army Corps of Engineers satellite telemeter is located at the station. Several unpublished observations of water temperature and specific conductance were made during the year.

Table 3. Daily mean discharge for Bighorn River above Tullock Creek, near Bighorn, Mont. (06294500), October 2009 through September 2010.

[Discharge is in cubic foot per second. Abbreviations: Ac-ft, acre-feet; e, estimated; Max, maximum; Min, minimum; WY, water year Symbol: ---, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	3,410	3,500	3,140	e3,000	2,870	2,290	2,050	3,080	10,400	10,500	3,370	3,220
2	3,430	3,540	3,120	e3,000	e2,850	2,310	2,080	3,150	10,200	10,400	3,290	3,180
3	3,450	3,580	3,110	3,020	2,840	2,330	2,070	3,240	9,990	10,400	3,250	3,110
4	3,460	3,630	3,120	3,010	2,840	2,360	2,070	3,340	10,100	10,400	3,340	3,240
5	3,650	3,400	3,130	3,030	2,940	2,440	2,050	3,430	e10,400	10,400	3,340	3,170
6	3,620	3,000	e3,150	3,000	3,000	2,440	2,040	3,690	e10,500	10,300	3,370	3,180
7	3,540	2,890	e3,150	3,020	2,990	2,430	2,050	4,020	e10,600	10,300	3,390	2,940
8	3,580	2,910	e3,050	e3,000	2,990	2,440	2,130	4,330	e10,600	9,570	3,380	2,950
9	3,620	2,930	e3,050	e3,000	2,980	2,420	2,190	4,470	e10,700	8,750	3,450	2,990
10	3,590	2,960	e3,050	e3,000	2,960	2,350	2,190	4,520	e10,700	7,820	3,380	3,020
11	3,580	3,000	e3,050	e3,000	e2,950	2,290	2,190	4,490	10,600	7,170	3,330	3,140
12	3,600	3,040	e3,050	e2,900	2,790	2,250	2,180	4,600	10,800	6,720	3,260	3,350
13	3,640	3,080	e3,050	e2,900	2,650	2,240	2,190	5,010	10,700	5,830	3,030	3,330
14	3,700	3,100	e3,050	e2,900	2,640	2,230	2,190	5,970	10,400	5,420	3,100	3,250
15	3,790	3,130	e3,050	2,900	e2,650	2,210	2,170	6,750	10,300	4,880	3,100	3,300
16	3,870	3,130	e3,050	2,900	e2,650	2,180	2,160	6,710	10,200	4,750	3,020	3,210
17	3,950	3,170	e3,050	2,910	2,650	2,170	2,180	6,510	10,600	4,540	2,950	3,230
18	3,600	3,150	3,080	2,880	2,660	2,160	2,190	6,700	11,000	4,380	2,930	3,280
19	3,200	3,100	3,090	2,880	2,680	2,150	2,200	6,660	11,800	4,330	2,930	3,230
20	2,660	3,120	3,120	2,870	2,680	2,130	2,130	6,700	11,600	4,050	2,890	3,220
21	2,300	3,140	3,130	2,880	2,660	2,120	2,210	7,130	11,400	3,800	2,900	3,250
22	1,900	3,170	3,060	2,870	2,650	2,120	2,200	7,370	10,900	3,910	2,970	3,270
23	3,460	3,200	e3,000	2,850	2,640	2,130	2,240	7,420	10,600	3,960	3,000	3,270
24	3,530	3,220	e3,000	2,830	2,620	2,110	2,340	7,600	10,900	3,920	2,950	3,260
25	3,650	3,160	e3,000	2,820	2,490	2,100	2,400	7,950	11,100	3,950	2,880	3,270
26	3,660	3,030	e3,000	2,790	2,350	2,110	2,490	8,980	11,000	3,890	2,810	3,280
27	3,730	3,060	2,990	e2,800	2,270	2,110	2,520	9,850	10,600	3,810	2,730	3,290
28	3,770	3,080	e3,000	e2,800	2,280	2,090	2,560	e10,100	10,800	3,810	2,660	3,340
29	3,600	3,100	e3,000	e2,800	---	2,070	2,560	e10,400	10,700	3,730	2,870	3,320
30	3,420	3,120	e3,000	e2,800	---	2,070	2,780	e10,100	10,600	3,600	3,090	3,290
31	3,470	---	e3,000	2,830	---	2,060	---	10,400	---	3,390	3,290	---
Total	107,430	94,640	94,890	90,190	76,220	68,910	67,000	194,670	320,790	192,680	96,250	96,380
Mean	3,465	3,155	3,061	2,909	2,722	2,223	2,233	6,280	10,690	6,215	3,105	3,213
Max	3,950	3,630	3,150	3,030	3,000	2,440	2,780	10,400	11,800	10,500	3,450	3,350
Min	1,900	2,890	2,990	2,790	2,270	2,060	2,040	3,080	9,990	3,390	2,660	2,940
Ac-ft	213,100	187,700	188,200	178,900	151,200	136,700	132,900	386,100	636,300	382,200	190,900	191,200

Table 3. Daily mean discharge for Bighorn River above Tullock Creek, near Bighorn, Mont. (06294500), October 2009 through September 2010—Continued.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945–2010, BY WATER YEAR (WY)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Mean	3,100	3,168	3,040	2,938	3,076	3,511	3,396	4,242	6,807	5,166	2,778	2,781
Max	5,546	5,599	4,907	5,478	5,314	6,580	7,881	9,102	15,180	19,090	6,972	4,952
(WY)	(1972)	(1974)	(1968)	(1968)	(1971)	(1972)	(1997)	(1947)	(1948)	(1967)	(1997)	(1973)
Min	1,103	1,223	1,280	1,382	1,544	908	1,063	1,304	1,050	707	868	1,009
(WY)	(2003)	(1978)	(1961)	(1961)	(2003)	(1966)	(1966)	(1966)	(1966)	(1960)	(1961)	(1966)

SUMMARY STATISTICS						
	Calendar Year 2009		**Water Year 2010**		**Water Years 1945–2010**	
Annual total	1,518,560		1,500,050			
Annual mean	4,160		4,110		3,651	
Highest annual mean					5,5941997	
Lowest annual mean					1,4742003	
Highest daily mean	13,400	Jun 24	11,800	Jun 19	50,000	May 20, 1978
Lowest daily mean	1,900	Oct 22	1,900	Oct 22	400	Apr 4, 1967
Annual seven-day minimum	2,610	Jan 26	2,060	Apr 1	528	May 6, 1961
Maximum peak flow			[a]12,000	Jun 19	[c]59,200	May 20, 1978
Maximum peak stage			[b]8.72	Dec 16	[d]14.21	Apr 2, 1965
Instantaneous low flow					[e]275	Nov 15, 1959
Annual runoff (ac-ft)	3,012,000		2,975,000		2,645,000	
10 percent exceeds	7,800		10,200		6,180	
50 percent exceeds	3,140		3,110		3,040	
90 percent exceeds	2,690		2,200		1,610	

	Water Years 1946–1961*		**Water Years 1967–2010****	
Annual mean	3,358		3,644	
Highest annual mean	5,501	1947	5,594	1997
Lowest annual mean	1,623	1961	1,474	2003
Highest daily mean	25,700	Jun 23, 1947	50,000	May 20, 1978
Lowest daily mean	462	May 12, 1962	400	Apr 4, 1967
Annual seven-day minimum	528	May 6, 1961	843	Nov 18, 1977
Maximum peak flow	[f]26,200	Jun 24, 1947	[c]59,200	May 20, 1978
Maximum peak stage	10.65	May 24, 1947	14.15	May 20, 1978
Instantaneous low flow	[e]275	Nov 15, 1959		
Annual runoff (ac-ft)	2,578,000		2,632,000	
10 percent exceeds	6,200		6,060	
50 percent exceeds	2,810		3,150	
90 percent exceeds	1,500		1,690	

*Prior to construction of Yellowtail Dam.

**After completion of Yellowtail Dam.

[a] Gage height, 6.99 ft.

[b] Result of ice jam.

[c] Gage height, 14.15 ft, at different site and datum.

[d] Ice jam, at different site and datum.

[e] About, result of freezeup.

[f] Gage height, 8.79 ft, at different site and datum.

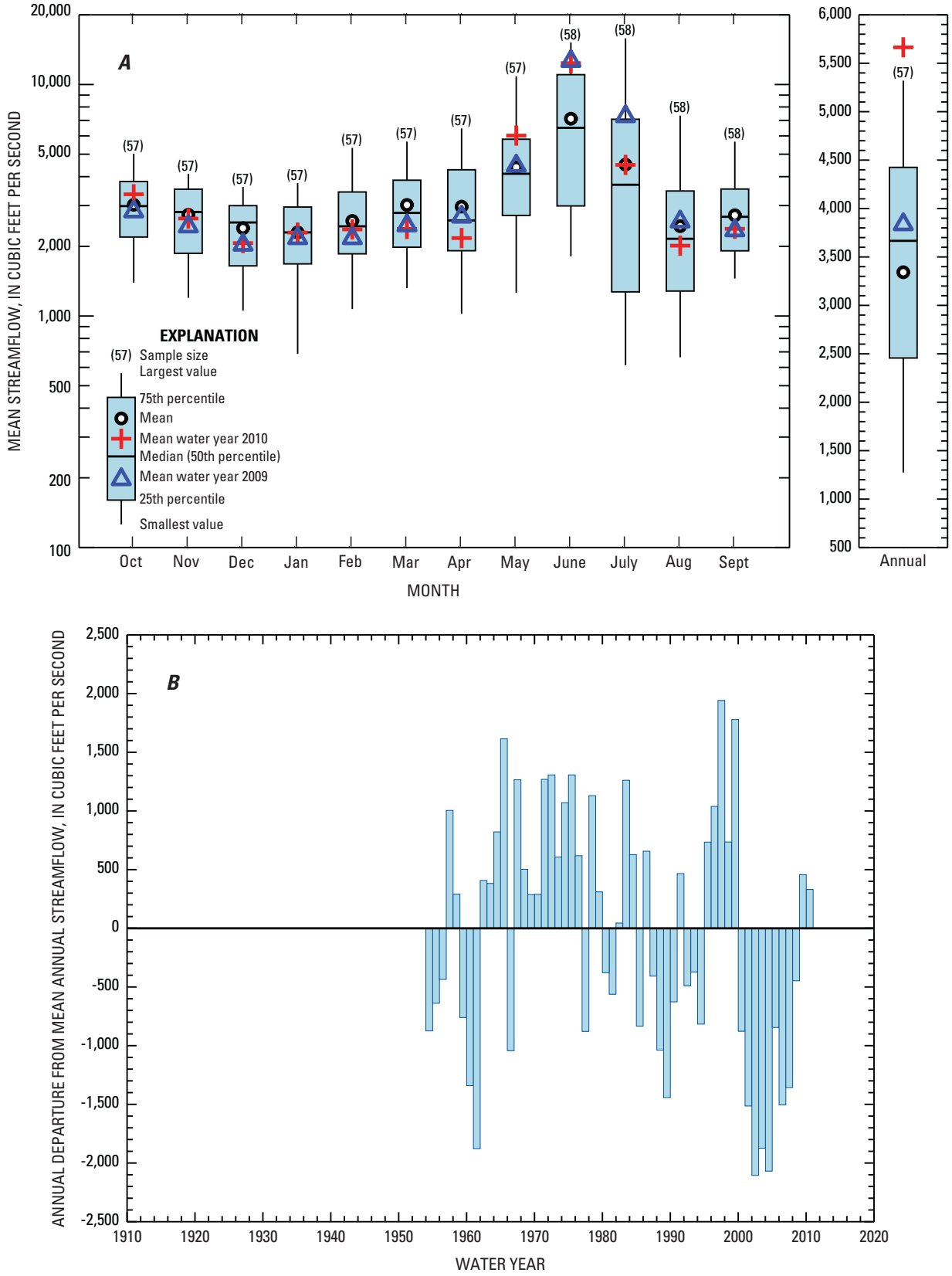


Figure 2. Streamflow data for Bighorn River above Tullock Creek, near Bighorn, Mont. (06294500), minus Little Bighorn River near Hardin, Mont. (06294000); adjusted for change in contents in Bighorn Lake, water years 1954–2010. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

06308500 Tongue River at Miles City, Mont.

LOCATION.--Lat 46°23′05″, long 105°50′41″ referenced to North American Datum of 1927, in SE ¼ SE ¼ SE ¼ 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 mi². Area at site used prior to October 4, 1995, 5,379 mi².

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. Flows at present site are equivalent with flows at site operated from April 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 2,360 ft, referenced to the National Geodetic Vertical Datum of 1929. 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.--Records are good except for estimated daily discharges, which are poor. Flow is regulated by Tongue River Reservoir (station 06307000) with usable contents of 79,070 acre-ft, and many small reservoirs in Wyoming with combined usable contents about 15,000 acre-ft. Diversions for irrigation of about 100,800 acres occur upstream from station. U.S. Army Corps of Engineers satellite telemeter is located at the station.

Table 4. Daily mean discharge for Tongue River at Miles City, Mont. (06308500), October 2009 through September 2010.

[Discharge is in cubic foot per second. Abbreviations: Ac-ft, acre-feet; e, estimated; Max, maximum; Min, minimum; WY, water year Symbol: ---, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	220	242	261	e130	e120	e280	180	229	1,320	1,520	169	179
2	244	241	241	e150	e120	e260	222	345	1,650	1,350	159	158
3	237	241	e120	e150	e120	e300	241	401	1,870	1,220	169	146
4	184	241	e110	e150	e130	e490	218	304	1,890	1,190	186	147
5	203	241	e120	e150	e130	e520	197	239	1,930	1,110	184	154
6	300	242	e140	e150	e130	e540	183	224	1,990	1,030	181	170
7	261	245	e140	e140	e130	e500	177	344	2,110	963	178	161
8	206	245	e140	e140	e130	e480	174	573	2,230	911	176	153
9	177	245	e150	e140	e120	e400	169	441	2,400	856	172	148
10	165	245	e160	e150	e130	e340	166	340	2,410	804	168	152
11	164	245	e160	e150	e150	e320	162	316	2,430	786	155	152
12	162	246	e150	e150	e150	e310	160	325	2,590	808	140	152
13	161	247	e150	e160	e140	e310	162	342	2,680	809	144	146
14	162	251	e140	e160	e130	e320	e155	366	2,690	743	162	132
15	166	255	e140	e150	e130	e340	e155	399	2,850	717	176	129
16	167	281	e150	e170	e120	e320	158	411	2,800	717	172	134
17	168	263	e160	e170	e130	e310	155	383	3,070	671	164	150
18	170	271	e170	e160	e150	304	154	337	3,120	605	145	145
19	177	e260	e170	e160	e150	256	154	344	2,520	641	130	145
20	181	e260	e160	e160	e140	238	153	367	2,380	572	120	150
21	201	262	e160	e160	e130	227	151	395	2,550	456	112	177
22	204	261	e160	e150	e130	219	147	406	2,450	526	108	178
23	206	260	e150	e130	e130	215	158	460	2,280	402	113	183
24	211	257	e140	e120	e130	212	181	934	2,290	421	112	183
25	227	270	e130	e120	e140	208	169	4,010	2,270	337	116	157
26	240	263	e140	e120	e190	198	164	3,830	2,190	280	104	139
27	245	267	e140	e120	e280	192	159	3,190	2,010	241	96	126
28	244	261	e140	e120	e270	187	159	2,230	1,850	216	109	113
29	243	260	e140	e120	---	182	164	2,400	1,680	200	111	108
30	242	258	e140	e120	---	179	179	1,860	1,530	171	129	107
31	244	---	e130	e120	---	178	---	1,410	---	151	161	---
Total	6,382	7,626	4,702	4,440	4,050	9,335	5,126	28,155	68,030	21,424	4,521	4,474
Mean	206	254	152	143	145	301	171	908	2,268	691	146	149
Max	300	281	261	170	280	540	241	4,010	3,120	1,520	186	183
Min	161	241	110	120	120	178	147	224	1,320	151	96	107
Ac-ft	12,660	15,130	9,330	8,810	8,030	18,520	10,170	55,850	134,900	42,490	8,970	8,870

Table 4. Daily mean discharge for Tongue River at Miles City, Mont. (06308500), October 2009 through September 2010.—Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938–2010, BY WATER YEAR (WY)*												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Mean	235	247	185	188	263	503	426	690	1,279	458	176	193
Max	694	585	423	529	1,794	1,783	1,693	2,983	3,825	2,207	700	599
(WY)	(1972)	(1942)	(1950)	(1999)	(1971)	(1971)	(1965)	(1978)	(1978)	(1975)	(1975)	(1968)
Min	10.3	60.9	68.0	65.3	74.5	74.5	12.5	29.2	41.9	12.6	6.08	2.40
(WY)	(1961)	(1989)	(1990)	(2005)	(2003)	(2002)	(1961)	(1961)	(2002)	(1960)	(1949)	(1938)

SUMMARY STATISTICS						
	Calendar Year 2009		**Water Year 2010**		**Water Years 1939–2010***	
Annual total	144,335		168,265			
Annual mean	395		461		400	
Highest annual mean					986	1978
Lowest annual mean					57.2	1961
Highest daily mean	1,620	Jun 16	4,010	May 25	9,290	Jun 15, 1962
Lowest daily mean	110	Jan 4	96	Aug 27	0.00	Jul 9, 1940
Annual seven-day minimum	123	Jan 20	108	Aug 22	0.00	Jul 9, 1940
Maximum peak flow			6,190	May 25	[a]13,300	Jun 15, 1962
Maximum peak stage			9.66	May 25	[b]13.27	Mar 19, 1960
Annual runoff (ac-ft)	286,300		333,800		290,100	
10 percent exceeds	784		1,450		903	
50 percent exceeds	260		181		217	
90 percent exceeds	140		130		65	

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

[a] Gage height, 11.33 ft, at previous site and datum.

[b] Ice jam, at previous site and datum used from 1963 to 1995.

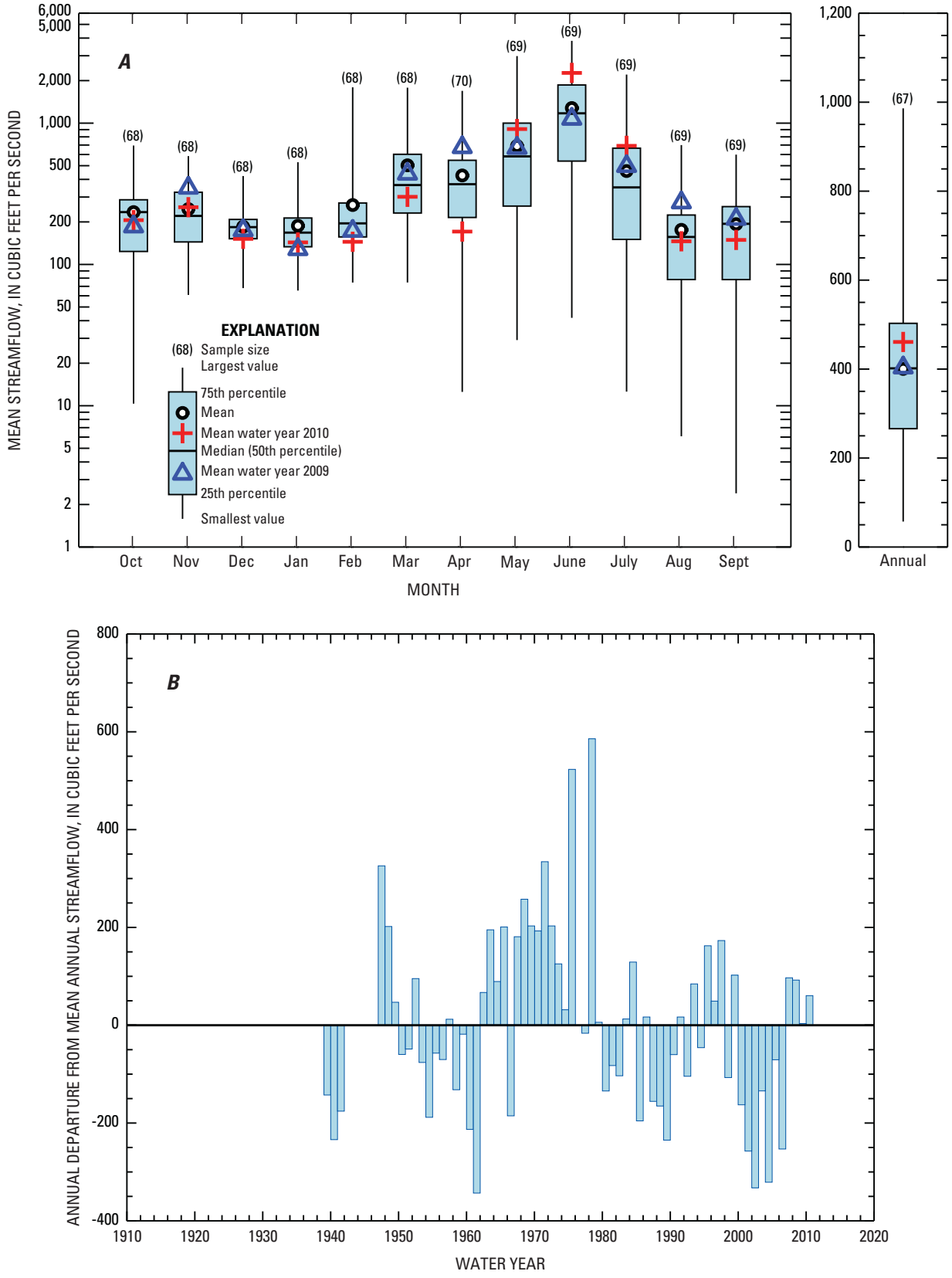


Figure 3. Streamflow data for Tongue River at Miles City, Mont. (06308500), water years 1939–2010. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

06326500 Powder River near Locate, Mont.

LOCATION.--Lat 46°25′48″, long 105°18′34″ referenced to North American Datum of 1927, in SW ¼ SW ¼ SE ¼ 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.--13,068 mi².

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 2,384.79 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.--Records are fair except for estimated daily discharges, which are poor. Flow is regulated by three reservoirs in Wyoming with combined usable contents of 36,800 acre-ft. Diversions for irrigation of about 101,800 acres occur upstream from station. U.S. Geological Survey satellite telemeter is located at the station.

Table 5. Daily mean discharge for Powder River near Locate, Mont. (06326500), October 2009 through September 2010.

[Discharge is in cubic feet per second. Abbreviations: Ac-ft, acre-feet; e, estimated; Max, maximum; Min, minimum; WY, water year Symbol: ---, no data]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	152	371	343	e150	e170	e450	578	1,040	3,110	1,660	190	77
2	177	388	324	e170	e170	e440	708	1,150	3,040	1,580	182	82
3	191	370	e200	e150	e170	e430	703	1,110	2,740	1,410	168	85
4	189	372	e150	e150	e170	e440	764	829	2,440	1,340	155	80
5	228	372	e110	e150	e180	e520	768	710	2,240	1,340	151	70
6	360	382	e100	e140	e190	e540	646	711	2,190	1,300	150	65
7	278	385	e140	e130	e190	e560	557	1,000	2,230	1,190	187	65
8	268	371	e180	e130	e180	e760	548	1,270	2,500	1,150	205	61
9	238	375	e190	e130	e180	e750	517	1,040	2,420	1,130	164	62
10	280	372	e210	e150	e220	e750	531	1,020	2,560	1,020	154	69
11	320	368	e200	e150	e260	e800	505	808	3,310	999	212	81
12	320	359	e150	e160	e270	e900	494	711	2,760	990	222	73
13	324	358	e140	e160	e300	e1,900	475	662	2,610	957	187	66
14	371	357	e140	e170	e330	e2,800	454	669	2,560	824	160	67
15	396	350	e150	e170	e350	e3,000	432	797	2,380	765	145	75
16	372	353	e160	e160	e340	e2,700	459	1,670	2,210	742	144	77
17	377	354	e170	e170	e320	e2,500	493	1,700	2,170	683	131	90
18	383	359	e190	e180	e330	2,040	452	1,620	2,210	605	124	92
19	385	346	e190	e170	e360	1,440	422	1,330	2,150	583	111	87
20	375	330	e170	e170	e390	1,030	410	1,150	2,140	502	109	82
21	379	318	e170	e170	e380	913	388	1,060	2,110	462	95	81
22	382	340	e160	e170	e370	807	387	1,040	2,820	557	78	78
23	387	350	e150	e160	e380	736	430	1,130	2,740	468	72	97
24	377	350	e160	e160	e390	710	466	2,790	2,610	394	74	110
25	381	346	e150	e170	e410	693	465	7,010	2,320	344	71	100
26	390	353	e160	e170	e430	634	718	4,740	2,190	302	69	98
27	370	351	e160	e160	e440	613	1,110	3,730	1,890	274	70	92
28	360	325	e160	e150	e430	614	1,260	3,030	1,870	255	70	89
29	375	337	e160	e160	---	590	1,200	3,340	1,800	224	72	84
30	386	344	e150	e150	---	587	1,060	2,970	1,700	196	81	91
31	388	---	e150	e160	---	570	---	2,920	---	191	92	---
Total	10,159	10,706	5,337	4,890	8,300	32,217	18,400	54,757	72,020	24,437	4,095	2,426
Mean	328	357	172	158	296	1,039	613	1,766	2,401	788	132	80.9
Max	396	388	343	180	440	3,000	1,260	7,010	3,310	1,660	222	110
Min	152	318	100	130	170	430	387	662	1,700	191	69	61
Ac-ft	20,150	21,240	10,590	9,700	16,460	63,900	36,500	108,600	142,900	48,470	8,120	4,810

Table 5. Daily mean discharge for Powder River near Locate, Mont. (06326500), October 2009 through September 2010—Continued.

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939–2010, BY WATER YEAR (WY)												
	Oct	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
Mean	244	218	148	142	407	1,171	728	1,151	1,588	555	205	160
Max	921	790	417	476	3,850	4,627	3,062	5,970	8,045	2,015	1,096	898
(WY)	(1941)	(1999)	(1942)	(1981)	(1943)	(1972)	(1965)	(1978)	(1944)	(1993)	(1941)	(1941)
Min	1.77	12.5	12.5	4.53	2.82	80.2	109	51.2	25.9	9.34	1.30	0.19
(WY)	(1961)	(1961)	(1961)	(1950)	(1950)	(1950)	(1961)	(2004)	(2004)	(2004)	(1988)	(1960)

SUMMARY STATISTICS						
	Calendar Year 2009		**Water Year 2010**		**Water Years 1939–2010**	
Annual total	200,855		247,744			
Annual mean	550		679		560	
Highest annual mean					1,622	1944
Lowest annual mean					79.1	2004
Highest daily mean	3,070	Apr 14	7,010	May 25	26,000	Feb 19, 1943
Lowest daily mean	73	Sept 27	61	Sep 8	0.00	Jan 16, 1950
Annual seven-day minimum	78	Sept 21	67	Sep 4	0.00	Jan 16, 1950
Maximum peak flow			8,370	May 25	[b]31,000	Feb 19, 1943
Maximum peak stage			7.40	May 25	[c]12.20	Mar 16, 1978
Instantaneous low flow			[a]51	Sep 8	0.00	Many days[d]
Annual runoff (ac-ft)	398,400		491,400		405,500	
10 percent exceeds	1,100		2,140		1,300	
50 percent exceeds	380		368		230	
90 percent exceeds	129		94		40	

[a] Gage height, 1.06 ft.

[b] Gage height, 11.23 ft.

[c] Backwater from ice.

[d] On many days in 1950, 1960-61, 1998, and 2006.

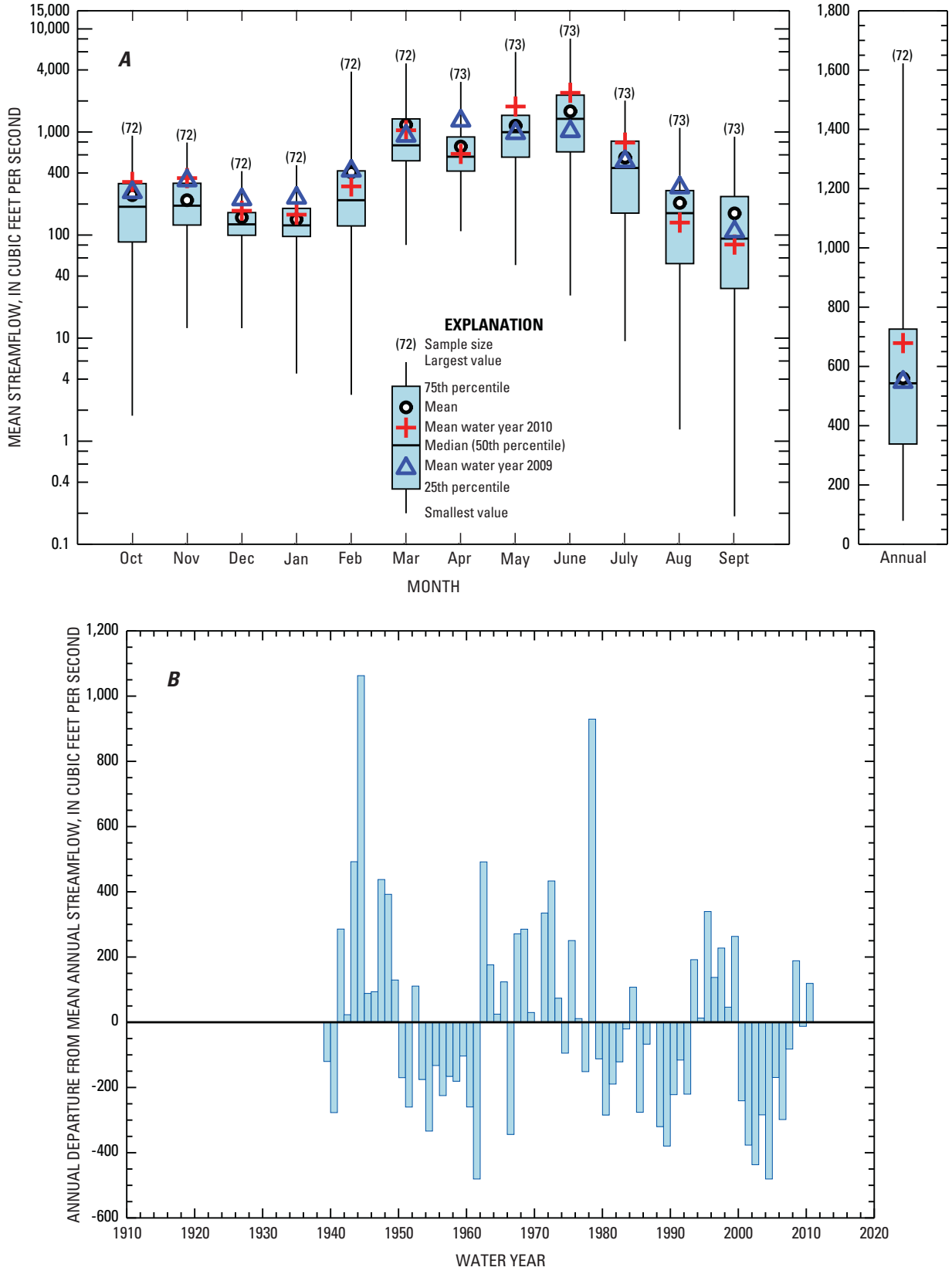


Figure 4. Streamflow data for Powder River near Locate, Mont. (06326500), water years 1939–2010. *A*, Statistical distribution of monthly and annual streamflow. *B*, Annual departure from the mean annual streamflow.

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

06258900 Boysen Reservoir, Wyo.

LOCATION.--Lat 43°25′00″, long 108°10′37″ referenced to North American Datum of 1927, in NW1/$_4$NW1/$_4$ sec. 16, T.5 N., R.6 E., Fremont County, Hydrologic Unit 10080005, at dam on Wind River and 13 mi north of Shoshoni, Wyo.

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

PERIOD OF RECORD.--October 1951 to present (month-end contents only).

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. Usable contents are 701,500 acre-ft between elevation 4,657.00 ft, invert of penstock pipe, and 4,725.00 ft, top of spillway gate. Dead storage is 40,080 acre-ft below elevation 4,657.00 ft. Prior to January 1, 1966, usable contents were 757,900 acre-ft and dead storage was 62,000 acre-ft at same elevations. Between January 1966 and October 1996, usable contents were 742,100 acre-ft and dead storage was 59,880 acre-ft, at same elevations. Crest of dam is at elevation 4,758.00 ft. Water used for irrigation, flood control, and power generation.

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

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

EXTREMES FOR WATER YEAR 2010.--Maximum daily contents, 695,700 acre-ft, July 4, elevation, 4,724.70 ft; minimum daily contents, 530,900 acre-ft, June 4, elevation, 4,715.34 ft.

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

[Symbol: --, no data]

Date	Water-surface elevation, in feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2009	4,720.63	619,500	--
October 31	4,720.85	623,500	4,000
November 30	4,720.59	618,800	-4,700
December 31	4,719.18	593,900	-24,900
January 31, 2010	4,717.71	569,000	-24,900
February 28	4,716.59	550,600	-18,400
March 31	4,716.84	554,700	4,100
April 30	4,718.12	575,800	21,100
May 31	4,715.83	538,500	-37,300
June 30	4,723.91	680,400	141,900
July 31	4,722.67	656,900	-23,500
August 31	4,720.56	618,200	-38,700
September 30, 2010	4,719.48	599,100	-19,100
2010 water year			-20,400

[1] Wyoming disagrees with the term “Compact Reservoirs” as used throughout this annual report. Wyoming’s acceptance of this annual report should not be construed as Wyoming’s acceptance of the use of that term.

06260300 Anchor Reservoir, Wyo.

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, Wyo.

DRAINAGE AREA.--131 mi^2.

PERIOD OF RECORD.--November 1960 to present (month-end contents only).

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. Usable contents are 17,410 acre-ft (revised) between elevation 6,343.75 ft, invert of river outlet, and 6,441.00 ft, spillway crest, including 68 acre-ft below elevation 6,343.75 ft. Prior to October 1, 1971, usable contents were 17,280 acre-ft, including 149 acre-ft below the invert. Water is used for irrigation of land in Owl Creek Basin.

COOPERATION.--Elevations and contents data furnished by Bureau of Reclamation.

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

EXTREMES FOR WATER YEAR 2010.--Maximum daily contents, 6,970 acre-ft, June 30, elevation, 6,411.39 ft; minimum daily contents during period of gaged record, 260 acre-ft, many days, elevation, 6,355.20 ft.

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

[Abbreviation: e, estimated Symbol: --, no data]

Date	Water-surface elevation, In feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2009	6,357.34	325	--
October 31	6,357.34	325	0
November 30	6,359.80	407	82
December 31	6,355.50	268	-139
January 31, 2010	6,356.60	302	34
February 28	6,356.80	308	6
March 31	6,355.30	263	-45
April 30	6,357.96	344	81
May 31	6,385.82	2,350	2,006
June 30	6,411.39	6,970	4,620
July 31	6,388.15	2,630	-4,340
August 31	6,359.43	394	-2,236
September 30, 2010	6,358.31	350e	-44
2010 water year			25

06286400 Bighorn Lake near St. Xavier, Mont.

LOCATION.--Lat 45°18′27″, long 107°57′26″ referenced to North American Datum of 1927, in SW ¼ SE ¼ 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, Montana Water Science Center in Helena, Mont.

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 data furnished by Bureau of Reclamation.

REMARKS.--Reservoir is formed by thin concrete-arch dam; construction began in 1961 and was completed in 1967. Storage began November 3, 1965. Usable contents are 1,312,000 acre-ft, between elevation 3,296.50 ft, river outlet invert, and 3,657.00 ft, top of flood control. Elevation of spillway crest is 3,593.00 ft. Normal maximum operating level is 1,097,000 acre-ft, between elevations, 3,640.00 ft and 3,657.00 ft. Minimum operating level is 483,400 acre-ft, elevation, 3,547.00 ft. Dead storage is 16,010 acre-ft, below elevation 3,296.50 ft. All elevations are referenced to the National Geodetic Vertical Datum of 1929. Figures given herein represent usable contents. Water is used for power production, flood control, irrigation, and recreation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,346,000 acre-ft, July 6, 1967, elevation, 3,656.43 ft; minimum since first filling, 519,400 acre-ft, March 11, 2003, elevation 3,572.81 ft.

EXTREMES FOR WATER YEAR 2010.--Maximum contents, 1,130,000 acre-ft, July 4, elevation, 3,645.59 ft; minimum, 923,400 acre-ft, February 25, elevation, 3,627.86 ft.

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

[Symbol: --, no data]

Date	Water-surface elevation, In feet	Usable contents, in acre-feet	Change in usable contents, in acre-feet
September 30, 2009	3,639.26	1,045,000	--
October 31	3,639.50	1,048,000	3,000
November 30	3,637.72	1,026,000	-22,000
December 31	3,632.73	970,800	-55,200
January 31, 2010	3,629.55	939,200	-31,600
February 28	3,627.97	924,400	-14,800
March 31	3,629.99	943,400	19,000
April 30	3,630.65	949,800	6,400
May 31	3,631.90	962,300	12,500
June 30	3,645.49	1,129,000	166,700
July 31	3,639.11	1,043,000	-86,000
August 31	3,634.02	984,400	-58,600
September 30, 2010	3,630.14	944,900	-39,500
2010 water year			-100,100

Month-End Contents for Yellowstone River Compact Reservoirs[1] 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 usable contents, in acre-ft, 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, Wyoming, and data on contents were furnished by the Bureau of Reclamation. The usable contents of Buffalo Bill Reservoir was increased in 1992 from 456,600 acre-ft to 644,540 acre-ft (listed as 646,565 acre-ft by 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 data. The usable contents of Tongue River Reservoir increased from 68,000 acre-ft to 79,070 acre-ft in 1999.

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

Date	Usable contents, in acre-feet[2]			
	06224500 Bull Lake	Pilot Butte Reservoir	06281500 Buffalo Bill Reservoir	06307000 Tongue River Reservoir
September 30, 2009	79,040	16,000	486,000	48,710
October 31	79,540	26,290	460,500	49,490
November 30	80,820	26,060	456,800	47,930
December 31	80,820	25,980	448,300	47,410
January 31, 2010	80,460	25,900	440,800	48,190
February 28	80,260	25,870	432,300	50,010
March 31	80,510	25,830	425,900	55,960
April 30	83,680	27,730	413,500	62,960
May 31	96,230	27,830	387,300	81,080
June 30	137,500	27,320	603,100	80,690
July 31	146,300	20,480	608,600	67,780
August 31	107,200	18,470	537,600	54,440
September 30, 2010	65,120	14,300	485,500	51,100
Change in contents during water year	-13,920	-1,700	-500	2,390

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

[2] Pre-Compact water rights and post-Compact water rights for these reservoirs are presented in table 10, "Water-year-end contents for Yellowstone River Compact reservoirs or lakes."

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

Water-Year-End Contents for Yellowstone River Compact Reservoirs[1] or Lakes

Month-end usable contents for additional reservoirs of interest to the Yellowstone River Compact are listed in table 10. The listed water rights or usable contents changed from the 2008 report for various reasons. In 2008, the post-compact 1950 water right for Adelaide Reservoir was 4,760 acre-ft. The correct post-compact 1950 water right is 3,320. Anchor Reservoir was built to hold 17,400 acre-ft, but sinkholes within the area contained by the dam prevent filling the reservoir to the designed volume, and at present only 9,250 acre-ft has been adjudicated with an extension to December 31, 2013, for the remaining 8,150 acre-ft. The water rights listed in 2008 annual report for pre- and post-compact for Lower Sunshine Reservoir were incorrect. There is a only a post-compact 1950 water right of 58,750 acre-ft.

Table 10. Water-year-end contents for Yellowstone River Compact reservoirs[1] or lakes.

[Contents are in acre-feet. Reservoirs or lakes are listed in alphabetical order by drainage basin. Abbreviation: e, estimated]

Reservoir or lake name	Pre-compact 1950 water right	Post-compact 1950 water right	Usable contents	Usable contents on Sept. 30, 2010	Usable contents on Sept. 30, 2009	Change in usable contents[2]
Bighorn River Basin						
(Lake) Adelaide Reservoir[3]	1,450	3,320	4,770	980	2,270	-1,290
Anchor Reservoir[4]	0	9,250	17,410	350e	325	25
Bighorn Lake[4]	0	1,312,000	1,312,000	944,900	1,045,000	-100,100
Boysen Reservoir[4]	757,900	0	701,500	599,100	619,500	-20,400
Buffalo Bill Reservoir[4]	456,600	187,900	644,500	485,500	486,000	-500
Bull Lake[4]	77,040	0	77,040	65,120	79,040	-13,920
Greybull Valley Reservoir[3]	0	33,170	33,170	4,160	1,280	2,880
Pilot Butte Reservoir[4]	34,600	0	34,600	14,300	16,000	-1,700
Sunshine Reservoir[3]	52,990	0	52,990	52,340	47,760	4,580
Lower Sunshine Reservoir[3]	0	58,750	58,750	25,060	35,570	-10,510
Powder River Basin						
Cloud Peak Reservoir[3]	3,400	172	3,570	3,570	3,570	0
Dull Knife Reservoir[3]	0	4,320	4,350	1,180	1,520	-340
Healy Reservoir[3]	0	5,140	5,140	3,970	4,340	-370
Kearney Reservoir[3]	1,850	4,470	6,320	2,190	2,500	-310
Lake DeSmet[3]	37,520	197,500	235,000	203,600	184,500	19,100
Muddy Guard Reservoir[3]	0	2,340	2,340	840	1,380	-540
Tie Hack Reservoir[3]	1,650	788	2,440	2,440	2,440	0
Willow Park Reservoir[3]	4,460	0	4,460	337	0	337
Tongue River Basin						
Bighorn Reservoir[3]	2,750	1,880	4,630	357	956	-599
Cross Creek Reservoir[3]	0	798	798	78	253	-175
Dome Reservoir[3,5]	1,840	188	2,030	993	1,760	-767
Granger Reservoir[3]	146	0	146	0	0	0
Last Chance Reservoir[3]	90	0	90	0	0	0
Martin Reservoir[3]	561	0	561	0	0	0
Park Reservoir[3]	7,350	3,020	10,360	3,790	4,160	-370
Sawmill Lakes Reservoir[3]	0	1,280	1,280	690	989	-299
Tongue River Reservoir[6]	79,070	0	79,070	51,100	48,710	2,390
Twin Lakes Reservoir[3,7]	1,180	2,220	3,400	2,200	2,350	-150
Weston Reservoir[3]	370	0	370	0	0	0
Willits Reservoir[3]	79	0	79	0	0	0

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

[2] Change in usable contents is derived from subtracting the 2010 usable contents from the 2009 usable contents.

[3] Private reservoirs permitted and accounted by the State of Wyoming.

[4] Reservoirs managed by Bureau of Reclamation.

[5] Data are combined contents of Dome Lake and Dome Lake Reservoir.

[6] Reservoir managed by the State of Montana.

[7] Data are combined contents of Twin Lakes Number 1 and Twin Lakes Number 2.

[1] Wyoming disagrees with the term "Compact Reservoirs" as used throughout this annual report. Wyoming's acceptance of this annual report should not be construed as Wyoming's acceptance of the use of that term.

RULES AND REGULATIONS FOR ADMINISTRATION OF THE YELLOWSTONE RIVER COMPACT

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

Article I. Collection of Water Records

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

1. Clarks Fork

The gaging station known as Clarks Fork near Silesia, Montana and located in NW1/4 SE1/4 sec. 1, T. 4 S., R. 23 E., shall be the point of measurement for the Clarks Fork.

2. Bighorn River (exclusive of Little Bighorn River)

The gaging station known as the Bighorn River above Tullock Creek, near Bighorn, Montana, and located in SE1/4 SE1/4 NE1/4 sec. 3, T. 4 N., R. 34 E., shall temporarily be the designated point of measurement on that stream. The flow of the Little Bighorn River as measured at the gaging station near Hardin, Montana, and located in SE1/4 NE1/4 NE1/4 sec. 19, T. 1 S., R. 34 E., shall be considered the point of measurement for that stream, except that if or when satisfactory records are not available, the records for the nearest upstream station with practical corrections for intervening inflow or diversion shall be used.

3. Tongue River

The gaging station known as the Tongue River at Miles City, Montana, and located in NE1/4 NE1/4 SE1/4 sec. 23, T. 7 N., R. 47 E., shall temporarily be the point of measurement for that stream.

4. Powder River

The gaging station known as the Powder River near Locate, Montana, and located in NW1/4 SW1/4 sec. 14, T. 8 N., R. 51 E., shall temporarily be the designated point of measurement for that stream.

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

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

Article II. Office and Officers

A. The office of the Commission shall be located at the office of the Chairman of the Commission.

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

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

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

Article III. Secretary

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

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

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

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

B. The Geological Survey shall act as Secretary to the Commission.

Article IV. Budget

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

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

Article V. Meetings

An annual meeting of the Commission shall be held each November at some mutually agreeable point in the Yellowstone River Basin for consideration of the annual report for the water year ending the preceding September 30th, and for the transaction of such other business consistent with its authority; provided that by unanimous consent of the Commission the date and place of the annual meeting may be changed. Other meetings as may be deemed necessary shall be held at a time and place set by mutual agreement, for the transaction of any business consistent with its authority.

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

Article VI. Amendments, Revisions and Abrogations.

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

Gary Fritz
Commissioner for Montana

George L. Christopulos
Commissioner for Wyoming

ATTESTED:

L. Grady Moore
Federal Representative

Adopted November 17, 1953
Amended December 16, 1986

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

December 19, 1995

Section I. General Framework

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

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

Section II. Purpose and Goal

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

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

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

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

Section III. Consensus

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

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

Section IV. Unassisted Negotiation

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

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

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

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

Section V. Facilitation

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

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

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

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

Section VI. Voting

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

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

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

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

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

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

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

Section VII. Funding

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

Section VIII. Amendments

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

Section IX. Execution

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

Gary Fritz
Commissioner for Montana

Gordon W. Fassett
Commissioner for Wyoming

William F. Horak
Federal Representative

July 22, 1996
Date

RULES FOR ADJUDICATING WATER RIGHTS ON INTERSTATE DITCHES

Article I. Purpose

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

Article II. Authority

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

Article III. Definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Article IV. Procedures

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

A. Wyoming Procedure

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

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

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

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

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

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

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

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

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

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

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

B. Montana Procedure

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

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

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

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

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

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

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

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

Article V. Exclusions

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

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

Article VI. Claim Form Submission Period

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

YELLOWSTONE RIVER COMPACT COMMISSION

WYOMING

GORDON W. FASSETT
STATE ENGINEER
HERSCHLER BUILDING
4TH FLOOR EAST
CHEYENNE, WYOMING 82002
(307) 777-7354

UNITED STATES

WILLIAM F. HORAK
CHAIRMAN
U.S. GEOLOGICAL SURVEY
821 E. INTERSTATE AVENUE
BISMARCK, NORTH DAKOTA 58501
(701) 250-4601

MONTANA

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.

_____

_____

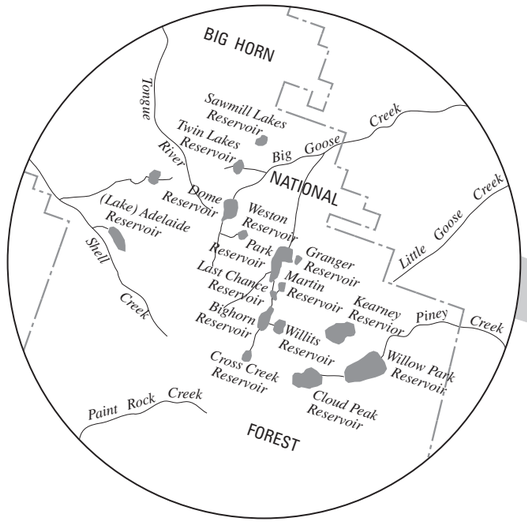
Subscribed and sworn before me, this ____day of _____, 19__.

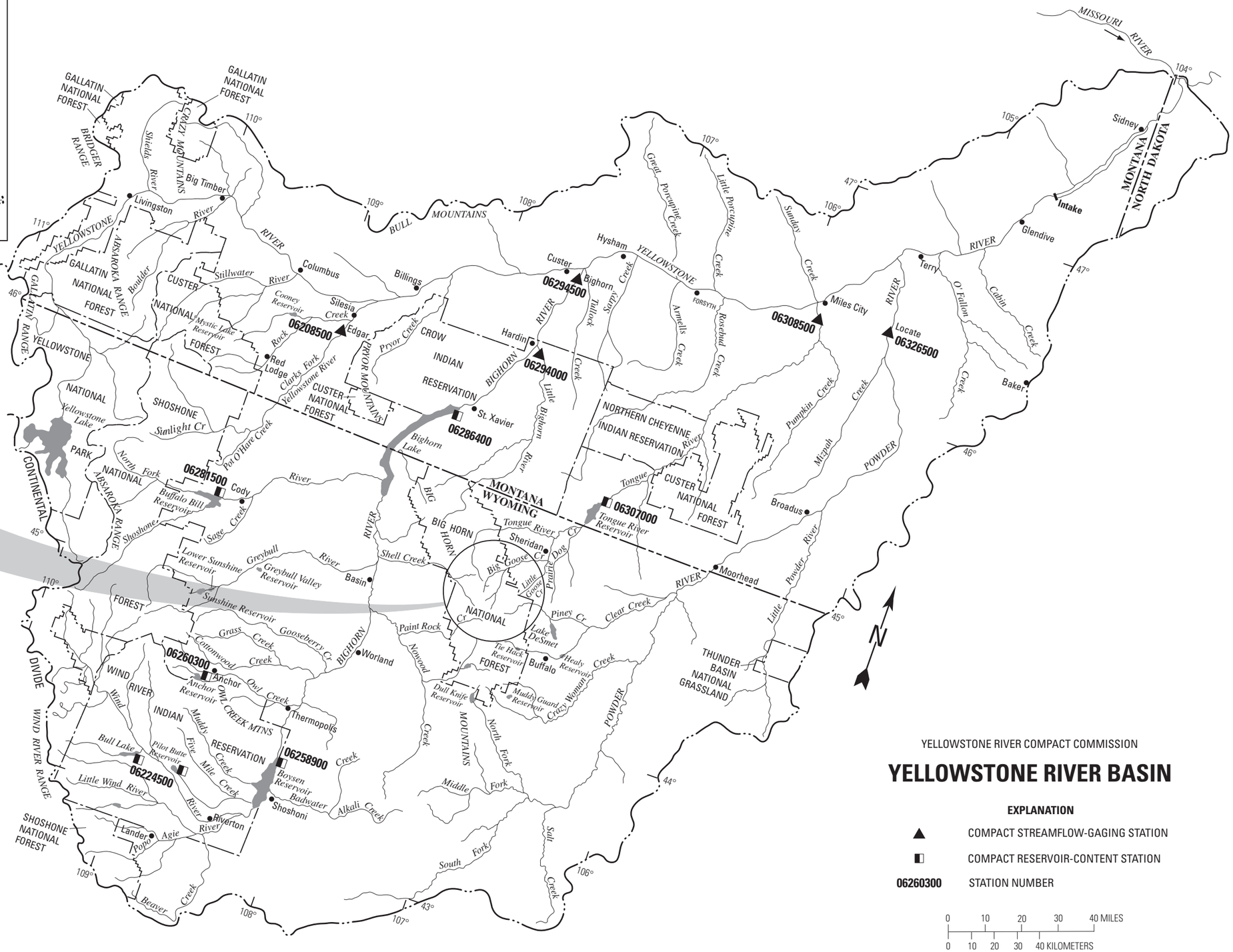
_____
Notary Public

Residing at: _____

My commission expires: _____

LOCATION MAP





LOCATIONS OF YELLOWSTONE RIVER COMPACT STREAMFLOW-GAGING AND RESERVOIR-CONTENT STATIONS

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