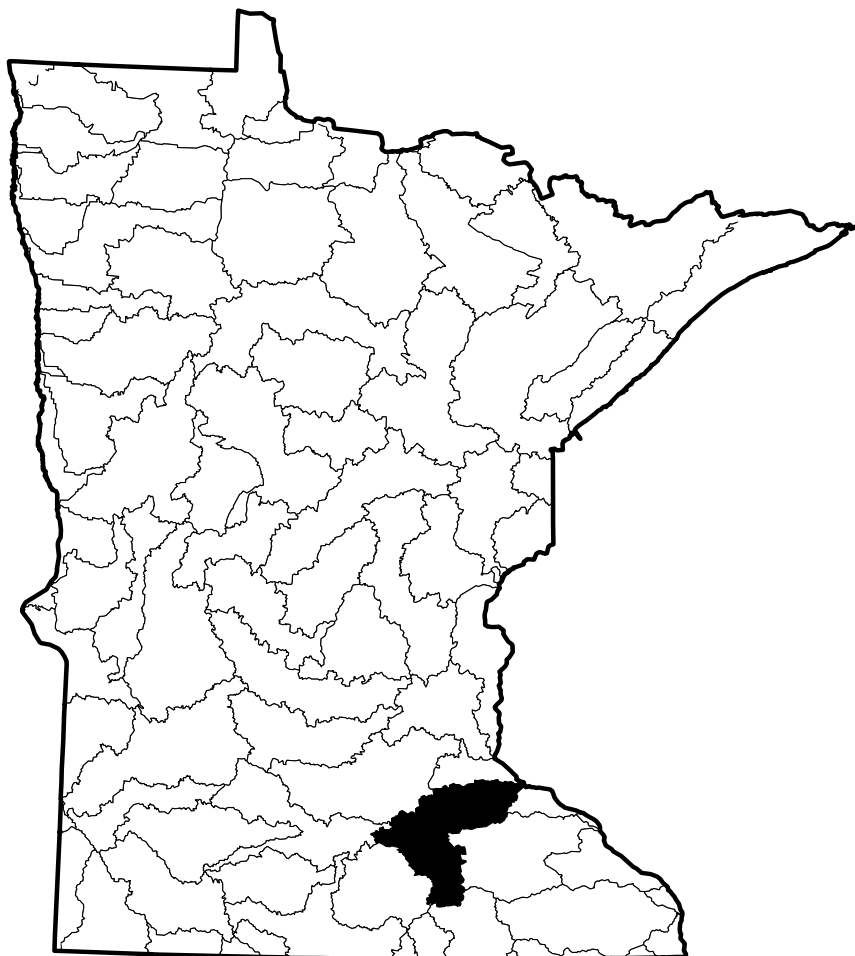


PHYSICAL CHARACTERISTICS OF STREAM SUBBASINS IN THE CANNON RIVER BASIN, SOUTHEASTERN MINNESOTA

By C. A. Sanocki and T. A. Winterstein

Open-File Report 99-472



Prepared in cooperation with the
Minnesota Department of Transportation

Mounds View, Minnesota

1999



U.S. Department of the Interior
U.S. Geological Survey

Physical Characteristics of Stream Subbasins in the Cannon River Basin, Southeastern Minnesota

By C. A. Sanocki and T. A. Winterstein

Abstract

Data that describe the physical characteristics of stream subbasins upstream from selected sites on streams in the Cannon River Basin, located in southeastern Minnesota, are presented in this report. The physical characteristics are the drainage area of the subbasin, the percentage area of the subbasin covered only by lakes, the percentage area of the subbasin covered by both lakes and marsh, the main-channel length, and the main-channel slope. Stream sites include outlets of subbasins of at least 5 square miles, and locations of U.S. Geological Survey high-flow, and continuous-record gaging stations.

Introduction

This is the 15th report in a series detailing subbasin characteristics of streams in Minnesota and adjacent states. The Cannon River Basin drains an area of 1440 square miles and is represented by hydrologic accounting unit 07040002 (U.S. Geological Survey, 1974). The Cannon River Basin includes parts of Blue Earth, Dakota, Freeborn, Goodhue, Le Sueur, Rice, Scott, Steele, Waseca Counties in southeastern Minnesota.

Selected data for sites on streams at outlets of subbasins larger than about 5 square miles; at locations of U.S. Geological Survey (USGS) high-flow, and continuous-record gaging stations located in the Cannon River Basin are presented in this report. This report was prepared in cooperation with the Minnesota Department of Transportation.

Methods

USGS 7-1/2 minute series topographic maps were used as source maps to define subbasin boundaries and to obtain main-channel length, and the contour elevation points used in this report. Paper copies of the maps were used. Lake and marsh data were obtained from U.S. Fish and Wildlife Service National Wetlands Inventory Data (U.S. Fish & Wildlife Service, 1981-present). A geographic information system (GIS) was used to define the geographic location and extent of the subbasins, lakes, marshes, main-channels, and elevation points. Data digitized from paper copies were in error by no more than twice the horizontal

accuracy of National Mapping Standards of 40 feet (Thompson, 1987, p. 104). All thematic (digitized) data were projected into an Albers Equal-Area projection for storage and analysis.

Subbasin boundaries were delineated on the basis of anthropogenic activities and topographic contours. Anthropogenic activities, such as the installation of storm sewers, the drainage of wetlands, and the diversion of streams, may alter the drainage area of a stream; therefore data from field inspections and recent drainage-ditch maps were transferred to the topographic maps. The subbasin boundaries were digitized by the Minnesota Department of Natural Resources (DNR), and the USGS, Minnesota District, using a GIS.

Lake and marsh boundaries were overlaid on the subbasin boundaries to associate each lake and marsh with a subbasin. The total area of lakes and marshes within each subbasin was calculated by the GIS. Total marsh area plus total lake area is defined as storage area.

Main channels were delineated for each subbasin on the 7-1/2 minute topographic maps starting at the outflow of the subbasin and continuing upstream. Whenever the main channel joined with another stream, the stream upstream of the junction that drained the largest area was selected as the main channel. The main channel, which represents the watercourse that drains the greatest area, is continuous and is defined as a single trace that passes through marshes, lakes, and midline of rivers and braided streams from the basin outlet to an endpoint in the basin, generally at the basin divide. The main channels were digitized by the Minnesota

Department of Transportation, using a computer aided drafting system and transferred to the GIS. Stream extensions that represent a portion of the main channel from the end of the mapped stream (blue line on 7-1/2 minute topographic maps) to an endpoint within the basin, generally at the basin divide, were digitized by USGS, Minnesota District, using a GIS. The main-channel data were overlaid onto the subbasin data to associate each main channel with its subbasin.

Elevation points were digitized at the intersection of topographic contour lines and main channels. The elevation data were digitized using a GIS. The elevation data was overlaid onto the main channel data to associate each elevation data point with a main channel. Two points on the main-channel, at 10 percent and at 85 percent of the main channel length from the basin outlet to the drainage divide, were located by the GIS. The elevations of these two points were interpolated from the digitized elevation data. Main-channel slope was calculated by dividing the difference in elevation between these points by the distance along the stream channel between these points.

Physical Characteristics of Cannon River Subbasins

Physical characteristics determined for each of the subbasins shown on plate 1 are presented in table 1. Subbasins are presented in order from headwaters to mouth. The rank of the subbasin stream is shown by indentation; whenever two subbasin streams joined, the stream draining the least cumulative area was assigned a lower rank and indented in the table.

The data for drainage area, and main-channel length are reported using three significant figures or rounded to the nearest one-hundredth of a unit. The data for lake area and storage area are rounded to the nearest one-tenth of a percent. The data for main-channel slope is reported to the nearest one-tenth of a foot per mile.

The following is an explanation of the terms used in table 1 and plate 1:

Subbasin number. A seven digit number based on the Minnesota Common Stream and Watershed Numbering System (Minnesota Department of Natural Resources, 1981). The first two digits are 39 and identify the Cannon River Basin. The following three digits are arbitrary and were assigned by the DNR. The last two digits were added by the USGS, Minnesota District,, to identify additional subdivisions to the DNR's watersheds at locations of USGS gaging stations and to identify noncontributing areas.

Stream name. The name of the stream or ditch shown on 7-1/2 minute topographic maps. The relative position of the subbasin above other subbasins, streams, and gaging stations.

Outlet location. The U.S. Public Lands Survey System is used to describe the location where the stream exits the subbasin, down to quarter-quarter section. The description includes quarter-quarter section, section, township, and range.

Drainage area. That area, measured on a horizontal plane, enclosed by a topographic divide, within which direct surface runoff from precipitation normally flows by gravity into a watercourse above a specific point. This may include closed basins and other areas that do not contribute directly to surface runoff.

Lake area. The percentage of the drainage area labeled lacustrine (lakes) on U.S. Fish and Wildlife Service National Wetlands Inventory Data.

Storage area. The percentage of a drainage area labeled lacustrine (lakes) and palustrine (marsh) on U.S. Fish and Wildlife Service National Wetlands Inventory Data. Marsh areas shown on plate 1 are from USGS 1:100,000 Digital Ling Graph data 1993.

Main-channel length. The total length of the main channel from the basin outlet to a point within the basin (generally at the basin divide) representing the watercourse that drains the greatest area.

Main-channel slope. The average slope of the watercourse between the points at 10 and at 85 percent of the distance along the main channel from the basin outlet to the drainage divide.

Stream extension. A representation of the main channel from the end of the mapped stream line (blue line on 7-1/2 minute topographic maps) to an endpoint within the basin, generally at the basin divide. This is done by interpreting topographic relief so that the extension of the main channel represents the watercourse draining the greatest area.

References Cited

- Minnesota Department of Natural Resources, 1981, The common stream and watershed numbering system: Minnesota Department of Natural Resources Stream Inventory and Data Retrieval Systems Report 7002, unpagged.
- Thompson, M.M., 1987, Maps for America, 3d edition: U.S. Geological Survey, 265 p.
- U.S. Geological Survey, 1974, Hydrologic unit map--1974 State of Minnesota: 1 plate, scale 1:500,000.
- U.S. Fish & Wildlife Service, National Wetlands Inventory Digital Data: Oct. 1981 to present

Table 1.—Physical characteristic data for the Cannon River Basin.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Town-ship	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)
3906600	Unnamed tributary from Glen Lake above unnamed tributary (basin 3906700)	SW NW	16	105N	19W	8.19	1.6	13.2	8.19	1.6	11.7	6.76	10.1
3906700	Unnamed tributary to basin 3906200	SW NW	16	105N	19W	5.51	0.6	1.4	5.51	0.6	0.8	3.61	22.8
3906300	Unnamed tributary to basin 3906200	NE SE	14	105N	20W	6.10	0.0	1.4	6.10	0.0	1.4	6.84	14.7
3906200	Unnamed tributary to basin 3905900	SE NE	16	105N	20W	10.1	0.0	4.4	29.9	0.6	5.3	14.1	9.7
3906100	Unnamed tributary above basin 3906000	SE NW	36	105N	20W	13.4	0.0	0.2	13.4	0.0	0.2	8.12	8.9
3906000	Unnamed tributary to basin 3905900	NE SE	16	105N	20W	14.3	0.0	1.6	27.7	0.0	0.9	13.4	8.2
3906400	Unnamed tributary to basin 3905900	NW NW	09	105N	20W	6.59	0.0	1.3	6.59	0.0	1.3	5.71	20.1
3905900	Unnamed tributary to Straight River	NE NE	05	105N	20W	5.04	0.0	1.8	69.2	0.2	3.0	17.3	8.5
3905800	Straight River above unnamed tributary (basin 3905700)	NW NE	05	105N	20W	17.8	0.1	0.7	17.8	0.1	0.6	10.4	5.7
3905700	Unnamed tributary to Straight River	NE NW	05	105N	20W	16.2	0.9	2.3	16.2	0.9	1.6	9.59	8.1
3905600	County Ditch 25 above Straight River	SW NE	29	106N	20W	9.18	0.0	1.1	9.18	0.0	1.1	6.68	13.4
3904100	County Ditch 5 above Straight River	NW NW	06	106N	20W	8.14	0.0	0.7	8.14	0.0	0.7	5.58	3.7
3905500	Straight River above Turtle Creek	NE SW	32	107N	20W	23.0	0.0	2.1	144.	0.2	2.4	29.9	5.3
3905300	Unnamed tributary to Turtle Creek	NE NW	07	106N	19W	5.86	0.0	1.7	5.86	0.0	1.7	4.85	16.8
3905401	Turtle Creek 2 near Pratt: station number is 05352700	NW SW	08	106N	19W	1.26	0.0	1.3	1.26	0.0	1.3	1.93	35.4
3906501	County Ditch 22 above gaging station near Steele Center: station number is 05352800	NW NW	11	106N	20W	5.00	0.0	0.2	5.00	0.0	0.2	4.68	15.1
3906500	County Ditch 22 above Turtle Creek	NW NE	03	106N	20W	1.77	0.0	1.1	6.77	0.0	0.4	6.04	14.2
3905400	Turtle Creek	SE NW	32	107N	20W	30.1	0.1	4.0	44.0	0.1	3.0	19.2	9.3

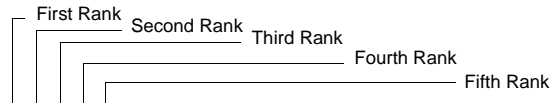


Table 1.—Physical characteristic data for the Cannon River Basin—Continued.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Township	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)
3904200	Straight River above Maple Creek	NE NE	09	107N	20W	16.5	0.3	3.3	204.	0.2	2.7	38.8	4.0
3905200	Unnamed tributary to Maple Creek	NW NW	09	107N	19W	16.3	0.0	1.6	16.3	0.0	1.6	8.61	7.9
3905100	Maple Creek above unnamed tributary (basin 3905200)	NW NW	09	107N	19W	6.06	0.0	12.5	6.06	0.0	12.5	4.52	11.2
3904300	Maple Creek	NE NE	09	107N	20W	16.1	0.0	2.7	38.5	0.0	3.8	17.1	6.5
3904400	Straight River above Crane Creek	NW NW	21	108N	20W	7.28	0.6	3.8	250.	0.2	3.0	44.4	3.2
3903400	Unnamed tributary to Rice Lake	SE SE	04	107N	22W	5.20	22.6	31.4	5.20	22.6	10.0	3.86	6.3
3903300	Rice Lake outlet	NW SW	03	107N	22W	14.0	1.9	14.8	19.2	7.5	13.2	6.61	5.7
3903600	Unnamed tributary to Goose Lake	SE NW	14	107N	22W	6.66	0.0	8.6	6.66	0.0	8.6	5.19	2.0
3903500	Crane Creek above Judicial Ditch number 1	NE NW	01	107N	22W	9.50	7.4	22.7	35.3	6.1	14.3	9.35	3.9
3903200	Judicial Ditch number 1 to Crane Creek	SE SW	36	108N	22W	7.80	0.0	17.7	7.80	0.0	17.7	5.43	6.0
3903100	Judicial Ditch number 1 to Crane Creek	SE SW	32	108N	21W	14.2	0.0	4.4	14.2	0.0	4.4	4.91	2.5
3904000	County Ditch number 21 to basin 3903900	SW SW	19	107N	21W	10.7	0.0	0.8	10.7	0.0	0.8	7.29	8.8
3903900	Judicial Ditch number 1 to Crane Creek	SE SW	05	107N	21W	8.77	0.0	0.5	19.5	0.0	0.7	11.6	5.9
3903800	Crane Creek	SE NE	20	108N	20W	28.9	0.0	0.9	106.	2.0	8.5	23.2	2.1
3904500	Medford Creek above unnamed tributary (basin 3904600)	SE SW	14	108N	20W	7.53	0.0	1.1	7.53	0.0	1.1	6.38	19.4
3904600	Unnamed tributary to Medford Creek	SE SW	14	108N	20W	7.25	0.0	1.2	7.25	0.0	1.2	7.57	17.2
3904800	Medford Creek	NW SE	04	108N	20W	7.48	0.0	2.8	22.3	0.0	1.7	11.7	18.8
3904900	Straight River above Rush Creek	SW SE	28	109N	20W	10.5	0.0	4.4	388.	0.7	6.2	51.1	3.5
3904700	Rush Creek	SW SE	28	109N	20W	22.5	0.0	0.5	22.5	0.0	0.5	14.9	13.2
3910200	Straight River above Mud Creek	NW SW	21	109N	20W	6.77	0.0	4.5	418.	0.6	6.1	53.2	3.4

Table 1.—Physical characteristic data for the Cannon River Basin—Continued.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Township	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)
3905000	Mud Creek	NW SW	21	109N	20W	14.3	0.0	3.1	14.3	0.0	3.1	10.5	7.4
3910101	Straight River above gaging station near Fairbault: station number is 05353800	NW SE	09	109N	20W	3.65	0.0	0.6	435.	0.6	6.0	55.6	3.3
3910100	Straight River above Falls Creek	SW SE	33	110N	20W	4.65	0.0	4.4	440.	0.6	6.0	58.4	3.3
3908000	Falls Creek	SE SW	33	110N	20W	12.5	0.0	0.1	12.5	0.0	0.1	10.4	16.1
3908800	Straight River	NW NE	30	110N	20W	8.02	0.0	3.7	461.	0.6	5.9	64.1	3.5
3908400	Cannon River above unnamed tributary from Lake Dora	SW SW	11	110N	23W	29.2	8.4	26.9	29.2	8.4	21.0	17.1	2.2
3908500	Unnamed tributary from Lake Dora	NE SE	10	110N	23W	20.4	5.4	15.8	20.4	5.4	11.5	9.73	2.6
3909200	Little Cannon River	NE NE	30	110N	23W	14.5	1.3	13.2	14.5	1.3	12.1	8.79	7.9
3910301	Cannon River above gaging station near Kilkenny: station number is 05348550	NE NE	31	110N	23W	23.6	8.1	21.9	87.8	6.5	19.9	30.5	2.0
3910700	Lake Jefferson outlet	SW NW	05	109N	24W	16.5	19.0	28.4	16.5	19.0	12.6	8.97	3.9
3910600	German Lake outlet	NW NE	04	109N	24W	7.48	17.7	32.4	23.9	18.6	15.5	10.5	3.0
3910500	County Ditch 59	SE SE	07	109N	23W	18.1	1.7	17.9	42.1	11.3	18.1	16.2	2.0
3910300	Cannon River above Tetonka Lake	NE NE	19	109N	23W	12.2	0.0	11.2	142.	7.3	24.1	37.7	2.2
3903700	Unnamed tributary to Tetonka Lake	NW NW	28	109N	23W	12.2	16.4	22.8	12.2	16.4	8.4	10.4	6.6
3910400	Cannon River above outlet of Tetonka Lake	NW NE	27	109N	23W	10.8	20.2	25.3	165.	8.8	27.2	40.9	2.2
3902800	Waterville Creek	SE SE	27	109N	23W	21.0	1.5	10.6	21.0	1.5	9.4	12.6	10.4
3902700	White Water Creek	SE NW	26	109N	23W	15.8	1.6	12.1	36.8	1.5	10.3	13.2	10.7
3909300	Unnamed tributary to Lower Sakatah Lake	SW SW	17	109N	22W	7.62	8.5	16.0	7.62	8.5	8.1	5.81	12.9
3909400	Cannon River above outlet of Lower Sakatah Lake	SW SE	17	109N	22W	8.03	23.5	28.2	217.	8.1	29.3	45.5	1.9

Table 1.—Physical characteristic data for the Cannon River Basin—Continued.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Township	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)
3909000	Devil Creek	SE SE	16	109N	22W	20.3	9.3	21.9	20.3	9.3	14.5	10.9	6.6
3902900	Unnamed tributary to Cannon River	SE SW	23	109N	22W	7.42	0.0	3.1	7.42	0.0	3.1	6.27	19.8
3909100	Cannon River above Cannon Lake	SE NE	13	109N	22W	11.6	0.4	7.9	257.	7.6	30.9	54.2	1.5
3903000	Mackenzie Creek	SE SW	09	109N	21W	24.0	0.0	1.9	24.0	0.0	1.9	12.9	10.7
3908900	Cannon River above Wells Lake (Cannon Lake outlet)	NW NE	04	109N	21W	14.5	17.4	22.6	295.	7.5	32.4	58.2	1.7
3910000	Unnamed tributary to Cannon River	NW NE	35	110N	21W	16.9	14.9	25.8	16.9	14.9	13.3	11.2	8.1
3908600	Cannon River above unnamed tributary (basin 3908700)	SE SW	25	110N	21W	8.81	12.4	16.8	321.	8.0	35.9	61.9	1.6
3908700	Unnamed tributary to Cannon River	SW SE	25	110N	21W	9.49	0.0	1.2	9.49	0.0	1.2	8.14	20.7
3908101	Cannon River above Straight River	NW NE	30	110N	20W	2.17	3.2	4.3	333.	7.8	35.6	63.2	1.5
3908100	Cannon River above unnamed tributary (basin 3908200)	NE NW	08	110N	20W	8.87	0.6	2.5	802.	3.6	34.5	69.1	4.3
3908200	Unnamed tributary to Cannon River	NE NW	08	110N	20W	8.58	0.5	10.6	8.58	0.5	10.2	6.38	18.1
3907700	Cannon River above Wolf Creek	NW NE	22	111N	20W	20.3	0.0	5.3	831.	3.4	34.6	76.0	4.2
3907500	Unnamed tributary to Circle Lake	NW SW	16	111N	21W	15.9	0.0	8.3	15.9	0.0	8.3	9.26	11.3
3908300	Wolf Creek above Circle Lake	SW SW	22	111N	21W	13.6	11.2	20.5	13.6	11.2	10.8	9.14	9.8
3907600	Wolf Creek	NW NE	22	111N	20W	13.4	9.6	13.0	42.9	6.6	9.9	20.8	6.0
3906903	Cannon River above unnamed tributary (basin 3909800)	SW SE	02	111N	20W	4.59	0.0	3.4	878.	3.6	37.4	78.7	4.2
3909800	Unnamed tributary to Cannon River	SE SW	02	111N	20W	6.46	0.0	1.6	6.46	0.0	1.6	7.29	14.7
3906902	Cannon River above Heath Creek	SW SE	02	111N	20W	0.08	0.0	3.8	885.	3.5	37.4	79.0	4.2
3907400	Unnamed tributary to Union Lake	SE NE	03	111N	21W	14.8	0.0	15.4	14.8	0.0	15.4	10.8	9.2
3907300	Knowles Creek	SE NE	35	112N	21W	14.0	0.0	10.1	14.0	0.0	10.1	10.5	11.3

Table 1.—Physical characteristic data for the Cannon River Basin—Continued.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Township	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)
3907000	Heath Creek	NW SE	02	111N	20W	13.0	4.8	11.6	41.8	1.5	11.6	23.0	6.4
3906901	Cannon River above gaging station at Northfield: station number is 05355024	NE NE	01	111N	20W	2.52	0.0	1.9	929.	3.4	38.2	80.6	4.2
3906900	Cannon River above unnamed tributary (basin 3909500)	SW NW	31	112N	19W	2.00	0.0	1.1	931.	3.4	38.2	81.3	4.2
3909500	Unnamed tributary to Cannon River	SW NW	31	112N	19W	10.2	0.0	1.6	10.8	0.0	1.6	6.62	29.7
3901900	Cannon River above Chub Creek	SE SW	08	112N	18W	16.5	0.0	3.7	958.	3.3	38.1	90.8	4.1
3907201	Dutch Creek above unnamed tributary (basin 3909700)	SW NW	16	112N	20W	14.2	0.0	21.5	14.2	0.0	21.5	7.24	17.0
3909700	Unnamed tributary to Dutch Creek	SW NW	16	112N	20W	8.80	0.0	19.4	8.80	0.0	19.4	7.73	20.7
3907200	Dutch Creek	NE SW	10	112N	20W	1.37	0.0	32.0	24.4	0.0	21.3	9.52	9.5
3911100	Chub Creek above Dutch Creek	NE SW	10	112N	20W	6.57	5.3	22.2	6.57	5.3	17.2	5.99	12.4
3911000	Chub Creek above Mud Creek	SE NE	18	112N	19W	11.5	0.0	10.0	42.5	0.8	17.9	15.2	6.3
3907100	Mud Creek	SE NE	18	112N	19W	9.95	0.0	8.2	9.95	0.0	8.2	8.13	12.7
3911201	Chub Creek above North Branch Chub Creek	NE NW	11	112N	19W	7.66	0.0	8.2	60.1	0.6	15.2	21.8	5.3
3910900	North Branch Chub Creek	NE NW	11	112N	19W	20.1	0.0	5.5	20.1	0.0	5.5	8.92	12.6
3911200	Chub Creek	SE SW	08	112N	18W	3.71	0.0	3.7	83.9	0.4	12.5	26.6	5.0
3902000	Spring Creek	SW NE	16	112N	18W	13.2	0.0	2.1	13.2	0.0	2.1	9.66	13.4
3907801	Prairie Creek above unnamed tributary (basin 3907900)	NE NE	34	111N	19W	22.7	0.0	5.3	22.7	0.0	5.3	12.1	15.1
3907900	Unnamed tributary to Prairie Creek	NE NE	34	111N	19W	11.5	0.0	1.5	11.5	0.0	1.5	9.74	28.5
3907800	Prairie Creek above unnamed tributary (basin 3909600)	SW NE	23	111N	19W	1.96	0.0	4.6	36.1	0.0	4.1	14.2	14.0

Table 1.—Physical characteristic data for the Cannon River Basin—Continued.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Township	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)
3909600	Unnamed tributary to Prairie Creek	SW NE	23	111N	19W	5.04	0.0	1.9	5.04	0.0	1.9	4.86	41.7
3909900	Prairie Creek above unnamed tributary (basin 3902600)	SE NW	12	111N	19W	5.81	0.0	1.8	47.0	0.0	3.5	17.4	13.0
3902600	Unnamed tributary to Prairie Creek	SE NW	12	111N	19W	17.5	0.0	2.1	17.5	0.0	2.1	7.75	19.6
3902102	Prairie Creek above unnamed tributary (basin 3902300)	SE SW	32	112N	18W	3.02	0.0	0.8	67.5	0.0	3.0	20.8	11.4
3902300	Unnamed tributary to Prairie Creek	NW NW	05	111N	18W	8.47	0.0	5.7	8.47	0.0	5.7	5.67	36.2
3902101	Prairie Creek above basin 3902100	NE NW	21	112N	18W	4.14	0.0	1.8	80.1	0.0	3.2	26.0	9.6
3902100	Prairie Creek	SW SE	16	112N	18W	0.10	0.0	12.0	80.2	0.0	3.3	26.6	9.4
3902200	Unnamed tributary to Lake Byllesby	NW SW	15	112N	18W	5.44	0.0	0.1	5.44	0.0	0.1	4.67	34.6
3901800	Cannon River above Little Cannon River	NE NW	18	112N	17W	16.4	11.8	14.1	1160.	3.0	40.5	97.0	4.2
3902401	Unnamed tributary above gaging station near Kenyon: station number is 05355100	NE SE	09	110N	18W	2.12	0.0	2.2	2.12	0.0	2.2	2.80	51.2
3902400	Little Cannon River above unnamed tributary (basin 3901400)	NW NW	12	110N	18W	19.3	0.0	2.5	21.4	0.0	2.5	11.4	19.6
3901400	Unnamed tributary to Little Cannon River	NW NW	12	110N	18W	7.83	0.0	0.8	7.83	0.0	0.8	5.73	43.0
3902502	Little Cannon River above unnamed tributary (basin 3901300)	NW SE	36	111N	18W	1.71	0.0	3.5	30.9	0.0	2.1	13.5	19.8
3901300	Unnamed tributary to Little Cannon River	SE SE	36	111N	18W	11.4	0.0	1.2	11.4	0.0	1.2	7.38	35.7
3902501	Little Cannon River above unnamed tributary (basin 3901500)	SW SW	07	111N	17W	16.7	0.0	1.6	59.0	0.0	1.8	19.8	16.0
3901500	Unnamed tributary to Little Cannon River	SW SW	07	111N	17W	5.65	0.0	0.3	5.65	0.0	0.3	3.91	93.9
3902500	Little Cannon River above Butler Creek	SE NW	06	111N	17W	2.23	0.0	1.3	66.8	0.0	1.7	22.1	14.9

Table 1.—Physical characteristic data for the Cannon River Basin—Continued.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Town-ship	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)
3900900	Butler Creek	SE NW	06	111N	17W	9.99	0.0	0.5	9.99	0.0	0.5	6.51	52.8
3901600	Little Cannon River	NE NW	18	112N	17W	18.6	0.1	1.1	95.4	0.0	1.4	29.3	13.1
3900801	Cannon River above Pine Creek	NW NW	09	112N	17W	3.76	0.0	0.4	1260.	2.7	40.1	99.6	4.1
3901701	Pine Creek above gaging station near Cannon Falls: station number is 05355150	NE NE	06	112N	17W	20.6	0.0	0.8	20.6	0.0	0.8	9.51	11.8
3901700	Pine Creek	NW NW	09	112N	17W	2.52	0.0	0.4	23.2	0.0	0.8	11.56	13.3
3900800	Cannon River above unnamed tributary (basin 3906800)	NE NW	01	112N	17W	22.0	0.0	0.4	1300.	2.6	39.9	104.	4.0
3906801	Unnamed tributary above unnamed tributary (basin 3910800)	NW SW	26	113N	17W	15.2	0.0	0.1	15.2	0.0	0.1	9.87	16.6
3910800	Unnamed tributary above unnamed tributary (basin 3906801)	SW NW	26	113N	17W	10.1	0.0	0.0	10.1	0.0	0.0	6.21	31.4
3906800	Unnamed tributary to Cannon River	SW SE	36	113N	17W	2.62	0.0	2.6	27.9	0.0	0.3	12.6	19.4
3900401	Cannon River above gaging station at Welch: station number is 05355200	NW SW	27	113N	16W	13.1	0.2	1.2	1340.	2.6	39.8	109.	4.9
3900400	Cannon River above Belle Creek	NW NE	35	113N	16W	1.76	0.0	8.2	1340.	2.6	39.8	111.	5.0
3901201	Belle Creek above unnamed tributary (basin 3901100)	NE SW	20	111N	16W	13.5	0.0	1.5	13.5	0.0	1.5	6.18	34.7
3901100	Unnamed tributary to Belle Creek	NE SW	20	111N	16W	9.73	0.0	1.4	9.73	0.0	1.4	7.17	31.3
3901200	Belle Creek above unnamed tributary (basin 3901000)	NE SW	08	111N	16W	3.30	0.0	0.8	26.5	0.0	1.4	9.51	23.9
3901000	Unnamed tributary to Belle Creek	NW SW	08	111N	16W	10.8	0.0	1.6	10.8	0.0	1.6	7.50	39.5
3900700	Belle Creek above unnamed tributary (basin 3900600)	SE SW	16	112N	16W	19.1	0.0	1.1	56.4	0.0	1.3	18.9	14.2

Table 1.—Physical characteristic data for the Cannon River Basin—Continued.

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin				
		Quarter-quarter section	Section	Town-ship	Range	Drainage area (square miles)	Lake area (percent of subbasin area)	Storage area (percent of subbasin area)	Drainage area (square miles)	Lake area (percent of total area)	Storage area (percent of total area)	Main channel length (miles)	Main channel slope (foot per mile)