Physical Characteristics of Stream Subbasins in the Middle Minnesota-Little Cottonwood River Basin, South-Central Minnesota

By Christopher A. Sanocki

Abstract

Data that describe the physical characteristics of stream subbasins upstream from selected sites on streams in the Middle Minnesota-Little Cottonwood River Basin, located in south-central 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. Stream sites include outlets of subbasins of at least 5 square miles, outfalls of sewage treatment plants, and locations of U.S. Geological Survey low-flow, high-flow, and continuous-record gaging stations.

Introduction

This is the 11th report in a series detailing subbasin characteristics of streams in Minnesota and adjacent states. The Middle Minnesota-Little Cottonwood River Basin drains an area of 1,350 square miles and is represented by hydrologic accounting unit 07020007 (U.S. Geological Survey, 1974). The Middle Minnesota-Little Cottonwood River Basin includes parts of Cottonwood, Redwood, Renville, Brown, Sibley, Blue Earth, Nicollet, and Le Sueur Counties in south-central Minnesota.

Selected data for sites 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 (USGS) low-flow, high-flow, and continuous-record gaging stations located in the Middle Minnesota-Little Cottonwood River Basin are presented in this report.

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Thomas E. Kujawa, a graduate student at Mankato State University, did much of the digitizing and assisted in the preparation of this report. The Water Resource Center at Mankato State University provided detailed watershed boundaries, which were used for parts of this report. These contributions were essential for the completion of this report.

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, 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. Data from field inspections and recent drainage-ditch maps, therefore, were transferred to the topographic maps. The subbasin boundaries were digitized by the Minnesota State Planning Land Management Information Center, Mankato State University, and the U.S. Geological Survey Minnesota using a GIS.

Lake and marsh data were digitized 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. Lakes and 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, 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 CAD system and transferred to the GIS. Stream extensions which represent a portion of the main channel from the end of the mapped stream (blue line on USGS 71/2 minute maps) to an endpoint within the basin, generally at the basin divide, were digitized by U.S. Geological Survey Minnesota 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 Middle Minnesota-Little 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, 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 reported using two significant figures or 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.

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 28 and identify the Middle Minnesota-Little 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 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 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 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 USGS 71/2 minute series 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 water course 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, unpaged.

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.

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood River Basin.

[All cities and towns are in Minnesota; --, not determined]

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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2506000	Minnesota River above Beaver Creek	NE¼ SW¼	27	113N	35W	8,930.	3.3	6.5	8,930.	3.3	6.5	226.	1.8
2801100	Minnesota River above Crow Creek	NE¼ SE¼	35	113N	35W	9.59	.9	3.7	8,940.	3.2	6.5	230.	1.8
2809900	County Ditch No. 22 to Crow Creek above mouth	NE¼ SE¼	04	112N	35W	16.6	0	0	16.6	0	0	11.1	5.4
2809800	Crow Creek (County Ditch No. 52) to Minnesota River above mouth	NE¼ SE¼	35	113N	35W	20.0	0	.2	36.6	0	.1	15.2	14.2
2801201	Minnesota River above outfall from sewage treatment plant for Morton	NW¼ SW¼	31	113N	34W	2.14	1.1	3.2	8,980.	3.2	6.5	233.	1.8
2801200	Minnesota River above Birch Coulee Creek	NW¼SW¼	05	112N	34W	4.67	.5	1.0	8,980.	3.2	6.5	236.	1.8
2800100	County Ditch No. 124 above County Ditch No. 85A	NE¼ SE¼	32	114N	34W	17.6	0	0	17.6	0	0	8.94	7.5
2800200	County Ditch No. 85A to County Ditch No. 124 above mouth	NE¼ SE¼	32	114N	34W	10.7	0	0	10.7	0	0	9.49	7.1
2800300	Judicial Ditch No. 12 above subbasin 2801300	SW¼ SE¼	01	113N	34W	10.8	0	0	10.8	0	0	7.41	7.9
2801300	Judicial Ditch No. 12 to Birch Coulee Creek above mouth	NE¼ NE¼	29	113N	34W	15.6	0	.2	26.4	0	.1	14.9	9.2
2801001	Birch Coulee Creek (Judicial Ditch No. 124) above gaging station near Morton: station number is 05316590	SW¼ SW¼	33	113N	34W	13.0	0	0	67.7	0	.1	21.2	11.0
2801000	Birch Coulee Creek to Minnesota River above mouth	NW¼SW¼	05	112N	34W	0.16	0	0	67.8	0	.1	22.1	12.7
2801600	County Ditch No. 109A to Purgatory Creek above mouth	SW¼SW¼	02	112N	34W	12.2	0	0	12.2	0	0	7.56	10.6
2801400	Purgatory Creek to Minnesota River above mouth	NW¼SW¼	11	112N	34W	8.08	0	.2	20.3	0	.1	9.88	29.3
2802701	Minnesota River above outfall from sewage treatment plant for Franklin	NW¼SE¼	11	112N	34W	5.24	.2	2.8	9,070.	3.2	6.4	242.	1.7

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2802700	Minnesota River above Wabasha Creek	SE¼ NW¼	13	112N	34W	1.86	0.1	1.0	9070.	3.2	6.4	244.	1.7
2810000	County Ditch No. 64 to Wabasha Creek above mouth	SE¼ NE¼	24	112N	35W	25.4	0	.6	25.4	0	.6	15.7	2.0
2810100	County Ditch No. 106 to Wabasha Creek above mouth	SE¼ NE¼	24	112N	35W	5.69	0	0	5.69	0	0	5.83	4.3
2810200	Wabasha Creek above unnamed tributary (subbasin 2810301)	SE¼ NE¼	22	112N	34W	14.8	.1	1.5	45.9	0	.8	22.3	6.2
2810302	Outfall from sewage treatment plant for Morgan	SE¼ NW¼	16	111N	34W	0.12	0	0	.12	0	0	.51	13.0
2810301	Wabasha Creek above gaging station near Franklin: station number is 05316630	NE¼ NE¼	22	112N	34W	22.5	0	0	68.5	0	.5	22.5	6.4
2810300	Wabasha Creek to Minnesota River above mouth	SE¼ NW¼	13	112N	34W	1.03	.2	.8	69.6	0	.5	24.6	9.0
2809600	Unnamed tributary to Minnesota River above mouth	NW¼NE¼	29	112N	33W	5.21	.2	.7	5.21	.2	.7	6.24	44.1
2802800	Minnesota River above Threemile Creek	NE¼ SE¼	28	112N	33W	6.67	1.0	3.0	9,160.	3.2	6.4	251.	1.7
2801700	Threemile Creek to Minnesota River above mouth	NE¼ SE¼	28	112N	33W	11.6	0	.1	11.6	0	.1	8.35	24.7
2809500	Unnamed tributary (Judicial Ditch No. 18) to Minnesota River above mouth	SW¼SE¼	34	112N	33W	20.0	0	0	20.0	0	0	12.0	15.5
2802900	Minnesota River above Fort Ridgely Creek	NW¼NE¼	07	111N	32W	9.69	.5	1.4	9,200.	3.2	6.4	258.	1.7
2800400	County Ditch No. 106A above subbasin 2800500	SW¼SW¼	27	114N	33W	5.58	0	0	5.58	0	0	4.80	7.9
2800500	County Ditch No. 106A above subbasin 2801500	NW¼SW¼	09	113N	33W	6.85	0	0	12.4	0	0	9.54	5.4
2801500	County Ditch No. 106A above County Ditch No. 115	NW¼NE¼	11	112N	33W	14.4	0	0	26.8	0	0	18.3	3.9
2800600	County Ditch No. 115 above subbasin 2801800	NE¼ SE¼	14	113N	33W	8.33	0	0	8.33	0	0	8.10	6.1
2801800	County Ditch No. 115 to County Ditch No. 106A above mouth	NW¼NE¼	11	112N	33W	11.9	0	0	20.3	0	0	14.0	5.3

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2801900	Fort Ridgely Creek (County Ditch No. 106A) above County Ditch No. 3	NE¼ NE¼	24	112N	33W	7.66	0.0	0.1	54.8	0.0	0.0	21.6	4.3
2802101	County Ditch No. 3 above outfall from sewage treatment plant for Fairfax	SE¼ NE¼	17	112N	32W	.43	0	0	.43	0	0	1.28	14.7
2802100	County Ditch No. 3 to Fort Ridgely Creek above mouth	NE¼ NE¼	24	112N	33W	3.45	0	3.0	3.89	0	2.6	4.64	12.3
2802201	Fort Ridgely Creek above gaging station near Fairfax: station number is 05316680	NW¼SW¼	05	111N	32W	10.4	0	.8	69.0	0	.3	27.4	7.6
2802200	Fort Ridgely Creek to Minnesota River above mouth	NW¼NE¼	07	111N	32W	.23	0	0	69.3	0	.3	28.3	8.8
2803000	Minnesota River above Spring Creek	NW¼SE¼	21	111N	32W	9.54	0	.1	9,280.	3.1	6.3	266.	1.7
2809402	County Ditch No. 12 above gaging station near Evan: station number is 05316690	NE¼ NW¼	25	111N	33W	4.13	0	0	4.13	0	0	3.70	7.7
2809401	Spring Creek (Judicial Ditch No. 29) above gaging station near Sleepy Eye: station number is 05316700	NE¼ SE¼	24	111N	33W	28.7	0	0	32.8	0	0	16.5	2.7
2809400	Spring Creek to Minnesota River above mouth	NW¼SE¼	21	111N	32W	12.1	.8	.8	44.9	.2	.2	20.4	10.1
2809300	Unnamed tributary (County Ditch No. 13) to Minnesota River above mouth	SE¼ NE¼	27	111N	32W	11.3	0	.6	11.3	0	.6	8.57	22.5
2809200	Unnamed tributary (County Ditch No. 10) to Minnesota River above mouth	NW¼NW¼	31	111N	31W	13.3	0	.2	13.3	0	.2	8.36	26.4
2807900	Minnesota River above Little Rock Creek	SW¼SW¼	30	111N	31W	8.06	.8	2.9	9,350.	3.1	6.3	273.	1.7
2800800	County Ditch No. 27 to County Ditch No. 34 above mouth	NE¼ NE¼	28	113N	32W	7.36	0	.6	7.36	0	.6	5.57	6.8
2800700	County Ditch No. 34 to Judicial Ditch No. 8 above mouth	NW¼NE¼	34	113N	32W	15.3	.1	.3	22.7	0	.4	13.8	3.7

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2800900	Judicial Ditch No. 8 above County Ditch No. 34	NW¼NE¼	34	113N	32W	10.3	0.1	0.3	10.3	0.1	0.3	9.17	4.8
2802500	Judicial Ditch No. 30 to Judicial Ditch No. 31 above mouth	SE¼ SW¼	11	112N	32W	4.00	0	4.3	4.00	0	4.3	5.99	7.2
2802400	Judicial Ditch No. 31 (Judicial Ditch No. 8) above County Ditch No. 100	NE¼ SE¼	15	112N	32W	11.1	0	9.5	48.1	0	2.8	18.4	4.0
2802000	County Ditch No. 100 to Judicial Ditch No. 31 above mouth	NE¼ SE¼	15	112N	32W	9.06	0	.6	9.06	0	.6	6.47	5.6
2802600	Judicial Ditch No. 13 to Little Rock Creek above mouth	SE¼ SE¼	11	111N	32W	14.1	0	.8	14.1	0	.8	9.78	6.0
2802301	Little Rock Creek (Judicial Ditch No. 31) above gaging station near Fairfax: station number is 05316740	NW¼NW¼	30	111N	31W	12.4	1.8	3.7	83.6	.3	2.3	31.5	7.3
2802300	Little Rock Creek to Minnesota River above mouth	SW¼SW¼	30	111N	31W	.23	0	0	83.8	.3	2.3	32.5	7.9
2805901	Eightmile Creek (Judicial Ditch No. 7) above gaging station near St. George: no station number assigned	SE¼ SW¼	29	111N	31W	37.1	0	.7	37.1	0	.7	20.5	8.8
2805900	Eightmile Creek (Judicial Ditch No. 7) to Minnesota River above mouth	NE¼ NE¼	31	111N	31W	.08	0	0	37.2	0	.7	21.0	9.8
2807800	Minnesota River above unnamed tributary (subbasin 2807700)	SE¼ NW¼	03	110N	31W	13.7	.5	3.4	9,490.	3.1	6.2	279.	1.6
2807700	Unnamed tributary to Minnesota River above mouth	SE¼ NW¼	03	110N	31W	7.76	0	.7	7.76	0	.7	8.74	31.0
2807500	Unnamed tributary (County Ditch No. 85) to Huelskamp Creek above mouth	SE¼ SW¼	31	111N	30W	5.70	.1	.9	5.70	.1	.9	7.88	13.7

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2807401	Huelskamp Creek (County Ditch No. 80) above gaging station near Klossner: no station number assigned	SW¼SE¼	06	110N	30W	5.96	0.0	0.3	11.7	0.1	0.6	9.24	23.6
2807400	Huelskamp Creek to Minnesota River above mouth	NE¼ SE¼	07	110N	30W	.40	0.0	0.0	12.1	.1	.6	10.1	26.9
2807600	Minnesota River above Fritsche Creek	NW¼NW¼	17	110N	30W	14.3	.5	6.9	9,520.	3.1	6.2	286.	1.6
2807200	Fritsche Creek (County Ditch No. 77) to Minnesota River above mouth	NW¼NW¼	17	110N	30W	20.7	0	1.0	20.7	0	1.0	15.6	13.8
2807302	Minnesota River above gaging station near New Ulm: station number is 05316770	NE¼ NE¼	20	110N	30W	3.49	.2	.7	9,550.	3.0	6.2	288.	1.6
2807301	Minnesota River above outfall from sewage treatment plant for New Ulm	SE¼ NW¼	34	110N	30W	3.63	.6	1.2	9,550.	3.0	6.2	293.	1.5
2807100	Heymans Creek (County Ditch No. 38) to Minnesota River above mouth	NW¼SE¼	34	110N	30W	16.6	0	.8	16.6	0	.8	10.7	12.7
2807300	Minnesota River above Cottonwood River	SE¼ SE¼	34	110N	30W	.81	0	.3	9,570.	3.0	6.2	295.	1.5
2900100	Cottonwood River above mouth	SE¼ SE¼	34	110N	30W	1,310.	.6	1.6	1,310.	.6	1.6	156.	4.7
2805800	Minnesota River above Little Cottonwood River	NW¼NW¼	16	109N	29W	17.2	1.2	3.6	10,900.	2.7	5.6	301.	1.5
2808000	Little Cottonwood River above unnamed tributary (subbasin 2808100)	NW¼SE¼	15	108N	34W	34.6	0	.2	34.6	0	.2	32.5	16.1
2808100	Unnamed tributary to Little Cottonwood River above mouth	NW¼SE¼	15	108N	34W	7.82	0	3.4	7.82	0	3.4	8.72	15.5
2809700	Little Cottonwood River above County Ditch No. 28-1	NE¼ SE¼	17	108N	33W	15.5	0	1.0	57.9	0	.9	37.5	14.6
2809001	Unnamed tributary above outfall from sewage treatment plant for Comfrey	SE¼ SW¼	35	108N	34W	.45	0	0	.45	0	0	1.82	15.2

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2809000	Unnamed tributary (County Ditch No. 39) to County Ditch No. 28-1 above mouth	SE¼ SW¼	17	108N	33W	16.6	0.0	0.4	17.0	0.0	0.4	16.5	10.2
2809100	County Ditch No. 28-1 to Little Cottonwood River above mouth	NE¼ SE¼	17	108N	33W	6.79	0	.1	23.8	0	.3	17.0	10.4
2808501	Little Cottonwood River above gaging station near Leavenworth: station number is 05317150	NE¼ SE¼	09	108N	33W	4.42	0	1.1	86.2	0	.7	39.8	13.9
2808500	Little Cottonwood River above unnamed tributary (subbasin 2808400)	NW¼NE¼	32	109N	31W	28.4	1.6	5.6	115.	.4	1.9	60.4	9.0
2808400	Unnamed tributary to Little Cottonwood River above mouth	NW¼NE¼	32	109N	31W	7.12	0	1.2	7.12	0	1.2	6.88	7.4
2808800	Unnamed tributary to Little Cottonwood River above mouth	SE¼ NE¼	28	109N	31W	7.11	1.0	9.9	7.11	1.0	9.9	5.97	7.2
2808600	County Ditch No. 11 to Little Cottonwood River above mouth	NE¼ NE¼	28	109N	31W	10.1	.5	7.8	10.1	.5	7.8	9.26	5.8
2808700	Little Cottonwood River above County Ditch No. 58	SW¼SE¼	20	109N	30W	10.3	1.3	3.1	149.	.5	2.8	71.0	7.7
2808900	County Ditch No. 58 to Little Cottonwood River above mouth	SW¼SE¼	20	109N	30W	7.47	.3	3.0	7.47	.3	3.0	6.09	10.0
2805702	Little Cottonwood River above gaging station near Cambria: station number is 05317195	NW¼NE¼	19	109N	29W	10.9	.1	1.6	168.	.5	2.7	80.3	6.9
2805701	Little Cottonwood River above gaging station near Courtland: station number is 05317200	SW¼NE¼	17	109N	29W	2.02	.1	.1	170.	.5	2.7	82.3	6.9
2805700	Little Cottonwood River to Minnesota River above mouth	NW¼NW¼	16	109N	29W	0.16	0	0	170.	.5	2.7	82.9	6.9
2808300	Judicial Ditch No. 10 above County Ditch No. 63	SE¼ SW¼	01	108N	30W	22.5	1.9	2.3	22.5	1.9	2.3	15.5	2.9

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2808200	County Ditch No. 63 to Judicial Ditch No. 10 above mouth	SE¼ SW¼	01	108N	30W	11.2	0.6	4.9	11.2	0.6	4.9	9.96	4.6
2805501	Morgan Creek (Judicial Ditch No. 10) above gaging station near Cambria: station number is 05317300	SW¼SW¼	16	109N	29W	25.4	.1	.6	59.1	.9	2.1	25.8	6.2
2805500	Morgan Creek to Minnesota River above mouth	NE¼ SW¼	16	109N	29W	.10	0	0	59.2	.9	2.1	26.3	6.8
2805601	Unnamed tributary above gaging station near Courtland: no station number assigned	SE¼ NW¼	15	109N	29W	1.54	.1	.3	1.54	.1	.3	2.71	64.9
2805600	Minnesota River above unnamed tributary (subbasin 2805300)	NE¼ SE¼	25	109N	29W	10.6	.7	1.0	11,100.	2.7	5.5	309.	1.5
2805300	Unnamed tributary to Minnesota River above mouth	NE¼ SE¼	25	109N	29W	13.2	0	.4	13.2	0	.4	7.68	30.3
2807000	County Ditch No. 20 to Swan Lake	NE¼ SE¼	08	110N	29W	7.03	.3	7.4	7.03	.3	7.4	5.52	4.9
2806900	Swan Lake outlet	SE¼ NE¼	06	109N	28W	35.6	27.5	44.2	42.7	23.0	38.1	14.3	1.5
2806802	Swan Lake Outlet above gaging station near Nicollet: no station number assigned	NW¼SW¼	05	109N	28W	.34	0	0	43.01	22.9	37.8	14.9	1.5
2806701	County Ditch No. 4 above outfall from sewage treatment plant for Nicollet	SE¼ NW¼	10	109N	28W	19.0	14.6	21.4	19.0	14.6	21.4	9.32	1.4
2806500	County Ditch No. 11 (County Ditch No. 12) to County Ditch No. 39 above mouth	SW¼SW¼	10	109N	28W	7.02	1.0	1.7	7.02	1.0	1.7	5.89	4.3
2806700	County Ditch No. 39 to Swan Lake Outlet above mouth	SW¼NE¼	16	109N	28W	.95	0	0	27.0	10.5	15.5	11.0	1.9
2806801	Swan Lake Outlet above gaging station near Judson: station number is 05317400	SE¼ SE¼	28	109N	28W	9.19	.2	.6	79.2	16.0	25.9	23.0	5.2
2806800	Swan Lake Outlet to Minnesota River above mouth	NE¼ SW¼	33	109N	28W	.23	1.8	1.8	79.4	16.0	25.8	23.9	6.7

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2805401	Minnesota River above gaging station near Judson: station number is 05317500	NE¼ SE¼	33	109N	28W	5.53	0.3	0.3	11,200.	2.8	5.7	314.	1.4
2805400	Minnesota River above unnamed tributary (subbasin 2805100)	NW¼NW¼	02	108N	28W	3.36	.5	.5	11,200.	2.8	5.7	316.	1.4
2805100	Unnamed tributary to Minnesota River above mouth	NW¼NW¼	02	108N	28W	4.75	.4	.4	4.75	.4	.4	4.38	62.5
2805200	Minnesota River above County Ditch No. 3	NE¼ NE¼	07	108N	27W	7.35	0	0	11,300.	2.8	5.7	320.	1.4
2806400	County Ditch No. 3 to Minnesota River above mouth	NE¼ NE¼	07	108N	27W	10.4	0	0	10.4	0	0	5.70	37.7
2810400	Unnamed tributary to Strom Lake	SW¼SW¼	19	108N	29W	4.86	.1	.4	4.86	.1	.4	3.4	5.5
2804900	Judicial Ditch No. 48 to Minneopa Creek above mouth	SE¼ NE¼	26	108N	29W	15.2	3.6	4.2	20.1	2.8	3.3	9.09	2.8
2805000	Minneopa Creek above Judicial Ditch No. 48	SE¼ NE¼	26	108N	29W	7.33	1.5	1.7	7.33	1.5	1.7	5.45	4.5
2804700	County Ditch No. 27 (County Ditch No. 50) to Lily Lake	NW¼SW¼	32	108N	28W	13.0	0	0	13.0	0	0	7.44	3.8
2804801	Minneopa Creek (Lily Lake outlet) above outfall from sewage treatment plant for Lake Crystal	NW¼SE¼	32	108N	28W	5.32	0	4.3	45.7	1.5	2.2	12.5	2.2
2804800	Minneopa Creek above Lake Crystal outlet	SE¼ NE¼	32	108N	28W	1.29	0	0	47.0	1.4	2.1	12.8	2.2
2804500	County Ditch No. 56 to Lake Crystal	NE¼ NE¼	05	107N	28W	14.8	0	.2	14.8	0	.2	9.31	2.3
2804600	Lake Crystal outlet to Minneopa Creek above mouth	SE¼ NE¼	32	108N	28W	6.94	31.9	32.6	21.7	10.2	10.6	10.3	2.3
2804401	Lake Crystal outlet above gaging station near city of Lake Crystal: no station number assigned	SW¼NW¼	33	108N	28W	.16	0	0	68.9	4.2	4.8	13.2	2.1
2804400	Minneopa Creek to Minnesota River above mouth	SW¼NE¼	16	108N	27W	16.1	.2	.3	85.0	3.4	3.9	23.8	5.5

Table 1.—Physical characteristics for the Middle Minnesota -Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2804301	Unnamed tributary above gaging station near Mankato: no station number assigned	NW¼NW¼	15	108N	27W	1.04	0.0	0.0	1.04	0.0	0.0	2.11	129.0
2804300	Minnesota River above Blue Earth River	NW¼NE¼	14	108N	27W	9.73	.1	.8	11,400.	2.8	5.6	326.	1.4
3009200	Blue Earth River above mouth	NW¼NE¼	14	108N	27W	3,540.	1.6	2.7	3,540.	1.6	2.7	141.	2.2
2804203	Minnesota River above gaging station at Mankato: station number is 05325000	NW¼NE¼	13	108N	27W	0.97	.6	.6	14,900.	2.5	4.9	327.	1.4
2804202	Warren Creek above gaging station at Mankato: no station number assigned	NW¼NW¼	18	108N	26W	2.69	.1	.1	2.69	.1	.1	3.60	67.1
2804201	Minnesota River above outfall from sewage treatment plant for Mankato	SW¼SW¼	06	108N	26W	11.0	.2	.9	14,900.	2.5	4.9	328.	1.3
2804200	Minnesota River above unnamed tributary (subbasin 2804100)	NE¼ SE¼	25	109N	27W	11.8	.5	.5	14,900.	2.5	4.9	332.	1.3
2804100	Unnamed tributary to Minnesota River above mouth	NE¼ SE¼	25	109N	27W	4.87	.1	1.0	4.87	.1	1.0	6.59	48.6
2804001	Unnamed tributary above gaging station near Mankato: station number is 05325100	SW¼SW¼	13	109N	27W	0.23	0	0	.23	0	0	1.02	219.1
2803200	Unnamed tributary to unnamed tributary (subbasin 2803400) above mouth	SW¼NW¼	20	109N	26W	7.89	7.3	10.2	7.89	7.3	10.2	8.49	26.2
2803400	Unnamed tributary to Minnesota River above mouth	SW¼NW¼	18	109N	26W	9.72	.1	1.8	17.6	3.3	5.6	10.6	30.3
2804000	Minnesota River above Sevenmile Creek	SE¼ NW¼	12	109N	27W	6.35	.2	.3	15,000.	2.5	4.9	338.	1.3
2806200	County Ditch No. 13A to Sevenmile Creek above mouth	SE¼ SE¼	33	110N	27W	15.6	1.7	2.9	15.6	1.7	2.9	7.35	3.2
2806600	County Ditch No. 46A to Sevenmile Creek above mouth	SE¼ SE¼	33	110N	27W	14.2	.2	8.0	14.2	.2	8.0	8.05	2.9

Table 1.—Physical characteristics for the Middle Minnesota - Little Cottonwood 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 subbasin area)	Storage area (percent of subbasin area)	Main channel length (miles)	Main channel slope (foot per mile)
	First Rank / Second Rank / Third Rank / Fourth Rank / Fifth Rank												
2806300	Sevenmile Creek to Minnesota River above mouth	SE¼ NW¼	12	109N	27W	6.99	0.0	0.0	36.8	0.8	4.3	11.5	20.4
2806000	Minnesota River above Shanaska Creek	NW¼SW¼	28	110N	26W	11.7	.5	.8	15000.	2.5	4.9	343.	1.3
2803300	Unnamed tributary to Lake Washington	NE¼ NE¼	17	109N	25W	11.2	12.8	21.4	11.2	12.8	21.4	7.27	4.8
2803100	Shanaska Creek above Dog Creek (County Ditch No. 58)	NW¼NW¼	01	109N	26W	13.7	20.1	29.1	24.9	16.8	25.6	12.3	5.4
2803600	Dog Creek (County Ditch No. 58) to Shanaska Creek above mouth	NW¼NW¼	01	109N	26W	10.2	12.9	18.0	10.2	12.9	18.0	7.89	10.7
2803500	Shanaska Creek to Minnesota River above mouth	NW¼SW¼	28	110N	26W	6.84	.4	1.4	41.9	13.2	19.8	17.3	12.6
2803801	Pauls Creek above outfall from sewage treatment plant for St. Peter	NE¼ NE¼	15	110N	26W	0.72	1.9	1.9	.72	1.9	1.9	1.19	41.8
2806100	Rogers Creek (County Ditch No. 78) to Minnesota River above mouth	SE¼ NW¼	04	110N	26W	27.0	.5	2.7	27.0	.5	2.7	15.4	12.3
2803900	County Ditch No. 4 (County Ditch No. 64) to Scotch Lake	SE¼ NE¼	23	110N	25W	13.0	1.6	17.1	13.0	1.6	17.1	7.99	1.8
2803702	Cherry Creek (County Ditch No. 65) above outfall from sewage treatment plant for Cleveland	NE¼ NW¼	21	110N	25W	7.75	13.0	17.4	20.8	5.9	17.2	12.1	2.6
2803701	Cherry Creek (County Ditch No. 5 & 37) above gaging station near Ottawa: no station number assigned	SE¼ SE¼	01	110N	26W	9.65	3.1	12.1	30.4	5.0	15.6	16.3	4.5
2803700	Cherry Creek to Minnesota River above mouth	NW¼SE¼	33	111N	26W	2.91	0	1.3	33.3	4.6	14.4	22.0	10.5
2803800	Minnesota River above Cherry Creek	NW¼SE¼	33	111N	26W	20.7	.6	3.6	15100.	2.5	5.0	350.	1.3