Bill Rose

Water Resources Data for Wisconsin

U.S. GEOLOGICAL SURVEY WATER-DATA REPORT WI-79-1

WATER YEAR 1979

Prepared in cooperation with the State of Wisconsin and with other agencies

CALENDAR FOR WATER YEAR 1979

1978

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOVEMBER

S	M	T	W	T	F	S
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DECEMBER

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17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

1979

JANUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
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28	29	30	31			

FEBRUARY

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4	5	6	7	8	9	10
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MARCH

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APRIL

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29	30					

MAY

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27	28	29	30	31		

JUNE

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JULY

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29	30	31				

AUGUST

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19	20	21	22	23	24	25
26	27	28	29	30	31	

SEPTEMBER

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30						

PREFACE

This report was prepared by personnel of the Wisconsin district of the Water Resources Division of the U. S. Geological Survey under the supervision of W. B. Mann IV, District Chief, and J. E. Biesecker, Regional Hydrologist, Northeastern Region. It was done in cooperation with the State of Wisconsin and with other agencies.

This report is one of a series issued by State. General direction for the series is by Philip Cohen, Chief Hydrologist, U. S. Geological Survey.

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16. Abstract (Limit: 200 words)

Water-resources data for the 1979 water year for Wisconsin include records of streamflow at gaging stations, partial-record stations, and miscellaneous sites; records of reservoir storage, records of chemical, physical, and biological characteristics of surface water, ground water, and precipitation, and records of water levels in observation wells. Records for a few gaging stations in bordering states also are included. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Wisconsin.

17. Document Analysis a. Descriptors

*Wisconsin, *Hydrologic data, *Surface water, *Ground water, *Water quality, Flow rate, Gaging stations, Lakes, Reservoirs, Chemical analyses, Sediments, Water temperatures, Sampling sites, Water levels, Water analyses.

b. Identifiers/Open-Ended Terms

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EXPLANATION OF GROUND-WATER LEVEL RECORDS

COLLECTION OF THE DATA

Ground-water-level data for 72 observation wells are published in this report. These wells are part of a network of 205 observation wells measured in Wisconsin. Of the 72 wells, 32 are measured by U.S. Geological Survey personnel, 34 by State or County personnel, and 6 by interested area residents.

These data represent water-table and artesian conditions in the principal aquifers of the State. Precipitation is the major climatic factor affecting ground-water levels. Spring and fall are the seasons when the water table is the highest. In spring ground-water recharge results from snowmelt and rain and in fall from rain. Winter precipitation is tied up as snow, and frost in the ground allows little infiltration.

An exception to these conditions is in the deep sandstone aquifer in southeastern Wisconsin where heavy municipal and industrial pumping is causing a continual decline in the water level. Water in this aquifer is under artesian pressure and recharge is inhibited by the overlying Maquoketa shale.

Water levels in several artesian wells in the State are sensitive to major earthquakes. This is observed on graphs from water-stage recorders as an instantaneous rise and fall in water level. These surges respond to worldwide shocks and generally occur within an hour of the initial earthquake shock.

Each well has a 15-digit identification number based on latitude and longitude, and a local well number. The local number identifies county, township, range, and section.

Water-level records for 59 wells are obtained from direct measurements with a steel tape; records for 13 are from the graph on a water-stage recorder. Water-level measurements in this report are referenced to the land-surface datum (lsd)--a datum plane approximately at land surface at each well. The altitude of the lsd above mean sea level and the height of the measuring point (MP) above or below the lsd is given in each well description.

All measurements for taped wells are listed. For wells with recorders, daily lows are listed for every fifth day and at the end of the month (eom). Water levels are reported to the precision measured (normally to the hundredth of a foot). The absolute value of the depth to water may be in error by a few tenths of a foot, but the error in determining the net change in water level between successive measurements is normally only a hundredth or a few hundredths of a foot.

NOTEWORTHY HYDROLOGIC EVENTS OF 1979

STREAMFLOW

Streamflow throughout Wisconsin was greater than average for the water year 1979. Runoff ranged from 100 to 120 percent of average in the west half of the State to greater than 160 percent of average in the southeast (fig. 1). The Rock River basin had the greatest runoff compared to long-term average yearly flow. The discharge for the year at Watertown was almost 2½ times the 42-year average and was the highest recorded. This exceptionally high flow was due to the large flows during March, April, and May. The April flow was the highest for the period of record, the March and May flows were the fourth and second highest, respectively.

The high spring runoff was due largely to the great amount of water stored in the unusually heavy snowpack. Snowfall in the State averaged nearly 70 inches. At Madison, the snowfall exceeded 76 inches, the greatest in more than 100 years of record. Snow depths reached maximums in late February and water equivalent of the snowpack near Madison was nearly 6 inches. Precipitation in March and April was more than normal. However, the shallow frost penetration and the gradual snowmelt made it possible for much of the water to soak into the soil, thus avoiding more severe flooding.

Figure 2 compares 1979 monthly and annual flow with median flow for several other Wisconsin rivers.

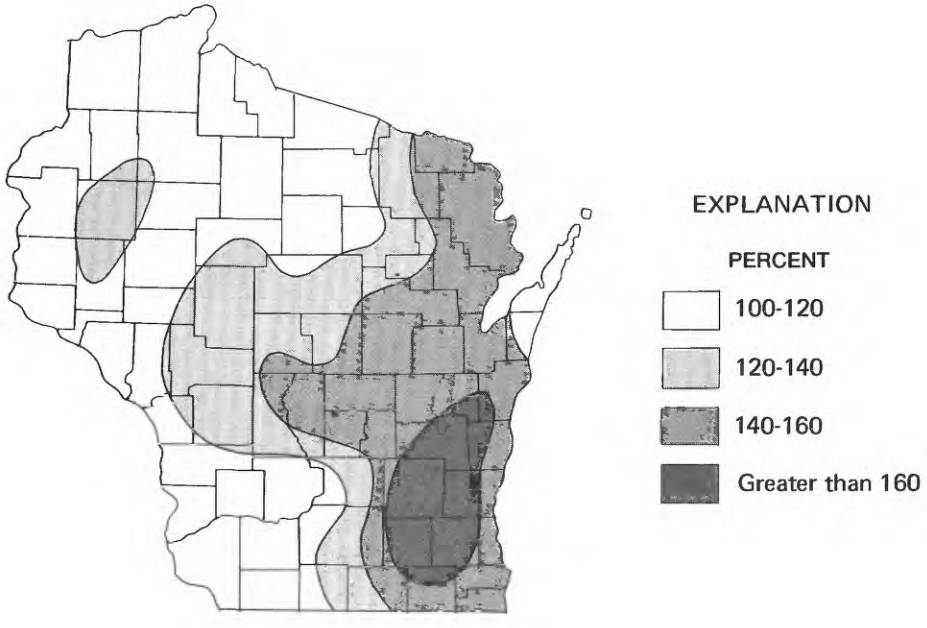

Figure 1. 1979 runoff as percent of long-term average runoff.

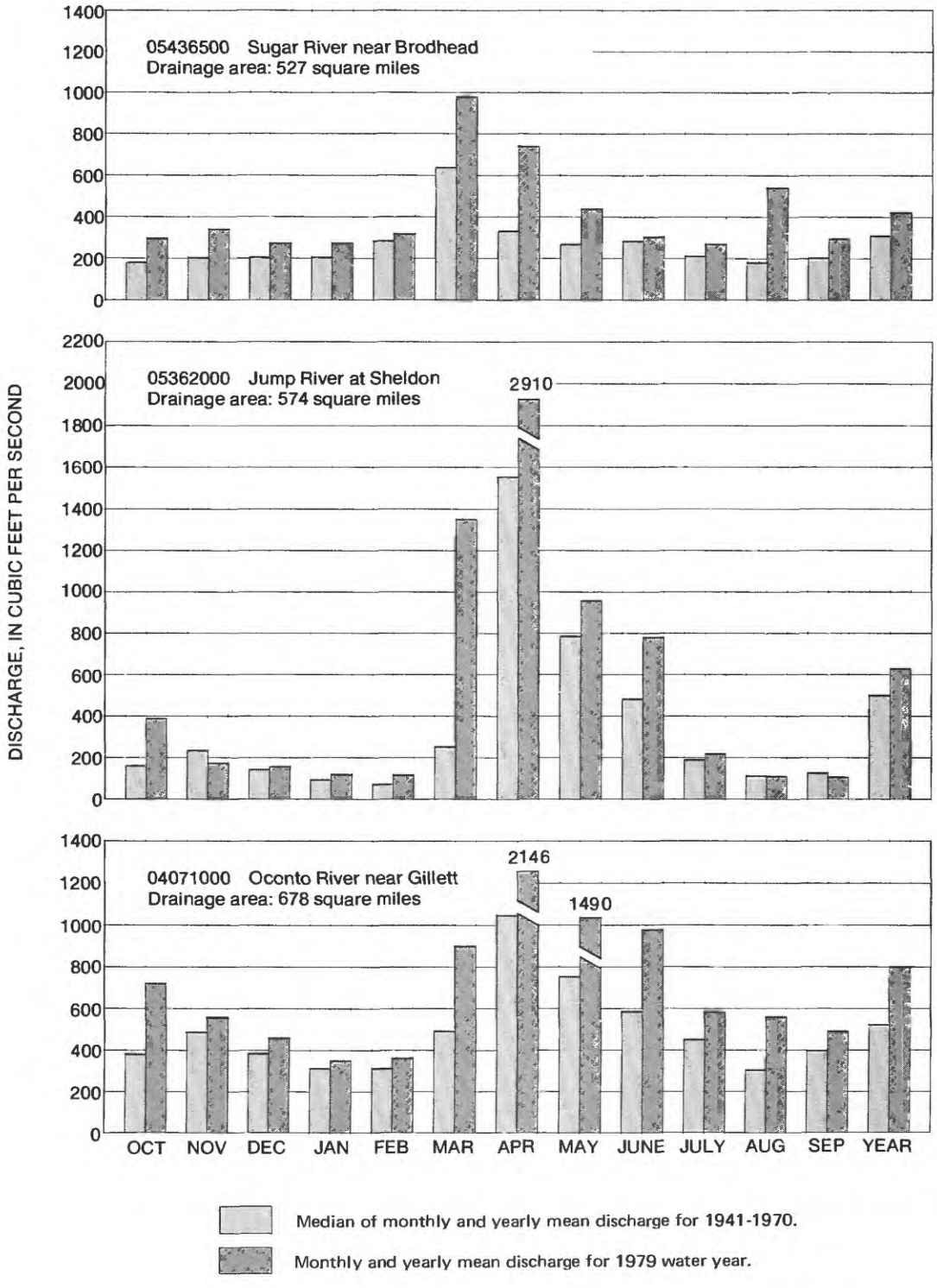

Figure 2. Comparison of discharge at representative gaging statons during 1979 water year with median discharge for 1941-70.

There were very few stations with relatively long periods of record at which new peak flows occurred. The Rock River again was the exception. The peak flow of 5,080 cfs, which occurred at Watertown on March 31, 1979, exceeded slightly the previous high of 5,030 cfs on April 4, 1959. This peak is slightly higher than would be expected to occur during the 50-year flood.

During 1979, several extreme floods occurred at crest-stage gages. Intense June thunderstorms producing 3 to 4 inches of rain caused 100-year floods at Duncan Creek at Bloomer and New Wood River near Merrill. These floods were preceded by high antecedent moisture conditions.

Low-flow conditions were greater than normal for most of the 1979 water year even though annual precipitation averaged approximately 10 percent below normal for the State, 20 percent below normal in the northwest. The slow melting of a record snowpack in the late winter, with little or no frost penetration, allowed most of the water to infiltrate and raise ground-water levels above normal in the spring. The slow release of water from the aquifers maintained streamflow above normal for the remainder of the water year.

WATER-QUALITY CONDITIONS

Dissolved-solids concentrations at most NASQAN stations continued to decrease during the 1979 water year from those during the 1977 and 1978 water years. At the Fox River at Wrightstown, the dissolved-solids concentrations decreased from 1977 to 1978 and increased from 1978 to 1979. Concentrations of trace metals were much less than the critical concentrations for various beneficial uses. No residues of pesticides or PCB's were found in Wisconsin streams during the year. Ground water used for public supply in the city of Madison contained no pesticide residues, PCB's, or volatile organic compounds.

Suspended-sediment loads in the southern part of the State were generally lower in 1979 than in 1978 even though water discharge volumes were generally greater in 1979 than in 1978. The following table of values for three selected sites illustrates this pattern:

Station	Water discharge volume in cfs-day		Suspended-sediment load in tons	
	1978	1979	1978	1979
Steiner Branch	1,505	1,802	2,180	452
Yellowstone River	5,260	7,040	6,280	1,550
Grant River at Burton	69,900	70,000	261,000	83,400

SURFACE-WATER RECORDS

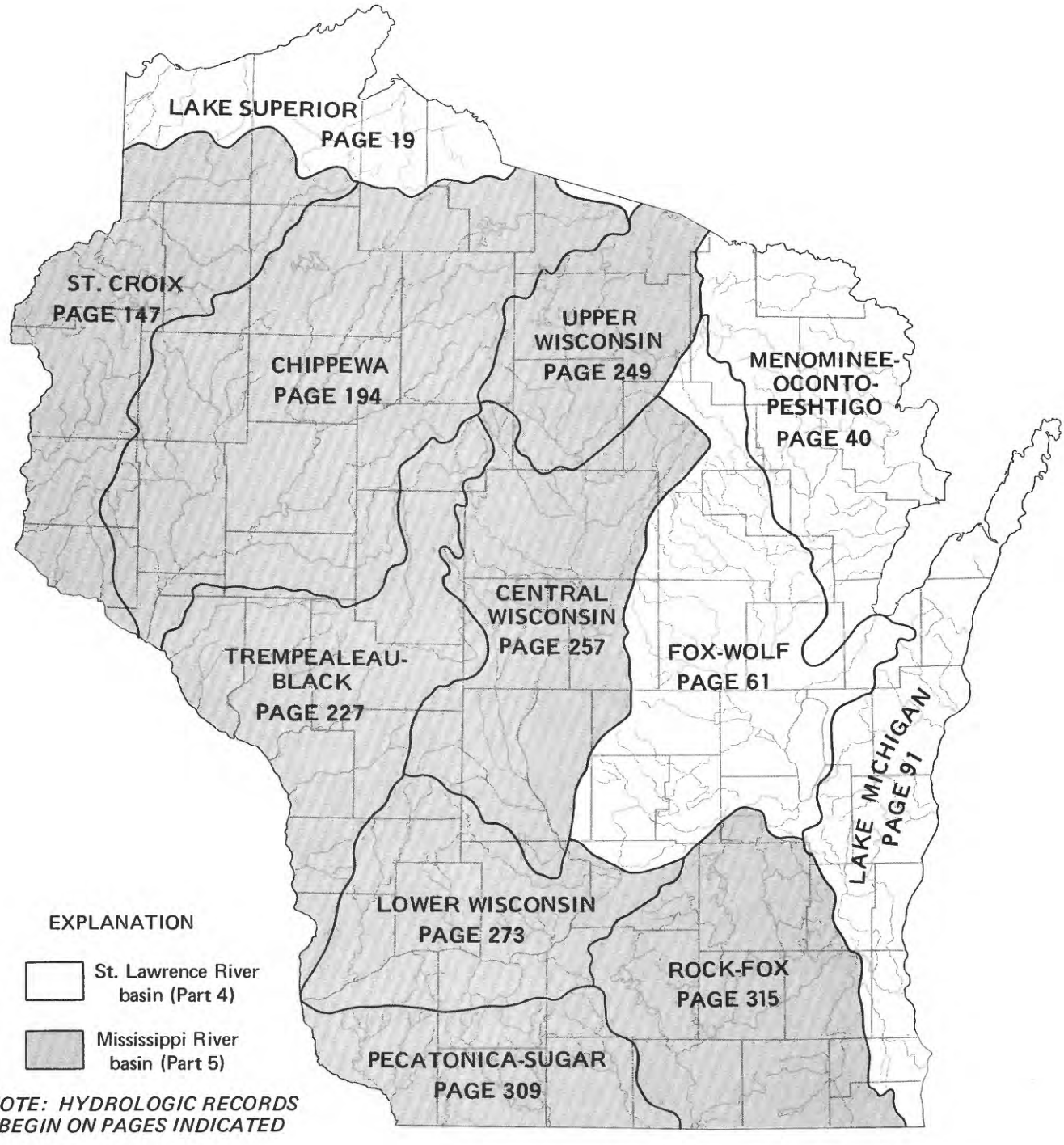

Figure 4. Major surface-water drainage basins and index of hydrologic records.

FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI). This report contains both the inch-pound and SI unit equivalents in the station manuscript descriptions.

Multiply inch-pound units	By	To obtain SI units
	Length	
inches (in)	2.54×10^{1}	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^{0}	kilometers (km)
	Area	
acres	4.047×10^{3}	square meters (m^2)
	4.047×10^{-1}	square hectometers (hm^2)
	4.047×10^{-3}	square kilometers (km^2)
square miles (mi^2)	2.590×10^{0}	square kilometers (km^2)
	Volume	
gallons (gal)	3.785×10^{0}	liters (L)
	3.785×10^{0}	cubic decimeters (dm^3)
	3.785×10^{-3}	cubic meters (m^3)
million gallons	3.785×10^{3}	cubic meters (m^3)
	3.785×10^{-3}	cubic hectometers (hm^3)
cubic feet (ft^3)	2.832×10^{1}	cubic decimeters (dm^3)
	2.832×10^{-2}	cubic meters (m^3)
cfs-days	2.447×10^{3}	cubic meters (m^3)
	2.447×10^{-3}	cubic hectometers (hm^3)
acre-feet (acre-ft)	1.233×10^{3}	cubic meters (m^3)
	1.233×10^{-3}	cubic hectometers (hm^3)
	1.233×10^{-6}	cubic kilometers (km^3)
	Flow	
cubic feet per second (ft^3/s)	2.832×10^{1}	liters per second (L/s)
	2.832×10^{1}	cubic decimeters per second (dm^3/s)
	2.832×10^{-2}	cubic meters per second (m^3/s)
gallons per minute (gal/min)	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm^3/s)
	6.309×10^{-5}	cubic meters per second (m^3/s)
million gallons per day	4.381×10^{1}	cubic decimeters per second (dm^3/s)
	4.381×10^{-2}	cubic meters per second (m^3/s)
	Mass	
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

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