WATER-RESOURCES INVESTIGATIONS OF THE U.S. GEOLOGICAL SURVEY IN WYOMING, FISCAL YEARS 1981 AND 1982

Compiled By S. L. Green

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Cheyenne, Wyoming

1983

UNITED STATES DEPARTMENT OF THE INTERIOR

JAMES G. WATT, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

FUNDING AGENCIES

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Wyoming Department of Agriculture
Wyoming Department of Economic Planning and Development
Wyoming Department of Environmental Quality
Wyoming Game and Fish Department
Wyoming Highway Department
Wyoming State Engineer
Wyoming Water Development Commission

Municipality

City of Cheyenne

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Cheyenne, Wyoming 82003

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ABSTRACT

This report contains lists and location maps of streamflow and reservoir stations, peak-flow partial-record stations, water-quality stations, sediment stations, and ground-water stations that are currently being operated. Water-resources appraisal projects in Wyoming are described, including many that are related to development of energy resources. The general locations of the projects are shown on maps. The U.S. Geological Survey is striving to coordinate its water-resources investigations with those of other agencies. This report is one phase of that coordination effort, and serves as an annual progress report to cooperators and the public.

INTRODUCTION

The U.S. Geological Survey is the Federal agency responsible for appraising the quantity, quality, and distribution of our surface-water and ground-water resources. Through its Water Resources Division, the Survey conducts interpretive studies, supports hydrologic research, and maintains data-collection networks in every State; it also works through cooperative programs with State, local, and other Federal agencies to help evaluate or solve regional and local water problems. Results of its investigations provide a basis for nearly all major public water-management decisions.

The Geological Survey, in cooperation with the State of Wyoming, the city of Cheyenne, and other Federal agencies, had five data-collection activities and 40 water-resource appraisal projects in Wyoming during fiscal year 1982 (October 1, 1981, through September 30, 1982).

The data-collection activities included: (1) Collection of records for streamflow and reservoir storage; (2) measurements of water levels in wells; (3) sampling and chemical analysis of water from streams and wells; (4) sampling and sediment analysis of surface water; and (5) collection of peak-flow information at partial-record sites. This report contains tables of monitoring sites for these five data-collection activities.

Water-resources appraisal projects described in the report include the projects that were being conducted during fiscal year 1982 and projects completed in previous fiscal years, but for which final reports were in preparation at the end of fiscal year 1982.

The purpose of this report is to describe the water-resources investigations being done in Wyoming. The report is also intended to inform cooperating officials and the public about the accomplishments in the various investigations during the fiscal year 1981 (October 1, 1980, through September 30, 1981) and planned work for fiscal year 1982. It is one phase of an effort to coordinate the water-resources investigations of the U.S. Geological Survey with those of other organizations.

A BRIEF HISTORY OF THE WYOMING DISTRICT

On March 3, 1879, President Rutherford B. Hayes signed a bill establishing the U.S. Geological Survey. The Sundry Civil Appropriation Act of 1888 established an Irrigation Survey as a part of the U.S. Geological Survey "for the purpose of investigating the extent to which the arid region of the United States can be redeemed by irrigation ***." The Water Resources Division, of which the Wyoming District is a part, has its roots in the Irrigation Survey of 1888-1890.

There was no Wyoming District in 1888, when the Washington, D. C. office of the Geological Survey paid the installation costs for the first gaging station in Wyoming, Laramie River at Woods Landing. It was constructed and operated by the Territorial Engineer, Elwood Mead. Between 1895 and 1901 the Geological Survey paid operating expenses for additional stations operated by the State Engineer. A. J. Parshall became the first resident hydrographer for the Geological Survey in Wyoming in 1901. For the next six years there was no cooperative work with the State, but 11 stations were operated with Geological Survey and Reclamation Service funds. By 1912 the Geological Survey's network consisted of 50 stations, including 21 in cooperation with the State Engineer. Parshall was appointed State Engineer; surprisingly, he refused to allow the Geological Survey to use any part of its share of the funds to pay office expenses, so cooperation ended in 1912. The first official letter written by J. B. True as the new State Engineer in 1915 was to the Geological Survey, urging resumption of the coop program. Fifty gaging stations were established or re-established; cooperation with the State Engineer has continued without further interruption.

Early Federal cooperators included the Indian Service (1908) and the Forest Service (1910). In 1938 the Bureau of Reclamation established 23 streamflow stations in the Green River Basin using Geological Survey plans. The Bureau also did field work at Geological Survey stations in the area; in return the Geological Survey computed and published the records for all stations. During the postwar period, 1945-50, many new streamflow stations were established under the Interior Department's Missouri River Basin program. A flood-investigations program, started in 1959 in cooperation with the Wyoming Highway Department, has continued to the present.

Surface-water activities in Wyoming were directed from Washington until 1903, when the Denver District was established under M. C. Hinderlider. Between 1903 and 1961 Wyoming was part of the Colorado District, with local offices at various times in Kemmerer, Sheridan, and Casper. The Wyoming District, Surface Water Branch, was established in 1961, with L. A. Wiard as District Engineer.

The earliest known ground-water studies by the Geological Survey in Wyoming were done between 1900 and 1917 by G. I. Adams in the Goshen Hole area (Water-Supply Paper 70); N. H. Darton in the Great Plains, Bighorn Mountains, Laramie Range, and Black Hills; and O. E. Meinzer in Lodgepole Valley. State cooperation has been continuous since 1940, when the Wyoming Planning and Water

Conservation Board sponsored a study of the Egbert-Pine Bluffs area by T. W. Robinson. Cooperation with the State Engineer has continued since 1945. In 1959 all State cooperative ground-water work was consolidated under the State Engineer program. A number of ground water studies in that part of Wyoming that lay in the Missouri River Basin was conducted by the staff of the Montana Ground Water District during 1945-53 with funds made available under the Missouri River Basin (MRB) program. From 1949 to 1953, this was largely done from a Montana District field office at Riverton, Wyoming. From 1954 through its termination in 1959, the MRB ground-water program in Wyoming was accomplished through the District office in Cheyenne. Ground-water work for other Federal agencies has also included measurements of discharge and power consumption for REA in 1941, and a continuous series of studies of Yellowstone and Grand Teton National Parks for the National Park Service since the early 1960's.

Ground-water work in Wyoming was directed from Washington until 1945, when Wyoming became a part of the Colorado District under S. W. Lohman. The local geologist in charge was A. M. Morgan. In 1951 the Wyoming District, Ground Water Branch, was established, with H. M. Babcock as District Geologist.

Surface-water quality work in Wyoming began with the establishment of an office and sediment laboratory in Worland in March 1946, with T. F. Hanly in charge. The program was directed by P. C. Benedict, Regional Engineer, in Lincoln, Nebraska. In 1948, chemical quality or sediment stations were in operation at 16 sites in the Bighorn Basin and 5 sites in the North Platte basin under the Department's Missouri River Basin program. By 1953, the program included 39 chemical-quality stations and 42 sediment stations.

In February 1956 the office in Worland was designated as a District Office, Quality of Water Branch, with a field office in Riverton; the Riverton office was reassigned to the Surface Water Branch in October 1964. The first sediment station in the State cooperative program was established on Rock Creek near Atlantic City for the Wyoming Natural Resources Board in 1957. The State Engineer started a cooperative chemical-quality program to evaluate the effects of the Kendrick Project on the North Platte River in 1959. Since 1965 the Wyoming Department of Agriculture has been principal State cooperator for chemical quality, and the State Engineer for sediment data. In 1966 water-quality work in the Green River basin, previously done by the Utah District, was transferred to the Wyoming District.

The District sediment laboratory was established in Worland in 1946 when the office was opened. In September 1982 the Worland office was closed and the sediment-laboratory function was transferred to Iowa City, Iowa. In recent years the lab served the Montana, North Dakota, and Alaska Districts, as well as the Wyoming District. The chemical laboratory was moved from Worland to Cheyenne in 1969 and was immediately downgraded because of the establishment of the WRD Central Laboratory in Salt Lake City. (The Central Laboratory was later moved to Denver, Colorado.) Since 1966, however, basic salinity analyses of samples collected for the State programs have been done by the State laboratory in Laramie for Direct Services credit in the cooperative program with the Wyoming Department of Agriculture.

The Branch districts were combined into a single WRD district in February 1967. The programs and staff of the District changed little until 1974. Within two years the staff doubled and the budget tripled, mostly in response to the pending boom in development of coal and other energy resources. The water-quality data program, in particular, increased several-fold. Significant new programs were started in cooperation with the Wyoming Department of Environmental Quality, the Bureau of Land Management, and the Environmental Protection Agency.

The District staff had increased from approximately 40 employees to approximately 75 by 1980. In 1981 and 1982, however; energy-related programs decreased significantly due to reductions in Federal funds. Today the District has approximately 50 employees, with field offices in Buffalo, Casper, Green River, and Riverton. Approximately two-thirds of the funding is for work in cooperation with other agencies, and one-third is for participation in the Survey's energy programs, regional aquifer-system assessments, and other USGS programs. Reconnaissance and inventory studies have given way to problem-oriented, multi-disciplinary studies and increased use of digital models. Major water-resources problems now being addressed by Wyoming District programs include the hydrology of energy-minerals areas, the hydrologic effects of energy development, the effects of human activities on water quality, and the availability of ground water to meet the rapidly increasing demands of agriculture and industry.

Water Resources programs have been directed by the following District Chiefs located in Wyoming:

Surface Water Branch: (Cheyenne)	Leon A. Wiard	10/61 - 2/67
Ground Water Branch: (Cheyenne)	Horace M. Babcock	10/51 - 1/58
	Ellis D. Gordon	2/58 - 2/67
Quality of Water Branch: (Worland)	Thomas F. Hanly	2/56 - 2/67
Water Resources Division: (Cheyenne)	Leon A. Wiard	2/67 - 8/68
	Robert L. Cushman	8/68 - 6/73
	Sam W. West	12/73 - 12/78
	William W. Dudley, Jr.	4/79 - 8/82
	Richard M. Bloyd	2/83 - present

DISTRICT OFFICE ADDRESSES

Inquiries regarding projects described in this volume may be directed to the District Office or Subdistrict Office in which the work originated.

Wyoming District Office

U.S. Geological Survey
Water Resources Division
2120 Capitol Avenue
P.O. Box 1125
Cheyenne, WY 82003
(307) 772-2153

Field Headquarters

9 Spruce Street
P.O. Box S
Buffalo, WY 82834
(307) 684-9661

215 N. Lincoln Street
Casper, WY 82601
(307) 261-5485

489 East 5th South
P.O. Box 1175
Green River, WY 82935
(307) 875-6700

509 S. Federal Blvd.
P.O. Box 431
Riverton, WY 82501
(307) 856-3771

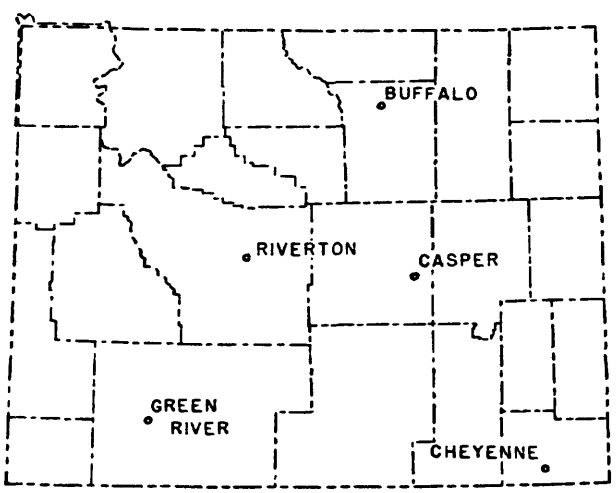


Figure 1.--Location of offices in Wyoming.

WYOMING DISTRICT ORGANIZATION CHART

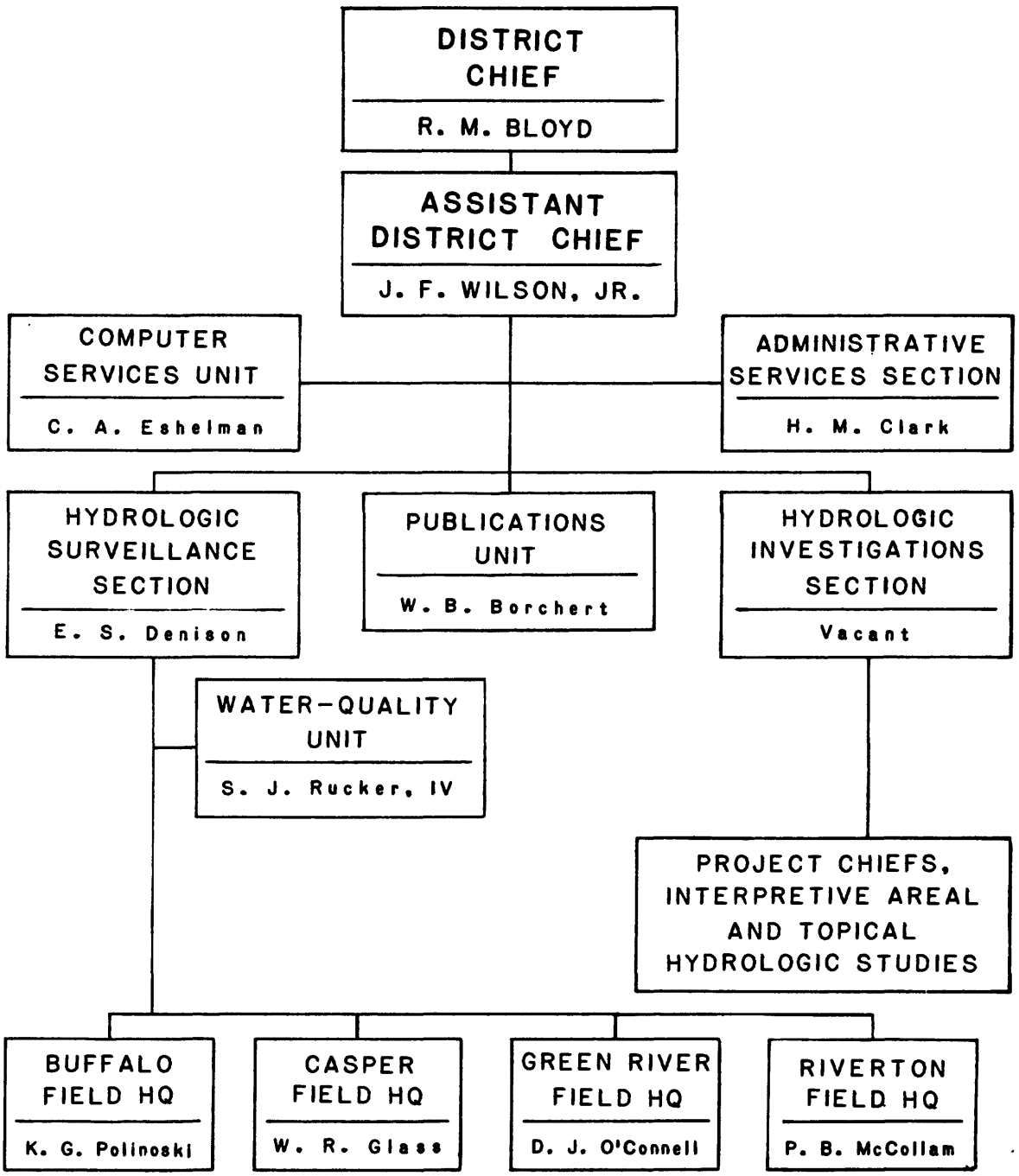


Figure 2.

WHERE TO OBTAIN GEOLOGICAL SURVEY PUBLICATIONS

Current releases are described in a monthly pamphlet, "New Publications of the Geological Survey," which may be obtained from:

Mailing List Unit
U.S. Geological Survey
582 National Center
Reston, VA 22092

Professional Papers, Bulletins, Water Supply Papers, Techniques of Water Resources Investigations, Earthquake Information Bulletin, and popular leaflets, pamphlets, and booklets may be purchased from:

Branch of Distribution
U.S. Geological Survey
604 South Pickett Street
Alexandria, VA 22304

Additional information is given in "A Guide to Obtaining Information from the U.S. Geological Survey, 1982," Geological Survey Circular 777, available without cost from the above address.

Open-file reports from Wyoming are available for inspection at the Wyoming District Office. Selected open-file reports may be purchased from:

Open-Files Services Section
U.S. Geological Survey
Box 25425, Federal Center
Lakewood, CO 80225

Flood-prone area maps may be obtained from the Wyoming District Office.

Hydrologic-Investigations Atlases and geologic, topographic, and other maps may be purchased from:

Western Distribution Branch
U.S. Geological Survey
Box 25286, Federal Center
Lakewood, CO 80225

Requests for miscellaneous water information and information on programs in other States may be referred to

Water Resources Division
U.S. Geological Survey
440 National Center
Reston, VA 22092

The Geological Survey National Center maintains a library with an extensive earth-sciences collection. Local libraries may obtain books, periodicals, and maps through interlibrary loan by writing to

U.S. Geological Survey Library
950 National Center
Reston, VA 22092
Telephone: (703) 860-6671

DATA-COLLECTION STATIONS

Lists of data-collection stations and the kinds of hydrologic data being collected at each are given as follows: Table 1, streamflow and reservoir stations; table 2, peak-flow partial-record stations; table 3, water-quality stations; table 4, sediment stations; and table 5, ground-water stations.

Identification numbers have been assigned to conform with the standard downstream order for listing stations within each hydrologic region. The location of each data stations is given in the tables. In table 2, ground-water stations are listed in numerical order by counties.

Abbreviations and codes are used to conserve space in the tables. Explanations of the abbreviations and codes precede each table.

The locations of surface-water data stations are shown in figures 3-7. The locations of ground-water stations are shown in figures 8-11.

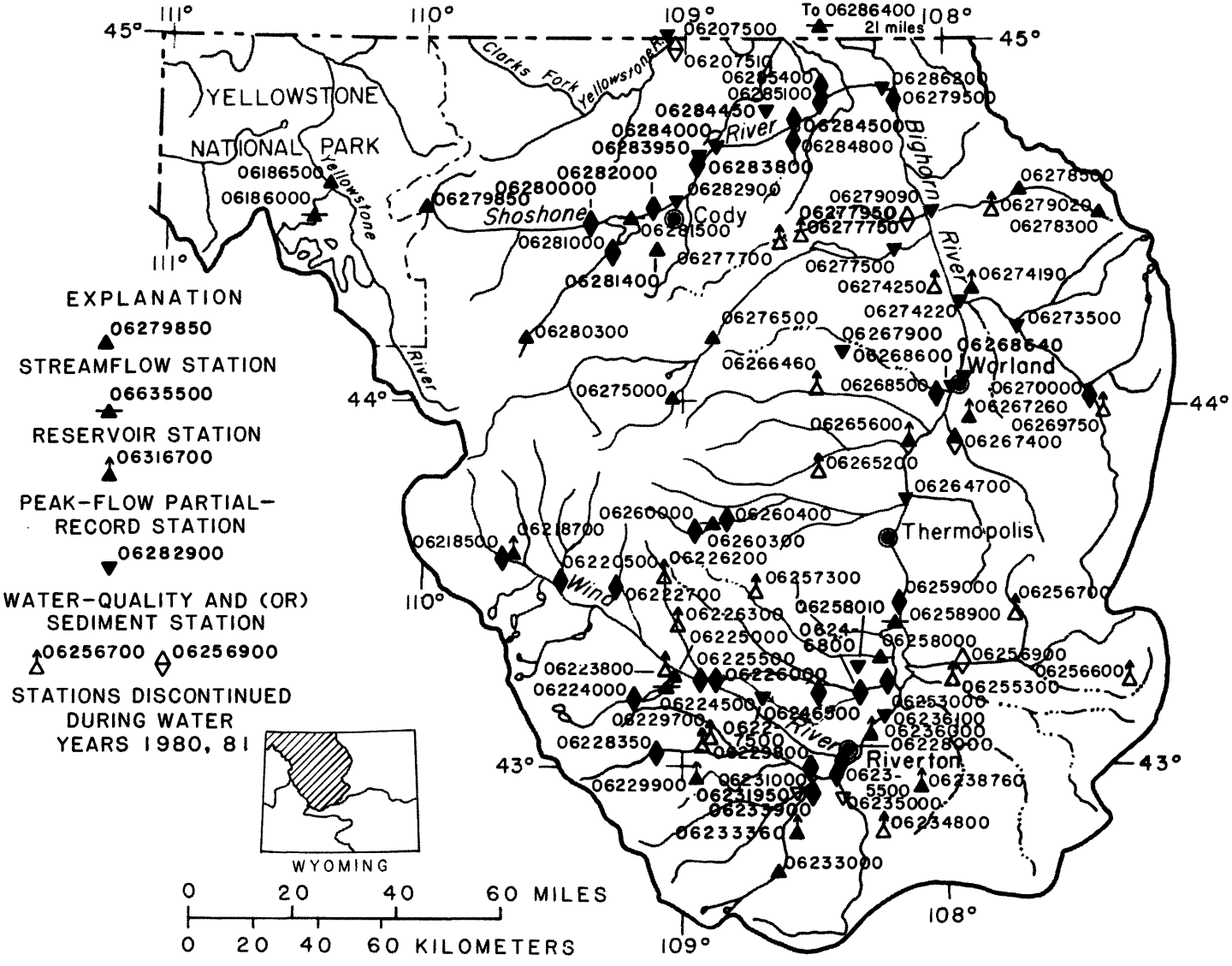


Figure 3.--Location of surface-water data stations in the Yellowstone River, Clarks Fork Yellowstone River, and Bighorn River basins.

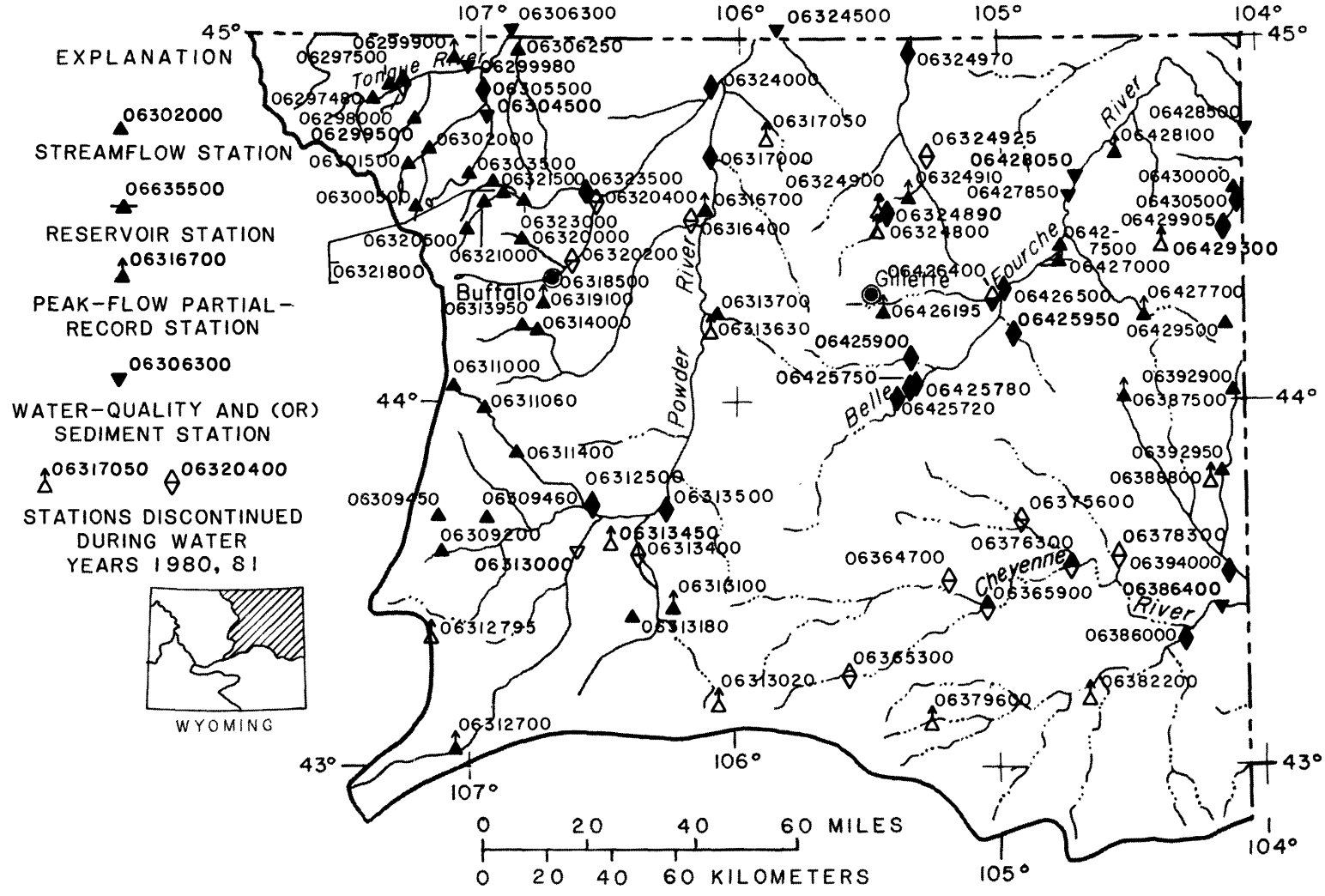


Figure 4.--Location of surface-water stations in the Tongue River, Powder River, Belle Fourche River, and Cheyenne River basins.

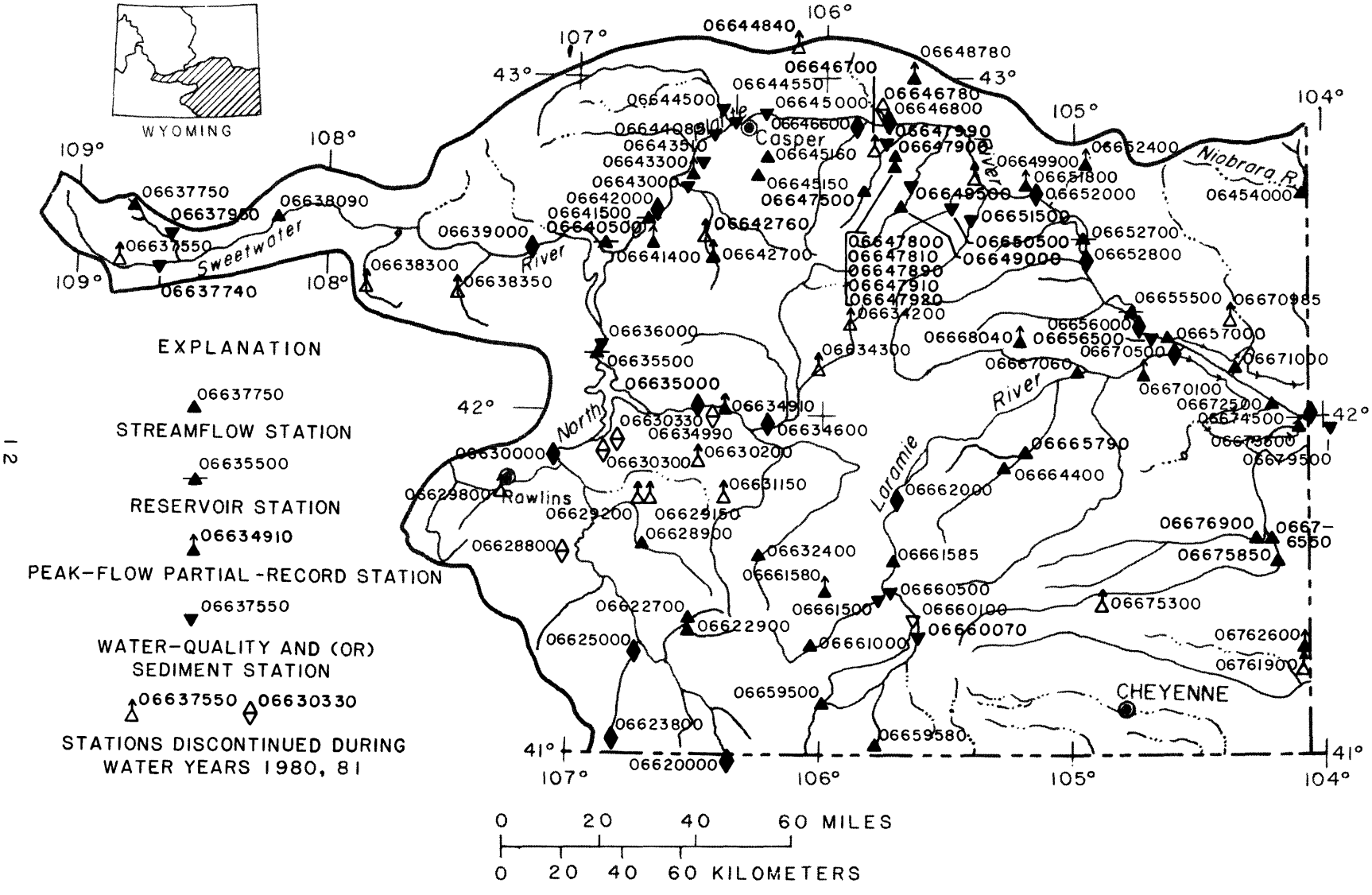


Figure 5.--Location of surface-water data stations in the Niobrara River and Platte River basins.

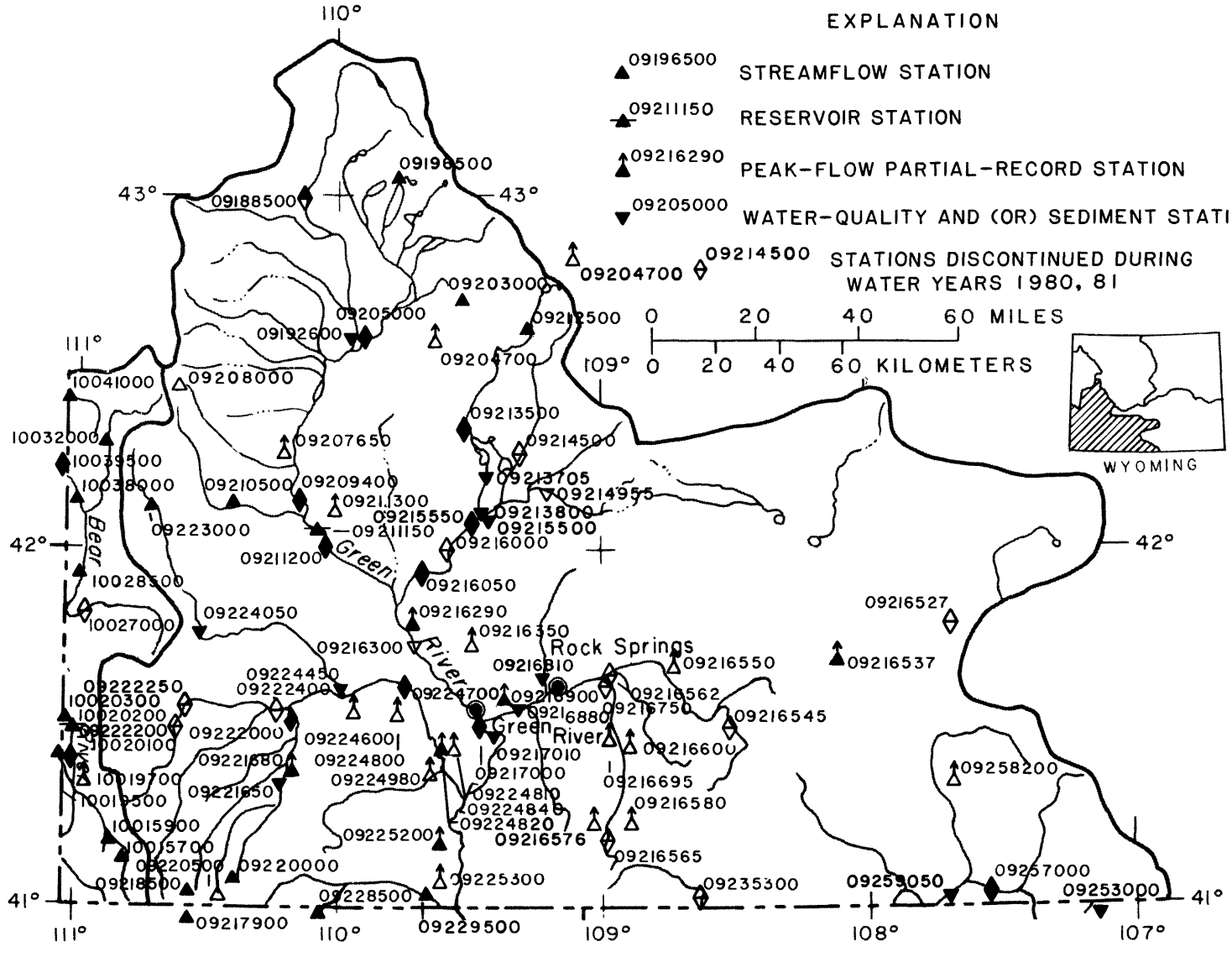


Figure 6.--Location of surface-water data stations in the Green River and Bear River basins.

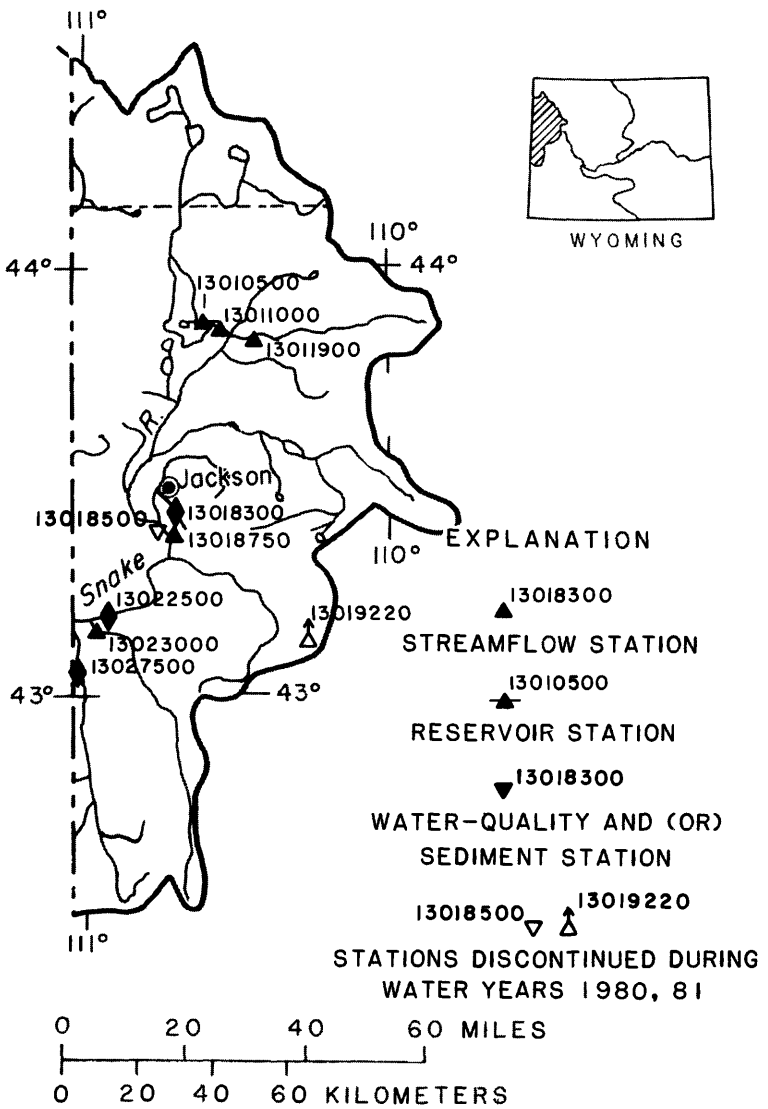


Figure 7.--Location of surface-water data stations in the Snake River basin.

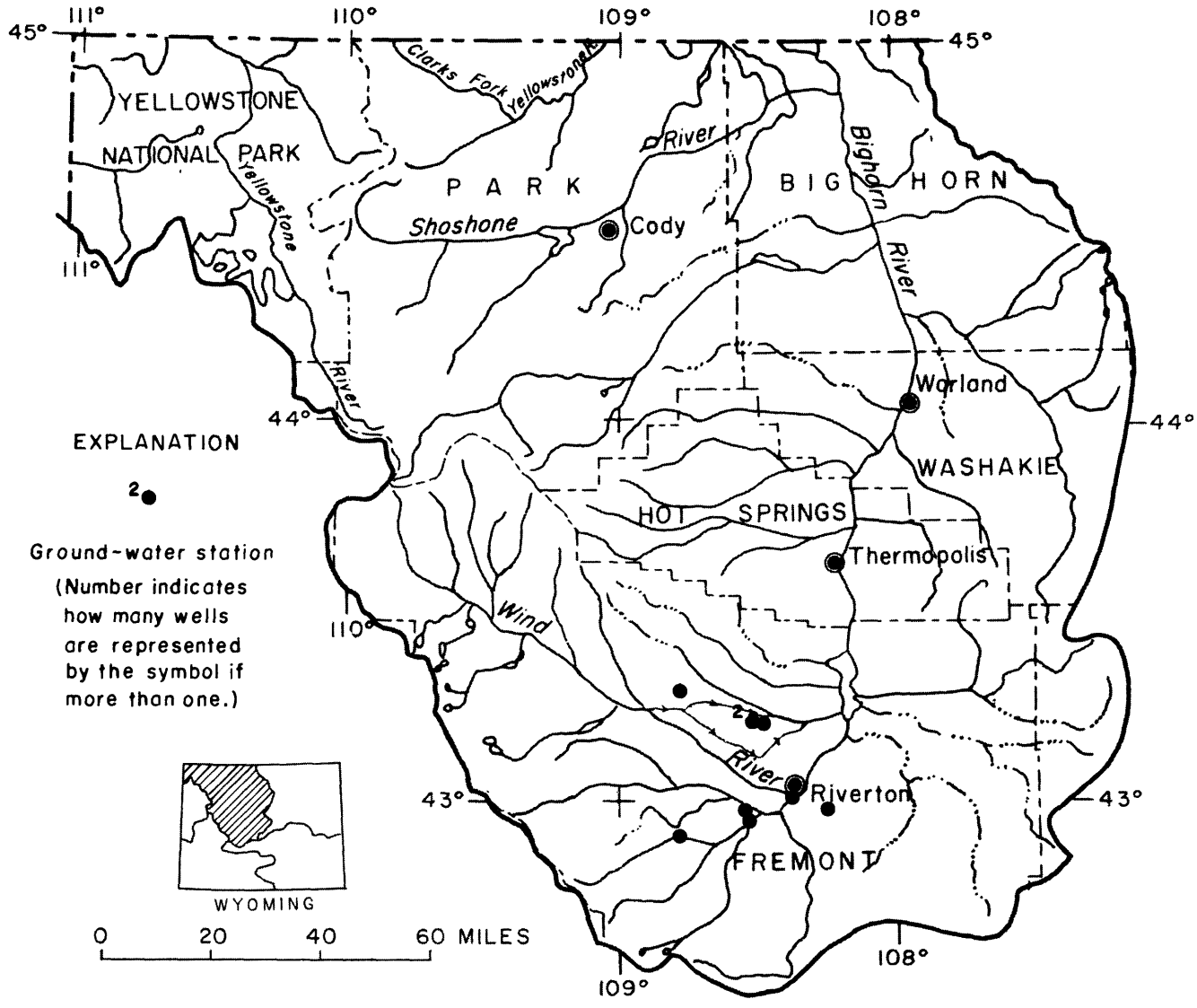


Figure 8 .--Location of ground-water stations in the Yellowstone River, Clarks Fork Yellowstone River, and Bighorn River basins.

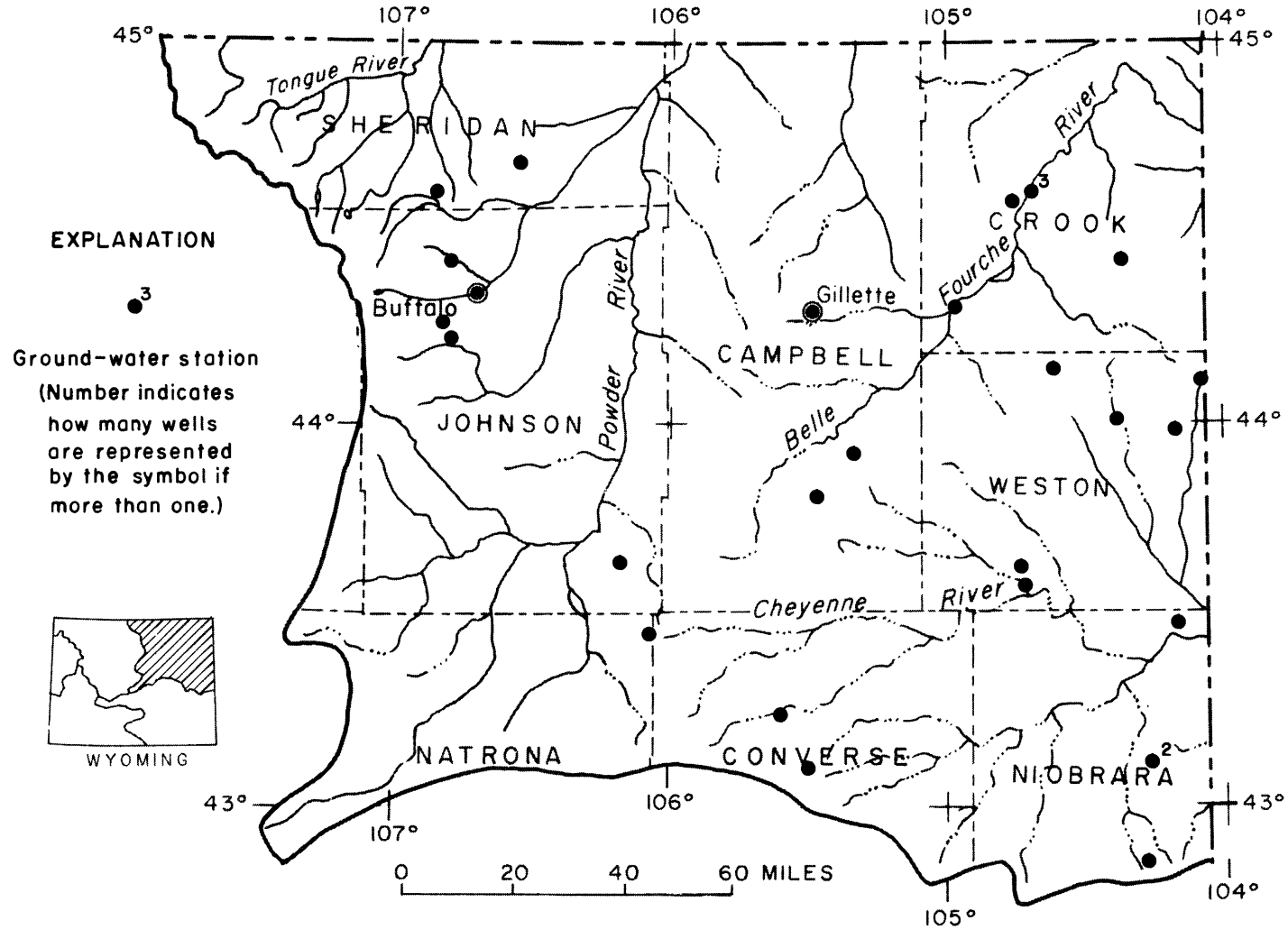


Figure 9.--Location of ground-water stations in the Tongue River, Powder River, Belle Fourche River, and Cheyenne River basins.

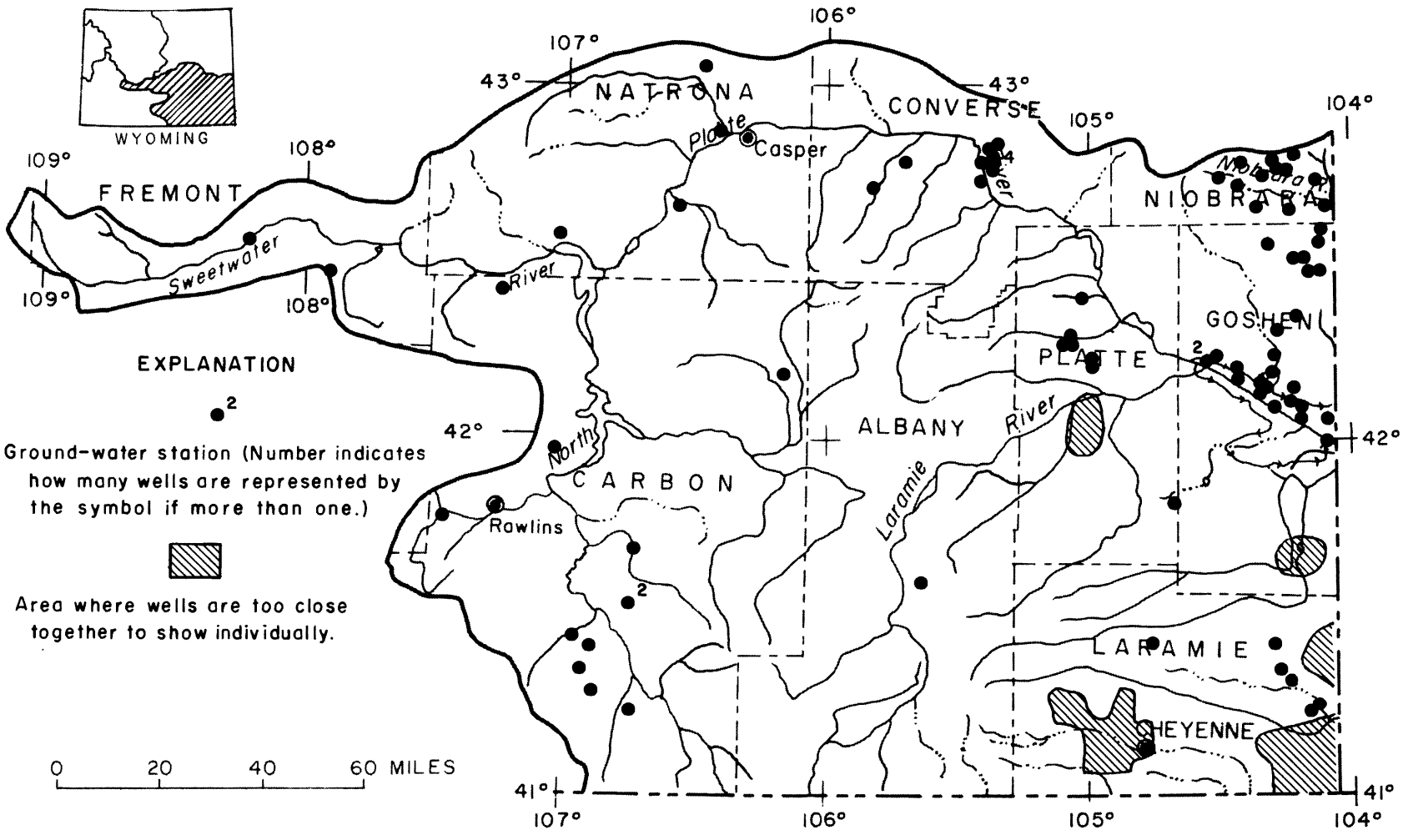


Figure 10.--Location of ground-water stations in the Niobrara River and Platte River basins.

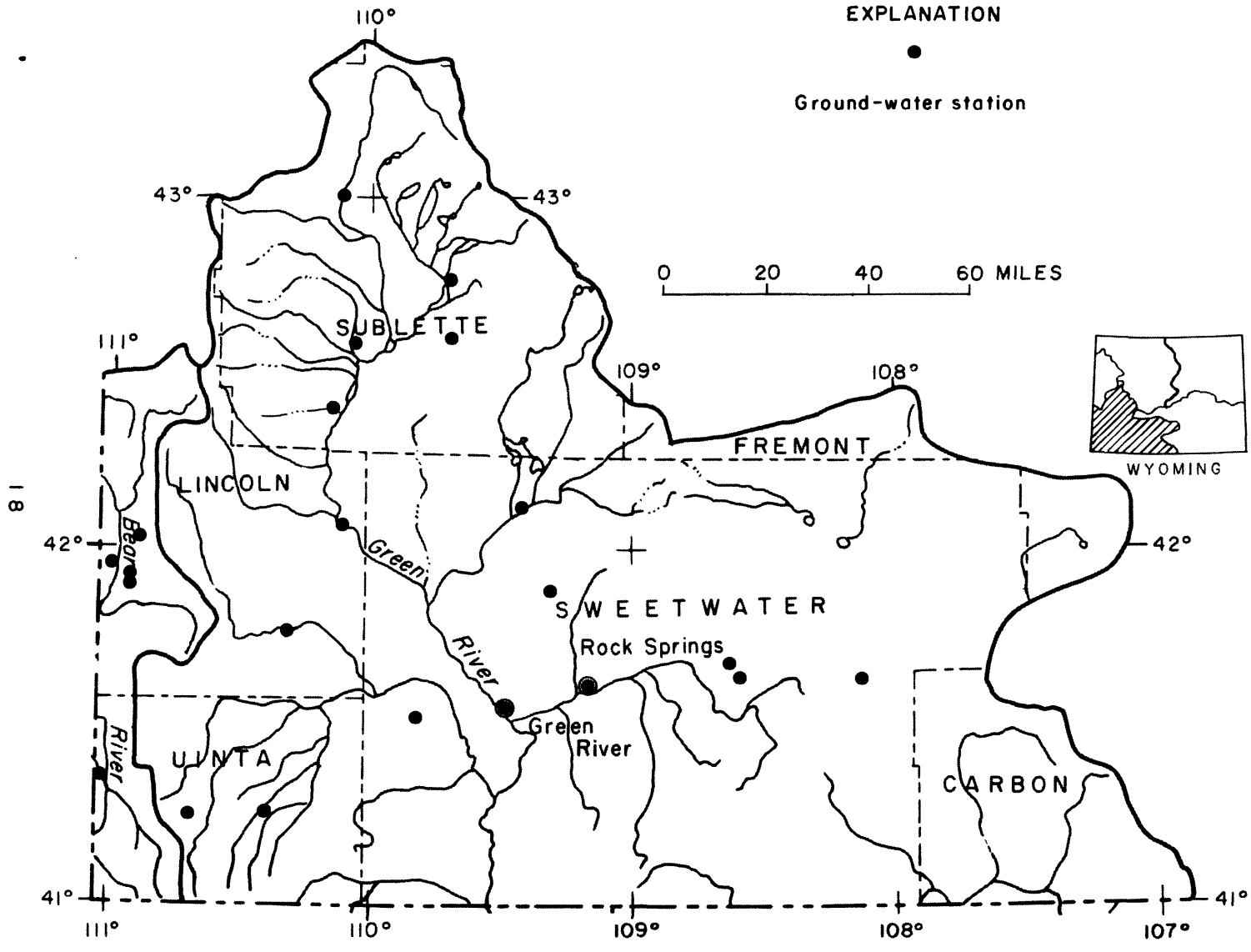


Figure 11.--Location of ground-water stations in the Green River and Bear River basins.

Streamflow and reservoir stations

Explanation of abbreviations and codes used in table 1.

Purpose: B, bench-mark or long-term-trend station
C, current-purpose station such as accounting, operation, forecasting, disposal, water quality, compact or legal, research or special study
H, hydrologic station
P, principal-stream station
R, regulated station

Period of Record: The dates given are the calendar years in which records began or ended. Breaks of less than a year are not shown.

Location: SE, section
TSP, township
RNGE, range

Gage Equipment: D, digital recorder
G, graphic recorder
M, manometer gage
O, observer record only
S, staff gage
T, pressure-transducer gage
W, well gage

Current Record Type: S, seasonal operation (no winter records)
Y, full-year operation

Field Office:
B, Buffalo
C, Casper
CF, Cheyenne Field Unit
CO, Colorado District
CT, Contractor
GR, Green River
I, Idaho District
M, Montana District
NE, Nebraska District
R, Riverton
S, Wyoming State Engineer
SD, South Dakota District
W, Worland
U, Utah District

Funding Agency:
BIA, Bureau of Indian Affairs
BLM, Bureau of Land Management
BRUC, Bureau of Reclamation, Colorado Region
BRUM, Bureau of Reclamation, Upper Missouri Region
CE, Corps of Engineers
DEPD, Wyoming Department of Economic Planning and Development
MRB, Geological Survey, Missouri River Basin Program
NPS, National Park Service
USE, Utah State Engineer
USGS, Geological Survey, Federal Program
WDEQ, Wyoming Department of Environmental Quality
WSE, Wyoming State Engineer

Remarks: USBR, U.S. Bureau of Reclamation

Table 1. Streamflow and Reservoir Stations

STATION NUMBER	STATION NAME	PURPOSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
					SE	TSP	RNGE					
YELLOWSTONE RIVER BASIN												
06186000	YELLOWSTONE LAKE AT BRIDGE BAY, YNP	P	1006	1921-	-	-	-	O	Y	M	-	
06186500	YELLOWSTONE R AT YELLOWSTONE LAKE OUTLET, YNP	P	1006	1922-25, 1926-	-	-	-	GW	Y	M	-	
*#06207510	BIG SAND COULEE AT WYOMING-MONTANA STATE LINE	CR	134	1973-81	32	9S	22E	GM	S	M	BLM	DISC. 9/30/81
*06218500	WIND RIVER NEAR DUBOIS	C	232	1945-	25	42N	108W	DW	Y	R	WSE	
*#06220500	EAST FORK WIND RIVER NEAR DUBOIS	C	427	1950-57, 1975-	34	6N	6W	GM	Y	R	MRB	
*06222700	CROW CREEK NEAR TIPPERARY	H	30.2	1962-	20	7N	4W	GM	Y	R	MRB	
*06224000	BULL LAKE CREEK ABOVE BULL LAKE	H	187	1941-53, 1966-	2	2N	4W	DW	Y	R	MRB	
06224500	BULL LAKE NEAR LENORE	C	210	1938-	30	3N	2W	-	-	-	MRB, BRUM	FURNISHED BY USBR
06225000	BULL LAKE CREEK NEAR LENORE	C	213	1918-	17	3N	2W	DGM	Y	R	BRUM	
#06225500	WIND RIVER NEAR CROWHEART	CP	1891	1945-	16	3N	2W	DGW	Y	R	BRUM	
#06226000	WYOMING CANAL NEAR LENORE	CR	-	1941-45, 1949-	17	3N	1W	DW	S	R	BRUM	APR THRU OCT
*06228000	WIND RIVER AT RIVERTON	CR	2309	1906-08, 1911-	2	1S	4E	DGM	Y	R	CE	
*06228350	SF LITTLE WIND R AB WASHAKIE RE NR FT WASHAKIE	H	90.3	1976-	18	1S	2W	DW	Y	R	BIA	
*06231000	LITTLE WIND RIVER ABOVE ARAPAHOE	C	660	1979-	23	1S	3E	DM	Y	R	BIA	
06233000	LITTLE POPO AGIE RIVER NEAR LANDER	C	125	1946-	27	32N	99W	GW	S	S	WSE	
*06233900	POPO AGIE RIVER NEAR ARAPAHOE	C	-	1979-	27	1S	3E	DM	Y	R	BIA	
*06235500	LITTLE WIND RIVER NEAR RIVERTON	CR	1904	1941-	11	1S	4E	DW	Y	R	CE	
*06246500	OCEAN DRAIN AT OCEAN LAKE OUTLET, NR PAVILLION	C		1948-53, 1978-				DW	Y	R	MRB	
#06246800	OCEAN DRAIN NEAR MIDVALE	C	-	1979-	25	3N	3E	DW	Y	R	BRUM	
*#06253000	FIVEMILE CREEK NEAR SHOSHONI	C	418	1941-42, 1948-	19	3N	6E	GM	Y	R	BRUM	
*#06256900	DRY CREEK NEAR BONNEVILLE	CH	52.6	1965-81	8	38N	92W	GW	Y	R	BLM	DISC. 9/30/81
06258000	MUDDY CREEK NEAR SHOSHONI	C	332	1949-68, 1972-	34	4N	5E	GM	Y	R	BRUM	
06258900	BOYSEN RESERVOIR	C	7700	1951-	16	5N	6E	-	-	-	MRB	FURNISHED BY USBR
*#06259000	WIND RIVER BELOW BOYSEN RESERVOIR	CR	7701	1951-	9	5N	6E	DM	Y	R	BRUM	
*06260000	SOUTH FORK OWL CREEK NEAR ANCHOR	CH	85.5	1932, 1939-43, 1959-	28	43N	100W	GM	Y	W	BRUM	
06260300	ANCHOR RESERVOIR	C	131	1960-	26	43N	100W	-	-	-	MRB	FURNISHED BY USBR
*06260400	SOUTH FORK OWL CREEK BELOW ANCHOR RESERVOIR	CR	131	1959-	25	43N	100W	GW	Y	W	BRUM	
*#06267400	EAST FORK NOWATER CREEK NEAR COLTER	H	149	1971-	31	46N	92W	GM	Y	W	WSE	

* Also water-quality station.
\# Also sediment station.

Table 1. Streamflow and Reservoir Stations (continued)

STATION NUMBER	STATION NAME	PURPOSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
					SE	TSP	RNGE					
YELLOWSTONE RIVER BASIN (continued)												
#06268500	FIFTEENMILE CREEK NEAR WORLAND	C	518	1951-72, 1978-	27	47N	93W	GM	Y	W	WDEQ	
*#06270000	NOWOOD RIVER NEAR TEN SLEEP	P	803	1938-43, 1950-55, 1972-	27	47N	88W	DGM	Y	W	WSE	
06275000	WOOD RIVER AT SUNSHINE	CH	194	1945-	15	47N	101W	GM	Y	W	WSE	
06276500	GREYBULL RIVER AT MEETEETSE	CP	681	1897, 1903, 1920-	4	48N	100W	DGM	S	S	WSE	
*#06277950	DRY CREEK NEAR GREYBULL	C		1979-81	7	52N	94W		Y	W	BLM	DISC. 9/30/81
06278300	SHELL CREEK ABOVE SHELL RESERVOIR	BCH	23.1	1956-	1	52N	88W	DW	Y	W	WSE	
06278500	SHELL CREEK NEAR SHELL	CH	145	1940-	17	53N	90W	GW	S	S	WSE	
*#06279500	BIGHORN RIVER AT KANE	CR	15765	1928-	9	55N	94W	GM	Y	W	MRB	
06279850	MIDDLE CREEK AT EAST ENTRANCE, YNP	C	32.6	1981-	-	-	-	DM	Y	W	NPS	
*06280000	NORTH FORK SHOSHONE RIVER NEAR WAPITI	CH	775	1921-26, 1979-	15	52N	104W	GM	Y	W	MRB	
06280300	SOUTH FORK SHOSHONE RIVER NEAR VALLEY	BH	297	1956-	24	49N	106W	DW	Y	W	USGS	
*06281000	SOUTH FORK SHOSHONE RIVER AB BUFFALO BILL RES	P	585	1903, 1905-08, 1921-26, 1973-	33	52N	103W	GM	Y	W	WSE	
06281400	DIAMOND CREEK NEAR CODY	C	7.34	1981-	29	52N	102W	S	Y	W	MRB	
06281500	BUFFALO BILL RESERVOIR	C	1498	1909-	12	52N	103W	-	-	-	MRB	FURNISHED BY USBR
*06282000	SHOSHONE RIVER BELOW BUFFALO BILL RESERVOIR	CR	1538	1921-	3	52N	102W	DW	Y	W	BRUM	
#06283800	SHOSHONE RIVER AB WILLWOOD DAM, NR WILLWOOD	CR	1830	1979-	19	54N	100W	GM	Y	W	BRUM	
*06284500	BITTER CREEK NEAR GARLAND	C	80.5	1950-53, 1957-60, 1968-	75	5N	97W	DW	Y	W	MRB	
*06284800	WHISTLE CREEK NEAR GARLAND	C	101	1958-60, 1968-	30	55N	97W	GM	Y	W	MRB	
*#06285100	SHOSHONE RIVER NEAR LOVELL	CR	2350	1966-	16	56N	96W	GM	Y	W	MRB	
*06285400	SAGE CREEK AT SIDON CANAL, NEAR DEAVER	C	341	1958-60, 1968-	34	57N	97W	GM	Y	W	MRB	
06286400	BIGHORN LAKE NEAR ST. XAVIER, MT	C	19626	1965-	18	6S	31E	-	-	-	MRB	FURNISHED BY USBR
06297500	HIGHLINE DITCH NEAR DAYTON	C	-	1919-23, 1940-	11	56N	87W	GW	S	B	WSE	
*06298000	TONGUE RIVER NEAR DAYTON	BCH	204	1918-29, 1940-	11	56N	87W	DW	Y	B	WSE	
06299500	WOLF CREEK AT WOLF	CH	37.8	1945-	4	55N	86W	GW	S	S	WSE	

* Also water-quality station.
\# Also sediment station.

Table 1. Streamflow and Reservoir Stations (continued)

STATION NUMBER	STATION NAME	PUR-POSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION SE	LOCATION TSP	LOCATION RNGE	GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
YELLOWSTONE RIVER BASIN (continued)												
06300500	EAST FORK BIG GOOSE CREEK NEAR BIG HORN	CH	20.1	1953-	28	53N	86W	GM	S	S	WSE	
06301500	WEST FORK BIG GOOSE CREEK NEAR BIG HORN	C	24.4	1953-	30	54N	86W	GM	S	S	WSE	
06302000	BIG GOOSE CREEK NEAR SHERIDAN	C	120	1929-	35	55N	86W	GW	S	S	WSE	
06303500	LITTLE GOOSE CREEK IN CANYON, NEAR BIG HORN	CH	51.6	1941-	1	53N	85W	GW	S	S	WSE	
*#06305500	GOOSE CREEK BELOW SHERIDAN	C	392	1941-	15	56N	84W	DW	Y	B	WSE	
06309200	MIDDLE FORK POWDER RIVER NEAR BARNUM	H	45.2	1961-	26	42N	86W	GM	Y	C	WSE	
06309450	BEAVER CREEK BELOW BAYER CREEK, NEAR BARNUM	C	10.9	1974-	28	43N	85W	GW	Y	C	WSE	
06309460	BEAVER CREEK AB WHITE PANTHER DITCH, NR BARNUM	C	24.2	1974-	16	43N	84W	GW	Y	C	WSE	
06311000	NORTH FORK POWDER RIVER NEAR HAZELTON	BCH	24.5	1946-	21	47N	85W	GW	Y	B	WSE	
06311060	N FORK POWDER RIVER BL BULL CREEK, NR HAZELTON	C	32.3	1974-	25	47N	85W	GM	Y	B	WSE	
06311400	N FK POWDER RIVER BL PASS CREEK, NR MAYOWORTH	CH	100	1974-	36	46N	84W	GM	Y	B	WSE	
06313180	DUGOUT CREEK TRIBUTARY NEAR MIDWEST	H	.8	1974-	14	40N	80W	GW	Y	C	USGS	
*#06313400	SALT CREEK NEAR SUSSEX	C	769	1976-81	8	42N	79W	GM	Y	C	USGS	DISC. 9/30/81
*#06313500	POWDER RIVER AT SUSSEX	CP	3090	1938-40, 1950-57, 1977-	13	43N	79W	DGM	Y	C	USGS	
06313700	DEAD HORSE CREEK NEAR BUFFALO	H	151	1971-	15	49N	77W	GM	Y	B	WSE	
06313950	N F CRAZY WOMAN CK BL POLE CREEK, NR BUFFALO	CH	43.4	1973-	28	49N	83W	GM	Y	B	DEPD	
06314000	NORTH FORK CRAZY WOMAN CREEK NEAR BUFFALO	CH	44.9	1942-49, 1973-	27	49N	83W	GM	Y	B	DEPD	AUX. WELL GAGE
*#06316400	CRAZY WOMAN CREEK AT UPPER STATION, NR ARVADA	CP	945	1963-70, 1977-81	18	52N	77W	DGW	Y	CT	USGS	DISC. 9/30/81
*06317000	POWDER RIVER AT ARVADA	CP	6050	1919-	21	54N	77W	GM	Y	B	WSE	
06318500	CLEAR CREEK NEAR BUFFALO	C	120	1894, 1896-99, 1917-27, 1938-	6	50N	82W	GW	Y	B	DEPD	
06320000	ROCK CREEK NEAR BUFFALO	CR	60.0	1941-	29	52N	83W	GW	S	S	WSE	
*#06320200	CLEAR CREEK BELOW ROCK CREEK, NEAR BUFFALO	C	322	1975-81	30	51N	81W	GW	Y	B	USGS	DISC. 9/30/81
*#06320400	CLEAR CREEK AT UCROSS	C	409	1976-81	19	53N	80W	GM	Y	B	USGS	DISC. 9/30/81
06320500	SOUTH PINEY CREEK AT WILLOW PARK	CR	33.6	1945-57, 1959-	24	52N	85W	GW	S	S	WSE	
06321500	NORTH PINEY CREEK NEAR STORY	CH	36.8	1951-	12	53N	84W	DW	Y	B	DEPD	
06323000	PINEY CREEK AT KEARNY	CR	118	1902-06, 1910-17, 1919-23, 1940-	26	53N	83W	GW	Y	S	WSE	
06323500	PINEY CREEK AT UCROSS	CR	267	1917-23, 1950-	18	53N	80W	GW	Y	B	DEPD	

* Also water-quality station.
\# Also sediment station.

Table 1. Streamflow and Reservoir Stations (continued)

STATION NUMBER	STATION NAME	PUR-POSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION SE	TSP	RNGE	GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
YELLOWSTONE RIVER BASIN (continued)												
*#06324000	CLEAR CREEK NEAR ARVADA	C	1110	1915-19, 1928-29, 1939-	36	57N	77W	DW	Y	B	DEPD	
*#06324500	POWDER RIVER AT MOORHEAD, MT	-	8080	1929-72, 1974-	8	9N	48W	GW	Y	M	-	
*#06324890	LITTLE POWDER R BELOW CORRAL C NEAR WESTON	CP	204	1977-	12	52N	72W	DGM	Y	B	USGS	
*#06324925	LITTLE POWDER RIVER NEAR WESTON	CP	540	1977-81	19	54N	70W	DGM	Y	CT	USGS	DISC. 9/30/81
*#06324970	LITTLE POWDER RIVER AB DRY CREEK, NEAR WESTON	P	1235	1972-	13	57N	71W	DGM	Y	B	WSE	
CHEYENNE RIVER BASIN												
*#06364700	ANTELOPE CREEK NEAR TECKLA	CP	959	1977-81	35	41N	70W	DGM	Y	CT	USGS	DISC. 9/30/81
*#06365300	DRY FORK CHEYENNE RIVER NEAR BILL	C	128	1976-81	31	38N	73W	GM	Y	C	BLM	DISC. 9/30/81
*#06365900	CHEYENNE RIVER NEAR DULL CENTER	C	1527	1976-81	20	40N	68W	DGM	Y	CT	USGS	DISC. 9/30/81
*#06375600	LITTLE THUNDER CREEK NEAR HAMPSHIRE	CP	234	1977-81	33	43N	67W	DGM	Y	CT	USGS	DISC. 9/30/81
06376300	BLACK THUNDER CREEK NEAR HAMPSHIRE	H	535	1972-	31	42N	65W	DGM	Y	C	WSE	
*#06378300	LODGEPOLE CREEK NEAR HAMPSHIRE	CP	354	1977-81	5	41N	64W	DGM	Y	CT	USGS	DISC. 9/30/81
*#06386000	LANCE CREEK NEAR RIVERVIEW	P	2070	1948-54, 1956-	14	39N	62W	GMW	Y	C	USGS	
06392900	BEAVER CREEK AT MALLO CAMP, NEAR FOUR CORNERS	C	10.3	1974-	4	47N	60W	GM	Y	SD	USGS	
06392950	STOCKADE BEAVER CREEK NEAR NEWCASTLE	C	107	1974-	19	45N	60W	GM	Y	SD	USGS	
*06394000	BEAVER CREEK NEAR NEWCASTLE	BP	1320	1943-	18	41N	60W	DGW	Y	C	USGS	
*#06425720	BELLE FOURCHE RIV BL RATTLESNAKE CR, NR PINEY	C	495	1975-	9	46N	71W	GM	Y	B	USGS	
*#06425750	COAL CREEK NEAR PINEY	C	-	1980-	12	46N	71W	DGM	Y	B	USGS	
*#06425780	BELLE FOURCHE RIVER AB DRY CREEK, NEAR PINEY	C	594	1975-	25	47N	71W	GM	Y	B	USGS	
*#06425900	CABALLO CREEK AT MOUTH, NEAR PINEY	CR	260	1977-	4	47N	70W	DGM	Y	B	USGS	
*#06425950	RAVEN CREEK NEAR MOORCROFT	CH	76	1977-	1	48N	69W	DGM	Y	B	USGS	
*#06426400	DONKEY CREEK NEAR MOORCROFT	CR	246	1977-81	30	50N	68W	DGM	Y	CT	USGS	DISC. 9/30/81
*#06426500	BELLE FOURCHE RIVER BELOW MOORCROFT	C	1670	1943-70, 1975-	24	50N	68W	GM	Y	B	USGS	
06427000	KEYHOLE RESERVOIR NEAR MOORCROFT	C	2000	1952-	27	51N	66W	-	-	-	MRB	FURNISHED BY USBR
06427500	BELLE FOURCHE RIVER BELOW KEYHOLE RESERVOIR	CR	2000	1951-	21	51N	66W	GM	Y	C	BRUM	
06429500	COLD SPRINGS CREEK AT BUCKHORN	C	19.0	1974-	9	48N	60W	GM	Y	SD	USGS	
*06429905	SAND CREEK NEAR RANCH A, NEAR BEULAH	C	267	1976-	5	52N	60W	GM	Y	SD	USGS	
06430000	MURRAY DITCH AT WYOMING-SOUTH DAKOTA ST LINE	C	-	1954-	7	7N	1E	GW	Y	SD	WSE	
#06430500	REDWATER CR AT WYOMING-SOUTH DAKOTA ST LINE	CH	471	1929-31, 1936-37, 1954-	18	7N	1E	GW	Y	SD	WSE	

* Also water-quality station.
\# Also sediment station.

Table 1. Streamflow and Reservoir Stations (continued)

STATION NUMBER	STATION NAME	PUR-POSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
					SE	TSP	RNGE					
NIOBRARA RIVER BASIN												
06454000	NIOBRARA RIVER AT WYOMING-NEBRASKA STATE LINE	BCH	450	1955-	15	31N	60W	DW	Y	N	-	
PLATTE RIVER BASIN												
*06620000	NORTH PLATTE RIVER AT NORTHGATE, CO	H	1431	1904, 1915-	11	11N	80W	DW	Y	CF	USGS	
06622700	NORTH BRUSH CREEK NEAR SARATOGA	H	37.4	1960-	8	16N	81W	GW	Y	CF	WSE	
06622900	SOUTH BRUSH CREEK NEAR SARATOGA	C	22.8	1960-74, 1976-	20	16N	81W	GW	S	S	WSE	
*#06623800	ENCAMPMENT R AB HOG PARK CR, NR ENCAMPMENT	BH	72.7	1964-	10	12N	84W	GM	Y	CF	USGS	HYDRO. B.M. STA.
*06625000	ENCAMPMENT RIVER AT MOUTH, NEAR ENCAMPMENT	CH	265	1940-	3	15N	83W	DW	Y	CF	WSE	
*#06628800	SAGE CREEK NEAR SARATOGA	C	263	1973-81	32	19N	85W	GM	S	CF	BLM	DISC. 9/30/81
06628900	PASS CREEK NEAR ELK MOUNTAIN	CH	91.5	1957-	27	19N	82W	GM	Y	CF	WSE	
*06630000	N PLATTE RIVER AB SEMINOE RES, NR SINCLAIR	CP	4175	1939-	13	22N	86W	GW	Y	CF	WSE	
*#06630300	BIG DITCH NEAR COYOTE SPRINGS	C	110	1975-81	30	23N	83W	GM	Y	CF	BLM	DISC. 9/30/81
*#06630330	NORTH DITCH NEAR COYOTE SPRINGS	C	22.6	1976-81	19	23N	83E	GM	Y	CF	BLM	DISC. 9/30/81
06632400	ROCK CR AB KING CANYON CANAL, NR ARLINGTON	BCH	62.9	1965-	25	19N	79W	GM	Y	CF,S	WSE	
*#06634600	LITTLE MEDICINE BOW RIVER NEAR MEDICINE BOW	P	963	1973-	22	23N	78W	GW	Y	CF	WSE	
*#06634990	HANNA DRAW NEAR HANNA	C	21.6	1975-81	34	24N	81W	GM	Y	CF	BLM	DISC. 9/30/81
*#06635000	MEDICINE BOW R AB SEMINOE RESERVOIR, NR HANNA	CP	2338	1939-	34	24N	81W	GW	Y	CF	WSE	
06635500	SEMINOE RESERVOIR NEAR LEO	C	7230	1939-	8	25N	84W	-	-	-	MRB	FURNISHED BY USBR
06637750	ROCK CREEK ABOVE ROCK CREEK RESERVOIR	CH	9.2	1962-	27	30N	100W	DGW	Y	R	WSE	
06638090	SWEETWATER RIVER NEAR SWEETWATER STATION	P	849	1973-	12	29N	96W	GM	Y	R	WSE	
*#06639000	SWEETWATER RIVER NEAR ALCOVA	CP	2327	1913-24, 1938-	25	29N	87W	GW	S	S	WSE	
06640500	PATHFINDER RESERVOIR NEAR ALCOVA	C	10711	1909-	24	29N	84W	-	-	-	MRB	FURNISHED BY USBR
06641500	ALCOVA RESERVOIR AT ALCOVA	C	10766	1938-	24	30N	83W	-	-	-	MRB	FURNISHED BY USBR
*#06642000	NORTH PLATTE RIVER AT ALCOVA	CR	10812	1904-05, 1934-	17	30N	82W	DW	Y	C	WSE	
*06646600	DEER CR BELOW MILLAR WASTEWAY, AT GLENROCK	CH	213	1961-	4	33N	75W	GM	Y	C,S	WSE	
*#06646780	SAND CREEK NEAR GLENROCK	CH	79.9	1977-81	5	33N	74W	DGM	Y	C	USGS	DISC. 9/30/81
*06646800	NORTH PLATTE RIVER NEAR GLENROCK	CR	13538	1959-	17	33N	74W	DW	Y	C,S	WSE	
06647500	BOX ELDER CREEK AT BOXELDER	H	63.0	1946-51, 1961-67, 1971-	32	31N	75W	GW	Y	C	WSE	
06647800	BOX ELDER CREEK NEAR BOXELDER	C	136	1981-	24	32N	75W	GM	Y	C	DEPD	
06647810	BOX ELDER CR AT CONVERSE CO. PK, NR CAREYHURST	C	138	1981-	6	32N	74W	DW	Y	C	DEPD	
06647890	LITTLE BOX ELDER CREEK NEAR CAREYHURST	C	7.18	1974-	8	32N	74W	DW	Y	C	DEPD	
06647900	L BOX ELDER C AT L BOX ELDER CAVE, N CAREYHURST	C	8.47	1974-	9	32N	74W	GW	Y	C	DEPD	

* Also water-quality station.
\# Also sediment station.

Table 1. Streamflow and Reservoir Stations (continued)

STATION NUMBER	STATION NAME	PURPOSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION SE	LOCATION TSP	LOCATION RNGE	GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
PLATTE RIVER BASIN (continued)												
06647910	DOUGLAS SPRING NEAR CAREYHURST	C	-	1981-				DW	Y	C	DEPD	
06647920	COTTONWOOD CREEK NEAR CAREYHURST	C	2.33	1981-				DW	Y	C	DEPD	
06649000	LAPRELE CREEK NEAR DOUGLAS	C	135	1919-	5	31N	73W	GW	S	S	WSE	
*#06652000	NORTH PLATTE RIVER AT ORIN	CR	14888	1895-99, 1917-18, 1924, 1958-	17	31N	69W	DW	Y	C	WSE	
06652700	GLENDO RESERVOIR NEAR GLENDO	C	15545	1957-	24	29N	68W	-	-	-	MRB	FURNISHED BY USBR
*06652800	NORTH PLATTE RIVER BELOW GLENDO RESERVOIR	CR	15548	1957-	30	29N	67W	DW	Y	CF,S	WSE	
06655500	GUERNSEY RESERVOIR NEAR GUERNSEY	C	16224	1928-	27	27N	66W	-	-	-	MRB	FURNISHED BY USBR
*06656000	NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR	CR	16237	1900-	27	27N	66W	DMW	Y	CF,S	WSE	
06657000	NORTH PLATTE R BELOW WHALEN DIVERSION DAM	CR	16425	1909-	12	26N	65W	GM	Y	CF,S	WSE	
06659500	LARAMIE RIVER AND PIONEER CANAL NEAR WOODS	CR	434	1912-24, 1926-27, 1931-	36	14N	77W	GW	S	S	WSE	
06659580	SAND CREEK AT COLORADO-WYOMING STATE LINE	C	29.2	1968-	24	12N	75W	GW	S	S	WSE	
06661000	LITTLE LARAMIE RIVER NEAR FILMORE	CH	157	1902-03, 1911-26, 1932-	4	15N	77W	GW	S	S	WSE	
06661585	LARAMIE RIVER NEAR BOSLER	CR	1790	1972-	10	18N	74W	GW	Y	S	WSE	
06662000	LARAMIE RIVER NEAR LOOKOUT	CR	2174	1912-17, 1921-27, 1932-	27	21N	74W	GW	S	S	WSE	
06664400	SYBILLE CR ABOVE MULE CREEK, NR WHEATLAND	CH	194	1974-	27	22N	70W	GW	S	S	WSE	
06665790	SYBILLE CR ABOVE CANAL NO. 3, NR WHEATLAND	CR	-	1980-	4	22N	69W	GW	S	S	WSE	
*#06670500	LARAMIE RIVER NEAR FORT LARAMIE	CR	4564	1915-	28	26N	64W	GM	Y	CF	WSE	
06671000	RAWHIDE CREEK NEAR LINGLE	C	522	1928-	20	25N	62W	GW	S	S	WSE	
06672500	CHERRY CREEK DRAIN NEAR TORRINGTON	C	356	1931-32, 1935-	23	24N	61W	GW	S	S	WSE	
06673500	KATZER DRAIN NEAR HENRY, NB	C	45.9	1928-	10	23N	60W	GW	S	S	WSE	
*#06674500	N PLATTE R AT WYOMING-NEBRASKA STATE LINE	CR	22218	1929-	4	23N	58W	GW	Y	CF	WSE	
*06679500	NORTH PLATTE RIVER AT MITCHELL, NE	C	24300	1901-10, 1911, 1912-13, 1916-18, 1920-	33	33N	56W	DGW	Y	NE	-	

* Also water-quality station.
\# Also sediment station.

Table 1. Streamflow and Reservoir Stations (continued)

STATION NUMBER	STATION NAME	PUR-POSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
					SE	TSP	RNGE					
GREEN RIVER BASIN												
09188500	GREEN RIVER AT WARREN BRIDGE, NEAR DANIEL	C	468	1931-	8	35N	111W	GM	Y	GR	WSE	
09196500	PINE CREEK ABOVE FREMONT LAKE	BCH	75.8	1954-	5	35N	108W	DW	Y	GR	USGS	
09203000	EAST FORK RIVER NEAR BIG SANDY	C	79.2	1938-	7	31N	105W	DW	Y	GR	WSE	
*09205000	NEW FORK RIVER NEAR BIG PINEY	P	1230	1954-	22	30N	110W	DW	Y	GR	WSE	
09208000	LABARGE CK NR LABARGE MEADOWS RANGER STA	BCH	6.3	1940-42, 1950-81	8	29N	116W	GM	Y	GR	USGS	DISC. 9/30/81
*#09209400	GREEN RIVER NEAR LABARGE	CP	3910	1963-	33	26N	112W	DW	Y	GR	WSE	
09210500	FONTENELLE C N HERSCHLER RANCH, N FONTENELLE	CH	152	1951-	2	24N	115W	GM	Y	GR	USGS	
09211150	FONTENELLE RESERVOIR NEAR FONTENELLE	C	4280	1964-	25	24N	112W	-	-	-	-	FURNISHED BY USBR
*09211200	GREEN RIVER BELOW FONTENELLE RESERVOIR	CR	4280	1963-	31	24N	111W	DGM	Y	GR	BRUC	
09212500	BIG SANDY RIV AT LECKIE RANCH, NR BIG SANDY	C	94.0	1910-11, 1939-	17	30N	104W	GM	S	GR	WSE	
#09213500	BIG SANDY RIVER NEAR FARSON	CR	322	1914-17, 1920-24, 1926-34, 1935-	17	27N	106W	DW	S	GR	WSE	
*#09214500	LITTLE SANDY CREEK ABOVE EDEN	C	134	1954-81	11	26N	105W	DW	Y	GR	BLM	DISC. 9/30/81
*09215550	BIG SANDY RIVER BELOW FARSON	CR	-	1981-	12	24N	107W	DM	Y	GR	BRUC	ESTAB. 6/10/81
*#09216000	BIG SANDY RIVER BELOW EDEN	CR	1610	1954-81	31	24N	107W	DW	Y	GR	BRUC	DISC. 8/10/81
*#09216050	BIG SANDY RIVER AT GASSON BRIDGE, NEAR EDEN	CR	1720	1972-	29	23N	108W	DW	Y	GR	BRUC	
*#09216527	SEPARATION CREEK NEAR RINER	C	55.3	1975-81	32	20N	90W	GW	Y	CF	BLM	DISC. 9/30/81
*#09216545	BITTER CREEK NEAR BITTER CREEK	C	308	1975-81	36	18N	99W	GM	Y	GR	USGS	DISC. 9/30/81
*#09216562	BITTER CR AB SALT WELLS CR, NR SALT WELLS	C	836	1976-81	2	19N	103W	GM	Y	GR	BLM	DISC. 9/30/81
*#09216565	SALT WELLS CREEK NEAR SOUTH BAXTER	C	34.7	1976-81	15	14N	103W	GM	Y	GR	BLM	DISC. 9/30/81
*#09216750	SALT WELLS CREEK NEAR SALT WELLS	C	526	1976-81	14	19N	103W	GM	Y	GR	BLM	DISC. 9/30/81
*#09217000	GREEN RIVER NEAR GREEN RIVER	CR	14000	1951-	26	18N	107W	GW	Y	GR	USGS	
09217900	BLACKS FORK NEAR ROBERTSON	H	130	1937-39, 1966-	27	3N	12E	GM	Y	GR	USE	
09218500	BLACKS FORK NEAR MILLBURNE	C	152	1939-	11	12N	117W	GM	Y	GR	WSE	
09220000	EAST FORK OF SMITH FORK NEAR ROBERTSON	CH	53.0	1939-	5	12N	115W	GW	S	S	WSE	
09220500	WEST FORK OF SMITH FORK NEAR ROBERTSON	CH	37.2	1939-81	15	12N	116W	GW	S	S	WSE	DISC. 9/30/81
*#09222000	BLACKS FORK NEAR LYMAN	CR	821	1937-57, 1962-	15	17N	113W	DW	Y	GR	BRUC	
*#09222200	RYCKMAN CREEK NEAR GLENCOE	C	53.4	1980-81	8	18N	117W	DM	Y	GR	BLM	DISC. 9/30/81
*#09222250	LITTLE MUDDY CREEK AB NORTH FORK, NR GLENCOE	C	366	1980-81	31	19N	116W	DM	Y	GR	BLM	DISC. 9/30/81
*#09222400	MUDDY CREEK NEAR HAMPTON	C	963	1975-81	18	18N	113W	GM	Y	GR	BLM	DISC. 9/30/81
09223000	HAMS FORK BELOW POLE CREEK, NEAR FRONTIER	CH	128	1952-	35	25N	117W	GM	Y	GR	USGS	
*#09224700	BLACKS FORK NEAR LITTLE AMERICA	CR	3100	1962-	15	18N	109W	DW	Y	GR	USGS	
09228500	BURNT FORK NEAR BURNTFORK	CH	52.8	1943-	36	3N	16E	GM	S	S	WSE	

* Also water-quality station.
\# Also sediment station.

Table 1. Streamflow and Reservoir Stations (continued)

STATION NUMBER	STATION NAME	PURPOSE	DRAINAGE AREA	PERIOD OF RECORD	LOCATION SE	LOCATION TSP	LOCATION RNGE	GAGING EQUIPMENT	CURRENT RECORD TYPE	FIELD OFFICE	FUNDING AGENCY	REMARKS
GREEN RIVER BASIN (continued)												
*09229500	HENRYS FORK NEAR MANILA, UT	CP	520	1928-	23	12N	109W	DW	Y	GR	USGS	
*#09235300	VERMILLION CREEK NEAR HIAWATHA, CO	C	196	1975-81	15	12N	100W	GM	Y	GR	BLM	DISC. 9/30/81
*#09257000	LITTLE SNAKE RIVER NEAR DIXON	CP	988	1910-23, 1938-	8	12N	90W	GM	S	CF	WSE	
BEAR RIVER BASIN												
10015700	SULPHUR CREEK ABOVE RESERVOIR, NEAR EVANSTON	CH	64.2	1957-	35	14N	119W	GW	Y	U	-	
10015900	SULPHUR CREEK BELOW RESERVOIR, NEAR EVANSTON	C	69.2	1958-	28	14N	119W	DW	Y	U	-	
10019500	CHAPMAN CANAL AT STATE LINE, NEAR EVANSTON	C	-	1942-	36	17N	121W	GW	Y	U	-	
*10020100	BEAR RIVER ABOVE RESERVOIR, NEAR WOODRUFF, UT	CR	752	1961-	29	17N	120W	GW	Y	U	-	
10020200	WOODRUFF NARROWS RESERVOIR NEAR WOODRUFF, UT	C	784	1965-	32	18N	120W	-	-	-	-	
10020300	BEAR RIVER BELOW RESERVOIR, NEAR WOODRUFF, UT	CR	784	1961-	32	18N	120W	DW	Y	U	-	
*#10027000	TWIN CREEK AT SAGE	C	246	1943-62, 1976-81	7	21N	119W	GM	Y	GR	BLM	DISC. 9/30/81
10028500	BEAR RIVER BELOW PIXLEY DAM, NEAR COKEVILLE	CR	2032	1941-43, 1952-56, 1958-	25	23N	120W	GW	S	U	-	
10032000	SMITHS FORK NEAR BORDER	BCH	165	1942-	33	27N	118W	GW	Y	U	-	
10038000	BEAR RIVER BELOW SMITHS FORK, NEAR COKEVILLE	C	2447	1954-	28	25N	119W	GW	Y	U	-	
*#10039500	BEAR RIVER AT BORDER	C	2490	1937-	15	14S	43E	GW	Y	U	-	
10041000	THOMAS FORK NEAR WYOMING-IDAHO STATE LINE	CH	113	1949-	19	28N	119W	DW	Y	U	-	
SNAKE RIVER BASIN												
13010500	JACKSON LAKE NEAR MORAN	C	807	1908-	18	45N	114W	-	-	I	-	FURNISHED BY USBR
13011000	SNAKE RIVER NEAR MORAN	BCR	807	1903-	18	45N	114W	DW	Y	I	-	
13011900	BUFFALO FORK ABOVE LAVA CREEK, NEAR MORAN	H	323	1965-	29	45N	113W	GM	Y	I	-	
*#13018300	CACHE CREEK NEAR JACKSON	BH	10.6	1962-	1	40N	116W	GW	Y	I	-	HYDRO. B.M. STA.
13018750	SNAKE RIVER BELOW FLAT CREEK NEAR JACKSON	CR	2627	1975-	3	39N	116W	DGM	Y	I	-	
*13022500	SNAKE RIVER ABOVE RESERVOIR, NEAR ALPINE	CR	3465	1917-18, 1937-39, 1953-	-	-	-	GW	Y	I	-	
13023000	GREYS RIVER ABOVE RESERVOIR, NEAR ALPINE	CP	448	1917-18, 1937-39, 1953-	34	37N	118W	GM	Y	I	-	
*13027500	SALT RIVER ABOVE RESERVOIR, NEAR ETNA	CR	829	1953-	28	36N	119W	DW	Y	I	-	

* Also water-quality station.
\# Also sediment station.

Peak-flow partial-record stations

Explanation of abbreviations and codes used in table 2.

Location: SE, section
TSP, township
RNGE, range

Period of Record: The dates given are the calendar years in which records began or ended. Breaks of less than a year are not shown.

Gage Equipment: CSI, crest-stage indicator
S-R, stage-rainfall recorder

Field Office: B, Buffalo
C, Casper
CF, Cheyenne Field Unit
GR, Green River
R, Riverton
W, Worland
U, Utah

Funding Agency: WHD, Wyoming Highway Department

Table 2. Peak-flow partial-record stations

STATION NUMBER	STATION NAME	DRAINAGE AREA	LOCATION			PERIOD OF RECORD	GAGING EQUIPMENT	FIELD OFFICE	FUNDING AGENCY	REMARKS
			SE	TSP	RNGE					
YELLOWSTONE RIVER BASIN										
06218700	WAGON GULCH NEAR DUBOIS	4.89	30	42N	107W	1961-	CSI	R	WHD	
06223800	WIND RIVER TRIBUTARY NO 2 NEAR CROWHEART	3.16	18	3N	2W	1961-81	CSI	R	WHD	DISC. 9/30/81
06226200	LITTLE DRY CREEK NEAR CROWHEART	10.5	35	7N	3W	1961-81	CSI	R	WHD	DISC. 9/30/81
06226300	DRY CREEK NEAR CROWHEART	97.9	19	5N	2W	1959, 1961-81	CSI	R	WHD	DISC. 9/30/81
06229700	NORKOK MEADOWS CREEK NEAR FORT WASHAKIE	15.4	8	1N	1W	1965-81	CSI	R	WHD	DISC. 9/30/81
06229800	SAND DRAW NEAR FORT WASHAKIE	.99	18	1N	1W	1961-81	CSI	R	WHD	DISC. 9/30/81
06229900	TROUT CREEK NEAR FORT WASHAKIE	16.1	25	1S	2N	1961-68, 1970-	CSI	R	WHD	
06233360	MONUMENT DRAW AT LOWER STATION, NEAR HUDSON	8.38	21	33N	98W	1965-73, 1973-	S-R CSI	R	WHD	
06234800	BOBCAT DRAW NEAR SAND DRAW	2.89	21	33N	95W	1969, 1971-81	CSI	R	WHD	DISC. 9/30/81
06236000	KIRBY DRAW NEAR RIVERTON	129	3	1N	5E	1951-53, 1961-	CSI	R	WHD	
06238760	W F DRY CHEYENNE C AT UPPER STA, NR RIVERTON	.69	4	34N	94W	1965-73, 1973-	S-R CSI	R	WHD	
06255300	POISON CREEK TRIBUTARY NEAR SHOSHONI	.39	33	38N	93W	1959-81	CSI	R	WHD	DISC. 9/30/81
06256600	RED CREEK NEAR ARMINTO	7.15	19	38N	87W	1963-81	CSI	C	WHD	DISC. 9/30/81
06256700	SOUTH BRIDGER CREEK NEAR LYSITE	10.0	9	40N	91W	1960-81	CSI	R	WHD	DISC. 9/30/81
06257300	SHOTGUN CREEK TRIBUTARY NEAR PAVILLION	2.57	27	6N	1E	1961-81	CSI	R	WHD	DISC. 9/30/81
06265200	SAND DRAW NEAR THERMOPOLIS	6.33	2	44N	97W	1960-81	CSI	W	WHD	DISC. 9/30/81
06265600	TIE DOWN GULCH NEAR WORLAND	1.78	10	45N	94W	1961-	CSI	W	WHD	
06266460	MURPHY DRAW NEAR GRASS CREEK	2.32	28	47N	97W	1965-73, 1973-81	S-R CSI	W	WHD	DISC. 9/30/81
06267260	NORTH PRONG EAST FORK NOWATER CR NEAR WORLAND	3.77	18	46N	91W	1964-73, 1973-	S-R CSI	W	WHD	
06269750	NOWOOD RIVER TRIBUTARY NEAR TEN SLEEP	.42	11	46N	88W	1960-81	CSI	W	WHD	DISC. 9/30/81
06274190	NOWOOD RIVER TRIBUTARY NO 2 NEAR BASIN	1.51	28	50N	92W	1965-73, 1973-	S-R CSI	W	WHD	
06274250	ELK CREEK NEAR BASIN	96.9	16	50N	93W	1959-81	CSI	W	WHD	DISC. 9/30/81
06277700	TWENTYFOUR MILE CREEK NEAR EMBLEM	12.8	23	52N	98W	1960-81	CSI	W	WHD	DISC. 9/30/81
06277750	DRY CREEK TRIBUTARY NEAR EMBLEM	.65	19	52N	97W	1960-68, 1970-81	CSI	W	WHD	DISC. 9/30/81
06279020	RED GULCH NEAR SHELL	47.8	32	53N	91W	1967, 1970-81	CSI	W	WHD	DISC. 9/30/81
06299900	SLATER CREEK NEAR MONARCH	18.0	18	57N	84W	1967-	CSI	B	WHD	
06312700	SOUTH FORK POWDER RIVER NEAR POWDER RIVER	262	3	35N	85W	1961-	CSI	C	WHD	
06312795	SANCHEZ CREEK ABOVE RESERVOIR, NEAR ARMINTO	5.53	20	39N	86W	1970-81	CSI	C	WHD	DISC. 9/30/81
06313020	BOBCAT CREEK NEAR EDGERTON	8.29	10	37N	77W	1965-73, 1973-81	S-R CSI	C	WHD	DISC. 9/30/81
06313100	COAL DRAW NEAR MIDWEST	11.4	8	40N	78W	1961-	CSI	C	WHD	
06313450	NORTH SPRING DRAW NEAR SUSSEX	5.21	1	42N	80W	1980-81	CSI	C	WHD	DISC. 9/30/81

Table 2. Peak-flow partial-record stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	LOCATION			PERIOD OF RECORD	GAGING EQUIPMENT	FIELD OFFICE	FUNDING AGENCY	REMARKS
			SE	TSP	RNGE					
YELLOWSTONE RIVER BASIN (continued)										
06313630	VAN HOUTEN DRAW NEAR BUFFALO	10.8	33	49N	77W	1971-81	CSI	B	WHD	DISC. 9/30/81
06316700	COAL DRAW NEAR BUFFALO	1.64	9	52N	77W	1965-73,	S-R			
						1973-	CSI	B	WHD	
06317050	RUCKER DRAW NEAR SPOTTED HORSE	3.98	28	55N	75W	1961-81	CSI	B	WHD	DISC. 9/30/81
06319100	BULL CREEK NEAR BUFFALO	10.8	29	50N	82W	1969-	CSI	B	WHD	
06324800	LITTLE POWDER RIVER TRIBUTARY NEAR GILLETTE	.81	36	52N	72W	1960-81	CSI	B	WHD	DISC. 9/30/81
06324900	CEDAR DRAW NEAR GILLETTE	3.45	6	52N	71W	1959-81	CSI	B	WHD	DISC. 9/30/81
06324910	COW CREEK TRIBUTARY NEAR WESTON	.72	26	53N	71W	1971-	CSI	B	WHD	
CHEYENNE RIVER BASIN										
06379600	BOX CREEK NEAR BILL	112	9	36N	70W	1956-58,				
						1959,				
						1961-81	CSI	C	WHD	DISC. 9/30/81
06382200	PRITCHARD DRAW NEAR LANCE CREEK	5.1	8	37N	65W	1964-72,	S-R			
						1972-81	CSI	C	WHD	DISC. 9/30/81
06387500	TURNER CREEK NEAR OSAGE	47.8	26	47N	64W	1959-	CSI	C	WHD	
06388800	BLACKTAIL CREEK TRIBUTARY NEAR NEWCASTLE	.25	16	44N	61W	1960-81	CSI	C	WHD	DISC. 9/30/81
06426195	DONKEY CR TRIB ABOVE RESERVOIR, NEAR GILLETTE	.2	29	50N	71W	1970-	CSI	B	WHD	
06427700	INYAN KARA CREEK NEAR UPTON	96.5	17	49N	63W	1959-	CSI	C	WHD	
06428100	BELLE FOURCHE RIVER TRIBUTARY NO 2 NR HULETT	10.2	3	54N	64W	1962-	CSI	C	WHD	
06429300	OGDEN CREEK NEAR SUNDANCE	8.42	30	52N	62W	1962-65,	CSI			
						1965-72,	S-R			
						1972-81	CSI	C	WHD	DISC. 9/30/81
PLATTE RIVER BASIN										
06629150	COAL BANK DRAW TRIBUTARY NEAR WALCOTT	3.65	3	20N	83W	1962-81	CSI	CF	WHD	DISC. 9/30/81
06629200	COAL BANK DRAW TRIBUTARY NO 2 NEAR WALCOTT	2.41	4	20N	83W	1962-81	CSI	CF	WHD	DISC. 9/30/81
06629800	COAL CREEK NEAR RAWLINS	7.32	30	21N	87W	1959-81	CSI	CF	WHD	DISC. 9/30/81
06630200	BIG DITCH TRIBUTARY NEAR HANNA	7.42	21	22N	81W	1959-70,	CSI			
						1970-72,	S-R			
						1972-81	CSI	CF	WHD	DISC. 9/30/81
06631150	THIRD SAND CREEK NEAR MEDICINE BOW	10.8	29	21N	79W	1965-73,	S-R			
						1973-81	CSI	CF	WHD	DISC. 9/30/81
06634200	SHEEP CREEK NEAR MARSHALL	61.0	30	27N	75W	1961-81	CSI	CF	WHD	DISC. 9/30/81
06634300	SHEEP CREEK NEAR MEDICINE BOW	174	19	25N	76W	1961-81	CSI	CF	WHD	DISC. 9/30/81
06634910	MEDICINE BOW RIVER TRIBUTARY NEAR HANNA	3.01	35	24N	81W	1965-73,	S-R			
						1973-	CSI	CF	WHD	
06637550	SWEETWATER RIVER NEAR SOUTH PASS CITY	177	28	28N	101W	1958-73,				
						1974-81	CSI	R	WHD	DISC. 9/30/81
06638300	WEST FORK CROOKS CREEK NEAR JEFFREY CITY	11.6	31	28N	92W	1961-81	CSI	R	WHD	DISC. 9/30/81
06638350	COAL CREEK NEAR MUDDY GAP	6.08	4	27N	89W	1961-81	CSI	R	WHD	DISC. 9/30/81

Table 2. Peak-flow partial-record stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	LOCATION			PERIOD OF RECORD	GAGING EQUIPMENT	FIELD OFFICE	FUNDING AGENCY	REMARKS
			SE	TSP	RNGE					
PLATTE RIVER BASIN (continued)										
06641400	BEAR SPRINGS CREEK NEAR ALCOVA	9.33	30	30N	82W	1960-	CSI	C	WHD	
06642700	LAWN CREEK NEAR ALCOVA	11.5	8	29N	80W	1961-	CSI	C	WHD	
06642760	STINKING CREEK NEAR ALCOVA	117	30	30N	80W	1961-81	CSI	C	WHD	DISC. 9/30/81
06643300	COAL CREEK NEAR GOOSE EGG	5.39	27	32N	81W	1960-	CSI	C	WHD	
06644840	MCKENZIE DRAW TRIBUTARY NEAR CASPER	2.02	12	36N	78W	1965-73,	S-R			
						1973-81	CSI	C	WHD	DISC. 9/30/81
06646700	EAST FORK DRY CREEK TRIBUTARY NEAR GLENROCK	2.60	26	33N	75W	1961-81	CSI	C	WHD	DISC. 9/30/81
06648780	SAGE CREEK TRIBUTARY NEAR ORPHA	1.38	18	35N	73W	1965-73,	S-R			
						1973-	CSI	C	WHD	
06649900	NORTH PLATTE RIVER TRIBUTARY NEAR DOUGLAS	8.53	5	31N	71W	1961-81	CSI	C	WHD	DISC. 9/30/81
06651800	SAND CREEK NEAR ORIN	27.8	11	31N	70W	1955,				
						1961-	CSI	C	WHD	
06652400	WATSON DRAW NEAR LOST SPRINGS	6.95	12	32N	68W	1960-70,	CSI			
						1970-72,	S-R			
						1972-	CSI	C	WHD	
06661580	SEVENMILE CREEK NEAR CENTENNIAL	11.2	11	17N	77W	1962-	CSI	CF	WHD	
06668040	RABBIT CREEK NEAR WHEATLAND	1.3	22	26N	70W	1965-72,	S-R			
						1972-	CSI	CF	WHD	
06670985	DRY RAWHIDE CREEK NEAR LINGLE	20	21	27N	62W	1969-81	CSI	CF	WHD	DISC. 9/30/81
06675300	HORSE CREEK TRIBUTARY NEAR LITTLE BEAR	8.16	10	17N	67W	1961-81	CSI	CF	WHD	DISC. 9/30/81
06761900	LODGEPOLE CREEK TRIBUTARY NEAR PINE BLUFFS	.44	21	15N	60W	1960-81	CSI	CF	WHD	DISC. 9/30/81
06762600	LODGEPOLE CREEK TRIBUTARY NO 2 NEAR ALBIN	5.69	28	16N	60W	1960-	CSI	CF	WHD	
GREEN RIVER BASIN										
09204700	SAND SPRINGS DRAW TRIBUTARY NEAR BOULDER	2.77	8	30N	107W	1961-81	CSI	GR	WHD	DISC. 9/30/81
09207650	DRY BASIN CREEK NEAR BIG PINEY	47.2	12	28N	112W	1971-81	CSI	GR	WHD	DISC. 9/30/81
09211300	FOURMILE GULCH TRIBUTARY NEAR FONTENELLE	14.2	15	24N	111W	1971-81	CSI	GR	WHD	DISC. 9/30/81
09216290	EAST OTTERSON WASH NEAR GREEN RIVER	16.6	23	21N	109W	1969-	CSI	GR	WHD	
09216350	SKUNK CANYON CREEK NEAR GREEN RIVER	15.7	8	20N	107W	1965,				
						1971-81	CSI	GR	WHD	DISC. 9/30/81
09216537	DELANEY DRAW NEAR RED DESERT	34.5	8	19N	95W	1961-	CSI	GR	WHD	
09216550	DEADMAN WASH NEAR POINT OF ROCKS	152	25	20N	101W	1962-81	CSI	GR	WHD	DISC. 9/30/81
09216576	GAP CR BL BEANS SPRING CR, NEAR SOUTH BAXTER	35.9	7	14N	103W	1976-81	CSI	GR	WHD	DISC. 9/30/81
09216580	BIG FLAT DRAW NEAR ROCK SPRINGS	19.5	4	15N	102W	1973-81	CSI	GR	WHD	DISC. 9/30/81
09216600	CUTTHROAT DRAW NEAR ROCK SPRINGS	7.88	17	17N	102W	1959-70,	CSI			
						1970-72,	S-R			
						1972-81	CSI	GR	WHD	DISC. 9/30/81
09216695	NO NAME CREEK NEAR ROCK SPRINGS	18.2	1	17N	103W	1973-81	CSI	GR	WHD	DISC. 9/30/81
09216900	BITTER CREEK TRIBUTARY NEAR GREEN RIVER	1.65	16	18N	106W	1959-	CSI	GR	WHD	
09221680	MUD SPRING HOLLOW NR CHURCH BUTTE, NR LYMAN	8.83	7	16N	113W	1965-73,	S-R			
						1973-	CSI	GR	WHD	
09224600	BLACKS FORK TRIBUTARY NEAR GRANGER	5.03	15	18N	111W	1959-81	CSI	GR	WHD	DISC. 9/30/81

Table 2. Peak-flow partial-record stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	LOCATION			PERIOD OF RECORD	GAGING EQUIPMENT	FIELD OFFICE	FUNDING AGENCY	REMARKS
			SE	TSP	RNGE					
GREEN RIVER BASIN (continued)										
09224800	MEADOW SPRINGS WASH TRIBUTARY NR GREEN RIVER	5.22	18	18N	109W	1962-65, 1968-81	CSI	GR	WHD	DISC. 9/30/81
09224810	BLACKS FORK TRIBUTARY NO 2 NEAR GREEN RIVER	12.0	8	17N	108W	1965-81	CSI	GR	WHD	DISC. 9/30/81
09224820	BLACKS FORK TRIBUTARY NO 3 NEAR GREEN RIVER	3.59	28	17N	108W	1965-	CSI	GR	WHD	
09224840	BLACKS FORK TRIBUTARY NO 4 NEAR GREEN RIVER	1.26	33	17N	108W	1965-81	CSI	GR	WHD	DISC. 9/30/81
09224980	SUMMERS DRY CREEK NEAR GREEN RIVER	423	13	16N	109W	1965-81	CSI	GR	WHD	DISC. 9/30/81
09225200	SQUAW HOLLOW NEAR BURNTFORK	6.57	29	14N	108W	1965-	CSI	GR	WHD	
09225300	GREEN RIVER TRIBUTARY NO 2 NEAR BURNTFORK	13.0	31	13N	108W	1959, 1961-81	CSI	GR	WHD	DISC. 9/30/81
09258200	DRY COW CREEK NEAR BAGGS	49.7	19	16N	91W	1970-81	CSI	CF	WHD	DISC. 9/30/81
BEAR RIVER BASIN										
10019700	WHITNEY CANYON CREEK NEAR EVANSTON	8.93	27	17N	120W	1965-81	CSI	U	WHD	DISC. 9/30/81
SNAKE RIVER BASIN										
13019220	SOUR MOOSE CREEK NEAR BONDURANT	2.77	26	37N	112W	1964-81	CSI	GR	WHD	DISC. 9/30/81

Water-quality stations

Explanation of abbreviations and codes used in table 3.

Period of Record: The dates given are the calendar years in which records began or ended. Breaks of less than a year are not shown.

Location:
- SE, section
- TSP, township
- RNGE, range

Funding Agency:
- BIA, Bureau of Indian Affairs
- BLM, Bureau of Land Management
- BRUC, Bureau of Reclamation, Upper Colorado Region
- BRUM, Bureau of Reclamation, Upper Missouri Region
- EPA, Environmental Protection Agency, Region 8
- MRB, Geological Survey, Missouri River Basin Program
- USGS, Geological Survey, Federal Program
- WDA, Wyoming Department of Agriculture
- WDEQ, Wyoming Department of Environmental Quality

Sampling Frequency:
- C, continuous (recorder)
- D, daily
- BM, bimonthly
- M, monthly
- MW, monthly, except weekly during irrigation season
- MQ, monthly during summer, quarterly during winter
- Q, quarterly
- HL, high and low flow samples only
- SA, semiannual
- A, annual
- I, infrequent or as requested

Analysis Schedule:
- 1, salinity (major constituents)
- 2, specific conductance
- 3, daily temperature (observed)
- 4, bacteria or chemical oxygen demand
- 5, field determinations of: pH, specific conductance, dissolved oxygen, temperature, and (or) turbidity
- 6, total coliform, fecal coliform, and (or) fecal streptococcus
- 7, nutrient
- 8, trace metals
- 9, pesticides
- 10, radiochemical
- 11, biological

Field Office:
- B, Buffalo
- C, Casper
- CF, Cheyenne Field Unit
- CT, Contractor
- GR, Green River
- I, Idaho
- M, Montana
- R, Riverton,
- S, Wyoming State Engineer
- W, Worland
- U, Utah

Table 3. Water-quality stations

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
				SE	TSP	RNGE					
YELLOWSTONE RIVER BASIN											
@06207500	CLARKS FORK YELLOWSTONE RIVER NEAR BELFRY, MT	1154	1965-	31	9S	22E	WDA	M	1	M	
#@06207510	BIG SAND COULEE AT WYOMING-MONTANA STATE LINE	134	1976-81	32	9S	22E	BLM	Q	1,5,7	M	DISC. 9/30/81
@06218500	WIND RIVER NEAR DUBOIS	232	1947-50, 1965-	25	42N	108W	WDA	Q	1	R	
#@06220500	EAST FORK WIND RIVER NEAR DUBOIS	427	1975-	34	6N	6W	MRB	M	5	R	
@06222700	CROW CREEK NEAR TIPPERARY	30.2	1974-	20	7N	4W	MRB	M	5	R	
@06224000	BULL LAKE CREEK ABOVE BULL LAKE	187	1974-	2	2N	4W	MRB	M	5	R	
@06228000	WIND RIVER AT RIVERTON	2309	1947-50, 1953, 1965-	2	1S	4E	WDA	Q	1	R	
@06228350	SF LITTLE WIND R AB WASHAKIE RE NR FT WASHAKIE		1976-	18	1S	2W	BIA	M	1,5	R	
@06231000	LITTLE WIND RIVER ABOVE ARAPAHOE	660	1966-	23	1S	3E	WDA	M	1	R	
06231950	BALDWIN CREEK NEAR LANDER	-	1981-82	8	33N	99W	WDEQ	M	4,5,7	R	DISC. 2/4/82
@06233900	POPO AGIE RIVER NEAR ARAPAHOE		1979-	27	1S	3E	BIA	M	1	R	
06235000	BEAVER CREEK NEAR ARAPAHOE	354	1967-81	29	1S	4E	WDA	M	1	R	DISC. 12/31/81
@06235500	LITTLE WIND RIVER NEAR RIVERTON	1904	1965-	11	15N	4E	WDa	Q	1	R	
06236100	WIND RIVER ABOVE BOYSEN RESERVOIR, NR SHOSHONI	4390	1974-	25	2N	5E	WDEQ	M	1,4,5,7	R	
@06246500	OCEAN DRAIN AT OCEAN LAKE OUTLET, NR PAVILLION		1978-				MRB	M	1,5	R	
#@06253000	FIVEMILE CREEK NEAR SHOSHONI	418	1949-51, 1953, 1965-	19	3N	6E	WDA	M	1	R	
#@06256900	DRY CREEK NEAR BONNEVILLE	52.6	1976-81	8	38N	92W	BLM	M	1,5	R	DISC. 9/30/81
#@06259000	WIND RIVER BELOW BOYSEN RESERVOIR	7701	1953-54, 1960-	9	5N	6E	USGS WDEQ	M M	1,5,6,7,8 1,5,6,7,8	R	
@06260000	SOUTH FORK OWL CREEK NEAR ANCHOR	85.5	1974-	28	43N	100W	BRUM	M	5	W	
@06260400	SOUTH FORK OWL CREEK BELOW ANCHOR RESERVOIR	131	1974-	25	43N	100W	BRUM	M	5	W	
06264700	BIGHORN RIVER AT LUCERNE	-	1966-	32	44N	94W	WDEQ	M	5,6,7	W	
#@06267400	EAST FORK NOWATER NEAR COLTER	149	1977-81	31	46N	92W	BLM BLM	Q HL	1,5,6 7,8	W	DISC. 9/30/81
#06267900	MIDDLE FORK FIFTEENMILE CREEK NEAR WORLAND		1979-81	2	47N	95W	BLM	Q	1,5,6	W	DISC. 9/30/81
#@06268500	FIFTEENMILE CREEK NEAR WORLAND	518	1962-72, 1979-81	27	47N	93W	BLM	Q	1,5,6	W	DISC. 9/30/81
06268600	BIGHORN RIVER AT WORLAND	10810	1966-	25	47N	93W	WDA	M	1	W	
06268640	SLICK CREEK NEAR WORLAND	-	1981-	7	47N	92W	WDA	Q	1	W	
#@06270000	NOWOOD RIVER NEAR TEN SLEEP	803	1967-	27	47N	88W	WDA	Q	1	W	
06273500	PAINT ROCK CREEK NEAR MOUTH, BELOW HYATTVILLE	376	1951-53, 1967-	19	49N	90W	WDA	Q	1	W	
06274220	NOWOOD RIVER AT MANDERSON	2000	1965-	30	50N	92W	WDA	M	1	W	
06277500	GREYBULL RIVER NEAR BASIN	1115	1951-53, 1965-	8	51N	94W	WDA	M	1	W	

Also sediment station.
@ Also surface-water station.

Table 3. Water-quality stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
				SE	TSP	RNGE					
YELLOWSTONE RIVER BASIN (continued)											
#@06277950	DRY CREEK NEAR GREYBULL		1979-81	7	52N	94W	BLM	Q	1,5,6	W	DISC. 9/30/81
06279090	SHELL CREEK NEAR GREYBULL	560	1951, 1965-	4	52N	93W	WDA	Q	1	W	
#@06279500	BIGHORN RIVER AT KANE	15765	1947-53, 1955-57, 1960-	9	55N	94W	MRB	M	5	W	
							WDA	M	1		
							WDEQ	M	7		
@06280000	NORTH FORK SHOSHONE RIVER NEAR WAPITI	775	1979-	15	52N	104W	MRB	C	3	W	
@06281000	SOUTH FORK SHOSHONE RIVER AB BUFFALO BILL RES	585	1981-	33	52N	103W	MRB	C	3	W	
@06282000	SHOSHONE RIVER BELOW BUFFALO BILL RESERVOIR	1538	1947-49, 1964-	3	52N	102W	WDA	M	1	W	
06282900	SHOSHONE RIVER ABOVE DRY CREEK, NEAR CODY	-	1974-	13	53N	101W	WDEQ	M	5,6,7	W	
06284450	BITTER CREEK BELOW SEWAGE LAGOON, NEAR POWELL	-	1981-	36	56N	99W	WDEQ	M	5,6,7	W	
@06284500	BITTER CREEK NEAR GARLAND	80.5	1958-60, 1969-	7	55N	97W	MRB	D	2,3	W	
							MRB	Q	1,5,7		
@06284800	WHISTLE CREEK NEAR GARLAND	101	1959-60, 1969-	30	55N	97W	MRB	D	2,3	W	
							MRB	Q	1,5,7		
#@06285100	SHOSHONE RIVER NEAR LOVELL	2350	1966-	16	56N	96W	MRB	D	2,3	W	
							MRB	Q	1,5,7		
@06285400	SAGE CREEK AT SIDON CANAL, NEAR DEAVER	341	1958-60, 1969-	34	57N	97W	MRB	D	2,3	W	
							MRB	Q	1,5,7		
06286200	SHOSHONE RIVER AT KANE	2989	1976-	6	56N	95W	WDEQ	M	5,6,7	W	
@06298000	TONGUE RIVER NEAR DAYTON	204	1966-81	11	56N	87W	WDA	M	1	W	DISC. 9/30/81
06304500	LITTLE GOOSE CREEK NEAR SHERIDAN	159	1979-	27	56N	84W	WDEQ	M	1,5,6	B	
#@06305500	GOOSE CREEK BELOW SHERIDAN	392	1959-60, 1961-64, 1967-	15	56N	84W	WDA	M	1	B	
							WDEQ	M	6		
							EPA	M	4,5,7		
							EPA	HL	8		
06306300	TONGUE RIVER AT STATE LINE, NEAR DECKER, MT	1477	1965-	33	9S	40E	WDA	M	1	M	
							WDEQ	M	5,6		
							EPA	M	7		
							EPA	HL	8		
06312500	POWDER RIVER NEAR KAYCEE	980	1968-	13	43N	81W	WDA	Q	1	C	
06313000	SOUTH FORK POWDER RIVER NEAR KAYCEE	1150	1968-81	9	42N	81W	WDA	M	1	C	DISC. 12/31/81
							WDEQ	M	5,6		
#@06313400	SALT CREEK NEAR SUSSEX	769	1967-81	8	42N	79W	WDA	M	1	C	DISC. 9/30/81
							USGS	M	4,5,7		
							USGS	Q	8		
#@06313500	POWDER RIVER AT SUSSEX	3090	1949-53, 1977-	13	43N	79W	USGS	Q	1,5,7	C	
							USGS	I	8		
							USGS	A	10		

Also sediment station.
@ Also surface-water station.

Table 3. Water-quality stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
				SE	TSP	RNGE					
YELLOWSTONE RIVER BASIN (continued)											
#@06316400	CRAZY WOMAN CREEK AT UPPER STATION, NR ARVADA	945	1966-81	18	52N	77W	USGS	M	1,5,6,7	CT	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		
@06317000	POWDER RIVER AT ARVADA	6050	1946-53, 1967-	21	54N	77W	WDA	Q	1	B	
#@06320200	CLEAR CREEK BELOW ROCK CREEK, NEAR BUFFALO	322	1975-81	30	51N	81W	USGS	M	1,4,5,7	B	DISC. 9/30/81
							USGS	Q	8		
#@06320400	CLEAR CREEK AT UCROSS	409	1975-81	19	53N	80W	USGS	M	1,4,5,7	B	DISC. 9/30/81
							USGS	Q	8		
#@06324000	CLEAR CREEK NEAR ARVADA	1110	1950-54, 1966-	36	57N	77W	WDA	Q	1	B	
#@06324500	POWDER RIVER AT MOOREHEAD, MT	8088	1976-	8	9S	48E	EPA	M	1,5,7	M	
#@06324890	LITTLE POWDER R BELOW CORRAL C NEAR WESTON	204	1975-	12	52N	72W	USGS	Q	1,5,7	B	
							USGS	I	8		
							USGS	A	10		
#@06324925	LITTLE POWDER RIVER NEAR WESTON	540	1976-81	19	54N	70W	USGS	M	1,5,6,7	CT	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		
#@06324970	LITTLE POWDER RIVER ABOVE DRY CREEK, NR WESTON	1230	1975-	13	57N	71W	EPA	SA	8	B	
							EPA	M	1,5,6,7		
							EPA	Q	7		
CHEYENNE RIVER BASIN											
#@06364700	ANTELOPE CREEK NEAR TECKLA	959	1977-81	35	41N	70W	USGS	M	1,5,6,7	CT	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		
#@06365300	DRY FORK CHEYENNE RIVER NEAR BILL	128	1976-81	31	38N	73W	BLM	M	1,4,5,7,8	CT	DISC. 9/30/81
#@06365900	CHEYENNE RIVER NEAR DULL CENTER	1527	1975-81	20	40N	68W	USGS	M	1,4,5,7	CT	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		
#@06375600	LITTLE THUNDER CREEK NEAR HAMPSHIRE	234	1977-81	33	43N	67W	USGS	M	1,5,6,7	CT	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		

Also sediment station.
@ Also surface-water station.

Table 3. Water-quality stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
				SE	TSP	RNGE					
	CHEYENNE RIVER BASIN (continued)										
#@06376300	BLACK THUNDER CREEK NEAR HAMPSHIRE	535	1979-81	31	42N	65W	USGS	M	1,5,6,7	CT	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		
#@06378300	LODGEPOLE CREEK NEAR HAMPSHIRE	354	1977-81	5	41N	64W	USGS	M	1,5,6,7	CT	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		
#@06386000	LANCE CREEK NEAR RIVERVIEW	2070	1975-	14	39N	62W	USGS	M	1,4,5,7	C	
							USGS	Q	8,10		
06386400	CHEYENNE RIVER NEAR RIVERVIEW	5270	1975-	25	40N	61W	EPA	M	1,5,6,7	C	
							EPA	HL	8,10	C	
@06394000	BEAVER CREEK NEAR NEWCASTLE	1320	1949-53, 1967-	18	41N	60W	WDA	M	1	C	
#@06425720	BELLE FOURCHE RIV BL RATTLESNAKE CR, NR PINEY	495	1975-	9	46N	71W	USGS	-	1,4,5,7,8	B	SAMPLE WHEN FLOW
#@06425750	COAL CREEK NEAR PINEY	-	1980-	12	46N	71W	USGS	-	1,4,5,7,8	B	SAMPLE WHEN FLOW
#@06425780	BELLE FOURCHE RIVER ABOVE DRY CREEK, NR PINEY	594	1975-	25	47N	71W	USGS	-	1,4,5,7,8	B	SAMPLE WHEN FLOW
#@06425900	CABALLO CREEK AT MOUTH, NEAR PINEY	260	1977-	4	47N	70W	USGS	M	1,5,6,7	B	
							USGS	I	8		
							USGS	A	10		
#@06425950	RAVEN CREEK NEAR MOORCROFT	76	1977-	1	48N	69W	USGS	M	1,5,6,7	B	
							USGS	I	8		
							USGS	A	10		
06426400	DONKEY CREEK NEAR MOORCROFT		1977-	30	50N	68W	WDEQ	M	1	C	
#@06426500	BELLE FOURCHE RIVER BELOW MOORCROFT	1670	1975-	24	50N	68W	EPA	M	1,5,6	C	
							EPA	SA	7		
							EPA	HL	8		
							USGS	A	8,10		
06427850	BELLE FOURCHE RIVER AT DEVILS TOWER	-	1967-	7	53N	65W	WDA	M	1	C	
06428050	BELLE FOURCHE RIVER BELOW HULETT	-	1981-	6	54N	64W	WDEQ	M	5,6,7	C	
06428500	BELLE FOURCHE R AT WYO-SOUTH DAKOTA ST LINE	3280	1965-	18	9N	1E	WDA	Q	1	C	
@06429905	SAND CREEK NEAR RANCH A, NEAR BEULAH	267	1982-	5	52N	60W	WDEQ	M	5,6,7	C	
	PLATTE RIVER BASIN (continued)										
@06620000	NORTH PLATTE RIVER NEAR NORTHGATE, CO	1431	1965-	11	11N	80W	WDA	M	1	CF	
#@06623800	ENCAMPMENT RIV AB HOG PARK CR, NR ENCAMPMENT	72.7	1967-	10	12N	84W	USGS	M	1,5,6,7	CF	
							USGS	HL	8,9		
							USGS	A	10		
@06625000	ENCAMPMENT RIVER AT MOUTH, NEAR ENCAMPMENT	265	1965-	3	15N	83W	WDA	M	1	CF	

Also sediment station.
@ Also surface-water station.

Table 3. Water-quality stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
				SE	TSP	RNGE					
PLATTE RIVER BASIN (continued)											
#@06628800	SAGE CREEK NEAR SARATOGA	263	1972-81	32	19N	85W	BLM	M	1	CF	DISC. 9/30/81
@06630000	NORTH PLATTE RIV AB SEMINOE RES, NR SINCLAIR	8134	1960-	13	22N	86W	WDA	M	1	CF	
							WDEQ	M	5,6,7	CF	
#@06630300	BIG DITCH NEAR COYOTE SPRINGS	110	1974-81	30	23N	83W	BLM	M	1,5,7	CF	DISC. 9/30/81
							BLM	Q	8		
							BLM	A	10		
#@06630330	NORTH DITCH NEAR COYOTE SPRINGS	22.6	1976-81	19	23N	83W	BLM	M	1,5,7	CF	DISC. 9/30/81
							BLM	Q	8		
							BLM	A	10		
#@06634600	LITTLE MEDICINE BOW RIVER NEAR MEDICINE BOW	966	1965-	21	23N	78W	WDA	Q	1	CF	
							EPA	Q	10		
							EPA	HL	8		
#@06634990	HANNA DRAW NEAR HANNA	21.6	1974-81	34	24N	81W	BLM	M	1,5,7,	CF	DISC. 9/30/81
							BLM	Q	8		
							BLM	A	10		
#@06635000	MEDICINE BOW RIVER AB SEMINOE RES, NR HANNA	2338	1965-	34	24N	81W	WDA	Q	1	CF	
							EPA	Q	10		
							EPA	HL	8		
06636000	NORTH PLATTE RIVER AB PATHFINDER RESERVOIR	7241	1969-	34	26N	84W	MRB	M	5	C	
#@06639000	SWEETWATER RIVER NEAR ALCOVA	2327	1964-	25	29N	87W	WDA	Q	1	C	
							EPA	Q	10		
							EPA	HL	8		
#@06642000	NORTH PLATTE RIVER AT ALCOVA	10812	1965-	17	30N	82W	USGS	M	1,5,6,7,8	C	
							WDEQ	M	1,5,6,7,8	C	
06642500	BATES CREEK NEAR FREEMAN	129	1981-	29	30N	79W	WDA	Q	1	C	
06643000	BATES CREEK NEAR ALCOVA	393	1970-	1	31N	82W	WDA	M	1	C	
							MRB	M	5		
06644085	NORTH PLATTE RIVER AT MILLS	-	1970-	7	33N	79W	WDEQ	M	6	C	
06644500	CASPER CREEK AT CASPER	668	1970-	7	33N	79W	MRB	MW	5	C	
							WDEQ	M	6		
#06644550	NORTH PLATTE RIVER AT CASPER	-	1971-	4	33N	79W	MRB	MW	5	C	
							WDEQ	M	6		
06645000	NORTH PLATTE RIVER BELOW CASPER	12574	1950-52, 1957-59, 1967-	4	33N	78W	WDA	M	1	C	
							WDEQ	M	5,6,7		
@06646600	DEER CREEK BEL MILLAR WASTEWAY, AT GLENROCK	213	1967-	4	33N	75W	WDA	Q	1	C	
#@06646780	SAND CREEK NEAR GLENROCK		1977-81	5	33N	74W	USGS	M	1,5,6,7	C	DISC. 9/30/81
							USGS	M	11		
							USGS	Q	8		
							USGS	SA	10		

Also sediment station.
@ Also surface-water station.

Table 3. Water-quality stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION SE	LOCATION TSP	LOCATION RNGE	FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
PLATTE RIVER BASIN (continued)											
@06646800	NORTH PLATTE RIVER NEAR GLENROCK	13538	1960-	17	33N	74W	WDA	Q	1	C,S	
06647990	BOX ELDER CREEK BELOW I-25, NEAR CAREYHURST	-	1981-	13	33N	74W	WDA	Q	1	C	
06649500	LAPRELE CREEK NEAR ORPHA	-	1981-	15	33N	72W	WDA	Q	1	C	
06650500	WAGONHOUND CREEK NEAR LABONTE	-	1981-	16	31N	71W	WDA	Q	1	C	
06651500	LABONTE CREEK NEAR LABONTE	-	1981-	15	31N	71W	WDA	Q	1	C	
#@06652000	NORTH PLATTE RIVER AT ORIN	14888	1966-	17	31N	69W	WDA	M	1	C	
							WDEQ	M	5,6,7		
							EPA	Q	10		
							EPA	HL	8		
@06652800	NORTH PLATTE RIVER BELOW GLENDO RESERVOIR	15548	1966-	30	29N	67W	WDA	M	1	C	
@06656000	NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR	16237	1950-58, 1965-	27	27N	66W	WDA	Q	1	CF	
06656500	NORTH PLATTE RIVER NEAR GUERNSEY	-	1981-	5	26N	65W	WDEQ	M	5,6,7	C	
06660070	LARAMIE RIVER ABOVE HOWELL	-	1980-	9	16N	73W	WDEQ	M	5,6	CF	
06660100	LARAMIE RIVER AT HOWELL	-	1974-80	30	17N	73W	WDEQ	M	1,5,6	CF	DISC. 10/81
06660500	LARAMIE RIVER AT TWO RIVERS	1224	1966-	5	17N	74W	WDA	Q	1	CF	
06661500	LITTLE LARAMIE RIVER AT TWO RIVERS	376	1965-	6	17N	74W	WDA	Q	1	CF	
#@06670500	LARAMIE RIVER NEAR FORT LARAMIE	4495	1965-	25	26N	65W	WDA	M	1	CF	
#@06674500	NORTH PLATTE R AT WYOMING-NEBRASKA STATE LINE	22218	1965-	4	23N	58W	WDA	M	1	CF	
							WDEQ	M	5,6		
06676550	HORSE CREEK AT WYCROSS RANCH, NEAR LAGRANGE	561	1981-	28	20N	61W	WDEQ	M	5,6,7	CF	
GREEN RIVER BASIN											
@09188500	GREEN RIVER AT WARREN BRIDGE, NEAR DANIEL	468	1962-64, 1967-73, 1974-82	8	35N	111W	WDEQ	M	1,5,6	GR	DISC. 2/4/82
09192600	GREEN RIVER NEAR BIG PINEY	1260	1967-	21	30N	110W	WDA	Q	1	GR	
@09205000	NEW FORK RIVER NEAR BIG PINEY	1230	1965-	22	30N	110W	WDA	Q	1	GR	
#@09209400	GREEN RIVER NEAR LABARGE	3910	1963-	33	26N	112W	WDA	M	1	GR	
@09211200	GREEN RIVER BELOW FONTENELLE RESERVOIR	4280	1967-	31	24N	111W	WDA	M	1	GR	
09213705	BIG SANDY RIVER BELOW BIG SANDY RESERVOIR	-	1981-	12	26N	106W	WDA	Q	1	GR	
09213800	BIG SANDY RIVER AT FARSON	-	1981-	33	25N	106W	WDA	Q	1	GR	
#@09214500	LITTLE SANDY CREEK ABOVE EDEN	134	1976-81	11	26N	105W	BLM	M	1,5	GR	DISC. 9/30/81
							BLM	Q	7		
							BLM	A	8		
09214955	JACK MORROW CREEK NEAR FARSON	-	1981	33	26N	104W	WDA	M	1	GR	DISC. 12/31/81
09215500	LITTLE SANDY CREEK AT FARSON	-	1981-	34	25N	106W	WDA	Q	1	GR	
@09215550	BIG SANDY RIVER BELOW FARSON	-	1981-	12	24N	107W	BRUC	C	5	GR	

Also sediment station.
@ Also surface-water station.

Table 3. Water-quality stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
				SE	TSP	RNGE					
GREEN RIVER BASIN (continued)											
#@09216000	BIG SANDY RIVER BELOW EDEN	1610	1961-64, 1967-81	31	24N	107W	WDA	M	1	GR	DISC. 6/81
							EPA	M	1,5,6,7		
							EPA	HL	8		
							WDA	HL	9		
#@09216050	BIG SANDY RIVER AT GASSON BRIDGE, NEAR EDEN	1720	1975-	29	23N	108W	WDA	M	1	GR	
							BRUC	C	5		
09216300	GREEN RIVER AT BIG ISLAND, NEAR GREEN RIVER	7300	1966-81	26	21N	109W	WDA	M	1	GR	DISC. 12/31/81
#@09216527	SEPARATION CREEK NEAR RINER	55.3	1975-81	32	20N	90W	BLM	M	1,4,5,7	CH	DISC. 9/30/81
							BLM	Q	8		
#@09216545	BITTER CREEK NEAR BITTER CREEK	308	1975-81	36	18N	99W	USGS	M	1,4,5,7	GR	DISC. 9/30/81
							USGS	Q	8		
#@09216562	BITTER CR AB SALT WELLS CR, NR SALT WELLS	836	1975-81	2	19N	103W	BLM	M	1,4,5,7	GR	DISC. 9/30/81
							BLM	Q	8		
#@09216565	SALT WELLS CREEK NEAR SOUTH BAXTER	34.7	1975-81	15	14N	103W	BLM	M	1,4,5,7	GR	DISC. 9/30/81
							BLM	Q	8		
#@09216750	SALT WELLS CREEK NEAR SALT WELLS	526	1975-81	14	19N	103W	BLM	M	1,4,5,7	GR	DISC. 9/30/81
							BLM	Q	8		
							BLM	D	2,3		
09216810	KILLPECKER CREEK AT ROCK SPRINGS	-	1975-80, 1982-	26	19N	105W	WDEQ	M	6	GR	
09216880	BITTER CR BEL LITTLE BITTER CREEK, NR KANDA	-	1975-	7	18N	105W	EPA	BM	1,5,6,7	GR	
							EPA	HL	8		
#@09217000	GREEN RIVER NEAR GREEN RIVER	14000	1951-	26	18N	107W	USGS	D	2,3	GR	
							USGS	SA	1,7		
							USGS	Q	8		
							USGS	BM	5,6,7		
09217010	GREEN RIVER BELOW GREEN RIVER	-	1973-	36	18N	107W	WDEQ	M	1,4,5,6	GR	
							EPA	M	4,7		
							EPA	HL	8		
09221650	SMITHS FORK NEAR LYMAN	-	1974-82	12	16N	114W	WDEQ	M	1,5,6	GR	DISC. 2/4/82
#@09222000	BLACKS FORK NEAR LYMAN	821	1962-	15	17N	113W	BRUC	D	2,3		
							BRUC	M	1		
#@09222200	RYCKMAN CREEK NEAR GLENCOE	53.4	1980-81	8	18N	117W	BLM	M	1,4,5,7	GR	DISC. 9/30/81
#@09222250	LITTLE MUDDY CR AB NORTH FORK, NR GLENCOE	366	1981	31	19N	116W	BLM	Q	8	GR	DISC. 9/30/81
							BLM	M	1,4,5,7		
							BLM	Q	8		
#@09222400	MUDDY CREEK NEAR HAMPTON	963	1975-81	18	18N	113W	BLM	M	1,4,5,7	GR	DISC. 9/30/81
							BLM	Q	8		
09224050	HAMS FORK NEAR DIAMONDVILLE	-	1975-	36	21N	116W	EPA	M	1,4,5,6,7	GR	
							EPA	HL	8		

Also sediment station.
@ Also surface-water station.

Table 3. Water-quality stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			FUNDING AGENCY	SAMPLING FREQUENCY	ANALYSIS SCHEDULE	FIELD OFFICE	REMARKS
				SE	TSP	RNGE					
GREEN RIVER BASIN (continued)											
#09224450	HAMS FORK NEAR GRANGER	670	1965-	30	19N	111W	WDA	M	1	GR	
#@09224700	BLACKS FORK NEAR LITTLE AMERICA	3100	1951-	15	18N	109W	USGS	D	2,3	GR	
							USGS	M	1		
09229500	HENRYS FORK NEAR MANILA, UT	520	1951-	23	12N	109W	WDA	M	1	GR	
#@09235300	VERMILLION CREEK NEAR HIAWATHA, CO	196	1975-81	15	12N	100W	BLM	M	1,4,5,7	GR	DISC. 9/30/81
							BLM	Q	8		
09253000	LITTLE SNAKE RIVER NEAR SLATER, CO	285	1978-	15	12N	87W	WDA	M	1	CF	
#@09257000	LITTLE SNAKE RIVER NEAR DIXON	988	1975-	8	12N	90W	WDA	M	1	GR	
09259050	LITTLE SNAKE RIVER BELOW BAGGS	-	1981-	7	12N	92W	WDA	Q	1	GR	
							WDEQ	M	5,6,7		
BEAR RIVER BASIN											
@10020100	BEAR RIVER AB RESERVOIR, NEAR WOODRUFF, UT	752	1968-	29	17N	120W	WDA	M	1	GR	
							WDEQ	M	5,7		
#@10027000	TWIN CREEK AT SAGE	246	1967-69, 1975-81	7	21N	119W	EPA	M	1,5,6,7	GR	DISC. 9/30/81
							EPA	HL	8		
							BLM	M	1,4,5,7		
							BLM	Q	8		
#@10039500	BEAR RIVER AT BORDER	2490	1965-	15	14S	46E	WDA	BM	1	U	
							WDEQ	M	4		
SNAKE RIVER BASIN											
#@13018300	CACHE CREEK NEAR JACKSON	10.6	1965-	1	40N	116W	USGS	-	-	I	
13018500	FLAT CREEK AT JACOBSON RANCH, NEAR JACKSON	-	1981-82							S	DISC. 8/82
@13022500	SNAKE RIVER ABOVE RESERVOIR, NEAR ALPINE	3465	1965-	-	-	-	WDA	M	1	I	
13023900	SALT RIVER NEAR SMOOT	-	1981-	33	30N	118W	WDA	M	1	S	
13025000	SWIFT CREEK NEAR AFTON	27.4	1981-	29	32N	118W	WDA	M	1	S	
@13027500	SALT RIVER ABOVE RESERVOIR, NEAR ETNA	829	1965-	28	36N	119W	WDA	M	1	I	

Also sediment station.
@ Also surface-water station.

Sediment stations

Explanation of abbreviations and codes used in table 4.

Period of Record: The dates given are the calendar years in which records began or ended. Breaks of less than a year are not shown.

Location:
SE, section
TSP, township
RNGE, range

Sampling Equipment:
H, hydrographer sample
O, observer sample
P, pumping sampler
S, single-stage samplers

Suspended Sediment Sampling Frequency:

1, samples collected by observer once daily during operation except during periods of rapidly changing flow when additional samples are collected.
2, sampled by hydrographer at least once a month all year, with additional samples collected during periods of rapidly changing flow.
3, sampled by hydrographer at least once a month during open-water period and at least twice during extended periods of ice cover.
4, sampled by hydrographer at least once a month Apr.-Sept.
5, samples collected by Water and Power Resources Services weekly during irrigation season.
6, pumping sampler serviced monthly or more often during periods of high runoff.
7, single-stage sampler serviced at least monthly. Samples collected by hydrographer if there is flow at time of visit.
8, infrequent sampling, sample when visiting station operated by WSE personnel.
9, sampled quarterly.

Bed Material Sampling Frequency:

3, sample the surficial bed material in the cross section at least three times per year (high, medium, and low flow).
4, manual in-situ measurement and analysis of streambed material (pebble count), at a frequency of once per year (or longer), at the discretion of the District sediment specialist.

Laboratory: W, Worland

Funding Agency:
BLM, Bureau of Land Management
BRUM, Bureau of Reclamation, Upper Missouri River Basin
MRB, Geological Survey, Missouri River Basin Program
USGS, Geological Survey, Federal Program
WSE, Wyoming State Engineer

Explanation of abbreviations and codes used in table 4.--continued

Field Office:
- B, Buffalo
- C, Casper
- CF, Cheyenne Field Unit
- CT, Contractor
- GR, Green River
- I, Idaho
- M, Montana
- R, Riverton
- SD, South Dakota
- W, Worland
- U, Utah

Suspended Analysis Type:
1, suspended-sediment concentration.
2, 0.062mm sieve analysis.
3, particle-size distribution.
4, all of the above.

Table 4. Sediment stations

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			SAMPLING EQUIPMENT	SUSPENDED SAMPLING FREQ	BED MATERIAL SAMPLING FREQ	LABORATORY	FUNDING AGENCY	FIELD OFFICE	SUSPENDED ANALYSIS TYPE	REMARKS
				SE	TSP	RNGE								
	YELLOWSTONE RIVER BASIN													
*@06207510	BIG SAND COULEE AT WYOMING-MONTANA STATE LINE	134	1973-81	32	9S	22E	O	1	3	W	BLM	M	1,3	DISC. 9/30/81
*@06220500	EAST FORK WIND RIVER NEAR DUBOIS	427	1975-	34	6N	6W	H	3	4	W	MRB	R	1,3	
@06225500	WIND RIVER NEAR CROWHEART	1891	1971-	16	3N	2W	H	3	4	W	WSE	R	3	
@06226000	WYOMING CANAL NEAR LENORE		1975-	17	3N	1W	H	5	-	W	BRUM	R	4	SAMPLED BY USBR
06227500	WYOMING CANAL BEL PILOT DIVERSION, NR MORTON		1975-	20	3N	1E	H	5	-	W	BRUM	R	4	SAMPLED BY USBR
@06246800	OCEAN DRAIN NEAR MIDVALE		1979-	25	3N	3E	H	3	-	W	BRUM	R	4	
*@06253000	FIVEMILE CREEK NEAR SHOSHONI	418	1948-75, 1978-	19	3N	6E	H	3	-	W	BRUM	R	1	
*@06256900	DRY CREEK NEAR BONNEVILLE	52.6	1965-81	8	38N	92W	H	1	3	W	BLM	R	1,3	DISC. 9/30/81
06258010	COTTONWOOD DRAIN NEAR SHOSHONI		1979-	27	4N	5E	H	4	-	W	BRUM	R	1,3	
*@06259000	WIND RIVER BELOW BOYSEN RESERVOIR	7701	1979-	9	5N	6E	H	3	-	W	USGS	R	1,2	
*@06267400	EAST FORK NOWATER CREEK NEAR COLTER	149	1977-81	31	46N	92W	H	6	-	W	BLM	W	1,2	DISC. 9/30/81
*06267900	MIDDLE FORK FIFTEENMILE CREEK NEAR WORLAND		1979-	2	47N	95W	H	9	-	W	DEQ	W	1,2	
@06268500	FIFTEENMILE CREEK NEAR WORLAND	518	1949-72, 1979-	27	47N	93W	P	6	-	W	DEQ	W	1,2	
*@06270000	NOWOOD RIVER NEAR TEN SLEEP	803	1971-	27	47N	88W	H	3	-	W	WSE	W	4	
*@06277950	DRY CREEK NEAR GREYBULL		1979-81	7	52N	94W	H	9		W	BLM	W	1,2	DISC. 9/30/81
*@06279500	BIGHORN RIVER AT KANE	15765	1946-64, 1969-	9	55N	94W	H	3	-	W	MRB	W	1,3	
@06283800	SHOSHONE RIVER AB WILLWOOD DAM, NR WILLWOOD		1979-	19	54N	100W	H	2	-	W	BRUM	W	1,2	
06283950	WILLWOOD CANAL NEAR WILLWOOD		1979-	9	54N	100W	H	5	-	W	BRUM	W	4	
06284000	SHOSHONE RIVER BELOW WILLWOOD DAM	1833	1979-	9	54N	100W	H	5	-	W	BRUM	W	4	
*@06285100	SHOSHONE RIVER NEAR LOVELL	2350	1971-	16	56N	96W	H	3	-	W	WSE	W	4	
*@06305500	GOOSE CREEK BELOW SHERIDAN	392	1971-	15	56N	84W	H	2	-	W	WSE	B	4	
*@06313400	SALT CREEK NEAR SUSSEX	769	1976-81	8	42N	79W	H	3	3	W	USGS	C	1,3	DISC. 9/30/81
*@06313500	POWDER RIVER AT SUSSEX	3090	1949-53, 1976-	13	43N	79W	H	3	3	W	USGS	C	1,3	
*@06316400	CRAZY WOMAN CR AT UPPER STATION, NR ARVADA	945	1977-81	18	52N	77W	H	3	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06320200	CLEAR CREEK BELOW ROCK CREEK, NEAR BUFFALO	322	1976-81	30	51N	81W	H	2	3	W	USGS	B	1,3	DISC. 9/30/81
*@06320400	CLEAR CREEK AT UCROSS	409	1976-81	19	53N	80W	H	2	3	W	USGS	B	1,3	DISC. 9/30/81
*@06324000	CLEAR CREEK NEAR ARVADA	1110	1950-53, 1975-	36	57N	77W	H	2	3	W	USGS	B	1,3	
*#06324500	POWDER RIVER AT MOORHEAD, MT	8080	1951-53, 1956-57, 1969-72, 1975-	8	9N	48W	O	1	-	-	-	M	1	
*@06324890	LITTLE POWDER RIVER BEL CORRAL CR, NR WESTON	204	1977-	12	52N	72W	H	3	3	W	USGS	B	1,3	
*@06324925	LITTLE POWDER RIVER NEAR WESTON	540	1977-81	19	54N	70W	H	3	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06324970	LITTLE POWDER RIVER AB DRY CREEK, NR WESTON	1230	1975-	13	57N	71W	H	3	3	W	WSE	B	1,3	

* Also water-quality station.
@ Also surface-water station.

Table 4. Sediment stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			SAMPLING EQUIPMENT	SUSPENDED SAMPLING FREQ	BED MATERIAL SAMPLING FREQ	LABORATORY	FUNDING AGENCY	FIELD OFFICE	SUSPENDED ANALYSIS TYPE	REMARKS
				SE	TSP	RNGE								
	CHEYENNE RIVER BASIN													
*@06364700	ANTELOPE CREEK NEAR TECKLA	959	1977-81	35	41N	70W	H	7	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06365300	DRY FORK CHEYENNE RIVER NEAR BILL	128	1976-81	31	38N	73W	H	3	3	W	BLM	C	1,3	DISC. 9/30/81
*@06365900	CHEYENNE RIVER NEAR DULL CENTER	1527	1976-81	20	40N	68W	H	3	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06375600	LITTLE THUNDER CREEK NEAR HAMPSHIRE	234	1977-81	33	43N	67W	H	7	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06376300	BLACK THUNDER CREEK NEAR HAMPSHIRE	535	1979-81	31	42N	65W	H	7	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06378300	LODGEPOLE CREEK NEAR HAMPSHIRE	354	1977-81	5	41N	64W	H	7	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06386000	LANCE CREEK NEAR RIVERVIEW	2070	1976-	14	39N	62W	H	3	3	W	USGS	C	1,3	
*@06425720	BELLE FOURCHE RIV BL RATTLESNAKE CR, NR PINEY	495	1975-	9	46N	71W	P	6	3	W	USGS	B	1,3	
*@06425750	COAL CREEK NEAR PINEY	-	1980-	12	46N	71W	P	6	3	W	USGS	B	1,3	
*@06425780	BELLE FOURCHE RIVER ABOVE DRY CREEK, NR PINEY	594	1975-	25	47N	71W	P	6	3	W	USGS	B	1,3	
*@06425900	CABALLO CREEK AT MOUTH, NEAR PINEY	260	1977-	4	47N	70W	H	7	3	W	USGS	B	1,3	
*@06425950	RAVEN CREEK NEAR MOORCROFT	76	1977-	1	48N	69W	H	7	3	W	USGS	B	1,3	
*@06426400	DONKEY CREEK NEAR MOORCROFT	246	1977-81	30	50N	68W	H	7	3	W	USGS	CT	1,3	DISC. 9/30/81
*@06426500	BELLE FOURCHE RIVER BELOW MOORCROFT	1670	1976-	24	50N	68W	H	3	3	W	USGS	B	1,3	
@06430500	REDWATER CR AT WYOMING-SOUTH DAKOTA ST LINE	471	1971-	18	7N	1E	H	3	4	W	WSE	SD	1,3	
	PLATTE RIVER BASIN													
*@06623800	ENCAMPMENT RIV AB HOG PARK CR, NR ENCAMPMENT	72.7	1964-	10	12N	84W	H	3	-	W	USGS	CF	1,3	
*@06628800	SAGE CREEK NEAR SARATOGA	263	1972-81	32	19N	85W	H	4	3	W	BLM	CF	1,3	DISC. 9/30/81
*@06630300	BIG DITCH NEAR COYOTE SPRINGS	110	1974-81	30	23N	83W	H	3	3	W	BLM	CF	1,3	DISC. 9/30/81
*@06630330	NORTH DITCH NEAR COYOTE SPRINGS	22.6	1976-81	19	23N	83W	H	3	3	W	BLM	CF	1,3	DISC. 9/30/81
*@06634600	LITTLE MEDICINE BOW RIVER NEAR MEDICINE BOW	963	1971-	22	23N	78W	H	3	3	W	WSE	CF	4	
*@06634990	HANNA DRAW NEAR HANNA	21.6	1974-81	34	24N	81W	H	3	3	W	BLM	CF	1,3	DISC. 9/30/81
*@06635000	MEDICINE BOW R AB SEMINOE RESERVOIR, NR HANNA	2338	1971-	34	24N	81W	H	3	3	W	WSE	CF	4	
06637740	SWEETWATER RIVER AB ROCK CR, NR ATLANTIC CITY	-	1981	22	28N	99W	H	3	-	W	WDA	R	1,3	DISC. 10/81
06637950	ROCK C AT OREGON TRL CROSSING, N ATLANTIC CITY	-	1981	35	29N	99W	H	3	-	W	WDA	R	1,3	DISC. 10/81
*@06639000	SWEETWATER RIVER NEAR ALCOVA	2327	1974-	25	29N	87W	H	3	-	W	WSE	C	1,3	
*@06642000	NORTH PLATTE RIVER AT ALCOVA	10812	1979-	17	30N	82W	H	3	-	W	USGS	C	1,2	
*06644550	NORTH PLATTE RIVER AT CASPER	-	1971-	4	33N	79W	H	3	3	W	WSE	C	1,3	
*@06646780	SAND CREEK NEAR GLENROCK	79.9	1977-81	5	33N	74W	H	8	3	W	USGS	C	1,3	DISC. 9/30/81
*@06652000	NORTH PLATTE RIVER AT ORIN	14888	1971-	17	31N	69W	H	3	3	W	WSE	C	1,3	
*@06670500	LARAMIE RIVER NEAR FORT LARAMIE	4495	1971-	25	26N	65W	H	3	3	W	WSE	CF	1,3	
*@06674500	NORTH PLATTE RIV AT WYOMING-NEBRASKA ST LINE	22218	1971-	4	23N	58W	H	3	3	W	WSE	CF	1,3	
	GREEN RIVER BASIN													
*@09209400	GREEN RIVER NEAR LABARGE	3910	1974-	33	26N	112W	H	3	4	W	WSE	GR	1,3	
@09213500	BIG SANDY RIVER NEAR FARSON	322	1971-	17	27N	106W	H	4	3	W	WSE	GR	1,3	SEASONAL
*@09214500	LITTLE SANDY CREEK ABOVE EDEN	134	1975-81	11	26N	105W	H	3	3	W	BLM	GR	1,3	DISC. 9/30/81

* Also water-quality station.
@ Also surface-water station.

Table 4. Sediment stations (continued)

STATION NUMBER	STATION NAME	DRAINAGE AREA	PERIOD OF RECORD	LOCATION			SAMPLING EQUIPMENT	SUSPENDED SAMPLING FREQ	BED MATERIAL SAMPLING FREQ	LABORATORY	FUNDING AGENCY	FIELD OFFICE	SUSPENDED ANALYSIS TYPE	REMARKS
				SE	TSP	RNGE								
GREEN RIVER BASIN (continued)														
*@09216000	BIG SANDY RIVER BELOW EDEN	1610	1971-81	31	24N	107W	H	3	3	W	WSE	GR	1,3	DISC. 8/10/81
*@09216050	BIG SANDY RIVER AT GASSON BRIDGE, NEAR EDEN	1720	1981-	29	23N	108W	H	3	3	W	WSE	GR	1,3	
*@09216527	SEPARATION CREEK NEAR RINER	55.3	1975-81	32	20N	90W	H	3	3	W	BLM	CF	1,3	DISC. 9/30/81
*@09216545	BITTER CREEK NEAR BITTER CREEK	308	1976-81	36	18N	99W	S	7	3	W	USGS	GR	1,3	DISC. 9/30/81
*@09216562	BITTER CREEK AB SALT WELLS CR, NR SALT WELLS	836	1976-81	2	19N	103W	H	3	3	W	BLM	GR	1,3	DISC. 9/30/81
*@09216565	SALT WELLS CREEK NEAR SOUTH BAXTER	34.7	1975-81	15	14N	103W	P	6	3	W	BLM	GR	1,3	DISC. 9/30/81
*@09216750	SALT WELLS CREEK NEAR SALT WELLS	526	1976-81	14	19N	103W	P	6	3	W	BLM	GR	1,3	DISC. 9/30/81
*@09217000	GREEN RIVER NEAR GREEN RIVER	14000	1951-	26	18N	107W	O	1	4	W	USGS	GR	4	
*@09222000	BLACKS FORK NEAR LYMAN	821	1971-	15	17N	113W	H	3	3	W	WSE	GR	1,3	
*@09222200	RYCKMAN CREEK NEAR GLENCOE	534	1980-81	8	18N	117W	H	3	3	W	BLM	GR	1,3	DISC. 9/30/81
*@09222250	LITTLE MUDDY CREEK AB NORTH FORK, NR GLENCOE	366	1980-81	31	19N	116W	H	3	3	W	BLM	GR	1,3	DISC. 9/30/81
*@09222400	MUDDY CREEK NEAR HAMPTON	963	1976-81	18	18N	113W	H	3	3	W	BLM	GR	1,3	DISC. 9/30/81
*09224450	HAMS FORK NEAR GRANGER	670	1971-	30	19N	111W	H	3	4	W	WSE	GR	1,3	
*@09224700	BLACKS FORK NEAR LITTLE AMERICA	3100	1967-	15	18N	109W	H	3	4	W	WSE	GR	1,3	
*@09235300	VERMILLION CREEK NEAR HIAWATHA, CO	196	1976-81	15	12N	100W	H	3	3	W	BLM	GR	1,3	DISC. 9/30/81
*@09257000	LITTLE SNAKE RIVER NEAR DIXON	988	1971-	8	12N	90W	H	4	3	W	WSE	CF	1,3	
BEAR RIVER BASIN														
*@10027000	TWIN CREEK AT SAGE	246	1976-	7	21N	119W	H	3	3	W	BLM	U	1,3	
*@10039500	BEAR RIVER AT BORDER	2490	1969, 1979-	15	14S	46E	H	3	-	W	USGS	U	1,2	
SNAKE RIVER BASIN														
*@13018300	CACHE CREEK NEAR JACKSON	10.6	1968-	1	40N	116W	H	3	3	W	USGS	I	1,3	

* Also water-quality station.
@ Also surface-water station.

Ground-water stations

Explanation of abbreviations and codes used in table 5.

Well number: The well-numbering procedure used is based on the U.S. Land Grant System. The first segment of the number is the township (north); the second number segment is the range (west); the third number segment is the section, which is followed by a first letter designating the quarter section, a second letter, if shown, designating the quarter-quarter section, etc., (A-NE¼, B-NW¼, C-SW¼, D-SE¼). Well 30-108-05BCD2, for example, is in the SE¼ of the SW¼ of the NW¼ of sec. 5, T. 30 N., R. 108 W. The number 2 indicates it is the second well in the quarter-quarter-quarter section. Wells shown in Fremont County have an additional uppercase letter that begins the number. This letter designates the quadrant of the Wind River Meridian and Base Line System. The quadrants are lettered A, B, C, and D in a counter-clockwise direction beginning with A in the northeast quadrant.

Lat-Long-Seq No.: The first six digits are the latitude in degrees, minutes, and seconds. The next seven digits are the longitude in degrees, minutes, and seconds. The last two digits indicate the sequence number of when the well was inventoried in the event more than one well has the same latitude and longitude.

Geologic Unit:

111 ALVM	Alluvium	211 ALMD	Almond Formation
111 TRRC	Terrace deposits	211 FXHL	Fox Hills Sandstone
121 NRPK	North Park Formation	211 LNCE	Lance Formation
121 OGLL	Ogallala Formation	211 MVRD	Mesaverde Formation or Group
122 ARKR	Arikaree Formation		
123 BRUL	Brule Formation	211 STEL	Steele Shale
123 WRVR	White River Formation or Group	217 LKOT	Lakota Formation
		221 SNDC	Sundance Formation
124 LNEY	Laney Shale Member of Green River Formation	237 SPRF	Spearfish Formation
		317 MNKT	Minnekahta Limestone
124 WDRV	Wind River Formation	331 MDSN	Madison Limestone
124 WSTC	Wasatch Formation	337 PHSP	Pahasapa Limestone
125 FRUN	Fort Union Formation	374 FLTD	Flathead Quartzite or Sandstone

The seven-character geologic unit code given above consists of two parts. The first three characters are numeric and identify the Era, System, and Series of the rock unit. The next four characters are in alpha mnemonic code for the name of the rock-stratigraphic unit.

Explanation of abbreviations and codes used in table 5--continued

Numeric Codes for Geologic Age Identification

	Code
Cenozoic	100
Quaternary	110
Holocene	111
Pleistocene	112
Tertiary	120
Pliocene	121
Miocene	122
Oligocene	123
Eocene	124
Paleocene	125
Mesozoic	200
Cretaceous	210
Upper	211
Lower	217
Jurassic	220
Upper	221
Middle	224
Lower	227
Triassic	230
Upper	231
Middle	234
Lower	237
Paleozoic	300
Permian	310
Upper	311
Lower	317
Paleozoic--continued	
Pennsylvanian	320
Upper	321
Middle	324
Lower	327
Mississippian	330
Upper	331
Lower	337
Devonian	340
Upper	341
Middle	344
Lower	347
Silurian	350
Upper	351
Middle	354
Lower	357
Ordovician	360
Upper	361
Middle	364
Lower	367
Cambrian	370
Upper	371
Middle	374
Lower	377
Precambrian	400

Explanation of abbreviations and codes used in table 5--Continued

Funding Agency: DEPD, Wyoming Department of Economic Planning and Development
CHEY, City of Cheyenne
USGS, Geological Survey, Federal Program
WSE, Wyoming State Engineer

Field Office:
B, Buffalo
C, Casper
CF, Cheyenne Field Unit
CH, Cheyenne Hydrologic Surveillance Section
GR, Green River
O, Observer
P, Project Personnel
R, Riverton
S, Wyoming State Engineer
SD, South Dakota District
U, Utah District

Frequency of Observation:
C, continuous (graphic or digital recorder)
M, monthly (12 visits per year)
Q, quarterly (4 visits per year)
SA, semiannual (2 visits per year)
A, annual (1 visit per year)

Period of Record: The dates given are the calendar years in which records began or ended. A record consists of one or more measurements during a calendar year.

Remarks: Recorder 77- indicates recorder continuous to present.

Table 5. Ground-water stations

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
ALBANY COUNTY	MISSOURI RIVER BASIN							
19-074-36CCA	413424105390301	211STEL	WSE	CF	SA	68,70-	O. L. SCHMIDL	
CAMPBELL COUNTY	MISSOURI RIVER BASIN							
44-072-22CC 01	434611105295001	124WSTC	USGS	C	SA	66-	DURHAM MEAT CO.	
46-071-34DDC01	435502105215001	211FXHL	WSE	P	C	76-81	MR. EDWARDS	DISC. 1981
CARBON COUNTY	MISSOURI RIVER BASIN							
14-083-03CAB01	411234106424601	121NRPK	WSE	P	C	80-	ROBERT HELMER	RECORDER 80-
15-083-24DCC01	411448106401701	121NRPK	WSE	P	C	80-81	JOHN ROUSE	DISC. 1981
15-083-32DDD01	411307106442601	121NRPK	WSE	CF	SA	67-68,70-	HENRY FINCH	
15-083-34BAB01	411353106425701	121NRPK	WSE	P	C	80-	ROBERT HELMER	RECORDER 80-
15-084-10ADB01	411707106491301	121NRPK	WSE	P	C	80-81	FRANK CARROLL	DISC. 1981
16-084-09CBC01	412202106511401	121NRPK	WSE	P	C	80-	G. A. BERGER	RECORDER 80-
17-083-28BCD01	412501106442901	121NRPK	WSE	P	C	80-81	EDWIN SHOLINE	DISC. 1981
17-085-23AAC01	412610106552401	122ARKR	WSE	CF	SA	77-	L. E. WALCK	
18-083-16DBD01	413145106440501	121NRPK	WSE	P	C	80-	SARATOGA LAND & CATTLE	RECORDER 80-
18-083-17CAC01	413148106453701	121NRPK	WSE	P	C	80-	BURTON TUTTLE	RECORDER 80-
20-083-28BAB	414104106442701	121NRPK	USGS	CF	SA	50-	STATE OF WYOMING	
21-089-22ADA	414650107254501	125FRUN	WSE	CF	SA	63,65-	BLM	
23-085-19DBD	415652107014201	211MVRD	WSE	CF	SA	67-68,70-	MILLER ESTATE	
25-078-03CCC	420936106105001	111ALVM	WSE	CF	SA	68,70-		
28-087-16CCA	422338107145001	122ARKR	WSE	S	C	81-		RECORDER 81-
CONVERSE COUNTY	MISSOURI RIVER BASIN							
32-071-02DAA01	424628105194201	125FRUN	WSE	C	SA	75-	ART SIMS	
32-071-04BDD01	424631105224301	125FRUN	WSE	C	SA	75-		
32-071-11BAB01	424558105204401	125FRUN	WSE	C	SA	75-		
32-071-31AAA	424229105242901	123WRVR	USGS	C	SA	50-56,59-	SALLIE EDWARDS	
32-074-03BCD	424620105424201	331MDSN	WSE	C	C	74-	WM BARBER	RECORDER 74-
32-074-08DBC01	424520105440501	331MDSN	WSE	C	C	80-	WM BARBER	RECORDER 81-
33-071-24DAA01	424902105192301	125FRUN	WSE	C	SA	75-	RAYMOND BAKER	
33-071-26DAD01	424801105200901	125FRUN	WSE	C	SA	75-	ART SIMS	
33-071-34ACD01	424722105214301	125FRUN	WSE	C	SA	75-	D.W. FUNK	
33-071-34ACD02	424723105213602	125FRUN	WSE	C	SA	75-	ROY JARMON	
33-071-34ADC01	424723105213001	125FRUN	WSE	C	SA	75-	PHILLIPS PETROLEUM	
33-071-34BBC01	424734105222801	125FRUN	WSE	C	SA	75-	ROY JARMON	
36-073-24BA	430502105334101	124WSTC	WSE	P	C	81-	MRS. WHITING	RECORDER 81-
38-074-03AAA	431809105430901	124WSTC	WSE	P	C	81-	ROY BAKER	RECORDER 81-

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
CROOK COUNTY	MISSOURI RIVER BASIN							
50-068-36AD	441620104575001	211LNCE	WSE	C	SA	69-	STATE OF WYOMING	
51-063-23AAC	442340104225001	221SNDC	WSE	C	SA	68,75-	CITY OF SUNDANCE	
51-066-06DCD	442540104493501	331MDSN	WSE	S	C	81-	CITY OF GILLETTE	RECORDER 81-
53-065-18BAC	443503104425101	317MNKT	USGS	C	SA	55,60,62-	NATIONAL PARK SERVICE	
53-065-18BBD01	443450104430001	237SPRF	WSE	C	SA	62-	NATIONAL PARK SERVICE	
53-065-18BBD02	443453104425602	337PHSP	WSE	C	SA	62-	NATIONAL PARK SERVICE	
FREMONT COUNTY	MISSOURI RIVER BASIN							
29-093-36DB	422632107540501	122ARKR	WSE	R	C	74-	STATE OF WYOMING	RECORDER 74-
30-095-31AD	423127108132201	122ARKR	WSE	R	SA	65,73-		
A 1-4-33DDB	430051108240901	124WDRV	WSE	R	C	51,61-	TETON STUDS CORP.	RECORDER 66-
A 3-3-21ADA01	431326108311001	124WDRV	WSE	R	SA	49,65-	H. W. ROLAND	
A 3-3-21ADA02	431327108311102	124WDRV	WSE	R	SA	48-	H. W. ROLAND	
A 3-3-25BBB	431253108284401	124WDRV	WSE	R	SA	49-	WPRS	
A 4-1-18DBC	431915108481501	124WDRV	WSE	R	SA	66-67,70-	USGS	
D 1-3-07DCD	425900108335401	124WDRV	WSE	R	SA	66-67,70-	USGS	
D 1-3-29CCC	425623108332401	124WDRV	WSE	R	SA	66-67,70-	USGS	
D 1-5-11BDD	425931108151301	111ALVM	WSE	R	SA	65-67,70-	USGS	
D 2-1-06DDD	425437108474101	111ALVM	WSE	R	SA	65-67,70-	I. W. SEAMANDS	
GOSHEN COUNTY	MISSOURI RIVER BASIN							
19-061-02CCD	413816104094901	111ALVM	WSE	S	SA	43,49-69,72-	CITY OF LAGRANGE	
19-061-03DCD	413817104103201	111ALVM	WSE	S	M	78-	CHARLES LYMAN	
19-061-04ABC	413852104114901	111ALVM	WSE	S	C	72-	FRANK SANDERS	RECORDER 73-
19-061-04CDD02	413813104115702	111ALVM	WSE	S	M	43,48-69,72-	HUGH STEMLER	
19-061-10AAB01	413810104102301	123BRUL	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
19-061-13BAA	413715104082701	123BRUL	WSE	S	M	72-	FLORA VANDEHEI	
20-060-30BBB	414049104074501	123BRUL	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
20-060-30CBB	414023104074501	123BRUL	WSE	S	M	72-	JOHN MEIER & SON, INC.	
20-061-03DAD01	414348104101301	123WRVR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
20-061-14CDB	414151104094101	123BRUL	WSE	S	M	78-	DAN PHINNEY	
20-061-15ADA02	414218104101502	123BRUL	WSE	S	M	78-	HORSE CRK. CONS. DIST.	
20-061-15DCD01	414149104103001	111ALVM	WSE	S	M	78-	HORSE CRK. CONS. DIST.	
20-061-15DCD02	414149104103002	123BRUL	WSE	S	M	78-	HORSE CRK. CONS. DIST.	
20-061-20DCC	414050104130301	111ALVM	WSE	S	M	78-	JOHN MEIER & SON, INC.	
20-061-21DDD	414051104112201	111ALVM	WSE	S	M	70-	CURTIS MEIER	
20-061-22AAA03	414139104101503	123BRUL	WSE	S	M	78-	HORSE CRK. CONS. DIST.	
20-061-22ACC	414118104104201	123BRUL	WSE	S	M	78-	JOHN MEIER & SON, INC.	
20-061-23BBC01	414133104100401	111ALVM	WSE	S	M	78-	JOHN MEIER & SON, INC.	
20-061-23BBC02	414133104100402	123BRUL	WSE	S	M	78-	JOHN MEIER & SON, INC.	

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
GOSHEN COUNTY	MISSOURI RIVER BASIN (continued)							
20-061-23BDB02	414128104094502	123BRUL	WSE	S	C	78-	JOHN MEIER & SON, INC.	RECORDER 78-
20-061-23CCC	414051104100701	111ALVM	WSE	S	C	72-	JOHN MEIER & SON, INC.	RECORDER 73-
20-061-23DBB02	414116104092802	111ALVM	WSE	S	M	72-	CURTIS MEIER	
20-061-24CDD	414052104083001	123BRUL	WSE	S	M	76-	JOHN MEIER & SON, INC.	
20-061-25CBC02	414017104085702	111ALVM	WSE	S	M	72-	JOHN MEIER & SON, INC.	
20-061-25DCC	414002104081601	123BRUL	WSE	S	M	76-	CURTIS MEIER	
20-061-27DDA	414005104101701	111TRRC	WSE	S	M	43,49-70,72-	CURTIS TEMPLIN	
20-061-30BAC	414043104142301	123BRUL	WSE	S	M	72-	JAMES WARD	
20-061-31BCB	413944104144101	123BRUL	WSE	S	M	72-	LOVERCHECK LAND & CATTLE	
20-061-31DAD	413919104134101	123BRUL	WSE	S	M	72-	WARD HAY & CATTLE CO.	
20-061-34DCC	413907104103801	123BRUL	WSE	S	M	78-	CURTIS TEMPLIN	
20-061-35AAB	413953104091101	123BRUL	WSE	S	M	70-76,78-	JOHN MEIER & SON, INC.	
20-061-35CCC	413910104100701	123BRUL	WSE	S	M	78-	JOHN MEIER & SON, INC.	
23-060-10AAC	415902104031601	111ALVM	WSE	CH	Q	50-	FRENCH IRR. DIST.	
24-060-28CBD	420141104051501	111ALVM	WSE	CH	Q	62-		
24-061-05CBB02	420449104133402	111ALVM	WSE	CH	Q	51-	USGS	
24-061-11BBB	420426104100601	111TRRC	WSE	CH	Q	62-	BILL RING	
24-061-23CCB	420204104100601	111ALVM	WSE	CH	Q	62-	USGS	
25-061-28DBC	420626104114501	111TRRC	WSE	CH	Q	43,48-52,54-	M. W. BERRY	
25-062-02BBB	421031104170001	111ALVM	WSE	CH	Q	62-	USGS	
25-062-19AAB	420753104204701	111ALVM	WSE	CH	Q	48-53,55-	LESTER STROUD	
25-062-27BDC02	420640104175402	111ALVM	WSE	CH	Q	62-	USGS	
25-062-31ADC	420548104204801	111ALVM	WSE	CH	Q	62-	USGS	
25-063-09CCB	420900104262201	111ALVM	WSE	CH	Q	43,48-	EMERY BRIGHT	
26-062-14BBA	421357104165001	111ALVM	WSE	CH	Q	48-	LESTER DUNTEN	
26-063-32DAC	421044104263201	111ALVM	WSE	CH	Q	48-	JOSEPH SPECKNER	
26-064-23CDA	421233104303401	111ALVM	WSE	CH	Q	62-	USGS	
26-064-28BBB	421216104332301	111ALVM	USGS	O	M	48-	NPS-FED NO. 2	
26-064-29ADA	421205104333001	111ALVM	WSE	O	M	42-43,46-	NPS	
28-061-06ABA	422512104135501	122ARKR	WSE	S	C	79-	STATE ENGINEER	RECORDER 79-
29-061-08CDC	422946104131001	122ARKR	WSE	CH	SA	49-51,70,75-	GERALD STURMAN	
29-061-17AAD	422928104121401	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
29-061-23ABB	422849104090801	122ARKR	WSE	S	C	79-	STATE ENGINEER	RECORDER 79-
29-061-26CBB01	422730104094801	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
30-060-04DAA	423603104041001	122ARKR	WSE	CH	SA	72-	WM IMMESOETA	
30-060-29BBC	423255104062301	122ARKR	WSE	CH	SA	72-	OTTO YORK	
30-061-09BBB01	423549104120901	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
30-062-33DCA	423130104183401	122ARKR	WSE	CH	SA	74-	RONALD PODALAK	

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
JOHNSON COUNTY	MISSOURI RIVER BASIN							
42-078-14DDB	433618106112901	211LNCE	WSE	C	SA	65-	W. B. LINCH	
49-083-05DCB	440912106512001	374FLTD	WSE	B	C	74-	MOBIL OIL	RECORDER 79-
49-083-27DBA02	441112106493502	331MDSN	WSE	B	C	74-	MOBIL OIL	RECORDER 74-
51-083-10ACB	442427106494001	124WSTC	WSE	B	SA	60-	HELEN RAUCH	
LARAMIE COUNTY	MISSOURI RIVER BASIN							
12-060-07DDD	410059104072401	123BRUL	WSE	S	C	77-	STATE ENGINEER	RECORDER 77-
12-061-06CBB	410218104152201	111TRRC	WSE	CH	M	69-81	KENNETH THOMPSON	DISC. 1981
12-061-15DDD	410007104105301	123BRUL	WSE	CH	M	70-81	USGS	DISC. 1981
12-062-10BBC	410145104184101	111TRRC	WSE	CH	M	70-81		DISC. 1981
12-062-13BAA	410100104160301	111TRRC	WSE	S	C	75-	STATE ENGINEER	RECORDER 75-
12-062-18DDB	410050104211701	111ALVM	WSE	CH	M	77-81	FRANCIS BLAKE	DISC. 1981
12-062-22ABB	410008104181101	111TRRC	WSE	CH	M	52,70-81	FRANK DWINNELL	DISC. 1981
12-063-15AAA02	410059104243202	123BRUL	WSE	S	C	73-	USGS	RECORDER 72-
13-060-05CCB	410703104071201	123BRUL	WSE	S	C	69-	ELMER GLANTZ	RECORDER 72-
13-060-20BBC	410458104071201	123BRUL	WSE	CH	M	46,70-81	BERNARD MORTIZ	DISC. 1981
13-061-04CBC	410710104125801	123BRUL	WSE	CH	M	53,59,65,70-81	CLAUS PLAMBECK	DISC. 1981
13-061-35CCC	410237104104101	111TRRC	WSE	CH	M	70-81	A. M. IDE	DISC. 1981
13-063-27DDC	410330104244501	123BRUL	WSE	CH	M	70-81		DISC. 1981
13-063-32DCC	410237104271801	123BRUL	WSE	CH	M	72-81		DISC. 1981
13-063-35CCC	410235104242801	123BRUL	WSE	CH	M	71-81	USGS	DISC. 1981
13-067-06BCB	410738104563501	1210GLL	CHEY	CH	A	67-81	ART KING	DISC. 1981
13-067-07DAD	410622104552801	1210GLL	CHEY	CH	A	63-64,67-81	ART KING	DISC. 1981
13-067-15BBA	410608104525201	1210GLL	CHEY	CH	A	41-43,49-50,64-65,67-68,71-	WARREN LIVESTOCK CO.	
13-067-16ABC	410557104534101	1210GLL	CHEY	CH	A	41-43,50,64-65,67-81	WARREN LIVESTOCK CO.	DISC. 1981
13-067-19CAA	410446104560501	1210GLL	CHEY	CH	A	41-42,50,64,67-81	DUCK CRK GRAZING ASSN.	DISC. 1981
13-067-28BCD	410401104540801	1210GLL	CHEY	CH	A	63,67,69-81	DUCK CRK GRAZING ASSN.	DISC. 1981
13-067-34BBA	410330104525801	1210GLL	CHEY	CH	A	63-81	STATE OF WYOMING	DISC. 1981
13-068-01BCD	410731104572901	1210GLL	CHEY	CH	A	63,67-81	ART & JERRY KING	DISC. 1981
13-068-03BBA	410747104594801	1210GLL	CHEY	CH	A	44-81	CITY OF CHEYENNE	DISC. 1981
13-068-04ADC	410729105001801	1210GLL	CHEY	CH	A	44-81	CITY OF CHEYENNE	DISC. 1981
13-068-04CBD	410717105010101	1210GLL	CHEY	CH	A	45-48,50-81	CITY OF CHEYENNE	DISC. 1981
13-068-04DCC	410707105002801	1210GLL	CHEY	CH	A	44-48,50-81	CITY OF CHEYENNE	DISC. 1981
13-068-09BAC	410640105004801	1210GLL	CHEY	CH	A	44,55,68-81	ART KING	DISC. 1981
13-068-11ACC	410642104581201	1210GLL	CHEY	CH	A	69-81	ART KING	DISC. 1981
13-068-12CCA	410622104573501	1210GLL	CHEY	CH	A	69-81	CHEVRON OIL CO.	DISC. 1981
13-068-12DCA	410623104565601	1210GLL	CHEY	CH	A	63-64,67-81	ART & JERRY KING	DISC. 1981
13-068-12DCC	410622104573201	1210GLL	CHEY	CH	A	70-81	ART KING	DISC. 1981
13-068-13CCC	410530104574001	1210GLL	CHEY	CH	C	42-50,69-	ART KING	RECORDER 72-
13-068-14BBB	410608104584901	1210GLL	CHEY	CH	A	45-50,69-81	CITY OF CHEYENNE	DISC. 1981

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
LARAMIE COUNTY	MISSOURI RIVER BASIN (continued)							
13-068-14CBD	410501104583901	1210GLL	CHEY	CH	A	45-81	CITY OF CHEYENNE	DISC. 1981
13-068-15CBD	410537104594701	1210GLL	CHEY	CH	A	63,68,70-81	ART & JERRY KING	DISC. 1981
13-068-16DBA	410542105002201	1210GLL	CHEY	CH	A	63,67,69-81	ART & JERRY KING	DISC. 1981
13-068-16DBD	410534105002401	1210GLL	CHEY	CH	A	49-81	CITY OF CHEYENNE	DISC. 1981
13-068-17CCB	410531105021601	1210GLL	CHEY	CH	A	65,67-69,71-81	BELVOIR GRAZING ASSN.	DISC. 1981
13-068-23BBC	410507104585201	1210GLL	CHEY	CH	A	67-81	BELVOIR GRAZING ASSN.	DISC. 1981
13-068-34ADD	410314104585801	1210GLL	CHEY	CH	A	61-69,71-81	CITY OF CHEYENNE	DISC. 1981
14-060-05BCB	410238104070801	123BRUL	WSE	S	C	57-	C. C. GROSS	RECORDER 72-
14-060-10DBB	411131104041801	123BRUL	WSE	S	C	73-	USGS	RECORDER 73-
14-060-19BDA02	411001104075001	111TRRC	WSE	CH	M	42,71-81	DALE BOWERS	DISC. 1981
14-061-18DDD01	411022104141201	123WRVR	WSE	S	C	77-	LARAMIE CO. WELL #2	RECORDER 77-
14-061-22DCC	410900104110701	123BRUL	WSE	S	C	75-	SHERIL BROWN	RECORDER 75-
14-061-23AAB	411019104094501	123BRUL	WSE	CH	M	71-81	WALTER BROWN	DISC. 1981
14-061-25CCB	410847104093101	123BRUL	WSE	CH	M	70-81	JAY BROWN	DISC. 1981
14-062-06AAC	411246104211301	1210GLL	WSE	CH	M	77-81	ALEX PAVLICA	DISC. 1981
14-062-20CCB	410940104205501	122ARKR	WSE	CH	M	59,64,70-81	JOHN BASTIAN	DISC. 1981
14-062-24BAB	411019104160201	123BRUL	WSE	CH	M	70-81	MINNICK	DISC. 1981
14-063-15AAA	411114104242501	122ARKR	WSE	S	C	77-	LARAMIE CO. WELL #3	RECORDER 77-
14-064-01DCB	411214104293301	1210GLL	WSE	S	C	77-	HOLLENBECK	RECORDER 77-
14-064-19BCC	411005104355001	1210GLL	WSE	S	C	77-	LARAMIE CO. WELL #9	RECORDER 77-
14-066-10ABA	411210104452001	1210GLL	WSE	S	C	77-	LARAMIE CO. WELL #8	RECORDER 77-
14-067-06DAD	411231104553401	1210GLL	CHEY	CH	A	64-65,67-81	JOHN BELL	DISC. 1981
14-067-07CCB	411130104562701	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-067-07DCB	411131104555601	1210GLL	CHEY	CH	A	64-65,67-81	CITY OF CHEYENNE	DISC. 1981
14-067-18CBD	411050104562001	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-067-18DDC	411034104554001	1210GLL	CHEY	CH	C	56-	CITY OF CHEYENNE	RECORDER 72-
14-067-19BBD	411020104562701	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-067-31BBD	410834104562201	1210GLL	CHEY	CH	A	41-43,64,67-81	MARK T. COX III	DISC. 1981
14-067-31DDC	410755104554301	1210GLL	CHEY	CH	A	64-65,67-81	ART KING	DISC. 1981
14-068-10DCD	411124104591101	1210GLL	CHEY	CH	A	64-65,67-81		DISC. 1981
14-068-12DBC	411138104570501	1210GLL	CHEY	CH	A	65,67-81	CITY OF CHEYENNE	DISC. 1981
14-068-13ACB	411109104571001	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-068-13CCD	411032104573001	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-068-13DAD	411045104564201	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-068-14ADA	411107104574901	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-068-14CAD	411049104582301	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-068-14CBB	411050104584701	111ALVM	CHEY	CH	A	41-48,50-81	CITY OF CHEYENNE	DISC. 1981
14-068-14DCD	411035104580501	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-068-23DDC	410939104580101	1210GLL	CHEY	CH	A	40-47,49-81	CITY OF CHEYENNE	DISC. 1981
14-068-24BDD	411007104571801	1210GLL	CHEY	CH	A	56-81	CITY OF CHEYENNE	DISC. 1981
14-068-24DDD	410939104563601	1210GLL	CHEY	CH	A	50-53,55-62,64-81	CITY OF CHEYENNE	DISC. 1981
14-068-25ABB	410932104565801	1210GLL	CHEY	CH	A	41-42,50-51,64,70-81	CITY OF CHEYENNE	DISC. 1981

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
LARAMIE COUNTY	MISSOURI RIVER BASIN (continued)							
14-068-25DDA	410857104564401	1210GLL	CHEY	CH	A	41-81	CITY OF CHEYENNE	DISC. 1981
14-068-26BDD	410908104581801	1210GLL	CHEY	CH	A	42-43,45-47,68-69,71-81	CITY OF CHEYENNE	DISC. 1981
14-068-26CBC01	410901104585201	1210GLL	CHEY	CH	A	40-81	CITY OF CHEYENNE	DISC. 1981
14-068-27DCC	410848104592301	1210GLL	CHEY	CH	A	40,42-61,63-81	CITY OF CHEYENNE	DISC. 1981
14-068-28BCB02	410922105010402	1210GLL	CHEY	CH	A	64,68-81	FRANCIS LIVESTOCK CO.	DISC. 1981
14-068-28BDA	410921105004001	1210GLL	CHEY	CH	A	64-65,67-81	FRANCIS LIVESTOCK CO.	DISC. 1981
14-068-32DDC	410759105012201	1210GLL	CHEY	CH	A	48-81	CITY OF CHEYENNE	DISC. 1981
14-068-33ABC	410836105002801	1210GLL	CHEY	CH	A	47-81	CITY OF CHEYENNE	DISC. 1981
14-068-33DCC	410758105003501	1210GLL	CHEY	CH	A	45-48,50-81	CITY OF CHEYENNE	DISC. 1981
14-068-34AAB	410844104590601	1210GLL	CHEY	CH	A	40,42-81	CITY OF CHEYENNE	DISC. 1981
14-068-34DBD	410809104591901	1210GLL	CHEY	CH	A	43-48,50,69-81	CITY OF CHEYENNE	DISC. 1981
14-068-34DDD	410755104590001	1210GLL	CHEY	CH	A	44-48,50-81	CITY OF CHEYENNE	DISC. 1981
14-068-35CAC	410811104583501	1210GLL	CHEY	CH	A	45-81	CITY OF CHEYENNE	DISC. 1981
14-068-35DDC02	410757104582302	1210GLL	CHEY	CH	C	69-	CITY OF CHEYENNE	RECORDER 72-
14-068-36ACC	410825104571001	1210GLL	CHEY	CH	A	41-81	CITY OF CHEYENNE	DISC. 1981
14-068-36ADB	410833104565101	1210GLL	CHEY	CH	A	41-61,63-81	CITY OF CHEYENNE	DISC. 1981
14-068-36BCA	410832104573501	1210GLL	CHEY	CH	A	41-61,63-81	CITY OF CHEYENNE	DISC. 1981
15-060-18DBB	411557104074001	123BRUL	WSE	CH	M	71-81	HENRY JESSEN	DISC. 1981
15-062-17BCC	411605104205201	1210GLL	WSE	CH	M	77-81	MIKE PAVLICA	DISC. 1981
15-062-20AAA	411531104194701	1210GLL	WSE	S	C	77-	LARAMIE CO. WELL #4	RECORDER 77-
15-063-18DBD	411549104281001	1210GLL	WSE	CH	M	77-81	ALICE PACE	DISC. 1981
15-063-32BBC	411341104275201	1210GLL	WSE	CH	M	77-81	MCDOWELL	DISC. 1981
15-063-35CCD	411304104240801	1210GLL	WSE	CH	M	77-81	ALEX PAVLICA	DISC. 1981
15-066-10BAB	411725104454601	1210GLL	WSE	S	C	77-	LARAMIE CO. WELL #7	RECORDER 77-
15-067-02DBA	411750104510901	1210GLL	WSE	CH	A	61-81	ERVIN M. MUELLER	DISC. 1981
15-067-32DBA	411330104543701	1210GLL	CHEY	CH	A	42,50,53,64,67,69-81	WARREN LIVESTOCK CO.	DISC. 1981
15-069-06ACA	411808105094201	123BRUL	CHEY	CH	A	43-44,54-81	CITY OF CHEYENNE	DISC. 1981
15-069-09CAD	411655105073501	123BRUL	CHEY	CH	A	42-44,54-81	CITY OF CHEYENNE	DISC. 1981
15-069-16ACB	411621105072901	123BRUL	CHEY	CH	A	54-81	CITY OF CHEYENNE	DISC. 1981
15-069-21DCC	411452105072801	123BRUL	CHEY	CH	A	54-81	CITY OF CHEYENNE	DISC. 1981
15-069-27CDC	411406105063701	123BRUL	CHEY	CH	A	55-81	CITY OF CHEYENNE	DISC. 1981
15-069-28DBA	411425105071701	123BRUL	CHEY	CH	A	54-81	CITY OF CHEYENNE	DISC. 1981
15-069-33ABB	411359105072701	123BRUL	CHEY	CH	A	55-81	CITY OF CHEYENNE	DISC. 1981
15-069-34AAA	411355105055401	123BRUL	CHEY	CH	A	54-81	CITY OF CHEYENNE	DISC. 1981
16-060-07BBB	412227104081401	1210GLL	WSE	S	C	75-	STATE ENGINEER	RECORDER 75-
16-060-10DBC	412155104040801	1210GLL	WSE	CH	M	76-81	DON ANDERSON PETER #2	DISC. 1981
16-060-27ABC	411941104041401	1210GLL	WSE	CH	M	72-81	ANDERSON LIVESTOCK	DISC. 1981
16-061-01CBA	412312104092001	1210GLL	WSE	CH	M	72-73,77-81	ORVILLE LERURISH	DISC. 1981
16-061-04DBB	412250104120901	1210GLL	WSE	CH	M	72-73,77-81	LEONARD LUNDBERG	DISC. 1981
16-061-08CCB	412147104135301	1210GLL	WSE	CH	M	77-81	E. ZIMMERMAN	DISC. 1981
16-061-14BBC	412126104102909	1210GLL	WSE	CH	M	64,74-81	WARREN ANDERSON	DISC. 1981
16-061-17AAA	411136104125301	1210GLL	WSE	S	C	77-	LARAMIE CO. WELL #5	RECORDER 77-

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
LARAMIE COUNTY	MISSOURI RIVER BASIN (continued)							
16-062-34CCC	411811104183501	122ARKR	WSE	CH	M	63-64,77-81	KING CATTLE CO.	DISC. 1981
16-063-26DDD02	411903104231902	122ARKR	WSE	CH	M	77-81	ROBERT WISROTH	DISC. 1981
16-065-21DBC	412015104394301	121OGLL	WSE	CH	M	53,64-65,77-81		DISC. 1981
17-060-20ADA02	412542104053202	122ARKR	WSE	CH	M	72-81	JOHN W. FREEBURG	DISC. 1981
17-060-30DAD	412429104064101	121OGLL	WSE	CH	M	72-81	RICHARD R. LARSON	DISC. 1981
17-060-33CBB	412343104053101	121OGLL	WSE	S	C	75-	STATE ENGINEER	RECORDER 75-
17-060-34CBB	412346104041801	121OGLL	WSE	CH	M	72-81	ED P. ANDERSON	DISC. 1981
17-061-26AAC	412456104084501	121OGLL	WSE	CH	M	77-81	MIKE & BRUCE PETERSON	DISC. 1981
17-062-20CCC	412507104133701	121OGLL	WSE	S	C	77-	LARAMIE CO. WELL #6	RECORDER 77-
17-062-26AAA	412505104160301	121OGLL	WSE	CH	M	53,64-70,72-81	STOCKGROWERS BANK	DISC. 1981
17-063-26DBA02	412433104230802	122ARKR	WSE	CH	M	77-81	LAZY JR LAND & LIVSTK	DISC. 1981
LINCOLN COUNTY	GREEN RIVER BASIN							
21-114-26BCC	414619110193301	124LNEY	WSE	GR	SA	65-	STATE OF WYOMING	
24-112-08CBB	420430110191901	124LNEY	WSE	GR	SA	66-70,72-	NATIONAL PARK SERVICE	
LINCOLN COUNTY	BEAR RIVER BASIN							
22-119-05CDA	415442110571801	111TRRC	WSE	U	SA	59,62-	DOYLE KNOUSE	
23-119-32BDA02	415552110571502	111TRRC	WSE	U	SA	62-	THORNOCK BROS.	
23-120-13AAC	415849110590801	111ALVM	WSE	U	SA	55-	DOYLE KNOUSE	
24-119-28ACA	420202110555501	111TRRC	WSE	U	SA	62-	HERMAN TEICHERT	
NATRONA COUNTY	MISSOURI RIVER BASIN							
30-085-21BAB	423346107014201	122ARKR	USGS	C	SA	67-		
33-080-04ABB	425147106263701	111TRRC	WSE	C	SA	50,65-	USBR	
35-080-31DDD	425700106282801	111TRRC	WSE	C	SA	67-	USGS	
40-078-15AAB	432633106115201	211FXHL	USGS	C	SA	65-	TOWN OF EDGERTON	
NIOBRARA COUNTY	MISSOURI RIVER BASIN							
31-060-15DA	423940104031201	122ARKR	WSE	CH	SA	62-	USGS	
31-061-29BB	423816104131501	122ARKR	WSE	CH	SA	72-	ROBERT HOLMES	
31-062-18DC	421024104060401	122ARKR	WSE	CH	SA	73,75-	GORDAN KAAN	
32-060-29BC	424323104060301	122ARKR	WSE	CH	SA	56,72-	A. E. LARSON	
32-062-05BAA	424709104194101	122ARKR	WSE	S	C	79-	STATE ENGINEER	RECORDER 79-
32-062-12CCD	424532104153001	122ARKR	WSE	CH	SA	72-	KEN FREEMAN	
32-062-20BDD	424410104195401	122ARKR	WSE	CH	SA	58,68,70-	KOEL LARSEN	
32-062-32BBB	424244104202001	122ARKR	USGS	C	C	70-	RICHARD PFISTER	RECORDER 70-
32-063-02CCC	424623104234601	122ARKR	WSE	CH	SA	52,59,68-	G. CHRISTIAN	

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
NIOBRARA COUNTY	MISSOURI RIVER BASIN (continued)							
32-063-08DAA	424544104260601	122ARKR	WSE	S	C	79-	STATE ENGINEER	RECORDER 79-
32-063-33BBB	424232104261001	122ARKR	WSE	CH	SA	57,60-	EARL QUIBLEY	
32-064-24DA 02	424355104290202	122ARKR	WSE	CH	SA	60-	IRA LAMB	
33-062-29DBA	424801104203101	122ARKR	WSE	CH	SA	67-74,76-	DALE FALLERTON	
36-062-28AB 01	430422104183201	331MDSN	USGS	C	C	74-	ENERGY TRANS. CO.	RECORDER 74-
36-062-28AB 02	430422104183202	217LKOT	WSE	C	C	74-	ENERGY TRANS. CO.	RECORDER 75-
40-061-21BAB	432611104114801	111ALVM	WSE	C	SA	70-	USGS	
PLATTE COUNTY	MISSOURI RIVER BASIN							
21-065-16AAA	414755104391101	122ARKR	WSE	CH	SA	72-	HELLBAUM	
23-068-15DDD	415733104585601	122ARKR	WSE	CH	Q	58-70,72,74-	WPRS	
23-068-18DAD	415749105022501	122ARKR	WSE	CH	Q	58-70,72-	WPRS	
24-067-21AAB	420237104532101	111ALVM	WSE DEPD	S	C	79-	ED PREUIT	RECORDER 79-
24-068-03DAD	420441104585801	122ARKR	WSE	CH	Q	58-70,72-	USBR	
24-068-22AAB	420246104590301	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 81-
25-067-19DDA01	420718104553901	122ARKR	WSE DEPD	P	C	79-	ED WILHELM	RECORDER 79-
25-067-34CCD	420524104530201	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
25-068-12DDA	420859104565001	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
25-068-15BBD	420840105000401	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
25-068-24AAD	420748104565051	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
25-068-31AAA	420613105024401	122ARKR	WSE DEPD	P	C	79-	ERNIE DOUGLAS	RECORDER 79-
26-068-12CBD01	421443104574601	122ARKR	WSE	S	C	80-	STATE ENGINEER	RECORDER 80-
26-068-36BBB01	421128104575801	122ARKR	WSE	S	C	81-	STATE ENGINEER	RECORDER 81-
27-069-25AAD	421723105035701	122ARKR	WSE	S	C	81-	STATE ENGINEER	RECORDER 81-
27-069-25ABB	421501105042801	122ARKR	WSE	S	C	81-	STATE ENGINEER	RECORDER 81-
27-069-25ABC01	421722105042401	122ARKR	WSE	S	C	81-	STATE ENGINEER	RECORDER 81-
28-068-17CBC	422355105023801	122ARKR	WSE	CH	Q	61-70,72-	W. H. JOHNSON	
SHERIDAN COUNTY	MISSOURI RIVER BASIN							
53-083-07ADC	443450106534801	124WSTC	WSE	B	SA	60-	MR. PRATHER	
54-081-14BC02	443915106352201	124WSTC	WSE	B	SA	60-	ULM SCHOOL	
SUBLETTE COUNTY	GREEN RIVER BASIN							
28-112-19AC01	422348110114501	124WSTC	WSE	GR	SA	65-70,72-	BLM	
30-107-06DD01	423540109382001	124WSTC	WSE	GR	SA	64-66,68-	BLM	
30-111-17ACA01	423504110053001	124WSTC	WSE	GR	SA	65-	SUBLETTE COUNTY	

Table 5. Ground-water stations (continued)

WELL NUMBER	LAT-LONG-SEQ NO	GEO LOGIC UNIT	FUNDING AGENCY	FIELD OFFICE	FREQUENCY OF OBSERVATION	PERIOD OF RECORD	NAME OF OWNER	REMARKS
SUBLETTE COUNTY		GREEN RIVER BASIN (continued)						
32-108-05BA	424624109450201	111ALVM	WSE	GR	SA	65-	JAMES BARGER	
35-111-08ADB	430118110071001	111ALVM	USGS	GR	SA	65-	USGS	
SWEETWATER COUNTY		GREEN RIVER BASIN						
18-110-21DBA01	413128109495801	111ALVM	WSE	GR	SA	64-	R. E. HOLDING	
19-095-05DD	413902108070601	124WSTC	WSE	GR	SA	72-	MR. JOLLEY	
19-099-06DCC	413850108362501	125FRUN	WSE	GR	SA	63-	ROCK SPGS GRAZING ASSOC.	
20-100-25DCD	414035108442001	211ALMD	WSE	GR	SA	63-	USGS	
22-105-07AAD	415402109203601	124LNEY	WSE	GR	SA	64-	SHEEP CO.	
25-106-27CCD	420615109265201	124LNEY	WSE	GR	SA	65-	TOWN OF FARSON	
UINTA COUNTY		GREEN RIVER BASIN						
15-115-20CBA	411549110243501	111TRRC	WSE	GR	SA	57-	SCHOOL DISTRICT	
15-118-24BCB	411607110404201	124WSTC	WSE	GR	SA	64-		
UINTA COUNTY		BEAR RIVER BASIN						
16-121-11ACC	412249111015801	111TRRC	WSE	U	SA	55-	ELWIN SESSIONS	
WESTON COUNTY		MISSOURI RIVER BASIN						
42-066-14ADC01	433710104443501	211FXHL	USGS	P	SA	74-	TRUE OIL CO.	
42-066-36CD01	433415104435001	211LNCE	USGS	C	SA	76-	SLAGLE RANCH	
46-061-29BAC	435628104123401	337PHSP	WSE	C	SA	69-	R. J. RUMNEY	
46-063-09DB	435840104253001	217LKOT	WSE	C	Q	69-	BLACK HILLS P & L	
47-060-04ADA	440500104034001	337PHSP	WSE	SD	M	72,75-	WESTON COUNTY	
48-065-35CCB	440530104381001	337PHSP	WSE	O	M	61-	UPTON #4	

WATER-RESOURCES PROJECTS

The numerous water-resources projects being conducted in Wyoming are described in the following pages. The descriptions reflect project status as of October 1981. The project number is given following each title. All project leaders in the Wyoming district are located in the Cheyenne office.

The funding agencies during the fiscal year 1982 are shown for each project. The section "Progress and Significant Results" covers the period for fiscal year 1981. The area of each study, unless noted as statewide, is shown as either a shaded area or a large black dot on the index map near the title of each project.

Water-Resources Projects Conducted by the Wyoming District

PROJECT TITLE: Surface-water stations (WY 00-001).

FUNDING AGENCIES: Wyoming State Engineer, Wyoming Department of Economic Planning and Development, Wyoming Department of Environmental Quality, Wyoming Game and Fish Department, Wyoming Water Development Commission, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, City of Cheyenne, Corps of Engineers, National Park Service, and Geological Survey.

PROJECT LEADER: Ernest S. Denison.

FIELD LOCATION: Statewide.

PROBLEM: Surface-water information is needed for purposes of surveillance, planning, design, hazard warning, operation, and management in related fields such as water supply, hydroelectric power, flood control, irrigation, bridge and culvert design, wildlife management, pollution abatement, flood-plain management, and water resources development. To provide this information, an appropriate data base is necessary.

OBJECTIVE: The objectives are to (1) collect surface-water data sufficient to satisfy needs for current-purpose uses such as (a) assessment of water resources, (b) operation of reservoirs or industries, (c) forecasting of stage or discharge, (d) pollution controls and disposal of wastes, (e) discharge data to accompany water-quality measurements, (f) compact and legal requirements, and (g) research or special studies; and (2) collect data necessary for analytical studies to define for any location the statistical properties of, and trends in, the occurrence of water in streams, lakes, and estuaries for use in planning and design.

APPROACH: Standard methods of data collection will be used as described in the series, "Techniques of Water Resource Investigations of the United States Geological Survey," and partial-record gaging will be used where it serves the required purpose instead of complete-record gaging.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Hydrologic data collection was performed on schedule. Computation of the 1980 water-year records was completed. During the year, seven gaging stations were installed and seven were discontinued. Several indirect measurements were made to aid in the definition of rating curves. To function more efficiently and reduce vehicle mileage, three stations were transferred to the contractor for operation and two others from the contractor back to the District. Numerous requests were received for printed tables of daily flow and for statistical summaries of flow data.

PLANS FOR FISCAL YEAR 1982: Limited Federal funding will result in the discontinuation of 19 gaging stations at the beginning of the year. An additional 12 stations will be discontinued if the Bureau of Land Management funding is cut further. The remainder of the network will remain with little or no change.

REPORTS PUBLISHED DURING FISCAL YEAR 1980 and 1981:

Green, S. L., 1981, Water-resources investigations of the U.S. Geological Survey in Wyoming, fiscal year 1980: U.S. Geological Survey Open-File Report 81-201, 118 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-78-1, 652 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 2, Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-78-2, 728 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1979, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-79-1, 642 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1979, Volume 2, Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-79-2, 283 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-80-1, 621 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 2, Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-80-2, 269 p.

PROJECT TITLE: Ground-water stations (WY 00-002).

FUNDING AGENCIES: Wyoming State Engineer, City of Cheyenne, Wyoming Department of Economic Planning and Development, and Geological Survey.

PROJECT LEADER: Jess O. Ragsdale.

FIELD LOCATION: Statewide.

PROBLEM: (1) Long-term water-level records are needed to evaluate the effects of climatic variations on the recharge to and discharge from the ground-water systems to provide a data base from which to (a) measure the effects of development, (b) to assist in the prediction of future supplies, and (c) to provide data for management of the resource. (2) Short-term water-level records are also needed for (a) assessment of ground-water resources, (b) areal investigations, and (c) water-use investigations.

OBJECTIVE: The objectives are (1) to collect water-level data sufficient to provide a minimum long-term data base so that the general response of the hydrologic system to climatic variations and induced stresses is known and potential problems can be defined early enough to allow planning and management; and (2) to provide a data base against which short-term records acquired in areal studies can be analyzed. This analysis must provide (a) an assessment of the ground-water resource, (b) allow prediction of future conditions, (c) detect and define pollution and supply problems, and (d) provide the data base necessary for ground-water management.

APPROACH: The most advantageous locations for long-term observations will be determined and this network will be refined as records become available and detailed areal studies of the ground-water system more closely define the aquifers, their properties, and the stresses to which they are subjected.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Water-level data for about 330 observation wells in the state were collected under the general supervision of the District Office. Continuous recorders were installed at 21 wells, bringing the total to 68 wells. About 1,200 water-level observations were made during the year. A report on ground-water levels for the years 1978-80 was completed.

PLANS FOR FISCAL YEAR 1982: An observation-well network evaluation will be completed in 1982 to determine which wells are no longer needed and in what areas additional wells are needed. Water-level observations will continue at frequencies similar to those for 1981. The open-file report containing 1978-80 water-level data and hydrographs for 1970-80 will be published. Another open-file report containing data for 1981 will be prepared.

REPORTS PUBLISHED DURING FISCAL YEAR 1980 and 1981:

Green, S. L., 1981, Water-resources investigations of the U.S. Geological Survey in Wyoming, fiscal year 1980: U.S. Geological Survey Open-File Report 81-201, 118 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 1. Missouri River Basin: U.S. Geological Survey Water-Data Report WY-78-1, 652 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 2. Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-78-2, 782 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1979, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-79-1, 642 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1979, Volume 2, Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-79-2, 283 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-80-1, 621 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 2, Green River, Bear River and Snake River Basins: U.S. Geological Survey Water-Data Report WY-80-2, 269 p.

PROJECT TITLE: Water-quality stations (WY 00-003).

FUNDING AGENCIES: Wyoming Department of Agriculture, Wyoming Department of Environmental Quality, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, Department of Energy, Environmental Protection Agency, and Geological Survey.

PROJECT LEADER: Samuel J. Rucker, IV.

FIELD LOCATION: Statewide.

PROBLEM: Water-resource planning and water-quality assessment require a nationwide base level of relatively standardized information. For intelligent planning and realistic assessment of the water resource, the chemical and physical quality of the rivers and streams must be defined and monitored.

OBJECTIVE: The objectives are to provide a national bank of water-quality data for broad Federal planning and action programs and to provide data for State and Federal management of interstate waters.

APPROACH: A network of water-quality stations will be operated to provide data on average chemical concentrations, loads, and trends as required by planning and management agencies.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Data collection continued at 190 stations during fiscal year 1981. Data was processed and tabulated for publication in the annual data report series. Two volumes in that series (80-1 and 80-2) were published. Adjustments were made in the network according to decisions made by cooperating State agencies at a meeting held early in the year. Sampling frequency was changed at about one-third of the stations. Sampling for picloram and dicamba herbicides were dropped at 20 stations.

PLANS FOR FISCAL YEAR 1982: Water-quality operations are to be discontinued at 48 stations and modified at 30 stations as a result of reductions or limits in funding available from the Geological Survey and many cooperating agencies. Additional adjustments are anticipated.

REPORTS PUBLISHED DURING FISCAL YEAR 1980 and 1981:

Green, S. L., 1981, Water-resources investigations of the U.S. Geological Survey in Wyoming, fiscal year 1980: U.S. Geological Survey Open-File Report 81-201, 118 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 1. Missouri River Basin: U.S. Geological Survey Water-Data Report WY-78-1, 652 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 2. Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-78-2, 728 p.

U.S. Geological Suvey, 1980, Water-resources data for Wyoming, water year 1979, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-79-1, 642 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1979, Volume 2, Green River, Bear River and Snake River Basins: U.S. Geological Survey, Water-Data Report WY-79-2, 283 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-80-1, 621 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 2, Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-80-2, 269 p.

PROJECT TITLE: Sediment stations (WY 00-004).

FUNDING AGENCIES: Wyoming State Engineer, Wyoming Department of Environmental Quality, Bureau of Land Management, Bureau of Reclamation, and Geological Survey.

PROJECT LEADER: Ernest S. Denison

LOCATION: Statewide.

PROBLEM: Water-resource planning and water-quality assessment require a nationwide base level of relatively standardized information. Sediment concentrations and discharges in rivers and streams must be defined and monitored.

OBJECTIVE: The major objectives are to (1) provide a national bank of sediment data for use in broad Federal and State planning and action programs, (2) provide data for Federal and State management of interstate waters, and (3) provide data for interpretation in areal studies.

APPROACH: A network of sediment stations will be established and operated to provide data on areal and temporal averages and trends of sediment concentration, sediment discharges, and particle size distribution of sediment being transported by rivers and streams.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Sediment data collection and processing continued on schedule at three daily observer stations and several stations with pumping samplers, and at 72 stations where the sampling frequency ranged from weekly to quarterly. The sediment laboratory in Worland processes all the sampling from Wyoming plus samples from the Alaska, Montana, and North Dakota Districts. During the year a total of 21,557 samples were processed for 14,339 concentration analyses, 621 sieve analyses (0.062 mm), 126 suspended-material size analyses, and 385 bed-material size analyses. Thirty-two percent of the laboratory work was performed on samples from Wyoming stations and sixty-eight percent on samples from Alaska, Montana, and North Dakota.

PLANS FOR FISCAL YEAR 1982: Field and laboratory workloads will continue during fiscal year 1982 on a reduced scale. The number of sediment stations in the Wyoming network will be reduced from 82 to 46. Of these remaining stations, one will be sampled daily, three have automatic pumping samplers, two will be sampled weekly during the irrigation season, thirty-nine will be sampled monthly, and one will be sampled quarterly. Results from the analysis of the samples collected during fiscal years 1980 and 1981 will be published in Water-Resources Data for Wyoming for the respective year.

REPORTS PUBLISHED DURING FISCAL YEAR 1980 and 1981:

Green, S. L., 1981, Water-resources investigations of the U.S. Geological Survey in Wyoming, fiscal year 1980: U.S. Geological Survey Open-File Report 81-201, 118 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 1. Missouri River Basin: U.S. Geological Survey Water-Data Report WY-78-1, 652 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1978, Volume 2. Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-78-2, 728 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1979, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-79-1, 642 p.

U.S. Geological Survey, 1980, Water-resources data for Wyoming, water year 1979, Volume 2, Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-79-2, 283 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 1, Missouri River Basin: U.S. Geological Survey Water-Data Report WY-80-1, 621 p.

U.S. Geological Survey, 1981, Water-resources data for Wyoming, water year 1980, Volume 2, Green River, Bear River, and Snake River Basins: U.S. Geological Survey Water-Data Report WY-80-2, 269 p.

PROJECT TITLE: Flood investigations in Wyoming (WY 59-010).

FUNDING AGENCIES: Wyoming Highway Department and Geological Survey.

PROJECT LEADER: Gordon S. Craig, Jr.

FIELD LOCATION: Statewide.

PERIOD OF PROJECT: July 1958 to September 1984.

PROBLEM: The optimal design of highway drainage structures requires a knowledge of the magnitude and frequency of peak discharges expected at a given site. This knowledge may be derived either from data collected at the desired location or from regional analysis of peak-flow characteristics. The paucity of peak-flow data for small drainage basins in Wyoming, particularly for ephemeral streams, restricts the use of the regionalization techniques presently available. A network of peak-flow partial-record sites is needed to supplement the existing network of continuous-record streamflow stations.

OBJECTIVE: The main objective is to obtain sufficient basic hydrologic data to define the magnitude and frequency of floods on a regional basis for the entire state and to publish the interpretative analyses in easily usable form. On request from the cooperator, flood-flow characteristics of streams at specific sites will be determined by studying such factors as: History of past floods; distribution of flow across the flood-plain and main channel; and mean velocities in the main channel and overflow areas.

APPROACH: Available flood data will be analyzed, and sites for crest-stage gages will be selected where they will best supplement the existing network of continuous-record stream-gaging stations. Stage-discharge relations will be defined for each crest-stage site by recording water stage and by making current-meter measurements, indirect measurements of peak flow, or by using the "step-backwater method." Basin characteristics that are pertinent in flood-frequency analysis will be determined. Frequency characteristics will be related to basin characteristics by regression analysis. Peak-flow measurements will be made at miscellaneous sites where unusual floods occur.

PROGRESS AND SIGNIFICANT RESULTS FOR 1981: The annual peak-flow data were obtained at 98 active crest-stage gage sites. Surveys for indirect measurements were made at four gage sites involving a slope-area measurement, a culvert flow with flow over the road, a contracted-opening flow with flow over the road, and a culvert-backwater survey for newly installed multiple culverts. A slope-area measurement of a flood peak at a miscellaneous site was made on special request of the Wyoming State Highway Department.

PLANS FOR FISCAL YEAR 1982: Operation of the crest-stage gage network will be continued. The network will be evaluated and some gage sites will be discontinued. The reduction in field work is essential because inflationary costs are exceeding the limited funding. The remaining network will be evaluated for further reduction to a small, final network in fiscal year 1983 for long-term monitoring. Also during 1982 a geomorphological evaluation of several sites will be made to extend the recurrence interval of maximum observed peak discharges.

PROJECT TITLE: Flood Hazard Information (WY 73-022).

FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Bruce H. Ringen.

FIELD LOCATION: Statewide.

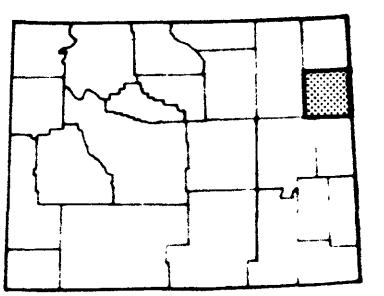
PERIOD OF PROJECT: February 1972 to September 1977; March 1981 to September 1981 (completed).

STATUS: This project was suspended September 30, 1977, when the National level of effort decreased. At that time all of the high-priority maps and many lower-priority maps for Wyoming had been completed. In mid-1981 the project was re-activated for preparation of 23 additional maps of flood-prone areas having potential for industrial development. These maps were completed during fiscal year 1981. Positive transparencies were made at the National Center. Reproduction of copies is done locally. The total number of maps prepared in this project is 209, covering parts of 221 quadrangles in Wyoming. No new mapping is planned, so the project is considered to be completed.

REPORTS PUBLISHED DURING FISCAL YEAR 1981:

U.S. Geological Survey, Flood-prone area maps, scale 1:24,000 (23 quadrangles, southwestern Wyoming).

PROJECT TITLE: Water resources of Weston County, Wyoming (WY 74-026).



FUNDING AGENCY: Wyoming State Engineer and Geological Survey.

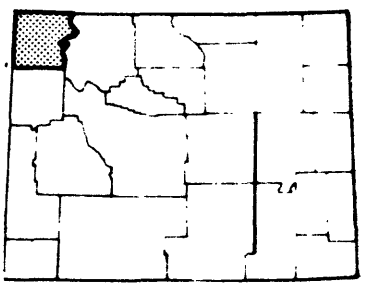
PROJECT LEADER: Marlin E. Lowry.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: March 1974 to June 1976 (incomplete).

STATUS: Data collection and analyses have been completed. The final report has been completed and is in review. The report will be published in 1983.

PROJECT TITLE: Monitoring wastewater effluent in Yellowstone National Park, Wyoming (WY-74-027).



FUNDING AGENCY: National Park Service.

PROJECT LEADER: Edward R. Cox.

FIELD LOCATION: Northwestern Wyoming.

PERIOD OF PROJECT: June 1974 to September 1982.

PROBLEM: The National Park Service is constructing new or rehabilitating existing evaporation-percolation ponds at several sewage wastewater treatment and disposal sites in Yellowstone National Park. The sites are near streams or lakes. The National Park Service needs to determine the effects of the wastewater effluent on nearby lakes and streams. In order to do this, they need to know the amount and direction of movement of the effluents that percolate from the ponds.

OBJECTIVE: The objectives are to determine (1) the position of the water table and its relation to the ponds and nearby surface-water bodies; (2) the slope of the water table and thus the direction of movement of the effluent; (3) the time-of-travel of effluent from pond to surface-water body; (4) the vertical zone of movement of the effluent; and (5) the baseline water quality in the shallow aquifers in the vicinity of the percolation ponds and in the surface-water bodies.

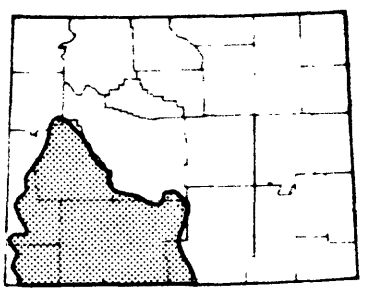
APPROACH: Fortysix wells were installed in unconsolidated material near the sewage ponds. Several wells have been destroyed, including four that were in the area of a new lagoon constructed in 1976. Tracer tests using Rhodomine WT dye were made in a few selected wells. Water samples are collected from the wells and analyzed for chemical quality of the water. Water levels in the wells are measured periodically. A program of monitoring water quality has been established following preliminary data collection depending on funds available for the project.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Water levels, temperature, and specific conductance of water were measured approximately monthly in about 40 wells and 4 effluents by personnel of the National Park Service. Some of the wells could not be reached in midwinter because of weather and snow conditions. Water samples were collected from 12 wells and at 6 sites on streams and were analyzed for dissolved organic carbon, nitrogen, phosphorus, chloride, sulfate, and other constituents. Waterlevelcontour maps were made in the four areas of study. Maps showing lines of equal

specific conductance and equal chloride concentration were prepared for various times of the year to show the extent of movement of percolating effluents. Stiff diagrams were made showing changes in major constituents in selected wells since 1974. Graphs were prepared showing fluctuations of water levels, specific conductance, and chloride concentrations of water in selected wells. Work was begun on the final report for the project.

PLANS FOR FISCAL YEAR 1982: Measuring water level, temperature, and specific conductance of water in the wells and the effluents will continue approximately monthly. Water samples will be collected for chemical analysis from selected wells and streams. Data will be compiled on maps, graphs, and tables and compared with previously collected data for interpretation of movement of wastewater effluents. The final report will be completed.

PROJECT TITLE: Water and its relation to economic development in the Green River and Great Divide basins in Wyoming (WY 75-030).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Hugh W. Lowham.

FIELD LOCATION: Southwestern Wyoming.

PERIOD OF PROJECT: November 1974 to September 1980 (incomplete).

STATUS: Data collection and analyses have been completed. Reports published to date include six major reports of results, seven other reports, three contributions to Bureau of Land Management reports, and eight abstracts of papers given at meetings. Principal reports remaining include three in press, two ready to submit for approval, and two in review. Work in fiscal year 1982 will consist of processing these reports for publication.

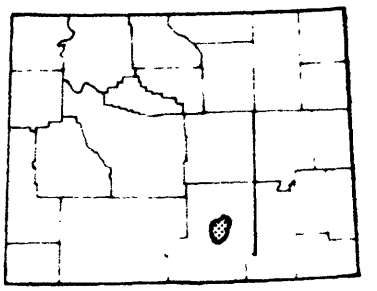
REPORTS PUBLISHED DURING FISCAL YEARS 1980 AND 1981:

Engelke, M. J., 1980, Aestivation of a water scavenger beetle in southwestern Wyoming: Coleopterist's Bulletin, v. 34, no. 2, p. 176.

_____, 1980, The biology of a plains stream, Salt Wells Creek, in an oil-shale area, southwestern Wyoming [abs.], in Gale, Charles (ed.), Oil Shale Symposium: Sampling, Analysis and Quality Assurance, March 1979: U.S. Environmental Protection Agency Industrial Environmental Research Laboratory Report EPA-600/9-80-022, p. 518.

Larson, L. R., and Zimmerman, E. A., 1981, Water resources of upper Separation Creek basin, south-central Wyoming: U.S. Geological Survey Water-Resources Investigations WRI 80-85, 69 p.

PROJECT TITLE: Impacts of economic development and water use on water resources in the Hanna Basin in Wyoming (WY 75-031).



FUNDING AGENCY: Geological Survey.

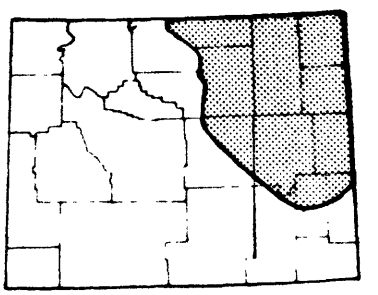
PROJECT LEADER: Pamela B. Daddow.

FIELD LOCATION: South-central Wyoming.

PERIOD OF PROJECT: July 1974 to September 1980 (incomplete).

STATUS: Data collection and analyses have been completed. Reports published to date include a water-quality data report and a contribution to a Bureau of Land Management report. One remaining report is in preparation. The report will be completed in fiscal year 1983.

PROJECT TITLE: Water resources of the Powder River structural basin in Wyoming in relation to energy development (WY 75-032).



FUNDING AGENCIES: Department of Energy and Geological Survey.

PROJECT LEADER: Marlin E. Lowry.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: November 1974 to September 1980 (incomplete).

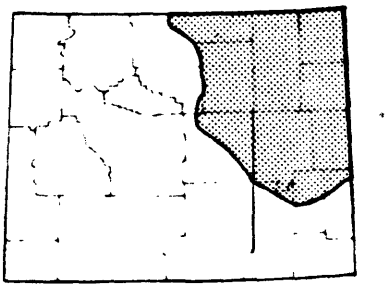
STATUS: Data collection and analyses have been completed. Four intermediate reports and abstracts of several papers given at meetings have been published. Principal reports remaining include one in press, three ready to submit for approval, three in review, and one in preparation. Work in fiscal year 1982 will consist of processing these reports for publication.

REPORTS PUBLISHED DURING FISCAL YEARS 1980 AND 1981:

Rankl, J. G., and Lowry, M. E., 1980, Ground-water and surface-water relationships in the Powder River structural basin, Wyoming and Montana [abs.]: American Geophysical Union annual meeting, San Francisco, California, 1980, 1 p.

Lowry, M. E., 1981, The relative importance of regional and local ground-water systems in the Powder River structural basin, Wyoming and Montana [abs.]: 10th Annual Rocky Mountain Ground Water Conference, Laramie, Wyoming, 1981, p. 71.

PROJECT TITLE: Hydrology of Paleozoic rocks in the Powder River Basin and adjacent areas, northeastern Wyoming (WY 75-033).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: (vacant).

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: November 1974 to September 1980 (incomplete).

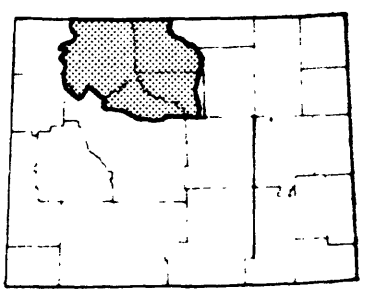
STATUS: Data collection and analyses have been completed. Reports published to date include a map report, two data reports, a journal article, and five abstracts of papers presented at meetings. Remaining reports include two ready to submit for approval and two in review. Work in fiscal year 1982 will consist of processing those reports for publication.

REPORTS PUBLISHED DURING FISCAL YEARS 1980 AND 1981:

Head, W. J., Kilty, K. T., and Knottek, R.W., 1979, Maps showing formation temperatures and configurations of the tops of the Minnelusa Formation and the Madison Limestone, Powder River Basin, Wyoming, Montana, and adjacent areas: U.S. Geological Survey Miscellaneous Investigations Map I-1159, 1 sheet.

Head, W. J., 1981, Regional ground-water movement in the Madison Limestone and Minnelusa Formation (ABS): 10th Annual Rocky Mountain Ground Water Conference, Laramie, Wyoming, 1981, Proceedings, p. 72.

PROJECT TITLE: Evaluation of Paleozoic and alluvial aquifers in the Bighorn Basin, Wyoming (WY 75-034).



FUNDING AGENCY: Wyoming State Engineer and Geological Survey.

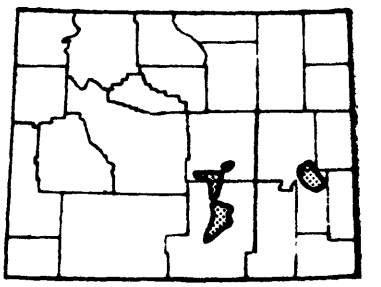
PROJECT LEADER: Maurice E. Cooley.

FIELD LOCATION: North-central Wyoming.

PERIOD OF PROJECT: December 1974 to September 1977 (incomplete).

STATUS: Data collection and analyses have been completed. Two reports on hydrologic features of alluvial deposits have been published. A third report on alluvial deposits and a report on the Paleozoic artesian aquifers have been completed and are ready to submit for approval. These reports will be published in fiscal year 1982.

PROJECT TITLE: Algal-growth potential of principal North Platte River reservoirs in Wyoming (WY 76-035).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Samuel J. Rucker, IV.

FIELD LOCATION: Central Wyoming.

PERIOD OF PROJECT: July 1975 to August 1981 (completed).

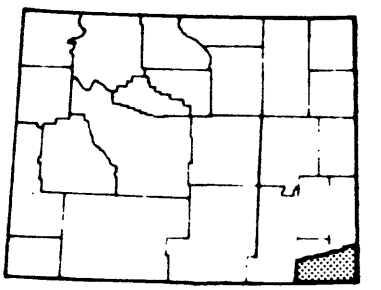
PROBLEM: Eutrophic conditions may be developing in one or more of the four major reservoirs on the North Platte River (Seminoe, Pathfinder, Alcova, and Glendo). Oxygen depletion could have an adverse effect on recreational use of the reservoirs and on fish habitat. Development of mineral resources, particularly coal mining, is taking place at locations adjacent to one of the reservoirs. There is no information about the present state of algal growth with which to evaluate the seriousness of the problem, to evaluate changes caused by mining activities, or to predict future trends.

OBJECTIVE: The objectives of the study are to (1) determine the extent of algal growth in the four major reservoirs; (2) evaluate trends in algal-growth potential, including effects of effluent from coal-mining activities adjacent to the reservoirs; and (3) determine the feasibility of developing a model for predicting algal growth (modeling would be a follow-up project).

APPROACH: The first three years will be devoted exclusively to data collection, with analysis of data and preparation of a report scheduled for the fourth year. Vertical-profile water samples will be collected monthly (May-October) from a boat at sites above the dams and in the principal arms of each reservoir. Sampling will also be done twice each winter. Field parameters will include dissolved oxygen and temperature. Lab parameters will include nitrogen ammonia (NH_4); nitrite + nitrate (NO_2+NO_3); phosphorus (P); residue, and algal-growth potential (AGP). A set of phytoplankton samples will be collected each year in early spring and in late summer for identification of genera.

STATUS: This project was designated as completed by memo of August 28, 1981, from Regional Hydrologist, Central Region, to District Chief, Wyoming. Results of investigation are documented by previous publication of data in Water-Resources Data Reports for Wyoming.

PROJECT TITLE: Quantitative study of the Tertiary aquifers in southern Laramie County, Wyoming (WY 77-038).



FUNDING AGENCY: Wyoming State Engineer, Wyoming Department of Planning and Development, Geological Survey.

PROJECT LEADER: Marvin A. Crist.

FIELD LOCATION: Southeastern Wyoming.

PERIOD OF PROJECT: October 1976 to September 1979.

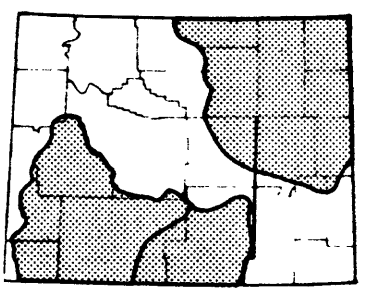
STATUS: The project was completed September 1980.

REPORTS PUBLISHED DURING FISCAL YEARS 1980 AND 1981:

Crist, M. A., 1980, Effects of pumpage on ground-water levels as modeled in Laramie County, Wyoming: U.S. Geological Survey Water-Resources Investigations Open-File Report 80-1104, 26 p.

Cooley, M. E., and Crist, M. A., 1981, Generalized fence diagram showing stratigraphy and potentiometric surface of the Tertiary formations in southeastern Wyoming and an adjacent part of Colorado: U.S. Geological Survey Miscellaneous Investigations Map I-1308.

PROJECT TITLE: Water-resources monitoring in the Powder River, south-central, and southwestern coal regions in Wyoming (WY 77-039).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Joel R. Schuetz.

FIELD LOCATION: Northeastern, south-central, and southwestern Wyoming.

PERIOD OF PROJECT: January 1977 to September 1981 (terminated).

PROBLEM: Coal mining and associated developments of the scale and duration anticipated in major coal-producing regions of the West may have adverse effects on the water resources of these regions. Mine dewatering, changes in land-use patterns, disposal of wastes, stream-channel realignment, and withdrawals of water for industrial and domestic use may significantly alter existing surface- and ground-water systems on a regional basis, limit available supplies, interfere with traditional water uses, and cause deterioration of the remaining water resources.

OBJECTIVE: The objective of the program is to determine the characteristics of the regional water-resources system and to detect and document changes in the system or its components that may be associated with coal mining.

APPROACH: The existing water-resources monitoring program will be evaluated for its regional-surveillance value and additional data sites will be added or existing sites upgraded as needed. Data that continuously or periodically describe ground-water levels and quality, and streamflows and their quality will be evaluated so that changes may be detected and documented.

STATUS: Because of a reduction in funds, the contract for operation of monitoring stations was terminated at the end of fiscal year 1981. The project was also terminated. Many stations were discontinued; those remaining are being operated under project WY 00-001.

REPORTS PUBLISHED DURING FISCAL YEAR 1980 AND 1981:

Druse, S. A., Dodge, K. A., and Hotchkiss, W. R., 1981, Base flow and chemical quality of streams in the Northern Great Plains area, Montana and Wyoming: U.S. Geological Survey Water-Resources Investigations Open-File report 81-692, 60 p.

Druse, S. A., 1982, Verification of step-backwater computations on ephemeral streams in northeastern Wyoming: U.S. Geological Survey Water-Supply Paper 2199, 12 p.

PROJECT TITLE: Effects of herbicide usage on water quality of selected streams in Wyoming (WY 77-043).

FUNDING AGENCIES: Wyoming Department of Agriculture and Geological Survey.

PROJECT LEADER: Samuel J. Rucker, IV.

FIELD LOCATION: Statewide.

PERIOD OF PROJECT: June 1977 to September 1982.

PROBLEM: Local weed- and pest-control districts will be spraying the banks of selected streams (and islands in larger rivers) throughout Wyoming with Tordon (4-amino-3, 5, 6-trichloropicolinic acid), Banvel (2-methoxy-3, 6-dichlorobenzoic acid), and 2,4-D. The Wyoming Department of Agriculture needs to know whether or not any of these herbicides appear in the water or bed material downstream from the spraying activity. This problem could be compounded by the extremely low flow expected in reaches of some rivers.

OBJECTIVE: The objectives are to determine the effects of herbicide spraying on water quality and on bed materials in the study reach.

APPROACH: Sets of water- and bed-material samples will be collected upstream and downstream from the spray area before, during, and after the herbicide is applied. Application will last for about 8 weeks, during which sample sets will be collected twice a week immediately downstream. Samples will be analyzed in the Central Laboratory. Results will be examined and the effects on water quality determined.

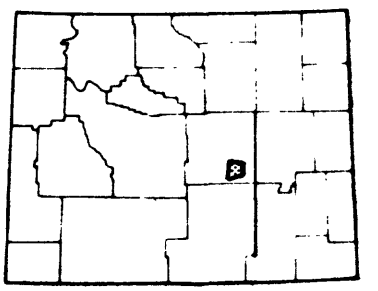
PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Herbicide sampling was continued at 26 stations. Additional samples under project WY-003 was discontinued. A progress report was published (Open-File Report 80-1110).

PLANS FOR FISCAL YEAR 1982: Data collection will be continued at approximately the same level as in fiscal year 1981.

REPORTS PUBLISHED DURING FISCAL YEAR 1980 AND 1981:

Butler, D. L., 1980, Effects of herbicide usage on water quality of selected streams in Wyoming: U.S. Geological Survey Open-File Report 80-1110, 17 p.

PROJECT TITLE: Digital model of the alluvial aquifer in Bates Hole, central Wyoming (WY 78-047).



FUNDING AGENCIES: Wyoming State Engineer and Geological Survey.

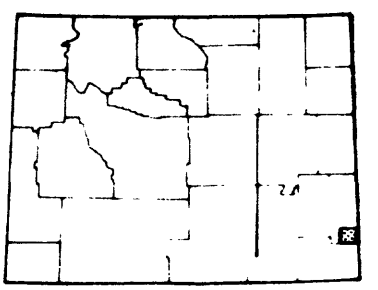
PROJECT LEADER: Kent C. Glover.

FIELD LOCATION: Central Wyoming.

PERIOD OF PROJECT: October 1977 to September 1980 (incomplete).

STATUS: Data collection and analyses have been completed. The final report has been reviewed and is nearly ready to submit for approval. The report will be published in fiscal year 1983.

PROJECT TITLE: Digital model of the hydrologic system in the La Grange area, southeastern Wyoming (WY 78-048).



FUNDING AGENCIES: Wyoming State Engineer and Geological Survey.

PROJECT LEADER: William B. Borchert.

FIELD LOCATION: Southeastern Wyoming.

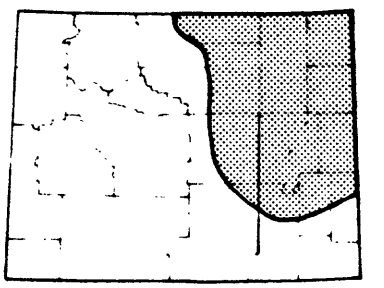
PERIOD OF PROJECT: October 1977 to September 1981 (incomplete).

STATUS: Data collection and analyses have been completed. One intermediate report has been published. The final report is in review and will be published in fiscal year 1983.

REPORTS PUBLISHED DURING FISCAL YEARS 1980 AND 1981:

Borchert, W. B., 1981, Water-level contours near La Grange, southeastern Wyoming and an adjacent part of Nebraska: U.S. Geological Survey Open-File Report 81-422, 1 sheet.

PROJECT TITLE: Northern Great Plains Regional Aquifer-System Analysis, Wyoming (WY 78-049).[1/]



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Dwight T. Hoxie.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: October 1977 to September 1981 (incomplete).

PROBLEM: Rapid development of energy resources in the Northern Great Plains will put stresses on heretofore little used aquifers for water requirements and waste disposal. Previous studies have concentrated on counties or river and structural basins. There is now a need for a regional study of potential aquifers. More knowledge is needed so water development and management alternatives can be evaluated. To provide this knowledge, the Wyoming District will concentrate on aquifers above the Madison and below the Pierre Shale (Cretaceous). The study area is essentially the same as the regional Madison study. Four districts in the Northern Great Plains will participate with coordination by a Central Region staff.

[1/] This project is subsidiary to project CR 78-230, described on page 116.

OBJECTIVE: The overall objectives of the project are to provide a quantitative evaluation of the principal hydrologic systems, the quantity and quality of the water in the principal aquifers, the amounts of water available to wells under existing technology, and the effects of withdrawing the water.

The ultimate objective is to provide water managers with technical means of administering and regulating the development of water resources in the project area with emphasis on ground water.

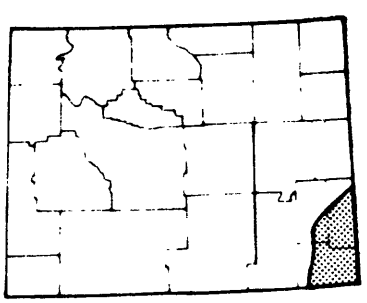
APPROACH: The areal extent of potential aquifers will be defined from previous studies, existing geohydrologic data will be compiled and evaluated, and a program will be developed to selectively collect additional data. The physical parameters of aquifers will be determined by machine processing of digitized geophysical logs. Recharge and discharge from streamflow records, seepage runs, well pumpage, evapotranspiration, and infiltration estimations will be determined. Digital models of the systems will be developed as a predictive means to evaluate alternatives for development of the aquifers and management of the systems. Water quality will be described and geochemical trends and anomalies defined. A data-collection network will be developed for future monitoring of systems.

STATUS: All data collection and preparation of hydrologic maps have been completed. A digital steady-stage ground-water flow model for the Dakota Aquifer system has been completed. The final report is nearly ready for review. Secondary reports in review include one on evapotranspiration and linear-features maps based on Landsat images for each of the Northern Great Plains States. A ground-water quality report for Wyoming is in preparation.

REPORTS PUBLISHED DURING FISCAL YEARS 1980 AND 1981:

Hoxie, D. T., and Glover, K. C., 1981, A "Black-Hole" pressure anamoly in the Newcastle Sandstone, Powder River Basin, Wyoming and Montana [abs.]: Proceedings, 10th Annual Rocky Mountain Ground Water Conference, Laramie, Wyoming, 1981, p. 43.

PROJECT TITLE: High Plains Regional Aquifer-System Analysis, Wyoming (WY 78-050).[1/]



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Charles F. Avery.

FIELD LOCATION: Southeastern Wyoming.

[1/] This project is subsidiary to project CR 78-229, described on page 114.

PERIOD OF PROJECT: October 1977 to September 1982.

PROBLEM: The Ogallala Formation and associated rocks are the principal aquifers underlying the High Plains. The economic future of the High Plains and surrounding area is heavily dependent upon the capacity of the aquifer to sustain withdrawals. Comprehensive knowledge of the aquifer system is needed so that water-management alternatives can be evaluated and the economic life of the aquifer projected. To provide that knowledge, the USGS will do a 5-year study; eight districts, including Wyoming, will participate, with coordination by Central Region staff.

OBJECTIVE: The overall (Regional) objectives are to (1) describe the quantity and quality of the water resource and the operation of the hydrologic system; (2) develop a regional water-resources data storage and retrieval system; (3) develop data-collection networks for future monitoring; (4) develop digital models of the aquifer system; and (5) evaluate ground-water management alternatives using the models. The objectives for Wyoming will be to provide hydrogeologic data for the post-Cretaceous formations in southeastern Wyoming to the Regional project staff in support of the overall objectives.

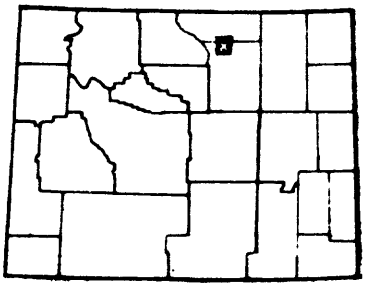
APPROACH: The areal extent of aquifer(s) will be defined based on previous studies. Geophysical logs will be examined to help determine aquifer thickness. About 25 test holes will be drilled. Ground-water occurrence and movement, aquifer properties, and recharge will be determined from existing data or from aquifer tests on new wells. Ground-water discharge will be estimated from pumpage and irrigated acreage inventories, and from streamflow measurements. Approximately 50 water samples will be collected and analyzed. Periodic mass water-level measurements will be made. All existing and new data will be compiled and entered into the Regional computer system. Work will be done with the Regional project team to apply Wyoming data to the Regional ground-water model.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Water levels for 1980-81 were entered into the Ground-Water Site-Inventory System. Maps of hydraulic conductivity and specific yield were prepared for the Wyoming part of the High Plains study area. The report on pumpage data was completed and reviewed.

PLANS FOR FISCAL YEAR 1982: The review of the map report will be completed. The map report and pumpage report will be submitted for approval as open-file reports.

REPORTS PUBLISHED DURING FISCAL YEARS 1980 AND 1981:

Avery, C. F., 1981, Pumpage-data collection in a part of the High Plains, Nebraska and Wyoming [abs.]: Proceedings, 10th Annual Rocky Mountain Ground Water Conference, Laramie, Wyoming, 1981, p. 46.



PROJECT TITLE: Rate of nutrient release from decomposing plankton and periphyton in Lake De Smet and its outflow, north-central Wyoming (WY 78-051).

FUNDING AGENCY: Geological Survey.

PROJECT LEADER: David J. Wangsness.

FIELD LOCATION: North-central Wyoming.

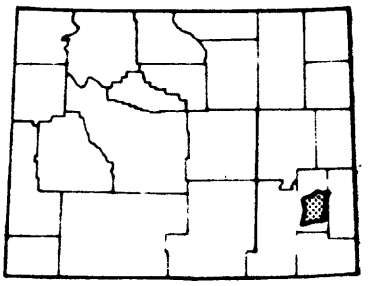
PERIOD OF PROJECT: September 1978 to August 1981 (completed).

PROBLEM: There is a lack of understanding about the amount and rate of nutrient (phosphorus and nitrogen) release during algal cell decomposition in lakes and streams. This kind of information would be useful to water managers. The Lake De Smet system is well suited to this study. Originally an abandoned coal pit, the lake receives most of its inflow by diversions from Piney and Clear Creeks. Lake capacity has been increased by dams and dikes. Outflow for irrigation is controlled.

OBJECTIVE: The objective is to determine the amounts of nutrients released during algal cell decomposition and the rate of nutrient release from blue-green algae and diatoms in stream periphyton and lake plankton.

APPROACH: Uniform samples of plankton and periphyton biomass will be collected and placed in duplicate sample bottles. Algal cells will be killed with a photosynthetic inhibitor and the samples incubated in the lake and stream. Every 3 hours for 36 hours, and every 6 hours for the second 36-hour period a sample will be filtered and analyzed for dissolved forms of nitrogen and phosphorus to the microgram per liter level. Additional samples will be analyzed for total nutrients, average sample biomass, specie identification and cell counts. Decomposition rates and total nutrient released will be determined.

STATUS: The project was designiated as complete by memo of August 28, 1981 , from Regional Hydrologist, Central Region to District Chief, Wyoming. Results of investigation are documented by previous publication of data in Water-Resources Data Reports for Wyoming.



PROJECT TITLE: Hydrologic conditions in the Wheatland Flats area, Platte County, Wyoming, Part II (WY 79-052).

FUNDING AGENCIES: Wyoming State Engineer, Wyoming Department of Economic Planning and Development, and Geological Survey.

PROJECT LEADER: Marvin A. Crist.

FIELD LOCATION: Southeastern Wyoming.

PERIOD OF PROJECT: April 1979 to March 1982.

PROBLEM: Water is diverted from the Laramie River to irrigate approximately 40,000 acres of land in the Wheatland Flats area. Ground water is the source for an additional 2,000 acres. Adequate supplies of surface water are available only in years when stream runoff is above normal. Additional water is provided by wells. The increase in irrigation wells from about 85 in 1960 to about 225 in 1978 has resulted in substantially more pumpage of ground water. Consequently some of the shallow wells are no longer productive. Information is needed to determine the effect of ground-water development upon water levels and streamflow.

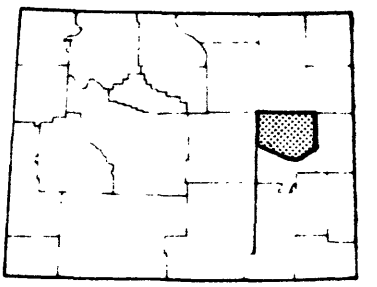
OBJECTIVE: The objectives are to (1) determine the extent of present ground-water development for irrigation, industry, and municipal use and describe the effect of this development upon water levels in the separate aquifers; (2) determine the effect of imported surface water upon water levels and the effect of imported water and ground-water development upon stream discharge in the area; and (3) provide a means of predicting the effect of water-management decisions.

APPROACH: Well-inventory, pumpage, and surface-water use data will be updated. Additional data will be collected to include the adjacent area around Wheatland Flats where irrigation wells have been constructed. An observation-well network will be established and mass water-level measurements will be made in the spring prior to start of irrigation. Seepage runs will be made on all the streams to estimate stream-aquifer relationship. Preparation of a water budget will aid in the development of a digital model of the hydrologic system, which will be tied in with two existing models for adjacent areas.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Seepage runs on three major streams indicate that ground-water contribution to the stream is about the same in January 1981 as it was in February 1959. Calibration of the digital model was completed. A report describing the results of the study is about 75 percent complete. The project was extended to March 1982 because of complications with the model.

PLANS FOR FISCAL YEAR 1982: Transient conditions will be simulated with the digital model and the report describing results of the study will be completed. It is planned to publish the report as an Open-File Report in the WRD Water-Resources Investigations series.

PROJECT TITLE: Hydrologic reconnaissance of the Powder River Basin Uranium District, Wyoming (WY 80-053).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Pamela B. Daddow.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: January to September 1980 (incomplete).

PROBLEM: The U.S. Geological Survey does not have the hydrologic data base to develop a substantiated concept of how the hydrologic system functions in the uranium area to define impacts associated with uranium exploration and mining activities. Also, a number of alleged conditions, which may or may not be problems and may or may not be severe, should be investigated to define their true nature. These conditions could have significant impact and include (1) drastic lowering of water levels in the aquifers underlying the area, (2) excursions of lixiviant from in-situ mines, (3) impacts of inter-aquifer flow caused by many unplugged drill holes, (4) impacts of mine water used for crop irrigation, (5) lack of mining industry water-requirement information, and (6) lack of natural (native) water-quality information.

OBJECTIVE: The objectives of this study are to (1) develop valid, substantiated concepts of how the hydrologic system functions in the uranium area; (2) gather enough information to determine if any or all of the conditions outlined above do, in fact, exist and are significant enough to require further investigation; (3) submit appropriate project proposals to investigate those problems requiring solution; and (4) publish all information developed during this study in an appropriate report.

APPROACH: Substantiated concepts of how the hydrologic system functions and geologic, hydraulic, and potential information will be gathered. Then enough information on each of the conditions outlined above (Problem) will be assembled to determine if, in fact, they are real and then to determine if they are significant enough to require federal effort for their resolution. If any of the problems appear to require additional effort, appropriate work will be proposed.

STATUS: Collection of hydrologic data and information about potential hydrologic problems was completed in 1980. The first draft of the final report was completed in 1981; since then the report has had extensive review and revision. The report is still in preliminary review; publication is now planned for 1983.

PROJECT TITLE: Precipitation, infiltration, and runoff relations for small basins in Wyoming (WY 80-054).

FUNDING AGENCY: Bureau of Land Management.

PROJECT LEADER: James G. Rankl.

FIELD LOCATION: Statewide.

PERIOD OF PROJECT: January 1980 to September 1982.

PROBLEM: Federal regulations concerning surface coal mining and reclamation operations specify use of precipitation-frequency criteria for hydraulic design. The problem is to determine runoff volumes from small drainage basins for selected precipitation frequencies. Variability of infiltration rates of soil and other surficial material requires an understanding of the hydrologic processes controlling the relations of precipitation, infiltration, and runoff in small drainage basins.

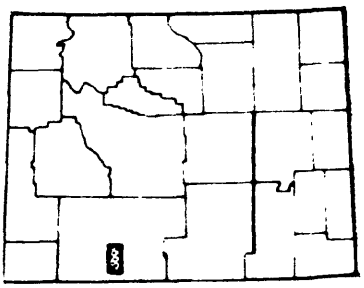
OBJECTIVE: The objectives of this study are to define infiltration-rate curves for soils and other surficial materials and determine the relations between infiltration rates computed from basin studies and those computed from infiltration tests.

APPROACH: Existing rainfall-runoff data collected at small ephemeral basins will be used with Soil Conservation Service soil maps and descriptions to define infiltration-rate curves. Infiltromoter data will be collected using a hand-portable model developed by McQueen (USGS) and the rainfall simulator of the USGS Public Lands Hydrology Program. These data will be analyzed statistically and compared to basin runoff.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: The empirical separation curve between runoff and nonrunoff rainfall events, which defines the infiltration parameters, was replaced with a separation curve based on the infiltration equation of Green and Ampt. The change improved the model fit and gives a physical meaning to the defined soil parameters. Ten basins have been calibrated using the improved model. Infiltration tests, using the McQueen rainfall simulator, were run at thirteen sites in the Dugout Creek tributary basin. Infiltration rates obtained from the tests did not compare with infiltration rates computed from rainfall and runoff data. The rainfall simulator tests were discontinued.

PLANS FOR FISCAL YEAR 1982: Infiltration-rate curves will be defined for small basins where soil and runoff data are available. A model sensitivity test will be made. The final report will be completed and submitted for review.

PROJECT TITLE: Quality of runoff from small basins in plains areas--Wyoming (WY 80-055).



FUNDING AGENCY: Bureau of Land Management.

PROJECT LEADER: Lewis L. DeLong.

FIELD LOCATION: Southwestern Wyoming.

PERIOD OF PROJECT: January 1980 to September 1981 (incomplete).

PROBLEM: Most energy-mineral development in Wyoming is planned for plains areas characterized by ephemeral and intermittent streams. Because of the flashy nature of precipitation and streamflow in these areas, water quality is highly variable and difficult to measure or predict. Routine, periodic sampling does not adequately describe base-line conditions or processes involved in the divestment and transport of waterborne constituents.

OBJECTIVE: The specific objectives of this study are to identify dominant processes involved in the divestment and transport of major dissolved salts within a small basin and to document the methods of short-term data collection and interpretation used so that they may be applied to other similar basins.

APPROACH: Streamflow and water-quality data will be collected intensively during runoff events. Multiple samples will be collected along stream reaches. Mass balances computed at sampling sites will be used to determine sources and sinks of salts in intervening reaches thus identifying the dominant processes by which constituents become waterborne and are transported. Streamflow and specific-conductance data recorded continuously at a downstream location will be analyzed on an event basis to determine the relation of total salt load to total runoff volume and time elapsed between events. This will help to determine the dependence of those processes identified on antecedent conditions. The final report will document the processes identified and the methods of data collection and interpretation utilized.

STATUS: Field sampling and collection of time-of-travel data have been completed. Mathematical models of one-dimensional transient flow and transport were developed to aid in the analysis of salt washoff during periods of flow in ephemeral stream channels. Preparation of the final report has been delayed because of the transfer of the project chief. Publication of the report is planned for late 1983.

PROJECT TITLE: Streamflow characteristics of energy-mineral areas in Wyoming (WY 80-056).

FUNDING AGENCY: Bureau of Land Management.

PROJECT LEADER: Hugh W. Lowham.

FIELD LOCATION: Statewide.

PERIOD OF PROJECT: March 1980 to September 1982.

PROBLEM: Substantial development of mineral resources is occurring in Wyoming. Planning and design related to such developments often require information concerning streamflow characteristics. Gaged data are sparse for the arid and semiarid areas where most of the energy-mineral development is occurring. Techniques for transferring or estimating streamflow information are therefore required. Existing techniques for estimating flow characteristics are limited mainly to peak flows. More complete information is needed concerning annual and seasonal runoffs.

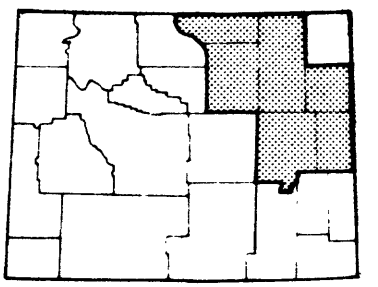
OBJECTIVES: This study will help solve problems currently being encountered in estimating runoff of arid and semiarid energy-mineral areas. Specific objectives are to (1) develop techniques and relations for estimating monthly and annual runoff with greater accuracy than now possible, and (2) refine relations for estimating peak flows for streams in these areas.

APPROACH: Existing techniques for estimating flow characteristics in Wyoming were developed using streamflow data available through 1973. Since then many new gaging stations have been established in the plains areas; those having suitable records will be included in the analysis. Because runoff from plains areas is highly variable, regional-analysis techniques will be developed considering average characteristics for groups of stations, with minimum reliance on individual short-term records. Regression techniques using basin features and channel-geometry measurements will be used in the analysis. Also, relations showing seasonal runoffs derived from an analysis of snowmelt and rainfall contributions will be investigated. The use of streambed-material size to improve channel-geometry relations will be examined.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Using Water Resources Council guidelines of Bulletin 17A, flood-frequency analyses were updated for about 300 stations. Mean-monthly and mean-annual runoffs were updated for all of the continuous-record stations being used in the study. Basin and climatic characteristics of 86 new stations were determined. All of the new and updated data were added to the Streamflow/Basin Characteristics file. Preliminary boundaries of six hydrologic regions were defined, and some preliminary regression relations determined. Statistical Analysis System (SAS) programs are being used for the regional analyses. Streambed- and bank-material samples were collected at a test group of 23 gaged sites in an attempt to improve the channel-geometry method for estimating streamflow in the semiarid plains area. Size distribution and cohesive properties of the samples were determined. The addition of these data to a regression analysis of channel width versus peak discharge did not yield significant improvements in the resulting relations. Based on an earlier study (WSP 2056), basin slope apparently has an important influence on peak flows. Basin slope for all of the gaged streams of the plains area is being determined by digitizing topographic maps. Basin slopes for about 120 of 180 streams were measured in fiscal year 1981.

PLANS FOR FISCAL YEAR 1982: Flood-frequency analyses will be made to update the peak-flow values in accordance with the guidelines in WRC Bulletin 17B. Streamflow data for the 1980 water year will be used in this updated analyses. Since the programs have already been developed and used, this update can be readily accomplished. Basin slope will be determined for the remaining streams. Regression equations for the basin-characteristics method will be developed, relating peak flow to drainage area and basin slope. The hydrologic regions and estimating equations will be refined. The final report will be completed and submitted for review.

PROJECT TITLE: Biological communities of small streams in Wyoming (WY 80-057).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: David A. Peterson.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: January 1980 to September 1981 (incomplete).

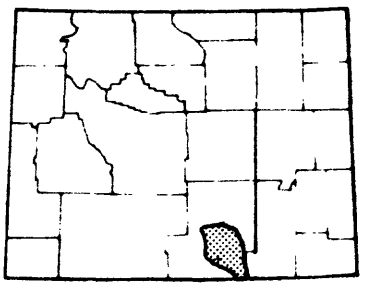
PROBLEM: The existing and potential development of energy minerals and water resources of the Powder River Basin has created great interest in the biologic communities of this area. Federal and State regulatory agencies and land-use planners are handicapped by a lack of published information and independent study of the biologic communities in the small streams of this area.

OBJECTIVE: The study objective is to define the biologic communities and their interrelated stream environments in a manner useful to regulatory agencies and land-use planning groups. An attempt will be made to determine which, if any, aquatic organisms are unique to alluvial valley floors, and whether they form a recognizable community that could be used in identification of alluvial valley floors. The occurrence of biologic communities restricted to a flowing-water habitat and their potential for re-establishment following a disturbance will be assessed.

APPROACH: Invertebrate samples will be collected using a variety of samplers and techniques to obtain the best measure of community composition. Samples of periphyton, phytoplankton, macrophytes, and organic matter in the water and within the substrate will be used to compare food resources and habitat differences. Physical and chemical measurements of the habitats will be compared to help isolate critical factors in community development. Biologic characteristics of streams affected by energy-mineral development will be compared with otherwise similar streams that are not affected. The final report will discuss the results in terms of balanced communities, specific organisms, and productivity and diversity of the communities.

STATUS: Collection and analysis of field data have been completed. All invertebrate samples have been indentified. The final report has been started, with publicaton planned for early 1983.

PROJECT TITLE: Reconnaissance of the water resources of the Saratoga Valley, south-central Wyoming (WY 80-058).



FUNDING AGENCIES: Wyoming State Engineer, Wyoming Department of Planning and Development, and Geological Survey.

PROJECT LEADER: Leslie W. Lenfest, Jr.

FIELD LOCATION: South-central Wyoming.

PERIOD OF PROJECT: March 1980 to June 1982.

PROBLEM: Recent increases in the development of water resources in the Saratoga Valley necessitate a better appraisal of the resources available and of the extent to which development is taking place. This information is needed by the Wyoming State Engineer's office to carry out its regulatory functions. Definition of the hydrologic system is needed and would include hydraulic properties and head in the aquifer, hydraulic head between aquifers, stream-aquifer relationships, irrigation and precipitation recharge of the aquifer, and the response of the aquifers to pumpage.

OBJECTIVE: The objectives are to (1) determine the present status of groundwater development, and the hydrology and hydraulic properties of the aquifers within the study area, based on the collected data; and (2) evaluate the need for additional studies and, if needed, recommend an approach for further investigations.

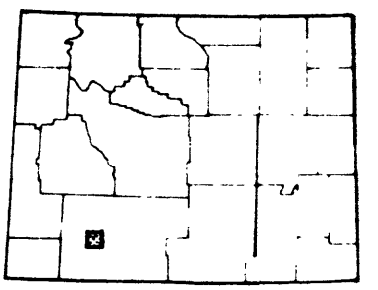
APPROACH: An inventory will be made of wells from documented information and field reconnaissance. A water-level network will be designed that consists of 20 to 25 wells to be measured monthly. A mass water-level measurement of all wells will be done to establish water levels and to monitor water-level changes in areas of extensive pumpage. An inventory of irrigated acreage will be made using infrared photographs and field reconnaissance. Seepage runs will be made to estimate stream-aquifer relationships. Tests will be done to determine hydraulic properties of aquifers.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Mass water-level measurements were made in November and December 1980. Approximately 130 wells were measured. A potentiometric-surface map was generated using Kriging techniques. A pumpage inventory was completed on 70 percent of the major irrigation wells. A map of surface geology was completed. Maintenance on 10 recorder sites continued, as well as monthly measurement of an additional 12 wells in the

monitor network. The project was extended to March 1982 for cleanup work, the writing of the report, and for a transition into the new project in Saratoga Valley.

PLANS FOR FISCAL YEAR 1982: A surface-water seepage run will be made in early October. Work will be done for transition into a new project in Saratoga Valley, a digital model of the hydrologic system. Unneeded recorders and shelters will be removed. The final report will be completed.

PROJECT TITLE: Hydrologic investigation of the in-situ oil-shale retort area near White Mountain, southwestern Wyoming (WY 81-059).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Kent C. Glover.

FIELD LOCATION: Southwestern Wyoming.

PERIOD OF PROJECT: October 1980 to September 1983.

PROBLEM: Comprehensive information is lacking on the hydrologic aspects of in-situ oil-shale retorting. At present, there is also little knowledge of the environmental effects of the retort process on associated aquifers and streams. This kind of information is needed by State and Federal agencies in planning and supervising the experimental and commercial development of oil-shale resources by retort processes.

OBJECTIVES: Broad objectives are to define the hydrologic regime, and to describe hydrologic changes due to retorting, which will permit evaluation of any environmental impacts. Specific objectives are to (1) identify hydrologic characteristics of the aquifers; (2) determine hydrologic relations among aquifers; (3) determine the nature and extent of the surface water-ground water relationship; and (4) determine the chemical characteristics of the ground water.

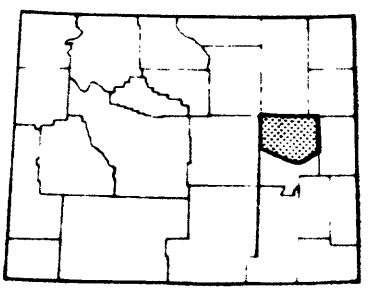
Although the project will be involved with a specific retort site, it is intended to be process oriented; therefore, the results should be highly transferrable to other retort sites.

APPROACH: In the first phase a planning document will be prepared based on existing information, including previous studies of the general area and related studies of other areas. A ground-water flow model will be selected and used as an aid in designing a data-collection program. A solute-transport model also will be selected. In the second phase test drilling will be done and hydrologic, geologic, geophysical, and water-quality data will be collected. The flow and transport models will be calibrated and tested. In the third phase results will be interpreted and the final reports prepared.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: The first phase of the study was completed. This included developing a preliminary ground-water flow model from existing information and identifying geologic, hydraulic and water-quality data needs. A planning report was prepared. Fourteen wells were drilled to monitor water levels and water quality. A water-quality sampling program was begun to investigate the effect of various sampling procedures on both organic and inorganic chemical species. Geophysical logging of new and previously existing wells also was started.

PLANS FOR FISCAL YEAR 1982: Data collection will continue with emphasis on geophysical logging and establishing a ground-water level and water-quality sampling network. The investigation of sampling procedures will be completed. Standard statistical methods will be used to analyze the water-quality data. Slug tests and conventional pumping tests will be made to estimate aquifer properties. Cross-plots and computer techniques will be used to determine lithology and porosity from geophysical logs. The ground-water model will be updated.

PROJECT TITLE: Ground-water hydrology of the Southern Powder River Uranium District, Wyoming (WY 81-060).



FUNDING AGENCY: Wyoming State Engineer, Wyoming Department of Environmental Quality, and Geological Survey.

PROJECT LEADER: Marlin E. Lowry.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: October 1980 to September 1983.

PROBLEM: Uranium exploration in the southern Powder River Basin has resulted in thousands of test holes, many of which were poorly plugged. This has resulted in flow between formerly isolated aquifers and uncontrolled flow at the surface. Development of uranium has stressed the ground-water system by pumping for supplies and for dewatering mines. There are presently 7 surface mines, 4 underground mines, and 3 in-situ mines; and additional mines are planned. Agriculture in the area is highly dependent on ground water. Therefore, the impacts of exploration and development are a concern.

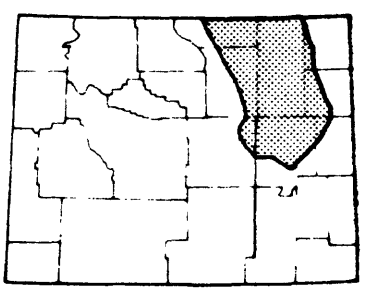
OBJECTIVES: The objectives are to (1) determine the existing hydrologic system, (2) determine the impacts on the ground-water system of the past and present uranium exploration and development, and (3) predict effects that might result from continued or modified uranium development in the future.

APPROACH: The first phase of the project will be to analyze the data obtained from companies and to establish a data-collection network. Data analysis will include testing concepts of how the hydrologic system operates and describing the geologic framework. Consistency with water-quality data will be an additional test of the concepts. The second phase will be to construct a digital model and collect additional required data. After calibration of the model, the effects of mining in the area will be simulated.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Collection of stratigraphic and hydrologic data was emphasized. Gamma logs were run in 25 wells to improve stratigraphic data and to identify completion zones. A network of observation wells was established. The wells and the flow of two streams were measured monthly. A compilation of available well data for 420 wells was nearly completed. Ranchers and mine representatives were interviewed and both surface and subsurface mines were inspected to evaluate the alleged problem of improperly plugged boreholes. Conclusive evidence of a hydrologic problem unique to improperly plugged boreholes was not found. Significant water-level declines were found only in the vicinity of one mine; in that area the loss of flowing stock wells was the most significant impact noted.

PLANS FOR FISCAL YEAR 1982: Collection of field data and well-inventory data will continue. Additional evaluations will be made of potential hydrologic problems related to uranium exploration and mining. A mathematical model will be prepared to test and improve the concept of the hydrologic system. The overall level of effort will be reduced by approximately one-half because of the slowdown in the uranium industry and because of higher-priority work in other areas.

PROJECT TITLE: Potentiometric maps of shallow aquifers in the Powder River Basin, northeastern Wyoming (WY 81-062).



FUNDING AGENCY: Bureau of Land Management.

PROJECT LEADER: Pamela B. Daddow.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: March 1981 to September 1983.

PROBLEM: Although knowledge of the ground-water system in the Powder River Basin, Wyoming, has improved since the surge of new mining began in 1975, potentiometric maps, which are fundamental to understanding the ground-water system, are not available for any shallow horizon in most of the basin and are only rudimentary elsewhere. Potentiometric maps are needed (1) to aid current modeling efforts, (2) to learn more about vertical-versus-horizontal movement and regional-versus-local movement of ground-water in the formations, and (3) to assess the impacts of surface mining on water levels in shallow aquifers.

OBJECTIVES: The objectives are to (1) improve on the present description of the hydrologic system by mapping potentiometric surfaces in the basin, (2) document impacts of surface mines, and (3) provide more information on the relative importance of vertical-versus-horizontal and regional-versus-local movement of ground-water.

APPROACH: Wells where the producing horizon can be related to a mappable horizon for construction of potentiometric maps will be inventoried. Emphasis will be on the horizon of the Wyodak Coal and deeper units. Data will be analyzed pertinent to effects of long-term pumping on overlying or underlying aquifers. Mass water-level measurements will be made during two field seasons, concentrating in areas where there is large stress on the system. A water-level change map will be made for the Wyodak Coal on the east side of Campbell County.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Project activities were chiefly concerned with locating ground-water wells completed in two stratigraphic horizons; the Wyodak-Anderson coal bed and the Lance-Foxhills formation, for the purpose of collecting potentiometric measurements. Locations and water-level measurements were obtained for 369 wells completed in the Wyodak-Anderson coal bed. Also, nine new ground-water wells were drilled, logged by geophysical methods, and completed in the Wyodak-Anderson coal bed where no previous information had existed. Information was collected for 87 wells completed in the Lance-Foxhills formation.

PLANS FOR FISCAL YEAR 1982: A preliminary potentiometric map will be constructed for the Wyodak-Anderson coal bed. Water-level measurements and a preliminary potentiometric map will be constructed for the Lance-Foxhills formation.

PROJECT TITLE: Analysis and evaluation of side-looking radar imagery for possible use in hydrologic investigations (WY 81-063).

FUNDING AGENCY: Geological Survey (Office of Earth Resources Applications).

PROJECT LEADER: Maurice E. Cooley.

FIELD LOCATION: Various locations in the Rocky Mountain area.

PERIOD OF PROJECT: October 1980 to September 1981 (incomplete).

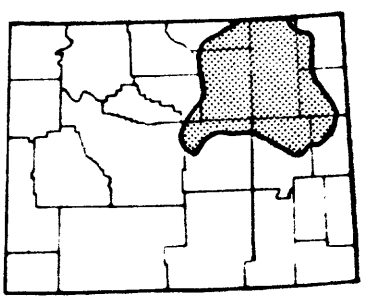
PROBLEM: There is an increasing need for earth-resources surveys and mapping in the United States, particularly in remote areas that have not been intensively surveyed. To meet this need, new technology, as it becomes available, must be tested, evaluated, and applied. SLAR (Side-Looking Airborne Radar) imagery is a remote-sensing tool with potential use in earth-resources investigations. Possible applications of SLAR as a tool in investigations have not been thoroughly evaluated.

OBJECTIVES: This project is a small part of the U.S. Geological Survey Radar Project, a comprehensive study with broad objectives to analyze the applications of modern, commerically available radar systems for earth-resources inventories and mapping; to compare the value of radar images with other kinds of data; and to determine the benefits of merging radar and other data. The objectives of this project are to (1) evaluate radar imagery for hydrologic information, (2) determine the applicability of radar imagery to ground-water and surface-water investigations, and (3) determine the relative value of radar imagery for hydrologic studies in comparison with other kinds of data.

APPROACH: Radar imagery, Landsat imagery, and aerial photographs for five 1:250,000 - scale quadrangles (four in the Butte-Flathead area of western Montana and one in west-central Utah) will be comprehensively studied. Hydrologic features will be identified and evaluated. Results will be compared among the imagery types and with ground information from previous studies and from on-site checking. The quadrangles were selected to provide contrasts in hydrologic and geologic characteristics to enhance the evaluation. Features to be studied include surface-water bodies, fluvial geomorphology, irrigated areas, vegetation differences (ground-water inference), movement and discharge of ground water, surficial hydrogeology, and linear features.

STATUS: Hydrologic evaluation of five radar mosaics has been completed. First drafts of the report of findings and a separate map report have been completed.

PROJECT TITLE: Hydrology in Area 50, Northern Great Plains Coal Province, Wyoming and Montana (WY 81-064).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: James F. Wilson, Jr.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: April 1981 to September 1982.

PROBLEM: Coal Area 50, comprised of the entire Powder River Basin and upper parts of the Belle Fourche and Cheyenne River basins, is rich in energy resources--coal, oil and gas, and uranium. These resources are being developed at an accelerating pace. Because the area is semiarid, both water availability and protection of water resources are problems. Mining companies are required by law to analyze the hydrologic effects of proposed activities and to take appropriate measures to minimize adverse effects. There is a need for information about the water resources of the area that is both comprehensive in scope and easily understood.

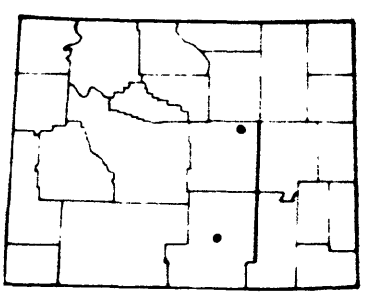
OBJECTIVES: The objective is to describe the hydrology of Area 50 in a clear and concise manner that can be used by both the coal-mining industry and the regulatory agencies. Although specifically oriented to coal hydrology, the results should also be useful for other kinds of energy development, particularly uranium, and to other interest groups, such as environmental organizations.

APPROACH: A topic outline will be developed, based on the Alabama Area 23 report, but oriented to the hydrology and related problems of Area 50. Topics will be assigned to hydrologists for analysis and writing based on their discipline specialties. For each topic all available information will be assembled and summarized or interpreted as needed. Records and other available information on hand are sufficient; no new data will be collected. Each topic will be discussed in a text not to exceed one page, accompanied by maps, graphs, and tables as needed. Regional hydrology will be emphasized. Sources of more detailed information will be sited.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: The chapter outline was completed and authors for each chapter were designated. Base map requirements were determined. Rough drafts of several chapters on surface water were completed.

PLANS FOR FISCAL YEAR 1982: A schedule for completion of the remaining chapters will be developed. All chapters will be completed and have intra-district review by March 31, 1982. A group (storyboard) review of the entire report will be done and the report processed for publication in 1983.

PROJECT TITLE: Sediment yield from natural and reclaimed small ephemeral stream basins in Wyoming (WY 81-066).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: James G. Rankl.

FIELD LOCATION: Central and southern Wyoming.

PERIOD OF PROJECT: April 1981 to September 1984.

PROBLEM: A recurring question in describing the impacts of energy development is what will be the change, if any, in sediment transport. Although sediment data are being collected at a number of stations in the State, none of the stations are on an ephemeral stream of the size that will be impacted by surface mines. Information about potential changes in sediment transport caused by mining is needed for assessing proposed and active mining on or near ephemeral streams.

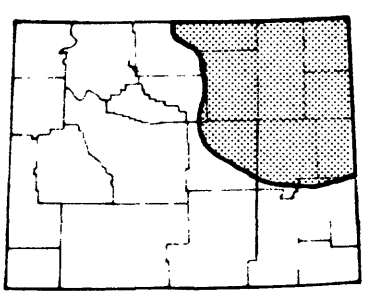
OBJECTIVES: The objectives are (1) to relate sediment yield to rainfall and runoff and determine if there is a significant difference that can be attributed to surface mining; (2) to determine the relative importance of channel erosion and slope wash as sediment sources; and (3) if a USGS transport model is approved by the Division in the period of study, the transport model will be added as a subroutine to the rainfall-runoff model of the Central Region research program, and the sediment transport calibrated.

APPROACH: Dugout Creek tributary, located in the Powder River Basin, will be instrumented for the collection of sediment and rainfall data. In 1982 a small basin, constructed from coal-mine spoil, will be selected in the Hanna Basin and instrumented. Rainfall, runoff, and sediment-concentration data will be collected for each basin. Also, data will be collected on channel and upland erosional processes to determine the range of parameter values that can be expected for small natural and reclaimed basins. Provided that a sediment transport model will be available, the data collected will be used to calibrate and test the model.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: The streamflow station on Dugout Creek tributary was modified and a pumping sediment sampler and recording rain gages were installed. The literature was searched for a suitable sediment transport model.

PLANS FOR FISCAL YEAR 1982: Evaluation of small basins in the Hanna Basin will be completed and the basins instrumented. Two upland soil-erosion plots will be established in the Dugout Creek tributary basin. Estimates of volumes and rates of channel erosion as a result of head cutting will be made using air photographs and channel surveys. A report will be prepared that will contain the data collected. The search for a suitable sediment transport model will continue.

PROJECT TITLE: Low flow of streams in the Powder River Structural basin, Wyoming (WY 81-067).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Gerald W. Armentrout, Jr.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: July 1981 to December 1981.

PROBLEM: The extensive development of energy minerals, particularly coal, in the Power River Basin is causing a rapid increase in the demand for water. Statistical information on long-term supplies is not available in easily useable form. Planners and others concerned with water supplies need to know the amount of water that optimally can be obtained from a stream under existing conditions, and with construction of artificial storage. This project will assess existing conditions, defined as "natural" flow. A second project, to be proposed later, will apply storage-analysis methodology to estimate supplies available when artificial storage is considered.

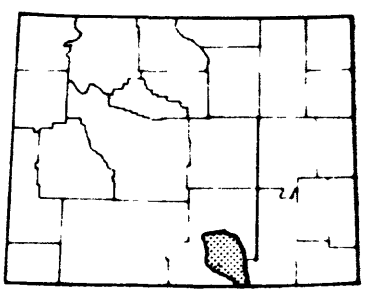
OBJECTIVES: The objective is to analyze low-flow characteristics of streams in the Powder River Basin for the purpose of indicating the amount of water available under present conditions. That is, without considering the use of artificial storage.

APPROACH: The project will be of short duration, but a report describing the statistical characteristics of low flows should have wide appeal to the user community. The work will consist of statistical analysis of low-flow data, compilation of results in an easily understood format, and a discussion of stations having five or more years of record since 1930 will be used. At least a dozen new stations installed as part of U.S. Geological Survey and Bureau of Land Management energy studies have sufficient record to be considered.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Duration and frequency analyses on daily streamflow records were made at 84 sites via WATSTORE (National Water Data Storage and Retrieval System) Program A969. A new approach to prairie-stream low-flow analysis was needed since no low-flow studies of ephemeral streams are known. The approach determined for prairie streams is a statistical description of the annual zero-flow periods to emphasize the need and risks for storage and (or) diversion for periods between flow events. Conventional analysis will be used for the perennial streams in the mountains. Most records at prairie sites are much too short (2 to 4 years) at this time to extend them to include the experience of records from the few long-term gages which have existed through at least one drought. Either drought experience or extention of the short-term records is needed for any future regionalization attempt because of the lack of prairie streamflow record.

PLANS FOR FISCAL YEAR 1982: Plans are to tabulate values of zero-flow period and low-flow period frequency and to study various low-flow and zero-flow indices for possible relations with streamflow or physiographical parameters. If relations are found, future regionalization might be possible. A report of the investigation will be completed.

PROJECT TITLE: Hydrologic evaluation of the shallow aquifer system in Saratoga Valley, south-central Wyoming (WY 82-068).



FUNDING AGENCIES: Wyoming State Engineer and Geological Survey.

PROJECT LEADER: Marvin A. Crist.

FIELD LOCATION: South-central Wyoming.

PERIOD OF PROJECT: October 1981 to September 1983.

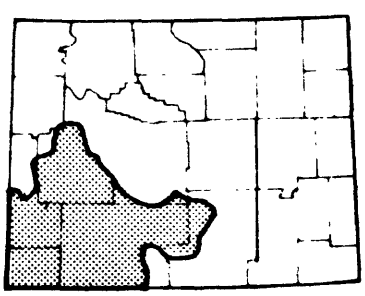
PROBLEM: Wells in the Saratoga Valley provide water to supplement surface water used for irrigation. About 30 irrigation wells were in use in 1981. Observation wells indicate water levels in parts of the valley declined as much as 13 feet between July 1980 and June 1981. The cause of this decline has not been identified. There is no restriction on the development of large-capacity wells such as irrigation wells. State water administrators need an evaluation of the effect of ground-water development upon water-levels and upon stream discharge.

OBJECTIVE: The objectives are to (1) describe the effect of ground-water development upon water levels and attempt to determine the effect upon stream discharge, and (2) determine if a digital model of the hydrologic system can be used to help understand the possible responses of the stream-aquifer system to changes of stress on the system.

APPROACH: Data collected during project WY 80-058 will provide the base for this study. The water-level monitoring network established by L. W. Lenfest will be continued. A quantitative analysis will be made of the data to determine if additional data is needed to prepare a digital model of the hydrologic system. It may be desirable to make more seepage runs to help define a water budget for the valley.

PLANS FOR FISCAL YEAR 1982: All existing data will be compiled and analyzed. Well and pumpage inventories will be updated. A water budget will be prepared from existing data and work will start on a digital model of the hydrologic system.

PROJECT TITLE: Hydrology of Area 52, Rocky Mountain Coal Province, Wyoming, Colorado, Idaho, and Utah (WY 82-069).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Hugh W. Lowham.

FIELD LOCATION: Southwestern Wyoming.

PERIOD OF PROJECT: April 1982 to September 1983.

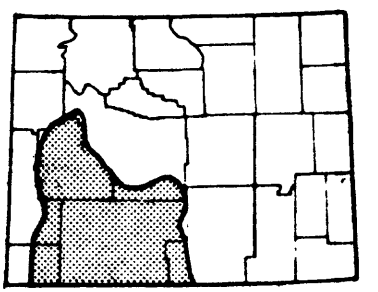
PROBLEM: Coal Area 52, comprised of the Upper Green River, Great Divide, and Upper Bear River basins, is rich in mineral resources--coal, trona, oil and gas, oil shale, and uranium. These resources are being developed at an accelerating pace. Because much of the area is semiarid, both water availability and protection of water resources are problems. Mining companies are required by law to analyze the hydrologic effects of proposed activities and to take appropriate measures to minimize adverse effects. There is a need for information about the water resources of the area that is both comprehensive in scope and easily understood.

OBJECTIVE: The objective is to describe the hydrology of Area 52 in a clear and concise manner that can be used by both the coal-mining industry and the regulatory agencies. Although specifically oriented to coal hydrology, the results should also be useful for other kinds of mineral development, such as trona, oil shale, and oil and gas, and to other interest groups, such as environmental organizations.

APPROACH: A topic outline will be developed, based on other coal area reports but oriented to the hydrology and related problems of Area 52. Topics will be assigned to hydrologists for analysis and writing based on their descipline specialties. For each topic, all available information will be assembled and summarized or interpreted as needed. Records and other available information on hand are sufficient; no new data will be collected. Each topic will be discussed in a text not to exceed one page, accompanied by maps, graphs, and tables as needed. Regional hydrology will be emphasized. Sources of more detailed information will be cited.

PLANS FOR FISCAL YEAR 1982: The final topic outline for the report will be prepared and topics assigned to contributors. A work schedule for completion of all sections of the report will be established. Each contributor will assemble all available information for their assigned topics and will begin summarizing and interpreting the information for presentation. Base maps will be obtained through the Wisconsin District. Approximately one-third of the sections will be completed.

PROJECT TITLE: Upper Colorado River Basin Regional Aquifer-System analysis, Wyoming (WY 82-070).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Everett A. Zimmerman.

FIELD LOCATION: Southwestern Wyoming.

PERIOD OF PROJECT: October 1981 to September 1985.

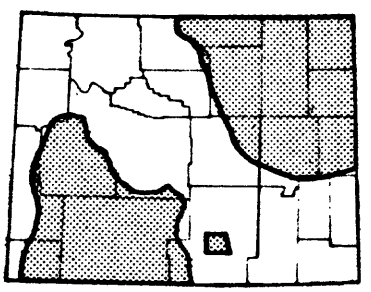
PROBLEM: Ground-water supplies are needed to augment surface-water supplies for increasing industrial, municipal, and domestic use consequent to energy-mineral resource development in the greater Green River Basin, Wyoming. The regional availability and quality of supply, hydrologic consequences of development and subsequent disposal of waste water need to be investigated. Knowledge of the overall operation of the three-dimensional ground-water flow system and its interaction with the surface-water regime is required to assess the effects of ground-water development and to ensure such development does not impair compliance with compacts affecting the Upper Colorado River and its tributaries.

OBJECTIVE: The objectives are to (1) identify aquifer units within the overall hydrogeologic framework, (2) estimate quantitatively aquifer and confining-unit hydraulic properties and parameters, (3) identify structural settings favorable for the development of secondary permeability, (4) infer groundwater flowsystem operation and its interaction with the surfacewater flow regime, (5) assess regional distribution of groundwater quality and availability of supply, and (6) develop capability of assessing consequences of current and projected groundwater use.

APPROACH: Existing waterwell, drillstemtest, and geophysical data will be used to establish the overall hydrogeologic framework, to estimate aquifer and confiningbed hydraulic properties and parameters, and to infer spatial distribution of groundwater quality. Digitalmodeling and parameter-estimation techniques will be employed to the extent feasible to develop and refine a conceptualization of overall groundwater flowsystem operation. Current and historical groundwateruse data will be collected.

PLANS FOR FISCAL YEAR 1982: Basic hydrogeologic, drillstemtest, and geophysical data will be assembled and interpretated. A planning document and work plan will be prepared.

PROJECT TITLE: Chemical quality of surface water in the Powder River, Green River, Great Divide, and Hanna basins, Wyoming (WY 82-071).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: David A. Peterson.

FIELD LOCATION: Northeastern, south-central, and southwestern Wyoming.

PERIOD OF PROJECT: October 1981 to September 1982.

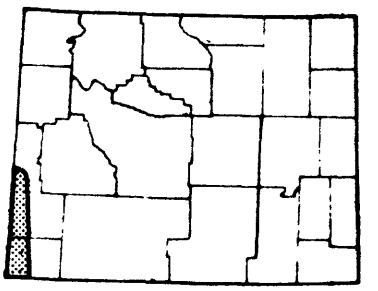
PROBLEM: The collection and analysis of hydrologic information in Wyoming was expanded greatly during the period 1975-81, in response to the sudden increase in the stripmining of coal. The U.S. Geological Survey Coal Hydrology Program and the Bureau of Land Management Energy, Mineral Inventory and Analysis Program (EMRIA) provided most of the funding for the intensified data-collection activities. In the principal coal areas repetitive water-quality sampling increased from a few stations to about 70 stations. The results of the sampling program have not been summarized comprehensively in any of the reports of investigations prepared to date. Such a summary in a single report would be useful for a wide variety of purposes.

OBJECTIVE: The objectives are to (1) summarize statistically the surface-water-quality data collected by the U.S. Geological Survey in the principal coal-producing basins in Wyoming, and (2) evaluate the adequacy of the water-quality data and make recommendations for future water-quality data-collection activities in the coal areas of Wyoming.

APPROACH: Descriptive statistics of constituents at each station sampled on a regular basis will be tabulated. Miscellaneous samples from sites in some areas may be used due to lack of repetitive data. Statistics will include the following for each constituent: sample size, maximum, minimum, median, geometric or arithmetic mean, and standard deviation. Regression relationships will be developed among some or all of the following: major ions, sediment, total dissolved solids, specific conductance, and discharge. The report will also include examples of graphs, descriptions of impacts of energy development for stations where impacts have been identified, and suggestions for future data-collection programs.

PLANS FOR FISCAL YEAR 1982: A project outline describing methods of data analysis and a timetable will be prepared. The data will be analyzed statistically and tabulated by station. A report summarizing the results will be prepared for publication in the Water-Resources Investigations series.

PROJECT TITLE: Stream-aquifer interaction in the Upper Bear River Valley of Wyoming and Utah (WY 82-072).



FUNDING AGENCIES: Wyoming State Engineer and Geological Survey.

PROJECT LEADER: Kent C. Glover.

FIELD LOCATION: Southwestern Wyoming.

PERIOD OF PROJECT: January 1982 to March 1984.

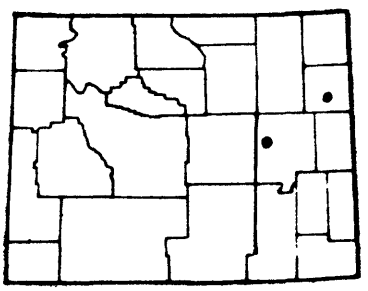
PROBLEM: Water of the Bear River drainage is allocated among the states of Idaho, Utah, and Wyoming by interstate compact. The compact has recently been interpreted to include ground-water withdrawals that result in streamflow depletion. However, there is an insufficient amount of information available to quantify the contribution of the ground-water system to streamflows of the Bear River and its tributaries. Such information is needed before decisions can be made concerning the allocation of ground-water.

OBJECTIVE: The objectives are to (1) determine the effect of existing ground-water pumpage on streamflows, (2) determine the total amount of surface and subsurface water in alluvium flowing across the state boundaries, and (3) provide the methodology for evaluating the effect that future ground-water development may have on streamflow.

APPROACH: This study will be made on the Bear River valley upstream from the Idaho-Wyoming border. Work tasks include mapping the potentiometric surface of alluvium, conducting a pumpage inventory, measuring water levels and streamflow diversions periodically, estimating flow from ungaged drainages, conducting seepage runs, estimating evapotranspiration, and conducting surveys of channel geometry. Data will be used to calibrate a digital stream-aquifer model and establish error tolerances for model parameters. The model will be used to evaluate the effects of existing pumpage on streamflow and to predict the effects of additional pumpage during years of low streamflow.

PLANS FOR FISCAL YEAR 1982: Wells in the study area will be scheduled and existing streamflow records will be reviewed. This information will be used to set up surface- and ground-water data-collection networks. The existing geologic framework will be reviewed and field-checked. Water levels will be monitored in approximately 80 wells and all major streamflow diversions will be measured periodically. Crops will be inventoried and irrigation pumpage will be estimated. A computer program will be selected for modeling and any needed programming will be completed. A conceptual flow model will be formulated.

PROJECT TITLE: Recharge of shallow aquifers through ephemeral stream channels in Wyoming (WY 82-073).



FUNDING AGENCY: Bureau of Land Management.

PROJECT LEADER: Leslie W. Lenfest, Jr.

FIELD LOCATION: Northeastern Wyoming.

PERIOD OF PROJECT: October 1981 to September 1984.

PROBLEM: The Surface Mining Act requires the protection of the essential hydrologic function of alluvial vally floors by either preservation or reclamation. The concern is principally for protection of subirrigation and flood irrigation. However, another important function of the alluvium in some areas is its role in recharge to bedrock aquifers. Water that infiltrates from overland runoff may not extend below the root zone and is discharged by evapotranspiration. Because alluvium is often more permeable thatn the upland soil, flow in ephemeral streams can infiltrate rapidly and be held in transient storage for recharge to underlying bedrock. The recharge function of alluvium in coal-producing areas is not known.

OBJECTIVE: The objectives are to (1) determine the relationship of water in the alluvium to streamflow, and the relationship of water in the alluvium to water in bedrock aquifers; and (2) evaluate the potential use of streamflow records to determine seepage from ephemeral streams.

APPROACH: A basin with an ephemeral reach will be selected and equipped with stage recorders and supplemental crest-stage gages. Observation wells will be drilled in the alluvial and bedrock aquifers adjacent to the streams. Hydrographs from a finite-difference routing model will be compared with observed hydrographs for possible use in estimating recharge if corresponding changes occur in the wells. Water levels and soil-moisture measurements will be used to determine downward movement from the stream to the saturated zone. A second site with a single gage will be used to verify hydraulic properties of the alluvium.

PLANS FOR FISCAL YEAR 1982: The study reaches will be selected and instrumented during the first year. Observation wells will be constructed in the alluvium and in the shallow bedrock aquifers. Stage, discharge, and water-level data will be collected during the rainfall season.

PROJECT TITLE: Ground-water quality in Wyoming (WY 82-074).

FUNDING AGENCY: Geological Survey.

PROJECT LEADER: L. Rodney Larson.

FIELD LOCATION: Statewide.

PERIOD OF PROJECT: June 1982 to September 1983.

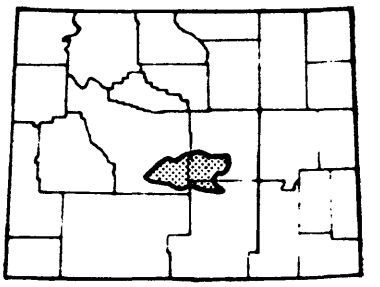
PROBLEM: The demand for ground-water supplies in Wyoming for municipal, agriculture, and industrial use is increasing rapidly, largely because of the growth in development of energy resources. In order to evaluate the ground-water resource and to provide for its protection, water planners need an adequate information base. Existing ground-water quality information probably is inadequate to meet most of these requirements. A comprehensive statewide compilation and analysis of existing data is needed to provide a minimal basis for planning and to identify deficiencies that can be corrected by acquisition of additional data.

OBJECTIVE: The objectives are to (1) summarize and evaluate the adequacy of ground-water quality data for Wyoming, (2) describe the ground-water quality data areally by aquifers or aquifer groups, and (3) make recommendations for future sampling and analyses.

APPROACH: All available ground-water chemical-quality data for Wyoming will be located and inventoried. U.S. Geological Survey data not in WATSTORE (National Water Storage and Retrieval System) will be entered. Water quality of aquifers or aquifer groups will be characterized by statistical summaries of critical constituents. Dissolved-solids concentration will be emphasized; ranges in concentration in wells will be shown on maps. Known or potential hazardous-waste problems in Wyoming will be determined in consultation with other agencies. The adequacy of existing data for assessing ground-water quality will be evaluated and recommendations made for future data aquisition.

PLANS FOR FISCAL YEAR 1982: Existing data will be inventoried and a search and review of pertinent literature made. Project plans will be completed and coordinated with other districts with active projects in the national program.

PROJECT TITLE: Preliminary digital model of the Arikaree aquifer in the Sweetwater River Basin, central Wyoming (WY 82-075).



FUNDING AGENCIES: Wyoming State Engineer, Wyoming Department of Economic Planning and Development, and Geological Survey.

PROJECT LEADER: William B. Borchert.

FIELD LOCATION: Central Wyoming.

PERIOD OF PROJECT: October 1981 to September 1982.

PROBLEM: Increased demand for water supplies in Wyoming are foreseen in the immediate future. The Sweetwater River basin is an area with potentially large supplies of ground water available. The North Platte and Sweetwater Rivers and small tributary streams may be hydraulically connected to the Arikaree aquifer. Water administrators are concerned about possible ground-water development impacts on ground-water levels and streamflow in the area. Additional hydrologic information is needed to update and refine a preliminary model developed with limited data in 1977. Data collection from existing wells and a drilling program are necessary to improve the model.

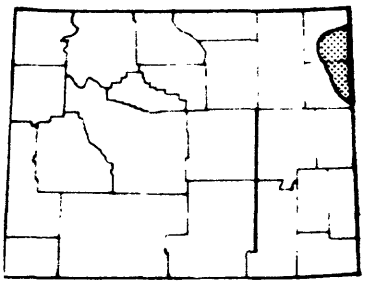
OBJECTIVE: The objectives during the first year will be to (1) collect hydrologic data useful for better definition of the hydrologic system, emphasizing evaluation of the discharge from and recharge to the aquifer, and collection of water-level data; and (2) design a drilling program that, if implemented, would provide data necessary for a management model. The objective during subsequent years, if data are sufficient, will be to provide the means for making water-management decisions by updating and refining the existing flow model.

APPROACH; Surface-water records will be analyzed for low-flow characteristics possibly related with ground water. Gain-and-loss studies will be made of the Sweetwater River and selected tributaries. Recharge from most northward-flowing streams will be estimated. Wells south of the Granite Mountains will be inventoried, water levels measured, an updated water-level contour map made, and an observation well network established. The drilling of observation wells necessary for model update and refinement is contingent upon the availability of supplemental funds from the Wyoming State Engineer for drilling. The feasibility of updating and refining the existing flow model will be determined.

PLANS FOR FISCAL YEAR 1982: Gain-and-loss studies will be made on the Sweetwater River in the fall and spring and on northward-flowing creeks in the spring. An inventory will be made of wells south of the Sweetwater River. Observation wells will be drilled as funds are available from the Wyoming State Engineer. Depth to water will be measured at selected wells south of the Sweetwater River and a water-level contour map will be prepared.

Water-Resources Projects Conducted by other Districts

PROJECT TITLE: Quality and availability of ground water in the Black Hills area, South Dakota and Wyoming (SD 81-059).



FUNDING AGENCY: South Dakota Department of Water and Natural Resources, Black Hills Conservancy Subdistrict, and Geological Survey.

PROJECT LEADER: Kathy D. Peter.

FIELD LOCATION: Eastern South Dakota and northeastern Wyoming.

PERIOD OF PROJECT: May 1981 to September 1984.

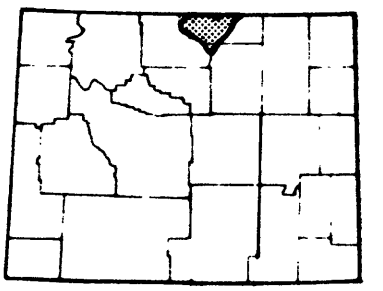
PROBLEM: Increasing development in the Black Hills area is placing increased demands on the ground-water system. The data and interpretations at the scale necessary to make specific management decisions are not available. There is concern about the effects of unplugged or improperly plugged uranium test holes, concern about the effect proposed withdrawals from the Madison Group will have on streams and aquifers in South Dakota, and concern about the effect of the numerous septic systems on the quality of water in the Minnelusa Formation, the principal aquifer supplying water to the residents in the area.

OBJECTIVE: The objectives are to (1) evaluate the quality and quantity of ground-water resources of the sedimentary aquifers in the Black Hills area of South Dakota and eastern Wyoming; (2) document, at a detailed scale, current water quality and head conditions of the sedimentary aquifers and determine recharge; (3) evaluate the effects of septic systems on the Minnelusa and Madison aquifers in the Piedmont Valley area; (4) develop the data base necessary for application of a digital model(s) to predict the effects of potential stress on the ground-water systems; and (5) evaluate the effects of selected ground-water management alternatives on the aquifers.

APPROACH: Streamflow and spring discharge data will be obtained as needed to evaluate net aquifer recharge. Water samples from wells in the Piedmont Valley area will be collected and analyzed. Additional wells will be inventoried and evaluated for prospective water quality and water-level observation networks. The USGS three-dimensional model will be used to predict the effects of stresses on the system and simulate recharge. The feasibility of using a geochemical model to evaluate effects of septic systems in the Piedmont Valley area will be evaluated and if practical, implemented. Reports on quality and availability of ground water will be prepared.

STATUS: Hydrologic data have been compiled. Twenty-nine water samples have been collected. Two rain gages have been installed and three sites have been selected for measuring spring flow. Well inventory is about 90 percent complete. A three-dimensional model of sediment aquifers on the northeastern slope of the Black Hills has been started. Preliminary water chemistry mapping has been completed. Eight structure-contour maps have been drawn of the Minnelusa formation.

PROJECT TITLE: Hydrology of Area 49, Northern Great Plains Coal Province, Montana and Wyoming (MT 81-080).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: Steven E. Slagle.

FIELD LOCATION: South-central Montana and north-central Wyoming.

PERIOD OF PROJECT: April 1981 to September 1982.

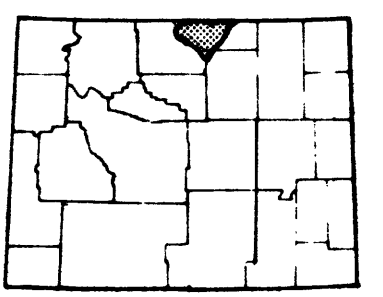
PROBLEM: Coal Area 49 includes the drainage basins of the Tongue River in Montana and Wyoming and Armells, Sarpy, and Rosebud Creeks in Montana. The area contains vast strippable coal reserves. The development of this coal is important in proposals for solving the nation's energy problems. Considerable amounts of hydrologic data have been collected in the area in cooperation with State and Federal agencies. Much of the information is presently in computer files, basic data reports, and technical publications. In its present form, the information is of limited use to land managers, coal developers, and regulatory agencies. The hydrology, available data, and current USGS programs need to be described in an easily understood and informative style.

OBJECTIVE: The objective is to describe the surface water, ground water, and water quality conditions of Coal Area 49 in a manner that can be easily understood by land managers, coal developers, regulatory agencies, and water users.

APPROACH: A topic outline will be prepared and topics assigned to hydrologists based on their field of expertise. Available data for each topic will be analyzed and summarized in concise maps, charts, or graphs, supplemented with brief narrative descriptions. A list of references will be included for source of more detailed information. No new data will be collected.

STATUS: During 1981, the topic outline was completed and topics assigned to authors. Data compilation was started. The final report will be completed and reviewed in fiscal year 1982.

PROJECT TITLE: Water for expanding needs in the Tongue River Area, Montana-Wyoming (MT 81-082).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: William R. Hotchkiss.

FIELD LOCATION: South-central Montana and north-central Wyoming.

PERIOD OF PROJECT: May 1981 to September 1982.

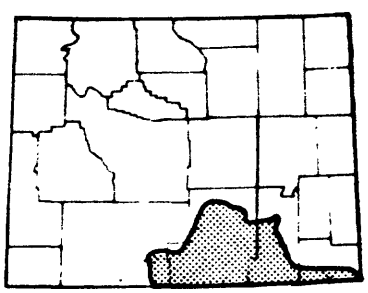
PROBLEM: Mining and associated operations will place heavy demands on limited water supplies of the area. They could also severely impact the resources through degradation of water quality. Water use conflicts will increase as water demands become greater. The water resources information that is available for the area needs to be effectively transferred to the lawmakers, decision makers, regulatory agencies, water users, and general public in a manner that is understandable and usable for making decisions that will have far-reaching impacts regarding use, protection, and management of the area's water resources.

OBJECTIVE: The objectives are to (1) increase public awareness of the availability of water resources data for the area; (2) present available water data for the area in a manner that can be understood and used by planners, managers, public officials, and that part of the public concerned with land and water resources decision making; and (3) describe techniques for utilizing existing water resources data and regional scale models to evaluate broad ground-water withdrawals related to possible development alternatives.

APPROACH: Available technical and data compilation reports will be used to prepare an informative, lay-reader report that describes the hydrologic system in the Tongue River area. Simple, singular-concept maps, charts, graphs, and tables will be prepared to transpose technical information into easily understood terms. Where possible, current management problems facing decision makers will be presented in terms of hydrologic alternatives to demonstrate the need for consideration of hydrologic consequences of decisions.

STATUS: The report outline and information compilation have been completed. Preparation of the report is underway, with completion scheduled for late 1982.

PROJECT TITLE: Coal Region Data and Information Reports in Colorado (CO 81-157).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: David J. Lystrom.

FIELD LOCATION: Central and northern Colorado and south-central Wyoming.

PERIOD OF PROJECT: April 1981 to September 1983.

PROBLEM: Development of coal resources are now taking place or being planned throughout the State of Colorado. The planning process requires current information concerning the hydrology, physiography, geology, and climate of coal resource regions. This information is at present dispersed in a variety of reports and unpublished data residing in the files of Water Resources Division (WRD) or other government agencies. Because this information is diversely located and may not be understandable to planners and managers, there is a need to compile available information in a form that will provide a basic description of hydrologic conditions for each coal resource region in Colorado.

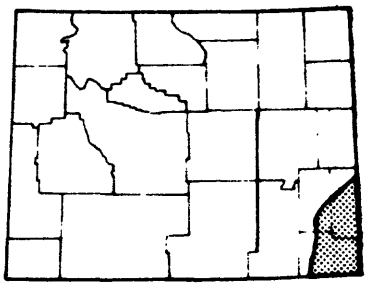
OBJECTIVES: The objective of this project is to compile information and publish a report describing basic hyrologic conditions for each major coal region in Colorado. These reports are intended for audiences ranging from the lay reader to the more technically oriented planners and managers. With this audience in mind, the reports are not to be highly technical or interpretive. The basic information presented will primarily provide a background information base describing hydrologic conditions prior to mining. Where information related to hydrologic impacts of mining are available, a section describing these impacts will be included. For the most part, only existing data will be used.

APPROACH: The report format will consist of a narrative page headed by a short subject title and a brief abstract. The narrative is supported by complimentary illustrations on the adjacent page. A list of subjects, maps, graphs, and photos will be selected based on a preliminary assessment of available data for each coal region report. Because only existing data will be used, flexibility will be given to authors to encourage innovation of subjects and illustrations.

STATUS: During 1981, data were assembled and the report was started for Coal Area 54 (upper North Platte River and upper Laramie River basins). The final report will be completed and reviewed in fiscal year 1982. Compilation of data for Coal Area 59 (upper south Platte River basin) will start in fiscal year 1982; the final report will be completed in fiscal year 1983. A starting date has not been established for a report on Coal Area 53 (1tttle Snake River basin in Wyoming).

Water-Resources Projects Conducted by Central Region Staff

PROJECT TITLE: High Plains regional aquifer-system analysis (CR 78-229).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: John B. Weeks. (Lakewood, Colorado)

FIELD LOCATION: Southeastern Wyoming, south-central South Dakota, Nebraska, eastern Colorado, western Kansas, western Oklahoma, western Texas, and eastern New Mexico.

PERIOD OF PROJECT: October 1978 to September 1983.

PROBLEM: The Ogallala Formation is the principal aquifer underlying the High Plains. The aquifer contains about 2 billion acre-feet of water in storage; but, water is being withdrawn for irrigation in excess of the rate of natural replenishment. The economic future of the High Plains in eight states is dependent upon the capacity of the aquifer to sustain withdrawals. A detailed knowledge of the aquifer system is needed so that the system can be simulated, water-management alternatives evaluated, and the economic life of the aquifer projected.

OBJECTIVES: Previous studies of the hydrology of the High Plains have been limited by political boundaries. This study will provide a regional description of the water resources and the operation of the hydrologic system consistent with the natural hydrologic boundaries of the High Plains. Computer models of the aquifer system will be developed and used to project the future response of the system to proposed future withdrawals and provide a basis for the economic evaluation of water-management alternatives.

APPROACH: Existing hydrologic data will be compiled and reviewed. Data collection networks will be revised or initiated to provide adequate coverage for the study area. The data will be regionalized to provide a detailed description of the aquifer system and stored in a digital computer for processing and retrieval. The computerized data file will provide the data base needed for the development of computer models of the aquifer system. Proposed water-management alternatives and their effects on the aquifer system will be simulated by the models to evaluate the economic life of the system for each alternative.

PROGRESS AND SIGNIFICANT RESULTS FOR FISCAL YEAR 1981: Water-level and saturated thickness changes were compiled and mapped. Hydraulic conductivity and specific yield data were compiled and mapped. Irrigated acreage mapping from Landsat data was completed. The Data Base Management System for computer storage of data was completed and user programs written. Loading of the Data Base was 75 percent completed. Estimation of historical pumpage was in progress and computer modeling of the aquifer started.

PLANS FOR FISCAL YEAR 1982: Estimation of pumpage and loading of the Data Base will be completed. Analysis of data as required to develop a groundwater flow model will continue. Management alternatives with the model will be simulated and the final reports will be prepared.

REPORTS PUBLISHED IN FISCAL YEAR 1980 AND 1981:

Weeks, J. B., 1979, High Plains regional aquifer-system analysis: in Ground Water Management Districts Association Conference, 4th, Amarillo, Texas, 1978, Proceedings, p. 13-16.

Gutentag, E. D., and Weeks, J. B., 1980, Water table in the High Plains aquifer in 1978 in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Hydrologic Investigations Atlas HA-642.

Luckey, R. R., Heimes, F. J., and Gaggiani, N. G., 1980, Calibration and testing of selected portable flowmeters for use on large irrigation systems: U.S. Geological Survey Water-Resources Investigations 80-72, 21 p.

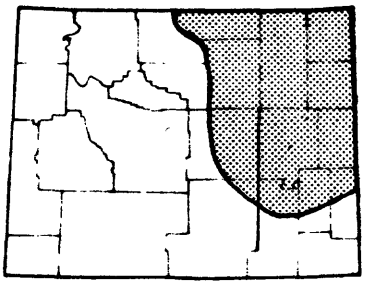
Heimes, F. J., and Thelin, G. P., 1980, Development and application of Landsat-derived irrigation cropland maps for water-use determination in the High Plans [abs], in Identifying irrigated lands using remote sensing: State of the art: Symposium, Sioux Falls, South Dakota, 1979 Proceedings Missouri River Basin Commission p. 76-77.

Heimes, F. J., and Luckey, R. R., 1980, Evaluating methods for determining water use in the High Plains in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Survey Water-Resources Investigations 80-111, 125 p.

Weeks, J. B., and Gutentag, E. D., 1981, Bedrock geology, altitude of base, and 1980 saturated thickness of the High Plains Aquifer in parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming: U.S. Geological Survey Hydrologic Investigations Atlas HA-648.

Luckey, R. R., Gutentag, E. D., and Weeks, J. B., Water-level and saturated thickness changes, predevelopment to 1980 in the High Plains Aquifer in parts of Colorado, Kansas, Nebraska, New Mexico, South Dakota, Texas, and Wyoming: U.S. Geological Survey Hydrologic Investigations Atlas HA-652.

PROJECT TITLE: Northern Great Plains regional aquifer-system analysis (CR 78-230).



FUNDING AGENCY: Geological Survey.

PROJECT LEADER: George A. Dinwiddie. (Lakewood, Colorado)

FIELD LOCATION: Northeastern Wyoming, eastern Montana, North Dakota, and South Dakota.

PERIOD OF PROJECT: October 1977 to September 1981.

PROBLEM: Anticipated development of coal, oil, and gas fields and increased demand for water for domestic, agricultural, and municipal uses will require better management of available water supplies. The supply of surface water, streamflow, is variable and, at times, undependable. The supply of ground water is not defined well enough to be a predictable supply for long-term use and management.

OBJECTIVES: Both the present and predevelopment ground-water systems will be described in terms of hydraulics, geology, and geochemistry. Once defined, the ground-water system(s) will be simulated by a versatile model that will serve as an investigative and predictive management tool with which to define the availability and quality of ground water and to predict the effects of producing these resources.

APPROACH: Existing data will be assembled from all available sources and evaluated for their validity and usefulness. On the basis of these data, a preliminary digital model will reveal areas in which additional data are required. The additional data will be collected from available springs, wells, and streams and from at least one exploratory hole. The simulation model will be periodically refined, calibrated, and confirmed with subsequent hard data until a reliable management tool has been developed.

STATUS: All work has been completed. A series of final reports of results is in preparation.

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