Physical Characteristics of Stream Subbasins in the Cottonwood River Basin, Southwestern Minnesota

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Abstract

Data that describe the physical characteristics of stream subbasins upstream from selected points on streams in the Cottonwood River Basin, located in southwestern 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 wetlands, the main-channel length, and the main-channel slope. The points on the stream include outlets of subbasins of at least 5 square miles, outlets of sewage treatment plants, and locations of U.S. Geological Survey low-flow, high-flow, and continuous-record gaging stations.

Introduction

This is the ninth report in a series of reports detailing subbasin characteristics of streams in Minnesota and adjacent states. The Cottonwood River Basin drains an area of 1,310 square miles and is represented by hydrologic accounting unit 07020008 (U.S. Geological Survey, 1974). The Cottonwood River Basin includes parts of Lyon, Murray, Cottonwood, Redwood, and Brown Counties in southwestern Minnesota.

Selected data for points on streams at outlets of subbasins larger than about 5 square miles; at outfalls of sewage treatment plants; and at locations of U.S. Geological Survey low-flow, high-flow, and continuous-record gaging stations located in the Cottonwood River Basin are presented in this report.

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Methods

U.S. Geological Survey 7-1/2 minute series topographic maps were used as source maps to obtain the areas for the subbasin boundaries, lakes, marshes, the main-channel length, and the contour elevation points used in this report. Paper copies of the maps were used. A geographic information system (GIS) was used to define the geographic location and extent of the subbasins, lakes, marsh, main-channels, and elevation points described below. 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 human activities and topographic contours. Human activities, such as the installation of storm sewers, the drainage of wetlands, and the diversion of streams, may alter the drainage area of the stream. Data from field inspections and recent drainage-ditch maps, therefore, were transferred to the topographic maps. The subbasin boundaries were digitized by LMIC using a GIS.

Lake and marsh data were digitized using a computer-aided drafting (CAD) system and transferred to the 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. Lake data was digitized by the Minnesota Department of Transportation and updated by the U.S. Geological Survey, Minnesota. Marshes were digitized by the U.S. Geological Survey, Minnesota.

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 is continuous and is defined as a single trace that passes through marshes, lakes, and the midline of rivers and braided streams from the basin outlet to the point within the basin that drains the greatest area; this is generally the basin divide. The main channels were digitized by U.S. Geological Survey, Minnesota, using a CAD system and transferred to the 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 was recorded using a CAD system and transferred to the 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 Cottonwood 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, main-channel length, and main-channel slope 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 reported using two significant figures or rounded to the nearest one-tenth of a percent.

The following is an explanation of terms used in table 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 29 and identify the Cottonwood River Basin. The following five digits are arbitrary and are used to identify each individual subbasin.

Stream name. The name of the stream or ditch shown on U.S. Geological Survey 7-1/2 minute topographic maps. The relative position of the subbasin above other subbasins, streams, gaging stations, and outfalls from sewage treatment plants also is given.

Outlet location. The U.S. Public Lands Survey System is used to describe the location 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 covered by open water as shown on 7-1/2 minute topographic maps.

Storage area. The percentage of a drainage area covered by open water and marshes as shown on 7-1/2 minute topographic maps. Marsh areas are not shown on plate 1.

Main-channel length. The total length of the main channel from the basin outlet to the point within the basin that drains the greatest area; this is generally the drainage divide. The main channel is 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.

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, unpaged.

Thompson, M.M., 1987, Maps for America, Third 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.

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin***
[All cities and towns are in Minnesota]

Basin number	Stream name and location	Outlet location: Quarter-quarter section	Section	Township	Range	By subbasin: Drainage area (square miles)	By subbasin: Lake area (percent of subbasin area)	By subbasin: Storage area (percent of subbasin area)	Cumulative to mouth of basin: Drainage area (square miles)	Cumulative to mouth of basin: Lake area (percent of total area)	Cumulative to mouth of basin: Storage area (percent of total area)	Main channel length (miles)	Main-channel slope (foot per mile)
	First rank stream; Second rank stream; Third rank stream; Fourth rank stream												
2909301	Unnamed tributary above gaging station near Balaton: station number is 05316800	NW¼NW¼	19	109N	42W	0.90	0.0	0.0	0.90	0.0	0.0	2.03	34.8
2909300	Unnamed tributary to Cottonwood River above mouth	NE¼NW¼	15	109N	42W	16.4	3.6	5.1	17.3	3.4	4.8	10.4	15.5
2909400	Cottonwood River above unnamed tributary (subbasin 2909300)	NE¼NW¼	15	109N	42W	7.60	.1	1.2	7.60	.1	1.2	6.45	18.2
2909500	Cottonwood River above unnamed tributary (subbasin 2909600)	NE¼NE¼	31	110N	41W	5.71	.1	3.1	30.6	2.0	3.6	19.4	12.5
2909600	Unnamed tributary to Cottonwood River above mouth	NE¼NE¼	31	110N	41W	13.3	3.6	6.9	13.3	3.6	6.9	10.2	13.6
2903601	Cottonwood River above gaging station near Tracy: station number is 05316840	SE¼SE¼	11	110N	40W	33.7	.0	1.0	77.6	1.4	3.0	45.6	11.8
2910800	Unnamed tributary to Cottonwood River above mouth	SW¼SW¼	12	110N	40W	6.02	.0	.1	6.02	.0	.1	11.0	24.7
2903800	Unnamed tributary to Cottonwood River above mouth	SW¼SE¼	12	110N	40W	16.28	.0	1.7	16.28	.0	1.7	17.6	23.4

Table 1.—***Physical characteristic data for the Cottonwood River drainage 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 mile)	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)
2903600	Cottonwood River above Meadow Creek	NW¼SW¼	07	110N	39W	0.94	0.0	0.0	101.0	1.1	2.6	47.7	11.6
2909700	Unnamed tributary to Meadow Creek above mouth	NE¼SE¼	21	111N	41W	10.9	.0	.5	10.9	.0	.5	15.2	22.8
2909800	Unnamed tributary to Meadow Creek above mouth	NE¼SE¼	21	111N	41W	10.5	.0	.2	10.5	.0	.2	12.2	26.9
2909900	Meadow Creek above County Ditch No. 44	NE¼NE¼	32	111N	40W	5.47	.0	.0	26.9	.0	.3	21.2	16.8
2910700	County Ditch No. 44 to Meadow Creek above mouth	NE¼NE¼	32	111N	40W	5.63	.0	.0	5.63	.0	.0	5.22	1.5
2910001	Unnamed tributary above gaging station near Lake Marshall: station number is 05316850	SE¼NE¼	34	111N	41W	.47	.0	.0	.47	.0	.0	1.99	54.9
2910100	Unnamed tributary above Lake Marshall	SE¼NW¼	36	111N	41W	7.92	.0	.5	7.92	.0	.5	9.61	26.8
2910200	Unnamed tributary to unnamed tributary (subbasin 2910000)	SE¼NW¼	31	111N	40W	9.10	.0	3.9	9.10	.0	3.9	15.2	28.2
2910000	Unnamed tributary to Meadow Creek above mouth	SE¼NE¼	32	111N	40W	14.9	2.7	3.9	32.4	1.2	3.0	18.6	18.4
2910600	Unnamed tributary to unnamed tributary (subbasin 2910500)	NE¼SE¼	09	110N	40W	5.50	.0	.1	5.50	.0	.1	6.34	35.1
2910300	Unnamed tributary to unnamed tributary (subbasin 2910500)	NE¼NE¼	10	110N	40W	5.33	.0	8.2	5.33	.0	8.2	9.02	23.8
2910500	Unnamed tributary to Meadow Creek above mouth	NE¼NE¼	11	110N	40W	13.1	.0	.3	23.9	.0	2.0	16.2	19.4

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin—Continued***

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2910401	Meadow Creek above gaging station near Tracy: station number is 05316855	NE¼NE¼	11	110N	40W	7.90	0.0	2.3	96.7	0.4	1.8	27.0	12.1
2910400	Meadow Creek to Cottonwood River above mouth	NW¼SW¼	07	110N	39W	.78	.0	.0	97.5	.4	1.8	28.8	11.1
2903700	Judicial Ditch No. 22 to Cottonwood River above mouth	NE¼NE¼	16	110N	39W	13.6	1.0	1.5	13.6	1.0	1.5	20.4	21.1
2903500	Cottonwood River above Judicial Ditch No. 9	NW¼NW¼	19	110N	38W	6.87	.1	.1	219	.8	2.1	58.7	9.8
2903900	Judicial Ditch No. 9 to Cottonwood River above mouth	NW¼NW¼	19	110N	38W	16.2	.0	.3	16.2	.0	.3	19.4	16.8
2903400	Judicial Ditch No. 12 to Cottonwood River above mouth	NW¼NW¼	19	110N	38W	12.4	.0	.8	12.4	.0	.8	11.9	4.0
2904200	Unnamed tributary to Lone Tree Creek above mouth	NW¼NW¼	02	109N	39W	10.8	.0	.1	10.8	.0	.1	13.5	21.2
2904100	Unnamed tributary to Lone Tree Creek above mouth	NW¼NW¼	02	109N	39W	9.03	.0	.0	9.03	.0	.0	14.1	21.3
2904000	Lone Tree Creek to Cottonwood River above mouth	SW¼SW¼	20	110N	38W	8.30	.0	.0	28.2	.0	.0	21.6	15.1
2904900	Cottonwood River above Plum Creek	NW¼NE¼	02	109N	38W	11.1	.5	.5	287	.6	1.7	69.3	7.9
2908800	Judicial Ditch No. 20A to Plum Creek above mouth	NW¼SW¼	12	108N	40W	18.3	.0	1.4	18.3	.0	1.4	9.07	14.8
2909000	Unnamed tributary to Plum Creek above mouth	NW¼SW¼	12	108N	40W	8.80	5.8	10.5	8.80	5.8	10.5	8.10	8.7
2908900	Plum Creek above Willow Creek	SE¼SE¼	17	108N	39W	7.00	.0	.5	34.1	1.5	3.6	14.4	10.5

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin--Continued***

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2909100	Willow Creek to Plum Creek above mouth	SE¼SE¼	17	108N	39W	14.6	0.0	0.8	14.6	0.0	0.8	7.44	25.3
2904600	Plum Creek above Judicial Ditch No. 28	SW¼SW¼	25	109N	39W	12.7	.0	.0	61.4	.9	2.2	25.3	11.6
2904402	Judicial Ditch No. 28 above gaging station at south inlet to Laura Lake Impoundment: station number is 44126095294801	SE¼NW¼	35	109N	39W	4.49	.0	.0	4.49	.0	.0	6.05	31.5
2904403	Judicial Ditch No. 28 above gaging station at north inlet to Laura Lake Impoundment: station number is 441246095294802	SE¼SW¼	26	109N	39W	1.19	.1	.1	1.19	.1	.1	2.65	47.8
2904401	Outlet of Laura Lake Impoundment at gaging station near Walnut Grove: station number is 441246095294804	SE¼SE¼	26	109N	39W	.74	10.4	10.4	6.42	1.2	1.2	7.40	32.4
2904400	Unnamed tributary to Plum Creek above mouth	SW¼SW¼	25	109N	39W	.05	.0	.0	6.47	1.2	1.2	7.53	32.4
2904500	Plum Creek above unnamed tributary (subbasin 2904300)	NE¼NW¼	18	109N	38W	4.38	.0	.0	72.2	.8	2.0	30.9	12.0
2904300	Unnamed tributary to Plum Creek above mouth	NE¼NW¼	18	109N	38W	11.4	.0	.0	11.4	.0	.0	12.7	21.2
2904801	Plum Creek above gaging station near Walnut Grove: station number is 05316870	NW¼NW¼	09	109N	38W	3.19	.0	.0	86.8	.7	1.6	35.2	11.6
2904800	Plum Creek to Cottonwood River above mouth	NW¼NE¼	02	109N	38W	3.68	.0	.0	90.5	.7	1.6	41.1	10.7
2905401	Cottonwood River above gaging station near Revere: station number is 05316875	SE¼NE¼	02	109N	38W	.27	.0	.0	377	.6	1.6	69.9	7.8
2905400	Cottonwood River above Pell Creek	SE¼SW¼	08	109N	37W	4.27	.2	.2	382	.6	1.6	74.9	7.3

Table 1.—*Physical characteristic data for the Cottonwood River drainage basin—Continued*

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2905200	Unnamed tributary to unnamed tributary (subbasin 2905100)	SW¼SW¼	27	109N	38W	10.6	0.0	0.1	10.6	0.0	0.1	11.8	22.0
2905100	Unnamed tributary to Pell Creek above mouth	SE¼NW¼	27	109N	38W	6.39	.0	.0	17.0	.0	.1	13.2	20.7
2904701	Unnamed tributary above outfall from sewage treatment plant for Walnut Grove	NW¼NW¼	28	109N	38W	3.44	.0	.0	3.44	.0	.0	3.87	32.3
2904700	Pell Creek above unnamed tributary (subbasin 2905100)	SE¼NW¼	27	109N	38W	9.82	.1	.1	13.3	.0	.1	5.99	17.1
2905301	Pell Creek above gaging station near Revere: station number is 05316879	NE¼SE¼	18	109N	37W	20.4	.0	.1	50.7	.0	.1	21.7	13.1
2905300	Pell Creek to Cottonwood River above mouth	SE¼SW¼	08	109N	37W	.44	.0	.0	51.1	.0	.1	23.3	12.5
2906201	Cottonwood River above gaging station near Lamberton: station number is 05316880	SE¼SE¼	08	109N	37W	4.14	.0	.4	437	.5	1.4	75.5	7.3
2906200	Cottonwood River above Dutch Charley Creek	SE¼NE¼	19	109N	36W	9.70	.0	.3	447	.5	1.4	82.4	6.8
2908400	County Ditch No. 2 to Highwater Creek above mouth	NW¼SE¼	10	106N	38W	6.04	.4	1.4	6.04	.4	1.4	3.64	12.1
2908300	Highwater Creek above unnamed tributary (subbasin 2908200)	NW¼NW¼	02	106N	38W	12.	3.3	6.0	18.0	2.3	4.5	7.32	11.7
2908200	Unnamed tributary to Highwater Creek above mouth	NW¼NW¼	02	106N	38W	13.6	.0	.4	13.6	.0	.4	6.83	9.8
2908000	Highwater Creek above unnamed tributary (subbasin 2908300)	NW¼NE¼	20	107N	37W	13.1	5.4	6.9	44.8	2.5	3.9	16.9	7.3
2908700	Judicial Ditch No. 28 to Augusta Lake	NE¼SW¼	10	106N	37W	11.8	1.8	1.9	11.8	1.8	1.9	6.04	11.9

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin--Continued***

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2908500	County Ditch No. 38 to unnamed tributary (subbasin 2908600)	SE¼NW¼	28	107N	37W	10.1	0.0	0.0	10.1	0.0	0.0	6.21	7.7
2908600	Unnamed tributary to Highwater Creek above mouth	NW¼NE¼	20	107N	37W	12.8	5.5	9.4	34.7	2.7	4.1	13.0	12.6
2907700	Highwater Creek above unnamed tributary (subbasin 2907600)	SE¼NW¼	04	107N	37W	6.79	.1	.4	86.3	2.4	3.7	23.0	7.5
2907600	Unnamed tributary to Highwater Creek above mouth	SE¼NW¼	04	107N	37W	4.90	.8	1.4	4.90	.8	1.4	5.61	21.4
2906501	Highwater Creek above gaging station near Lamberton: station number is 05316895	NW¼NW¼	36	109N	37W	16.1	.0	.1	107	1.9	3.1	42.1	8.0
2906500	Highwater Creek to Dutch Charley Creek above mouth	NW¼SE¼	25	109N	37W	.41	.0	.7	108	1.9	3.1	43.2	8.0
2909200	County Ditch No. 19 to Lake Julia	SE¼SE¼	24	107N	39W	16.1	.1	1.8	16.1	.1	1.8	6.85	13.0
2908100	Unnamed tributary to Lake Julia	NW¼NE¼	25	107N	39W	9.28	4.3	6.8	9.28	4.3	6.8	7.28	11.0
2907500	Dutch Charley Creek above Judicial Ditch No. 3	NE¼SE¼	09	107N	38W	11.2	.9	1.9	36.6	1.4	3.1	13.6	7.9
2907200	Judicial Ditch No. 3 to Dutch Charley Creek above mouth	NE¼SE¼	09	107N	38W	11.7	.0	.0	11.7	.0	.0	7.80	9.6
2907400	Dutch Charley Creek above unnamed tributary (subbasin 2907000)	NE¼NW¼	05	108N	37W	17.0	1.9	2.1	65.3	1.3	2.3	34.3	9.3
2907300	Unnamed tributary above unnamed tributary (subbasin 2907100)	NW¼NW¼	24	108N	38W	5.76	.0	.0	5.76	.0	.0	7.16	25.9
2907100	Unnamed tributary above unnamed tributary (subbasin 2907300)	NW¼NW¼	24	108N	38W	4.87	.0	.0	4.87	.0	.0	6.74	29.1

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin--Continued***

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2907000	Unnamed tributary to Dutch Charley Creek above mouth	NE¼NW¼	05	108N	37W	6.04	0.0	0.3	16.7	0.0	0.1	14.4	19.8
2906302	Dutch Charley Creek above gaging station near Lamberton: station number is 05316890	NE¼SE¼	27	109N	37W	5.66	.0	.1	87.6	.9	1.7	39.9	9.1
2906400	Unnamed tributary to Dutch Charley Creek above mouth	NE¼SE¼	26	109N	37W	7.67	.0	1.3	7.67	.0	1.3	8.52	15.5
2906301	Dutch Charley Creek above gaging station near Lamberton: station number not assigned	NE¼NE¼	25	109N	37W	3.42	.1	.5	206	1.4	2.4	44.2	8.9
2906300	Dutch Charley Creek to Cottonwood River above mouth	SE¼NE¼	19	109N	36W	2.46	.1	.9	209	1.4	2.4	50.1	7.9
2901601	Cottonwood River above gaging station near Sanborn: station number not assigned	SE¼SW¼	26	109N	36W	10.0	.0	.4	666	.8	1.7	88.1	6.4
2907901	Dry Creek above gaging station near Jeffers: station number is 05316900	NE¼NE¼	31	108N	36W	3.16	.0	.0	3.16	.0	.0	5.91	47.2
2907900	Dry Creek above unnamed tributary (subbasin 2907800)	NW¼SW¼	20	108N	36W	8.62	.0	.1	11.8	.0	.1	8.41	37.3
2907800	Unnamed tributary to Dry Creek above mouth	NW¼SW¼	20	108N	36W	8.76	.0	.1	8.76	.0	.1	11.9	23.4
2906702	Unnamed tributary above gaging station near Sanborn: station number is 05316920	SW¼NW¼	12	108N	36W	.38	.1	.1	.38	.1	.1	1.27	44.2
2906701	Dry Creek above gaging station near Sanborn: station number is 05316910	NW¼NW¼	02	108N	36W	19.4	.1	.5	40.4	.0	.3	3.68	33.7
2906700	Dry Creek to Cottonwood River above mouth	NE¼NW¼	35	109N	36W	.58	.0	.0	40.9	.0	.3	22.2	16.0
2901600	Cottonwood River above Mound Creek	NW¼SE¼	32	109N	35W	4.81	.3	.3	711	.7	1.6	92.8	6.1

Table 1.—***Physical characteristic data for the Cottonwood River drainage 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 mile)	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)
2901800	Unnamed tributary to Mound Creek above mouth	NE¼SE¼	30	108N	35W	13.6	0.0	0.7	13.6	0.0	0.7	12.0	25.0
2901900	Mound Creek above unnamed tributary (subbasin 2901800)	NE¼SE¼	30	108N	35W	13.5	.0	.0	13.5	.0	.0	8.85	36.3
2901701	Mound Creek above gaging station near Springfield: station number is 05316940	NW¼NW¼	04	108N	35W	25.8	.2	1.0	52.8	.1	.7	28.3	8.2
2901700	Mound Creek to Cottonwood River above mouth	NW¼SE¼	32	109N	35W	2.88	.0	.1	55.7	.1	.6	29.4	7.9
2901501	Cottonwood River above gaging station near Sanborn: station number is 05316950	SW¼NW¼	34	109N	35W	9.55	.2	.9	777	.7	1.5	94.3	6.0
2901500	Cottonwood River above Coal Mine Creek	SE¼SE¼	27	109N	35W	1.76	1.2	2.7	778	.7	1.5	95.7	6.0
2906100	Coal Mine Creek above County Ditch No. 49	SW¼NE¼	11	109N	36W	18.1	.2	3.0	18.1	.2	3.0	11.6	3.9
2906000	County Ditch No. 49 to Coal Mine Creek above mouth	SW¼NE¼	11	109N	36W	13.2	.5	2.6	13.2	.5	2.6	7.07	4.7
2901401	Coal Mine Creek above gaging station near Springfield: station number is 05316960	SE¼SE¼	22	109N	35W	14.9	.0	1.0	46.2	.2	2.2	18.5	3.9
2901400	Coal Mine Creek to Cottonwood River above mouth	SE¼SE¼	27	109N	35W	.82	.0	.0	47.0	.2	2.2	19.9	3.9
2902001	Cottonwood River above outfall from sewage treatment plant for Springfield	SW¼SW¼	17	109N	34W	18.5	.2	1.3	844	.7	1.6	101	5.8
2902000	Cottonwood River above unnamed tributary (subbasin 2902100)	NW¼NW¼	28	109N	33W	25.8	.3	.8	870	.6	1.5	113	5.3
2902100	Unnamed tributary to Cottonwood River above mouth	NW¼NW¼	28	109N	33W	5.22	4.0	4.4	5.22	4.0	4.4	4.22	20.8

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin—Continued***

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2902201	Cottonwood River above gaging station at Leavenworth: station number is 05316970	SE¼SE¼	21	109N	33W	1.15	1.3	1.5	876	0.7	1.6	114	5.3
2902200	Cottonwood River above Sleepy Eye Creek	NW¼NE¼	14	109N	33W	7.77	.1	1.1	884	.7	1.5	119	5.1
2903300	Sleepy Eye Creek above unnamed tributary (subbasin 2905000)	SE¼SE¼	06	110N	37W	37.2	.4	2.6	37.2	.4	2.6	16.3	2.7
2905000	Unnamed tributary to Sleepy Eye Creek above mouth	SE¼SE¼	06	110N	37W	21.5	.2	2.4	21.5	.2	2.4	9.44	5.5
2905600	Sleepy Eye Creek above unnamed tributary (subbasin 2905500)	SE¼SE¼	15	110N	37W	6.81	.8	1.4	65.5	.4	2.4	20.0	2.5
2905500	Unnamed tributary to Sleepy Eye Creek above mouth	SE¼SE¼	15	110N	37W	13.0	.0	.5	13.0	.0	.5	8.23	6.0
2905800	Sleepy Eye Creek above County Ditch No. 54	NW¼SE¼	07	110N	36W	9.86	.1	.6	88.3	.3	1.9	23.3	2.4
2903200	County Ditch No. 54 to Sleepy Eye Creek above mouth	NW¼SE¼	07	110N	36W	12.2	.0	.0	12.2	.0	.0	7.02	5.1
2903100	Unnamed tributary to County Ditch No. 73 above mouth	NE¼NE¼	14	111N	37W	5.13	3.8	10.2	5.13	3.8	10.2	4.86	3.3
2903000	County Ditch No. 73 to unnamed tributary above mouth	NE¼NW¼	13	111N	37W	8.37	.0	.7	13.5	1.5	4.3	7.00	6.7
2902901	Outfall from sewage treatment plant for Wabasso	SE¼NE¼	23	111N	37W	.04	.0	.0	.04	.0	.0	.36	15.0
2902900	Unnamed tributary to Sleepy Eye Creek above mouth	NE¼SW¼	03	110N	36W	23.5	.0	2.8	37.1	.5	3.4	13.5	4.0
2902800	County Ditch No. 26 to Sleepy Eye Creek above mouth	SE¼SW¼	01	110N	36W	7.92	.0	.0	7.92	.0	.0	5.51	6.3

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin--Continued***

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2905700	Sleepy Eye Creek above County Ditch No. 68	NE¼NE¼	12	110N	36W	7.25	0.1	1.0	153	0.3	2.0	29.4	2.3
2905900	County Ditch No. 68 to Sleepy Eye Creek above mouth	NE¼NE¼	12	110N	36W	6.87	.0	.3	6.87	.0	.3	6.27	4.5
2906900	Sleepy Eye Creek above County Ditch No. 38	NE¼NW¼	16	110N	35W	9.11	.0	.3	169	.3	1.8	32.6	2.3
2906800	County Ditch No. 38 to Sleepy Eye Creek above mouth	NE¼NW¼	16	110N	35W	9.30	.0	.0	9.30	.0	.0	7.76	8.4
2902600	Sleepy Eye Creek above County Ditch No. 24	SW¼SW¼	13	110N	35W	6.64	.0	.1	185	.3	1.7	35.6	2.3
2902700	County Ditch No. 24 to Sleepy Eye Creek above mouth	SW¼SW¼	13	110N	35W	27.2	.0	.1	27.2	.0	.1	14.6	1.6
2902500	Sleepy Eye Creek above Judicial Ditch No. 35	NE¼SW¼	30	110N	34W	4.74	.4	2.5	217	.2	1.5	37.8	2.3
2901300	Judicial Ditch No. 35 to Sleepy Eye Creek above mouth	NE¼SW¼	30	110N	34W	17.9	.0	.1	17.9	.0	.1	11.8	4.8
2901200	Sleepy Eye Creek above Judicial Ditch No. 36	SE¼NE¼	35	110N	34W	19.7	1.3	2.6	254	.3	1.5	43.7	2.2
2902400	Judicial Ditch No. 36 to Sleepy Eye Creek above mouth	SE¼NE¼	35	110N	34W	5.41	.0	.0	5.41	.0	.0	5.11	7.6
2901102	Sleepy Eye Creek above gaging station near Cobden: station number is 05316990	SE¼NE¼	08	109N	33W	8.73	.0	.0	268	.3	1.4	48.0	2.2
2901101	Sleepy Eye Creek above gaging station near Leavenworth: station number is 05316996	SW¼SE¼	11	109N	33W	4.80	.0	.2	273	.3	1.4	52.3	2.1
2901100	Sleepy Eye Creek to Cottonwood River above mouth	NW¼NE¼	14	109N	33W	.05	.0	.0	273	.3	1.4	52.5	2.1
2901000	Cottonwood River above unnamed tributary (subbasin 2902300)	SW¼NE¼	20	109N	32W	9.17	.8	1.9	1,170	.6	1.5	125	5.0

Table 1.—***Physical characteristic data for the Cottonwood River drainage 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 mile)	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)
2902300	Unnamed tributary to Cottonwood River above mouth	SW¼NE¼	20	109N	32W	10.3	0.0	2.2	10.3	0.0	2.2	8.35	12.8
2910900	Unnamed tributary to Cottonwood River above mouth	SW¼SW¼	16	109N	32W	3.59	.0	2.2	3.59	.0	2.2	5.02	11.2
2900600	Cottonwood River above outfall from sewage treatment plant for Sleepy Eye	NE¼NE¼	04	109N	32W	5.21	.0	.2	1,180	.6	1.5	131	4.9
2900800	Judicial Ditch No. 30 above County Ditch No. 5	NW¼NE¼	36	110N	33W	31.7	.0	.0	31.7	.0	.0	21.7	1.7
2900900	County Ditch No. 60 to Judicial Ditch No. 30 above mouth	NE¼NW¼	36	110N	33W	8.16	.0	.0	8.16	.0	.0	6.26	4.7
2900701	Judicial Ditch No. 30 above outfall from sewage treatment plant for Sleepy Eye	NW¼SE¼	05	109N	32W	17.2	2.6	3.4	57.0	.8	1.0	25.0	2.0
2900700	Judicial Ditch No. 30 to Cottonwood River above mouth	NE¼NE¼	04	109N	32W	1.26	.0	.2	58.3	.8	1.0	27.2	2.3
2900401	Cottonwood River above gaging station near Sleepy Eye: station number not assigned	NE¼NW¼	03	109N	32W	.94	.0	.0	1,240	.6	1.5	132	4.9
2900400	Cottonwood River above unnamed tributary (subbasin 2900500)	NE¼SE¼	06	109N	31W	20.8	.8	2.3	1,260	.6	1.5	139	4.8
2900500	Unnamed tributary to Cottonwood River above mouth	NE¼SE¼	06	109N	31W	5.91	2.4	7.1	5.91	2.4	7.1	5.41	28.6
2900300	Cottonwood River above unnamed tributary (subbasin 2900200)	NE¼SW¼	35	110N	31W	15.2	4.6	8.3	1,290	.6	1.6	146	4.7
2900200	Unnamed tributary to Cottonwood River above mouth	NE¼SW¼	35	110N	31W	9.14	1.2	6.3	9.14	1.2	6.3	8.66	19.1

Table 1.—***Physical characteristic data for the Cottonwood River drainage basin—Continued***

Basin number	Stream name and location	Outlet location				By subbasin			Cumulative to mouth of basin			Main channel length (miles)	Main-channel slope (foot per mile)
		Quarter-quarter section	Section	Township	Range	Drainage area (square mile)	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)		
2900101	Cottonwood River above gaging station near New Ulm: station number is 05317000	SW¼NE¼	33	110N	30W	9.21	0.3	0.6	1,300	0.6	1.6	152	4.8
2900100	Cottonwood River above mouth	SE¼SE¼	34	110N	30W	6.34	.1	2.9	1,310	.6	1.6	156	4.7

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