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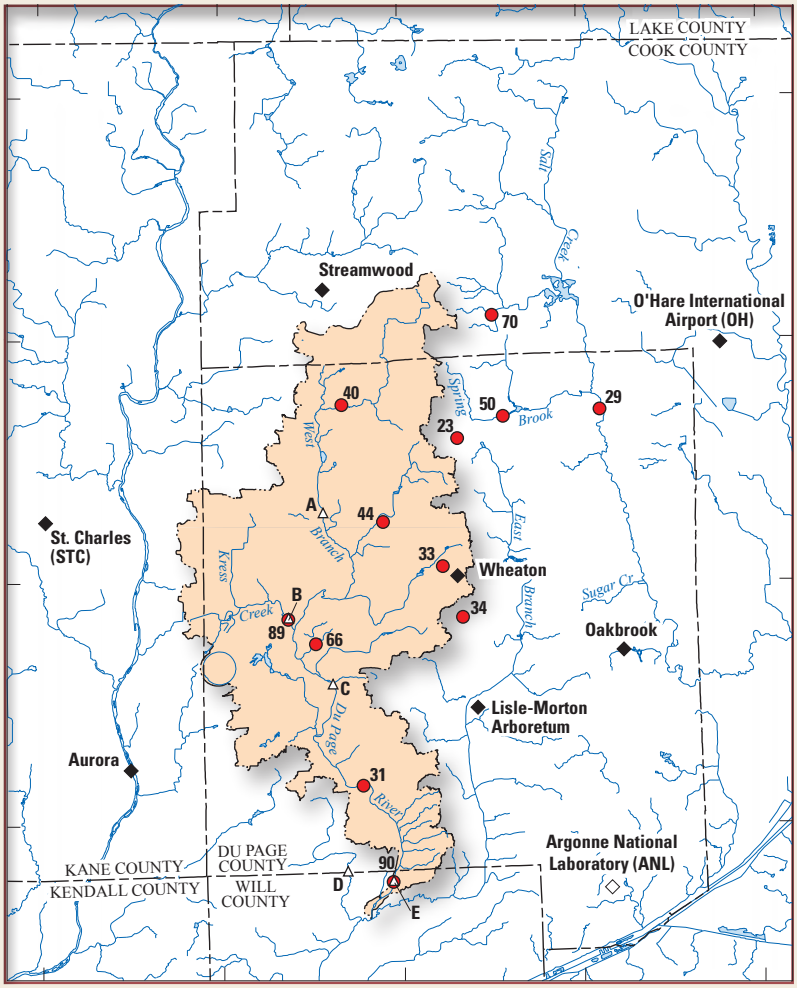
Watershed Data Management (WDM) Database for West Branch DuPage River Streamflow Simulation, DuPage County, Illinois, January 1, 2007, through September 30, 2013



Open-File Report 2017–1099

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

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RYAN K. ZINKE, Secretary

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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow rate	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
inch per hour (in/h)	0 .0254	meter per hour (m/h)
inch per day (in/d)	0 .0254	meter per day (m/d)
	Energy flux density	
Langleys per hour (Lg/hr)	11.63	watts per square meter (W/m^2)

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:

$$°C = (°F – 32) / 1.8.$$

Datum

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83) and the North American Datum of 1927 (NAD 27).

Abbreviations

ADAPS	USGS Automated Data Processing System
ANL	Argonne National Laboratory
FEQ	Full Equations hydraulic model
BASINS	Better Assessment Science Integrating point and Non-point Sources
GenScn	Generation and Analysis of Model Simulation Scenarios
HSPF	Hydrological Simulation Program-FORTRAN
HYDHR	HSPF hourly-observations
MAGIC	Meteorological and hydrologic GenScn input converter
QA/QC	Quality-assured and quality-controlled
USGS	U.S. Geological Survey
WBDR	West Branch DuPage River
WDM	Watershed Data Management
DSN	Dataset number
WY	Water year
WDR	USGS Annual Water Data Reports

Watershed Data Management (WDM) Database for West Branch DuPage River Streamflow Simulation, DuPage County, Illinois, January 1, 2007, through September 30, 2013

By Maitreyee Bera

Abstract

The U.S. Geological Survey (USGS), in cooperation with the DuPage County Stormwater Management Department, maintains a database of hourly meteorological and hydrologic data for use in a near real-time streamflow simulation system. This system is used in the management and operation of reservoirs and other flood-control structures in the West Branch DuPage River watershed in DuPage County, Illinois. The majority of the precipitation data are collected from a tipping-bucket rain gage network located in and near DuPage County. The other meteorological data (air temperature, dewpoint temperature, wind speed, and solar radiation) are collected at Argonne National Laboratory in Argonne, Ill. Potential evapotranspiration is computed from the meteorological data using the computer program LXPET (Lamoreux Potential Evapotranspiration). The hydrologic data (water-surface elevation [stage] and discharge) are collected at USGS streamgages in and around DuPage County. These data are stored in a Watershed Data Management (WDM) database.

This report describes a version of the WDM database that is quality-assured and quality-controlled annually to ensure datasets are complete and accurate. This database is named WBDR13.WDM. It contains data from January 1, 2007, through September 30, 2013. Each precipitation dataset may have time periods of inaccurate data. This report describes the methods used to estimate the data for the periods of missing, erroneous, or snowfall-affected data and thereby improve the accuracy of these data. The meteorological datasets other than precipitation (air temperature, dewpoint temperature, wind speed, solar radiation, and potential evapotranspiration) are copied from ARGN14.WDM and stored in WBDR13.WDM, and the hydrologic datasets in the database are fully described in the online USGS annual water data reports for Illinois and, therefore, are described in less detail than the precipitation datasets in this report.

Introduction

The U.S. Geological Survey (USGS), in cooperation with the DuPage County Stormwater Management Department, maintains a database of hourly meteorological and hydrologic data for use in a near real-time streamflow simulation system. This system is used in the management and operation of reservoirs and other flood-control structures in the West Branch DuPage River (WBDR) watershed in DuPage County, Illinois. The USGS and DuPage County currently (2017) use the Hydrological Simulation Program-FORTRAN (HSPF) hydrologic model (Bicknell and others, 2000) and Full Equations (FEQ) hydraulic model (Franz and Melching, 1997) to develop the simulations of the watershed rainfall runoff (HSPF) and routed streamflow (FEQ) at a 1-hour time step. The Watershed Data Management (WDM) database was designed for use with the HSPF model to store input and output data files. This report focuses on the processing and the data organization of the WDM database WBDR13.WDM that is used in the near real-time streamflow simulation system for WBDR watershed in DuPage County, Ill. It does not describe how HSPF and FEQ models are used in the real-time streamflow simulation system. For a related reference, see Ishii and others (1998), which describes in detail how HSPF and FEQ are used in near real-time streamflow simulation system for Salt Creek watershed in DuPage county Ill.

The meteorological and hydrologic data are collected at various sites in and near DuPage County (fig. 1). These provisional data are stored in a WDM database that is updated at least weekly by USGS staff. The provisional data may have periods of missing or flawed data due to equipment malfunctions or other problems. To improve the accuracy of simulations, the WDM database is updated and corrected with quality-assured and quality-controlled (QA/QC) data for each water year (WY; a water year is the 12-month period October 1 through September 30 and is designated by the calendar year

in which it ends). This update is done to maintain a record of the data in a model-compatible format and for studying historical storms. Although this database is compiled for the WBDR watershed, the data could be used in other hydrologic models in northeastern Illinois or by scientists studying rain distribution or climate in the area.

The purpose of this report is to describe the data sources and data organization used to create the QA/QC version of the WDM database, including how periods of missing or inaccurate precipitation data are estimated. The QA/QC database discussed in this document encompasses the period from January 1, 2007, through September 30, 2013, and is named the WBDR13.WDM. Detailed explanations of the hydrologic data are given in the documentation of the USGS Annual Water Data Report (U.S. Geological Survey, 2016). This documentation is available online at https://wdr.water.usgs.gov/current/documentation.html. Over and others (2010) describe in detail the methods used to fill in missing and erroneous meteorological data (air temperature, dewpoint temperature, wind speed, and solar radiation). These documentations will not be repeated in his report.

Watershed Data Management (WDM) Database

The WDM database is a binary, direct-access electronic file (Flynn and others, 1995). It was developed by the USGS to be used with hydrologic and water-quality models and analyses. Data within the WDM database are stored in datasets. WDM databases can be accessed with the ANNIE computer program (Flynn and others, 1995); with the Generation and Analysis of Model Simulation Scenarios (GenScn), an interactive computer program (Kittle and others, 1998); or with Better Assessment Science Integrating point and Non-point Sources (BASINS), a multipurpose environmental analysis system. The WBDR13.WDM database contains meteorological and hydrologic data collected in and near DuPage County, Illinois. The WDM database WBDR13.WDM and its associated metadata (Bera, 2017) are available at https://doi.org/10.5066/F71Z42M0. The data organization, sources, and QA/QC procedures are discussed below.

Database Numbering Scheme

To aid in identifying the contents of WDM datasets, dataset numbers (DSNs) are assigned in a systematic order. The DSNs are limited to four digits in the Hydrological Simulation Program-FORTRAN (HSPF) model, which uses the WDM. Up to 32,000 datasets are allowed in the WDM database, but access to these datasets requires a direct-access computer program such as ANNIE. In the WBDR13.WDM, all DSNs are between 1 and 7019.

The data are numbered in the WDM database according to data type and the location from which the data were gathered. Generally, the different data types are grouped into series (table 1). For example, the dataset numbers from 100 to 199 are for precipitation. The last two digits of the DSN indicate the station identification or location of the data source. The last two digits are based on the DuPage County site identifier for rain gages (fig. 1). In addition to hourly meteorological data, WBDR13.WDM contains hourly data flags describing each of the four meteorological data types: air temperature, dewpoint temperature, wind speed, and solar radiation. Each hourly data flag time series is assigned a three digit DSN. The second and third digits are 1and 0 respectively. The first digit is the same as that of the corresponding meteorological data type DSN. These data flags are described in detail in Over and others (2010) and Bera (2014).

For hydrologic data, a four-digit DSN is used; the first two digits of the number indicate the type and location of the data, and the third and fourth digits are 00 if the data are observed. There are a few exceptions to the observed data label of 00. The complete list of datasets in WBDR13.WDM database is given in table 2, and a list of dataset attributes is given in Appendix 1.

As can be seen from table 2, WBDR13.WDM contains many datasets that are not part of the annual QA/QC process. These datasets have been created in the WDM database for data analyses or for convenience of data processing. For example, dataset 1 contains a constant arithmetic value used to generate a datum for the water-surface elevations. Datasets 107 and 801–811 are used in comparisons of precipitation data. Datasets 6107–7019 are used in model simulation outputs for reviewing model operations.

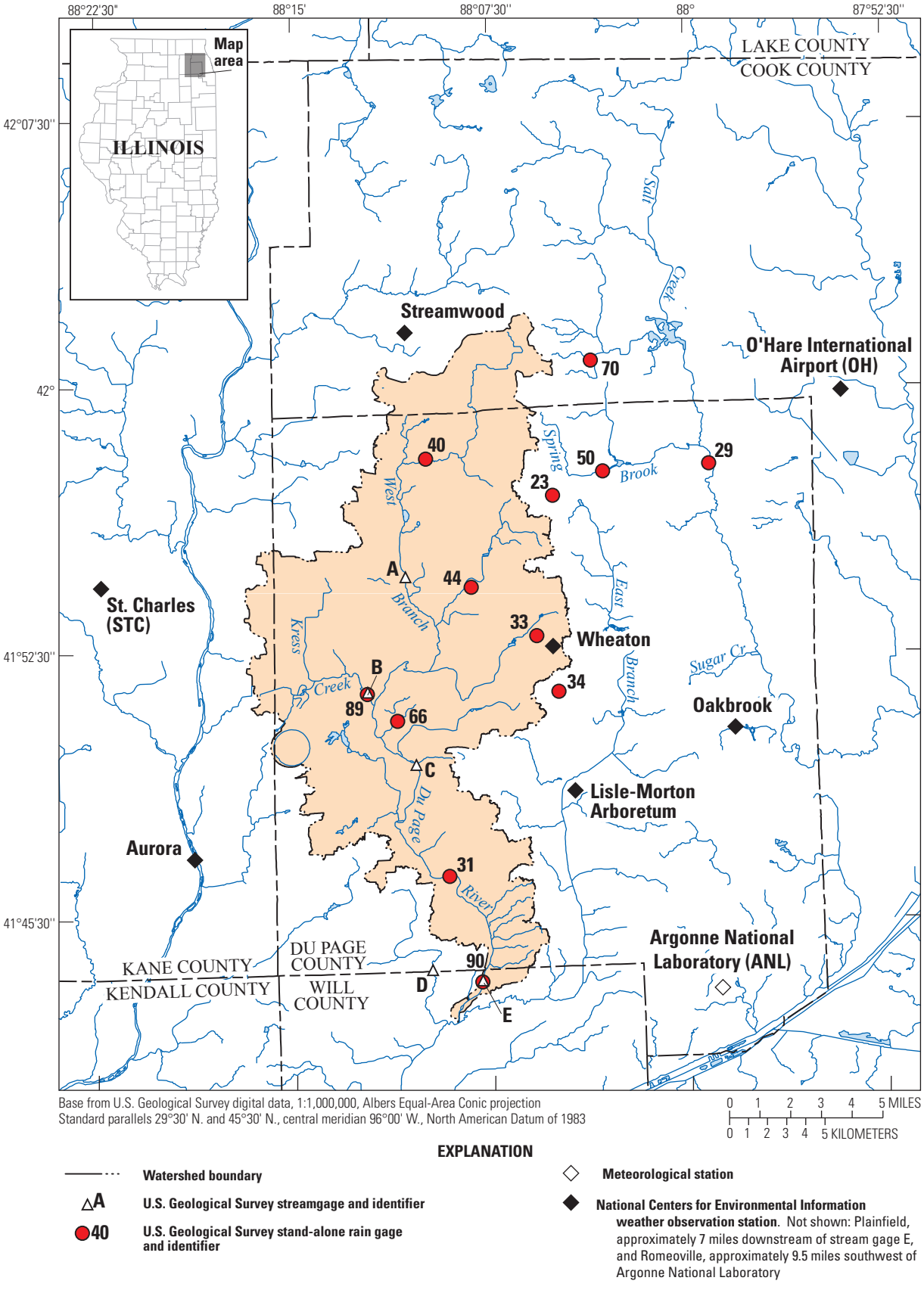

Figure 1. Location of the West Branch DuPage River watershed and data-collection sites in and near DuPage County, Illinois.

Table 1. Description of dataset numbering system for the data in the WBDR13.WDM database.

[The impervious and pervious runoff datasets are used to store output from the hydrologic model simulations; the data stored therein change with each model run. USGS, U.S. Geological Survey; IDCON, identification of data type; NEXRAD, Next Generation Radar; ISUR, runoff from impervious surfaces; PERO, runoff from pervious surfaces]

Dataset numbers	Data type	IDCON attribute
	General data	
1–10	Datums	ELEV.
	Meteorological data	
100–199	Precipitation from tipping bucket gages	PREC.
200–299	Potential evapotranspiration	EVAP.
300–399	Wind speed	WIND.
400–499	Air temperature	TEMP.
500–599	Dewpoint temperature	DEWP.
600–699	Solar radiation	SRAD.
800–899	Computed NEXRAD precipitation	PREC.
	Hydrologic data	
2000–2999	Discharge	FLOW.
4000–4999	Water-surface elevation from USGS gages	ELEV.
6000–6999	Hydrologic model output	ISUR/PERO.
7000–7999	Simulated flow components	Various.

Table 2. List of datasets in the WBDR13.WDM database.

[DSN, dataset number; Description, station name, location, and information about the units used; TSTYPE, type of data; ft, feet; ELEV, elevation; in., inch; PREC, precipitation; Bldg., building; Ill., Illinois; WWTF, wastewater treatment facility; EVAP, evapotranspiration; WIND, wind speed; FLAG, hourly data flag; TEMP, air temperature; ° F, degrees Fahrenheit; DEWP, dewpoint; SRAD, solar radiation; NEXRAD, Next Generation Radar; AVG, average; WBDR, West Branch DuPage River; Trib, tributary; FLOW, discharge; ft^3/s, cubic feet per second; NGVD 29, National Geodetic Vertical Datum of 1929; in/hr, inches per hour; *, multiply by; mi^2, square mile; ISUR, runoff from impervious surfaces; PERO, runoff from pervious surfaces; SURO, surface outflow; IFWO, interflow outflow; in/d, inch per day; PET, potential evapotranspiration; ET, evapotranspiration; TAET, simulated evapotranspiration; UZS, upper zone storage; LZS, lower zone storage; AGWS, groundwater storage at start; SNOW, simulated snow depth]

DSN	Description	TSTYPE
1	Dummy datum (600 ft)	ELEV.
107	Argonne tipping bucket PREC (0.01 in.)	PREC.
131	Naperville Municipal Bldg. at Naperville, Ill. (0.01 in.)	PREC.
133	Wheaton Water Department at Wheaton, Ill. (0.01 in.)	PREC.
134	Wheaton Sewer Department at Wheaton, Ill. (0.01 in.)	PREC.
140	Bartlett WWTF near Bartlett, Ill. (0.01 in.)	PREC.
144	Carol Stream WWTF at Carol Stream, Ill. (0.01 in.)	PREC.
150	Spring Creek Reservoir near Bloomingdale, Ill. (0.01 in.)	PREC.
166	Blackwell Forest Preserve near Warrenville, Ill. (0.01 in.)	PREC.
189	Kress Creek at West Chicago, Ill. (0.01 in.)	PREC.
190	West Branch DuPage River near Naperville, Ill. (0.01 in.)	PREC.
207	Argonne EVAP—unadjusted wind (0.001 in.)	EVAP.
307	Unadjusted Argonne hourly wind speed (miles per hour)	WIND.
310	Argonne hourly wind flag	FLAG.
407	Argonne hourly air temperature (° F)	TEMP.
410	Argonne hourly air temperature flag	FLAG.
507	Argonne hourly dewpoint temperature (° F)	DEWP.
510	Argonne dewpoint temperature flag	FLAG.
607	Argonne hourly solar radiation (Langleys)	SRAD.
610	Argonne hourly solar radiation flag	FLAG.
801	NEXRAD hourly avg for WBDR mainstem (upper) (0.01 in.)	PREC.
802	NEXRAD hourly avg for trib 1 of WBDR 0.01 in.)	PREC.
803	NEXRAD hourly avg for trib 4 of WBDR (0.01 in.)	PREC.
804	NEXRAD hourly avg for WBDR mainstem (Middle) (0.01 in.)	PREC.
805	NEXRAD hourly avg for Klein Creek (0.01 in.)	PREC.
806	NEXRAD hourly avg for Winfield Creek (0.01 in.)	PREC.
807	NEXRAD hourly avg for Kress Creek (0.01 in.)	PREC.
808	NEXRAD hourly avg for Spring Brook (0.01 in.)	PREC.
809	NEXRAD hourly avg for Ferry Creek (0.01 in.)	PREC.
810	NEXRAD hourly avg for Steeple Run Creek (0.01 in.)	PREC.

Table 2. List of datasets in the WBDR13.WDM database.—Continued

[DSN, dataset number; Description, station name, location, and information about the units used; TSTYPE, type of data; ft, feet; ELEV, elevation; in., inch; PREC, precipitation; Bldg., building; Ill., Illinois; WWTF, wastewater treatment facility; EVAP, evapotranspiration; WIND, wind speed; FLAG, hourly data flag; TEMP, air temperature; ° F, degrees Fahrenheit; DEWP, dewpoint; SRAD, solar radiation; NEXRAD, Next Generation Radar; AVG, average; WBDR, West Branch DuPage River; Trib, tributary; FLOW, discharge; ft^3/s, cubic feet per second; NGVD 29, National Geodetic Vertical Datum of 1929; in/hr, inch per hour; *, multiply by; mi^2, square mile; ISUR, runoff from impervious surfaces; PERO, runoff from pervious surfaces; SURO, surface outflow; IFWO, interflow outflow; in/d, inch per day; PET, potential evapotranspiration; ET, evapotranspiration; TAET, simulated evapotranspiration; UZS, upper zone storage; LZS, lower zone storage; AGWS, groundwater storage at start; SNOW, simulated snow depth]

DSN	Description	TSTYPE
811	NEXRAD hourly avg for WBDR mainstem (lower) (0.01 in.)	PREC.
2060	Discharge at Kress Creek at West Chicago, Ill. (ft^3/s)	FLOW.
2130	Discharge at West Branch DuPage River near Naperville, Ill. (ft^3/s)	FLOW.
2750	Discharge at Spring Brook at 87th Street near Naperville, Ill. (ft^3/s)	FLOW.
2950	Discharge at West Branch DuPage River near Warrenville, Ill. (ft^3/s)	FLOW.
2990	Discharge at West Branch DuPage River near West Chicago, Ill. (ft^3/s)	FLOW.
4031	Water-surface ELEV at West Branch DuPage River at Fawell Dam (NGVD 29)	ELEV.
4060	Water-surface ELEV at Kress Creek at West Chicago, Ill. (NGVD 29)	ELEV.
4130	Water-surface ELEV at West Branch DuPage River near Naperville, Ill. (NGVD 29)	ELEV.
4750	Water-surface ELEV at Spring Brook at 87th Street near Naperville, Ill. (NGVD 29)	ELEV.
4950	Water-surface ELEV at West Branch DuPage River near Warrenville, Ill. (NGVD 29)	ELEV.
4990	Water-surface ELEV at West Branch DuPage River near West Chicago, Ill. (NGVD 29)	ELEV.
6107	Impervious runoff (in/h* mi^2)	ISUR.
6207	Flat grass runoff (in/h*mi^2)	PERO.
6307	Moderate grass runoff (in/h*mi^2)	PERO.
6407	Steep grass runoff (in/h*mi^2)	PERO.
6507	Forest runoff (in/h*mi^2)	PERO.
6607	Agriculture runoff (in/h*mi^2)	PERO.
7012	Surface outflow (in/h*mi^2)	SURO.
7013	Interflow outflow (in/h*mi^2)	IFWO.
7014	Potential evapotranspiration (in/d*mi^2)	PET.
7015	Simulated ET (in/d*mi^2)	TAET.
7016	Upper zone storage (in*mi^2)	UZS.
7017	Lower zone storage (in*mi^2)	LZS.
7018	Groundwater storage at start (in.)	AGWS.
7019	Simulated snow depth (in.)	SNOW.

Precipitation Data

The source of precipitation data in the QA/QC WDM is the USGS and DuPage County real-time flood-warning rain gage network. The real-time flood-warning rain gage network contains 8 rain gages (31, 33, 34, 40, 44, 66, 89, and 90; table 3) in and near the West Branch DuPage River watershed (fig. 1). The real-time flood-warning rain gage network consists of 6-, 8-, and 12-inch (in.) diameter tipping-bucket rain gages. These tipping-bucket rain gages are set to tip when 0.01 in. of rain has been collected in the gage. Some of the gages in the network are heated, thus allowing them to record snowfall amounts (table 3). Some of the rain gages have radio telemetry, which transmits the data to a DuPage County facility at every 5 minutes (table 3).

Most of the rain gages with radio telemetry also have an onsite data logger that records the data. Files from the data logger are downloaded by USGS personnel during site visits. Data collected with a data logger are generally more reliable than data transmitted by a radio telemetry, because transmission failures are avoided. When the data logger is missing data, radio-transmitted data are used as a backup record at the gages. If there is no backup record available at the gage, then gaps when data are missing are filled with data from a nearby gage. The rain gage data from 23 (USGS 415651088051900, Bloomingdale Lift Station at Bloomingdale, Ill., located at 41°56′51″, 88°05′19″), 29 (USGS 415751087591000, Wood Dale WWTF at Wood Dale, Ill., located at 41°57′51″, 87°59′10″), 50 (USGS 415737088031100, Spring Creek Reservoir near Bloomingdale, Ill., located at 41°57′37″, 88°03′11″), and 70 (USGS 420052088034200, Schaumburg Public Works at Schaumburg, Ill., located at 42°00′52″, 88°03′42″) near the West Branch DuPage River watershed are used as a backup. The QA/QC processing of the data from these gages are described in detail in Bera (2014).

The data from the rain gage network were checked for accuracy and processed for publication in the USGS Annual WDR. Missing data are flagged as "–-" and snowfall-affected data are flagged as "e" in the WDR. Snowfall-affected data were flagged for heated and unheated rain gages. Snowfall-affected data were flagged because unheated rain gages inaccurately record precipitation data at temperatures below freezing. Frozen precipitation, usually in the form of snow, accumulates in the funnel of unheated rain gages. This frozen precipitation is measured when it melts. Wind can blow snow out of the rain gage before it can melt, thus leaving some precipitation unmeasured. The determination of which data were affected by snowfall took into consideration the air temperature data obtained from the nearby National Centers for Environmental Information weather observation stations (fig. 1; National Centers for Environmental Information, 2017) from the Illinois network listed in table 4, the placement of the rain gage, and the amount of precipitation observed at heated rain gages in the network. The weather observation station is chosen by the hydrographer working on the record for a specific rain gage. Missing data are filled from nearby rain gages as a part of the QA/QC process and stored in the WDM database. Unit value precipitation data from January 1, 2007, through September 30, 2013, were retrieved from the USGS Automated Data Processing System (ADAPS) database (U.S. Geological Survey, 2015) and were used as the basis for the QA/QC of the WDM database. Unit value precipitation data are the incremental data collected by the recorder (data logger at the data site) or computed from the recorded incremental data. Unit value data are often recorded in 15-minute increments. ADAPS unit value data were processed into hourly values by using the meteorological and hydrologic GenScn input converter (MAGIC) computer program (Ortel and Martin, 2010). Any missing hourly value of precipitation was filled with the corresponding data from a nearby network gage. These data were then input to WBDR13.WDM. For each station, the estimated data were determined by consulting the USGS Annual WDR (U.S. Geological Survey, 2016) for Illinois, which identified days with estimated rainfall with snowmelt and days with partial records. Appendix table 2–1 describes all of the missing periods and the stations used to fill in the missing data. Appendix table 2–2 lists the snowfall-affected periods.

Table 3. Characteristics of rain gages used and selected meteorological data observed during January 1, 2007, through September 30, 2013, in and near DuPage County, Illinois, stored in quality-assured/quality-controlled WBDR13.WDM Watershed Data Management database.

[USGS, U.S. Geological Survey; WDM, Watershed Data Management; ANL, Argonne National Laboratory; PREC, precipitation; —, not applicable; in., inch; Lat, latitude given as: degrees (°) minutes (′) seconds (″); Long, longitude given as: degrees (°) minutes (′) seconds (″); ° F, degrees Fahrenheit; EVAP, potential evapotranspiration; Bldg., Building; Ill., Illinois; Y, Yes; WWTF, Wastewater Treatment Facility]

Site identifier (fig. 1)	Dataset number	Location of gage (USGS station number)	Data type (unit of measurement)	Radio telemetry (yes or no)	Period of record in WBDR13.wdm database (month/day/year)	Rain gage
						Water year heated[1]
ANL	107	Argonne National Laboratory	PREC (0.01 in.)	—	01/01/1996–09/30/2013	—
	307	Lat: 41º42’06” Long: 87º59’46” (—)	Air temperature (° F)	—	01/01/1996–09/30/2013	—
	310		Air temperature flag (—)	—	01/01/1996–09/30/2013	—
	607		Dewpoint temperature (deg F)	—	01/01/1996–09/30/2013	—
	610		Dewpoint temperature flag (—)	—	01/01/1996–09/30/2013	—
	407		Wind speed (miles per hour)	—	01/01/1996–09/30/2013	—
	410		Wind speed flag (—)	—	01/01/1996–09/30/2013	—
	507		Solar radiation (Langleys)	—	01/01/1996–09/30/2013	—
	510		Solar radiation flag (—)	—	01/01/1996–09/30/2013	—
	207		EVAP (0.001 in.)	—	01/01/1996–09/30/2013	—
31	131	Naperville Municipal Bldg. at Naperville, Ill. Lat: 41°46’13” Long: 88º09’10” (414613088091000)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	2007, 2008
33	133	Wheaton Water Department at Wheaton, Ill. Lat: 41°53’00” Long: 88°05’46” (415300088054600)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	2007, 2008, 2011, 2012, 2013
34	134	Wheaton Sewer Department at Wheaton, Ill. Lat: 41°51’25” Long: 88°04’57” (415125088045700)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	2007, 2008, 2011, 2012
40	140	Bartlett WWTF near Bartlett, Ill. Lat: 41°58’01” Long 88°09’57” (415801088095700)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	None.
44	144	Carol Stream WWTF at Carol Stream, Ill. Lat: 41°54’23” Long 88°08’15” (41523088081500)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	None.
[2]66	166	Blackwell Forest Preserve near Warrenville, Ill. Lat: 41°50’37” Long: 88°11’06” (415037088110600)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	None.
89	189	Kress Creek at West Chicago, Ill. Lat: 41°51’23” Long 88°12’14” (05540060)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	None.
90	190	West Branch DuPage River near Naperville, Ill. Lat: 41°43’13” Long: 88°07’55” (05540130)	PREC (0.01 in.)	Y	01/01/2007–09/30/2013	None.

[1]Information not available for WY09 (except for rain gage 89).

[2]Rain gage 66 was removed permanently on 08/27/13.

Table 4. National Centers for Environmental Information Observation Stations in Illinois used to determine the snowfall-affected days for the rain gages in and near DuPage County, Illinois, during January 1, 2007, through September 30, 2013.

Site identifier (fig. 1)	Dataset number	Weather observation stations used (water year)
31	131	Romeoville (2007); Plainfield (2010); Aurora (2011, 2012, 2013).
33	133	Wheaton (2007); Oakbrook (2010); O'Hare International Airport (2011, 2012, 2013).
34	134	Wheaton (2007); Oakbrook (2010); O'Hare International Airport (2011, 2012, 2013).
40	140	O'Hare International Airport (2007, 2008); Streamwood (2010); Aurora (2011, 2012, 2013).
44	144	Wheaton (2007, 2008); Oakbrook (2010); Aurora (2011, 2012, 2013).
66	166	Wheaton (2007, 2008); Lisle-Morton Arboretum (2010); Aurora (2011, 2012, 2013).
89	189	Aurora and St. Charles (2007, 2008); Aurora (2009, 2010, 2011, 2012, 2013).
90	190	Romeoville (2007, 2008); Aurora (2010, 2011, 2012, 2013).

Other Meteorological Data

The U.S. Department of Energy facility, Argonne National Laboratory (ANL), is the main source of meteorological data in the WDM database. The air temperature, dewpoint temperature, wind speed, and solar radiation data were obtained from the ANL Web site (Argonne National Laboratory, 2015). Any missing data were estimated to provide a full and accurate data record in the WDM database. The data were quality controlled by ANL staff (Argonne National Laboratory, 2015); however, these data still required adjustment to account for different data-collection methods at the ANL station over the period of record. Missing and erroneous values were estimated from adjusted meteorological data derived from the backup weather observation stations at St. Charles, Ill., and O'Hare International Airport, Chicago, Ill. (fig. 1). As described in Over and others (2010), the adjustments were computed based on the regressions between the primary data series from ANL and the backup series from the meteorological stations at St. Charles and O'Hare by using data obtained during common periods. Each hourly meteorological data value is assigned a corresponding data-source flag denoted by a three-digit code in the form "xyz" (Over and others, 2010). These flags provide complete information regarding the origin and transformations of each hourly value in the database. In addition to the hourly meteorological data, WBDR13.WDM contains those data-source flags describing the meteorological data.

Details of these regression equations and data-source flags are documented in Over and others (2010). The regression equation for solar radiation is changed based on the regression analysis of the backup data series at St. Charles for WYs 2008–10 as described in Bera (2014). Potential evapotranspiration is computed from the meteorological data according to the method described in Murphy (2005).

Hydrologic Data

In addition to the meteorological data used as inputs to the HSPF model, WBDR13.WDM contains datasets of observed discharge and water-surface elevation (stage). These data are used to compare the simulated discharges generated by HSPF and water-surface elevations generated by FEQ. The stage data are measured at five USGS streamgages (table 4), and the discharge data are computed from these stage data.

The discharge data are estimated when stage data are missing or when the stage-discharge relation is temporarily not valid, such as for backwater conditions. The daily mean estimated discharge data are flagged "e" and missing stage data are flagged "—" in the USGS Annual WDR (U.S. Geological Survey, 2016). The corresponding computed and approved unit value discharge data in ADAPS are assigned a flag "U" for all of the time steps for that day. Missing stage data are identified as "-123456E20" in the data file for unit value stage in ADAPS. Unit value stage and discharge data are recorded in 5-minute increments. Hourly stage and discharge data from January 1, 2007, to September 30, 2013, were retrieved from ADAPS and were processed by using MAGIC (Ortel and Martin, 2010). The MAGIC processing creates a file in HSPF hourly-observations (HYDHR) file format (Ortel and Martin, 2010) in which it writes "-99.9" for each "U" flag in the file of unit value discharge and "-99.9" for each "-123456E20" flag in the file of unit value stage data. Unit value stage data are instantaneous data collected by the data logger at the site. The unit value stage data in ADAPS lack the correction to the National Geodetic Vertical Datum (NGVD) of 1929, but user control input (uci) file for HSPF is written such that the correct datum is added and the resultant elevation data are stored in the WDM file. These HSPF HYDHR files are written to WBDR13.WDM by using an HSPF uci file. Appendix tables 2–3 and 2–4 describe the periods of missing data for stage and estimated data for discharge.

Table 5. Characteristics of hydrologic data observed in DuPage County, Illinois, stored in WBDR13.WDM Watershed Data Management database.

[USGS, U.S. Geological Survey; WDM. Watershed Data Management; IDCON, constituent identification attribute in WDM database; Ill., Illinois; ft, feet; NGVD 29, National Geodetic Vertical Datum of 1929; dates are expressed as month/day/year; ELEV, water-surface elevation; FLOW, discharge]

Site map identifier (fig. 1)	Source of data	USGS station number	Data type	Period of record in WBDR13.WDM	WDM database dataset number and IDCON
A	West Branch DuPage River near West Chicago, Ill. (DATUM: 717.76 ft above NGVD of 1929)	05539900	Stage	01/01/2007–09/30/2013	4990 ELEV.
			Discharge	01/01/2007–09/30/2013	2990 FLOW.
B	Kress Creek at West Chicago, Ill. (DATUM: 700.00 ft above NGVD of 1929)	05540060	Stage	01/01/2007–09/30/2013	4060 ELEV.
			Discharge	01/01/2007–09/30/2013	2060 FLOW.
C	West Branch DuPage River near Warrenville, Ill. (DATUM: 688.59 ft above NGVD of 1929)	05540095	Stage	01/01/2007–09/30/2013	4950 ELEV.
			Discharge	01/01/2007–09/30/2013	2950 FLOW.
D	Spring Brook at 87th Street near Naperville, Ill. (DATUM: 647.00 ft above NGVD of 1929)	05540275	Stage	01/01/2007–09/30/2013	4750 ELEV.
			Discharge	01/01/2007–09/30/2013	2750 FLOW.
E	West Branch DuPage River near Naperville, Ill. (DATUM: 630.00 ft above NGVD of 1929)	05540130	Stage	01/01/2007–09/30/2013	4130 ELEV.
			Discharge	01/01/2007–09/30/2013	2130 FLOW.

Summary

The U.S. Geological Survey (USGS), in cooperation with DuPage County Stormwater Management Department, maintains a database of hourly meteorological and hydrologic data for use in a near real-time streamflow simulation system. This system is used in the management and operation of reservoirs and other flood-control structures in the West Branch DuPage River watershed in DuPage County, Illinois. The precipitation data are from a network of real-time tipping-bucket rain gages maintained by the USGS and DuPage County. The other meteorological data (air temperature, dewpoint temperature, wind speed, and solar radiation) are collected at the Argonne National Laboratory located in Argonne, Ill. Potential evapotranspiration is computed from the meteorological data. The water-surface elevation (stage) and discharge data for the West Branch DuPage River are collected by the USGS at five streamgages.

This database is updated annually with quality-assured and quality-controlled (QA/QC) data. A version of the database, WBDR13.WDM that contains QA/QC data from January 1, 2007, through September 30, 2013, is described in this report. As part of the QA/QC process, the precipitation datasets in WBDR13.WDM were filled when data were missing and estimated during periods of snowfall at unheated rain gages. The missing data were most often filled with data from a nearby rain gage. Periods of snowfall were flagged "e" in the USGS Annual Water Data Reports by using records from heated gages and air temperature data obtained from the National Climatic Data Center for the nearby weather observation stations. The weather observation station is chosen by the hydrographer working on this record. The missing air temperature, dewpoint temperature, wind speed, and solar radiation data are filled from weather observation stations at St. Charles, Ill., and O'Hare Airport, Chicago, Ill.

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Appendix 1. Dataset Attributes for the WBDR13.WDM Watershed Data Management Database

More information about these Watershed Data Management database attributes can be found in the following reference:

Flynn, K.M., Hummel, P.R., Lumb, A.M., and Kittle, J.L., Jr., 1995, User's manual for ANNIE, version 2, a computer program for interactive hydrologic data management: U.S. Geological Survey Water-Resources Investigations Report 95–4085, 211 p. (Also available at https://pubs.usgs.gov/wri/1995/4085/report.pdf.)

Table 1–1. Detail dataset attributes for the WBDR13.WDM Watershed Data Management database.

Attribute	Detail description
DATCRE	Date the dataset was created (year, month, day, hour, and minute).
DATMOD	Date the dataset was modified (year, month, day, hour, and minute).
TSTYPE	Category of data; PREC, EVAP, WIND, ELEV, FLOW, etc.
TGROUP	Manner in which data are grouped in database. 6 YEARS 5 MONTHS Affects the speed of data access.
COMPFG	1 No compression. 2 Compression—Should be used for precipitation data.
TSFORM	Manner in which the data are assigned to the time step. 1 MEAN. 2 TOTAL. 3 INSTANTANEOUS AT END OF TIME STEP.
TCODE	Time step of the data. Generally, the same as Time Units. 1 SECONDS. 2 MINUTES. 3 HOURS. 4 DAYS. 5 MONTHS. 6 YEARS.
TSTEP	1 Time step in TCODE units.
VBTIME	1 Time step is constant.
TSBYR	Base year—Dataset can extend 100 years beyond the base year.
UNITS	Units used.
IDSCEN	Scenario identification; ‘OBSERVED’ is used for observed data.
IDCONS	FLOW, ELEV, PREC, and others. Generally, the same as TSTYPE.
IDLOCN	Location identifier; This corresponds to the location of the gage. Dataset 1 does not have a location associated with it and is assigned <UNK> for unknown.
ISTAID	Station identification number, as an integer, usually the gage number.
STAID	Station identification number, up to 16 alpha-numeric characters, usually the gage number.
STANAM	Station name and/or description of the data set including the units used. The maximum width is 48 characters.
TSFILL	Time-series filler value. This value will be used for missing values. The default is 0.0. For Stage data series it is Datum plus -99.9; -99.9 for streamflow data series; -99.0, -99.9, and -9990.0 for the missing values for the precipitation time series.

Attributes of DSN 1

DATCRE	20090921152328
DATMOD	20090921152328
TSTYPE	ELEV
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	2000
IDSCEN	OBSERVED
IDCONS	ELEV
IDLOCN	<UNK>
STANAM	dummy datum (600ft)

Attributes of DSN 107

DATCRE	20030407115257
DATMOD	20141202030308
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	ARGONNE
STANAM	TIPPING BUCKET PREC (.01 in.) at ARGONNE
UNITS	in.
STAID	ARGONNE

Attributes of DSN 131

DATCRE	20090929121726
DATMOD	20151216155516
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	31
STANAM	NAPERVILLE MUNI BLDG AT NAPERVILLE, Ill (.01 in.)
UNITS	in.
STAID	414613088091000

Attributes of DSN 133

DATCRE	20090929122247
DATMOD	20151216155516
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	33
STANAM	WHEATON WATER DEPT AT WHEATON, Ill (.01 in.)
UNITS	in.
STAID	415300088054600

Attributes of DSN 134

DATCRE	20090929122236
DATMOD	20151216155516
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	34
STANAM	WHEATON SEWER DEPT. AT WHEATON, Ill (0.01 in.)
UNITS	in.
STAID	415125088045700

Attributes of DSN 144

DATCRE	20090929121726
DATMOD	20151216155517
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	44
STANAM	CAROL STREAM WWTF AT CAROL STREAM, Ill (.01 in.)
UNITS	in.
STAID	41523088081500

Attributes of DSN 140

DATCRE	20060413161217
DATMOD	20151216155517
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	40
STANAM	BARTLETT WWTF NEAR BARTLETT, Ill. (.01 in.)
UNITS	in.
STAID	415801088095700

Attributes of DSN 166

DATCRE	20090929121726
DATMOD	20151216155517
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	66
STANAM	BLACKWELL FP NEAR WARRENVILLE, Ill (.01 in.)
UNITS	in.
STAID	415037088110600

Attributes of DSN 189

DATCRE	20090929122334
DATMOD	20151216155517
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	89
STANAM	KRESS CREEK AT WEST CHICAGO, Ill (.01 in.)
UNIT	in.
STAID	05540060

Attributes of DSN 190

DATCRE	20090929122334
DATMOD	20151216155517
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	PREC
IDLOCN	90
STANAM	WBDR NEAR NAPERVILLE, Ill (.01 in.)
UNITS	in.
STAID	05540130

Attributes of DSN 207

DATCRE	20080331131133
DATMOD	20151215164443
TSTYPE	EVAP
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	COMPUTED
IDCONS	EVAP
IDLOCN	ARGONNE
STANAM	COMPUTED EVAP-UNADJUSTED WIND (0.001 in.)
UNITS	in.

Attributes of DSN 307

DATCRE	20080215125938
DATMOD	20151215164443
TSTYPE	WIND
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	OBSERVED
IDCONS	WIND
IDLOCN	ARGONNE
STANAM	UNADJUSTED HOURLY WIND SPEED (miles/hr.) at ARGONNE
TSFILL	-99.9
UNITS	mi
STAID	ARGONNE

Attributes of DSN 310

DATCRE	20111117113827
DATMOD	20151123153620
TSTYPE	WIND
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	FLAG
IDCONS	WIND
IDLOCN	ARGONNE
STANAM	HOURLY WIND FLAG
TSFILL	-99.9
STAID	ARGONNE

Attributes of DSN 410

DATCRE	20111117113427
DATMOD	20151123153620
TSTYPE	TEMP
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	FLAG
IDCONS	TEMP
IDLOCN	ARGONNE
STANAM	HOURLY AIR TEMP FLAG
TSFILL	-99.9
STAID	ARGONNE

Attributes of DSN 407

DATCRE	20080215113040
DATMOD	20151215164443
TSTYPE	TEMP
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	OBSERVED
IDCONS	TEMP
IDLOCN	ARGONNE
STANAM	HOURLY AIR TEMP (deg F) at ARGONNE
TSFILL	-99.9
UNITS	deg F
STAID	ARGONNE

Attributes of DSN 507

DATCRE	20080215122708
DATMOD	20151215164443
TSTYPE	DEWP
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	OBSERVED
IDCONS	DEWP
IDLOCN	ARGONNE
STANAM	HOURLY DEWPOINT TEMP (deg F) at ARGONNE
TSFILL	-99.9
UNITS	deg F
STAID	ARGONNE

Attributes of DSN 510

DATCRE	20111117113606
DATMOD	20151123153620
TSTYPE	DEWP
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	FLAG
IDCONS	DEWP
IDLOCN	ARGONNE
STANAM	HOURLY DEWPOINT TEMP FLAG
TSFILL	-99.9
STAID	ARGONNE

Attributes of DSN 610

DATCRE	20080215143429
DATMOD	20151123153620
TSTYPE	SRAD
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	FLAG
IDCONS	SRAD
IDLOCN	ARGONNE
STANAM	HOURLY SOLAR RADIATION FLAG
TSFILL	-99.9
STAID	ARGONNE

Attributes of DSN 607

DATCRE	20080215124924
DATMOD	20151215164443
TSTYPE	SRAD
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1940
IDSCEN	OBSERVED
IDCONS	SRAD
IDLOCN	ARGONNE
STANAM	HOURLY SOLAR RADIATION (LANGLEYS) at ARGONNE
TSFILL	-99.9
UNITS	LANGLEYS
STAID	ARGONNE

Attributes of DSN 801

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	801
STANAM	NEXRAD HOURLY AVG FOR WBDR MAIN-STEM (UPPER) INCLUDING TRIB 2
ISTAID	801
UNITS	in.
TSFILL	-99.9
STAID	801

Attributes of DSN 802

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	802
STANAM	NEXRAD HOURLY AVG FOR WBDR TRIB1
ISTAID	802
UNITS	in.
TSFILL	-99.9
STAID	802

Attributes of DSN 803

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	803
STANAM	NEXRAD HOURLY AVG FOR WBDR TRIB 4
ISTAID	803
UNITS	in.
TSFILL	-99.9
STAID	803

Attributes of DSN 804

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	804
STANAM	NEXRAD HOURLY AVG FOR WBDR MAINSTEM (MID)
ISTAID	804
UNITS	in.
TSFILL	-99.9
STAID	804

Attributes of DSN 805

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	805
STANAM	NEXRAD HOURLY AVG FOR KLEIN CREEK
ISTAID	805
UNITS	in.
TSFILL	-99.9
STAID	805

Attributes of DSN 806

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	806
STANAM	NEXRAD HOURLY AVG FOR WINFIELD CREEK
ISTAID	806
UNITS	in.
TSFILL	-99.9
STAID	806

Attributes of DSN 807

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	807
STANAM	NEXRAD HOURLY AVG FOR KRESS CREEK
ISTAID	807
UNITS	in.
TSFILL	-99.9
STAID	807

Attributes of DSN 808

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	808
STANAM	NEXRAD HOURLY AVG FOR SPRINGBROOK 1
ISTAID	808
STAID	808
UNITS	in.
TSFILL	-99.9

Attributes of DSN 809

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	809
STANAM	NEXRAD HOURLY AVG FOR FERRY CREEK
ISTAID	809
UNITS	in.
TSFILL	-99.9
STAID	809

Attributes of DSN 810

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	810
STANAM	NEXRAD HOURLY AVG FOR STEEPLE RUN
ISTAID	810
UNITS	in.
TSFILL	-99.9
STAID	810

Attributes of DSN 811

DATCRE	20030501144051
DATMOD	20141202030316
TSTYPE	PREC
TGROUP	6
COMPFG	1
TSFORM	2
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	NEXRAD
IDCONS	PREC
IDLOCN	811
STANAM	NEXRAD HOURLY AVG FOR WBDR MAIN-STEM (LOWER) INCLUDING CRESS CREEK
ISTAID	811
UNITS	in.
TSFILL	-99.9
STAID	811

Attributes of DSN 2060

DATCRE	20090930093045
DATMOD	20151218142539
TSTYPE	FLOW
TGROUP	6
COMPFG	1
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	FLOW
IDLOCN	05540060
STANAM	KRESS CREEK AT WEST CHICAGO, Ill (cfs)
STAID	05540060
UNITS	ft^3/s.

Attributes of DSN 2130

DATCRE	20090930093033
DATMOD	20151218142539
TSTYPE	FLOW
TGROUP	6
COMPFG	1
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	FLOW
IDLOCN	05540130
STANAM	WBDR NEAR NAPERVILLE, Ill (cfs)
STAID	05540130
UNITS	ft^3/s.

Attributes of DSN 2750

DATCRE	20090930093108
DATMOD	20151218142539
TSTYPE	FLOW
TGROUP	6
COMPFG	1
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	FLOW
IDLOCN	05540275
STANAM	SPRINGBROOK AT 87TH ST. NEAR NAPERVILLE, Ill (cfs)
STAID	05540275
UNITS	ft^3/s.

Attributes of DSN 2990

DATCRE	20090930093024
DATMOD	20151218142539
TSTYPE	FLOW
TGROUP	6
COMPFG	1
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	FLOW
IDLOCN	05539900
STANAM	WBDR NEAR WEST CHICAGO, Ill (cfs)
STAID	05539900
UNITS	ft^3/s.

Attributes of DSN 2950

DATCRE	20090930093100
DATMOD	20151218142539
TSTYPE	FLOW
TGROUP	6
COMPFG	1
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	FLOW
IDLOCN	05540095
STANAM	WBDR NEAR WARRENVILLE, Ill (cfs)
STAID	05540095
UNITS	ft^3/s.

Attributes of DSN 4031

DATCRE	20100219143213
DATMOD	20141202030311
TSTYPE	ELEV
TGROUP	6
COMPFG	1
TSFORM	1
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	2000
IDSCEN	OBSERVED
IDCONS	ELEV
IDLOCN	D31
STANAM	FAWELL DAM IN WBDR WATERSHED (ft.)
STAID	D31
UNITS:	ft

Attributes of DSN 4130

DATCRE	20090930093129
DATMOD	20151218142538
TSTYPE	ELEV
TGROUP	6
COMPFG	2
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	ELEV
IDLOCN	05540130
STANAM	WBDR NEAR NAPERVILLE (ft.)
STAID	05540130
UNITS	ft.

Attributes of DSN 4060

DATCRE	20100219143213
DATMOD	20151218142539
TSTYPE	ELEV
TGROUP	6
COMPFG	2
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	2000
IDSCEN	OBSERVED
IDCONS	ELEV
IDLOCN	05540060
STANAM	KRESS CREEK AT WEST CHICAGO, Ill (ft.)
STAID	05540060
UNITS	ft.

Attributes of DSN 4750

DATCRE	20090930093204
DATMOD	20151218142539
TSTYPE	ELEV
TGROUP	6
COMPFG	2
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	ELEV
IDLOCN	05540275
STANAM	SPRING BROOK AT 87TH ST (ft.)
STAID	05540275
UNITS	ft.

Attributes of DSN 4950

DATCRE	20090930093154
DATMOD	20151218151619
TSTYPE	ELEV
TGROUP	6
COMPFG	2
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	ELEV
IDLOCN	05540095
STANAM	WARRENVILLE, Ill (ft.)
STAID	05540095
UNITS	ft.

Attributes of DSN 4990

DATCRE	20090930093121
DATMOD	20151218142538
TSTYPE	ELEV
TGROUP	6
COMPFG	2
TSFORM	3
TCODE	3
TSSTEP	1
VBTIME	1
TSBYR	1990
IDSCEN	OBSERVED
IDCONS	ELEV
IDLOCN	05539900
STANAM	WBDR NEAR WEST CHICAGO, Ill (ft.)
STAID	05539900
UNITS	ft.

Attributes of DSN 6207

DATCRE	20130215131607
DATMOD	20130215132412
TSTYPE	PERO
STAID	05551700
STANAM	FLAT GRASS RUNOFF (IN/HOUR*SQ MI)
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDSCEN	COMPUTED
IDLOCN	GENERIC
IDCONS	ERO
TSFILL	-99.9
ISTAID	5551700

Attributes of DSN 6307

DATCRE	20130215131736
DATMOD	20130215132412
TSTYPE	PERO
STAID	05551700
STANAM	MODERATE GRASS RUNOFF (IN/HOUR*SQ MI)
TCODE	3
TGROU	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDSCEN	COMPUTED
IDLOCN	GENERIC
IDCONS	PERO
TSFILL	-99.9
ISTAID	5551700

Attributes of DSN 6407

DATCRE	20130215131501
DATMOD	20130215132412
TSTYPE	PERO
STAID	05551700
STANAM	STEEP GRASS RUNOFF (IN/HOUR*SQ MI)
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDSCEN	COMPUTED
IDLOCN	GENERIC
IDCONS	PERO
TSFILL	-99.9

Attributes of DSN 6607

DATCRE	20130215131607
DATMOD	20130215132412
TSTYPE	PERO
STAID	05551700
STANAM	AGRICULTURE RUNOFF (IN/HOUR*SQ MI)
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDSCEN	COMPUTED
IDLOCN	GENERIC
IDCONS	PERO
TSFILL	-99.9

Attributes of DSN 6507

DATCRE	20130215131325
DATMOD	20130215132412
TSTYPE	PERO
STAID	05551700
STANAM	FOREST RUNOFF (IN/HOUR*SQ MI)
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDSCEN	COMPUTED
IDLOCN	GENERIC
IDCONS	PERO
TSFILL	-99.9

Attributes of DSN 7012

DATCRE	20130215133257
DATMOD	20130215133358
TSTYPE	SURO
STAID	05551700
STANAM	SURFACE OUTFLOW (IN/HR*SQ MI)
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
IDCONS	SURO
TSFILL	-99.9

Attributes of DSN 7013

DATCRE	20130215133257
DATMOD	20130215133358
TSTYPE	IFWO
STAID	05551700
STANAM	INTERFLOW OUTFLOW (IN/HR *SQ MI)
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
IDCONS	IFWO
TSFILL	-99.9

Attributes of DSN 7014

DATCRE	20130215134119
DATMOD	20130215134626
TSTYPE	PET
STAID	05551700
STANAM	PET (IN/DAY*SQ MI)
TCODE	4
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
IDCONS	PET
TSFILL	-99.9

Attributes of DSN 7015

DATCRE	20130215135259
DATMOD	20130215135509
TSTYPE	TAET
STAID	05551700
STANAM	SIMULATED ET (IN/DAY*SQ MI)
TCODE	4
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
IDCONS	TAET
TSFILL	-99.9

Attributes of DSN 7016

DATCRE	20130215134924
DATMOD	20130215135202
TSTYPE	UZS
STAID	05551700
STANAM	UPPER ZONE STORAGE (IN*SQ MI)
TCODE	4
TGROUP	6
TSFORM	1
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
IDCONS	UZS
TSFILL	-99.9

Attributes of DSN 7017

DATCRE	20130215135702
DATMOD	20130215135737
TSTYPE	LZS
STAID	05551700
STANAM	LOWER ZONE STORAGE (IN*SQ MI)
TCODE	4
TGROUP	6
TSFORM	1
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
IDCONS	LZS
TSFILL	-99.9

Attributes of DSN 7119

DATCRE	20130215132902
DATMOD	20130215133142
TSTYPE	SNOW
STAID	05551700
STANAM	SIMULATED SNOW DEPTH (in.)
TCODE	3
TGROUP	6
TSFORM	1
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
IDCONS	SNOW
TSFILL	-99.9

Attributes of DSN 7018

DATCRE	20130215133257
DATMOD	20130215133358
TSTYPE	AGWS
STAID	05551700
STANAM	GW STORAGE AT START (in.)
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDLOCN	GENERIC
IDSCEN	COMPUTED
DCONS :	AGWS

Attributes of DSN 6107

DATCRE	20130215131736
DATMOD	20130215132412
TSTYPE	ISUR
STAID	05551700
STANAM	IMPERVIOUS RUNOFF
TCODE	3
TGROUP	6
TSFORM	2
VBTIME	1
COMPFG	1
TSSTEP	1
TSBYR	2000
IDSCEN	COMPUTED
IDLOCN	GENERIC
IDCONS	ISUR
ISTAID	5551700
TSFILL	-99.9

Appendix 2. Descriptions of Missing Data Periods and Estimated Days in the Precipitation, Stage, and Discharge Data in the WBDR13.WDM Watershed Data Management Database

Table 2–1. Missing data periods for real-time network of rain gages along West Branch DuPage River in and near DuPage County, Illinois, January 1, 2007, through September 30, 2013, in the WBDR13.WDM Watershed Data Management database.

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; site numbers correspond to figure 1; DSN, dataset number; Ill., Illinois; WWTF, wastewater treatment facility; Do., ditto]

Station data used to fill missing period (site number)	Missing data period (month/day/year)
Naperville Municipal Building at Naperville, Ill. (Site 31; DSN 131)	
Blackwell Forest Preserve near Warrenville, Ill. (Site 66)	01/26/2012
Wheaton Water Department at Wheaton, Ill. (Site 33; DSN 133)	
Wheaton Sewer Department at Wheaton, Ill. (Site 34)	03/14/2008–03/20/2008
	06/15/2008–06/17/2008
	11/04/2010–12/07/2010
	05/08/2012–08/01/2012
Wheaton Sewer Department at Wheaton, Ill. (Site 34; DSN 134)	
Wheaton Water Department at Wheaton, Ill. (Site 33)	03/15/2009–03/17/2009
	04/16/2009–04/18/2009
	05/19/2009–05/23/2009
	06/23/2009–06/25/09
	07/01/2009–07/03/09
	07/21/2009–08/16/09
	08/18/2009–08/19/09
	08/21/2009–08/24/09
	08/26/2009–08/27/09
	08/29/2009–11/23/09
	07/21/2013–08/22/13
Bartlett WWTF near Bartlett, Ill. (Site 40; DSN 140)	
Bloomingdale Lift Station at Bloomingdale, Ill. (Site 23)	08/25/2007–10/01/2007
Spring Creek Reservoir near Bloomingdale, Ill. (Site 50)	10/02/2007–11/04/2007
Do.	12/01/2009–12/23/2010
Bloomingdale Lift Station at Bloomingdale, Ill. (Site 23)	12/24/2009–12/25/2009
Spring Creek Reservoir near Bloomingdale, Ill. (Site 50)	12/26/2009–02/22/2010
Do.	05/21/2011–06/07/2011
Wood Dale WWTF at Wood Dale, Ill. (Site 29)	08/19/2011–09/08/2011
Spring Creek Reservoir near Bloomingdale, Ill. (Site 50)	09/09/2011–09/26/2011
Do.	11/09/2011–12/02/2011
Carol Stream WWTF at Carol Stream, Ill. (Site 44; DSN 144)	
Wheaton Water Department at Wheaton, Ill. (Site 33)	08/05/2009–08/09/2009
	09/11/2009–09/13/2009
	10/01/2009–11/23/2009
	11/09/2011–01/19/2012

Table 2–1. Missing data periods for real-time network of rain gages along West Branch DuPage River in and near DuPage County, Illinois, January 1, 2007, through September 30, 2013, in the WBDR13.WDM Watershed Data Management database.—Continued

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; site numbers correspond to figure 1; DSN, dataset number; Ill., Illinois; WWTF, wastewater treatment facility; Do., ditto]

Station data used to fill missing period (site number)	Missing data period (month/day/year)
Blackwell Forest Preserve near Warrenville, Ill. (Site 66; DSN 166)	
Wheaton Sewer Department at Wheaton, Ill. (Site 34)	08/24/2007–11/17/2007
Do.	03/14/2008–03/20/2008
Wheaton Water Department at Wheaton, Ill. (Site 33)	08/01/2009–11/23/2009
Wheaton Sewer Department at Wheaton, Ill. (Site 34)	10/24/2010–08/18/2011
Do.	12/21/2012–01/27/2013
Do.	08/28/2013–09/30/2013
Kress Creek at West Chicago, Ill. (Site 89; DSN 189)	
Blackwell Forest Preserve near Warrenville, Ill. (Site 66)	01/01/2009–01/02/2009
Wheaton Sewer Department at (Site 34)	01/01/2011–04/05/2011
Do.	04/28/2011–09/30/2011
Do.	10/01/2011–02/21/2012
Do.	06/19/2012
West Branch DuPage River near Naperville, Ill. (USGS gage 05540130; DSN 190)	
Naperville Municipal Building. at Naperville, Ill. (Site 31)	02/03/2008–02/06/2008
	06/13/2008–10/28/2008
	11/04/2008
	12/10/0208–12/11/2008
	12/13/2008–12/14/2008
	12/17/2008
	12/19/2008–12/22/2008
	12/24/2008–12/26/2008
	12/28/2008
	01/01/2009
	01/03/2009–01/04/2009
	01/07/2009
	01/09/2009–01/14/2009
	01/16/2009–02/03/2009
	02/05/2009–02/12/2009
	02/15/2009
	02/22/2009
	02/24/2009
	03/01/2009–07/05/2009
	07/07/2009
	07/09/2009

Table 2–1. Missing data periods for real-time network of rain gages along West Branch DuPage River in and near DuPage County, Illinois, January 1, 2007, through September 30, 2013, in the WBDR13.WDM Watershed Data Management database.—Continued

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; site numbers correspond to figure 1; DSN, dataset number; Ill., Illinois; WWTF, wastewater treatment facility; Do., ditto]

Station data used to fill missing period (site number)	Missing data period (month/day/year)
West Branch DuPage River near Naperville, Ill. (USGS gage 05540130; DSN 190)—Continued	
Naperville Municipal Building. at Naperville, Ill. (Site 31)—Continued	07/12/2009
	07/26/2009
	07/28/2009
	08/02/2009–08/18/2009
	08/22/2009–08/26/2009
	08/28/2009–09/30/2009
	10/01/2009–06/28/2010
	10/16/2010–02/18/2011
	06/07/2011–06/14/2011
	09/20/2011–09/30/2011
	10/01/2011–11/10/2011
	12/08/2011–02/02/2012
	05/06/2012–05/15/2012
	10/24/2012–11/14/2012
	12/08/2011–02/02/2012
	05/06/2012–05/15/2012
	10/24/2012–11/14/2012

Table 2–2. Snowfall-affected periods for real-time network of rain gages along West Branch DuPage River, in and near DuPage County, Illinois, stored in the WBDR13.WDM Watershed Data Management database, January 1, 2007–September 30, 2013.

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; site numbers correspond to figure 1; Ill., Illinois; DSN, dataset number; WWTF, wastewater treatment facility]

Snow-affected periods (month/day/year) for Naperville Municipal Building at Naperville, Ill. (Site 31; DSN 131)		
01/06/2007–01/07/2007	12/10/2010–12/11/2010	02/07/2012–02/08/2012
01/14/2007–01/15/2007	12/20/2010	02/10/2012–02/11/2012
01/21/2007	12/24/2010–12/26/2010	02/13/2012–02/13/2012
02/12/2007–02/13/2007	12/29/2010–12/30/2010	02/20/2012–02/21/2012
02/17/2007	01/11/2011–01/12/2011	02/23/2012–02/24/2012
02/24/2007–02/25/2007	01/22/2011	12/26/2012–12/29/2012
03/09/2007	01/24/2011	01/20/2013–01/21/2013
12/03/2009–12/10/2009	01/27/2011–01/29/2011	01/23/2013–01/25/2013
12/18/2009–12/28/2009	02/01/2011–02/02/2011	01/30/2013–02/10/2013
12/30/2009–12/31/2009	02/06/2011	02/18/2013–02/19/2013
01/06/2010–01/08/2010	02/08/2011	02/21/2013–03/02/2013
01/10/2010–01/12/2010	02/12/2011	03/04/2013–03/08/2013
01/14/2010–01/21/2010	02/15/2011	03/11/2013–03/12/2013
01/24/2010–01/28/2010	02/22/2011–02/28/2011	03/18/2013–03/21/2013
02/01/2010–02/03/2010	03/06/2011	
02/05/2010–02/06/2010	11/09/2011–11/10/2011	
02/08/2010–02/10/2010	11/27/2011–11/28/2011	
02/15/2010–02/16/2010	12/08/2011–12/09/2011	
02/19/2010–02/28/2010	12/16/2011–12/17/2011	
03/01/2010	01/12/2012–01/12/2012	
03/19/2010–03/21/2010	01/18/2012–01/22/2012	
12/04/2010–12/05/2010	01/27/2012–01/28/2012	
Snow-affected periods (month/day/year) for Wheaton Water Department at Wheaton, Ill. (Site 33; DSN 133)		
01/06/2007–01/07/2007	01/20/2010–01/21/2010	02/01/2011–02/02/2011
01/14/2007–01/15/2007	01/25/2010–02/12/2010	02/06/2011–02/08/2011
01/18/2007–01/19/2007	02/15/2010–02/16/2010	02/11/2011–02/12/2011
01/21/2007	02/19/2010–03/03/2010	02/20/2011–02/23/2011
02/06/2007	03/19/2010–03/21/2010	02/25/2011–02/28/2011
02/12/2007–02/13/2007	04/08/2010–04/09/2010	03/05/2011
02/17/2007	12/09/2010	03/10/2011
02/24/2007–02/26/2007	12/11/2010–12/13/2010	03/24/2011–03/26/2011
02/28/2007	12/16/2010	04/16/2011–04/18/2011
03/03/2007	12/20/2010–12/22/2010	
03/06/2007	12/24/2010–12/26/2010	
03/09/2007	12/29/2010–12/30/2010	
11/25/2009–11/27/2009	01/01/2011	
12/03/2009–12/10/2009	01/05/2011–01/08/2011	
12/12/2009–12/13/2009	01/11/2011–01/20/2011	
12/17/2009–01/18/2010	01/22/2011–01/31/2011	

Table 2–2. Snowfall-affected periods for real-time network of rain gages along West Branch DuPage River, in and near DuPage County, Illinois, stored in the WBDR13.WDM Watershed Data Management database, January 1, 2007–September 30, 2013.—Continued

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; site numbers correspond to figure 1; Ill., Illinois; DSN, dataset number; WWTF, wastewater treatment facility]

Snow-affected periods (month/day/year) for Wheaton Sewer Department at Wheaton, Ill. (Site 34; DSN 134)			
01/06/2007–01/07/2007	03/19/2010–03/21/2010	02/20/2011–02/23/2011	01/23/2013–01/25/2013
01/14/2007–01/15/2007	04/08/2010–04/09/2010	02/25/2011–02/28/2011	01/27/2013
01/21/2007	11/24/2010	03/05/2011	01/30/2013–02/05/2013
02/06/2007	11/30/2010	03/10/2011	02/04/2013–02/08/2013
02/12/2007–02/13/2007	12/01/2010	03/23/2011–03/25/2011	02/11/2013
02/17/2007	12/03/2010–12/06/2010	04/16/2011	02/15/2013–02/16/2013
02/24/2007–02/25/2007	12/09/2010	04/18/2011	02/18/2013–02/19/2013
03/06/2007	12/11/2010–12/13/2010	11/12/2012	02/21/2013–02/23/2013
03/09/2007	12/16/2010	11/23/2012	02/26/2013–03/02/2013
11/25/2009–11/26/2009	12/20/2010–12/22/2010	12/09/2012–12/11/2012	03/04/2013–03/06/2013
12/03/2009–12/10/2009	12/24/2010–12/26/2010	12/15/2012	03/06/2013
12/12/2009–12/13/2009	01/01/2011	12/20/2012–12/21/2012	03/11/2013–03/14/2013
12/17/2009–01/12/2010	01/05/2011–01/08/2011	12/24/2012–12/29/2012	03/16/2013
01/15/2010–01/18/2010	01/11/2011–01/20/2011	01/03/2013	03/15/2013–03/20/2013
01/20/2010–01/21/2010	01/22/2011–01/31/2011	01/05/2013	03/24/2013–03/25/2013
01/24/2010–02/12/2010	02/01/2011–02/02/2011	01/12/2013–01/13/2013	
02/15/2010–02/16/2010	02/06/2011–02/08/2011	01/16/2013	
02/19/2010–03/03/2010	02/11/2011–02/12/2011	01/21/2013	
Snow-affected periods (month/day/year) for Bartlett WWTF near Bartlett, Ill. (Site 40; DSN 140)			
01/06/2007–01/07/2007	01/17/2008–01/27/2008	03/29/2009	01/18/2012–01/22/2012
01/14/2007–01/16/2007	01/29/2008–02/03/2008	11/25/2009–11/26/2009	01/27/2012–01/29/2012
01/19/2007–01/20/2007	02/05/2008–02/13/2008	02/23/2010–02/27/2010	02/07/2012–02/08/2012
01/22/2007	02/15/2008	03/19/2010–03/21/2010	02/10/2012–02/11/2012
02/12/2007	02/18/2008–02/22/2008	12/04/2010–12/05/2010	02/13/2012–02/15/2012
02/14/2007	02/25/2008–02/29/2008	12/10/2010–12/11/2010	02/20/2012–02/21/2012
02/17/2007	03/04/2008	12/20/2010–12/21/2010	02/23/2012–02/24/2012
02/25/2007–02/26/2007	03/06/2008–03/10/2008	12/24/2010–12/26/2010	02/26/2012
02/28/2007	03/21/2008–03/22/2008	12/29/2010	12/26/2012–12/29/2012
03/03/2007	03/27/2008	01/11/2011–01/12/2011	01/30/2013–02/04/2013
03/07/2007	11/24/2008	01/22/2011–01/24/2011	02/06/2013–02/09/2013
03/09/2007	11/30/2008	01/27/2011–01/28/2011	02/18/2013–02/19/2013
11/21/2007–11/22/2007	12/03/2008–12/04/2008	02/01/2011–02/02/2011	02/21/2013–02/22/2013
12/01/2007	12/09/2008–12/10/2008	02/06/2011	02/24/2013
12/04/2007–12/10/2007	12/18/2008	02/08/2011	02/26/2013–03/02/2013
12/15/2007–12/18/2007	12/24/2008–12/25/2008	02/22/2011–02/26/2011	03/04/2013–03/08/2013
12/23/2007–12/24/2007	01/22/2009	02/28/2011	03/11/2013–03/12/2013
12/28/2007	01/28/2009	03/06/2011	03/18/2013–03/21/2013
12/30/2007–01/02/2008	02/14/2009	12/08/2011–12/09/2011	
01/04/2008	02/18/2009	12/16/2011–12/17/2011	
01/14/2008–01/15/2008	02/22/2009	01/12/2012–01/13/2012	

Table 2–2. Snowfall-affected periods for real-time network of rain gages along West Branch DuPage River, in and near DuPage County, Illinois, stored in the WBDR13.WDM Watershed Data Management database, January 1, 2007–September 30, 2013.—Continued

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; site numbers correspond to figure 1; Ill., Illinois; DSN, dataset number; WWTF, wastewater treatment facility]

Snow-affected periods (month/day/year) for Carol Stream WWTF at Carol Stream, Ill. (Site 44; DSN 144)			
01/06/2007–01/07/2007	02/01/2008	12/18/2009–01/12/2010	03/06/2011
01/14/2007–01/15/2007	02/04/2008	01/15/2010–01/18/2010	01/20/2012–01/21/2012
01/20/2007	02/07/2008–02/08/2008	01/20/2010–01/21/2010	01/27/2012–01/28/2012
01/22/2007	02/12/2008–02/14/2008	01/24/2010–02/12/2010	02/07/2012–02/08/2012
01/26/2007	02/20/2008	02/15/2010–02/16/2010	02/10/2012–02/11/2012
02/17/2007	02/22/2008	02/19/2010–02/28/2010	02/13/2012–02/14/2012
02/25/2007–02/28/2007	02/26/2008–02/29/2008	03/01/2010–03/03/2010	02/20/2012–02/21/2012
03/02/2007	03/21/2008–03/22/2008	03/19/2010–03/21/2010	02/23/2012–02/24/2012
03/07/2007	03/28/2008	04/08/2010–04/09/2010	12/26/2012–12/29/2012
03/09/2007	12/08/2008	12/04/2010–12/05/2010	01/20/2013–01/21/2013
03/11/2007	12/10/2008	12/10/2010–12/11/2010	01/23/2013–01/26/2013
12/05/2007	12/13/2008	12/20/2010–12/22/2010	01/30/2013–02/04/2013
12/07/2007	12/18/2008	12/24/2010–12/26/2010	02/06/2013–02/08/2013
12/09/2007–12/10/2007	12/20/2008	12/29/2010–12/30/2010	02/18/2013–02/19/2013
12/18/2007	12/24/2008	01/11/2011–01/12/2011	02/21/2013–02/22/2013
12/29/2007	12/31/2008	01/22/2011	02/24/2013
12/31/2007–01/02/2008	01/22/2009	01/24/2011	02/26/2013–03/02/2013
01/15/2008	02/23/2009–02/24/2009	01/27/2011–01/28/2011	03/04/2013–03/07/2013
01/18/2008–01/19/2008	03/29/2009	02/01/2011–02/02/2011	03/11/2013–03/12/2013
01/21/2008–01/22/2008	11/25/2009–11/27/2009	02/06/2011–02/08/2011	03/18/2013–03/21/2013
01/24/2008	12/03/2009–12/10/2009	02/22/2011–02/26/2011	
01/26/2008	12/12/2009–12/15/2009	02/28/2011	
Snow-affected periods (month/day/year) for Blackwell Forrest Preserve near Warrenville, Ill. (Site 66; DSN 166)			
01/06/2007–01/07/2007	01/26/2008	01/31/2009	12/08/2011–12/09/2011
01/14/2007–01/15/2007	02/01/2008	02/23/2009	12/16/2011–12/18/2011
01/20/2007	02/04/2008	03/29/2009	01/12/2012–01/13/2012
01/24/2007	02/07/2008–02/08/2008	12/03/2009–12/04/2009	01/18/2012–01/22/2012
01/26/2007	02/10/2008	12/06/2009–12/10/2009	01/27/2012–01/28/2012
02/25/2007–02/28/2007	02/12/2008–02/14/2008	12/18/2009–12/28/2009	02/07/2012–02/08/2012
03/09/2007–03/10/2007	02/16/2008	12/30/2009–12/31/2009	02/10/2012–02/11/2012
12/05/2007	02/20/2008	01/06/2010–01/08/2010	02/13/2012–02/14/2012
12/07/2007	02/22/2008	01/11/2010–01/12/2010	02/20/2012–02/21/2012
12/09/2007–12/10/2007	02/26/2008–02/27/2008	01/25/2010–01/30/2010	02/23/2012–02/24/2012
12/16/2007	02/29/2008	02/01/2010–02/03/2010	01/30/2013–02/04/2013
12/18/2007	03/21/2008–03/22/2008	02/05/2010–02/06/2010	02/06/2013–02/08/2013
12/29/2007	03/28/2008	02/08/2010–02/10/2010	02/18/2013–02/19/2013
12/31/2007–01/02/2008	12/01/2008	02/15/2010–02/16/2010	02/21/2013–02/22/2013
01/15/2008	12/08/2008	02/19/2010–02/27/2010	02/24/2013–03/02/2013
01/18/2008–01/19/2008	12/13/2008	03/19/2010–03/20/2010	03/04/2013–03/08/2013
01/21/2008–01/22/2008	12/24/2008	11/09/2011–11/10/2011	03/11/2013–03/12/2013
01/24/2008	01/22/2009	11/27/2011–11/28/2011	03/18/2013–03/21/2013

Table 2–2. Snowfall-affected periods for real-time network of rain gages along West Branch DuPage River, in and near DuPage County, Illinois, stored in the WBDR13.WDM Watershed Data Management database, January 1, 2007–September 30, 2013.—Continued

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; site numbers correspond to figure 1; Ill., Illinois; DSN, dataset number; WWTF, wastewater treatment facility]

Snow-affected periods (month/day/year) for Kress Creek at West Chicago, Ill. (Site 89; DSN 189)			
01/14/2007–01/22/2007	01/15/2008	01/07/2009–01/15/2009	02/28/2010
01/24/2007	01/17/2008–01/19/2008	01/28/2009	12/04/2010–12/05/2010
01/26/2007–01/27/2007	01/21/2008–01/22/2008	02/06/2009	12/10/2010–12/11/2010
01/29/2007	01/24/2008	02/14/2009	12/20/2010
01/31/2007	01/26/2008	02/17/2009	12/24/2010–12/26/2010
02/06/2007	01/28/2008–01/30/2008	02/19/2009	12/29/2010–12/31/2010
02/11/2007–02/14/2007	02/01/2008–02/02/2008	02/21/2009–02/22/2009	02/23/2012–02/24/2012
02/17/2007–02/19/2007	02/04/2008–02/09/2008	02/24/2009	12/26/2012–12/29/2012
02/25/2007–03/02/2007	02/12/2008–02/14/2008	03/30/2009	01/10/2013
12/02/2007–12/03/2007	02/20/2008	04/06/2009	01/20/2013–01/21/2013
12/05/2007	02/26/2008	12/06/2009–12/14/2009	01/23/2013–01/26/2013
12/07/2007	02/29/2008	12/18/2009–12/27/2009	01/30/2013–02/04/2013
12/10/2007	03/21/2008–03/23/2008	12/30/2009–01/01/2010	02/06/2013
12/15/2007–12/16/2007	11/17/2008	01/06/2010–01/08/2010	02/08/2013
12/18/2007–12/20/2007	11/24/2008	01/14/2010–01/15/2010	02/18/2013–02/19/2013
12/23/2007–12/24/2007	11/30/2008–12/03/2008	01/22/2010–01/28/2010	02/21/2013–02/22/2013
12/27/2007	12/06/2008–12/10/2008	02/01/2010–02/02/2010	02/24/2013
12/29/2007	12/13/2008–12/15/2008	02/05/2010–02/06/2010	02/26/2013–03/02/2013
12/31/2007–01/02/2008	12/17/2008	02/08/2010–02/10/2010	03/04/2013–03/12/2013
01/05/2008	12/19/2008–12/22/2008	02/15/2010–02/16/2010	03/18/2013–03/21/2013
01/10/2008	12/24/2008–12/27/2008	02/19/2010–02/25/2010	
Snow-affected periods (month/day/year) for West Branch DuPage River near Naperville, Ill. (Site 90; DSN 190)			
01/06/2007–01/07/2007	01/21/2008–01/23/2008	12/09/2008	12/26/2012–12/30/2012
01/13/2007–01/15/2007	01/25/2008	12/15/2008–12/16/2008	01/20/2013–01/21/2013
01/26/2007	01/29/2008	12/23/2008	01/23/2013–01/26/2013
02/13/2007–02/14/2007	01/31/2008–02/02/2008	01/06/2009	01/30/2013–01/31/2013
2/19/2007	02/07/2008–02/08/2008	02/13/2009–02/14/2009	02/01/2013–02/08/2013
02/24/2007–02/28/2007	02/11/2008–02/12/2008	02/18/2009	02/18/2013–02/19/2013
03/09/2007	02/18/2008–02/21/2008	02/21/2009	02/21/2013–02/24/2013
03/15/2007	02/25/2008–02/29/2008	02/22/2011–02/26/2011	02/26/2013–02/28/2013
12/01/2007	03/07/2008–03/08/2008	02/28/2011	03/01/2013–03/02/2013
12/03/2007–12/09/2007	03/10/2008	03/06/2011	03/04/2013–03/06/2013
12/15/2007–12/17/2007	03/21/2008–03/22/2008	11/27/2011–11/28/2011	03/11/2013–03/12/2013
12/23/2007–12/24/2007	03/27/2008	02/07/2012–02/08/2012	03/18/2013–03/21/2013
12/28/2007	11/16/2008–11/17/2008	02/10/2012–02/11/2012	04/19/2013–04/20/2013
12/30/2007–01/02/2008	11/30/2008–12/01/2008	02/13/2012–02/14/2012	
01/14/2008–01/15/2008	12/03/2008	02/20/2012–02/21/2012	
01/17/2008–01/18/2008	12/06/2008	02/23/2012–02/24/2012	

Table 2–3. Descriptions of estimated and missing days in river stage data from U.S. Geological Survey streamgages along the West Branch DuPage River in and near DuPage County, Illinois, stored in the WBDR13.WDM Watershed Data Management database, for January 1, 2007, through September 30, 2013.

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https//wdr.water.usgs.gov; Ill., Illinois DSN, dataset number]

Station name (site number)	Missing period (month/day/year)	Estimated period (month/day/year)
West Branch DuPage River near West Chicago, Ill. (USGS gage 05539900; DSN 4990)	05/02/2013 05/04/2013–05/06/2013	None.
West Branch DuPage River near Warrenville, Ill. (USGS gage 05540095; DSN 4950)	03/19/2010–03/23/2010 07/22/2010–07/23/2010 08/02/2010–08/03/2010 08/24/2010–08/26/2010 12/08/2010	None.
Spring Brook at 87th Street near Naperville, Ill. (USGS gage 05540275; DSN 4750)	10/02/2011–10/03/2011 10/05/2011–10/06/2011 11/10/2011 11/16/2011–11/17/2011 11/19/2011–11/20/2011	None.
West Branch DuPage River near Naperville, Ill. (USGS gage 05540130; DSN 4130)	12/23/2006–12/27/2006 02/04/2007–02/28/2007 08/22/2007–08/23/2007 12/06/2007–12/10/2007 12/16/2007–12/18/2007 01/01/2008–01/05/2008 01/15/2008–02/22/2008 12/05/2008–12/09/2008 12/11/2008–12/13/2008 12/15/2008–12/27/2008 12/31/2008–02/09/2009 02/19/2009–02/22/2009 03/02/2009–03/04/2009 10/01/2009	None.
Kress Creek at West Chicago, Ill. (USGS gage 05540060; DSN 4060)	12/30/2006–01/05/2007 02/03/2007–02/08/2007 03/01/2007–03/27/2007 05/18/2008–05/22/2008 12/30/2008–01/02/2009 05/12/2011–05/17/2011 05/21/2011–05/22/2011 06/11/2011–06/12/2011 06/26/2011–06/27/2011	05/18/2011–05/20/2011 05/23/2011–06/10/2011 06/13/2011–06/25/2011 06/28/2011–08/03/2011 08/06/2011–08/07/2011 05/25/2012–05/31/2012 07/01/2012–07/24/2012 09/06/2012–09/21/2012

Table 2–4. Descriptions of estimated and missing days in river discharge data from U.S. Geological Survey streamgages along the West Branch DuPage River, in and near DuPage County, Illinois, stored in the WBDR13.WDM Watershed Data Management database, for January 1, 2007, through September 30, 2013.

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https://wdr.water.usgs.gov; Ill., Illinois; DSN, dataset number]

Station name (site number)	Missing period (month/day/year)	Estimated period (month/day/year)
West Branch DuPage River near West Chicago, Ill. (USGS gage 05539900; DSN 2990)	None	02/01/2007–02/19/2007 01/04/2009–01/08/2009 01/15/2009–01/19/2009 01/22/2009–02/02/2009 12/12/2009–12/13/2009 01/02/2013 05/02/2013 05/04/2013–05/06/2013
West Branch DuPage River near Warrenville, Ill. (USGS gage 05540095; DSN 2950)	None	02/01/2007–02/19/2007 01/21/2008–01/26/2008 01/16/2009–01/20/2009 08/30/2009–09/19/2009 03/16/2010–03/23/2010 06/30/2010–07/24/2010 08/02/2010–08/03/2010 08/24/2010–08/26/2010 12/08/2010 06/28/2011–07/21/2011 07/25/2012–08/25/2012 12/02/2013
Spring Brook at 87th Street near Naperville, Ill. (USGS gage 05540275; DSN 2750)	None	02/02/2007–02/18/2007 12/04/2007–12/07/2007 12/17/2007–12/18/2007 01/01/2008–01/04/2008 01/15/2008–02/16/2008 02/23/2008–03/01/2008 01/14/2009–01/23/2009 01/25/2009–01/29/2009 01/27/2010 12/15/2010–12/31/2010 01/07/2011–02/15/2011 10/02/2011–10/03/2011 10/05/2011–10/06/2011 11/16/2011–11/17/2011 11/19/2011–11/20/2011 01/20/2012–01/22/2012 02/11/2012–02/12/2012

Table 2–4. Descriptions of estimated and missing days in river discharge data from U.S. Geological Survey streamgages along the West Branch DuPage River, in and near DuPage County, Illinois, stored in the WBDR13.WDM Watershed Data Management database, for January 1, 2007, through September 30, 2013.—Continued

[For more details, consult the corresponding annual U.S. Geological Survey (USGS) water data report at https//wdr.water.usgs.gov; DSN, dataset number; Ill., Illinois]

Station name (site number)	Missing period (month/day/year)	Estimated period (month/day/year)
West Branch DuPage River near Naperville, Ill. (USGS gage 05540130; DSN 2130)	None	12/23/2006–12/27/2006 01/28/2007–02/28/2007 08/22/2007–08/23/2007 12/06/2007–12/10/2007 12/16/2007–12/18/2007 01/01/2008–01/05/2008 01/15/2008–02/22/2008 12/05/2008–12/09/2008 12/11/2008–12/13/2008 12/15/2008–12/27/2008 12/31/2008–02/09/2009 02/19/2009–02/22/2009 03/02/2009–03/04/2009 10/01/2009 12/12/2009 12/17/2009 12/31/2009–01/22/2010 01/28/2010–02/19/2010 06/16/2010–06/17/2010 12/09/2010–12/30/2010 01/12/2011–02/15/2011 01/04/2012 01/15/2012–01/16/2012 01/21/2012–01/22/2012 02/12/2012–02/13/2012 01/04/2013–01/08/2013 01/21/2013–01/27/2013
Kress Creek at West Chicago, Ill. (USGS gage 05540060; DSN 2060)	None	12/30/16–01/05/2007 02/01/2007–02/20/2007 03/01/2007–03/27/2007 12/05/2007–12/10/2007 01/02/2008 01/19/2008 01/21/2008–01/26/2008 02/11/2008–02/14/2008 05/18/2008–05/22/2008 12/30/2008–01/02/2009 01/04/2009 01/09/2009–01/17/2009 01/21/2009–01/24/2009 01/30/2009 12/14/2009–12/23/2009 01/03/2010–01/22/2010 02/09/2010–02/13/2010 02/18/2010–02/19/2010 12/17/2010–12/28/2010 01/11/2011–02/15/2011 05/12/2011–08/07/2011 05/25/2012–05/31/2012 07/01/2012–07/24/2012 09/06/2012–09/21/2012

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