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In cooperation with the
Ohio Department of Natural Resources, Division of Water

Hydrologic Considerations for Estimation of Storage-Capacity Requirements of Impounding and Side-Channel Reservoirs Used for Water Supply in Ohio

Water-Resources Investigations Report 01–4256

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

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By G.F. Koltun

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2001

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CONVERSION FACTORS AND ABBREVIATIONS

Multiply	By	To obtain
Length		
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
Area		
square mile (mi^2)	2.590	square kilometer
acre	0.4047	hectare
Volume		
cubic foot (ft^3)	28.32	liter
acre-foot (acre-ft)	1,233	cubic meter
million gallons (Mgal)	3,785	cubic meter
Flow rate		
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
million gallons per day (Mgal/d)	0.04381	cubic meter per second

Other abbreviations used in this report:

MAF	Mean annual flow
ODNR	Ohio Department of Natural Resources
PET	Potential evapotranspiration
USGS	U. S. Geological Survey
RMSE	Root-mean-square error
$7Q_2$	7-day, 2-year low flow

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ABSTRACT

This report provides data and methods to aid in the hydrologic design or evaluation of impounding reservoirs and side-channel reservoirs used for water supply in Ohio. Data from 117 streamflow-gaging stations throughout Ohio were analyzed by means of nonsequential-mass-curve-analysis techniques to develop relations between storage requirements, water demand, duration, and frequency. Information also is provided on minimum runoff for selected durations and frequencies. Systematic record lengths for the streamflow-gaging stations ranged from about 10 to 75 years; however, in many cases, additional streamflow record was synthesized.

For impounding reservoirs, families of curves are provided to facilitate the estimation of storage requirements as a function of demand and the ratio of the 7-day, 2-year low flow to the mean annual flow. Information is provided with which to evaluate separately the effects of evaporation on storage requirements.

Comparisons of storage requirements for impounding reservoirs determined by nonsequential-mass-curve-analysis techniques with storage requirements determined by annual-mass-curve techniques that employ probability routing to account for carryover-storage requirements indicate that large differences in computed required storages can result from the two methods, particularly for conditions where demand cannot be met from within-year storage.

For side-channel reservoirs, tables of demand-storage-frequency information are provided for a primary pump relation consisting of one variable-speed pump with a pumping capacity that ranges from 0.1 to 20 times demand. Tables of adjustment ratios are provided to facilitate determination of storage requirements for 19 other pump sets consisting of assorted combinations of fixed-speed pumps or variable-speed pumps with aggregate pumping capacities smaller than or equal to the primary pump relation. The effects of evaporation on side-channel reservoir storage requirements are incorporated into the storage-requirement estimates. The effects of an instream-flow requirement equal to the 80-percent-duration flow are also incorporated into the storage-requirement estimates.

INTRODUCTION

In 1999, an average of more than 1.5 billion gallons of water was used in Ohio every day for public water supply, with about 65 percent of the water coming from surface-water sources (Luczyk, 2000). Although total water use in Ohio did not consistently increase in the period 1996–99 (Lucyzk, 1997-2000), increases in population, concern over potential impacts of global warming, and lingering memories of the 1999 drought reinforce the need to ensure that Ohio's water-supply demands can be met in the future.

Construction of new reservoirs is one way to meet increasing water-supply demands. Two types of reservoirs are commonly used in Ohio: impounding reservoirs and side-channel reservoirs. An impounding reservoir is an onstream reservoir that is formed by damming the stream. A side-channel reservoir is an offstream reservoir that is formed by pumping water from a stream into an impoundment. The volume of storage (storage capacity) required for an impounding reservoir is in part a function of the draft rate (the rate at which water will be withdrawn on a daily basis) and the severity of the low-flow conditions for which the reservoir is designed. In addition to those characteristics that govern the required storage capacity of an impounding reservoir, a side-channel reservoir also is subject to constraints associated with the numbers, types, and capacities of pumps used to fill the reservoir.

Precipitation, evaporation, sedimentation, and seepage also must be considered in the design of reservoirs. Information is presented in this report to help assess the effects of precipitation and evaporation on required reservoir capacities; however, no information is provided to assist the user with design considerations resulting from sedimentation or seepage processes.

Purpose and Scope

This report, prepared in cooperation with the Ohio Department of Natural Resources (ODNR), Division of Water, provides data and methods to aid in the hydrologic design or evaluation of impounding reservoirs and side-channel reservoirs used for water supply in Ohio. Data from 117 streamflow-gaging stations throughout Ohio were analyzed by means of nonsequential-mass-curve-analysis techniques to develop relations between storage requirements, water demand, duration, and frequency. Information also is provided on minimum runoff for selected durations and frequencies. Systematic record lengths for the streamflow-gaging stations ranged from about 10 to 75 years; however, in many cases, additional streamflow record was synthesized.

For impounding reservoirs, families of curves are provided to facilitate the estimation of storage requirements as a function of demand and the ratio of the 7-day, 2-year low flow to the mean annual flow. Information is provided with which to evaluate separately the effects of evaporation on storage requirements. Storage requirements for impounding reservoirs determined by nonsequential-mass-curve-analysis techniques are compared to storage requirements determined by annual-mass-curve techniques that employ probability routing to account for carryover-storage requirements.

For side-channel reservoirs, tables of demand-storage-frequency information are provided for a primary pump relation consisting of one variable-speed pump with a pumping capacity that ranges from 0.1 to 20 times demand. Tables of adjustment ratios are provided to facilitate determination of storage requirements for 19 other pump sets consisting of assorted combinations of fixed-speed pumps or variable-speed pumps with aggregate pumping capacities smaller than or equal to the primary pump relation. The effects of evaporation on side-channel reservoir storage requirements are incorporated into the storage-requirement estimates. The effects of an instream-flow requirement equal to the 80-percent-duration flow are also incorporated into the storage-requirement estimates. Several example computations for determining reservoir storage capacity are presented.

The information presented in this report provides a starting point for assessing required reservoir storage capacity. The various hydrologic design tables do not take into consideration all factors that can affect the design of a reservoir. Consequently, users need to understand the methods and assumptions used in developing these tables.

Previous Studies

Several studies have addressed storage requirements associated with impounding reservoirs on Ohio streams (Cross and Webber, 1950; Cross, 1963, 1965). Collectively, these studies provided minimum runoff information for selected sites and durations, site-specific draft-storage-frequency relations, and regionalized draft-storage-frequency curves. The draft-storage-frequency relations presented by Cross (1963) were based on data collected through September 30, 1960. No statewide analysis of storage requirements for side-channel reservoirs has been prepared for Ohio; however, an analysis was done for Illinois (Knapp, 1982).

Acknowledgments

Special thanks are extended to Michael Schiefer and David Cashell of ODNR for their support, assistance, and guidance.

DATA AND METHODS

Many of the methods used for this study were patterned closely after methods used for studies on the hydrologic design of impounding and side-channel reservoirs in Illinois (Terstriep and others, 1982; Knapp, 1982). The present study, however, represents an original interpretation and implementation of those methods and also includes changes and enhancements to the methods used in the Illinois studies.

Streamflow Data

Daily streamflow data from 117 U. S. Geological Survey (USGS) streamflow-gaging stations located throughout Ohio were used in this study (table 1; fig. 1). Drainage areas at the gaging stations ranged from 0.98 to 5,993 mi^2, and streamflow record lengths ranged from about 10 to 75 years with a median record length of about 30 years. Streamflow at some of the 117 gaging stations is currently regulated; however, data used in this study were from periods without appreciable regulation or significant urban influences.

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Table 1. Selected characteristics of streamflow-gaging stations whose data were used for the reservoir-storage analyses

Map number (fig. 1)	Station number	Station name	Latitude	Longitude	Hydrologic unit code	Drainage area
1	03089500	Mill Creek near Berlin Center	41°00′01″	80°58′07″	5030103	19.1
2	03092000	Kale Creek near Pricetown	41°08′23″	80°59′43″	5030103	21.9
3	03092090	West Branch Mahoning River near Ravenna	41°09′41″	81°11′50″	5030103	21.8
4	03092500	West Branch Mahoning River near Newton Falls	41°10′18″	81°01′16″	5030103	96.3
5	03093000	Eagle Creek at Phalanx Station	41°15′40″	80°57′16″	5030103	97.6
6	03096000	Mosquito Creek at Niles	41°11′02″	80°45′39″	5030103	138
7	03102950	Pymatuning Creek at Kinsman	41°26′34″	80°35′18″	5030102	96.7
8	03109000	Lisbon Creek at Lisbon	40°46′55″	80°45′53″	5030101	6.19
9	03109500	Little Beaver Creek near East Liverpool	40°40′33″	80°32′27″	5030101	496
10	03110000	Yellow Creek near Hammondsville	40°32′16″	80°43′31″	5030101	147
11	03110500	Yellow Creek at Hammondsville	40°33′15″	80°42′30″	5030101	164
12	03111500	Short Creek near Dillonvale	40°11′36″	80°44′04″	5030106	123
13	03111548	Wheeling Creek below Blaine	40°04′01″	80°48′31″	5030106	97.7
14	03114000	Captina Creek at Armstrongs Mills	39°54′31″	80°55′27″	5030106	134
15	03115400	Little Muskingum River at Bloomfield	39°33′47″	81°12′14″	5030201	210
16	03117500	Sandy Creek at Waynesburg	40°40′21″	81°15′36″	5040001	253
17	03119000	Sandy Creek at Sandyville	40°38′04″	81°22′28″	5040001	481
18	03090500	Mahoning River below Berlin Dam near Berlin Center	41°02′54″	81°00′05″	5030103	248
19	03130500	Touby Run at Mansfield	40°45′53″	82°32′43″	5040002	5.44
20	03134000	Jerome Fork at Jeromeville	40°48′07″	82°12′01″	5040002	120
21	03136500	Kokosing River at Mount Vernon	40°24′20″	82°30′00″	5040003	202
22	03137000	Kokosing River at Millwood	40°23′51″	82°17′09″	5040003	455
23	03139000	Killbuck Creek at Killbuck	40°28′53″	81°59′10″	5040003	464
24	03140000	Mill Creek near Coshocton	40°21′46″	81°51′45″	5040003	27.2
25	03144000	Wakatomika Creek near Frazeysburg	40°07′57″	82°08′53″	5040004	140
26	03144500	Muskingum River at Dresden	40°07′13″	81°59′59″	5040004	5993
27	03146000	North Fork Licking River at Utica	40°13′41″	82°27′06″	5040006	116
28	03146500	Licking River near Newark	40°03′33″	82°20′23″	5040006	537

Table 1. Selected characteristics of streamflow-gaging stations whose data were used for the reservoir-storage analyses—Continued

Map number (fig. 1)	Station number	Station name	Latitude	Longitude	Hydrologic unit code	Drainage area
29	03147000	Licking River at Toboso	40°03′26″	82°13′12″	5040006	672
30	03147500	Licking River below Dillon Dam near Dillon Falls	39°59′18″	82°04′50″	5040006	742
31	03149500	Salt Creek near Chandlersville	39°54′31″	81°51′38″	5040004	75.7
32	03157000	Clear Creek near Rockbridge	39°35′18″	82°34′43″	5030204	89.0
33	03157500	Hocking River at Enterprise	39°33′54″	82°28′29″	5030204	459
34	03159500	Hocking River at Athens	39°19′44″	82°05′16″	5030204	943
35	03159540	Shade River near Chester	39°03′49″	81°52′55″	5030202	156
36	03142200	Salt Fork near Cambridge	40°05′05″	81°27′20″	5040005	55.6
37	03228000	Scioto Big Run at Briggsdale	39°54′56″	83°03′55″	5060001	11.0
38	03202000	Raccoon Creek at Adamsville	38°51′32″	82°21′43″	5090101	585
39	03217500	Scioto River at LaRue	40°34′28″	83°23′15″	5060001	257
40	03218000	Little Scioto River above Marion	40°37′43″	83°10′11″	5060001	72.4
41	03219500	Scioto River near Prospect	40°25′10″	83°11′50″	5060001	567
42	03219590	Bokes Creek near Warrensburg	40°19′20″	83°10′30″	5060001	83.2
43	03220000	Mill Creek near Bellepoint	40°14′54″	83°10′26″	5060001	178
44	03223000	Olentangy River at Claridon	40°34′58″	82°59′20″	5060001	157
45	03224500	Whetstone Creek near Ashley	40°27′18″	82°57′28″	5060001	98.7
46	03225500	Olentangy River near Delaware	40°21′18″	83°04′02″	5060001	393
47	03226500	Olentangy River at Stratford	40°15′29″	83°03′44″	5060001	445
48	03228500	Big Walnut Creek at Central College	40°06′13″	82°53′03″	5060001	190
49	03229000	Alum Creek at Columbus	39°56′42″	82°56′28″	5060001	189
50	03229500	Big Walnut Creek at Rees	39°51′24″	82°57′26″	5060001	544
51	03230500	Big Darby Creek at Darbyville	39°42′02″	83°06′37″	5060001	534
52	03230800	Deer Creek at Mount Sterling	39°42′54″	83°15′26″	5060002	228
53	03231000	Deer Creek at Williamsport	39°35′09″	83°07′22″	5060002	333
54	03232000	Paint Creek near Greenfield	39°22′45″	83°22′32″	5060003	249
55	03232300	Rattlesnake Creek at Centerfield	39°19′44″	83°28′32″	5060003	209
56	03232500	Rocky Fork near Barretts Mills	39°13′06″	83°23′08″	5060003	140
57	03234000	Paint Creek near Bourneville	39°15′49″	83°10′01″	5060003	807
58	03235000	Salt Creek at Tarlton	39°33′20″	82°46′51″	5060002	11.5

Table 1. Selected characteristics of streamflow-gaging stations whose data were used for the reservoir-storage analyses—Continued

Map number (fig. 1)	Station number	Station name	Latitude	Longitude	Hydrologic unit code	Drainage area
59	03236000	Salt Creek near Londonderry	39°15′22″	82°46′12″	5060002	286
60	03237280	Upper Twin Creek at McGaw	38°38′37″	83°12′57″	5090201	12.2
61	03237500	Ohio Brush Creek near West Union	38°48′13″	83°25′16″	5090201	387
62	03238500	White Oak Creek near Georgetown	38°51′29″	83°55′43″	5090201	218
63	03240000	Little Miami River near Oldtown	39°44′54″	83°55′53″	5090202	129
64	03240500	North Fork Massie Creek at Cedarville	39°45′25″	83°47′25″	5090202	28.9
65	03241000	South Fork Massie Creek near Cedarville	39°44′20″	83°45′50″	5090202	17.1
66	03241500	Massies Creek at Wilberforce	39°43′22″	83°52′58″	5090202	63.2
67	03242050	Little Miami River near Spring Valley	39°35′00″	84°01′49″	5090202	366
68	03242200	Anderson Fork near New Burlington	39°33′59″	83°54′10″	5090202	77.8
69	03242300	Caesar Creek at Harveysburg	39°30′27″	84°00′42″	5090202	209
70	03242500	Little Miami River near Fort Ancient	39°22′42″	84°05′32″	5090202	680
71	03245500	Little Miami River at Milford	39°10′17″	84°17′53″	5090202	1203
72	03246200	East Fork Little Miami River near Marathon	39°06′52″	84°01′29″	5090202	195
73	03246500	East Fork Little Miami River at Williamsburg	39°03′09″	84°03′02″	5090202	237
74	03247050	East Fork Little Miami River near Batavia	39°03′36″	84°10′32″	5090202	352
75	03247500	East Fork Little Miami River at Perintown	39°08′13″	84°14′17″	5090202	476
76	03260700	Bokengehalas Creek near De Graff	40°20′50″	83°53′28″	5080001	36.3
77	03260800	Stony Creek near De Graff	40°17′27″	83°54′36″	5080001	59.1
78	03264000	Greenville Creek near Bradford	40°06′08″	84°25′48″	5080001	193
79	03265000	Stillwater River at Pleasant Hill	40°03′28″	84°21′22″	5080001	503
80	03266500	Mad River at Zanesfield	40°21′01″	83°40′28″	5080001	7.31
81	03267000	Mad River near Urbana	40°06′27″	83°47′57″	5080001	162
82	03268000	Buck Creek at New Moorefield	39°59′31″	83°42′53″	5080001	65.3
83	03268500	Beaver Creek near Springfield	39°56′26″	83°44′56″	5080001	39.2
84	03270800	Wolf Creek at Trotwood	39°47′39″	84°18′36″	5080002	22.7
85	03271000	Wolf Creek at Dayton	39°46′00″	84°14′10″	5080002	68.7
86	03271800	Twin Creek near Ingomar	39°42′28″	84°31′30″	5080002	197
87	03272700	Sevenmile Creek at Camden	39°37′45″	84°38′40″	5080002	69.0
88	03272800	Sevenmile Creek at Collinsville	39°31′23″	84°36′39″	5080002	120
89	03273500	Fourmile Creek near Hamilton	39°27′30″	84°32′50″	5080002	307

Table 1. Selected characteristics of streamflow-gaging stations whose data were used for the reservoir-storage analyses—Continued

Map number (fig. 1)	Station number	Station name	Latitude	Longitude	Hydrologic unit code	Drainage area
90	04177000	Ottawa River at Toledo	41°39′29″	83°37′19″	4100001	150
91	04184500	Bean Creek at Powers	41°40′39″	84°13′56″	4100006	206
92	04189000	Blanchard River near Findlay	41°03′21″	83°41′17″	4100008	346
93	04195500	Portage River at Woodville	41°26′58″	83°21′41″	4100010	428
94	04196000	Sandusky River near Bucyrus	40°48′13″	83°00′21″	4100011	88.8
95	04196500	Sandusky River near Upper Sandusky	40°51′02″	83°15′23″	4100011	298
96	04197000	Sandusky River near Mexico	41°02′39″	83°11′42″	4100011	774
97	04197100	Honey Creek at Melmore	41°01′20″	83°06′35″	4100011	149
98	04197170	Rock Creek at Tiffin	41°06′49″	83°10′06″	4100011	34.6
99	04198000	Sandusky River near Fremont	41°18′28″	83°09′32″	4100011	1251
100	04199000	Huron River at Milan	41°18′06″	82°36′25″	4100012	371
101	04199500	Vermilion River near Vermilion	41°22′55″	82°19′01″	4100012	262
102	04207200	Tinkers Creek at Bedford	41°23′04″	81°31′39″	4110002	83.9
103	04210000	Phelps Creek near Windsor	41°30′56″	80°56′07″	4110004	25.6
104	04211000	Rock Creek near Rock Creek	41°39′05″	80°50′10″	4110004	69.2
105	04212000	Grand River near Madison	41°44′26″	81°02′48″	4110004	581
106	04212100	Grand River near Painesville	41°43′08″	81°13′41″	4110004	685
107	04212500	Ashtabula River near Ashtabula	41°51′20″	80°45′44″	4110003	121
108	04213000	Conneaut Creek at Conneaut	41°55′37″	80°36′15″	4120101	175
109	03125000	Home Creek near New Philadelphia	40°28′06″	81°24′10″	5040001	1.64
110	03201600	Sandy Run above Big Four Hollow Creek near Lake Hope	39°21′45″	82°18′47″	5090101	0.98
111	03201700	Big Four Hollow Creek near Lake Hope	39°21′48″	82°18′51″	5090101	1.01
112	03201800	Sandy Run near Lake Hope	39°20′01″	82°19′56″	5090101	4.99
113	03235500	Tar Hollow Creek at Tar Hollow State Park	39°23′22″	82°45′03″	5060002	1.35
114	04185000	Tiffin River at Stryker	41°30′16″	84°25′47″	4100006	410
115	04185440	Unnamed Tributary to Lost Creek near Farmer	41°21′42″	84°41′28″	4100006	4.23
116	04197020	Honey Creek near New Washington	40°57′37″	82°47′19″	4100011	17.0
117	04201500	Rocky River near Berea	41°24′24″	81°53′14″	4110001	267

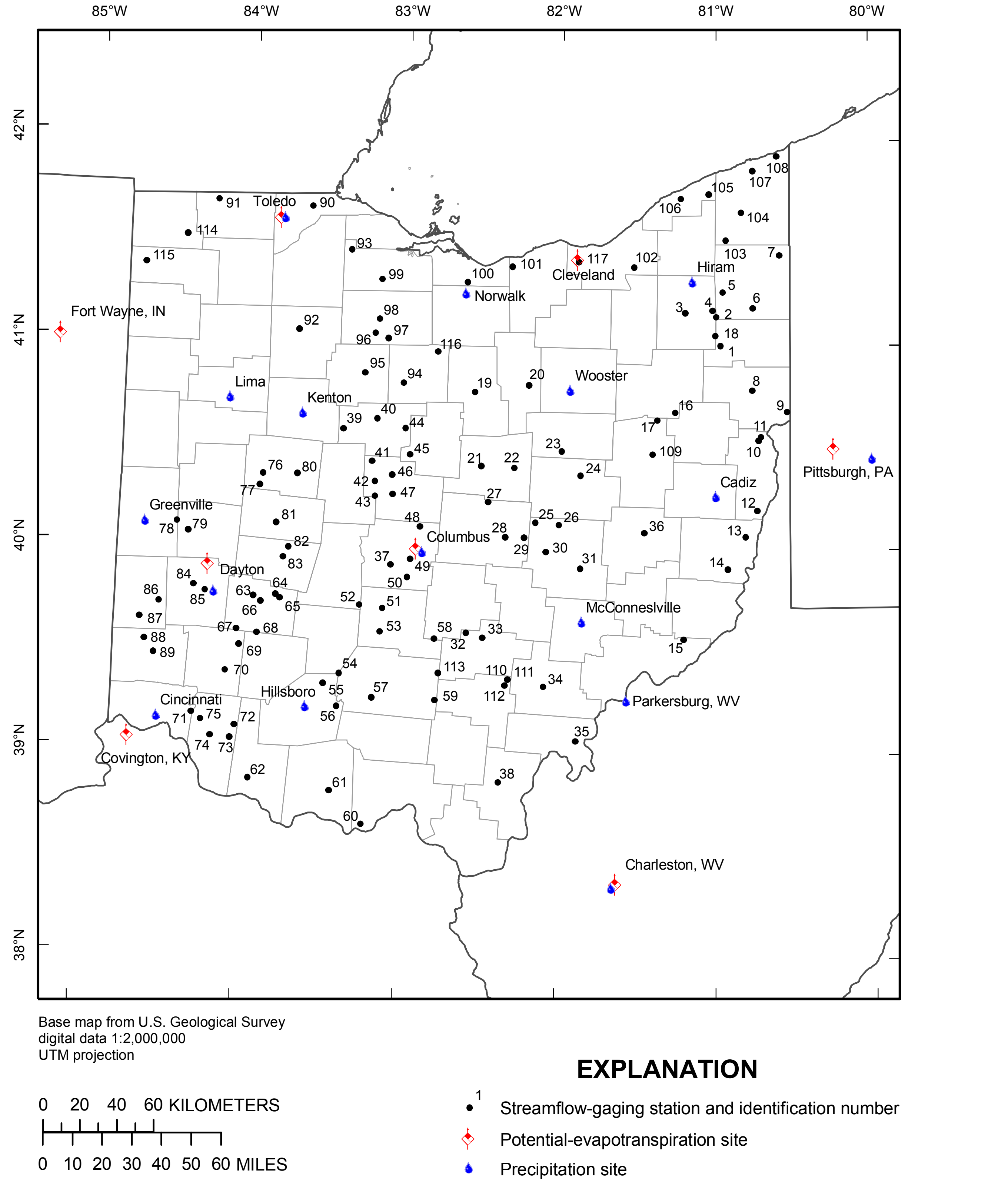

Figure 1. Locations of streamflow-gaging stations in Ohio and climate stations used in the analyses.

Extension of Streamflow Records

Daily streamflow records from about 70 percent of the gaging stations were extended mathematically in time in an attempt to include as many years of streamflow data as possible in each analysis. Record was extended as a function of daily streamflow data from a gaging station with long-term record (an index station) by means of a hybrid method that combines a maintenance of variance extension type 1 (move.1) estimator (Hirsch, 1982) with a duration-based estimator (Searcy, 1959).

The hybrid method of record extension was developed because the move.1 estimator frequently did not provide estimates of streamflow during low-flow periods that were as accurate as those provided by the duration-based estimator. Because accurate estimates of streamflow over the entire range of flow are important for some of the reservoir analyses, a method of record extension was developed in which the move.1 estimator could be used for one range of flows and the duration-based estimator for the remaining range of flows. The actual streamflow value for the index station at which the method of estimation shifted from the move.1 estimator to the duration-based estimator was based on minimizing the root-mean-square error (RMSE) between the predicted and observed flows for the concurrent period of record of the index station and the station whose record was being extended. After that streamflow value was determined for a given station pair, it was used consistently to shift between estimators for the entire streamflow time series. Typically, the move.1 estimator was used for the upper range of flows and the duration-based estimator was used for the lower range of flows; however, the method does not preclude use of a pure move.1 or duration-based estimator solution if one or the other minimizes the RMSE.

The choice of index station to use for extension was somewhat subjective but was based on two quantitative criteria: (1) maximizing Pearson's coefficient of correlation between daily mean streamflows for the station whose record was being extended and concurrent daily mean streamflows at the potential index station, and (2) maximizing the period of extended record. A minimum correlation coefficient of 0.80 was required for a station to be considered for use as an index station.

Low-Flow Series and Development of Low-flow Frequency Tables

Partial-duration series[1] of low flows (hereafter referred to as "partial low-flow series") were determined in preparation for mass-curve analyses. For most data sets, running-average streamflows (in units of inches[2]) were calculated from daily mean streamflows for durations ranging from 30 to 1,800 days (30-day increments from 30 to 360 days and 60-day increments from 360 to 1,800 days). A reduced set of durations was used for analyzing data from three stations (03228000, 04210000, and 04185440) (table 1) because the record available for analysis was relatively short. Capacity-draft-frequency tables for those three stations are truncated to reflect this change.

The average low flows for each duration were sorted in ascending order, resulting in series of low flows whose chronologies were not necessarily preserved; therefore, those series are referred to as "nonsequential." Each nonsequential partial low-flow series was scanned, beginning with the smallest value and then stepping down in the series, to remove any larger values that had an overlapping averaging period. The resulting partial series for each duration was composed of relatively independent values (in that all values in a given series were determined for periods that did not overlap in time). Terstriep and others (1982) and the U.S. Army Corps of Engineers (1997) discuss the theoretical justification for use of the nonsequential partial low-flow series.

Recurrence intervals were computed for each value in the series by application of the Weibull plotting-position formula (Weibull, 1939), as shown below:

$$RI = \frac{(n+1)}{m}, \tag{1}$$

where RI is the recurrence interval[3] (in years), m is the rank order (with 1 being assigned to the lowest average streamflow), and n is the number of years (either observed or extended) of data for the station being analyzed.

After the nonsequential partial low-flow series were constructed and recurrence intervals were computed, separate polynomial equations were fit to the data for each duration analyzed to develop tables of estimated low-flow runoff for selected durations and a range of recurrence intervals. The polynomial equations were fit using the base 10 logarithm of the minimum runoff as the dependent variable and the type 1 extreme-value variate associated with the recurrence interval as the independent variable. The type 1 extreme-value variate was computed as shown below:

$$Z_e = -\ln\left(-\ln\left(1 - \frac{1}{RI}\right)\right), \tag{2}$$

[1]A partial-duration series is defined as the maximum *N* or more values from the *N* years of record, it being possible that more than one value would come from certain years (Chow, 1964).

[2]When streamflow (units of volume per time) is considered over a specified period of time, the resulting quantity is a volume. In this report, that volume is reported in units of equivalent inches of water spread uniformly over the drainage area.

[3]For low flows, the recurrence interval is the average interval, in years, between occurrences of flows less than or equal to a given magnitude.

where Z_e is the type 1 extreme-value variate, ln is the natural logarithm, and *RI* is the recurrence interval (in years).

Polynomial equations were fit to only those values with recurrence intervals of 5 years and greater. For a given station, equations were determined beginning with the longest duration and then proceeding sequentially to the shortest duration. A second-order polynomial equation, with recurrence interval as the independent variable, was fit to the data for the longest duration. The polynomial equation was then used to determine low-flow ordinates corresponding to recurrence intervals of 5, 10, 20, 25, 30, 40, 50, 60, 70, 80, 90, and 100 years. To avoid extrapolation, ordinates are reported only for recurrence intervals that lie within the bounds of the recurrence intervals assigned to the particular partial low-flow series (as determined from equation 1). Consequently, if a partial low-flow series has computed recurrence intervals that range from 5.4 to 27 years, low-flow ordinates were computed for recurrence intervals of 5.4, 10, 20, 25, and 27 years. If the computed ordinates decreased consistently (monotonically) with increasing recurrence interval, then the polynomial equation was accepted and the calculation proceeded to the next shorter duration. If the computed ordinates did not decrease monotonically, a third-order polynomial was fit to the data, the low-flow ordinates were recomputed, and the results were checked to ensure a monotonic decrease in flow with increasing duration. After a third-order polynomial was required for a particular duration, all shorter duration data also were fit with a third-order polynomial.

By definition, the low-flow ordinate cannot increase with decreasing duration for a given recurrence interval. As successively shorter duration partial low-flow series were analyzed, the ordinates computed for a given recurrence interval were compared with those of the next longer duration. If an increase was observed, then the value assigned for that recurrence interval was set to that of the longer duration. A sample low-flow frequency table with results for selected durations is shown in table 2.

Storage Analyses for Impounding Reservoirs

Construction of large impounding reservoirs has become less common over time, possibly because of their great expense and their potential detrimental impact on the natural aquatic environment (Collier and others, 1996). Impounding reservoirs, however, remain a viable alternative for meeting water demands in some areas. In addition, estimates of storage requirements may be useful for evaluating the adequacy of existing impounding reservoirs. The following three sections address methods used to derive estimates of storage requirements for impounding reservoirs.

Nonsequential-Mass-Curve Analysis for Impounding Reservoirs

A conventional mass-curve analysis is done by plotting cumulative flow against time and comparing the resulting curve to a curve constructed by plotting the cumulative demand against time. A nonsequential-mass-curve analysis differs from a conventional mass-curve analysis in two important ways: (1) the mass-curve-type analysis is done on a recurrence-interval basis, and (2) the cumulative flows that are plotted are nonsequential, cumulative low flows for selected recurrence intervals and durations (as opposed to

Table 2. Example low-flow frequency table

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
53.00	3.96	0.12	2.98	6.90	11.18	22.13	30.99	43.74
50.00	3.90	0.12	3.14	7.01	11.39	22.55	31.55	44.53
40.00	3.68	0.12	3.74	7.43	12.21	24.16	33.72	47.56
30.00	3.38	0.12	4.51	7.97	13.27	26.24	36.52	51.48
25.00	3.20	0.12	4.95	8.23	13.87	27.28	38.09	54.06
20.00	2.97	0.13	5.34	8.33	14.40	27.81	39.46	57.46
10.00	2.25	0.19	6.18	9.49	16.58	31.93	48.04	63.55
5.30	1.57	0.34	6.96	12.42	22.50	42.19	70.57	–

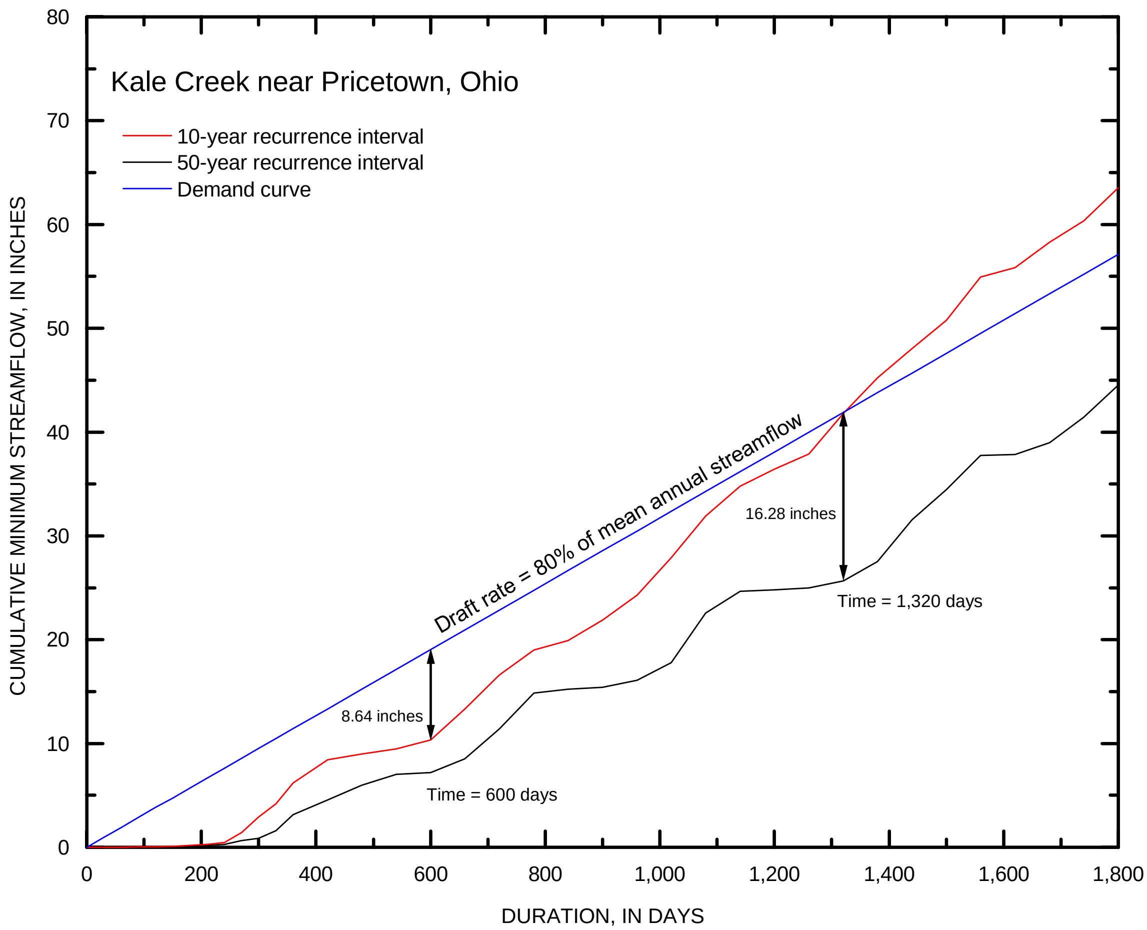

Figure 2. Determination of required reservoir storage capacities and critical drawdown periods from nonsequential mass curves for Kale Creek near Pricetown, Ohio.

streamflows accumulated in chronological order). The maximum positive difference between the ordinate of the cumulative demand curve and the ordinate of the nonsequential mass curve for a given recurrence interval represents the reservoir storage required to meet the indicated demand under low-flow conditions with the specified recurrence interval. The time abscissa at which that maximum difference occurs represents the duration of the critical drawdown period (the period of time during which the reservoir will be under draft such that a maximum reservoir capacity is required to meet demand) for the indicated demand and recurrence interval. From a practical standpoint, the critical drawdown period represents the time period required to completely empty an initially full reservoir under the specific set of inflow and demand conditions.

To help illustrate the nonsequential-mass-curve-analysis technique, figure 2 shows a demand curve and nonsequential mass curves for 10- and 50-year recurrence intervals for the gaging station on Kale Creek near Pricetown, Ohio (station 03092000). The sloped straight line represents a cumulative demand curve corresponding to a draft equal to 80 percent of the mean annual streamflow. The two nonlinear mass curves represent the cumulative minimum streamflows (in inches), with 10- and 50-year recurrence intervals. The mass curves are constructed by plotting points corresponding to the minimum streamflows with sequentially increasing durations for a given recurrence interval (in this case, 10 or 50 years), and then connecting the points by straight lines. The reservoir capacity required to meet the indicated demand is determined by computing the difference between the demand-curve ordinate and the nonsequential-mass-curve ordinate for all durations and then selecting the maximum positive difference. For the example shown in figure 2, the maximum positive differences between the demand curve and the nonsequential mass curves were 8.64 inches and 16.28 in. for 10- and 50-year recurrence intervals, respectively. The critical drawdown periods are equal to the durations (x-axis values) corresponding to those maximum differences, which, in figure 2, are 600 days and 1,320 days for the 10- and 50-year recurrence intervals, respectively.

Nonsequential mass analyses were done numerically by means of a computer program developed by the author. Tables resulting from these analyses (appendix; table 3 is an example) list the reservoir storage (in inches) required to meet draft rates of 0.02, 0.05, 0.10, 0.15, 0.20, 0.25, 0.30, 0.35, 0.40, 0.45, 0.50, 0.60, 0.70, 0.80, 0.90, and 1.00 times the mean annual flow with recurrence intervals of 5, 6, 8, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, and 100 years. The tables also show the duration of the critical drawdown period (in days).

Terstriep and others (1982) show that the duration of the critical drawdown period does not necessarily increase monotonically with demand for a given recurrence interval. This result is dependent on the flow characteristics of the station being analyzed. For a given demand, however, the duration of the critical drawdown period either increases or remains constant with increasing recurrence interval.

Table 3. Example of nonsequential mass analysis table showing reservoir storage capacities and critical-drawdown durations for selected draft rates and recurrence intervals

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.01	0.07	0.23	0.47	0.73	1.10	1.46	1.89	2.74	3.61	4.59	5.59	7.19
	0	0	0	30	30	90	120	180	180	180	210	210	240	240	300	600
6	0.00	0.00	0.00	0.01	0.08	0.28	0.52	0.82	1.19	1.57	2.00	2.85	3.74	4.72	5.70	8.04
	0	0	0	30	60	120	120	180	180	210	210	210	240	240	300	600
8	0.00	0.00	0.00	0.01	0.12	0.33	0.60	0.93	1.30	1.71	2.14	2.99	4.00	5.10	6.87	9.58
	0	0	0	30	90	120	150	180	180	210	210	210	270	270	600	900
10	0.00	0.00	0.00	0.01	0.13	0.36	0.65	1.00	1.37	1.80	2.23	3.19	4.29	5.39	7.83	11.49
	0	0	0	30	90	120	150	180	210	210	210	270	270	270	900	900
15	0.00	0.00	0.00	0.02	0.15	0.42	0.73	1.10	1.53	2.01	2.50	3.57	4.67	6.81	9.87	13.54
	0	0	0	30	120	150	180	210	210	240	240	270	270	600	900	900
20	0.00	0.00	0.00	0.03	0.17	0.46	0.80	1.22	1.71	2.20	2.69	3.76	5.27	7.71	10.62	16.65
	0	0	0	30	120	150	180	240	240	240	240	270	600	600	900	1740
25	0.00	0.00	0.00	0.03	0.19	0.50	0.85	1.34	1.83	2.32	2.81	3.94	5.88	8.33	12.00	18.68
	0	0	0	30	120	150	240	240	240	240	240	300	600	600	1320	1740
30	0.00	0.00	0.00	0.04	0.23	0.53	0.94	1.43	1.92	2.40	2.91	4.13	6.33	8.78	13.09	20.18
	0	0	0	30	150	150	240	240	240	240	300	300	600	600	1740	1740
40	0.00	0.00	0.00	0.05	0.29	0.62	1.04	1.53	2.02	2.53	3.14	4.50	6.94	9.39	15.42	22.51
	0	0	0	30	150	180	240	240	240	300	300	600	600	600	1740	1740
50	0.00	0.00	0.00	0.06	0.35	0.69	1.12	1.58	2.06	2.64	3.25	4.89	7.33	10.25	17.34	24.43
	0	0	0	90	150	180	210	240	240	300	300	600	600	1740	1740	1740
60	0.00	0.00	0.00	0.10	0.40	0.77	1.20	1.62	2.08	2.70	3.31	5.15	7.60	11.98	19.07	26.16
	0	0	30	120	150	210	210	210	300	300	300	600	600	1740	1740	1740
70	0.00	0.00	0.01	0.15	0.46	0.84	1.26	1.69	2.12	2.71	3.32	5.34	7.78	13.59	20.68	27.77
	0	0	30	150	180	210	210	210	210	300	300	600	600	1740	1740	1740
80	0.00	0.00	0.02	0.20	0.52	0.90	1.33	1.75	2.18	2.71	3.32	5.47	8.02	15.11	22.20	29.29
	0	0	30	150	180	210	210	210	210	300	300	600	1740	1740	1740	1740
90	0.00	0.00	0.04	0.24	0.57	0.95	1.38	1.81	2.24	2.73	3.32	5.57	9.46	16.55	23.65	30.74
	0	0	60	150	180	210	210	210	210	270	300	600	1740	1740	1740	1740
100	0.00	0.00	0.06	0.29	0.62	1.00	1.43	1.86	2.29	2.78	3.39	5.63	10.84	17.93	25.02	32.11
	0	0	60	150	180	210	210	210	210	270	540	600	1740	1740	1740	1740

Annual-Mass-Curve Analysis of Streamflow with Probability Routing

Riggs and Hardison (1973) presented storage-analysis methods for impounding reservoirs. They indicate that within-year storage requirements can be assessed by use of the annual-mass-curve method and that carryover storage requirements (that part of the storage requirement that spans more than 1 year) can be assessed by means of probability-routing techniques.

In 1968, a computer program called ANSTOR (Moore, 1984) was developed by the USGS to facilitate the determination of within-year storage requirements. An executable version of ANSTOR is no longer available; however, the USGS retained the ANSTOR source code, the core components of which were translated from PL1 to Fortran and used by the author to create a program to replicate its function. That program was supplemented with new code to assist with probability-routing calculations, but some manual calculations are still required. All of the probability-routing calculations for this study were based on methods described by Riggs and Hardison (1973).

Data from 12 streamflow-gaging stations were analyzed by the nonsequential-mass-curve method and by the annual-mass-curve method with probability routing to facilitate comparison of computed storage requirements (table 4). Carryover storage requirements were determined for storage conditions that result in annual deficiency probabilities (probabilities of not being able to supply all of the demand) of 2 and 5 percent by means of methods described by Riggs and Hardison (1973).

Some generalities can be inferred from the data in table 4. For the 2-percent annual probability of deficiency

Table 4. Summary of differences between required storage determined from annual-mass-curve analysis with probability routing and nonsequential-mass-curve analysis

[nd, not determined]

Station number	Difference between required storage determined from annual-mass-curve analysis with probability routing and required storage determined from nonsequential-mass-curve analysis (expressed as a ratio to the mean annual flow) for indicated draft and percent chance of deficiency											
	2-percent chance of annual deficiency for indicated draft, in percentage of mean annual flow						5-percent chance of annual deficiency for indicated draft, in percentage of mean annual flow					
	90	70	50	30	10	5	90	70	50	30	10	5
03092000	nd	0.019	0.085	0.017	0.001	0.000	0.226	0.047	-0.018	0.004	0.001	0.001
03111500	0.403	0.171	0.050	0.000	0.000	0.000	0.327	0.156	-0.020	0.009	0.000	0.000
03130500	-0.417	-0.590	-0.223	-0.005	-0.012	-0.001	-0.098	-0.125	-0.064	0.004	0.001	0.000
03139000	0.422	-0.059	-0.058	-0.013	0.001	0.000	0.437	0.059	-0.053	-0.008	0.000	0.000
03144000	0.135	-0.101	-0.108	-0.018	0.003	0.000	0.338	0.011	-0.084	-0.018	0.001	0.000
03157000	0.190	-0.139	-0.096	0.002	0.000	0.000	0.483	0.142	-0.023	0.004	0.001	0.000
03159500	0.518	-0.040	-0.119	-0.057	0.002	0.000	0.518	-0.040	-0.119	-0.057	0.002	0.000
03159540	-0.483	-0.735	-0.399	-0.116	-0.003	0.005	0.509	-0.029	-0.054	-0.003	-0.005	-0.003
04184500	-0.371	-1.922	-1.586	-0.910	-0.199	-0.010	1.096	-0.023	-0.065	-0.072	-0.004	0.000
04201500	-0.387	-0.329	-0.143	-0.073	-0.014	-0.001	0.144	0.018	-0.078	-0.022	-0.004	0.002
04207200	-2.369	-1.974	-1.182	-0.314	-0.038	-0.006	-0.053	-0.089	-0.040	0.004	0.024	0.011
04213000	-0.376	-0.180	-0.068	-0.021	-0.001	0.000	0.120	-0.099	-0.040	-0.008	0.001	0.000
Maximum	0.518	0.171	0.085	0.017	0.003	0.005	1.096	0.156	-0.018	0.009	0.024	0.011
Mean	-0.249	-0.490	-0.321	-0.126	-0.022	-0.001	0.337	0.002	-0.055	-0.014	0.002	0.001
Median	-0.371	-0.160	-0.114	-0.020	-0.001	0.000	0.333	-0.006	-0.054	-0.006	0.001	0.000
Minimum	-2.369	-1.974	-1.586	-0.910	-0.199	-0.010	-0.098	-0.125	-0.119	-0.072	-0.005	-0.003

and drafts greater than or equal to about 30 percent of the mean annual flow, the nonsequential-mass-curve analyses generally indicated the need for more storage (as indicated by negative differences) than did the annual-mass-curve analysis with probability routing. The opposite pattern generally was observed for the 5-percent annual probability of deficiency with drafts greater than or equal to about 70 percent of the mean annual flow.

For the data shown in table 4, the largest absolute mean difference between required storage (expressed as a ratio to the mean annual flow) determined from annual-mass-curve analyses with probability routing and required storage determined from nonsequential-mass-curve analyses was 0.490 for a draft of 70 percent of the mean annual flow and a 2-percent annual deficiency probability. The largest absolute difference between required storage determined from annual-mass-curve analyses with probability routing and required storage determined from nonsequential-mass-curve analyses (again expressed as a ratio to the mean annual flow) was 2.369 for a draft of 90 percent of the mean annual flow and a 2-percent annual deficiency probability. These results, and others shown in table 4, illustrate that large differences in computed required storage can result from the two methods, particularly when draft rates equal or exceed 30 percent of the mean annual flow.

Of the 12 streamflow-gaging stations considered in this comparison, 10 could meet draft rates of at least 20 percent of the mean annual flow without requiring carryover storage. Consequently, a draft rate equal to 30 percent of the mean annual flow represents a value at which carryover storage was necessary to meet demand for most of the streamflow-gaging stations. This finding suggests that differences in results obtained from the annual-mass-curve analyses with probability routing and the nonsequential-mass-curve analyses are most pronounced for drafts where demand cannot be met from within-year storage.

Evaporation Losses

Evaporative losses from reservoirs can be significant and consequently should be considered in reservoir design. Data on net evaporation (the difference between evaporation and precipitation) were analyzed for seven locations in Ohio and adjacent states to provide information on potential evaporative losses in reservoirs. Long-term daily precipitation and potential evapotranspiration data were obtained from the Midwestern Regional Climate Center[4] for use in the analyses (table 5). Potential evapotranspiration (PET), a measure of the ability of the atmosphere to remove water from a surface through the processes of evaporation and transpiration assuming an unlimited supply of water, provides good estimates of evaporation from shallow lakes (Farnsworth and Thompson, 1982). The reader is cautioned that, because deep lakes can store appreciable amounts of heat, evaporation from deep lakes on any given day can be significantly different from the PET. The PET data were computed by the Midwestern Regional Climate Center by means of the Penman-Monteith formula (Monteith, 1965). The Penman-Monteith formula requires a considerable amount of relatively sophisticated climatic data (such as measures of solar radiation and windspeed) to compute PET. Because those data were not routinely collected prior to about 1948, the PET data only were available for the period 1948–99.

Daily net evaporation data were analyzed to estimate maximum net evaporation (in inches) for selected durations and recurrence intervals. The maximum net evaporation data were analyzed by methods similar to those used for the low-flow duration-frequency analyses. The main difference in method between the low-flow duration-frequency analyses and the maximum net evaporation duration-frequency analyses was that a different form of equation was used to fit the data. The maximum net evaporation data were fit by a growth model of the form

$$Enet_{max} = \frac{(ab + c(RI)^d)}{(b + (RI)^d)}, \tag{3}$$

where $Enet_{max}$ is the maximum net evaporation (in inches) for a given duration, RI is the recurrence interval (in years), and a, b, c, and d are fitted coefficients. The growth model shown in equation 3 produces an S-shaped curve that increases monotonically, approaching an asymptote. Another difference in method between the low-flow analyses and the maximum net evaporation analyses was that maximum net evaporation was not forced to increase or remain constant with increasing duration for a given recurrence interval. In fact, as illustrated in figure 3 (page 22), the maximum net evaporation data for a given recurrence interval commonly exhibit a sinusoidal pattern as a function of duration with a period of about 1 year (most likely resulting from the annual climatic cycle). The results of the evaporation-duration-frequency analyses are listed in tables 6 through 12; the precipitation data-collection sites are shown on figure 1.

Negative net evaporation values in tables 6 through 12 indicate that precipitation exceeded evaporation and consequently could be used to supplement inflow to the impounding reservoir. A more cautious approach is to treat the negative values as zeros.

[4]The Midwestern Regional Climate Center is a cooperative program of the Illinois State Water Survey (Illinois Department of Natural Resources) and the National Climatic Data Center (National Oceanic and Atmospheric Administration, U.S. Department of Commerce).

Table 5. National Weather Service Cooperative Station names, locations, and periods of precipitation and potential-evapotranspiration data used in the reservoir-storage analyses

[WSO, weather service office; dates reported as year, month, day in format YYYYMMDD; PET, potential evapotranspiraton]

Cooper-ative station ID	Station name	Decimal latitude	Decimal longitude	County	State	Dates of PET data used	Dates of precipita-tion data used
331152	Cadiz	40.27	81.00	Harrison	OH	No available data	19030101-19990911
461575	Charlestown 1	38.35	81.65	Kanawha	WV	No available data	19260101-19740213
461570	Charleston Weather Service Fore-cast Office AP	38.37	81.60	Kanawha	WV	19501201-19990912	19480101-19990908
331561	Cincinnati Abbe WSO	39.15	84.52	Hamilton	OH	No available data	18960101-19821231
151855	Cincinnati Northern KY Airport	39.05	84.67	Boone	KY	19480717-19990912	not used
331576	Cincinnati Municipal Airport Lunke	39.10	84.42	Hamilton	OH	No available data	19490101-19990908
331657	Cleveland WSO	41.40	81.85	Cuyahoga	OH	19480101-19990912	18960501-19990908
331786	Port Columbus International Air-port	39.98	82.87	Franklin	OH	19480701-19990912	18960501-19990908
331778	Columbus Ohio State University	40.00	83.02	Franklin	OH	No available data	18960101-19570930
332075	Dayton International Airport	39.90	84.20	Montgomery	OH	19480701-19990912	not used
332067	Dayton MCD	39.77	84.18	Montgomery	OH	No available data	18960101-19990731
123037	Forte Wayne International Airport	41.00	85.20	Allen	IN	19480201-19990912	not used
333375	Greenville Water Plant	40.10	84.65	Darke	OH	No available data	18960501-19990731
333758	Hillsboro / Hillsboro 5 S	39.20	83.62	Highland	OH	No available data	18960501-19990908
333780	Hiram	41.32	81.15	Portage	OH	No available data	18960501-19990731
334189	Kenton 2 W	40.65	83.65	Portage	OH	No available data	18960501-19990908
334551	Lima Wastewater Treatment Plant	40.72	84.12	Allen	OH	No available data	19020301-19990731
336118	Norwalk Wastewater Treatment Plant	41.25	82.62	Huron	OH	No available data	18960501-19990908
335041	Mc Connelsville Lock 7	39.65	81.83	Morgan	OH	No available data	18960501-19990908
466859	Parkersburg WSO	39.27	81.57	Wood	WV	No available data	19260101-19990731
366992	Pittsburgh International Airport	40.35	79.93	Allegany	PA	19450701-19520915	not used
366993	Pittsburgh WSO	40.50	80.22	Allegany	PA	19520916-19990912	19520916-19990908
366997	Pittsburgh WSO City	40.45	80.00	Allegany	PA	No available data	19260101-19790930
338356	Toledo Metcalf Field	41.57	83.47	Lucas	OH	19460101-19550131	19460101-19550101
338357	Toledo Express Airport (366992)	41.60	83.80	Lucas	OH	19550201-19990912	19550201-19990908
339312	Wooster Exp. Station	40.78	81.93	Wayne	OH	No available data	18930601-19990911

Table 6. Maximum net evaporation for Charleston, West Virginia

[<, less than; maximum net evaporation was computed from data obtained from the Midwestern Regional Climate Center for National Oceanic and Atmospheric Administration climate stations 461575 and 461570 (table 5); calculations based on period 12/01/1950–09/08/1999]

Duration, in days	Maximum net evaporation (in inches) for indicated recurrence interval (in years)														
	5	6	8	10	15	20	25	30	40	50	60	70	80	90	100
30	4.3	4.4	4.7	4.9	5.3	5.6	5.7	5.8	5.9	5.9	6.0	6.0	6.0	6.0	6.0
60	6.6	6.8	7.1	7.5	8.1	8.5	8.9	9.1	9.5	9.6	9.7	9.8	9.8	9.8	9.9
90	7.7	7.9	8.4	8.9	10.0	10.7	11.1	11.4	11.7	11.8	11.9	11.9	11.9	12.0	12.0
120	9.5	9.6	9.8	10.2	11.1	11.9	12.6	13.1	13.8	14.2	14.4	14.6	14.7	14.7	14.8
150	9.6	10.0	10.7	11.4	12.7	13.7	14.4	14.9	15.5	15.9	16.2	16.4	16.5	16.6	16.7
180	9.8	10.5	11.7	12.7	14.2	14.9	15.4	15.6	15.9	16.0	16.1	16.2	16.2	16.2	16.2
210	9.9	10.8	12.1	13.0	14.3	15.0	15.5	15.8	16.2	16.4	16.6	16.7	16.8	16.8	16.9
240	9.2	10.1	11.8	13.1	15.0	15.7	16.1	16.2	16.4	16.5	16.5	16.5	16.5	16.5	16.5
270	8.5	9.3	10.7	11.7	13.4	14.3	14.8	15.2	15.7	15.9	16.1	16.2	16.3	16.4	16.4
300	6.6	7.7	9.4	10.5	12.2	13.1	13.8	14.2	14.8	15.2	15.5	15.7	15.8	16.0	16.1
330	5.4	6.2	7.5	8.5	10.4	11.7	12.7	13.5	14.8	15.8	16.5	17.2	17.8	18.3	18.7
360	2.4	3.5	5.3	6.8	9.5	11.5	13.1	14.4	16.6	18.2	19.6	20.8	21.9	22.8	23.6
420	2.8	4.3	6.6	8.5	12.0	14.4	16.3	17.8	20.0	21.7	23.0	24.1	24.9	25.7	26.3
480	3.8	4.7	6.9	9.2	14.2	17.5	19.6	20.9	22.4	23.1	23.4	23.7	23.8	23.9	24.0
540	0.5	2.8	6.8	9.9	15.2	18.2	20.2	21.4	23.0	23.9	24.4	24.8	25.1	25.3	25.4
600	-0.7	0.9	4.5	8.1	15.0	19.0	21.1	22.4	23.6	24.2	24.5	24.6	24.7	24.8	24.9
660	-4.6	-1.3	3.7	7.1	12.4	15.5	17.5	18.9	20.8	22.0	22.8	23.4	23.9	24.3	24.6
720	-8.9	-5.4	-0.3	3.5	9.7	13.6	16.3	18.4	21.3	23.3	24.8	26.0	26.9	27.7	28.4
780	-9.8	-6.8	-2.1	1.6	8.3	13.0	16.6	19.5	24.0	27.5	30.3	32.6	34.6	36.3	37.8
840	-10.9	-7.6	-2.4	1.6	8.7	13.6	17.3	20.2	24.7	28.0	30.6	32.8	34.6	36.1	37.5
900	-20.7	-13.9	-4.5	1.6	10.6	15.6	18.8	21.0	23.9	25.7	27.0	28.0	28.7	29.3	29.7
960	-24.0	-16.2	-5.9	0.6	9.7	14.5	17.4	19.4	22.0	23.5	24.6	25.3	25.9	26.3	26.7
1020	-30.8	-20.7	-8.2	-0.9	8.3	12.7	15.2	16.8	18.7	19.8	20.5	20.9	21.3	21.5	21.7
1080	-38.4	-27.5	-13.9	-5.7	5.2	10.7	13.9	16.1	18.9	20.5	21.6	22.4	23.0	23.4	23.8
1140	-53.0	-35.7	-15.8	-5.0	7.5	12.8	15.6	17.3	19.1	20.1	20.7	21.1	21.3	21.5	21.7
1200	-55.3	-38.1	-17.4	-5.8	8.4	14.7	18.2	20.3	22.8	24.1	24.9	25.4	25.8	26.1	26.3
1260	-65.4	-44.7	-20.5	-7.2	8.3	14.8	18.3	20.3	22.6	23.8	24.5	25.0	25.3	25.6	25.7
1320	-76.6	-50.2	-21.5	-7.0	8.6	14.5	17.5	19.1	20.9	21.7	22.2	22.5	22.7	22.8	22.9
1380	-79.2	-53.5	-24.9	-10.1	6.2	12.6	15.9	17.8	19.8	20.8	21.4	21.7	22.0	22.1	22.3
1440	-91.5	-60.2	-27.3	-11.3	5.2	11.2	14.0	15.6	17.2	17.9	18.4	18.6	18.8	18.9	19.0
1500	<-99.9	-66.4	-29.0	-12.5	2.9	7.8	10.0	11.1	12.1	12.6	12.8	13.0	13.0	13.1	13.1
1560	<-99.9	-69.9	-31.8	-14.3	2.6	8.3	10.8	12.2	13.5	14.1	14.4	14.6	14.7	14.8	14.9
1620	<-99.9	-72.8	-34.2	-15.9	2.4	8.9	11.9	13.6	15.2	16.0	16.4	16.6	16.8	16.9	17.0
1680	-70.2	-54.6	-34.0	-21.0	-3.2	5.9	11.4	15.0	19.5	22.2	23.9	25.2	26.1	26.8	27.4
1740	<-99.9	-83.3	-41.1	-21.0	-0.9	6.2	9.5	11.3	13.0	13.8	14.3	14.6	14.7	14.8	14.9
1800	-64.5	-58.3	-45.4	-33.4	-11.4	0.8	7.5	11.5	15.6	17.5	18.5	19.1	19.5	19.8	19.9

Table 7. Maximum net evaporation for Cincinnatti, Ohio

[Maximum net evaporation was computed from data obtained from the Midwestern Regional Climate Center for National Oceanic and Atmospheric Administration climate stations 331561, 151855, and 331576 (table 5); calculations based on period 07/17/1948–09/08/1999]

Duration, in days	Maximum net evaporation (in inches) for indicated recurrence interval (in years)														
	5	6	8	10	15	20	25	30	40	50	60	70	80	90	100
30	5.3	5.3	5.4	5.5	5.6	5.8	5.9	6.1	6.4	6.7	7.1	7.4	7.7	8.0	8.3
60	8.1	8.4	8.7	9.0	9.7	10.2	10.6	11.0	11.6	12.2	12.6	13.1	13.5	13.8	14.1
90	10.8	10.9	11.2	11.5	12.2	12.8	13.5	14.2	15.4	16.7	18.0	19.2	20.5	21.7	22.9
120	12.4	12.9	13.8	14.4	15.6	16.4	17.0	17.5	18.2	18.7	19.1	19.4	19.6	19.8	20.0
150	13.9	14.0	14.5	15.2	17.0	18.6	19.6	20.2	20.8	21.1	21.2	21.3	21.4	21.4	21.4
180	15.1	15.1	15.3	15.7	17.8	20.2	21.5	22.0	22.4	22.5	22.5	22.5	22.5	22.5	22.5
210	15.7	15.9	16.4	17.0	18.9	20.4	21.5	22.1	22.8	23.1	23.3	23.4	23.4	23.5	23.5
240	14.9	15.5	16.6	17.5	19.2	20.3	21.2	21.8	22.8	23.5	24.0	24.3	24.6	24.9	25.1
270	14.7	14.8	15.0	15.3	16.9	19.0	20.8	22.1	23.3	23.8	24.0	24.1	24.2	24.2	24.2
300	12.9	13.2	14.0	14.8	16.7	18.4	19.7	20.8	22.4	23.4	24.1	24.6	24.9	25.2	25.4
330	10.9	11.6	12.9	13.9	16.0	17.6	18.9	20.0	21.6	22.8	23.8	24.6	25.3	25.9	26.4
360	10.2	10.4	11.0	11.9	15.2	18.6	21.2	22.8	24.3	24.9	25.2	25.4	25.4	25.5	25.5
420	10.3	11.5	13.5	15.1	18.2	20.5	22.3	23.9	26.3	28.3	29.9	31.3	32.6	33.7	34.7
480	11.8	13.8	16.9	19.1	22.8	25.3	27.1	28.5	30.5	32.0	33.1	34.1	34.8	35.5	36.0
540	12.9	15.2	18.7	21.2	25.2	27.6	29.2	30.4	32.0	33.1	33.8	34.4	34.9	35.3	35.6
600	12.7	15.0	18.4	20.9	25.0	27.6	29.4	30.7	32.5	33.8	34.7	35.4	36.0	36.5	36.9
660	9.0	11.6	15.5	18.4	23.2	26.2	28.3	29.9	32.1	33.5	34.6	35.5	36.2	36.7	37.2
720	2.8	6.5	11.9	15.8	21.9	25.5	27.9	29.6	32.0	33.5	34.5	35.3	35.9	36.4	36.8
780	2.4	6.2	11.9	16.1	23.0	27.2	30.2	32.3	35.3	37.3	38.7	39.8	40.7	41.4	42.0
840	0.2	5.6	13.3	18.6	26.6	31.2	34.2	36.4	39.2	41.1	42.4	43.3	44.1	44.7	45.2
900	2.8	8.5	16.2	21.4	29.1	33.5	36.4	38.5	41.3	43.1	44.4	45.4	46.2	46.8	47.3
960	-1.0	7.0	17.0	22.9	30.5	34.0	36.1	37.4	39.0	39.8	40.4	40.8	41.1	41.3	41.5
1020	-4.4	3.4	13.3	19.3	27.2	31.1	33.4	34.9	36.7	37.7	38.4	38.9	39.3	39.5	39.8
1080	-11.9	-1.4	11.0	17.8	25.9	29.5	31.4	32.6	33.9	34.6	35.1	35.4	35.6	35.7	35.8
1140	-17.5	-6.4	7.5	15.8	26.9	32.4	35.8	38.0	40.8	42.4	43.5	44.3	44.9	45.4	45.7
1200	-26.0	-12.3	4.7	14.9	28.6	35.4	39.5	42.2	45.7	47.7	49.1	50.0	50.8	51.3	51.8
1260	-31.0	-15.7	3.5	14.9	30.3	37.9	42.5	45.6	49.4	51.7	53.3	54.3	55.2	55.8	56.3
1320	-45.7	-18.8	7.9	20.4	32.9	37.6	40.0	41.4	43.3	44.6	45.6	46.6	47.5	48.4	49.2
1380	-50.2	-22.7	4.7	17.5	30.3	35.0	37.4	38.8	40.6	41.8	42.7	43.5	44.3	45.1	45.8
1440	-55.1	-26.6	1.8	15.0	28.2	32.9	35.2	36.6	38.2	39.2	39.9	40.6	41.1	41.7	42.2
1500	-44.4	-27.7	-6.7	5.8	22.5	30.9	35.9	39.3	43.4	46.0	47.6	48.8	49.7	50.4	51.0
1560	-6.0	-2.1	5.5	12.1	24.1	31.2	35.6	38.4	41.6	43.3	44.2	44.9	45.3	45.6	45.8
1620	-4.8	-1.8	4.6	10.7	23.2	31.4	36.7	40.1	44.1	46.1	47.3	48.1	48.6	48.9	49.2
1680	-3.9	-1.7	3.6	9.7	23.2	31.8	36.7	39.5	42.3	43.4	44.0	44.3	44.5	44.7	44.7
1740	-8.0	-5.1	1.2	7.5	20.2	28.2	33.1	36.1	39.3	40.9	41.8	42.3	42.6	42.9	43.0
1800	-12.6	-10.2	-4.0	3.0	18.3	27.3	32.1	34.7	37.1	38.1	38.5	38.8	38.9	39.0	39.1

Table 8. Maximum net evaporation for Cleveland, Ohio

[Maximum net evaporation was computed from data obtained from the Midwestern Regional Climate Center for National Oceanic and Atmospheric Administration climate station 331657 (table 5); calculations based on period 01/01/1948–09/08/1999]

Duration, in days	Maximum net evaporation (in inches) for indicated recurrence interval (in years)														
	5	6	8	10	15	20	25	30	40	50	60	70	80	90	100
30	5.4	5.6	5.8	6.0	6.4	6.6	6.8	6.9	7.0	7.2	7.2	7.3	7.3	7.4	7.4
60	8.4	8.6	9.1	9.4	10.1	10.5	10.9	11.3	11.8	12.2	12.6	12.9	13.1	13.4	13.6
90	10.8	11.2	11.9	12.4	13.2	13.6	13.9	14.1	14.4	14.5	14.6	14.7	14.8	14.8	14.9
120	13.1	13.4	13.9	14.4	15.4	15.9	16.2	16.3	16.5	16.6	16.6	16.7	16.7	16.7	16.7
150	14.0	14.5	15.2	15.7	16.6	17.2	17.6	17.9	18.4	18.7	19.0	19.2	19.4	19.5	19.7
180	15.1	15.4	16.0	16.4	17.2	17.8	18.3	18.7	19.3	19.8	20.2	20.5	20.8	21.1	21.3
210	14.5	15.1	16.0	16.6	17.8	18.6	19.2	19.7	20.4	21.0	21.4	21.8	22.1	22.3	22.5
240	13.1	13.9	15.1	16.0	17.5	18.5	19.1	19.6	20.3	20.8	21.2	21.4	21.6	21.8	22.0
270	11.8	12.7	13.9	14.9	16.6	17.8	18.7	19.3	20.4	21.2	21.8	22.3	22.7	23.0	23.3
300	10.3	11.1	12.4	13.4	15.3	16.6	17.7	18.5	19.9	20.9	21.8	22.5	23.1	23.7	24.2
330	9.0	10.0	11.6	12.8	14.6	15.8	16.6	17.2	18.0	18.6	19.0	19.4	19.6	19.9	20.0
360	8.2	9.2	10.7	11.9	13.8	15.1	16.0	16.8	17.8	18.6	19.1	19.6	19.9	20.2	20.5
420	10.3	11.2	12.7	13.8	15.9	17.3	18.5	19.4	20.8	22.0	22.9	23.6	24.3	24.9	25.4
480	12.0	12.7	13.9	14.9	17.1	19.0	20.6	22.0	24.6	26.8	28.7	30.6	32.2	33.8	35.3
540	12.4	13.0	14.2	15.3	17.7	19.9	21.9	23.8	27.3	30.6	33.7	36.6	39.4	42.1	44.8
600	9.6	10.5	12.1	13.6	16.8	19.6	22.2	24.6	28.9	32.8	36.4	39.7	42.8	45.8	48.6
660	6.4	7.6	9.6	11.4	15.1	18.1	20.7	23.1	27.1	30.6	33.7	36.5	39.0	41.3	43.5
720	3.4	5.2	8.0	10.3	14.5	17.6	20.1	22.1	25.3	27.9	30.0	31.8	33.3	34.7	35.9
780	3.0	4.6	7.4	9.7	14.3	17.9	20.9	23.6	28.0	31.7	34.8	37.6	40.1	42.4	44.5
840	0.7	3.5	8.0	11.5	17.9	22.5	26.0	28.9	33.4	36.9	39.7	42.1	44.1	45.9	47.5
900	0.2	3.5	8.7	12.7	19.7	24.5	28.1	31.0	35.3	38.4	40.9	42.9	44.6	46.0	47.2
960	-4.2	0.3	6.9	11.5	19.1	23.8	27.1	29.5	32.9	35.3	37.0	38.4	39.5	40.4	41.2
1020	-4.6	-0.6	5.2	9.3	16.0	20.1	22.9	25.1	28.1	30.1	31.6	32.8	33.7	34.5	35.2
1080	-12.0	-5.3	3.1	8.3	15.3	18.8	20.9	22.3	24.0	25.0	25.7	26.2	26.5	26.8	27.0
1140	-7.2	-2.7	3.7	8.2	15.3	19.6	22.5	24.6	27.5	29.5	30.9	32.0	32.9	33.6	34.1
1200	-12.3	-5.7	3.4	9.5	18.6	23.6	26.9	29.2	32.3	34.2	35.5	36.5	37.3	37.9	38.4
1260	-25.7	-14.2	0.2	8.8	20.3	26.1	29.5	31.8	34.7	36.4	37.6	38.4	39.0	39.5	39.9
1320	-15.1	-7.3	3.2	9.9	19.5	24.6	27.8	30.0	32.8	34.6	35.8	36.7	37.3	37.8	38.3
1380	-13.4	-8.6	-1.3	4.1	13.0	18.7	22.7	25.7	29.9	32.9	35.0	36.7	38.1	39.2	40.1
1440	-17.4	-13.1	-6.2	-0.9	8.4	14.7	19.3	22.9	28.1	31.9	34.8	37.0	38.9	40.4	41.7
1500	-30.8	-21.1	-8.1	0.1	11.7	17.8	21.5	24.0	27.1	29.1	30.3	31.2	31.9	32.5	32.9
1560	-11.4	-9.3	-4.6	0.2	10.8	18.7	24.2	28.0	32.7	35.2	36.7	37.7	38.3	38.8	39.1
1620	-34.7	-24.9	-11.3	-2.2	11.7	19.6	24.9	28.6	33.7	37.1	39.5	41.3	42.7	43.9	44.9
1680	-79.3	-50.7	-19.2	-3.1	14.7	21.6	25.1	27.1	29.2	30.3	30.9	31.3	31.6	31.8	31.9
1740	-16.1	-13.8	-9.0	-4.4	5.8	13.7	19.6	24.0	29.9	33.6	36.0	37.6	38.8	39.7	40.4
1800	-31.3	-25.9	-16.8	-9.4	3.6	11.9	17.4	21.3	26.4	29.5	31.6	33.1	34.1	35.0	35.6

Table 9. Maximum net evaporation for Columbus, Ohio

[Maximum net evaporation was computed from data obtained from the Midwestern Regional Climate Center for National Oceanic and Atmospheric Administration climate stations 331786 and 331778 (table 5); calculations based on period 07/01/1948–09/08/1999]

Duration, in days	Maximum net evaporation (in inches) for indicated recurrence interval (in years)														
	5	6	8	10	15	20	25	30	40	50	60	70	80	90	100
30	5.2	5.3	5.4	5.6	5.9	6.0	6.2	6.2	6.3	6.4	6.4	6.5	6.5	6.5	6.5
60	8.0	8.2	8.4	8.6	8.9	9.1	9.2	9.3	9.4	9.5	9.5	9.6	9.6	9.7	9.7
90	10.1	10.4	10.7	11.0	11.5	11.8	12.1	12.3	12.6	12.8	13.0	13.1	13.3	13.4	13.5
120	12.1	12.4	12.8	13.2	13.7	14.1	14.3	14.5	14.8	15.0	15.2	15.3	15.4	15.4	15.5
150	12.6	13.0	13.7	14.4	15.5	16.2	16.5	16.7	16.9	17.1	17.1	17.1	17.2	17.2	17.2
180	12.9	13.3	14.2	15.3	17.6	18.6	19.0	19.2	19.3	19.3	19.4	19.4	19.4	19.4	19.4
210	13.1	13.4	14.1	14.9	17.1	18.7	19.6	20.2	20.8	21.1	21.2	21.3	21.4	21.4	21.4
240	12.7	12.8	13.2	14.0	17.3	19.5	20.4	20.7	21.0	21.0	21.0	21.0	21.0	21.0	21.0
270	12.0	12.1	12.5	13.3	16.9	19.3	20.2	20.5	20.7	20.7	20.7	20.7	20.7	20.7	20.7
300	11.1	11.3	11.8	12.9	16.9	19.0	19.7	19.9	20.0	20.1	20.1	20.1	20.1	20.1	20.1
330	9.4	10.1	11.6	12.9	15.6	17.3	18.3	19.0	19.8	20.3	20.5	20.6	20.8	20.8	20.9
360	9.6	10.2	11.6	12.9	15.2	16.6	17.5	18.0	18.5	18.8	19.0	19.1	19.1	19.2	19.2
420	10.9	11.7	13.0	14.0	15.9	17.3	18.4	19.3	20.7	21.8	22.8	23.5	24.2	24.9	25.4
480	11.8	12.8	14.4	15.6	18.1	19.9	21.3	22.5	24.4	25.9	27.2	28.3	29.2	30.1	30.8
540	12.5	14.0	16.4	18.2	21.6	24.0	25.9	27.4	29.8	31.6	33.1	34.4	35.5	36.5	37.4
600	10.8	12.9	16.1	18.5	22.7	25.5	27.5	29.1	31.5	33.3	34.7	35.8	36.8	37.6	38.3
660	7.6	10.3	14.4	17.3	22.1	25.2	27.3	28.8	31.0	32.5	33.6	34.4	35.0	35.6	36.0
720	6.0	8.6	12.6	15.5	20.5	23.7	26.0	27.8	30.4	32.3	33.8	35.0	35.9	36.8	37.5
780	5.4	8.4	12.9	16.2	21.4	24.7	27.0	28.7	31.1	32.8	34.1	35.0	35.8	36.5	37.0
840	5.1	9.8	16.0	19.9	25.2	28.0	29.7	30.9	32.3	33.2	33.8	34.2	34.6	34.8	35.0
900	4.9	9.7	16.2	20.5	26.9	30.4	32.8	34.4	36.5	37.9	38.9	39.6	40.1	40.6	40.9
960	4.1	10.6	18.4	22.9	28.5	31.0	32.4	33.3	34.4	35.0	35.3	35.6	35.8	35.9	36.0
1020	3.6	8.9	15.7	19.9	25.7	28.6	30.4	31.5	33.0	33.9	34.5	34.9	35.2	35.5	35.7
1080	-6.5	0.6	9.5	14.9	22.0	25.4	27.4	28.7	30.3	31.2	31.8	32.2	32.5	32.7	32.9
1140	-5.8	-0.5	7.2	12.4	20.7	25.6	28.9	31.3	34.6	36.8	38.5	39.7	40.7	41.5	42.1
1200	-5.6	-0.4	7.3	12.9	22.2	28.1	32.2	35.4	40.0	43.1	45.5	47.4	48.9	50.1	51.2
1260	-5.6	0.0	8.4	14.4	24.3	30.4	34.8	38.0	42.7	45.9	48.3	50.2	51.7	53.0	54.0
1320	-6.3	-0.7	7.8	14.0	24.2	30.6	35.1	38.5	43.4	46.8	49.4	51.4	53.0	54.3	55.5
1380	-8.5	-2.8	5.7	11.9	22.3	29.0	33.7	37.3	42.6	46.2	49.0	51.1	52.9	54.4	55.6
1440	-11.9	-5.7	3.4	10.0	20.8	27.6	32.3	35.9	40.9	44.4	47.0	49.0	50.6	51.9	53.1
1500	-22.5	-13.0	0.2	9.0	22.0	29.2	33.8	37.0	41.3	43.9	45.8	47.2	48.2	49.0	49.7
1560	-13.3	-7.7	1.3	8.1	20.2	28.1	33.9	38.4	44.8	49.3	52.7	55.4	57.5	59.3	60.8
1620	-25.3	-16.5	-3.3	6.3	21.9	31.5	38.1	42.9	49.4	53.8	56.9	59.3	61.1	62.6	63.8
1680	-27.9	-18.5	-4.4	5.7	22.3	32.4	39.3	44.3	51.3	55.9	59.2	61.7	63.7	65.3	66.6
1740	-44.7	-30.8	-11.2	2.0	21.5	32.2	39.0	43.7	49.8	53.6	56.2	58.0	59.4	60.5	61.4
1800	-66.1	-46.3	-19.8	-3.1	20.1	31.9	39.0	43.8	49.7	53.1	55.4	57.1	58.3	59.2	59.9

Table 10. Maximum net evaporation for Dayton, Ohio

[Maximum net evaporation was computed from data obtained from the Midwestern Regional Climate Center for National Oceanic and Atmospheric Administration climate stations 332075 and 332067 (table 5); calculations based on period 07/01/1948–07/31/1999]

Duration, in days	Maximum net evaporation (in inches) for indicated recurrence interval (in years)														
	5	6	8	10	15	20	25	30	40	50	60	70	80	90	100
30	5.7	5.7	5.7	5.8	6.1	6.4	6.7	6.8	7.0	7.0	7.0	7.0	7.0	7.1	7.1
60	8.8	8.9	9.2	9.5	10.0	10.4	10.8	11.0	11.5	11.9	12.2	12.4	12.6	12.8	13.0
90	11.4	11.6	11.9	12.2	12.8	13.4	13.9	14.3	15.2	16.0	16.7	17.4	18.0	18.7	19.3
120	13.4	13.6	13.9	14.3	15.5	16.6	17.3	17.7	18.1	18.3	18.4	18.4	18.5	18.5	18.5
150	15.2	15.2	15.6	16.3	17.8	18.3	18.4	18.4	18.5	18.5	18.5	18.5	18.5	18.5	18.5
180	16.2	16.5	17.1	17.5	18.3	19.0	19.5	19.9	20.5	21.1	21.5	21.9	22.2	22.5	22.7
210	16.0	16.5	17.4	18.1	19.1	19.8	20.3	20.6	21.1	21.5	21.7	21.9	22.1	22.2	22.3
240	15.9	16.4	17.0	17.5	18.3	18.9	19.3	19.5	20.0	20.3	20.5	20.7	20.9	21.0	21.1
270	14.4	15.1	16.2	17.0	18.1	18.8	19.3	19.6	20.0	20.3	20.5	20.6	20.7	20.8	20.9
300	13.4	14.0	15.1	16.0	17.5	18.5	19.1	19.6	20.2	20.6	20.9	21.1	21.2	21.3	21.4
330	11.9	12.3	13.4	14.5	16.8	18.2	18.9	19.3	19.7	19.9	20.0	20.0	20.0	20.1	20.1
360	11.1	12.1	13.5	14.6	16.6	18.0	19.0	19.9	21.2	22.2	23.0	23.6	24.2	24.6	25.1
420	12.7	13.4	15.1	16.7	20.1	22.5	23.9	24.9	26.0	26.6	26.9	27.1	27.3	27.4	27.4
480	14.1	15.3	18.1	20.7	25.3	27.8	29.2	30.0	30.8	31.1	31.3	31.4	31.5	31.5	31.5
540	16.2	18.2	21.3	23.5	26.9	28.9	30.1	30.9	31.9	32.5	32.9	33.2	33.4	33.5	33.7
600	14.9	17.2	20.6	23.1	26.7	28.7	29.9	30.6	31.5	32.1	32.4	32.6	32.8	32.9	33.0
660	11.9	15.0	19.1	21.6	25.1	26.9	28.0	28.8	29.8	30.3	30.7	31.0	31.2	31.4	31.5
720	7.7	11.6	16.6	19.5	23.2	25.0	26.0	26.6	27.4	27.8	28.0	28.2	28.3	28.4	28.5
780	6.9	11.8	18.0	21.6	26.2	28.4	29.6	30.4	31.4	31.9	32.3	32.5	32.7	32.8	32.9
840	4.6	11.1	19.2	24.0	30.0	32.8	34.4	35.4	36.6	37.3	37.7	37.9	38.1	38.3	38.4
900	5.6	12.4	20.8	25.7	32.1	35.0	36.6	37.7	38.9	39.6	40.0	40.3	40.5	40.6	40.7
960	6.7	13.2	21.1	25.6	31.2	33.7	35.1	35.9	36.9	37.4	37.8	38.0	38.1	38.3	38.3
1020	4.0	10.2	17.9	22.4	28.2	30.9	32.5	33.5	34.6	35.3	35.7	36.0	36.2	36.4	36.5
1080	-0.8	4.8	12.3	17.1	23.8	27.2	29.3	30.7	32.4	33.4	34.0	34.5	34.8	35.1	35.3
1140	-8.3	1.6	13.4	20.0	27.9	31.4	33.3	34.4	35.7	36.4	36.9	37.1	37.3	37.5	37.6
1200	-7.0	2.2	14.0	21.2	30.8	35.5	38.2	39.9	42.0	43.2	44.0	44.5	44.9	45.2	45.4
1260	-11.6	0.3	14.7	22.9	33.0	37.5	40.0	41.6	43.4	44.4	45.0	45.4	45.7	45.9	46.1
1320	-24.5	-4.6	15.4	24.6	33.6	36.7	38.1	38.8	39.5	39.9	40.0	40.1	40.2	40.3	40.3
1380	-25.5	-7.0	12.2	21.5	31.0	34.5	36.1	37.0	38.0	38.4	38.6	38.8	38.9	38.9	39.0
1440	-33.5	-9.7	12.0	20.9	28.6	30.8	31.8	32.2	32.6	32.8	32.9	32.9	32.9	32.9	33.0
1500	-39.9	-15.9	8.4	19.6	30.5	34.2	35.9	36.8	37.6	38.0	38.2	38.4	38.4	38.5	38.5
1560	-15.6	-8.8	4.1	14.6	30.7	38.1	41.8	43.9	45.8	46.7	47.2	47.4	47.6	47.7	47.8
1620	-20.6	-7.0	9.9	19.9	32.7	38.8	42.3	44.6	47.3	48.9	49.9	50.6	51.1	51.5	51.8
1680	-13.3	-6.2	6.0	15.5	30.6	38.6	43.3	46.1	49.4	51.0	52.0	52.6	53.1	53.4	53.6
1740	-23.6	-12.8	2.9	13.4	28.3	35.7	40.0	42.8	46.1	47.9	49.0	49.7	50.2	50.6	50.9
1800	-20.5	-13.6	-1.3	8.6	24.9	33.8	39.0	42.2	45.8	47.7	48.8	49.4	49.9	50.2	50.5

Table 11. Maximum net evaporation for Pittsburgh, Pennsylvania

[Maximum net evaporation was computed from data obtained from the Midwestern Regional Climate Center for National Oceanic and Atmospheric Administration climate stations 366992, 366993, and 366997 (table 5); calculations based on period 07/01/1945–09/08/1999]

Duration, in days	Maximum net lake evaporation (in inches) for indicated recurrence interval (in years)														
	5	6	8	10	15	20	25	30	40	50	60	70	80	90	100
30	4.9	5.0	5.2	5.3	5.6	5.8	5.9	6.1	6.3	6.5	6.6	6.7	6.8	6.9	7.0
60	7.5	7.6	7.8	8.1	8.9	9.6	10.0	10.2	10.4	10.4	10.5	10.5	10.5	10.5	10.5
90	9.3	9.5	9.9	10.3	11.2	11.9	12.4	12.8	13.3	13.5	13.7	13.8	13.9	13.9	14.0
120	10.8	11.1	11.6	12.1	13.0	13.7	14.3	14.8	15.6	16.3	16.8	17.2	17.6	17.9	18.2
150	11.9	12.1	12.7	13.2	14.3	15.2	15.8	16.3	16.9	17.4	17.7	17.9	18.0	18.2	18.3
180	12.9	13.3	14.0	14.5	15.5	16.1	16.6	17.0	17.5	17.8	18.1	18.3	18.4	18.6	18.7
210	13.2	13.6	14.3	14.8	15.9	16.7	17.4	17.9	18.7	19.3	19.7	20.0	20.3	20.6	20.8
240	13.3	13.7	14.4	15.0	16.1	16.9	17.6	18.1	18.8	19.4	19.9	20.2	20.6	20.8	21.1
270	12.6	13.0	13.8	14.5	15.7	16.4	17.0	17.4	17.9	18.3	18.5	18.7	18.8	18.9	19.0
300	11.4	12.0	13.0	13.7	14.9	15.5	16.0	16.3	16.8	17.1	17.3	17.4	17.6	17.7	17.7
330	10.3	11.1	12.1	12.9	14.0	14.8	15.2	15.6	16.0	16.4	16.6	16.7	16.9	17.0	17.1
360	10.1	10.9	12.1	13.0	14.4	15.4	16.1	16.6	17.4	17.9	18.3	18.6	18.8	19.1	19.2
420	10.8	11.5	12.8	13.8	15.7	17.1	18.2	19.1	20.5	21.6	22.6	23.4	24.1	24.7	25.2
480	12.4	13.5	15.3	16.6	18.9	20.5	21.6	22.5	23.8	24.7	25.4	26.0	26.5	26.9	27.2
540	12.7	13.7	15.9	17.9	21.2	22.9	23.7	24.2	24.6	24.8	24.9	25.0	25.0	25.0	25.1
600	12.8	13.2	15.0	17.8	22.9	24.4	24.7	24.9	24.9	24.9	25.0	25.0	25.0	25.0	25.0
660	10.8	12.0	14.4	16.6	20.3	22.0	22.9	23.4	23.8	24.0	24.1	24.2	24.2	24.2	24.3
720	7.7	9.6	12.4	14.4	17.8	19.9	21.4	22.6	24.3	25.5	26.4	27.1	27.7	28.3	28.7
780	7.7	8.8	11.0	13.2	18.1	21.8	24.4	26.3	28.6	29.9	30.7	31.3	31.7	31.9	32.1
840	5.8	8.9	13.5	16.7	22.0	25.4	27.7	29.5	32.1	33.9	35.3	36.4	37.3	38.0	38.7
900	6.2	10.4	16.1	19.8	25.4	28.5	30.5	32.0	34.0	35.3	36.2	36.9	37.4	37.9	38.2
960	2.2	9.0	16.9	21.3	26.4	28.6	29.8	30.5	31.3	31.8	32.0	32.2	32.3	32.4	32.5
1020	-0.3	7.1	15.3	19.6	24.4	26.3	27.3	27.9	28.6	28.9	29.1	29.2	29.3	29.4	29.4
1080	-6.0	0.9	9.6	14.9	21.8	25.3	27.4	28.8	30.5	31.6	32.3	32.8	33.1	33.4	33.7
1140	-6.1	1.4	10.7	16.3	23.8	27.6	29.8	31.3	33.2	34.3	35.1	35.6	36.0	36.3	36.6
1200	-6.8	1.5	11.8	18.0	26.3	30.4	32.9	34.5	36.6	37.8	38.6	39.2	39.7	40.0	40.3
1260	-17.1	-1.2	14.6	22.0	29.4	32.1	33.5	34.3	35.3	36.0	36.5	37.0	37.5	37.9	38.3
1320	-29.5	-9.6	10.3	19.6	28.9	32.3	34.1	35.1	36.5	37.3	38.1	38.7	39.3	39.9	40.5
1380	-30.9	-10.9	9.0	18.2	27.4	30.7	32.2	33.2	34.2	34.8	35.2	35.5	35.8	36.1	36.4
1440	-38.4	-16.4	5.4	15.6	25.7	29.3	31.1	32.1	33.3	34.0	34.5	34.9	35.3	35.6	36.0
1500	-37.7	-16.2	5.1	15.1	25.0	28.6	30.4	31.5	32.8	33.7	34.3	34.9	35.5	36.0	36.5
1560	8.1	9.0	11.5	15.0	24.4	30.7	34.2	36.0	37.6	38.2	38.4	38.6	38.6	38.7	38.7
1620	-6.5	1.8	12.2	18.4	26.7	30.9	33.4	35.1	37.1	38.4	39.2	39.8	40.3	40.6	40.9
1680	-2.3	2.1	8.7	13.6	21.5	26.5	30.0	32.6	36.4	39.0	40.9	42.4	43.6	44.6	45.5
1740	-9.8	-3.2	5.8	11.9	20.9	26.1	29.4	31.8	35.0	37.1	38.6	39.7	40.6	41.3	41.9
1800	-17.6	-9.4	1.6	8.8	18.8	24.1	27.3	29.5	32.2	33.8	34.9	35.7	36.2	36.7	37.0

Table 12. Maximum net evaporation for Toledo, Ohio

[Maximum net evaporation was computed from data obtained from the Midwestern Regional Climate Center for National Oceanic and Atmospheric Administration climate stations 338356 and 338357 (table 5); calculations based on period 01/01/1946–09/08/1999]

Duration, in days	Maximum net evaporation (in inches) for indicated recurrence interval (in years)														
	5	6	8	10	15	20	25	30	40	50	60	70	80	90	100
30	5.5	5.7	6.1	6.5	7.1	7.6	8.0	8.3	8.9	9.4	9.8	10.1	10.5	10.8	11.0
60	8.5	8.9	9.6	10.1	11.2	12.0	12.7	13.2	14.2	15.0	15.7	16.3	16.8	17.3	17.8
90	11.1	11.6	12.5	13.2	14.6	15.7	16.6	17.4	18.7	19.8	20.7	21.5	22.3	22.9	23.5
120	13.5	14.1	15.0	15.8	17.3	18.5	19.5	20.3	21.7	22.8	23.7	24.6	25.3	26.0	26.7
150	15.7	16.3	17.1	17.8	19.2	20.2	21.0	21.8	22.9	23.9	24.7	25.4	26.0	26.5	27.0
180	17.4	17.9	18.9	19.7	21.2	22.3	23.2	24.0	25.3	26.3	27.2	27.9	28.6	29.2	29.8
210	17.7	18.3	19.3	20.1	21.7	22.9	23.9	24.7	26.1	27.2	28.2	29.0	29.7	30.4	31.0
240	17.4	18.0	19.2	20.1	21.9	23.3	24.4	25.4	27.0	28.3	29.4	30.4	31.3	32.1	32.8
270	16.9	17.4	18.4	19.2	20.9	22.3	23.5	24.7	26.7	28.4	30.0	31.4	32.7	34.0	35.1
300	16.0	16.4	17.2	17.9	19.5	21.0	22.3	23.6	26.0	28.1	30.2	32.2	34.0	35.8	37.5
330	14.5	15.3	16.5	17.4	19.0	20.1	20.9	21.6	22.5	23.2	23.8	24.2	24.5	24.8	25.1
360	13.6	14.5	15.9	17.0	18.8	20.1	21.0	21.7	22.7	23.4	24.0	24.4	24.8	25.1	25.4
420	16.1	17.0	18.7	20.3	23.2	25.1	26.3	27.2	28.2	28.8	29.2	29.4	29.6	29.7	29.8
480	20.7	21.6	23.1	24.3	26.5	28.2	29.5	30.6	32.3	33.7	34.9	35.9	36.7	37.5	38.2
540	22.5	23.4	25.0	26.4	28.9	30.7	32.1	33.2	35.0	36.2	37.2	38.0	38.7	39.2	39.7
600	22.6	23.4	24.8	26.2	29.3	31.9	34.0	35.5	37.5	38.5	39.0	39.2	39.3	39.4	39.4
660	20.2	21.1	22.8	24.4	28.2	31.3	33.7	35.4	37.3	38.2	38.6	38.7	38.8	38.8	38.8
720	16.6	17.9	20.7	23.3	28.7	32.2	34.1	35.1	35.8	35.9	36.0	36.0	36.0	36.0	36.0
780	16.1	19.6	24.3	27.3	31.6	33.9	35.3	36.3	37.5	38.2	38.7	39.1	39.4	39.6	39.8
840	18.6	20.3	23.7	26.9	33.0	36.7	39.0	40.4	42.0	42.8	43.3	43.6	43.8	43.9	44.0
900	17.5	21.2	26.5	30.2	36.0	39.4	41.7	43.4	45.7	47.2	48.3	49.2	49.8	50.4	50.8
960	15.9	20.7	27.3	31.6	38.0	41.7	44.1	45.8	48.1	49.7	50.7	51.6	52.2	52.7	53.2
1020	13.3	18.4	25.4	30.0	36.9	40.7	43.3	45.1	47.6	49.2	50.3	51.2	51.9	52.4	52.9
1080	13.6	17.1	22.8	27.0	34.1	38.5	41.4	43.5	46.3	48.1	49.3	50.2	50.9	51.4	51.9
1140	13.4	18.2	25.2	30.0	37.1	40.9	43.2	44.8	46.8	48.0	48.7	49.3	49.7	50.0	50.2
1200	11.7	17.3	25.8	31.9	40.8	45.3	48.0	49.7	51.7	52.8	53.5	53.9	54.2	54.5	54.6
1260	16.8	20.8	28.0	33.9	43.5	48.8	51.9	53.8	56.0	57.1	57.8	58.2	58.5	58.7	58.9
1320	15.8	20.7	29.3	35.9	46.3	51.4	54.3	56.0	57.8	58.7	59.2	59.5	59.7	59.9	60.0
1380	12.4	17.6	27.1	34.4	45.2	50.2	52.7	54.1	55.5	56.1	56.4	56.6	56.7	56.8	56.9
1440	9.4	14.8	24.1	31.2	41.9	47.2	50.0	51.7	53.5	54.4	55.0	55.3	55.5	55.6	55.7
1500	10.8	15.3	23.1	29.5	40.4	46.9	51.0	53.7	57.0	58.8	59.9	60.7	61.2	61.6	61.9
1560	13.4	17.3	24.8	31.3	43.1	50.2	54.6	57.4	60.6	62.3	63.3	64.0	64.4	64.7	65.0
1620	18.4	20.1	25.3	32.1	47.6	56.1	59.9	61.8	63.2	63.7	63.9	64.0	64.1	64.1	64.1
1680	17.1	19.4	25.5	32.7	48.3	56.9	61.0	63.1	64.9	65.5	65.8	66.0	66.1	66.1	66.2
1740	10.5	15.5	24.9	32.9	46.8	54.7	59.3	62.2	65.5	67.1	68.1	68.7	69.1	69.4	69.6
1800	-0.5	7.2	20.3	30.2	45.3	52.9	57.0	59.5	62.2	63.6	64.4	64.8	65.2	65.4	65.6

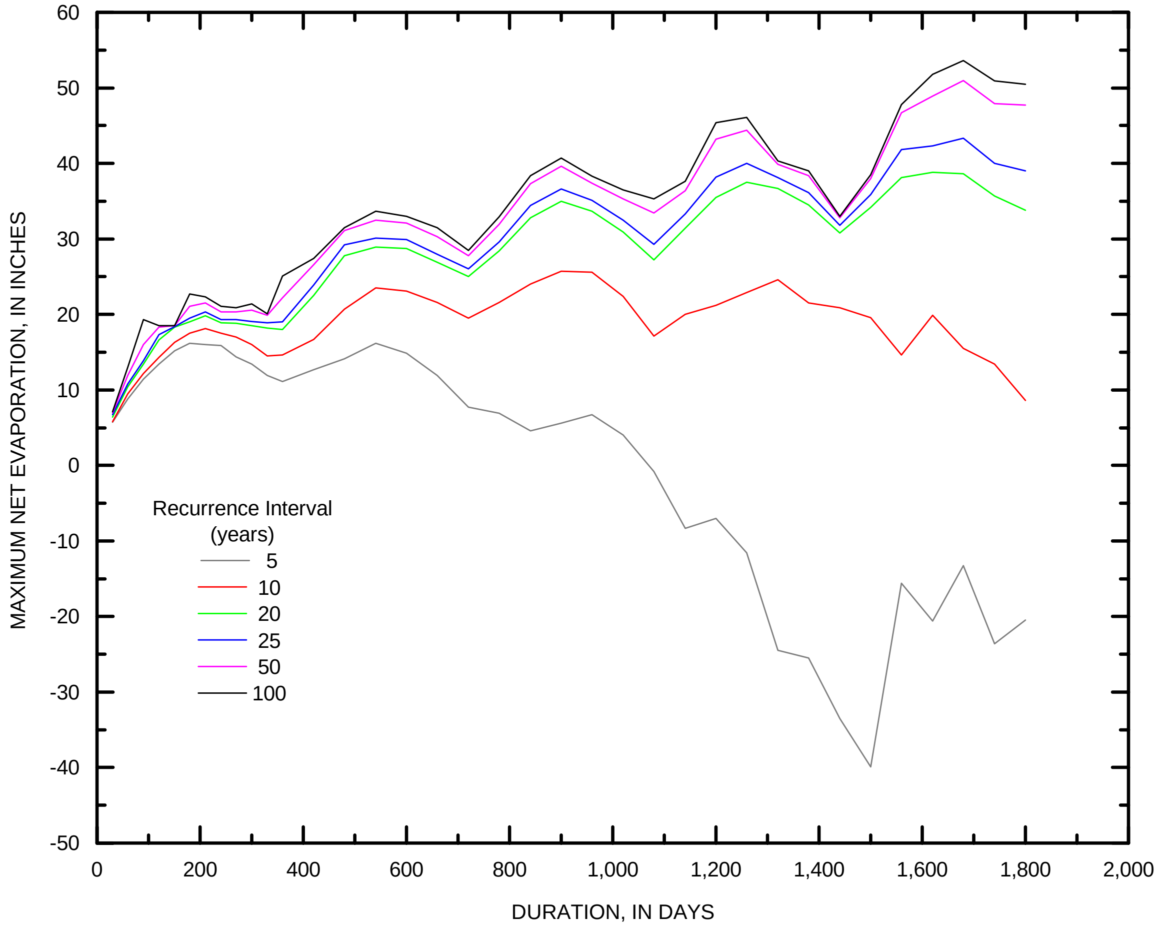

Figure 3. Maximum net evaporation as a function of duration and recurrence interval computed for the climatic station at the Dayton International Airport.

Characteristics of Storage Requirements for Impounding Reservoirs

Storage requirements computed for selected demands and recurrence intervals were examined to identify patterns that might facilitate estimation of storage requirements at sites where site-specific storage calculations have not been done. Cross (1963, 1965) related the ratio of required storage to mean annual flow volume to what was called the "7-day median index of average low flow in ratio to mean annual flow." The 7-day median index of average low flow now is commonly called the 7-day, 2-year low flow, or $7Q_2$. In this study, the required storage (in inches) is related to the $7Q_2$ divided by the mean annual flow.

Cross (1963, 1965) developed separate relations for northeast Ohio and the remainder of the State. In this study, relations were developed for the entire State because no separation appeared necessary. Families of curves corresponding to selected demands were prepared for recurrence intervals of 5, 10, 20, and 50 years. Each family of curves was developed by plotting, for each site, the computed storage requirements (in inches) for each demand (in percent of the mean annual flow) against the ratio of the $7Q_2$ to the mean annual flow. A best-fit curve was then drawn through the data points by a two-step process. First, data were fitted by means of a logistic model of the form

$$S = \frac{a}{\left(1 + \exp\left(b - c\left(\frac{7Q_2}{MAF}\right)\right)\right)}, \qquad (4)$$

where S is the storage required (in inches); $7Q_2$ is the 7-day, 2-year low flow (in cubic feet per second); MAF is the mean annual flow (in cubic feet per second); and a, b, and c are coefficients. Then, the resulting curve was manually modified (if necessary) to ensure a logical progression of storage requirements with increasing demand and recurrence interval. A sample plot of the data points and the family of curves for the 10-year recurrence interval is shown in figure 4. Figures 5-8 show the families of curves, without the individual data points, for recurrence intervals of 5, 10, 20, and 50 years.

Storage Analyses for Side-Channel Reservoirs

In the design of an impounding reservoir, the storage required is a function of the demand for water and the recurrence interval associated with the design low-flow conditions. Unlike an impounding reservoir, which can theoretically capture all of the streamflow, side-channel reservoirs depend on one or more pumps to fill the reservoir. Consequently, the number, types, and capacities of the pumps in use are additional factors that must be considered in the reservoir design.

Streamflow Data for Side-Channel Reservoir Analyses

The same streamflow data that were used for the impounding reservoir analyses were also used for the side-channel reservoir analyses. For a side-channel reservoir, however, ODNR currently recommends that the 80-percent-duration (d80) flow (or the entire flow of the stream if it is less than the 80-percent-duration flow) be maintained (Michael Schiefer, 2000, Ohio Department of Natural Resources, Division of Water, written commun.). That recommendation was adopted for this study, the impact of which was to occasionally limit or prohibit the computed withdrawal of water from the stream.

The d80 was determined for each stream location on the basis of streamflow data collected during the period of systematic record. For the side-channel reservoir storage calculations, the d80 was subtracted from each daily mean streamflow value. If the result of that subtraction was zero or negative, then inflow to the side-channel reservoir was set to zero for that day. If instead the subtraction resulted in a positive flow value, then that amount of flow was considered available for withdrawal.

Treatment of Evaporation in Side-Channel Reservoirs

The same PET data used in the impounding reservoir analyses were used for the side-channel reservoir analyses. Rather than tabulating maximum net evaporation data (as was done for the impounding reservoir analyses), however, daily net evaporation was estimated for each individual gaging-station location, and those estimates were incorporated directly into the storage calculations.

Net evaporation data generally were computed by subtracting a representative daily precipitation value from a representative daily PET value. The selection of which precipitation and PET data to use as representative of a particular gaging station location was based on the physical proximity of the gaging station's drainage area to the climate station(s) and on similarities in regional patterns of evaporation (Kohler and others, 1959) and mean annual precipitation (Harstine, 1991).

Precipitation data were available for several long-term National Oceanic and Atmospheric Administration (NOAA) climate stations (table 5), and some of the data included time periods that predated the computed PET values. Net evaporation for periods that predated the computed PET values was estimated by subtracting the daily precipitation value from the long-term mean PET value computed from the available PET data for that calendar month. For example, the net evaporation for October 1, 1940, at the Dayton climate station was determined by subtracting the precipitation measured on that day from the mean PET determined for that station based on all October days for the period of PET data availability (1948-99).

Daily net evaporation data can be considered directly in storage calculations only if the surface area contributing direct runoff to the reservoir and the surface area of water in the reservoir are known. For a side-channel reservoir (and unlike an impounding reservoir), these two areas frequently can be considered to be approximately equal. During a reservoir's design phase, however, those calculations are complicated by the fact that neither the exact geometry of the reservoir nor the surface area of water in the reservoir are yet known.

Knapp (1982) presented an empirical equation that related storage volume to reservoir surface area for side-channel reservoirs in Illinois. That equation was tested against a sampling of surface area versus storage relations for existing side-channel reservoirs in Ohio and found to provide relatively poor estimates of surface area. Consequently, a new equation was developed on the basis of data from several existing side-channel reservoirs in Ohio, resulting in generally improved estimates of reservoir surface area.

The equation developed to relate storage to surface area in side-channel reservoirs in Ohio is

$$A_t = 0.26 V_{full}^{0.58} V_t^{0.18}, \qquad (5)$$

where A_t is the area of the water surface (in acres) at time t, V_{full} is the volume of the full reservoir (in acre-feet), and V_t is the volume of the reservoir (in acre-feet) at time t. Equation 5 was used in the computations to estimate the reservoir surface area under conditions of changing storage.

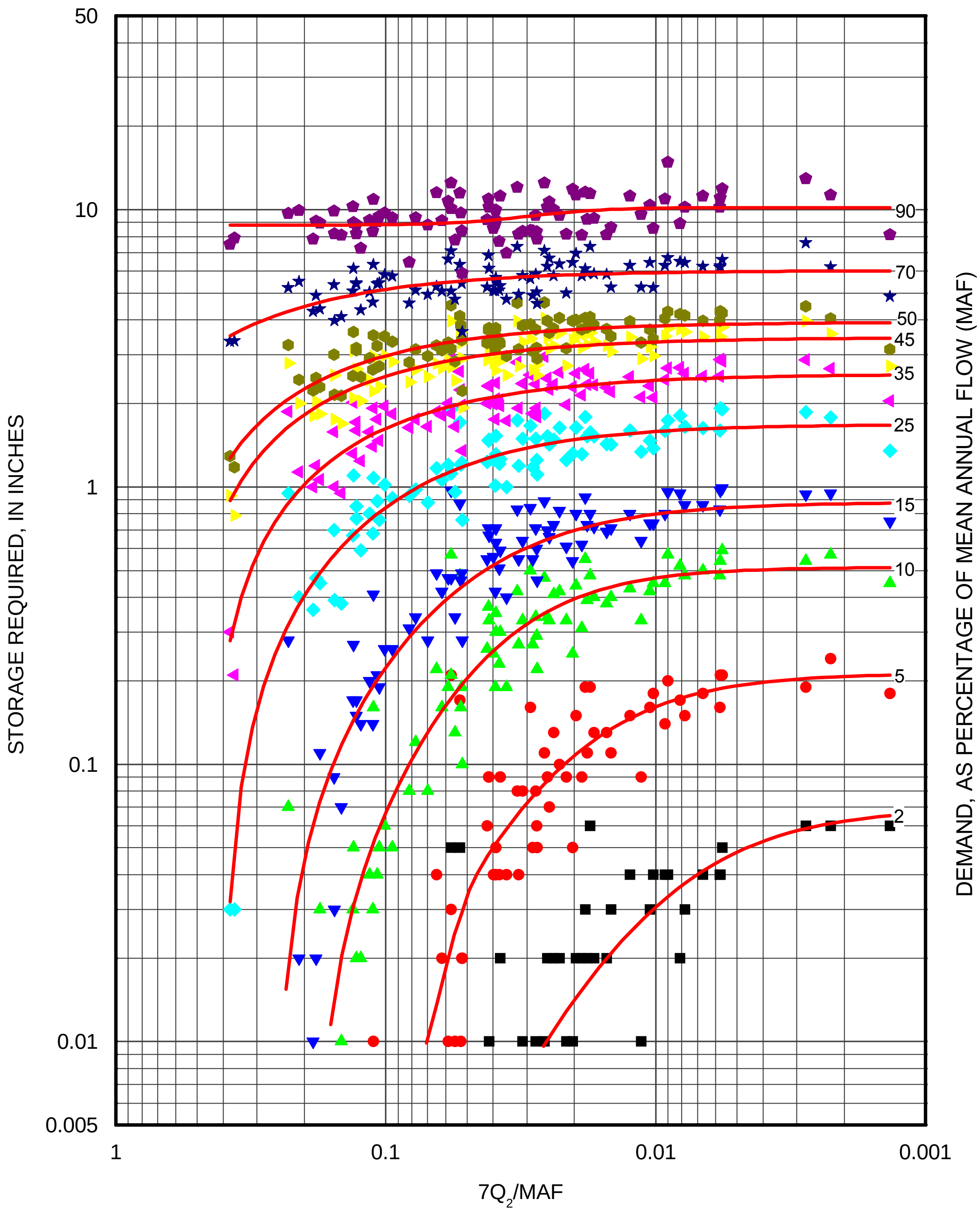

Figure 4. Storage required to meet demands as a function of the 7-day, 2-year low flow ($7Q_2$) divided by the mean annual flow (MAF) for a 10-year recurrence interval, with data points plotted.

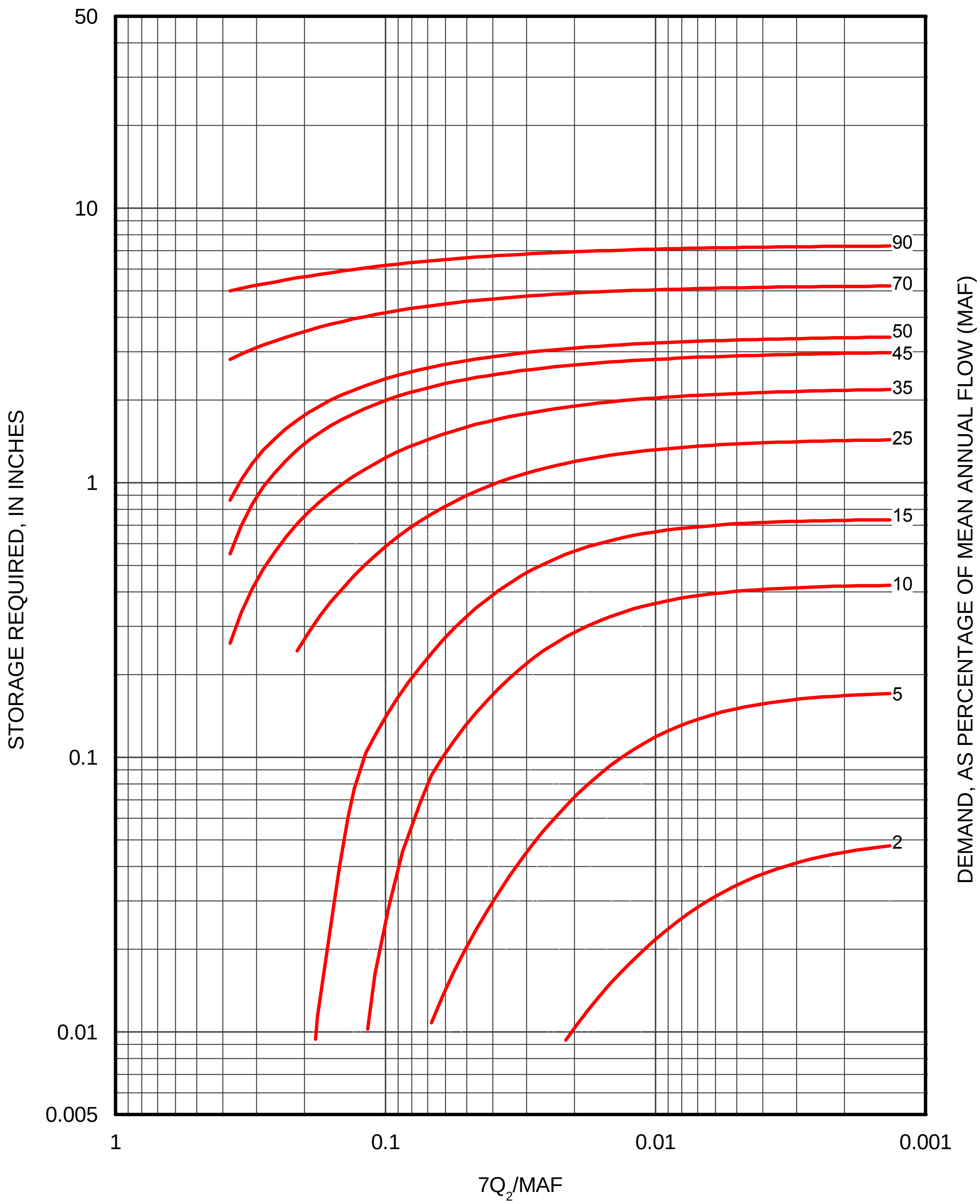

Figure 5. Storage required to meet demands as a function of the 7-day, 2-year low flow ($7Q_2$) divided by the mean annual flow (MAF) for a 5-year recurrence interval.

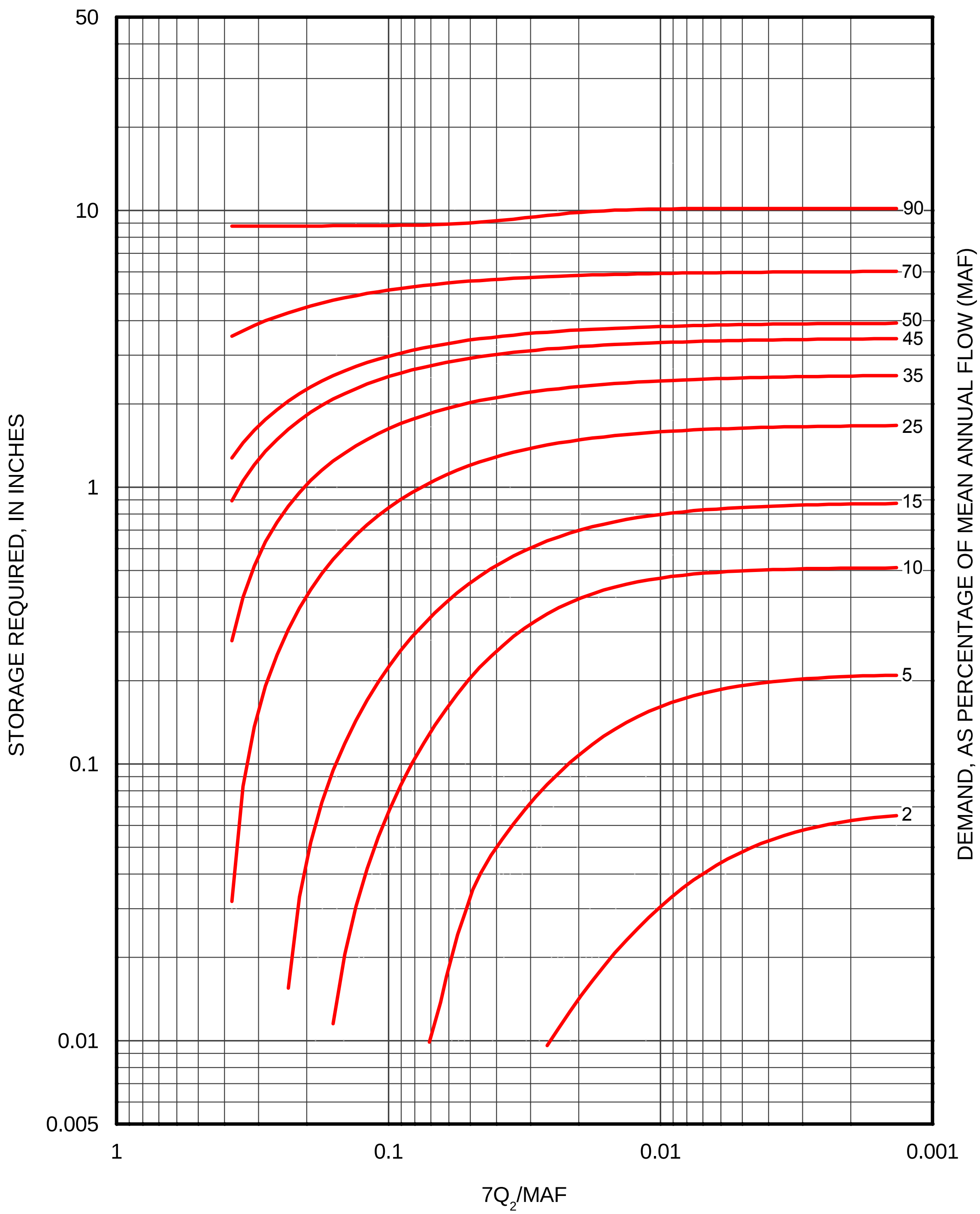

Figure 6. Storage required to meet demands as a function of the 7-day, 2-year low flow ($7Q_2$) divided by the mean annual flow (MAF) for a 10-year recurrence interval.

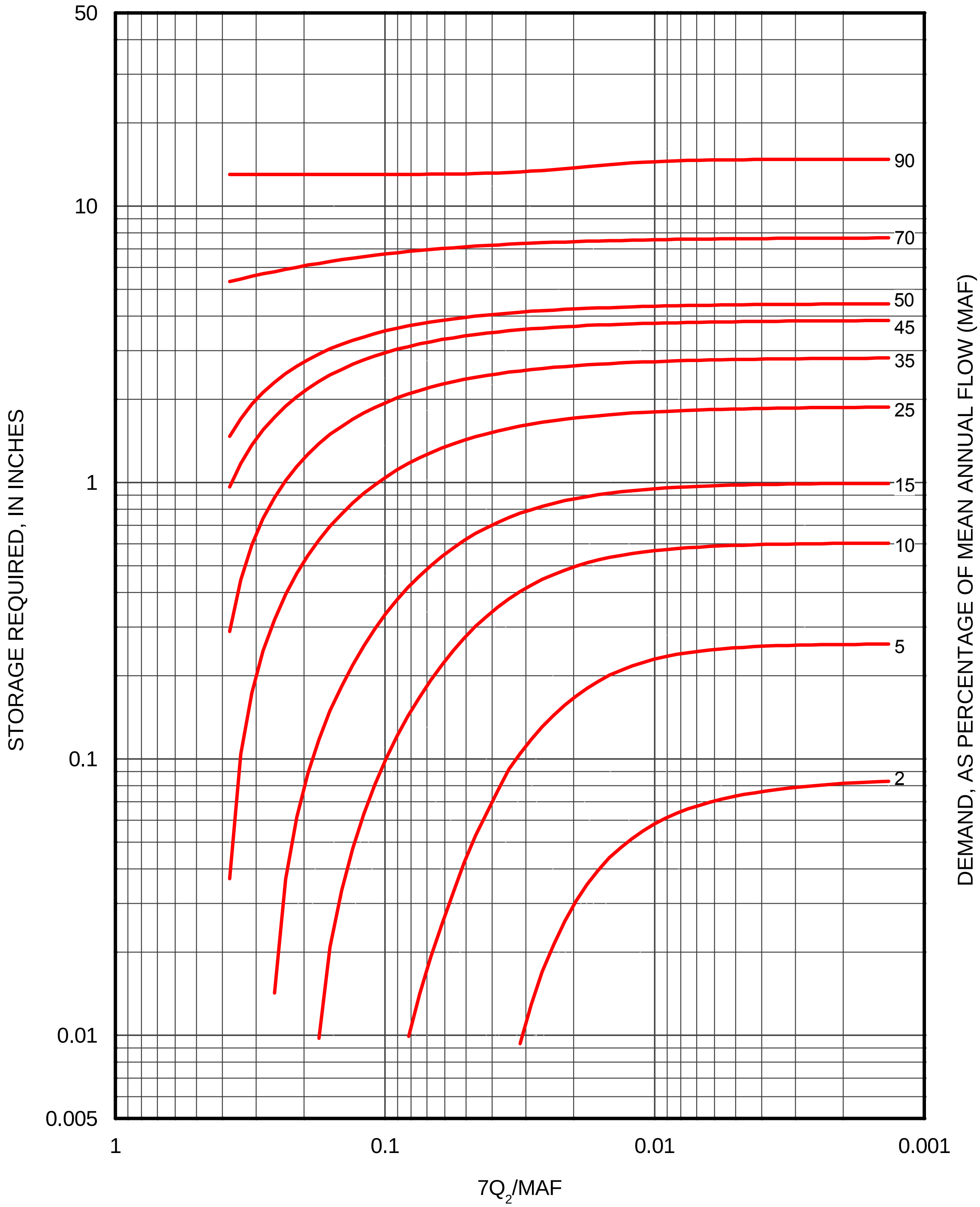

Figure 7. Storage required to meet demands as a function of the 7-day, 2-year low flow ($7Q_2$) divided by the mean annual flow (MAF) for a 20-year recurrence interval.

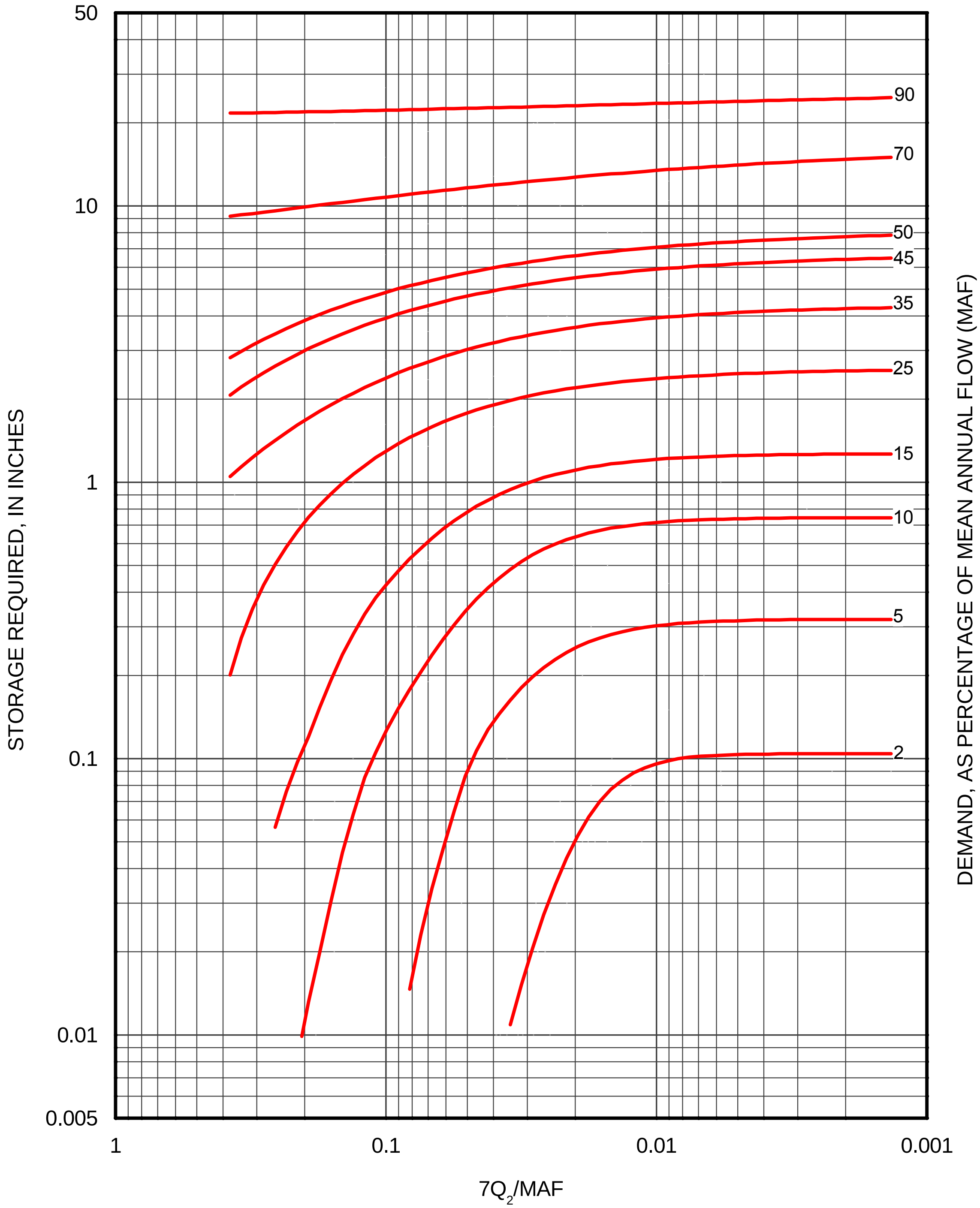

Figure 8. Storage required to meet demands as a function of the 7-day, 2-year low flow ($7Q_2$) divided by the mean annual flow (MAF) for a 50-year recurrence interval.

An iterative procedure was used to determine the maximum storage required to meet demand plus evaporative losses. The first step in that procedure was to determine the storage required to meet the demand without consideration of evaporative losses. Next, evaporative losses were computed for a side-channel reservoir with a volume equal to the initial estimate. This first guess at the volume of evaporative losses was added to the initial estimate of storage to compute revised estimates of storage and surface area. The process of computing evaporative losses and revising the storage and surface area was repeated until the maximum storage volume was just large enough to meet demand plus evaporative losses.

Pumping Systems

The water budget for a side-channel reservoir can be represented by the following equation:

$$\Delta S = P - (D + E + L), \qquad (6)$$

where ΔS is the change in storage, P is the volume of water pumped into the reservoir, D is withdrawal demand, E is the net evaporation, and L is loss due to other processes (such as seepage). The volume of water that can be pumped into the reservoir is primarily a function of the numbers and types of pumps in use; however, the maximum amount of water that can be pumped is occasionally constrained by instream-flow requirements and (or) the available storage capacity in the reservoir.

Twenty different pump sets were examined for this analysis in combination with demands equal to 0.002, 0.01, 0.02, 0.05, 0.10, 0.20, and 0.30 times the mean annual streamflow. The pump sets (table 13) represent a sampling of pump types, pump capacities, and numbers of pumps in use. Relations involving both variable-speed pumps with a variety of pumping capacity ranges and assorted combinations of one to four fixed-speed pumps were tested.

The pump set that provided the largest and most flexible range of pump capacity (pump set 1 in table 13) was based on use of a single variable-speed pump with a pumping capacity that ranged from a low of 0.1 times demand to a high of 20 times demand. That pump set will be referred to as the primary pump relation. Other pump sets in table 13 may allow for pumping rates as low or as high as the primary pump relation; however, no other pump set simultaneously provides both the range and flexibility of pumping rates that the primary pump relation provides.

Each pump set results in a unique demand-storage-frequency relation. It is known in advance that, compared to the other pump sets, use of the primary pump relation results in the smallest required storage for a given demand and design recurrence interval. Consequently, information on the storage required for the 20 pump sets can be presented as adjustment ratios to the primary pump relation (an example of which is shown in table 14), where the adjustment ratio will be greater than or equal to 1. For example, if for a given demand, use of pump set number 2 results in a maximum reservoir storage requirement that is 4 times that of the maximum storage requirement computed for the primary pump relation, then the adjustment ratio for pump set number 2 for that demand would be 4. The storage requirements for any of the pump sets can be determined simply by multiplying its adjustment ratios by the storage requirements for the primary pump relation for the same demands.

Modified Mass-Curve Analysis for Side-Channel Reservoirs

The water-budget equation shown in equation 6 was used in modified form to compute the daily change in storage for all combinations of site, demand, and pump set. The modified form of the equation is

$$\Delta S = P - (D + E), \qquad (7)$$

where ΔS is the change in storage, P is the volume of water pumped into the reservoir, D is withdrawal demand, and E is the net evaporation. The only difference between equation 6 and equation 7 is that equation 7 does not include the term that accounts for water losses from other processes, such as seepage. A positive value of ΔS computed for a given day indicates that more water was pumped into the reservoir than was removed as a result of withdrawal and evaporation. Conversely, a negative value of ΔS indicates that withdrawal and evaporation collectively exceeded the amount of water pumped into the reservoir on that day.

Computed daily changes in storage were accumulated over time. The reservoir capacity required to meet demand plus evaporative losses during any given climatic year[5] is the maximum accumulated negative change in storage for any time period ending in that climatic year. The need for carry-over storage is indicated if the cumulative ΔS is negative at the end of the climatic year. Negative values of ΔS were permitted to carry over into the next climatic year; however, positive ΔS values were reset to zero on climatic-year boundaries.

[5]A climatic year extends from April 1 of one year to March 31 of the following year and is designated by the calendar year in which it begins.

Table 13. Characteristics of pump sets used in the side-channel reservoir analyses

[NA, not applicable]

Pump set	Pump type	Pump capacity or range of capacity (expressed as a multiple of demand) for indicated pump number				Minimum pumpage (multiple of demand)	Maximum pumpage (multiple of demand)
		1	2	3	4		
1	Variable speed	0.1 - 20	NA	NA	NA	0.1	20
2	Variable speed	.1 - 2	NA	NA	NA	.1	2
3	Variable speed	.1 - 4	NA	NA	NA	.1	4
4	Variable speed	.1 - 8	NA	NA	NA	.1	8
5	Variable speed	.1 - 12	NA	NA	NA	.1	12
6	Variable speed	.1 - 16	NA	NA	NA	.1	16
7	Fixed speed	1	1	NA	NA	1	2
8	Fixed speed	1	3	NA	NA	1	4
9	Fixed speed	2	2	NA	NA	2	4
10	Fixed speed	3	3	NA	NA	3	6
11	Fixed speed	4	4	NA	NA	4	8
12	Fixed speed	1	1	1	NA	1	3
13	Fixed speed	2	2	2	NA	2	6
14	Fixed speed	3	3	3	NA	3	9
15	Fixed speed	4	4	4	NA	4	12
16	Fixed speed	5	5	5	NA	5	15
17	Fixed speed	2	2	2	2	2	8
18	Fixed speed	3	3	3	3	3	12
19	Fixed speed	4	4	4	4	4	16
20	Fixed speed	5	5	5	5	5	20

Table 14. Example table showing pump adjustment ratios for a side-channel reservoir

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.38	1.32	1.33	2.28	4.00	11.24	15.00
3	1.12	1.10	1.05	1.00	1.08	1.67	2.61
4	1.17	1.01	1.00	1.00	1.00	1.00	1.27
5	1.01	1.01	1.00	1.00	1.00	1.00	1.10
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.40	1.55	1.65	3.71	10.22	18.79	25.77
8	1.13	1.18	1.16	1.17	1.65	3.36	10.51
9	1.12	1.19	1.19	1.41	1.90	6.21	14.11
10	1.10	1.22	1.22	1.27	1.51	3.00	9.45
11	1.04	1.24	1.20	1.30	1.27	2.30	6.87
12	1.20	1.21	1.14	1.46	2.36	8.16	14.52
13	1.07	1.16	1.18	1.22	1.33	2.08	5.34
14	1.16	1.18	1.23	1.27	1.21	1.69	3.23
15	1.08	1.22	1.20	1.30	1.27	1.53	3.05
16	1.03	1.24	1.26	1.33	1.32	1.63	2.92
17	1.17	1.13	1.16	1.22	1.14	1.60	2.82
18	1.06	1.17	1.23	1.27	1.21	1.51	2.01
19	1.07	1.19	1.20	1.31	1.29	1.37	2.13
20	1.00	1.24	1.26	1.34	1.31	1.47	1.97

Table 15. Example of a storage-demand-frequency table for a side-channel reservoir

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
53.00	2.078	204.22	171.85	184.52	207.10	235.82	250.89	272.18
50.00	2.054	202.30	171.27	184.04	206.67	235.15	250.71	271.56
40.00	1.960	194.79	168.99	182.18	204.98	232.54	250.02	269.13
30.00	1.834	184.70	165.92	179.68	202.71	229.02	249.09	265.88
25.00	1.751	179.69	162.80	178.46	201.21	226.79	248.38	263.53
20.00	1.645	177.74	155.93	178.06	199.31	224.18	247.26	260.05
10.00	1.282	169.41	149.07	155.11	188.32	215.76	240.17	250.33
5.00	0.841	148.32	125.02	137.04	156.33	171.16	188.68	198.46
2.04	0.024	95.90	69.70	77.29	95.04	119.65	139.38	145.51

The annual series of maximum storage requirements was ranked in order of decreasing magnitude, the largest storage-requirement value being of rank 1. Recurrence intervals were calculated for each value in the series by application of the Weibull plotting position formula (eq. 1).

After the nonsequential maximum storage series were determined and recurrence intervals calculated, tables were constructed summarizing side-channel storages required for the primary pump relation as a function of selected recurrence intervals and demands, as shown in table 15 (page 31). Tables for all sites show storage requirements computed for demands equal to 0.002, 0.01, 0.02, 0.05, 0.10, 0.20, and 0.30 times the mean annual streamflow; however, the set of recurrence intervals for which storage requirements are reported varies from site to site. The recurrence intervals included in the storage tables for the primary pump relation are bounded by the maximum and minimum recurrence intervals associated with the nonsequential maximum storage series (a function of the number of years of data analyzed). Within those bounds, storage requirements were interpolated for a preselected set of recurrence intervals.

Linear interpolation was done between the base 10 logarithms of the maximum required storage and the standardized normal deviates (z) with nonexceedance probability p, where

$$p = Prob\{Z_n < z\} = 1 - \frac{1}{RI}, \tag{8}$$

Z_n is the standardized normal random variate, and RI is the recurrence interval (in years). The standardized normal variate was computed by use of the GAUSAB function described by Kirby (1980). The results of those interpolations were transformed into the original engineering units (in this case equivalent days of demand[6]) as shown in table 15. The purpose of the transformations prior to interpolation was to provide results that would be identical to those that would be obtained if the nonsequential maximum storage series had been plotted on log-probability paper and values for the reported recurrence intervals had been obtained from the graph.

[6]An equivalent day of demand, or demand day, is equal to the the volume of storage required divided by the demand rate. For example, if the volume of storage required is 100 Mgal and the demand rate is 10 Mgal/d, then the storage required is equal to 10 demand days (100 Mgal ÷ 10 Mgal/d).

SUMMARY

Nonsequential-mass-curve-analysis techniques were applied to streamflow data from 117 streamflow-gaging stations throughout Ohio to develop relations between storage requirements, water demand, duration, and frequency and to assess minimum runoff for selected durations and frequencies. Systematic record lengths for the streamflow-gaging stations ranged from about 10 to 75 years; however, in many cases, additional streamflow record was synthesized by means of a hybrid method that employs move.1 and duration-based estimators.

For impounding reservoirs, families of curves were constructed to facilitate estimation of storage requirements as a function of demand and the ratio of the 7-day, 2-year low flow to the mean annual flow. Maximum net evaporation information was computed for selected durations and frequencies for seven locations in Ohio and adjacent states to facilitate evaluation of the effects of evaporation on storage requirements.

Storage requirements for impounding reservoirs determined by nonsequential-mass-curve-analysis techniques and storage requirements determined by conventional annual-mass-curve techniques that employ probability routing to account for carryover-storage requirements were compared on the basis of data from 12 streamflow-gaging stations. In some cases, large differences in computed storage requirements were observed between techniques, particularly for conditions where demand cannot be met from within-year storage.

For side-channel reservoirs, demand-storage-frequency tables were constructed for a primary pump relation consisting of one variable-speed pump with a pumping capacity that ranges from 0.1 to 20 times demand. Tables of adjustment ratios were also constructed to facilitate determination of storage requirements for 19 other pump sets consisting of assorted combinations of fixed-speed pumps or variable-speed pumps with aggregate pumping capacities smaller than or equal to the primary pump relation. The effects of evaporation and an instream-flow requirement equal to the 80-percent-duration flow are incorporated into the storage-requirement estimates for side-channel reservoirs.

APPLICATIONS

The hydrologic design of impounding reservoirs and side channel reservoirs can be complex. The following hypothetical problems are presented to help illustrate some of the ways in which the tables and figures presented in this report can be used to address common design questions.

Sample Computations for Impounding Reservoirs

1. **Given a reservoir site on Kale Creek near Pricetown, Ohio with a pool area of 300 acres, a storage capacity of 4,500 acre-ft, and a drainage area of 21.9 mi^2, determine the net yield (without consideration of water losses other than due to evaporation) with a 5-percent annual probability of deficiency (20-year recurrence interval). (Note: If the reservoir is not at a site for which storage characteristics have been determined, then use the nearest site with computed storage characteristics that is expected to have similar hydrology and, ideally, similar contributing drainage area.)**

   a. Determine the reservoir storage capacity in inches.

$$\text{Reservoir capacity} = \left(\frac{4{,}500 \text{ acre-ft}}{21.9 \text{ mi}^2}\right)\left(\frac{1 \text{ mi}^2}{640 \text{ acre}}\right)\left(\frac{12 \text{ in.}}{1 \text{ ft}}\right) = 3.85 \text{ in.}$$

   b. Determine the allowable gross draft rate (gross yield) as a fraction of the mean annual flow.

   The table of required storage as a function of draft rate and recurrence interval for Kale Creek near Pricetown (page 48) indicates that for a 20-year recurrence interval, a reservoir storage capacity of 3.85 in. will permit a gross draft rate of between 0.40 and 0.45 times the mean annual flow. One can determine the allowable gross draft rate (also called the gross yield) more precisely by linear interpolation in log space as a function of draft rate and reservoir storage capacity, as shown below:

$$\log(\text{draft}) = \left[\frac{\log(0.45) - \log(0.40)}{\log(4.11) - \log(3.57)}\right](\log(3.85) - \log(3.57)) + \log(0.40) = -0.37052$$

$$\text{Draft} = \text{antilog}(-0.37052) = 0.426 \times \text{mean annual flow}$$

   c. Determine the gross yield in million gallons per day.

   The descriptive information for Kale Creek near Pricetown indicates that the mean annual flow is 14.56 in.; consequently, the annual gross yield in inches can be determined as shown below:

$$\text{Gross yield} = \text{draft} = 0.426 \times \text{mean annual flow} = 0.426 \times 14.56 \text{ in.} = 6.20 \text{ in.}$$

   The annual gross yield, in inches, can be converted to a daily flow rate, in million gallons per day, by multiplying it by 0.0476 (a units conversion factor) and by the drainage area as shown below:

$$\text{Gross yield} = 6.20\frac{\text{in.}}{\text{yr}} \times 0.0476\frac{\text{Mgal} \cdot \text{yr}}{\text{in.} \cdot \text{mi}^2 \cdot \text{d}} \times 21.9 \text{ mi}^2 = 6.46 \text{ Mgal/d}$$

d. Determine the duration of the critical drawdown period.

From the table of required storage as a function of draft rate and recurrence interval for Kale Creek near Pricetown, the critical-drawdown duration can been seen to be 270 days because the critical-drawdown durations for the bounding draft rates of 0.40 and 0.45 times the mean annual flow for a 20-year recurrence interval are both 270 days.

e. Determine the volume and rate of evaporation.

The nearest site with computed net evaporation data is in Cleveland. It will be assumed here that the recurrence interval for the maximum net evaporation is the same as that of the deficiency. Table 8 indicates that the maximum net evaporation is 17.8 in. for a recurrence interval of 20 years and a duration of 270 days. Hudson and Roberts (1955) analyzed area-capacity curves for impounding reservoirs in Illinois and determined that the mean surface area with respect to time, when draft from the reservoir was continuous and uniform, was 64.4 percent of the surface area with the water level at the spillway crest. No comparable analysis has been completed for Ohio; however, a value of 65 percent of the pool area will be used as the effective area for lake evaporation in this example. The reader is cautioned that this value may or may not be representative of conditions found in Ohio.

The volume and rate of evaporation can be estimated as shown below:

$$\text{Volume of evaporation} = \frac{300 \text{ acres} \times 0.65 \times 17.8 \text{ in.}}{12 \text{ in/ft}} = 289.25 \text{ acre-ft}$$

$$\text{Rate of evaporation} = \frac{289.25 \text{ acre-ft}}{270 \text{ d}} = 1.07 \frac{\text{acre-ft}}{\text{d}} = 0.35 \text{ Mgal/d}$$

f. Determine the net yield (without consideration of water losses other than due to evaporation).

The net yield is equal to the gross yield minus evaporation, as shown below:

$$\text{Net yield} = 6.46 - 0.35 = 6.11 \text{ Mgal/d}$$

2. For a 2-percent annual probability of deficiency (50-year recurrence interval), estimate the amount of storage required to support a gross draft rate equal to 30 percent of the mean annual flow at a site located downstream of the streamflow-gaging station on Kale Creek near Pricetown, Ohio, with a drainage area of 29.1 mi^2.

a. The table on page 48 for the streamflow-gaging station on Kale Creek near Pricetown, Ohio, indicates that for a 50-year recurrence interval, the reservoir storage capacity required to meet a draft rate equal to 0.30 times the mean annual flow is 2.75 in. The storage capacity (in inches) required at the site of interest will be assumed to be equal to that at the gaging station location because it is the same stream and the drainage area of the site of interest is reasonably similar. The storage capacity, in inches, can be converted to acre-feet by multiplying by the drainage area, in square miles, and units conversion factors as shown below:

$$\text{Reservoir storage capacity} = 2.75 \text{ in.} \times \frac{1 \text{ ft}}{12 \text{ in.}} \times \frac{640 \text{ acre}}{1 \text{ mi}^2} \times 29.1 \text{ mi}^2 = 4,268 \text{ acre-ft}$$

3. For a hypothetical stream with a drainage area of 110 mi^2 located in the vicinity of the Wheeling and Short Creek Basins, estimate the amount of storage required to support a gross draft rate equal to 40 percent of the mean annual flow with a 5-percent annual probability of deficiency (20-year recurrence interval).

a. Data are presented in the appendix for Wheeling Creek below Blaine, Ohio (station number 03111548) and for Short Creek near Dillonvale, Ohio (station number 03111500). One can examine the required storage for these two streamflow-gaging stations to estimate the required storage for the hypothetical stream, assuming that the hypothetical stream is hydrologically similar to both Wheeling Creek and Short Creek, and given that the drainage area at the hypothetical stream site is reasonably similar to those of the two streamflow-gaging stations. The tables for Wheeling Creek and Short Creek, on pages 86 and 83, indicate that the reservoir storage capacities required to meet a draft rate of 40 percent of the mean annual flow are 1.88 in. and 1.68 in., respectively. Because the drainage area at the hypothetical stream site is roughly midway between the drainage areas of the gages on Wheeling and Short Creeks, and because there is no known reason to favor one estimate over the other, an average of the two storage capacities is used to estimate reservoir storage capacity, as shown below:

$$\text{Reservoir storage capacity} = \frac{1.88\text{ in.} + 1.68\text{ in.}}{2} \times 53.33 \times 110\text{ mi}^2 = 10{,}422\text{ acre-ft}$$

4. Estimate the minimum 720-day runoff that would not be exceeded on average once every 35 years (35-year recurrence interval) for a site on Kale Creek near Pricetown, Ohio.

a. One can estimate the 720-day minimum runoff ($720ROmin_{35}$) with a 35-year recurrence interval by determining the extreme-value variate (Z_e) corresponding to a 35-year recurrence interval using equation 2 as shown below:

$$Z_e = -\ln\left(-\ln\left(1 - \frac{1}{RI}\right)\right) = -\ln\left(-\ln\left(1 - \frac{1}{35}\right)\right) = 3.54$$

b. Using the extreme-value variate determined above, interpolate linearly using the extreme-value variates and the logarithms of the minimum runoffs reported in the table on page 47 as shown below:

$$\log(720ROmin_{35}) = \left[\frac{\log(12.21) - \log(13.27)}{3.68 - 3.38}\right](3.54\text{–}3.38) + \log(13.27) = 1.1036$$

$$720ROmin_{35} = \text{antilog}(1.1036) = 12.69\text{ in.}$$

5. Estimate the minimum 1,260-day runoff with a 50-year recurrence interval ($1260ROmin_{50}$) for a site on Kale Creek near Pricetown, Ohio.

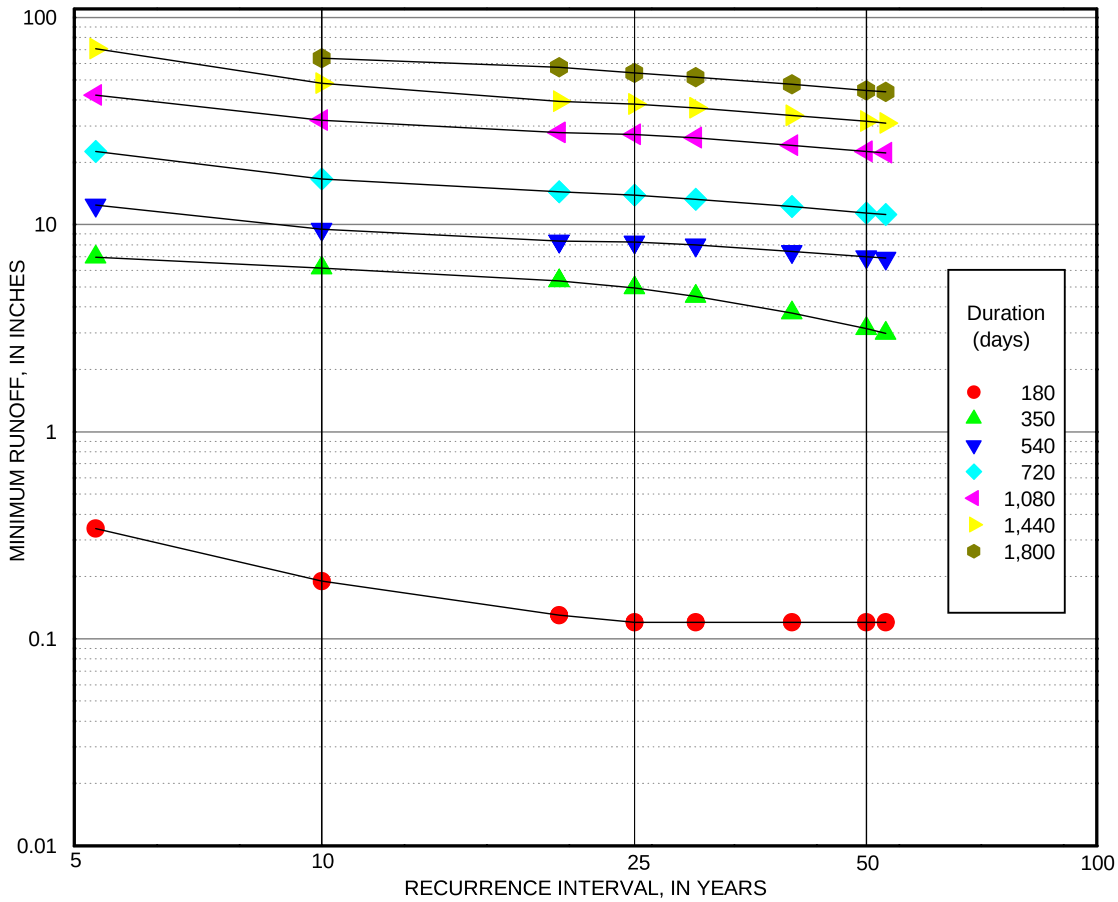

Figure 9. Relation between recurrence interval and minimum runoff for Kale Creek near Pricetown, Ohio.

a. The distance between minimum runoff ordinates for a given pair of durations can vary as a function of recurrence interval. Consequently, it is recommended that data from the runoff-duration-frequency table be plotted and that the type of interpolation to perform be selected after viewing the spacing characteristics of curves for adjacent duration. For example, the data for Kale Creek near Pricetown from the table on page 47 were plotted as shown above in figure 9. A duration of 1,260 days lies exactly halfway between durations of 1,440 and 1,080 days. Based on the regularity in spacing between curves for duration pairs of 1,880 and 1,440 days and 1,440 and 1,080 days at a recurrence interval of 50 years, it appears that it would be appropriate to interpolate as a linear function of duration and as a logarithmic function of runoff, as shown below:

$$\log(1260ROmin_{50}) = \left[\frac{\log(31.55) - \log(22.55)}{1440 - 1080}\right](1260-1080) + \log(22.55) = 1.4261$$

$$11260ROmin_{50} = \text{antilog}(1.4261) = 26.67 \text{ in.}$$

Sample Computations for Side-Channel Reservoirs

1. **A side-channel reservoir is planned for a site on an ungaged stream in the extreme northeast corner of Ohio. The drainage area is 100 mi^2, and the estimated mean annual flow at the site is 98 ft^3/s. The reservoir will be used as a water supply with an estimated withdrawal demand of 12.7 Mgal/d or about 20 percent of the mean annual flow. The side-channel storage is expected to meet the stated withdrawal demand for droughts with a 5-percent annual probability of deficiency (20-year recurrence interval). The pumping system planned for use with this reservoir will incorporate three fixed-speed pumps, each with pumping capacities of 2 times demand (pump set number 13).**

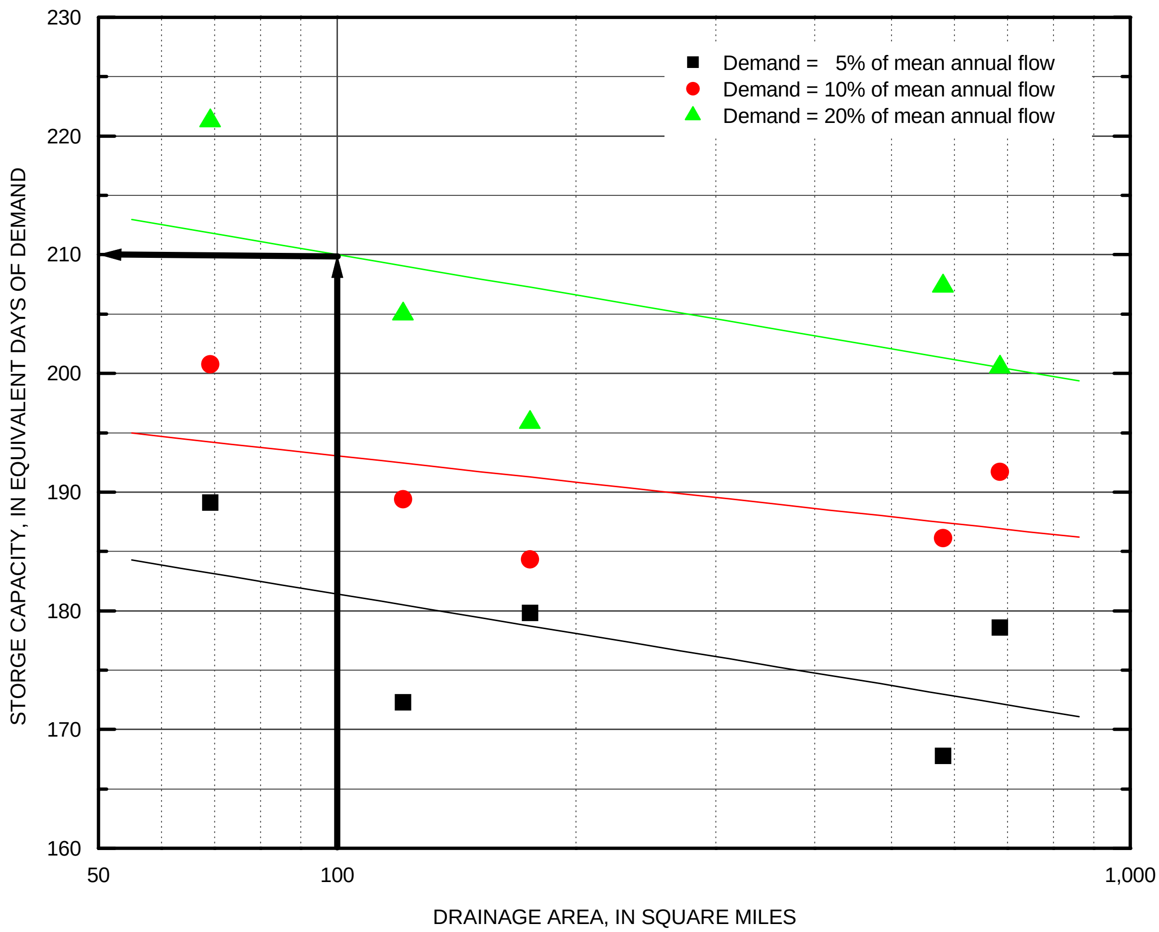

Figure 10. Relation between drainage area and storage for selected streams in extreme northeast Ohio.

a. Because no gaging stations are on the stream of interest, one should review storage requirements for streams in the area to assess regional patterns in storage characteristics. One way to assess these trends is to prepare a plot of drainage area versus required storage capacity for the primary pump relation, demand, and recurrence interval of interest. Figure 10 (above) is such a plot; it shows drainage area versus storage capacity for a 20-year recurrence interval for five northeast Ohio streamflow-gaging stations (station numbers 04211000, 04212000, 04212100, 04212500, and 04213000). Data used to prepare these plots can be found in appendix tables on pages 405, 409, 412, 415, and 419. The required storage capacities corresponding to demands of 5, 10, and 20 percent of the mean annual flow have been plotted, and best-fit lines (in this case determined by means of simple linear regression) have been drawn on the plot. The storage capacity required for the stated conditions can be estimated by determining the ordinate value corresponding to the point at which the 100-mi^2 drainage line intersects the regression line corresponding to a withdrawal demand of 20 percent of the mean annual flow (as illustrated by the dark arrows on the plot). The estimated storage capacity is seen to be 210 equivalent days of demand. This value can be converted to acre-feet as shown below:

$$(210 \text{ days})(12.7 \text{ Mgal/d})\left(3.07\ \frac{\text{acre-ft}}{\text{Mgal}}\right) = 8,188 \text{ acre-ft}\,.$$

b. The pumping system planned for use with this reservoir is not as efficient at capturing available streamflow as is the primary pumping relation; consequently, a larger storage capacity will be required to meet demand. The required increase in storage capacity can be assessed by examining the pump adjustment ratios for the indicated pumping system and demand for nearby hydrologically similar gaging stations. The pump adjustment ratios for stations 04211000, 04212000, 04212100, 04212500, and 04213000 with pump set 13 and a demand of 20 percent of the mean annual flow are 1.57, 1.32, 1.22, 1.15, and 1.15 respectively (taken from tables shown on pages 403, 408, 412, 415, and 419). Because an exact location has not been specified for the planned side-channel reservoir in this example, the median pump adjustment ratio (1.22) will be used. An alternative approach that would lead to a more conservative (larger) estimate of required storage capacity would be to choose the maximum value (1.57). Using the median adjustment ratio, the required storage capacity would be

$$(8,188 \text{ acre-ft})(1.22) = 10,721 \text{ acre-ft}\,.$$

This estimate of required storage takes into account withdrawal demand, instream flow requirements, and net evaporation but does not take into account other water losses, such as seepage into the ground. Demand associated with the other water losses must be estimated, and additional storage must be provided to meet that demand. Because some of the other water losses may be a function of the storage capacity (seepage for example), an iterative procedure may be required to determine the total required storage.

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APPENDIX

Hydrologic Design Tables

03089500 Mill Creek near Berlin Center, Ohio

Location: Latitude 41°00′01″, longitude 80°58′07″, Mahoning County, Hydrologic Unit 05030103

Drainage area, in square miles: 19.1

Station used for record extension: None

Time period of systematic or extended record analyzed: 1941-10-01 to 1971-10-04

Eighty-percent-duration streamflow, in cubic feet per second: 0.7

Mean annual streamflow, in inches: 11.85

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
31.00	3.42	0.22	4.29	7.09	10.97	20.71	29.52	35.75
30.00	3.38	0.22	4.29	7.10	10.97	20.77	29.80	36.66
25.00	3.20	0.22	4.32	7.14	11.00	21.09	31.33	41.75
20.00	2.97	0.23	4.35	7.20	11.03	21.48	33.23	48.00
10.00	2.25	0.26	5.20	7.70	13.49	26.53	39.37	58.66
5.17	1.54	0.29	5.65	10.08	16.96	31.54	49.48	–

03089500 Mill Creek near Berlin Center, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.08	0.30	0.59	0.91	1.25	1.59	1.93	2.31	2.70	3.09	3.87	4.64	5.42	6.37	8.32
	30	90	180	180	210	210	210	210	240	240	240	240	240	240	600	600
6	0.01	0.08	0.31	0.60	0.94	1.28	1.62	1.99	2.38	2.77	3.16	3.97	4.85	5.76	7.70	9.65
	30	90	180	180	210	210	210	240	240	240	240	270	270	600	600	600
8	0.01	0.08	0.32	0.63	0.97	1.31	1.68	2.07	2.46	2.86	3.30	4.17	5.05	6.83	8.78	11.06
	30	120	180	210	210	210	240	240	240	270	270	270	270	600	600	900
10	0.01	0.09	0.33	0.64	0.98	1.34	1.73	2.11	2.50	2.89	3.32	4.20	5.24	7.18	9.60	12.71
	30	120	180	210	210	240	240	240	240	240	270	270	600	600	960	960
15	0.02	0.11	0.35	0.67	1.01	1.40	1.79	2.18	2.57	2.96	3.35	4.20	5.95	9.07	12.20	16.07
	60	120	180	210	240	240	240	240	240	240	240	270	960	960	1020	1320
20	0.02	0.12	0.36	0.69	1.05	1.44	1.83	2.22	2.61	3.00	3.41	4.34	6.94	10.25	13.92	18.20
	60	120	180	210	240	240	240	240	240	240	270	300	1020	1020	1320	1320
25	0.02	0.12	0.37	0.71	1.09	1.48	1.87	2.28	2.77	3.25	3.74	4.71	7.18	10.49	14.18	18.46
	60	120	210	210	240	240	240	300	300	300	300	300	1020	1020	1320	1320
30	0.02	0.13	0.39	0.73	1.15	1.63	2.12	2.60	3.09	3.58	4.06	5.04	7.18	10.49	15.71	21.36
	60	120	210	210	270	300	300	300	300	300	300	300	1020	1020	1740	1740
40	0.03	0.15	0.60	1.09	1.57	2.06	2.55	3.03	3.52	4.10	6.92	12.57	18.21	23.85	29.50	35.14
	60	270	300	300	300	300	300	300	300	1740	1740	1740	1740	1740	1740	1740
50	0.05	0.32	0.81	1.30	1.78	2.39	5.21	8.03	10.85	13.67	16.49	22.14	27.78	33.42	39.07	44.71
	270	300	300	300	300	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
60	0.13	0.42	0.90	2.35	5.17	7.99	10.81	13.63	16.46	19.28	22.10	27.74	33.38	39.03	44.67	50.31
	300	300	300	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
70	0.17	0.46	2.54	5.36	8.18	11.01	13.83	16.65	19.47	22.29	25.11	30.76	36.40	42.04	47.69	53.33
	300	300	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
80	0.18	1.27	4.09	6.91	9.74	12.56	15.38	18.20	21.02	23.84	26.66	32.31	37.95	43.59	49.24	54.98
	300	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1800
90	0.36	2.05	4.87	7.69	10.52	13.34	16.16	18.98	21.80	24.62	27.44	33.09	38.82	44.66	50.50	56.33
	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800	1800	1800
100	0.75	2.44	5.26	8.08	10.90	13.72	16.55	19.37	22.19	25.04	27.96	33.79	39.63	45.47	51.31	57.14
	1740	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800	1800	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.14	1.13	1.17	1.62	2.95	4.97	9.20
3	1.07	1.04	1.05	1.00	1.13	1.45	2.02
4	1.01	1.01	1.00	1.00	1.00	1.00	1.07
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.14	1.20	1.47	2.90	5.34	12.85	16.77
8	1.07	1.11	1.24	1.17	1.71	3.02	4.80
9	1.08	1.17	1.34	1.40	1.98	4.12	8.13
10	1.03	1.24	1.29	1.31	1.62	2.56	5.00
11	1.06	1.20	1.31	1.38	1.51	2.10	4.45
12	1.09	1.09	1.26	1.43	2.21	4.19	8.36
13	1.04	1.12	1.26	1.17	1.47	1.76	3.82
14	1.00	1.15	1.26	1.28	1.42	1.43	3.10
15	1.06	1.17	1.31	1.37	1.49	1.32	2.57
16	1.08	1.21	1.34	1.42	1.61	1.34	2.36
17	1.02	1.12	1.17	1.17	1.34	1.44	2.40
18	1.00	1.13	1.26	1.26	1.41	1.32	1.69
19	1.06	1.18	1.33	1.34	1.51	1.33	1.43
20	1.08	1.21	1.34	1.44	1.59	1.35	1.38

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
31.00	1.849	104.99	148.95	155.29	191.76	212.04	255.81	279.22
30.00	1.834	103.57	148.02	155.02	191.38	211.66	254.52	277.62
25.00	1.751	95.52	142.77	153.52	189.21	209.52	247.23	268.55
20.00	1.645	85.28	136.08	151.60	186.45	206.79	237.95	257.02
10.00	1.282	72.56	112.14	135.95	160.02	201.05	225.21	234.61
5.00	0.841	55.76	98.09	111.32	144.16	173.01	206.26	220.40
2.07	0.040	33.00	66.25	72.10	85.42	112.33	141.59	154.63

03090500 Mahoning River below Berlin Dam near Berlin Center, Ohio

Location: Latitude 41°02′54″, longitude 81°00′05″, Mahoning County, Hydrologic Unit 05030103

Drainage area, in square miles: 248.

Station used for record extension: 03117500

Time period of systematic or extended record analyzed: 1930-10-01 to 1997-09-30

Percentage of estimated values in extended record: 82.1

Eighty-percent-duration streamflow, in cubic feet per second: 16.

Mean annual streamflow, in inches: 13.45

Location of station used for precipitation data: Pittsburgh, Pennsylvania

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
68.00	4.21	0.14	3.15	5.42	11.46	21.86	32.33	41.11
60.00	4.09	0.17	3.36	5.55	11.74	21.89	32.47	41.59
50.00	3.90	0.21	3.67	5.73	12.14	21.94	32.67	42.29
40.00	3.68	0.25	4.04	5.96	12.64	22.01	32.92	43.14
30.00	3.38	0.29	4.64	6.64	13.03	22.77	33.93	45.73
25.00	3.20	0.29	5.10	7.38	13.08	23.83	35.15	48.60
20.00	2.97	0.30	5.36	7.83	13.36	24.47	36.40	51.00
10.00	2.25	0.36	5.76	8.88	15.65	28.65	40.38	55.71
5.23	1.55	0.56	6.47	12.71	21.60	39.44	75.55	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.04	0.23	0.49	0.77	1.07	1.40	1.74	2.13	2.53	2.98	3.99	5.10	6.20	7.31	8.41
	0	60	120	150	150	180	180	210	210	240	240	300	300	300	300	300
6	0.00	0.05	0.26	0.53	0.86	1.19	1.57	1.95	2.34	2.73	3.13	4.01	5.10	6.20	7.31	9.44
	0	90	120	150	180	180	210	210	210	210	240	240	300	300	300	600
8	0.00	0.06	0.30	0.62	0.96	1.35	1.74	2.12	2.51	2.90	3.34	4.23	5.20	7.20	9.41	11.62
	0	120	150	180	210	210	210	210	210	240	240	240	270	600	600	600
10	0.00	0.08	0.33	0.66	1.02	1.41	1.80	2.18	2.60	3.04	3.49	4.43	5.91	8.12	10.33	13.66
	30	120	180	180	210	210	210	210	240	240	240	270	600	600	600	1020
15	0.00	0.09	0.35	0.68	1.07	1.48	1.92	2.36	2.80	3.29	3.79	4.78	6.71	9.04	12.79	17.35
	30	120	150	210	210	240	240	240	240	270	270	270	600	1020	1020	1740
20	0.00	0.10	0.37	0.70	1.14	1.58	2.02	2.48	2.98	3.48	3.98	4.97	7.05	9.99	13.86	19.18
	30	120	150	240	240	240	240	270	270	270	270	270	660	1020	1380	1740
25	0.01	0.11	0.38	0.76	1.20	1.64	2.09	2.59	3.09	3.59	4.11	5.21	7.28	10.37	14.64	19.96
	30	150	150	240	240	240	270	270	270	270	300	300	660	1020	1380	1740
30	0.01	0.12	0.40	0.79	1.24	1.68	2.16	2.66	3.18	3.73	4.28	5.39	7.44	10.58	15.03	20.47
	30	150	150	240	240	240	270	270	300	300	300	300	660	960	1380	1740
40	0.01	0.14	0.42	0.83	1.28	1.72	2.27	2.82	3.37	3.93	4.48	5.58	7.68	10.81	15.58	21.54
	30	150	150	240	240	270	300	300	300	300	300	300	660	960	1320	1740
50	0.01	0.16	0.46	0.85	1.29	1.80	2.35	2.91	3.46	4.01	4.56	5.88	8.03	10.98	16.55	22.96
	60	150	210	240	240	300	300	300	300	300	300	540	600	1320	1740	1740
60	0.02	0.18	0.52	0.90	1.29	1.82	2.38	2.93	3.48	4.03	4.59	6.34	8.55	11.86	18.27	24.68
	90	150	210	210	210	300	300	300	300	300	300	600	600	1740	1740	1740
70	0.02	0.20	0.57	0.96	1.34	1.82	2.38	2.93	3.48	4.03	4.71	6.88	9.09	13.79	20.20	26.61
	90	180	210	210	210	300	300	300	300	300	540	600	600	1740	1740	1740
80	0.03	0.23	0.61	1.00	1.39	1.82	2.38	2.93	3.48	4.10	5.20	7.41	9.62	15.82	22.23	28.64
	150	180	210	210	210	300	300	300	300	600	600	600	600	1740	1740	1740
90	0.05	0.26	0.65	1.03	1.42	1.82	2.38	2.93	3.51	4.61	5.72	7.92	11.48	17.89	24.29	30.70
	180	210	210	210	210	300	300	300	600	600	600	600	1740	1740	1740	1740
100	0.07	0.29	0.67	1.06	1.45	1.83	2.38	2.93	3.99	5.09	6.20	8.41	13.52	19.93	26.34	32.75
	180	210	210	210	210	210	300	300	600	600	600	600	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.10	1.11	1.16	1.61	2.11	4.61	11.35
3	1.01	1.00	1.00	1.00	1.01	1.40	1.60
4	1.01	1.00	1.00	1.00	1.00	1.01	1.06
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.12	1.17	1.41	2.12	3.90	16.11	27.73
8	1.03	1.02	1.02	1.04	1.48	1.93	3.78
9	1.03	1.04	1.04	1.09	1.60	2.38	7.13
10	1.02	1.06	1.05	1.06	1.29	1.76	3.54
11	1.02	1.07	1.06	1.08	1.21	1.69	3.17
12	1.02	1.01	1.02	1.20	1.81	3.10	8.83
13	1.02	1.03	1.03	1.05	1.13	1.60	2.31
14	1.01	1.06	1.05	1.05	1.20	1.51	1.73
15	1.03	1.07	1.06	1.08	1.21	1.53	1.90
16	1.03	1.09	1.06	1.11	1.25	1.56	2.14
17	1.02	1.03	1.03	1.05	1.10	1.38	1.57
18	1.02	1.06	1.05	1.06	1.21	1.38	1.60
19	1.03	1.07	1.06	1.09	1.21	1.42	1.69
20	1.03	1.10	1.06	1.11	1.27	1.43	1.93

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
68.00	2.178	244.47	240.66	239.19	236.17	239.38	251.56	277.12
60.00	2.128	239.71	232.66	230.48	226.95	235.01	250.82	275.15
50.00	2.054	232.61	220.76	217.52	213.23	228.51	249.73	272.22
40.00	1.960	223.66	205.73	201.16	195.90	220.31	248.34	268.51
30.00	1.834	211.72	189.66	184.44	182.73	211.30	245.05	264.69
25.00	1.751	203.92	182.52	177.82	182.51	207.04	241.68	263.14
20.00	1.645	199.59	170.95	170.89	179.62	201.81	234.29	251.31
10.00	1.282	158.42	142.96	154.57	168.27	185.91	209.29	226.18
5.00	0.841	112.79	107.80	118.73	139.37	153.88	177.55	196.68
2.00	0.000	79.89	49.26	54.84	60.36	76.27	99.16	123.46

03092000 Kale Creek near Pricetown, Ohio

Location: Latitude 41°08′23″, longitude 80°59′43″, Trumbull County, Hydrologic Unit 05030103

Drainage area, in square miles: 21.9

Station used for record extension: None

Time period of systematic or extended record analyzed: 1941-05-01 to 1993-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 0.6

Mean annual streamflow, in inches: 14.56

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
53.00	3.96	0.12	2.98	6.90	11.18	22.13	30.99	43.74
50.00	3.90	0.12	3.14	7.01	11.39	22.55	31.55	44.53
40.00	3.68	0.12	3.74	7.43	12.21	24.16	33.72	47.56
30.00	3.38	0.12	4.51	7.97	13.27	26.24	36.52	51.48
25.00	3.20	0.12	4.95	8.23	13.87	27.28	38.09	54.06
20.00	2.97	0.13	5.34	8.33	14.40	27.81	39.46	57.46
10.00	2.25	0.19	6.18	9.49	16.58	31.93	48.04	63.55
5.30	1.57	0.34	6.96	12.42	22.50	42.19	70.57	–

03092000 Kale Creek near Pricetown, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.03	0.17	0.44	0.74	1.08	1.46	1.88	2.30	2.71	3.13	3.55	4.48	5.47	6.54	7.62	9.30
	120	120	150	150	180	210	210	210	210	210	210	240	270	270	270	540
6	0.04	0.18	0.48	0.78	1.18	1.60	2.02	2.46	2.94	3.42	3.89	4.85	5.81	6.76	8.31	10.46
	90	150	150	180	210	210	210	240	240	240	240	240	240	240	540	600
8	0.04	0.20	0.50	0.90	1.33	1.80	2.28	2.76	3.24	3.72	4.20	5.15	6.11	7.62	10.02	12.41
	90	150	150	210	240	240	240	240	240	240	240	240	240	600	600	600
10	0.04	0.21	0.54	0.97	1.45	1.92	2.40	2.88	3.36	3.84	4.31	5.27	6.25	8.64	11.03	13.91
	90	150	210	240	240	240	240	240	240	240	240	240	600	600	600	900
15	0.06	0.22	0.60	1.07	1.55	2.03	2.51	2.99	3.46	3.94	4.46	5.53	7.46	9.85	12.73	17.63
	120	150	210	240	240	240	240	240	240	240	270	270	600	600	900	1680
20	0.06	0.23	0.63	1.11	1.59	2.06	2.54	3.04	3.57	4.11	4.65	5.73	8.04	10.43	14.81	20.38
	120	180	240	240	240	240	240	270	270	270	270	270	600	600	1320	1680
25	0.07	0.24	0.65	1.12	1.60	2.08	2.60	3.13	3.67	4.21	4.75	6.02	8.44	11.15	16.41	21.68
	120	180	240	240	240	240	270	270	270	270	270	600	660	1320	1320	1680
30	0.07	0.24	0.65	1.13	1.61	2.11	2.64	3.18	3.72	4.26	4.85	6.30	8.91	12.41	17.67	22.93
	120	180	240	240	240	270	270	270	270	270	300	600	660	1320	1320	1320
40	0.07	0.25	0.67	1.15	1.62	2.12	2.66	3.25	3.85	4.45	5.04	6.91	9.54	14.48	19.74	25.10
	120	150	240	240	240	270	270	300	300	300	300	660	660	1320	1320	1380
50	0.08	0.26	0.68	1.16	1.64	2.15	2.75	3.34	3.94	4.54	5.14	7.30	11.02	16.28	21.77	27.70
	150	150	240	240	240	300	300	300	300	300	300	660	1320	1320	1380	1680
60	0.09	0.27	0.70	1.17	1.65	2.19	2.79	3.39	3.98	4.58	5.18	8.49	12.80	19.74	26.67	33.61
	150	150	240	240	240	300	300	300	300	300	300	960	1380	1740	1740	1740
70	0.10	0.28	0.71	1.19	1.67	2.20	2.80	3.40	4.00	4.59	6.32	12.22	19.16	26.09	33.02	39.96
	150	150	240	240	240	300	300	300	300	300	960	1740	1740	1740	1740	1740
80	0.11	0.29	0.73	1.20	1.68	2.20	2.80	3.40	4.04	7.51	10.97	17.91	24.84	31.78	38.71	45.64
	150	150	240	240	240	300	300	300	1740	1740	1740	1740	1740	1740	1740	1740
90	0.11	0.29	0.74	1.22	1.70	2.20	2.80	5.41	8.88	12.35	15.82	22.75	29.68	36.62	43.55	50.49
	150	150	240	240	240	300	300	1740	1740	1740	1740	1740	1740	1740	1740	1740
100	0.11	0.29	0.76	1.24	1.71	2.48	5.94	9.41	12.88	16.34	19.81	26.75	33.68	40.61	47.55	54.48
	150	150	240	240	240	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740

03092000 Kale Creek near Pricetown, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.38	1.32	1.33	2.28	4.00	11.24	15.00
3	1.12	1.10	1.05	1.00	1.08	1.67	2.61
4	1.17	1.01	1.00	1.00	1.00	1.00	1.27
5	1.01	1.01	1.00	1.00	1.00	1.00	1.10
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.40	1.55	1.65	3.71	10.22	18.79	25.77
8	1.13	1.18	1.16	1.17	1.65	3.36	10.51
9	1.12	1.19	1.19	1.41	1.90	6.21	14.11
10	1.10	1.22	1.22	1.27	1.51	3.00	9.45
11	1.04	1.24	1.20	1.30	1.27	2.30	6.87
12	1.20	1.21	1.14	1.46	2.36	8.16	14.52
13	1.07	1.16	1.18	1.22	1.33	2.08	5.34
14	1.16	1.18	1.23	1.27	1.21	1.69	3.23
15	1.08	1.22	1.20	1.30	1.27	1.53	3.05
16	1.03	1.24	1.26	1.33	1.32	1.63	2.92
17	1.17	1.13	1.16	1.22	1.14	1.60	2.82
18	1.06	1.17	1.23	1.27	1.21	1.51	2.01
19	1.07	1.19	1.20	1.31	1.29	1.37	2.13
20	1.00	1.24	1.26	1.34	1.31	1.47	1.97

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
53.00	2.078	204.22	171.85	184.52	207.10	235.82	250.89	272.18
50.00	2.054	202.30	171.27	184.04	206.67	235.15	250.71	271.56
40.00	1.960	194.79	168.99	182.18	204.98	232.54	250.02	269.13
30.00	1.834	184.70	165.92	179.68	202.71	229.02	249.09	265.88
25.00	1.751	179.69	162.80	178.46	201.21	226.79	248.38	263.53
20.00	1.645	177.74	155.93	178.06	199.31	224.18	247.26	260.05
10.00	1.282	169.41	149.07	155.11	188.32	215.76	240.17	250.33
5.00	0.841	148.32	125.02	137.04	156.33	171.16	188.68	198.46
2.04	0.024	95.90	69.70	77.29	95.04	119.65	139.38	145.51

03092090 West Branch Mahoning River near Ravenna, Ohio

Location: Latitude 41°09′41″, longitude 81°11′50″, Portage County, Hydrologic Unit 05030103

Drainage area, in square miles: 21.8

Station used for record extension: 03092000

Time period of systematic or extended record analyzed: 1941-05-01 to 1993-09-30

Percentage of estimated values in extended record: 46.6

Eighty-percent-duration streamflow, in cubic feet per second: 3.7

Mean annual streamflow, in inches: 16.13

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
53.00	3.96	0.65	5.72	9.05	14.75	27.69	37.76	52.38
50.00	3.90	0.65	5.80	9.15	15.02	28.11	38.40	53.11
40.00	3.68	0.65	6.11	9.56	16.05	29.72	40.87	55.92
30.00	3.38	0.65	6.52	10.08	17.37	31.81	44.05	59.56
25.00	3.20	0.66	6.80	10.41	18.10	32.80	45.57	62.09
20.00	2.97	0.68	7.24	10.83	18.66	33.17	46.13	65.80
10.00	2.25	0.86	7.76	12.30	21.17	38.40	57.17	75.39
5.30	1.57	1.09	9.81	15.05	27.37	47.08	75.38	–

03092090 West Branch Mahoning River near Ravenna, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.01	0.10	0.36	0.65	0.99	1.32	1.67	2.07	2.53	3.00	3.94	5.00	6.06	7.12	8.18
	0	30	90	120	150	150	150	180	210	210	210	240	240	240	240	540
6	0.00	0.01	0.12	0.38	0.71	1.04	1.37	1.80	2.26	2.75	3.28	4.34	5.40	6.46	7.52	9.11
	0	30	90	120	150	150	150	210	210	240	240	240	240	240	240	540
8	0.00	0.01	0.15	0.43	0.76	1.09	1.55	2.07	2.60	3.13	3.66	4.72	5.78	6.84	8.44	11.08
	0	30	120	150	150	150	210	240	240	240	240	240	240	240	600	600
10	0.00	0.01	0.16	0.46	0.79	1.20	1.71	2.24	2.77	3.30	3.83	4.89	5.95	7.06	9.71	12.65
	0	30	120	150	150	210	240	240	240	240	240	240	240	600	600	900
15	0.00	0.02	0.17	0.49	0.88	1.34	1.87	2.40	2.93	3.46	3.99	5.05	6.18	8.77	11.59	17.19
	0	30	120	150	210	210	240	240	240	240	240	240	270	600	900	1320
20	0.00	0.02	0.18	0.51	0.94	1.40	1.92	2.45	2.98	3.51	4.04	5.16	7.02	9.67	14.01	19.83
	0	30	120	180	210	210	240	240	240	240	240	270	600	600	1320	1320
25	0.00	0.02	0.18	0.54	0.97	1.43	1.95	2.48	3.01	3.54	4.07	5.25	7.58	10.23	15.70	21.52
	0	30	120	180	210	210	240	240	240	240	240	270	600	600	1320	1320
30	0.00	0.02	0.19	0.56	0.98	1.45	1.97	2.50	3.03	3.56	4.10	5.34	7.99	11.12	16.95	22.77
	0	30	120	180	210	210	240	240	240	240	270	600	600	1320	1320	1320
40	0.00	0.02	0.20	0.56	0.99	1.48	2.01	2.54	3.07	3.60	4.20	5.89	8.54	13.00	18.83	24.66
	0	30	120	180	210	240	240	240	240	240	300	600	600	1320	1320	1320
50	0.00	0.03	0.21	0.56	0.99	1.52	2.05	2.58	3.11	3.68	4.34	6.27	8.98	14.50	20.33	27.34
	0	30	120	180	240	240	240	240	240	300	300	600	960	1320	1320	1680
60	0.00	0.03	0.23	0.56	1.05	1.58	2.11	2.64	3.17	3.78	4.44	6.56	10.75	16.51	23.93	31.47
	0	30	120	180	240	240	240	240	240	300	300	600	960	1680	1680	1740
70	0.00	0.03	0.24	0.57	1.10	1.63	2.16	2.69	3.22	3.84	4.50	8.21	13.19	20.75	28.43	36.11
	0	30	120	240	240	240	240	240	240	300	300	960	1680	1740	1740	1740
80	0.00	0.03	0.25	0.63	1.16	1.69	2.22	2.75	3.28	3.88	5.55	9.93	17.62	25.30	32.98	40.66
	0	30	120	240	240	240	240	240	240	300	960	1740	1740	1740	1740	1740
90	0.00	0.03	0.27	0.69	1.22	1.75	2.28	2.81	3.34	4.89	7.01	14.22	21.90	29.59	37.27	44.95
	0	30	120	240	240	240	240	240	240	960	960	1740	1740	1740	1740	1740
100	0.00	0.04	0.28	0.74	1.27	1.80	2.33	2.86	4.11	6.63	10.48	18.16	25.84	33.52	41.20	48.88
	0	30	120	240	240	240	240	240	960	1740	1740	1740	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.07	1.65	1.65	2.43	2.97	7.65	11.60
3	1.42	1.18	1.07	1.00	1.00	1.38	1.88
4	1.21	1.12	1.02	1.00	1.00	1.00	1.19
5	1.13	1.07	1.00	1.00	1.00	1.00	1.02
6	1.00	1.02	1.00	1.00	1.00	1.00	1.00
7	2.13	1.69	2.16	3.04	6.38	13.59	20.58
8	1.43	1.18	1.10	1.07	1.38	2.18	6.07
9	1.46	1.20	1.12	1.12	1.55	2.61	10.26
10	1.32	1.20	1.13	1.17	1.18	2.01	7.01
11	1.25	1.20	1.13	1.20	1.20	1.89	4.90
12	1.57	1.21	1.11	1.20	1.78	3.12	10.01
13	1.33	1.17	1.10	1.12	1.11	1.72	2.99
14	1.21	1.16	1.11	1.17	1.13	1.52	2.67
15	1.21	1.15	1.11	1.20	1.19	1.47	2.59
16	1.11	1.17	1.13	1.25	1.24	1.40	2.98
17	1.25	1.14	1.08	1.12	1.11	1.44	2.09
18	1.19	1.12	1.09	1.17	1.13	1.36	1.89
19	1.06	1.12	1.11	1.20	1.18	1.33	1.94
20	1.04	1.14	1.13	1.25	1.23	1.31	2.30

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
53.00	2.078	172.52	176.88	195.39	212.63	234.25	248.94	255.74
50.00	2.054	172.03	175.73	193.41	211.73	233.31	248.03	255.57
40.00	1.960	170.10	171.25	185.67	208.23	229.65	244.50	254.92
30.00	1.834	167.51	165.22	175.28	203.53	224.73	239.74	254.03
25.00	1.751	165.35	161.46	169.39	200.19	221.34	237.56	253.16
20.00	1.645	161.43	157.27	164.52	195.32	216.68	237.32	251.25
10.00	1.282	151.76	144.77	150.59	170.43	194.85	227.02	243.09
5.00	0.841	117.75	125.40	139.96	154.14	163.86	181.42	192.96
2.04	0.024	68.00	58.10	70.96	89.78	101.87	116.44	128.41

03092500 West Branch Mahoning River near Newton Falls, Ohio

Location: Latitude 41°10′18″, longitude 81°01′16″, Portage County, Hydrologic Unit 05030103

Drainage area, in square miles: 96.3

Station used for record extension: None

Time period of systematic or extended record analyzed: 1926-10-01 to 1981-10-02

Eighty-percent-duration streamflow, in cubic feet per second: 14.

Mean annual streamflow, in inches: 14.01

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
56.00	4.02	0.63	4.28	5.51	10.38	21.09	31.42	37.87
50.00	3.90	0.63	4.28	5.68	10.53	21.34	31.48	38.81
40.00	3.68	0.64	4.28	6.02	10.83	21.82	31.60	40.68
30.00	3.38	0.65	4.29	6.46	11.22	22.45	31.76	43.09
25.00	3.20	0.68	4.35	6.61	11.99	24.07	33.61	48.44
20.00	2.97	0.74	4.48	6.69	13.33	26.97	37.18	57.85
10.00	2.25	0.78	6.20	10.22	17.96	32.59	43.87	65.45
5.09	1.52	1.03	8.56	15.11	23.05	41.89	77.16	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.04	0.19	0.44	0.73	1.02	1.42	1.83	2.23	2.63	3.48	4.40	5.36	6.51	7.66
	0	0	60	90	150	150	180	210	210	210	210	240	240	300	300	300
6	0.00	0.00	0.05	0.22	0.47	0.77	1.13	1.53	1.93	2.38	2.84	3.76	4.68	5.64	6.73	8.33
	0	0	60	120	150	180	210	210	210	240	240	240	240	270	300	600
8	0.00	0.00	0.06	0.26	0.53	0.88	1.28	1.74	2.20	2.66	3.12	4.04	5.02	6.06	8.22	10.52
	0	0	60	120	180	180	240	240	240	240	240	240	270	270	600	600
10	0.00	0.00	0.07	0.28	0.58	0.95	1.41	1.87	2.33	2.79	3.25	4.19	5.22	7.39	9.69	12.87
	0	0	90	120	180	240	240	240	240	240	240	270	270	600	600	1320
15	0.00	0.00	0.09	0.32	0.64	1.07	1.53	1.99	2.45	2.91	3.37	4.91	7.21	9.51	12.72	17.69
	0	0	90	150	180	240	240	240	240	240	270	600	600	600	1020	1320
20	0.00	0.00	0.10	0.35	0.68	1.11	1.57	2.03	2.49	2.95	3.72	6.02	8.32	10.97	14.88	19.72
	0	0	90	150	210	240	240	240	240	270	600	600	600	1020	1020	1320
25	0.00	0.00	0.11	0.37	0.71	1.13	1.59	2.05	2.51	3.22	4.37	6.67	8.97	12.17	16.08	20.87
	0	0	90	150	210	240	240	240	240	600	600	600	600	1020	1020	1320
30	0.00	0.00	0.12	0.38	0.73	1.14	1.60	2.06	2.56	3.62	4.77	7.07	9.37	12.87	16.78	23.37
	0	30	90	150	210	240	240	240	270	600	600	600	600	1020	1020	1740
40	0.00	0.00	0.12	0.40	0.77	1.17	1.63	2.14	2.89	4.04	5.19	7.49	9.79	14.32	21.00	27.67
	0	30	90	150	210	240	240	270	600	600	600	600	600	1740	1740	1740
50	0.00	0.00	0.12	0.41	0.79	1.21	1.72	2.24	3.02	4.17	5.32	7.63	10.64	17.32	23.99	30.66
	0	30	120	150	210	240	270	270	600	600	600	600	1740	1740	1740	1740
60	0.00	0.00	0.13	0.42	0.80	1.30	1.82	2.34	3.02	4.17	5.32	7.63	12.85	19.52	26.20	32.87
	0	30	120	180	210	270	270	270	600	600	600	600	1740	1740	1740	1740
70	0.00	0.00	0.13	0.44	0.87	1.39	1.91	2.43	3.02	4.17	5.32	7.87	14.54	21.22	27.89	34.56
	0	30	120	180	270	270	270	270	600	600	600	1740	1740	1740	1740	1740
80	0.00	0.00	0.14	0.46	0.96	1.48	2.00	2.52	3.03	4.17	5.32	9.21	15.88	22.56	29.23	35.90
	0	30	120	180	270	270	270	270	270	600	600	1740	1740	1740	1740	1740
90	0.00	0.00	0.14	0.53	1.04	1.56	2.08	2.60	3.12	4.17	5.42	10.29	16.97	23.64	30.31	36.99
	0	30	120	270	270	270	270	270	270	600	900	1740	1740	1740	1740	1740
100	0.00	0.00	0.16	0.60	1.12	1.64	2.16	2.67	3.19	4.38	6.10	11.19	17.86	24.53	31.21	37.88
	0	30	180	270	270	270	270	270	270	900	900	1740	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.93	1.62	1.68	1.83	3.20	8.63	11.68
3	1.19	1.03	1.04	1.00	1.26	1.48	1.80
4	1.07	1.00	1.02	1.00	1.00	1.27	1.15
5	1.00	1.00	1.00	1.00	1.00	1.16	1.09
6	1.00	1.00	1.00	1.00	1.00	1.07	1.05
7	1.93	1.62	1.74	2.95	6.63	19.04	19.87
8	1.19	1.05	1.05	1.21	1.60	2.91	7.26
9	1.19	1.05	1.08	1.31	1.75	3.67	11.91
10	1.12	1.01	1.06	1.18	1.73	3.24	8.46
11	1.09	1.05	1.13	1.19	1.69	2.78	6.90
12	1.25	1.07	1.14	1.43	1.74	3.78	11.25
13	1.12	1.01	1.07	1.11	1.50	2.18	3.23
14	1.08	1.03	1.07	1.18	1.48	1.90	2.91
15	1.02	1.03	1.11	1.19	1.48	1.92	3.07
16	1.00	1.05	1.18	1.23	1.48	1.96	3.05
17	1.08	1.01	1.08	1.11	1.30	1.77	2.54
18	1.02	1.04	1.06	1.18	1.32	1.83	2.32
19	1.01	1.03	1.11	1.21	1.31	1.90	2.44
20	1.00	1.05	1.18	1.23	1.32	1.95	2.40

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
56.00	2.101	200.87	207.05	205.27	228.62	243.34	282.92	382.51
50.00	2.054	192.56	201.31	202.56	225.26	242.33	280.28	368.31
40.00	1.960	175.77	189.71	197.10	218.47	240.29	274.94	339.62
30.00	1.834	153.20	174.11	189.75	209.34	237.55	267.76	301.05
25.00	1.751	146.94	163.91	180.21	204.78	232.35	263.12	289.81
20.00	1.645	145.57	151.00	164.49	200.11	223.14	257.31	286.36
10.00	1.282	139.33	127.55	144.19	161.44	177.77	218.98	262.25
5.00	0.841	115.17	102.46	122.78	133.98	151.15	184.10	222.05
2.00	0.000	66.66	57.56	61.84	75.99	91.42	126.29	151.05

03093000 Eagle Creek at Phalanx Station, Ohio

Location: Latitude 41°15′40″, longitude 80°57′16″, Trumbull County, Hydrologic Unit 05030103

Drainage area, in square miles: 97.6

Station used for record extension: 03090500

Time period of systematic or extended record analyzed: 1926-06-01 to 1997-09-30

Percentage of estimated values in extended record: 4.2

Eighty-percent-duration streamflow, in cubic feet per second: 19.

Mean annual streamflow, in inches: 16.11

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
72.00	4.27	0.78	4.49	5.82	13.28	22.78	32.60	39.92
70.00	4.24	0.78	4.51	5.89	13.31	23.01	33.00	40.55
60.00	4.09	0.79	4.61	6.26	13.44	24.30	35.19	43.98
50.00	3.90	0.80	4.73	6.69	13.61	25.82	37.79	48.05
40.00	3.68	0.81	4.87	7.23	13.81	27.69	40.97	53.04
30.00	3.38	0.83	5.07	7.74	14.56	29.17	42.64	58.59
25.00	3.20	0.84	5.21	7.99	15.21	29.77	42.80	61.79
20.00	2.97	0.88	6.20	9.54	15.66	32.70	45.47	63.98
10.00	2.25	1.12	7.90	13.19	22.27	37.93	56.07	76.24
5.14	1.53	1.43	10.13	15.98	28.47	49.46	–	–

03093000 Eagle Creek at Phalanx Station, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.02	0.13	0.37	0.70	1.03	1.39	1.86	2.32	2.78	3.74	4.80	5.86	6.92	8.10
	0	0	30	90	120	150	150	210	210	210	210	240	240	240	240	270
6	0.00	0.00	0.03	0.17	0.42	0.74	1.09	1.54	2.00	2.47	2.93	3.95	5.02	6.22	7.41	8.65
	0	0	30	90	120	150	180	210	210	210	210	240	270	270	270	600
8	0.00	0.00	0.04	0.22	0.48	0.82	1.26	1.72	2.19	2.65	3.17	4.32	5.51	6.70	8.00	10.46
	0	0	30	120	150	180	210	210	210	210	240	270	270	270	300	900
10	0.00	0.00	0.05	0.26	0.54	0.91	1.37	1.83	2.30	2.82	3.35	4.55	5.74	7.02	9.36	13.09
	0	0	60	120	150	210	210	210	210	240	270	270	270	300	600	900
15	0.00	0.00	0.07	0.31	0.63	1.06	1.52	2.01	2.53	3.06	3.59	4.78	6.79	9.43	12.43	16.57
	0	0	90	120	180	210	210	240	240	240	240	270	600	600	900	960
20	0.00	0.00	0.09	0.34	0.69	1.14	1.61	2.14	2.67	3.20	3.72	5.77	8.42	11.07	14.22	19.65
	0	0	90	150	180	210	240	240	240	240	240	600	600	600	960	1380
25	0.00	0.00	0.10	0.37	0.73	1.19	1.69	2.22	2.75	3.28	4.16	6.81	9.46	12.10	15.81	21.90
	0	0	90	150	180	210	240	240	240	240	600	600	600	600	1380	1380
30	0.00	0.00	0.10	0.39	0.76	1.22	1.74	2.27	2.80	3.54	4.86	7.51	10.15	12.80	17.44	23.53
	0	0	90	150	180	210	240	240	240	600	600	600	600	660	1380	1380
40	0.00	0.00	0.11	0.42	0.80	1.28	1.81	2.34	3.02	4.35	5.67	8.32	10.96	13.75	19.78	27.19
	0	0	90	150	210	240	240	240	600	600	600	600	600	660	1680	1680
50	0.00	0.00	0.11	0.43	0.83	1.31	1.84	2.37	3.41	4.74	6.06	8.71	11.35	16.24	23.65	31.22
	0	0	90	150	210	240	240	240	600	600	600	600	600	1680	1680	1740
60	0.00	0.00	0.11	0.44	0.84	1.33	1.86	2.45	3.57	4.89	6.22	8.86	12.44	19.91	27.59	35.27
	0	0	150	150	210	240	240	270	600	600	600	600	1680	1740	1740	1740
70	0.00	0.00	0.12	0.45	0.85	1.39	1.99	2.58	3.64	4.91	6.23	8.88	16.04	23.72	31.39	39.07
	0	0	150	150	210	270	270	270	540	600	600	600	1740	1740	1740	1740
80	0.00	0.00	0.12	0.45	0.92	1.52	2.11	2.71	3.75	4.94	6.23	11.88	19.56	27.23	34.91	42.58
	0	0	150	150	270	270	270	270	540	540	600	1740	1740	1740	1740	1740
90	0.00	0.00	0.12	0.45	1.04	1.64	2.23	2.83	3.80	4.99	7.42	15.10	22.77	30.45	38.12	45.80
	0	0	150	150	270	270	270	270	540	540	1740	1740	1740	1740	1740	1740
100	0.00	0.00	0.12	0.56	1.15	1.75	2.34	2.94	3.84	6.51	10.34	18.02	25.70	33.37	41.05	48.72
	0	0	150	270	270	270	270	270	480	1740	1740	1740	1740	1740	1740	1740

03093000 Eagle Creek at Phalanx Station, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.92	1.77	1.81	2.04	2.81	6.32	10.66
3	1.21	1.01	1.01	1.01	1.25	1.52	1.99
4	1.06	1.02	1.00	1.00	1.00	1.21	1.13
5	1.03	1.00	1.00	1.00	1.00	1.13	1.08
6	1.01	1.00	1.00	1.00	1.00	1.06	1.04
7	1.92	1.90	1.97	2.75	4.89	17.13	19.88
8	1.21	1.05	1.05	1.24	1.58	3.05	6.97
9	1.21	1.05	1.09	1.51	1.73	3.44	11.90
10	1.13	1.04	1.12	1.20	1.66	3.26	8.28
11	1.06	1.02	1.14	1.25	1.55	3.06	6.38
12	1.34	1.23	1.30	1.52	2.09	3.29	11.00
13	1.12	1.03	1.08	1.14	1.47	2.51	2.95
14	1.04	1.01	1.13	1.16	1.51	2.30	2.84
15	1.02	1.04	1.13	1.27	1.39	2.12	2.77
16	1.03	1.04	1.18	1.25	1.66	2.20	2.84
17	1.06	1.01	1.08	1.14	1.34	1.77	2.61
18	1.03	1.02	1.15	1.18	1.38	1.84	2.50
19	1.03	1.02	1.14	1.26	1.24	1.83	2.48
20	1.02	1.06	1.17	1.25	1.55	1.95	2.59

03093000 Eagle Creek at Phalanx Station, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
72.00	2.201	210.36	204.99	205.61	222.58	243.49	299.75	383.50
70.00	2.190	209.74	204.49	205.49	222.54	242.90	298.46	381.30
60.00	2.128	206.32	201.76	204.84	222.34	239.62	291.34	369.17
50.00	2.054	202.18	198.45	204.06	222.09	235.65	282.71	354.48
40.00	1.960	196.96	194.27	203.06	221.78	230.64	271.82	335.92
30.00	1.834	178.62	187.12	196.95	215.87	226.60	264.32	309.14
25.00	1.751	162.29	181.82	191.13	209.91	224.94	262.02	290.76
20.00	1.645	157.71	168.29	175.46	201.89	224.54	257.30	276.40
10.00	1.282	148.52	132.36	135.20	162.27	187.28	221.12	245.12
5.00	0.841	125.45	110.18	121.29	127.42	148.06	172.13	197.97
2.00	0.000	89.39	59.30	60.04	70.55	86.24	104.78	118.07

03096000 Mosquito Creek at Niles, Ohio

Location: Latitude 41°11′02″, longitude 80°45′39″, Trumbull County, Hydrologic Unit 05030103

Drainage area, in square miles: 138.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1929-07-01 to 1951-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 3.1

Mean annual streamflow, in inches: 11.76

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
23.00	3.11	0.07	2.66	3.22	9.49	18.40	26.15	32.65
20.00	2.97	0.07	2.67	3.83	9.56	18.98	27.71	35.82
10.00	2.25	0.09	2.96	6.30	10.81	23.22	35.27	51.73
5.75	1.65	0.17	3.90	7.18	18.32	36.78	46.73	68.48

03096000 Mosquito Creek at Niles, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.04	0.15	0.40	0.67	1.00	1.34	1.73	2.12	2.50	2.89	3.28	4.05	4.82	5.86	7.40	10.05
	60	150	150	210	210	240	240	240	240	240	240	240	240	330	540	1020
6	0.05	0.15	0.43	0.77	1.11	1.45	1.78	2.14	2.52	2.91	3.30	4.15	5.43	7.36	9.29	11.46
	90	150	210	210	210	210	210	240	240	240	240	270	600	600	600	1020
8	0.05	0.18	0.48	0.82	1.16	1.49	1.92	2.35	2.79	3.22	3.66	4.83	6.77	8.73	11.82	14.91
	90	180	210	210	210	210	270	270	270	270	270	600	600	960	960	960
10	0.06	0.21	0.49	0.82	1.16	1.58	2.01	2.44	2.88	3.31	3.75	5.00	6.93	9.45	12.54	15.63
	120	150	180	210	210	270	270	270	270	270	270	600	600	960	960	960
15	0.08	0.23	0.51	0.84	1.22	1.61	2.03	2.47	2.90	3.34	3.77	5.23	7.65	10.94	14.22	17.50
	150	150	180	240	240	240	270	270	270	270	270	600	1020	1020	1020	1020
20	0.08	0.23	0.53	0.87	1.24	1.62	2.04	2.47	2.91	3.63	4.50	6.36	8.41	11.71	17.11	22.52
	150	150	210	210	240	240	270	270	270	540	540	600	1020	1680	1680	1680
25	0.08	0.25	0.58	0.92	1.26	1.71	2.58	3.45	4.32	5.19	6.05	7.88	12.83	18.24	23.64	29.05
	150	210	210	210	210	540	540	540	540	540	540	600	1680	1680	1680	1680
30	0.08	0.29	0.63	1.11	1.98	2.85	3.72	4.59	6.97	9.48	11.99	17.01	22.03	27.05	32.07	37.09
	210	210	210	540	540	540	540	540	1560	1560	1560	1560	1560	1560	1560	1560
40	0.12	0.47	1.63	4.14	6.65	9.16	11.67	14.18	16.69	19.20	21.71	26.73	31.75	36.77	41.79	46.81
	210	540	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560
50	0.25	1.80	4.31	6.82	9.33	11.84	14.35	16.86	19.37	21.88	24.39	29.41	34.44	39.46	44.48	49.50
	540	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560
60	0.41	2.38	4.89	7.40	9.91	12.42	14.93	17.44	19.95	22.46	24.97	29.99	35.22	40.82	46.42	52.02
	1380	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1740	1740	1740	1740
70	0.76	2.49	5.00	7.51	10.02	12.53	15.04	17.55	20.13	22.93	25.73	31.33	36.93	42.53	48.13	53.73
	1380	1560	1560	1560	1560	1560	1560	1560	1740	1740	1740	1740	1740	1740	1740	1740
80	0.87	2.51	5.02	7.53	10.04	12.70	15.50	18.30	21.10	23.90	26.70	32.30	37.90	43.50	49.10	54.70
	1500	1560	1560	1560	1560	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
90	0.93	2.51	5.02	7.65	10.45	13.25	16.05	18.85	21.65	24.45	27.25	32.85	38.45	44.05	49.65	55.25
	1500	1560	1560	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
100	0.95	2.51	5.16	7.96	10.76	13.56	16.36	19.16	21.96	24.76	27.56	33.16	38.76	44.36	49.98	55.77
	1500	1560	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800

03096000 Mosquito Creek at Niles, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.70	1.16	1.27	1.32	2.04	3.86	5.06
3	1.01	1.00	1.02	1.00	1.00	1.22	1.27
4	1.00	1.00	1.00	1.00	1.00	1.00	1.10
5	1.00	1.00	1.00	1.00	1.00	1.00	1.04
6	1.00	1.00	1.00	1.00	1.00	1.00	1.01
7	1.71	1.29	1.50	2.15	3.46	7.38	8.54
8	1.56	1.01	1.14	1.12	1.20	1.64	2.33
9	1.55	1.02	1.21	1.13	1.39	1.77	3.07
10	1.56	1.04	1.28	1.18	1.15	1.76	2.21
11	1.58	1.07	1.29	1.18	1.20	1.86	2.01
12	1.56	1.03	1.13	1.10	1.42	2.32	3.54
13	1.01	1.02	1.21	1.14	1.10	1.61	1.66
14	1.56	1.04	1.28	1.18	1.14	1.63	1.79
15	1.58	1.06	1.29	1.18	1.21	1.71	1.99
16	1.59	1.16	1.38	1.19	1.21	1.89	2.14
17	1.01	1.02	1.21	1.14	1.10	1.50	1.59
18	1.56	1.04	1.28	1.18	1.14	1.51	1.77
19	1.58	1.06	1.29	1.18	1.21	1.63	1.96
20	1.59	1.16	1.38	1.19	1.21	1.84	2.14

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
23.00	1.712	143.00	186.27	182.70	215.32	226.42	236.36	283.23
20.00	1.645	142.37	185.35	181.21	210.18	222.59	234.39	277.26
10.00	1.282	128.82	165.00	159.76	183.12	201.48	223.43	251.73
5.00	0.841	85.07	119.90	123.69	139.00	163.34	190.02	225.45
2.09	0.054	42.00	66.91	63.91	91.21	100.16	132.52	149.58

03102950 Pymatuning Creek at Kinsman, Ohio

Location: Latitude 41°26′34″, longitude 80°35′18″, Trumbull County, Hydrologic Unit 05030102

Drainage area, in square miles: 96.7

Station used for record extension: 04212000

Time period of systematic or extended record analyzed: 1922-10-01 to 1994-09-30

Percentage of estimated values in extended record: 59.7

Eighty-percent-duration streamflow, in cubic feet per second: 12.

Mean annual streamflow, in inches: 17.27

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.38	6.28	10.09	16.51	30.27	43.58	57.17
70.00	4.24	0.38	6.31	10.11	16.64	30.69	44.04	57.87
60.00	4.09	0.39	6.42	10.18	17.11	32.25	45.72	60.45
50.00	3.90	0.40	6.54	10.27	17.67	34.10	47.71	63.50
40.00	3.68	0.41	6.70	10.38	18.35	36.36	50.16	67.25
30.00	3.38	0.46	7.06	11.81	20.78	37.52	51.82	69.36
25.00	3.20	0.50	7.34	13.10	22.79	37.74	52.44	69.89
20.00	2.97	0.56	7.46	13.66	24.12	38.51	54.02	72.23
10.00	2.25	0.67	9.74	14.83	25.87	41.97	61.37	83.20
5.21	1.55	1.00	10.94	17.99	29.21	49.91	77.36	–

03102950 Pymatuning Creek at Kinsman, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.06	0.25	0.54	0.82	1.19	1.62	2.04	2.47	2.90	3.32	4.17	5.02	5.88	7.06	8.34
	30	60	120	120	120	180	180	180	180	180	180	180	180	180	270	270
6	0.02	0.08	0.30	0.59	0.87	1.26	1.69	2.11	2.54	2.96	3.39	4.24	5.13	6.12	7.12	8.38
	30	60	120	120	120	180	180	180	180	180	180	180	210	210	240	270
8	0.02	0.11	0.35	0.64	0.98	1.36	1.79	2.21	2.64	3.06	3.53	4.53	5.52	6.63	7.77	9.34
	30	90	120	120	150	180	180	180	180	180	210	210	210	240	240	600
10	0.02	0.13	0.38	0.69	1.05	1.43	1.85	2.28	2.72	3.22	3.71	4.71	5.85	6.98	8.12	10.50
	30	90	120	150	150	180	180	180	210	210	210	240	240	240	240	960
15	0.03	0.15	0.42	0.77	1.13	1.53	1.96	2.41	2.90	3.43	4.00	5.14	6.27	7.41	9.19	12.80
	60	90	150	150	150	180	180	210	210	240	240	240	240	240	600	900
20	0.03	0.16	0.45	0.81	1.17	1.59	2.02	2.49	3.06	3.63	4.19	5.33	6.46	7.74	10.32	14.58
	60	90	150	150	180	180	180	240	240	240	240	240	240	300	900	900
25	0.04	0.17	0.47	0.82	1.21	1.64	2.06	2.60	3.17	3.73	4.30	5.46	6.74	8.31	11.59	16.28
	90	90	150	150	180	180	180	240	240	240	240	270	270	600	900	1380
30	0.04	0.17	0.48	0.84	1.24	1.66	2.10	2.67	3.23	3.80	4.40	5.67	6.95	8.99	12.58	17.79
	90	90	150	150	180	180	240	240	240	240	270	270	270	600	900	1380
40	0.05	0.18	0.50	0.85	1.28	1.70	2.17	2.74	3.37	4.01	4.64	5.92	7.20	10.04	14.25	20.69
	90	90	150	180	180	180	240	240	270	270	270	270	270	600	1260	1680
50	0.05	0.18	0.50	0.88	1.30	1.73	2.22	2.85	3.49	4.13	4.77	6.05	8.00	11.01	16.62	23.92
	90	90	150	180	180	180	270	270	270	270	270	270	600	900	1320	1680
60	0.06	0.18	0.51	0.89	1.32	1.74	2.27	2.91	3.55	4.19	4.83	6.10	8.65	12.49	19.03	26.97
	90	90	150	180	180	180	270	270	270	270	270	270	600	1320	1680	1680
70	0.06	0.19	0.51	0.90	1.33	1.75	2.29	2.93	3.57	4.21	4.84	6.36	9.30	14.39	21.90	29.85
	90	120	150	180	180	180	270	270	270	270	270	600	960	1320	1680	1680
80	0.06	0.19	0.51	0.91	1.34	1.76	2.29	2.93	3.57	4.21	4.84	6.83	10.99	16.65	24.60	32.54
	90	120	150	180	180	180	270	270	270	270	270	600	960	1680	1680	1680
90	0.06	0.20	0.51	0.92	1.34	1.77	2.29	2.93	3.57	4.21	4.84	8.02	12.73	19.18	27.13	35.07
	90	120	150	180	180	180	270	270	270	270	270	960	1020	1680	1680	1680
100	0.06	0.21	0.51	0.92	1.34	1.77	2.29	2.93	3.57	4.21	4.94	9.58	14.41	21.55	29.50	37.44
	90	120	150	180	180	180	270	270	270	270	960	1020	1020	1680	1680	1680

03102950 Pymatuning Creek at Kinsman, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.63	1.24	1.10	1.06	1.10	1.91	2.76
3	1.38	1.14	1.03	1.00	1.06	1.07	1.03
4	1.19	1.00	1.00	1.00	1.00	1.02	1.00
5	1.11	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.63	1.25	1.11	1.20	1.67	3.93	15.09
8	1.39	1.15	1.06	1.15	1.25	1.29	1.94
9	1.38	1.16	1.08	1.24	1.34	1.48	2.49
10	1.28	1.10	1.16	1.32	1.37	1.57	2.59
11	1.24	1.17	1.21	1.30	1.40	1.70	2.50
12	1.46	1.20	1.08	1.16	1.26	1.48	2.57
13	1.28	1.08	1.08	1.19	1.31	1.30	1.68
14	1.14	1.10	1.16	1.26	1.30	1.31	1.92
15	1.18	1.17	1.20	1.23	1.33	1.43	2.11
16	1.08	1.19	1.28	1.28	1.38	1.52	2.54
17	1.19	1.06	1.08	1.17	1.26	1.28	1.55
18	1.16	1.10	1.16	1.20	1.24	1.32	1.75
19	1.04	1.15	1.22	1.20	1.29	1.43	1.94
20	1.08	1.18	1.27	1.26	1.35	1.52	2.41

3102950 Pymatuning Creek at Kinsman, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
73.00	2.206	167.09	164.15	177.11	185.34	195.71	214.42	240.47
70.00	2.190	166.88	162.76	176.26	185.17	195.41	214.42	240.10
60.00	2.128	166.11	157.62	173.10	184.52	194.29	214.40	238.72
50.00	2.054	165.18	151.39	169.28	183.73	192.94	214.38	237.04
40.00	1.960	164.00	143.51	164.45	182.74	191.24	214.36	234.93
30.00	1.834	163.41	137.47	160.28	180.34	187.28	208.39	224.18
25.00	1.751	163.32	134.85	158.23	178.43	184.16	202.67	214.69
20.00	1.645	163.02	132.84	151.00	165.59	172.79	198.46	208.71
10.00	1.282	148.24	125.03	136.59	145.77	157.77	176.86	188.86
5.00	0.841	124.16	106.35	122.02	125.14	140.89	149.15	164.77
2.03	0.017	85.34	56.44	63.03	78.84	96.75	106.83	119.64

03109000 Lisbon Creek at Lisbon, Ohio

Location: Latitude 40°46′55″, longitude 80°45′53″, Columbiana County, Hydrologic Unit 05030101

Drainage area, in square miles: 6.19

Station used for record extension: 03090500

Time period of systematic or extended record analyzed: 1941-10-01 to 1971-10-04

Percentage of estimated values in extended record: 46.7

Eighty-percent-duration streamflow, in cubic feet per second: 0.4

Mean annual streamflow, in inches: 11.75

Location of station used for precipitation data: Pittsburgh, Pennsylvania

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
31.00	3.42	0.23	4.95	7.18	11.69	20.59	30.65	37.50
30.00	3.38	0.24	4.97	7.22	11.74	20.67	30.77	38.16
25.00	3.20	0.28	5.09	7.45	12.03	21.08	31.44	41.87
20.00	2.97	0.33	5.23	7.74	12.38	21.60	32.27	46.42
10.00	2.25	0.46	5.77	8.53	14.63	28.02	38.89	55.99
5.17	1.54	0.48	6.55	10.18	17.47	30.72	57.75	–

03109000 Lisbon Creek at Lisbon, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.03	0.19	0.40	0.68	0.97	1.31	1.65	1.99	2.32	2.66	3.37	4.22	5.09	5.97	7.90
	0	60	120	150	180	210	210	210	210	210	210	240	270	270	600	600
6	0.00	0.04	0.19	0.42	0.68	1.00	1.34	1.68	2.02	2.35	2.70	3.47	4.27	5.14	6.66	8.59
	0	60	120	150	180	210	210	210	210	210	240	240	270	270	600	600
8	0.00	0.04	0.20	0.45	0.72	1.06	1.40	1.74	2.08	2.44	2.82	3.59	4.43	5.43	7.36	9.60
	30	60	150	150	210	210	210	210	210	240	240	240	270	600	600	900
10	0.00	0.05	0.22	0.46	0.77	1.11	1.45	1.79	2.13	2.52	2.90	3.71	4.58	5.79	7.84	10.88
	30	60	120	150	210	210	210	210	240	240	240	270	270	600	900	960
15	0.01	0.06	0.25	0.51	0.85	1.19	1.52	1.88	2.26	2.66	3.09	3.96	4.83	7.49	10.69	15.01
	30	120	120	210	210	210	210	240	240	270	270	270	270	960	1320	1380
20	0.01	0.07	0.27	0.55	0.89	1.23	1.58	1.97	2.36	2.79	3.23	4.09	5.95	9.04	12.53	16.78
	30	120	150	210	210	210	240	240	270	270	270	270	960	960	1320	1320
25	0.01	0.08	0.29	0.58	0.91	1.26	1.65	2.03	2.42	2.85	3.29	4.24	6.84	9.93	13.31	17.56
	30	120	180	180	210	240	240	240	270	270	270	300	960	960	1320	1320
30	0.01	0.08	0.34	0.63	0.93	1.31	1.70	2.09	2.49	2.97	3.45	4.42	7.34	10.47	14.21	19.76
	30	120	180	180	240	240	240	240	300	300	300	300	960	1020	1680	1740
40	0.01	0.13	0.42	0.71	1.01	1.40	1.79	2.27	2.75	3.24	4.66	10.26	15.86	21.45	27.05	32.65
	60	180	180	180	240	240	300	300	300	300	1740	1740	1740	1740	1740	1740
50	0.02	0.18	0.47	0.76	1.08	1.51	3.36	6.16	8.96	11.76	14.56	20.16	25.76	31.35	36.95	42.55
	60	180	180	180	240	300	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
60	0.04	0.21	0.50	1.16	3.96	6.76	9.56	12.36	15.15	17.95	20.75	26.35	31.95	37.55	43.15	48.75
	180	180	180	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
70	0.06	0.23	1.85	4.64	7.44	10.24	13.04	15.84	18.64	21.44	24.24	29.84	35.44	41.03	46.63	52.23
	180	180	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
80	0.08	0.90	3.69	6.49	9.29	12.09	14.89	17.69	20.49	23.29	26.09	31.69	37.29	42.88	48.48	54.08
	180	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
90	0.09	1.85	4.64	7.44	10.24	13.04	15.84	18.64	21.44	24.24	27.04	32.64	38.23	43.83	49.43	55.03
	180	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
100	0.09	2.32	5.12	7.92	10.72	13.52	16.32	19.12	21.92	24.72	27.52	33.11	38.71	44.34	50.14	55.93
	180	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.26	1.07	1.03	1.04	1.83	3.53	4.63
3	1.13	1.03	1.00	1.00	1.03	1.13	1.36
4	1.09	1.00	1.00	1.00	1.00	1.00	1.00
5	1.06	1.00	1.00	1.00	1.00	1.00	1.00
6	1.03	1.00	1.00	1.00	1.00	1.00	1.00
7	1.26	1.09	1.10	1.46	3.50	6.10	11.36
8	1.13	1.07	1.04	1.08	1.11	1.82	3.16
9	1.14	1.12	1.06	1.07	1.43	2.07	4.74
10	1.12	1.05	1.05	1.11	1.25	1.71	4.31
11	1.08	1.11	1.08	1.11	1.28	1.64	4.74
12	1.17	1.08	1.06	1.07	1.38	2.54	4.18
13	1.11	1.09	1.05	1.05	1.15	1.47	2.44
14	1.07	1.07	1.04	1.06	1.23	1.42	2.12
15	1.07	1.09	1.10	1.07	1.23	1.45	2.76
16	1.04	1.10	1.07	1.06	1.39	1.49	3.96
17	1.09	1.08	1.05	1.04	1.12	1.26	1.61
18	1.07	1.08	1.04	1.07	1.21	1.42	1.56
19	1.04	1.08	1.09	1.06	1.25	1.46	1.69
20	1.03	1.10	1.07	1.05	1.39	1.48	2.88

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
31.00	1.849	181.44	194.75	202.99	206.49	208.13	223.47	239.79
30.00	1.834	181.15	193.97	201.30	204.74	207.68	223.06	239.67
25.00	1.751	179.54	189.55	191.71	194.79	205.13	220.74	238.99
20.00	1.645	177.48	183.93	179.52	182.14	201.88	217.79	238.12
10.00	1.282	147.60	133.36	128.71	160.29	160.03	203.49	217.79
5.00	0.841	109.84	117.00	117.52	131.88	151.97	179.97	195.52
2.07	0.040	74.62	70.05	68.34	76.69	95.79	120.52	144.08

03109500 Little Beaver Creek near East Liverpool, Ohio

Location: Latitude 40°40′33″, longitude 80°32′27″, Columbiana County, Hydrologic Unit 05030101

Drainage area, in square miles: 496.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1926-01-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 82.

Mean annual streamflow, in inches: 14.54

Location of station used for precipitation data: Pittsburgh, Pennsylvania

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
72.00	4.27	0.44	3.55	6.31	14.44	23.34	34.67	43.17
70.00	4.24	0.45	3.61	6.34	14.44	23.45	34.76	43.27
60.00	4.09	0.50	3.95	6.48	14.46	24.08	35.28	43.79
50.00	3.90	0.56	4.34	6.66	14.49	24.82	35.89	44.40
40.00	3.68	0.63	4.83	6.87	14.52	25.72	36.64	45.16
30.00	3.38	0.70	5.18	8.07	15.21	26.50	39.47	51.59
25.00	3.20	0.72	5.29	9.18	15.90	26.85	41.95	57.67
20.00	2.97	0.74	6.14	9.97	16.10	28.14	43.22	59.13
10.00	2.25	0.93	6.89	11.01	19.27	34.15	46.70	65.34
5.14	1.53	1.24	8.66	14.26	23.57	43.81	77.53	–

03109500 Little Beaver Creek near East Liverpool, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.06	0.21	0.39	0.65	0.95	1.28	1.64	2.06	2.50	3.45	4.41	5.38	6.45	8.54
	0	0	60	90	90	150	150	180	210	210	240	240	240	270	270	600
6	0.00	0.00	0.06	0.22	0.43	0.73	1.04	1.40	1.81	2.23	2.68	3.63	4.59	5.57	6.88	9.27
	0	0	60	90	150	150	180	180	210	210	240	240	240	270	600	600
8	0.00	0.00	0.07	0.25	0.51	0.81	1.17	1.57	1.98	2.40	2.87	3.82	4.78	5.83	7.98	10.37
	0	0	60	120	150	180	180	210	210	210	240	240	240	270	600	600
10	0.00	0.00	0.08	0.28	0.55	0.88	1.24	1.65	2.07	2.49	2.97	3.93	4.93	6.41	8.80	12.41
	0	0	60	120	150	180	180	210	210	240	240	240	270	600	600	960
15	0.00	0.00	0.11	0.32	0.61	0.97	1.34	1.76	2.17	2.65	3.12	4.15	5.40	7.79	11.44	15.49
	0	30	90	120	180	180	210	210	210	240	240	270	600	600	1020	1020
20	0.00	0.01	0.13	0.34	0.66	1.02	1.40	1.82	2.28	2.75	3.28	4.35	6.29	8.77	12.81	18.00
	0	30	90	120	180	180	210	210	240	240	270	270	600	960	1020	1740
25	0.00	0.01	0.15	0.35	0.70	1.06	1.46	1.90	2.37	2.90	3.44	4.58	6.93	9.52	13.58	19.71
	0	30	90	150	180	180	210	240	240	270	270	300	600	1020	1020	1740
30	0.00	0.01	0.16	0.38	0.74	1.10	1.52	1.99	2.50	3.03	3.59	5.03	7.42	10.01	14.15	21.03
	0	30	90	180	180	210	210	240	270	270	300	600	600	1020	1620	1740
40	0.00	0.02	0.18	0.45	0.81	1.22	1.68	2.18	2.72	3.30	3.90	5.74	8.13	10.65	16.39	23.32
	0	30	90	180	180	210	240	270	270	300	300	600	600	1020	1740	1740
50	0.00	0.02	0.19	0.52	0.90	1.35	1.83	2.35	2.92	3.52	4.12	6.24	8.62	11.63	18.56	25.48
	0	30	90	180	210	240	240	270	300	300	300	600	600	1740	1740	1740
60	0.00	0.02	0.22	0.58	1.01	1.49	1.96	2.50	3.09	3.69	4.28	6.61	9.00	13.77	20.70	27.62
	0	30	150	210	240	240	240	270	300	300	300	600	600	1740	1740	1740
70	0.00	0.02	0.26	0.66	1.12	1.60	2.08	2.63	3.22	3.82	4.52	6.90	9.29	15.88	22.80	29.73
	0	60	180	210	240	240	270	300	300	300	600	600	600	1740	1740	1740
80	0.00	0.03	0.32	0.74	1.22	1.70	2.19	2.74	3.33	3.93	4.77	7.14	11.01	17.93	24.86	31.78
	0	60	210	240	240	240	270	300	300	300	540	600	1680	1740	1740	1740
90	0.00	0.03	0.38	0.83	1.30	1.78	2.28	2.83	3.43	4.02	5.00	7.34	13.16	19.91	26.84	33.76
	0	120	210	240	240	240	270	300	300	300	540	600	1680	1740	1740	1740
100	0.00	0.06	0.44	0.90	1.38	1.85	2.35	2.91	3.51	4.12	5.19	8.55	15.23	21.92	28.74	35.66
	0	150	210	240	240	240	270	300	300	540	540	1680	1680	1680	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.24	1.15	1.04	1.00	1.48	2.41	6.45
3	1.09	1.06	1.00	1.00	1.00	1.00	1.18
4	1.00	1.01	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.24	1.17	1.07	1.40	2.10	9.48	17.88
8	1.10	1.10	1.06	1.05	1.06	1.41	2.90
9	1.10	1.11	1.08	1.08	1.10	1.73	4.11
10	1.03	1.11	1.13	1.13	1.13	1.50	3.67
11	1.00	1.14	1.15	1.12	1.19	1.59	4.09
12	1.15	1.13	1.04	1.04	1.06	1.73	3.76
13	1.04	1.08	1.08	1.07	1.09	1.30	2.23
14	1.00	1.08	1.13	1.12	1.13	1.36	2.20
15	1.00	1.14	1.15	1.12	1.18	1.50	2.80
16	1.00	1.16	1.19	1.13	1.19	1.56	3.59
17	1.00	1.06	1.08	1.07	1.09	1.19	1.69
18	1.00	1.08	1.13	1.12	1.13	1.28	1.71
19	1.00	1.14	1.16	1.12	1.18	1.47	2.16
20	1.00	1.16	1.19	1.13	1.19	1.52	2.99

03109500 Little Beaver Creek near East Liverpool, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
72.00	2.201	213.53	218.97	241.30	259.72	265.65	276.41	290.81
70.00	2.190	212.92	216.70	238.89	257.78	263.88	275.11	290.15
60.00	2.128	209.54	204.20	225.60	247.06	254.11	267.93	286.50
50.00	2.054	205.46	189.05	209.49	234.06	242.27	259.22	282.08
40.00	1.960	200.29	169.92	189.15	217.66	227.33	248.23	276.51
30.00	1.834	190.42	155.94	170.04	195.20	205.85	235.64	259.00
25.00	1.751	182.80	151.08	160.49	180.22	191.15	228.14	243.71
20.00	1.645	176.20	141.13	153.56	171.64	181.76	219.95	238.89
10.00	1.282	147.52	126.61	135.81	146.80	163.62	194.00	218.19
5.00	0.841	124.74	100.30	102.44	116.07	137.22	165.69	189.55
2.00	0.000	93.27	56.21	59.64	67.15	74.20	99.30	114.67

03110000 Yellow Creek near Hammondsville, Ohio

Location: Latitude 40°32′16″, longitude 80°43′31″, Jefferson County, Hydrologic Unit 05030101

Drainage area, in square miles: 147.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1940-11-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 20.

Mean annual streamflow, in inches: 14.98

Location of station used for precipitation data: Pittsburgh, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
57.00	4.03	0.36	4.75	8.07	16.50	29.69	39.59	50.71
50.00	3.90	0.36	5.07	8.39	16.60	29.72	40.40	52.28
40.00	3.68	0.37	5.62	8.95	16.76	29.77	41.79	54.95
30.00	3.38	0.38	6.33	9.66	16.97	29.83	43.58	58.41
25.00	3.20	0.39	6.59	9.82	17.13	30.15	44.44	59.24
20.00	2.97	0.41	6.80	9.86	17.33	30.68	45.37	59.59
10.00	2.25	0.83	7.86	12.29	18.74	35.14	48.40	67.15
5.18	1.54	1.01	8.46	14.37	23.39	42.02	–	–

03110000 Yellow Creek near Hammondsville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.03	0.14	0.33	0.63	0.94	1.29	1.66	2.03	2.40	2.78	3.65	4.63	5.61	6.62	8.13
	0	30	90	90	150	150	180	180	180	180	210	240	240	240	300	600
6	0.00	0.03	0.15	0.33	0.63	0.94	1.29	1.66	2.03	2.40	2.78	3.66	4.65	5.63	6.70	9.17
	0	30	90	90	150	150	180	180	180	180	210	240	240	240	600	600
8	0.00	0.03	0.17	0.38	0.64	0.95	1.29	1.66	2.03	2.40	2.89	3.87	4.86	5.84	8.03	10.49
	0	60	90	120	150	150	180	180	180	180	240	240	240	240	600	600
10	0.00	0.04	0.19	0.42	0.70	1.01	1.38	1.75	2.14	2.63	3.13	4.11	5.10	6.39	8.85	11.40
	0	60	90	120	150	180	180	180	240	240	240	240	240	600	600	660
15	0.00	0.05	0.25	0.53	0.86	1.23	1.60	2.09	2.58	3.07	3.56	4.55	5.64	7.52	9.98	16.08
	0	60	120	150	180	180	180	240	240	240	240	240	270	600	600	1740
20	0.00	0.06	0.30	0.62	0.99	1.36	1.84	2.33	2.83	3.32	3.81	4.88	5.99	8.09	12.21	17.65
	30	90	150	180	180	210	240	240	240	240	240	270	270	600	1320	1740
25	0.00	0.07	0.34	0.69	1.06	1.49	1.98	2.47	2.96	3.46	3.98	5.09	6.29	8.85	13.77	19.18
	30	90	150	180	180	240	240	240	240	240	270	270	300	960	1320	1320
30	0.00	0.08	0.37	0.73	1.12	1.56	2.06	2.55	3.04	3.56	4.11	5.27	6.50	9.60	14.64	20.05
	30	120	150	180	210	240	240	240	240	270	270	300	300	960	1320	1320
40	0.00	0.09	0.40	0.77	1.18	1.62	2.12	2.61	3.15	3.70	4.26	5.46	6.79	10.36	15.16	20.58
	30	120	180	180	210	240	240	240	270	270	270	300	540	960	1320	1320
50	0.01	0.09	0.40	0.77	1.18	1.62	2.12	2.65	3.20	3.76	4.31	5.50	7.28	10.56	15.16	22.08
	30	120	180	180	210	240	240	270	270	270	270	300	480	960	1320	1740
60	0.01	0.09	0.40	0.77	1.18	1.62	2.12	2.65	3.21	3.76	4.31	5.69	7.66	10.56	17.40	24.54
	30	120	180	180	210	240	240	270	270	270	270	480	480	960	1740	1740
70	0.01	0.09	0.40	0.77	1.18	1.62	2.12	2.65	3.21	3.76	4.31	5.99	7.96	13.00	20.13	27.27
	30	120	180	180	210	240	240	270	270	270	270	480	480	1740	1740	1740
80	0.01	0.09	0.40	0.77	1.18	1.62	2.12	2.65	3.21	3.76	4.31	6.23	8.71	15.84	22.98	30.12
	30	120	180	180	210	240	240	270	270	270	270	480	1740	1740	1740	1740
90	0.01	0.09	0.40	0.77	1.18	1.62	2.12	2.65	3.21	3.76	4.46	6.43	11.56	18.69	25.83	32.97
	30	120	180	180	210	240	240	270	270	270	480	480	1740	1740	1740	1740
100	0.01	0.09	0.40	0.77	1.18	1.62	2.12	2.65	3.21	3.76	4.64	7.20	14.34	21.47	28.61	35.75
	30	120	180	180	210	240	240	270	270	270	480	1740	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.37	1.10	1.03	1.13	1.28	2.16	3.94
3	1.28	1.02	1.00	1.01	1.00	1.01	1.00
4	1.16	1.00	1.00	1.00	1.00	1.00	1.00
5	1.02	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.37	1.12	1.09	1.33	1.77	5.63	11.10
8	1.30	1.03	1.03	1.05	1.10	1.18	2.60
9	1.29	1.05	1.04	1.08	1.23	1.39	3.74
10	1.25	1.04	1.06	1.09	1.24	1.38	3.21
11	1.20	1.07	1.11	1.13	1.30	1.47	3.52
12	1.30	1.06	1.02	1.05	1.10	1.39	3.42
13	1.26	1.04	1.03	1.08	1.21	1.20	1.69
14	1.10	1.04	1.05	1.10	1.24	1.26	1.82
15	1.06	1.07	1.10	1.10	1.29	1.39	1.97
16	1.07	1.11	1.11	1.14	1.35	1.70	2.08
17	1.17	1.04	1.03	1.08	1.19	1.21	1.40
18	1.03	1.04	1.06	1.10	1.24	1.26	1.68
19	1.05	1.07	1.10	1.10	1.30	1.36	1.83
20	1.06	1.11	1.11	1.14	1.37	1.63	1.95

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
57.00	2.108	194.59	198.20	205.59	210.78	216.84	239.67	257.45
50.00	2.054	189.18	197.14	204.55	208.50	214.47	237.58	254.51
40.00	1.960	179.72	195.27	202.74	204.51	210.33	233.93	249.36
30.00	1.834	167.00	192.77	200.31	199.15	204.76	229.03	242.45
25.00	1.751	156.81	188.92	192.89	192.67	203.45	227.03	241.11
20.00	1.645	142.98	182.96	180.63	183.00	202.93	225.11	240.98
10.00	1.282	121.88	119.18	118.93	133.16	149.80	170.88	188.99
5.00	0.841	100.00	87.28	92.41	114.01	131.54	151.44	169.49
2.04	0.022	60.69	51.98	56.89	69.03	78.25	103.45	117.14

03110500 Yellow Creek at Hammondsville, Ohio

Location: Latitude 40°33′15″, longitude 80°42′30″, Jefferson County, Hydrologic Unit 05030101

Drainage area, in square miles: 164.

Station used for record extension: 03109500

Time period of systematic or extended record analyzed: 1926-01-01 to 1997-09-30

Percentage of estimated values in extended record: 82.7

Eighty-percent-duration streamflow, in cubic feet per second: 17.

Mean annual streamflow, in inches: 17.89

Location of station used for precipitation data: Pittsburgh, Pennsylvania

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
72.00	4.27	0.20	3.73	9.21	17.10	29.83	44.48	54.99
70.00	4.24	0.22	3.81	9.28	17.17	29.87	44.56	55.09
60.00	4.09	0.30	4.26	9.66	17.57	30.10	45.01	55.64
50.00	3.90	0.41	4.79	10.11	18.05	30.36	45.54	56.28
40.00	3.68	0.54	5.43	10.66	18.63	30.69	46.18	57.07
30.00	3.38	0.61	6.57	11.12	19.37	31.28	48.53	63.34
25.00	3.20	0.62	7.41	11.32	19.84	31.72	50.58	69.24
20.00	2.97	0.71	7.70	11.73	20.19	33.29	51.45	70.72
10.00	2.25	0.91	8.36	12.67	22.28	42.10	56.73	79.37
5.14	1.53	1.20	10.17	16.93	28.34	53.75	93.77	–

03110500 Yellow Creek at Hammondsville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.04	0.17	0.39	0.63	1.00	1.38	1.83	2.27	2.78	3.29	4.46	5.64	6.83	8.15	10.77
	30	30	90	90	150	150	180	180	180	210	210	240	240	270	270	600
6	0.00	0.05	0.19	0.41	0.76	1.13	1.55	1.99	2.48	3.00	3.54	4.72	5.89	7.16	9.31	12.25
	30	30	90	120	150	150	180	180	210	210	240	240	240	270	600	600
8	0.00	0.05	0.22	0.51	0.86	1.26	1.70	2.18	2.70	3.23	3.82	5.00	6.21	8.03	10.97	13.90
	30	30	120	120	150	180	180	210	210	240	240	240	270	600	600	600
10	0.01	0.05	0.25	0.54	0.89	1.32	1.77	2.29	2.80	3.39	3.97	5.15	6.43	8.92	11.86	14.91
	30	30	120	120	150	180	210	210	210	240	240	240	270	600	600	1020
15	0.01	0.07	0.26	0.56	0.96	1.40	1.91	2.43	3.02	3.61	4.20	5.43	7.09	10.03	13.68	20.53
	30	60	120	120	180	180	210	240	240	240	240	270	600	600	1020	1680
20	0.02	0.09	0.29	0.59	1.02	1.50	2.01	2.58	3.17	3.76	4.35	5.66	7.64	10.58	15.46	23.21
	30	60	90	150	180	210	210	240	240	240	240	300	600	600	1020	1740
25	0.02	0.10	0.32	0.64	1.08	1.59	2.13	2.71	3.30	3.89	4.54	6.01	8.02	11.53	16.52	24.57
	30	60	90	180	180	210	240	240	240	240	300	300	600	1020	1020	1740
30	0.02	0.11	0.33	0.71	1.17	1.68	2.24	2.83	3.42	4.06	4.79	6.26	8.31	12.27	17.39	25.52
	30	90	90	180	210	210	240	240	240	300	300	300	600	1020	1620	1740
40	0.03	0.14	0.41	0.84	1.33	1.86	2.45	3.03	3.68	4.41	5.15	6.62	8.80	13.29	18.80	27.25
	60	90	150	180	210	240	240	240	300	300	300	300	600	1020	1620	1740
50	0.04	0.16	0.50	0.95	1.47	2.03	2.62	3.20	3.90	4.64	5.37	6.84	9.24	14.05	20.70	29.23
	60	90	180	210	210	240	240	240	300	300	300	300	600	1020	1740	1740
60	0.05	0.20	0.59	1.07	1.58	2.17	2.76	3.37	4.06	4.80	5.53	7.03	9.69	14.69	22.95	31.47
	90	150	180	210	210	240	240	270	300	300	300	330	1020	1020	1740	1740
70	0.06	0.25	0.66	1.16	1.70	2.29	2.88	3.53	4.19	4.91	5.65	7.26	10.26	16.86	25.39	33.91
	90	150	180	210	240	240	240	270	270	300	300	330	1020	1740	1740	1740
80	0.07	0.29	0.72	1.24	1.80	2.39	3.00	3.66	4.32	5.02	5.82	7.49	10.87	19.39	27.91	36.43
	120	150	210	210	240	240	270	270	270	330	330	600	1740	1740	1740	1740
90	0.09	0.31	0.78	1.30	1.88	2.47	3.12	3.78	4.44	5.17	5.98	7.85	13.42	21.94	30.46	38.98
	150	180	210	210	240	240	270	270	270	330	330	600	1740	1740	1740	1740
100	0.11	0.34	0.83	1.36	1.95	2.55	3.22	3.88	4.59	5.47	6.35	8.20	15.94	24.46	32.98	41.51
	150	180	210	240	240	270	270	270	360	360	360	600	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.28	1.13	1.12	1.03	1.00	1.58	2.69
3	1.14	1.01	1.02	1.00	1.00	1.00	1.05
4	1.08	1.00	1.00	1.00	1.00	1.00	1.00
5	1.04	1.00	1.00	1.00	1.00	1.00	1.00
6	1.02	1.00	1.00	1.00	1.00	1.00	1.00
7	1.28	1.15	1.13	1.09	1.53	3.83	14.84
8	1.15	1.02	1.05	1.08	1.18	1.36	2.47
9	1.14	1.03	1.06	1.13	1.26	1.66	4.09
10	1.13	1.00	1.03	1.29	1.35	1.61	3.94
11	1.10	1.02	1.10	1.32	1.36	1.54	4.99
12	1.19	1.07	1.06	1.07	1.14	1.57	3.26
13	1.12	1.01	1.03	1.13	1.25	1.32	2.05
14	1.07	1.00	1.00	1.27	1.35	1.33	2.30
15	1.07	1.02	1.08	1.32	1.36	1.38	3.69
16	1.05	1.01	1.09	1.39	1.35	1.43	4.46
17	1.09	1.01	1.01	1.13	1.25	1.22	1.61
18	1.05	1.00	1.00	1.27	1.35	1.33	1.62
19	1.05	1.02	1.10	1.32	1.37	1.38	2.80
20	1.02	1.01	1.09	1.39	1.35	1.43	3.70

03110500 Yellow Creek at Hammondsville, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
72.00	2.201	167.31	185.73	183.87	199.87	218.14	246.01	258.33
70.00	2.190	165.61	182.83	181.30	197.79	216.82	244.49	256.77
60.00	2.128	156.23	166.82	167.10	186.33	209.57	236.07	248.13
50.00	2.054	144.86	147.42	149.90	172.45	200.77	225.88	237.66
40.00	1.960	130.50	122.92	128.18	154.91	189.67	213.00	224.45
30.00	1.834	122.34	109.96	115.28	142.29	175.75	199.29	217.82
25.00	1.751	121.10	108.84	112.85	138.03	166.94	191.58	217.60
20.00	1.645	115.22	106.42	108.09	127.30	149.03	184.94	212.40
10.00	1.282	105.32	81.75	94.31	114.86	134.63	163.43	195.42
5.00	0.841	88.09	67.48	78.04	87.51	105.54	143.59	164.03
2.00	0.000	62.36	40.65	42.13	49.24	62.49	87.32	102.46

03111500 Short Creek near Dillonvale, Ohio

Location: Latitude 40°11′36″, longitude 80°44′04″, Jefferson County, Hydrologic Unit 05030106

Drainage area, in square miles: 123.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1941-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 33.

Mean annual streamflow, in inches: 14.31

Location of station used for precipitation data: Cadiz, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
57.00	4.03	0.86	4.92	8.23	14.20	26.26	37.81	50.81
50.00	3.90	0.89	5.15	8.62	14.88	26.60	37.99	51.75
40.00	3.68	0.95	5.55	9.29	16.04	27.17	38.30	53.35
30.00	3.38	1.03	6.06	10.16	17.54	27.91	38.70	55.43
25.00	3.20	1.17	6.28	10.34	17.82	28.57	39.92	56.04
20.00	2.97	1.40	6.49	10.40	17.83	29.49	41.89	56.45
10.00	2.25	1.48	7.16	11.71	18.98	32.54	46.02	63.60
5.18	1.54	1.74	9.06	14.17	24.58	40.71	66.56	–

03111500 Short Creek near Dillonvale, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.04	0.13	0.29	0.56	0.85	1.14	1.47	1.84	2.67	3.49	4.43	5.81	8.16
	0	0	0	30	60	120	150	150	150	180	210	210	210	240	600	600
6	0.00	0.00	0.00	0.05	0.15	0.30	0.56	0.86	1.17	1.52	1.88	2.70	3.62	4.56	6.69	9.04
	0	0	0	30	60	120	150	150	180	180	210	210	240	240	600	600
8	0.00	0.00	0.00	0.06	0.17	0.34	0.60	0.90	1.24	1.60	1.99	2.90	3.84	5.27	7.62	9.97
	0	0	0	30	60	120	150	150	180	180	210	240	240	600	600	600
10	0.00	0.00	0.01	0.07	0.19	0.38	0.65	0.95	1.31	1.69	2.13	3.07	4.11	5.73	8.08	12.81
	0	0	30	60	60	120	150	180	180	210	240	240	270	600	600	1680
15	0.00	0.00	0.02	0.09	0.23	0.47	0.77	1.10	1.51	1.95	2.42	3.38	4.44	6.27	11.40	17.98
	0	0	30	60	120	150	150	210	210	240	240	270	270	600	1680	1680
20	0.00	0.00	0.03	0.11	0.29	0.56	0.85	1.26	1.68	2.15	2.62	3.56	4.60	6.55	11.40	17.98
	0	0	30	60	120	150	150	210	240	240	240	240	300	600	1680	1680
25	0.00	0.00	0.03	0.12	0.33	0.62	0.96	1.37	1.82	2.29	2.76	3.70	4.70	7.37	11.70	17.98
	0	0	30	60	120	150	210	210	240	240	240	240	300	960	1320	1680
30	0.00	0.00	0.04	0.13	0.38	0.67	1.04	1.46	1.93	2.40	2.87	3.81	4.87	8.00	12.51	17.98
	0	0	30	120	150	150	210	240	240	240	240	240	540	960	1320	1680
40	0.00	0.00	0.04	0.17	0.44	0.76	1.16	1.62	2.09	2.56	3.03	3.97	5.59	8.89	13.78	18.96
	0	0	30	120	150	180	210	240	240	240	240	240	480	960	1320	1320
50	0.00	0.00	0.04	0.19	0.51	0.86	1.26	1.73	2.20	2.67	3.14	4.57	6.45	9.71	14.88	20.06
	0	0	30	150	180	180	240	240	240	240	240	480	480	1320	1320	1320
60	0.00	0.00	0.04	0.24	0.59	0.95	1.34	1.81	2.28	2.75	3.46	5.34	7.22	10.76	15.93	22.39
	0	0	30	180	180	180	240	240	240	240	480	480	480	1320	1320	1740
70	0.00	0.00	0.04	0.31	0.66	1.02	1.40	1.87	2.34	3.20	4.14	6.02	8.35	13.60	20.42	27.24
	0	0	30	180	180	180	240	240	240	480	480	480	840	1740	1740	1740
80	0.00	0.00	0.04	0.37	0.73	1.08	1.45	1.92	2.85	3.79	4.73	6.61	11.76	18.58	25.40	32.22
	0	0	30	180	180	180	240	240	480	480	480	480	1740	1740	1740	1740
90	0.00	0.00	0.07	0.43	0.78	1.13	1.49	2.42	3.37	4.31	5.25	9.72	16.54	23.36	30.18	37.00
	0	0	180	180	180	180	240	480	480	480	480	1740	1740	1740	1740	1740
100	0.00	0.00	0.12	0.47	0.82	1.18	1.94	2.88	3.82	4.76	7.30	14.12	20.94	27.76	34.58	41.39
	0	0	180	180	180	180	480	480	480	480	1740	1740	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.22	1.81	1.65	1.67	1.93	2.32	4.75
3	1.32	1.10	1.07	1.06	1.04	1.24	1.19
4	1.22	1.07	1.06	1.00	1.00	1.00	1.04
5	1.15	1.05	1.03	1.00	1.00	1.00	1.00
6	1.07	1.02	1.01	1.00	1.00	1.00	1.00
7	2.22	1.83	1.85	2.02	2.35	7.79	11.01
8	1.32	1.12	1.11	1.11	1.15	1.83	3.25
9	1.32	1.14	1.14	1.13	1.36	2.41	5.83
10	1.27	1.10	1.11	1.14	1.20	2.09	6.92
11	1.23	1.15	1.12	1.14	1.29	2.40	9.14
12	1.39	1.17	1.16	1.13	1.32	2.23	4.60
13	1.27	1.11	1.11	1.09	1.10	1.84	2.31
14	1.20	1.08	1.09	1.10	1.13	1.90	4.01
15	1.20	1.13	1.10	1.09	1.17	2.09	7.01
16	1.15	1.11	1.10	1.14	1.21	2.92	10.04
17	1.22	1.10	1.09	1.07	1.09	1.75	2.03
18	1.16	1.06	1.07	1.06	1.12	1.85	2.58
19	1.14	1.10	1.08	1.07	1.17	2.00	5.67
20	1.09	1.08	1.10	1.14	1.21	2.82	8.95

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
57.00	2.108	188.92	211.85	213.34	222.55	234.58	251.21	337.46
50.00	2.054	184.62	204.26	206.95	216.15	231.08	248.68	324.16
40.00	1.960	177.10	190.99	195.76	204.94	224.96	244.24	300.89
30.00	1.834	166.99	173.15	180.73	189.88	216.73	238.28	269.62
25.00	1.751	156.52	149.82	157.75	183.41	210.34	235.40	260.56
20.00	1.645	141.35	114.50	122.15	176.87	201.75	232.25	254.71
10.00	1.282	124.44	91.85	98.47	122.56	145.39	188.80	215.02
5.00	0.841	101.37	83.17	83.80	105.98	132.63	154.96	179.92
2.04	0.022	83.43	53.37	51.47	62.77	77.85	97.44	120.04

03111548 Wheeling Creek below Blaine, Ohio

Location: Latitude 40°04′01″, longitude 80°48′31″, Belmont County, Hydrologic Unit 05030106

Drainage area, in square miles: 97.7

Station used for record extension: 03115000

Time period of systematic or extended record analyzed: 1941-10-01 to 1997-09-30

Percentage of estimated values in extended record: 75.3

Eighty-percent-duration streamflow, in cubic feet per second: 36.

Mean annual streamflow, in inches: 15.69

Location of station used for precipitation data: Cadiz, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
57.00	4.03	0.82	5.21	9.06	15.08	28.94	41.41	55.97
50.00	3.90	0.87	5.57	9.50	15.85	29.13	41.60	56.64
40.00	3.68	0.95	6.19	10.24	17.17	29.44	41.94	57.77
30.00	3.38	1.05	7.00	11.21	18.88	29.86	42.36	59.24
25.00	3.20	1.20	7.15	11.47	19.31	30.77	43.56	60.12
20.00	2.97	1.43	7.16	11.62	19.54	32.20	45.49	61.17
10.00	2.25	1.66	7.94	12.69	21.13	36.45	50.89	64.53
5.18	1.54	1.93	9.65	14.73	25.58	43.63	73.66	–

03111548 Wheeling Creek below Blaine, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.02	0.08	0.19	0.35	0.61	0.87	1.20	1.57	1.96	2.86	3.80	4.83	6.28	8.85
	0	0	30	30	60	120	120	150	150	180	210	210	240	240	600	600
6	0.00	0.00	0.02	0.08	0.20	0.36	0.62	0.91	1.24	1.63	2.01	2.91	3.93	4.96	7.31	9.89
	0	0	30	30	60	90	120	150	180	180	180	210	240	240	600	600
8	0.00	0.00	0.02	0.09	0.22	0.40	0.66	0.99	1.34	1.72	2.14	3.13	4.16	5.82	8.40	10.98
	0	0	30	60	60	120	150	150	180	180	210	240	240	600	600	600
10	0.00	0.00	0.03	0.11	0.24	0.45	0.74	1.06	1.43	1.83	2.29	3.32	4.38	6.36	8.94	14.08
	0	0	30	60	60	120	150	150	180	210	240	240	270	600	600	1680
15	0.00	0.00	0.04	0.14	0.31	0.56	0.88	1.22	1.68	2.13	2.65	3.68	4.78	6.98	12.97	20.19
	0	0	30	60	120	120	150	210	210	240	240	240	270	600	1680	1680
20	0.00	0.00	0.05	0.16	0.38	0.67	0.99	1.43	1.88	2.37	2.89	3.92	5.01	7.29	12.97	20.19
	0	0	30	60	120	150	150	210	210	240	240	240	300	600	1680	1680
25	0.00	0.00	0.05	0.18	0.44	0.75	1.12	1.57	2.03	2.55	3.06	4.10	5.16	8.15	13.05	20.19
	0	0	30	120	120	150	210	210	240	240	240	240	300	960	1380	1680
30	0.00	0.00	0.06	0.22	0.48	0.81	1.23	1.68	2.17	2.69	3.20	4.23	5.26	8.88	13.59	20.19
	0	0	30	120	150	150	210	210	240	240	240	240	240	960	1380	1680
40	0.00	0.00	0.06	0.27	0.57	0.95	1.37	1.85	2.37	2.88	3.40	4.43	5.91	9.93	14.80	20.59
	0	0	30	120	150	180	210	240	240	240	240	240	540	960	1320	1380
50	0.00	0.00	0.06	0.31	0.68	1.06	1.47	1.99	2.50	3.02	3.54	5.01	7.08	10.70	16.13	21.89
	0	0	30	150	180	180	240	240	240	240	240	480	480	960	1320	1380
60	0.00	0.00	0.06	0.38	0.77	1.16	1.58	2.09	2.61	3.12	4.12	6.18	8.36	11.97	17.53	23.71
	0	0	30	180	180	180	240	240	240	240	480	480	840	840	1320	1740
70	0.00	0.00	0.07	0.46	0.84	1.23	1.65	2.17	3.08	4.11	5.14	7.20	9.93	13.54	20.45	27.92
	0	0	150	180	180	180	240	240	480	480	480	480	840	840	1740	1740
80	0.00	0.00	0.13	0.52	0.91	1.29	1.89	2.92	3.95	4.98	6.01	8.07	11.39	17.48	24.96	32.44
	0	0	180	180	180	180	480	480	480	480	480	480	840	1740	1740	1740
90	0.00	0.00	0.18	0.57	0.96	1.58	2.62	3.65	4.68	5.71	6.74	9.12	14.51	21.98	29.46	36.94
	0	0	180	180	180	480	480	480	480	480	480	840	1740	1740	1740	1740
100	0.00	0.00	0.23	0.62	1.16	2.19	3.22	4.25	5.28	6.31	7.35	11.33	18.81	26.29	33.76	41.24
	0	0	180	180	480	480	480	480	480	480	480	1740	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	5.70	2.76	2.38	2.22	2.28	5.40	6.61
3	1.12	1.11	1.09	1.08	1.03	1.40	1.37
4	1.07	1.06	1.03	1.02	1.00	1.12	1.06
5	1.05	1.04	1.01	1.00	1.00	1.03	1.02
6	1.02	1.02	1.00	1.00	1.00	1.01	1.00
7	5.70	2.91	2.52	2.44	4.36	11.31	12.61
8	1.13	1.12	1.12	1.11	1.45	2.18	5.43
9	1.13	1.12	1.13	1.13	1.63	2.91	7.92
10	1.08	1.08	1.09	1.14	1.56	2.68	8.46
11	1.09	1.08	1.07	1.12	1.62	2.87	9.62
12	1.20	1.17	1.14	1.17	1.57	2.57	6.44
13	1.10	1.08	1.06	1.10	1.26	1.91	4.57
14	1.08	1.06	1.06	1.11	1.25	2.09	5.62
15	1.06	1.07	1.05	1.12	1.29	2.63	7.46
16	1.03	1.05	1.06	1.14	1.37	2.87	9.64
17	1.09	1.07	1.05	1.09	1.08	1.80	2.34
18	1.07	1.04	1.04	1.09	1.13	1.89	3.98
19	1.04	1.05	1.04	1.12	1.19	2.47	6.18
20	1.00	1.03	1.06	1.14	1.26	2.73	8.59

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
57.00	2.108	235.40	229.11	226.98	229.88	246.97	273.52	383.81
50.00	2.054	234.20	221.02	219.45	227.56	245.38	270.94	364.17
40.00	1.960	232.11	206.87	206.27	223.49	242.61	266.42	329.80
30.00	1.834	229.29	187.85	188.55	218.02	238.88	260.34	283.60
25.00	1.751	209.49	169.77	179.95	210.16	233.00	257.58	271.96
20.00	1.645	175.53	144.07	170.53	198.07	223.83	254.68	266.38
10.00	1.282	154.35	116.96	122.48	141.18	160.16	206.35	226.71
5.00	0.841	130.88	89.34	96.49	125.30	148.44	173.87	195.56
2.04	0.022	99.74	60.27	59.88	80.30	90.03	116.83	141.85

03114000 Captina Creek at Armstrongs Mills, Ohio

Location: Latitude 39°54′31″, longitude 80°55′27″, Belmont County, Hydrologic Unit 05030106

Drainage area, in square miles: 134.

Station used for record extension: 03111500

Time period of systematic or extended record analyzed: 1941-10-01 to 1997-09-30

Percentage of estimated values in extended record: 30.4

Eighty-percent-duration streamflow, in cubic feet per second: 13.

Mean annual streamflow, in inches: 17.03

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
57.00	4.03	0.08	3.63	6.77	12.82	27.28	39.89	58.65
50.00	3.90	0.11	4.15	7.31	13.89	28.74	40.65	59.44
40.00	3.68	0.16	5.04	8.22	15.71	31.24	41.95	60.80
30.00	3.38	0.22	6.19	9.41	18.07	34.47	43.64	62.55
25.00	3.20	0.28	6.49	10.17	18.73	35.18	44.74	63.79
20.00	2.97	0.37	6.64	11.12	19.14	35.40	46.10	65.39
10.00	2.25	0.52	7.27	12.46	21.24	37.94	58.33	75.97
5.18	1.54	0.73	9.98	14.55	27.39	48.39	75.20	–

03114000 Captina Creek at Armstrongs Mills, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.02	0.10	0.33	0.61	0.94	1.36	1.78	2.20	2.62	3.06	3.55	4.53	5.59	6.71	7.83	10.32
	60	60	120	120	180	180	180	180	180	210	210	210	240	240	240	540
6	0.03	0.11	0.36	0.68	1.03	1.44	1.86	2.28	2.70	3.17	3.68	4.80	5.92	7.04	8.54	11.06
	60	60	120	150	150	180	180	180	180	210	240	240	240	240	540	540
8	0.03	0.12	0.41	0.76	1.12	1.54	1.96	2.37	2.83	3.38	3.94	5.06	6.18	7.30	9.95	12.75
	60	90	150	150	180	180	180	180	210	240	240	240	240	240	600	600
10	0.04	0.14	0.45	0.80	1.17	1.59	2.01	2.44	2.93	3.49	4.05	5.16	6.28	8.12	10.92	14.37
	60	120	150	150	180	180	180	210	210	240	240	240	240	600	600	960
15	0.04	0.18	0.49	0.84	1.26	1.68	2.12	2.61	3.10	3.61	4.17	5.32	6.59	9.39	14.37	22.20
	60	120	150	150	180	180	210	210	210	240	240	270	600	600	1680	1680
20	0.05	0.19	0.52	0.91	1.33	1.75	2.24	2.73	3.22	3.73	4.29	5.53	7.32	10.12	16.72	24.55
	60	120	150	180	180	210	210	210	210	240	240	270	600	600	1680	1680
25	0.05	0.21	0.55	0.97	1.39	1.85	2.34	2.83	3.32	3.88	4.44	5.70	7.87	10.73	17.43	25.26
	90	120	180	180	180	210	210	210	240	240	270	270	600	660	1680	1680
30	0.06	0.22	0.60	1.02	1.44	1.93	2.42	2.91	3.47	4.03	4.59	5.84	8.34	12.29	18.72	25.41
	90	120	180	180	180	210	210	240	240	240	240	270	600	1380	1380	1680
40	0.06	0.26	0.68	1.10	1.56	2.08	2.64	3.20	3.76	4.32	4.88	6.84	9.29	14.79	21.22	27.66
	120	180	180	180	210	240	240	240	240	240	240	480	540	1380	1380	1380
50	0.07	0.32	0.73	1.19	1.75	2.31	2.87	3.43	3.99	4.98	6.10	8.34	11.11	16.65	23.09	29.52
	120	180	180	240	240	240	240	240	240	480	480	480	900	1380	1380	1380
60	0.10	0.35	0.79	1.35	1.91	2.47	3.03	3.93	5.05	6.17	7.29	9.91	14.03	18.77	24.92	31.08
	180	180	240	240	240	240	240	480	480	480	480	840	900	1320	1320	1320
70	0.12	0.37	0.90	1.46	2.02	2.61	3.73	4.85	5.97	7.09	8.46	12.40	16.60	21.12	27.28	33.43
	180	180	240	240	240	480	480	480	480	480	840	900	900	1320	1320	1320
80	0.14	0.41	0.97	1.53	2.20	3.32	4.44	5.56	6.85	8.67	10.52	14.61	18.80	23.34	29.50	35.65
	180	240	240	240	480	480	480	480	780	780	840	900	900	1320	1320	1320
90	0.15	0.46	1.02	1.61	2.73	3.85	4.97	6.67	8.49	10.31	12.26	16.45	20.65	25.41	31.57	37.72
	180	240	240	480	480	480	480	780	780	780	900	900	900	1320	1320	1320
100	0.16	0.50	1.06	2.02	3.14	4.33	6.15	7.97	9.78	11.69	13.79	17.99	22.18	27.32	33.48	39.63
	240	240	240	480	480	780	780	780	780	900	900	900	900	1320	1320	1320

03114000 Captina Creek at Armstrongs Mills, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.35	1.28	1.29	1.34	1.59	1.98	3.55
3	1.13	1.10	1.09	1.08	1.03	1.18	1.28
4	1.03	1.07	1.04	1.00	1.01	1.00	1.09
5	1.02	1.04	1.02	1.00	1.00	1.00	1.02
6	1.01	1.02	1.00	1.00	1.00	1.00	1.01
7	1.35	1.32	1.33	1.55	1.92	4.88	8.36
8	1.14	1.14	1.13	1.12	1.07	1.58	2.28
9	1.13	1.14	1.12	1.12	1.23	1.92	3.29
10	1.12	1.12	1.10	1.12	1.07	1.74	2.80
11	1.08	1.11	1.09	1.11	1.12	1.83	2.81
12	1.19	1.18	1.16	1.13	1.21	1.89	2.62
13	1.08	1.11	1.08	1.08	1.07	1.58	2.12
14	1.07	1.10	1.09	1.09	1.07	1.59	2.41
15	1.03	1.09	1.08	1.07	1.12	1.57	2.61
16	1.06	1.09	1.06	1.10	1.15	1.96	2.74
17	1.04	1.11	1.07	1.06	1.05	1.45	1.88
18	1.03	1.09	1.06	1.06	1.07	1.49	2.30
19	1.02	1.08	1.05	1.05	1.12	1.51	2.50
20	1.04	1.06	1.07	1.10	1.15	1.79	2.63

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
57.00	2.108	214.81	217.45	218.04	224.07	238.27	251.07	284.95
50.00	2.054	211.50	208.74	210.14	215.78	230.29	242.81	279.97
40.00	1.960	205.71	193.50	196.32	201.28	216.32	228.37	271.27
30.00	1.834	197.93	173.02	177.74	181.79	197.54	208.95	259.57
25.00	1.751	188.91	160.29	168.49	176.94	191.07	203.22	246.16
20.00	1.645	175.54	144.49	158.21	174.72	185.74	199.40	226.34
10.00	1.282	146.03	115.27	119.81	138.47	152.41	179.08	197.34
5.00	0.841	126.61	84.95	88.32	114.12	132.32	156.40	177.33
2.04	0.022	95.00	57.05	62.39	71.28	84.80	104.95	133.00

03115400 Little Muskingum River at Bloomfield, Ohio

Location: Latitude 39°33′47″, longitude 81°12′14″, Washington County, Hydrologic Unit 05030201

Drainage area, in square miles: 210.

Station used for record extension: 03114000

Time period of systematic or extended record analyzed: 1958-09-13 to 1997-09-30

Percentage of estimated values in extended record: 35.8

Eighty-percent-duration streamflow, in cubic feet per second: 15.

Mean annual streamflow, in inches: 17.07

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
40.00	3.68	0.27	7.16	9.17	19.54	34.41	48.28	61.52
30.00	3.38	0.29	7.17	10.10	19.74	34.87	49.91	63.73
25.00	3.20	0.30	7.18	10.69	19.86	35.17	50.94	65.13
20.00	2.97	0.32	7.19	11.41	20.02	35.53	52.21	66.86
10.00	2.25	0.53	7.76	12.78	23.56	39.54	55.29	70.52
5.71	1.65	0.68	9.08	14.12	25.14	44.09	71.42	–

03115400 Little Muskingum River at Bloomfield, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.02	0.14	0.35	0.69	1.04	1.41	1.83	2.25	2.67	3.09	3.53	4.66	5.78	6.90	8.02	10.21
	30	90	90	150	150	180	180	180	180	180	240	240	240	240	240	540
6	0.03	0.14	0.38	0.72	1.07	1.42	1.84	2.26	2.76	3.25	3.74	4.82	5.94	7.06	8.57	11.10
	60	90	120	150	150	150	180	210	210	210	210	240	240	240	540	540
8	0.04	0.14	0.43	0.78	1.13	1.51	1.95	2.44	2.94	3.43	3.92	4.98	6.10	7.26	9.57	12.21
	60	120	150	150	150	180	210	210	210	210	210	240	240	270	540	600
10	0.04	0.16	0.48	0.83	1.18	1.60	2.02	2.50	2.99	3.48	3.97	5.06	6.19	7.62	10.21	13.82
	60	120	150	150	150	180	180	210	210	210	210	240	270	540	600	1320
15	0.05	0.19	0.54	0.90	1.32	1.74	2.16	2.58	3.01	3.50	4.00	5.12	6.35	8.55	11.35	18.59
	60	150	150	180	180	180	180	180	210	210	240	240	270	600	600	1680
20	0.05	0.23	0.58	0.97	1.39	1.81	2.23	2.65	3.07	3.50	4.01	5.13	6.53	9.61	13.77	21.63
	90	150	150	180	180	180	180	180	180	210	240	240	540	660	1680	1680
25	0.05	0.25	0.60	1.00	1.42	1.84	2.26	2.68	3.10	3.53	4.02	5.14	7.19	10.28	15.19	23.04
	90	150	150	180	180	180	180	180	180	210	210	240	660	660	1680	1680
30	0.06	0.27	0.62	1.00	1.43	1.85	2.27	2.69	3.11	3.57	4.06	5.14	7.66	10.51	15.88	23.73
	120	150	150	180	180	180	180	180	180	210	210	240	600	660	1680	1680
40	0.07	0.28	0.63	1.00	1.43	1.85	2.27	2.70	3.19	3.69	4.18	5.94	8.66	11.46	16.64	24.78
	120	150	150	180	180	180	180	210	210	210	210	540	600	600	1740	1740
50	0.09	0.29	0.64	1.00	1.43	1.85	2.35	2.84	3.33	3.82	4.31	6.78	9.55	12.36	19.11	27.41
	120	150	150	180	180	210	210	210	210	210	210	540	600	600	1740	1800
60	0.09	0.30	0.65	1.00	1.49	1.98	2.47	2.96	3.45	3.94	5.00	7.56	10.36	16.07	24.48	32.89
	120	150	150	180	210	210	210	210	210	210	540	600	600	1800	1800	1800
70	0.10	0.30	0.65	1.10	1.59	2.08	2.57	3.06	3.55	4.41	5.68	8.29	14.07	21.66	30.08	38.49
	120	150	150	210	210	210	210	210	210	540	540	600	1440	1800	1800	1800
80	0.10	0.30	0.69	1.19	1.68	2.17	2.66	3.15	3.76	5.02	6.28	12.00	18.73	27.05	35.46	43.88
	120	150	210	210	210	210	210	210	540	540	540	1440	1440	1800	1800	1800
90	0.11	0.31	0.76	1.25	1.74	2.23	2.72	3.22	4.30	6.05	9.42	16.15	23.62	32.04	40.45	48.87
	120	150	210	210	210	210	210	210	540	1440	1440	1440	1800	1800	1800	1800
100	0.11	0.32	0.81	1.30	1.79	2.29	2.78	3.52	6.31	9.67	13.04	19.77	28.14	36.56	44.97	53.38
	120	210	210	210	210	210	210	540	1440	1440	1440	1440	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.30	1.10	1.05	1.05	1.10	2.19	3.60
3	1.19	1.05	1.01	1.02	1.00	1.00	1.00
4	1.09	1.02	1.00	1.00	1.00	1.00	1.00
5	1.06	1.00	1.00	1.00	1.00	1.00	1.00
6	1.03	1.00	1.00	1.00	1.00	1.00	1.00
7	1.32	1.11	1.07	1.10	2.10	4.53	7.33
8	1.21	1.07	1.02	1.07	1.12	1.14	1.60
9	1.23	1.07	1.07	1.13	1.15	1.35	2.65
10	1.13	1.06	1.07	1.18	1.20	1.31	1.90
11	1.11	1.07	1.07	1.18	1.22	1.40	2.20
12	1.26	1.07	1.05	1.08	1.10	1.29	2.76
13	1.13	1.06	1.05	1.11	1.15	1.19	1.54
14	1.10	1.04	1.06	1.16	1.21	1.26	1.76
15	1.08	1.06	1.07	1.19	1.22	1.24	2.09
16	1.05	1.12	1.07	1.27	1.27	1.28	2.24
17	1.12	1.03	1.03	1.11	1.15	1.17	1.41
18	1.09	1.05	1.08	1.16	1.20	1.22	1.66
19	1.05	1.06	1.07	1.18	1.22	1.20	2.05
20	1.01	1.12	1.07	1.29	1.26	1.26	2.20

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
40.00	1.960	166.03	169.63	172.44	174.41	184.36	199.12	205.53
30.00	1.834	153.75	158.86	166.40	174.27	180.53	190.90	197.64
25.00	1.751	145.64	151.75	162.42	174.18	178.00	185.48	192.43
20.00	1.645	135.33	142.70	157.35	174.06	174.79	178.58	185.80
10.00	1.282	122.55	117.01	122.54	142.69	149.57	172.69	184.99
5.00	0.841	104.15	84.39	93.37	112.04	124.91	153.39	169.44
2.00	0.000	69.33	50.12	55.66	63.25	69.05	89.42	105.44

03117500 Sandy Creek at Waynesburg, Ohio

Location: Latitude 40°40′21″, longitude 81°15′36″, Stark County, Hydrologic Unit 05040001

Drainage area, in square miles: 253.

Station used for record extension: 03119000

Time period of systematic or extended record analyzed: 1923-10-01 to 1997-09-30

Percentage of estimated values in extended record: 20.5

Eighty-percent-duration streamflow, in cubic feet per second: 52.

Mean annual streamflow, in inches: 14.82

Location of station used for precipitation data: Wooster, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
75.00	4.31	0.58	4.02	7.47	14.76	27.03	37.61	46.87
70.00	4.24	0.58	4.15	7.50	14.78	27.07	37.66	46.87
60.00	4.09	0.60	4.42	7.57	14.83	27.17	37.78	46.87
50.00	3.90	0.61	4.76	7.66	14.88	27.29	37.93	46.88
40.00	3.68	0.63	5.16	7.76	14.95	27.43	38.10	46.88
30.00	3.38	0.77	5.47	8.54	15.73	28.21	39.65	52.95
25.00	3.20	0.89	5.62	9.15	16.35	28.81	40.88	57.93
20.00	2.97	0.92	6.37	9.73	17.57	29.10	42.96	58.09
10.00	2.25	1.03	7.76	11.27	18.86	33.11	48.37	66.36
5.36	1.58	1.35	8.51	14.19	24.53	43.45	77.36	–

03117500 Sandy Creek at Waynesburg, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.02	0.13	0.34	0.62	0.94	1.31	1.67	2.10	2.53	3.38	4.23	5.20	6.42	7.64
	0	0	30	90	120	150	180	180	210	210	210	210	210	300	300	300
6	0.00	0.00	0.02	0.15	0.38	0.67	1.01	1.38	1.78	2.21	2.63	3.48	4.41	5.39	6.42	8.84
	0	0	30	90	120	150	180	180	210	210	210	210	240	240	300	600
8	0.00	0.00	0.03	0.18	0.43	0.74	1.11	1.49	1.92	2.34	2.77	3.72	4.75	5.84	8.13	10.57
	0	0	60	120	150	180	180	210	210	210	210	240	270	270	600	600
10	0.00	0.00	0.04	0.20	0.48	0.80	1.17	1.58	2.01	2.43	2.92	3.94	5.04	6.74	9.17	12.27
	0	0	60	120	150	180	180	210	210	210	240	270	270	600	600	960
15	0.00	0.00	0.04	0.24	0.55	0.90	1.30	1.73	2.21	2.70	3.22	4.32	5.73	8.16	11.01	15.88
	0	0	60	120	150	180	210	210	240	240	270	270	600	600	960	1740
20	0.00	0.00	0.05	0.29	0.60	0.97	1.39	1.87	2.36	2.86	3.41	4.50	6.47	8.91	12.26	19.32
	0	0	60	150	180	210	210	240	240	270	270	270	600	600	1740	1740
25	0.00	0.00	0.05	0.32	0.64	1.03	1.48	1.97	2.45	2.98	3.56	4.78	6.94	9.37	14.22	21.28
	0	0	90	150	180	210	240	240	240	270	300	300	600	600	1740	1740
30	0.00	0.00	0.06	0.35	0.68	1.09	1.55	2.04	2.54	3.14	3.75	4.97	7.26	9.70	15.51	22.57
	0	0	120	150	180	210	240	240	300	300	300	300	600	600	1740	1740
40	0.00	0.00	0.09	0.39	0.75	1.18	1.64	2.15	2.75	3.36	3.97	5.25	7.68	10.13	17.19	24.24
	0	0	120	150	210	210	240	300	300	300	300	600	600	1740	1740	1740
50	0.00	0.00	0.12	0.44	0.82	1.25	1.71	2.24	2.85	3.46	4.06	5.52	7.95	11.28	18.33	25.39
	0	0	150	180	210	210	240	300	300	300	300	600	600	1740	1740	1740
60	0.00	0.00	0.15	0.48	0.88	1.31	1.75	2.26	2.87	3.48	4.08	5.71	8.14	12.20	19.26	26.32
	0	0	150	180	210	210	240	300	300	300	300	600	600	1740	1740	1740
70	0.00	0.00	0.18	0.52	0.93	1.36	1.79	2.27	2.87	3.48	4.08	5.85	8.29	13.02	20.08	27.14
	0	0	150	180	210	210	210	240	300	300	300	600	600	1740	1740	1740
80	0.00	0.00	0.20	0.55	0.98	1.40	1.83	2.29	2.87	3.48	4.08	5.96	8.40	13.78	20.84	27.89
	0	30	150	180	210	210	210	240	300	300	300	600	600	1740	1740	1740
90	0.00	0.01	0.22	0.59	1.02	1.44	1.87	2.33	2.88	3.48	4.08	6.05	8.49	14.50	21.56	28.62
	0	60	150	210	210	210	210	270	270	300	300	600	600	1740	1740	1740
100	0.00	0.02	0.24	0.63	1.05	1.48	1.90	2.36	2.91	3.48	4.08	6.13	8.56	15.27	22.26	29.32
	0	60	180	210	210	210	210	270	270	300	300	600	600	1680	1740	1740

03117500 Sandy Creek at Waynesburg, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.34	1.17	1.25	1.50	1.90	3.22	7.43
3	1.04	1.01	1.01	1.00	1.01	1.26	1.48
4	1.00	1.00	1.00	1.00	1.00	1.00	1.04
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.35	1.21	1.36	1.83	3.06	10.77	20.18
8	1.04	1.02	1.03	1.02	1.26	1.70	2.99
9	1.05	1.03	1.03	1.05	1.43	1.89	4.09
10	1.03	1.03	1.03	1.07	1.16	1.64	3.73
11	1.01	1.05	1.06	1.11	1.19	1.59	3.90
12	1.06	1.01	1.02	1.04	1.51	2.07	3.97
13	1.02	1.02	1.03	1.04	1.13	1.47	1.99
14	1.00	1.03	1.03	1.05	1.16	1.32	2.31
15	1.01	1.04	1.05	1.10	1.19	1.46	2.67
16	1.02	1.05	1.05	1.09	1.23	1.63	3.57
17	1.00	1.03	1.03	1.04	1.12	1.24	1.61
18	1.00	1.03	1.04	1.04	1.15	1.27	1.79
19	1.01	1.03	1.04	1.08	1.19	1.41	2.23
20	1.02	1.05	1.03	1.11	1.22	1.59	3.20

03117500 Sandy Creek at Waynesburg, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
75.00	2.217	279.68	260.85	250.94	241.69	243.05	259.45	272.86
70.00	2.190	275.70	257.04	247.64	240.14	242.49	258.26	272.85
60.00	2.128	266.68	248.39	240.14	236.63	241.23	255.56	272.84
50.00	2.054	255.75	237.91	231.05	232.38	239.69	252.28	272.83
40.00	1.960	241.94	224.67	219.58	227.01	237.75	248.15	272.81
30.00	1.834	235.87	219.72	211.91	212.09	230.55	245.23	265.93
25.00	1.751	234.20	218.84	208.30	200.81	224.93	243.80	260.12
20.00	1.645	229.27	201.65	194.39	197.47	212.85	240.95	259.67
10.00	1.282	182.93	178.61	171.63	169.51	189.27	221.29	231.54
5.00	0.841	144.99	121.57	126.38	144.66	154.24	182.87	192.82
2.03	0.017	101.80	71.20	69.96	73.52	84.86	108.25	122.11

03119000 Sandy Creek at Sandyville, Ohio

Location: Latitude 40°38′04″, longitude 81°22′28″, Tuscarawas County, Hydrologic Unit 05040001

Drainage area, in square miles: 481.

Station used for record extension: 03117500

Time period of systematic or extended record analyzed: 1923-10-01 to 1997-09-30

Percentage of estimated values in extended record: 67.6

Eighty-percent-duration streamflow, in cubic feet per second: 120.

Mean annual streamflow, in inches: 14.89

Location of station used for precipitation data: Wooster, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
75.00	4.31	0.99	4.61	8.12	14.79	26.43	37.09	45.59
70.00	4.24	1.01	4.75	8.15	14.96	26.74	37.44	46.09
60.00	4.09	1.06	5.06	8.23	15.36	27.44	38.22	47.20
50.00	3.90	1.11	5.43	8.31	15.82	28.26	39.14	48.52
40.00	3.68	1.18	5.88	8.42	16.39	29.27	40.27	50.14
30.00	3.38	1.29	6.22	9.58	17.39	30.63	41.98	54.38
25.00	3.20	1.37	6.39	10.51	18.07	31.50	43.11	57.47
20.00	2.97	1.43	7.11	10.74	18.42	31.63	43.51	60.90
10.00	2.25	1.58	8.37	12.47	19.86	35.32	52.82	69.24
5.36	1.58	1.81	9.31	15.20	25.79	42.78	66.07	–

03119000 Sandy Creek at Sandyville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.01	0.07	0.23	0.47	0.73	1.10	1.46	1.89	2.74	3.61	4.59	5.59	7.19
	0	0	0	30	30	90	120	180	180	180	210	210	240	240	300	600
6	0.00	0.00	0.00	0.01	0.08	0.28	0.52	0.82	1.19	1.57	2.00	2.85	3.74	4.72	5.70	8.04
	0	0	0	30	60	120	120	180	180	210	210	210	240	240	300	600
8	0.00	0.00	0.00	0.01	0.12	0.33	0.60	0.93	1.30	1.71	2.14	2.99	4.00	5.10	6.87	9.58
	0	0	0	30	90	120	150	180	180	210	210	210	270	270	600	900
10	0.00	0.00	0.00	0.01	0.13	0.36	0.65	1.00	1.37	1.80	2.23	3.19	4.29	5.39	7.83	11.49
	0	0	0	30	90	120	150	180	210	210	210	270	270	270	900	900
15	0.00	0.00	0.00	0.02	0.15	0.42	0.73	1.10	1.53	2.01	2.50	3.57	4.67	6.81	9.87	13.54
	0	0	0	30	120	150	180	210	210	240	240	270	270	600	900	900
20	0.00	0.00	0.00	0.03	0.17	0.46	0.80	1.22	1.71	2.20	2.69	3.76	5.27	7.71	10.62	16.65
	0	0	0	30	120	150	180	240	240	240	240	270	600	600	900	1740
25	0.00	0.00	0.00	0.03	0.19	0.50	0.85	1.34	1.83	2.32	2.81	3.94	5.88	8.33	12.00	18.68
	0	0	0	30	120	150	240	240	240	240	240	300	600	600	1320	1740
30	0.00	0.00	0.00	0.04	0.23	0.53	0.94	1.43	1.92	2.40	2.91	4.13	6.33	8.78	13.09	20.18
	0	0	0	30	150	150	240	240	240	240	300	300	600	600	1740	1740
40	0.00	0.00	0.00	0.05	0.29	0.62	1.04	1.53	2.02	2.53	3.14	4.50	6.94	9.39	15.42	22.51
	0	0	0	30	150	180	240	240	240	300	300	600	600	600	1740	1740
50	0.00	0.00	0.00	0.06	0.35	0.69	1.12	1.58	2.06	2.64	3.25	4.89	7.33	10.25	17.34	24.43
	0	0	0	90	150	180	210	240	240	300	300	600	600	1740	1740	1740
60	0.00	0.00	0.00	0.10	0.40	0.77	1.20	1.62	2.08	2.70	3.31	5.15	7.60	11.98	19.07	26.16
	0	0	30	120	150	210	210	210	300	300	300	600	600	1740	1740	1740
70	0.00	0.00	0.01	0.15	0.46	0.84	1.26	1.69	2.12	2.71	3.32	5.34	7.78	13.59	20.68	27.77
	0	0	30	150	180	210	210	210	210	300	300	600	600	1740	1740	1740
80	0.00	0.00	0.02	0.20	0.52	0.90	1.33	1.75	2.18	2.71	3.32	5.47	8.02	15.11	22.20	29.29
	0	0	30	150	180	210	210	210	210	300	300	600	1740	1740	1740	1740
90	0.00	0.00	0.04	0.24	0.57	0.95	1.38	1.81	2.24	2.73	3.32	5.57	9.46	16.55	23.65	30.74
	0	0	60	150	180	210	210	210	210	270	300	600	1740	1740	1740	1740
100	0.00	0.00	0.06	0.29	0.62	1.00	1.43	1.86	2.29	2.78	3.39	5.63	10.84	17.93	25.02	32.11
	0	0	60	150	180	210	210	210	210	270	540	600	1740	1740	1740	1740

03119000 Sandy Creek at Sandyville, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.13	1.04	1.00	1.06	1.44	2.17	3.90
3	1.11	1.01	1.01	1.00	1.02	1.00	1.26
4	1.03	1.00	1.00	1.00	1.00	1.00	1.04
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.16	1.06	1.07	1.33	2.13	7.58	17.83
8	1.14	1.05	1.04	1.07	1.11	1.57	2.70
9	1.12	1.06	1.06	1.11	1.25	1.99	4.87
10	1.11	1.06	1.09	1.13	1.18	1.87	4.55
11	1.10	1.09	1.13	1.17	1.24	1.87	7.26
12	1.16	1.06	1.03	1.06	1.19	1.92	3.33
13	1.10	1.05	1.06	1.08	1.17	1.50	2.66
14	1.08	1.06	1.08	1.09	1.17	1.64	2.76
15	1.00	1.10	1.12	1.17	1.24	1.79	3.33
16	1.01	1.12	1.12	1.21	1.34	1.91	4.94
17	1.09	1.05	1.06	1.07	1.17	1.39	2.20
18	1.01	1.06	1.08	1.08	1.17	1.56	2.42
19	1.01	1.10	1.12	1.17	1.24	1.73	3.04
20	1.01	1.12	1.11	1.21	1.34	1.90	4.00

03119000 Sandy Creek at Sandyville, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
75.00	2.217	233.01	230.24	231.67	231.02	238.90	260.90	280.72
70.00	2.190	230.61	228.09	229.59	230.32	238.39	258.90	279.95
60.00	2.128	225.15	223.21	224.88	228.73	237.24	254.37	278.21
50.00	2.054	218.54	217.30	219.17	226.81	235.84	248.87	276.10
40.00	1.960	210.19	209.84	211.96	224.38	234.08	241.94	273.43
30.00	1.834	194.13	207.10	203.66	206.47	220.74	239.61	266.25
25.00	1.751	182.62	206.65	198.44	191.91	209.89	239.38	260.83
20.00	1.645	181.64	172.60	171.72	185.24	194.28	237.36	254.64
10.00	1.282	150.60	146.14	149.09	155.31	170.06	207.90	234.12
5.00	0.841	101.34	84.33	98.86	110.80	132.71	162.09	187.91
2.03	0.017	72.23	51.58	51.49	57.74	65.63	84.58	100.02

03125000 Home Creek near New Philadelphia, Ohio

Location: Latitude 40°28′06″, longitude 81°24′10″, Tuscarawas County, Hydrologic Unit 05040001

Drainage area, in square miles: 1.64

Station used for record extension: None

Time period of systematic or extended record analyzed: 1936-12-12 to 1979-12-10

Eighty-percent-duration streamflow, in cubic feet per second: 0.1

Mean annual streamflow, in inches: 10.64

Location of station used for precipitation data: Cadiz, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
43.00	3.75	0.06	2.39	3.86	8.73	15.73	22.62	32.75
40.00	3.68	0.07	2.57	4.13	8.87	15.84	22.81	32.87
30.00	3.38	0.10	3.30	5.23	9.44	16.28	23.58	33.35
25.00	3.20	0.11	3.77	5.92	9.81	16.57	24.07	33.66
20.00	2.97	0.13	4.21	6.57	10.35	17.86	25.56	35.11
10.00	2.25	0.16	4.74	8.27	12.48	26.12	35.52	49.01
5.38	1.58	0.25	5.30	9.68	16.47	29.29	46.34	–

03125000 Home Creek near New Philadelphia, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.10	0.30	0.52	0.77	1.03	1.29	1.55	1.82	2.16	2.56	3.34	4.13	4.92	5.70	6.49
	30	90	150	150	180	180	180	180	180	270	270	270	270	270	270	270
6	0.02	0.10	0.31	0.56	0.83	1.09	1.35	1.64	1.94	2.27	2.62	3.34	4.13	4.92	5.70	6.60
	60	90	150	180	180	180	180	210	210	240	240	270	270	270	270	600
8	0.03	0.11	0.35	0.61	0.88	1.18	1.49	1.79	2.10	2.45	2.80	3.50	4.27	5.14	6.49	8.41
	60	120	180	180	210	210	210	210	210	240	240	240	300	300	660	660
10	0.03	0.13	0.36	0.63	0.93	1.23	1.54	1.85	2.20	2.55	2.90	3.59	4.46	5.43	7.35	9.27
	60	120	180	180	210	210	210	240	240	240	240	240	300	660	660	660
15	0.05	0.16	0.38	0.66	0.97	1.27	1.65	2.04	2.43	2.83	3.22	4.01	4.79	6.23	9.14	13.81
	120	120	180	210	210	240	270	270	270	270	270	270	270	660	1380	1680
20	0.06	0.17	0.40	0.68	1.07	1.46	1.86	2.25	2.64	3.04	3.43	4.22	5.00	8.31	12.33	17.39
	120	150	180	270	270	270	270	270	270	270	270	270	270	1380	1380	1800
25	0.06	0.18	0.41	0.78	1.17	1.56	1.96	2.35	2.74	3.14	3.53	4.32	6.47	10.32	14.31	19.52
	120	150	180	270	270	270	270	270	270	270	270	270	1320	1320	1380	1800
30	0.06	0.18	0.43	0.82	1.21	1.61	2.00	2.39	2.79	3.18	3.57	4.36	7.85	11.70	15.61	20.43
	120	150	180	270	270	270	270	270	270	270	270	270	1320	1320	1380	1800
40	0.06	0.19	0.46	0.82	1.22	1.61	2.00	2.40	2.79	3.29	3.99	5.55	9.30	13.15	17.05	21.07
	120	180	180	270	270	270	270	270	270	480	480	900	1320	1320	1380	1380
50	0.06	0.22	0.49	0.84	1.22	1.61	2.20	2.90	3.60	4.30	5.00	6.78	9.78	13.63	17.65	21.67
	120	180	210	240	270	270	480	480	480	480	480	900	1320	1380	1380	1380
60	0.07	0.23	0.53	0.87	1.48	2.18	2.88	3.58	4.27	4.97	5.67	7.78	10.39	13.82	17.78	21.80
	180	180	210	240	480	480	480	480	480	480	480	840	900	1260	1380	1380
70	0.09	0.25	0.67	1.28	1.92	2.62	3.32	4.02	4.72	5.42	6.15	8.60	11.21	14.38	18.05	21.80
	180	210	420	420	480	480	480	480	480	480	840	840	900	1260	1260	1380
80	0.09	0.30	0.91	1.52	2.21	2.91	3.61	4.31	5.01	5.71	6.82	9.26	11.88	14.79	18.46	22.13
	180	420	420	420	480	480	480	480	480	480	840	900	900	1260	1260	1260
90	0.10	0.44	1.05	1.70	2.40	3.10	3.80	4.50	5.20	6.14	7.36	9.84	12.46	15.09	18.76	22.43
	180	420	420	480	480	480	480	480	480	840	840	900	900	1260	1260	1260
100	0.14	0.51	1.13	1.83	2.53	3.23	3.93	4.63	5.38	6.60	7.82	10.34	12.96	15.58	18.98	22.79
	420	420	480	480	480	480	480	480	840	840	840	900	900	900	1260	1560

03125000 Home Creek near New Philadelphia, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	43.88	7.75	5.47	3.98	3.52	4.51	8.13
3	2.27	1.47	1.36	1.24	1.10	1.32	1.51
4	1.17	1.16	1.12	1.10	1.02	1.00	1.11
5	1.10	1.03	1.01	1.04	1.00	1.00	1.06
6	1.04	1.00	1.00	1.00	1.00	1.00	1.03
7	43.87	7.73	5.47	4.40	4.47	12.57	15.07
8	2.26	1.48	1.39	1.26	1.26	2.07	3.04
9	2.29	1.49	1.41	1.33	1.46	2.45	6.06
10	2.02	1.31	1.26	1.22	1.17	2.03	5.31
11	1.17	1.24	1.28	1.24	1.23	2.11	5.59
12	2.84	2.26	1.87	1.61	1.86	2.65	5.05
13	2.04	1.30	1.27	1.24	1.16	1.75	2.29
14	1.15	1.14	1.15	1.13	1.16	1.81	2.38
15	1.10	1.06	1.15	1.19	1.21	1.92	2.81
16	1.06	1.06	1.11	1.26	1.26	1.99	3.14
17	1.17	1.19	1.20	1.17	1.14	1.61	1.87
18	1.10	1.05	1.04	1.10	1.15	1.66	2.08
19	1.04	1.06	1.09	1.16	1.22	1.84	2.49
20	1.00	1.05	1.07	1.23	1.25	1.90	2.86

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
43.00	1.991	126.00	183.73	189.50	207.08	238.27	272.02	337.91
40.00	1.960	125.51	181.38	187.56	204.08	234.97	269.73	333.06
30.00	1.834	123.48	171.74	179.63	191.78	221.44	260.35	313.23
25.00	1.751	122.14	165.37	174.39	183.66	212.51	254.16	300.13
20.00	1.645	119.11	159.28	167.69	176.13	203.36	247.21	285.59
10.00	1.282	101.10	144.54	143.73	165.52	194.59	223.31	254.85
5.00	0.841	60.00	98.87	120.66	154.04	170.52	189.47	201.26
2.05	0.029	37.00	63.99	66.70	72.01	81.43	114.17	136.49

03130500 Touby Run at Mansfield, Ohio

Location: Latitude 40°45′53″, longitude 82°32′43″, Richland County, Hydrologic Unit 05040002

Drainage area, in square miles: 5.44

Station used for record extension: None

Time period of systematic or extended record analyzed: 1946-10-01 to 1978-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 0.6

Mean annual streamflow, in inches: 12.78

Location of station used for precipitation data: Wooster, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
33.00	3.48	0.49	4.55	6.64	11.47	18.84	27.53	39.71
30.00	3.38	0.50	4.72	7.15	11.75	19.81	28.77	40.82
25.00	3.20	0.52	5.05	8.13	12.28	21.68	31.16	42.95
20.00	2.97	0.54	5.45	9.33	12.93	23.98	34.09	45.57
10.00	2.25	0.63	6.46	11.16	16.74	31.66	44.20	60.42
5.50	1.61	1.21	6.91	12.59	21.32	36.77	53.31	–

03130500 Touby Run at Mansfield, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)														
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.00	0.05	0.19	0.35	0.51	0.71	0.97	1.23	1.49	1.76	2.42	3.30	4.24	5.19	6.36
	0	0	30	90	90	90	150	150	150	150	150	240	270	270	300	600
6	0.00	0.01	0.07	0.22	0.43	0.69	0.96	1.22	1.49	1.81	2.13	2.92	3.89	4.94	5.99	7.04
	0	30	60	120	120	150	150	150	180	180	210	240	300	300	300	300
8	0.00	0.01	0.11	0.32	0.57	0.86	1.18	1.49	1.85	2.22	2.59	3.48	4.53	5.58	6.63	8.89
	0	30	120	120	150	180	180	180	210	210	240	300	300	300	300	660
10	0.00	0.01	0.13	0.34	0.64	0.96	1.28	1.65	2.02	2.42	2.84	3.70	4.75	5.80	7.77	10.08
	0	30	120	120	180	180	210	210	210	240	240	300	300	300	660	660
15	0.00	0.01	0.17	0.38	0.69	1.04	1.42	1.84	2.26	2.68	3.10	3.99	4.93	7.03	10.37	15.15
	0	30	90	180	180	210	240	240	240	240	240	270	270	660	1020	1740
20	0.00	0.03	0.19	0.39	0.70	1.07	1.49	1.91	2.33	2.75	3.21	4.16	6.68	10.25	14.75	20.84
	0	90	90	180	180	240	240	240	240	240	270	270	1020	1020	1740	1740
25	0.00	0.03	0.19	0.40	0.72	1.08	1.50	1.92	2.36	2.83	3.30	5.02	8.59	12.16	17.09	23.19
	0	90	90	180	180	240	240	240	270	270	270	1020	1020	1020	1740	1740
30	0.00	0.03	0.20	0.47	0.75	1.08	1.50	1.93	2.40	2.87	3.34	6.05	9.62	13.94	18.77	23.60
	0	90	150	150	180	240	240	270	270	270	270	1020	1020	1380	1380	1380
40	0.00	0.08	0.34	0.61	0.87	1.15	1.50	1.95	2.42	3.03	3.98	7.03	11.44	15.85	20.64	25.47
	0	150	150	150	150	180	240	270	270	540	540	1260	1260	1260	1380	1380
50	0.02	0.17	0.44	0.70	0.96	1.25	1.57	2.50	3.44	4.39	5.33	9.68	14.09	18.50	22.91	27.32
	150	150	150	150	150	180	180	540	540	540	540	1260	1260	1260	1260	1260
60	0.06	0.22	0.48	0.75	1.03	1.62	2.57	3.51	4.46	5.40	7.37	11.77	16.18	20.59	25.00	29.41
	150	150	150	150	180	540	540	540	540	540	1140	1260	1260	1260	1260	1260
70	0.09	0.24	0.51	0.78	1.43	2.37	3.32	4.26	5.27	7.26	9.26	13.45	17.86	22.27	26.68	32.12
	150	150	150	180	540	540	540	540	1140	1140	1140	1260	1260	1260	1260	1620
80	0.10	0.26	0.52	1.04	1.99	2.93	3.88	4.82	6.79	8.79	10.78	14.84	19.25	23.66	29.16	34.83
	150	150	150	540	540	540	540	540	1140	1140	1140	1260	1260	1260	1620	1620
90	0.10	0.26	0.55	1.46	2.41	3.35	4.30	6.05	8.04	10.04	12.03	16.02	20.42	25.96	31.63	37.30
	150	150	180	540	540	540	540	1140	1140	1140	1140	1140	1260	1620	1620	1620
100	0.10	0.26	0.83	1.77	2.72	3.66	5.09	7.08	9.08	11.07	13.07	17.06	22.52	28.19	33.86	39.53
	150	180	540	540	540	540	1140	1140	1140	1140	1140	1140	1620	1620	1620	1620

03130500 Touby Run at Mansfield, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	4.87	2.85	2.62	2.86	3.35	4.30	8.94
3	1.95	1.25	1.11	1.08	1.21	1.36	2.28
4	1.26	1.14	1.06	1.00	1.03	1.01	1.02
5	1.11	1.05	1.03	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	4.87	3.16	3.25	3.29	4.08	14.04	19.69
8	1.94	1.25	1.13	1.23	1.31	2.78	6.45
9	1.94	1.25	1.21	1.21	1.58	3.40	9.59
10	1.75	1.19	1.10	1.19	1.36	2.85	7.73
11	1.26	1.20	1.11	1.22	1.43	2.88	7.13
12	2.18	1.33	1.30	1.27	1.95	3.36	9.01
13	1.74	1.20	1.10	1.10	1.30	2.23	3.39
14	1.22	1.16	1.09	1.07	1.30	1.74	3.43
15	1.11	1.14	1.10	1.05	1.42	1.74	3.32
16	1.00	1.06	1.06	1.07	1.47	1.65	3.41
17	1.26	1.17	1.08	1.03	1.24	1.45	2.89
18	1.11	1.11	1.07	1.04	1.30	1.28	2.90
19	1.00	1.08	1.07	1.06	1.41	1.31	2.82
20	1.00	1.02	1.06	1.07	1.46	1.35	2.97

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
33.00	1.877	104.00	144.64	159.06	172.91	175.65	210.58	232.01
30.00	1.834	98.93	138.03	151.05	165.03	174.09	209.99	231.14
25.00	1.751	89.00	125.09	135.35	149.59	171.04	208.83	229.43
20.00	1.645	76.36	108.62	115.38	129.95	167.16	207.36	227.26
10.00	1.282	58.52	82.82	85.94	108.09	154.68	184.75	206.72
5.00	0.841	32.17	70.27	64.16	73.76	98.30	131.99	152.06
2.06	0.038	16.00	43.46	38.14	42.37	45.59	63.66	94.53

03134000 Jerome Fork at Jeromeville, Ohio

Location: Latitude 40°48′07″, longitude 82°12′01″, Ashland County, Hydrologic Unit 05040002

Drainage area, in square miles: 120.

Station used for record extension: 03218000

Time period of systematic or extended record analyzed: 1925-10-01 to 1971-10-01

Percentage of estimated values in extended record: 47.8

Eighty-percent-duration streamflow, in cubic feet per second: 8.2

Mean annual streamflow, in inches: 11.16

Location of station used for precipitation data: Wooster, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
47.00	3.84	0.19	2.22	4.53	6.83	15.03	22.41	28.99
40.00	3.68	0.19	2.45	4.74	7.93	16.73	24.16	31.08
30.00	3.38	0.20	2.85	5.12	9.90	19.77	27.28	34.83
25.00	3.20	0.21	3.11	5.37	11.15	21.70	29.27	37.22
20.00	2.97	0.21	3.29	5.66	11.60	22.74	30.31	39.56
10.00	2.25	0.32	4.10	7.32	12.58	24.65	33.26	45.47
5.22	1.55	0.42	4.90	8.65	14.88	33.71	53.41	–

03134000 Jerome Fork at Jeromeville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.02	0.15	0.38	0.65	0.93	1.24	1.58	2.00	2.41	2.82	3.65	4.47	5.30	6.82	8.65
	0	60	120	180	180	180	210	270	270	270	270	270	270	270	600	600
6	0.00	0.03	0.17	0.41	0.71	1.03	1.35	1.71	2.07	2.48	2.89	3.71	4.54	5.59	7.43	9.26
	0	60	120	180	210	210	210	240	240	270	270	270	270	600	600	600
8	0.00	0.03	0.21	0.50	0.82	1.16	1.53	1.89	2.26	2.63	3.07	3.99	4.91	6.29	8.13	9.96
	0	60	150	210	210	240	240	240	240	240	300	300	300	600	600	600
10	0.00	0.04	0.25	0.56	0.89	1.25	1.62	1.99	2.36	2.80	3.26	4.18	5.10	6.70	8.54	11.60
	0	90	180	210	240	240	240	240	240	300	300	300	300	600	600	1680
15	0.00	0.07	0.32	0.63	1.00	1.37	1.73	2.14	2.56	3.02	3.48	4.40	5.51	7.35	11.05	16.19
	0	150	180	210	240	240	240	270	300	300	300	300	600	600	1680	1680
20	0.00	0.09	0.35	0.69	1.05	1.43	1.84	2.26	2.67	3.11	3.57	4.49	5.99	7.82	11.81	17.13
	0	150	180	240	240	270	270	270	270	300	300	300	600	600	1740	1740
25	0.00	0.10	0.37	0.72	1.09	1.50	1.91	2.32	2.74	3.16	3.61	4.57	6.40	8.24	12.78	18.09
	0	150	210	240	240	270	270	270	270	300	300	600	600	600	1740	1740
30	0.00	0.10	0.38	0.74	1.13	1.54	1.95	2.37	2.78	3.19	3.64	4.95	6.79	9.39	14.01	19.33
	0	150	210	240	270	270	270	270	270	270	300	600	600	1380	1740	1740
40	0.00	0.10	0.41	0.78	1.17	1.58	1.99	2.41	2.82	3.23	3.95	6.08	9.01	13.21	17.50	22.82
	0	150	240	240	270	270	270	270	270	270	660	960	960	1380	1740	1740
50	0.00	0.10	0.44	0.80	1.18	1.59	2.00	2.42	3.23	4.70	6.16	9.28	12.83	17.05	22.32	27.82
	0	150	240	240	270	270	270	270	960	960	960	1020	1380	1380	1800	1800
60	0.00	0.10	0.46	0.83	1.19	1.59	2.69	4.25	5.81	7.37	8.93	12.05	16.87	22.37	27.87	33.37
	0	150	240	240	240	270	1020	1020	1020	1020	1020	1380	1800	1800	1800	1800
70	0.00	0.11	0.48	0.84	1.61	3.17	4.73	6.29	7.85	9.41	10.97	16.27	21.77	27.27	32.77	38.28
	0	240	240	240	1020	1020	1020	1020	1020	1020	1020	1800	1800	1800	1800	1800
80	0.00	0.13	0.49	1.50	3.06	4.62	6.18	7.74	9.38	12.05	14.80	20.31	25.81	31.31	36.81	42.31
	0	240	240	1020	1020	1020	1020	1020	1260	1800	1800	1800	1800	1800	1800	1800
90	0.00	0.14	0.94	2.50	4.06	5.62	7.24	9.74	12.49	15.24	17.99	23.49	29.00	34.50	40.00	45.50
	0	240	1020	1020	1020	1020	1260	1800	1800	1800	1800	1800	1800	1800	1800	1800
100	0.00	0.15	1.63	3.19	4.75	6.69	9.44	12.19	14.94	17.69	20.44	25.95	31.45	36.95	42.45	47.95
	0	240	1020	1020	1020	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800

03134000 Jerome Fork at Jeromeville, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.26	1.45	1.53	2.21	2.68	5.94	10.01
3	1.01	1.00	1.00	1.03	1.01	1.87	2.06
4	1.00	1.00	1.00	1.00	1.00	1.11	1.41
5	1.00	1.00	1.00	1.00	1.00	1.00	1.21
6	1.00	1.00	1.00	1.00	1.00	1.00	1.09
7	1.26	1.63	2.16	3.23	4.96	15.84	19.69
8	1.01	1.06	1.08	1.17	1.68	3.09	4.69
9	1.01	1.11	1.17	1.23	1.90	3.84	8.98
10	1.00	1.15	1.18	1.26	1.72	3.23	5.06
11	1.01	1.23	1.27	1.28	1.76	3.00	4.25
12	1.01	1.04	1.12	1.31	2.21	4.14	8.76
13	1.01	1.12	1.13	1.22	1.14	2.72	3.36
14	1.00	1.16	1.16	1.26	1.25	2.50	2.62
15	1.01	1.19	1.25	1.27	1.42	2.57	2.61
16	1.01	1.21	1.27	1.32	1.43	2.54	2.55
17	1.00	1.11	1.13	1.22	1.14	2.28	2.46
18	1.00	1.16	1.16	1.25	1.19	2.26	2.38
19	1.00	1.19	1.26	1.26	1.24	2.36	2.34
20	1.01	1.21	1.27	1.29	1.30	2.34	2.34

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
47.00	2.029	256.01	226.47	235.20	242.88	265.75	287.16	374.25
40.00	1.960	250.97	226.46	234.28	242.78	265.69	285.60	373.61
30.00	1.834	241.63	226.45	232.59	242.61	265.59	282.72	372.41
25.00	1.751	235.47	226.44	231.47	242.49	265.51	280.81	371.62
20.00	1.645	230.39	226.06	226.52	241.77	259.33	270.53	341.59
10.00	1.282	193.62	183.84	197.17	220.29	233.81	243.21	261.82
5.00	0.841	124.18	135.92	139.00	154.02	181.76	213.63	238.87
2.04	0.027	73.67	75.40	75.71	101.54	125.97	147.91	172.71

03136500 Kokosing River at Mount Vernon, Ohio

Location: Latitude 40°24′20″, longitude 82°30′00″, Knox County, Hydrologic Unit 05040003

Drainage area, in square miles: 202.

Station used for record extension: 03137000

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 40.6

Eighty-percent-duration streamflow, in cubic feet per second: 42.

Mean annual streamflow, in inches: 15.30

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.75	3.40	6.33	11.52	22.59	33.72	44.26
70.00	4.24	0.76	3.48	6.38	11.63	23.33	34.43	44.86
60.00	4.09	0.78	3.62	6.48	11.83	24.71	35.77	46.00
50.00	3.90	0.80	3.79	6.60	12.07	26.35	37.35	47.34
40.00	3.68	0.83	4.00	6.75	12.37	28.36	39.28	48.98
30.00	3.38	0.84	4.58	6.84	13.55	29.43	42.87	50.49
25.00	3.20	0.84	4.99	7.03	14.51	30.02	45.13	51.82
20.00	2.97	0.90	5.49	9.65	17.22	32.81	45.28	60.47
10.00	2.25	1.07	6.70	11.29	20.55	37.20	51.04	69.84
5.07	1.52	1.35	9.05	14.56	25.48	49.21	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.01	0.10	0.32	0.60	0.94	1.32	1.69	2.07	2.46	3.34	4.36	5.49	6.62	8.40
	0	0	30	60	120	150	180	180	180	180	210	210	270	270	270	600
6	0.00	0.00	0.01	0.12	0.34	0.66	1.04	1.41	1.80	2.24	2.68	3.56	4.67	5.81	6.94	9.01
	0	0	30	60	150	180	180	180	210	210	210	240	270	270	270	600
8	0.00	0.00	0.02	0.15	0.42	0.78	1.15	1.59	2.03	2.47	2.95	3.98	5.11	6.24	7.75	10.25
	0	0	30	90	150	180	180	210	210	210	240	270	270	270	540	600
10	0.00	0.00	0.02	0.17	0.47	0.85	1.27	1.71	2.16	2.66	3.17	4.26	5.39	6.56	8.82	11.42
	0	0	30	90	150	180	210	210	240	240	240	270	270	300	600	960
15	0.00	0.00	0.03	0.22	0.56	0.96	1.43	1.93	2.44	2.98	3.54	4.68	6.00	8.27	10.78	14.80
	0	0	30	150	180	210	240	240	240	270	270	300	540	600	600	1320
20	0.00	0.00	0.03	0.26	0.61	1.06	1.56	2.07	2.63	3.20	3.77	5.02	7.11	9.54	12.06	18.41
	0	0	30	150	180	240	240	270	270	270	300	300	540	600	600	1680
25	0.00	0.00	0.04	0.28	0.64	1.13	1.64	2.20	2.77	3.36	3.98	5.59	7.91	10.43	13.82	21.02
	0	0	30	150	180	240	270	270	270	300	300	540	600	600	1680	1740
30	0.00	0.00	0.04	0.30	0.68	1.18	1.73	2.29	2.87	3.50	4.13	6.10	8.55	11.06	15.65	22.94
	0	0	30	150	240	240	270	270	300	300	300	540	600	600	1740	1740
40	0.00	0.00	0.05	0.32	0.74	1.27	1.83	2.42	3.05	3.70	4.47	6.89	9.40	12.16	18.42	25.95
	0	0	60	150	240	270	270	300	300	330	540	600	600	900	1800	1800
50	0.00	0.00	0.06	0.34	0.77	1.32	1.89	2.52	3.15	3.80	4.89	7.40	9.92	13.45	20.52	28.05
	0	0	120	150	240	270	300	300	300	330	600	600	600	900	1800	1800
60	0.00	0.00	0.07	0.36	0.80	1.34	1.95	2.57	3.20	3.97	5.22	7.74	10.76	15.06	22.07	29.61
	0	0	120	150	240	270	300	300	300	600	600	600	900	1320	1800	1800
70	0.00	0.00	0.08	0.37	0.82	1.35	1.97	2.60	3.23	4.18	5.44	7.96	11.98	17.45	23.30	30.84
	0	0	90	180	240	270	300	300	300	600	600	960	960	1380	1800	1800
80	0.00	0.00	0.09	0.39	0.83	1.36	1.99	2.61	3.24	4.32	5.58	9.11	14.33	20.11	25.89	31.84
	0	0	90	210	240	300	300	300	300	600	600	960	1380	1380	1380	1800
90	0.00	0.00	0.10	0.42	0.86	1.36	1.99	2.61	3.24	4.41	6.12	10.99	16.77	22.55	28.33	34.11
	0	0	90	210	210	300	300	300	300	600	960	1380	1380	1380	1380	1380
100	0.00	0.00	0.11	0.45	0.89	1.36	1.99	2.61	3.24	5.06	7.44	13.22	19.00	24.78	30.56	36.34
	0	0	90	210	210	300	300	300	300	960	1380	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.92	1.63	1.53	1.53	1.79	3.10	5.71
3	1.13	1.23	1.11	1.01	1.00	1.26	1.37
4	1.10	1.10	1.04	1.00	1.00	1.00	1.06
5	1.00	1.04	1.01	1.00	1.00	1.00	1.03
6	1.00	1.00	1.00	1.00	1.00	1.00	1.01
7	1.93	1.75	1.74	1.90	2.29	9.05	16.47
8	1.14	1.27	1.17	1.11	1.30	1.93	4.24
9	1.14	1.28	1.18	1.13	1.43	2.14	6.65
10	1.12	1.23	1.20	1.22	1.26	2.30	6.27
11	1.13	1.22	1.21	1.23	1.20	2.42	6.60
12	1.17	1.31	1.17	1.11	1.44	2.14	5.28
13	1.13	1.20	1.15	1.11	1.14	1.68	3.34
14	1.08	1.16	1.17	1.20	1.17	2.08	3.42
15	1.01	1.17	1.18	1.24	1.19	2.27	3.86
16	1.01	1.10	1.15	1.30	1.22	2.32	4.38
17	1.11	1.16	1.13	1.09	1.15	1.54	2.17
18	1.01	1.12	1.16	1.20	1.18	1.97	2.36
19	1.00	1.13	1.19	1.25	1.20	2.17	2.58
20	1.03	1.08	1.14	1.30	1.22	2.24	3.13

03136500 Kokosing River at Mount Vernon, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
76.00	2.222	252.55	221.80	245.59	279.34	302.80	322.96	389.32
70.00	2.190	251.24	221.64	242.74	276.02	299.05	319.78	384.66
60.00	2.128	248.74	221.34	237.32	269.70	291.92	313.72	375.80
50.00	2.054	245.72	220.98	230.75	262.04	283.27	306.38	365.06
40.00	1.960	241.90	220.52	222.46	252.37	272.36	297.11	351.50
30.00	1.834	230.17	217.77	216.99	233.41	250.74	289.41	339.50
25.00	1.751	221.92	214.52	213.11	220.71	236.40	284.61	332.53
20.00	1.645	218.07	191.98	191.21	214.80	232.76	272.26	325.05
10.00	1.282	170.03	150.92	159.39	178.35	218.36	239.56	273.62
5.00	0.841	144.43	119.87	129.94	139.55	158.40	182.66	200.74
2.00	0.000	95.35	65.15	66.54	81.08	95.67	118.04	136.95

03137000 Kokosing River at Millwood, Ohio

Location: Latitude 40°23′51″, longitude 82°17′09″, Knox County, Hydrologic Unit 05040003

Drainage area, in square miles: 455.

Station used for record extension: 03136500

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 30.7

Eighty-percent-duration streamflow, in cubic feet per second: 85.

Mean annual streamflow, in inches: 15.25

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.76	4.51	6.41	10.82	20.96	35.91	50.68
70.00	4.24	0.76	4.59	6.49	11.14	21.41	36.33	50.96
60.00	4.09	0.77	4.74	6.65	11.73	22.25	37.11	51.47
50.00	3.90	0.78	4.91	6.83	12.43	23.25	38.03	52.09
40.00	3.68	0.80	5.13	7.06	13.29	24.48	39.17	52.84
30.00	3.38	0.82	5.59	9.24	14.43	27.95	39.58	53.62
25.00	3.20	0.83	5.90	10.79	15.11	30.30	39.79	54.22
20.00	2.97	0.90	6.00	11.06	15.16	31.28	41.56	57.02
10.00	2.25	1.11	6.51	12.20	21.27	36.40	52.55	71.35
5.07	1.52	1.32	8.20	15.28	22.63	45.21	–	–

03137000 Kokosing River at Millwood, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.00	0.01	0.08	0.28	0.56	0.94	1.31	1.69	2.06	2.44	3.39	4.51	5.64	6.77	8.78
	0	0	30	60	120	180	180	180	180	180	180	240	270	270	270	660
6	0.00	0.00	0.01	0.10	0.31	0.61	0.98	1.36	1.74	2.14	2.63	3.63	4.73	5.86	6.99	8.78
	0	0	30	60	120	180	180	180	180	210	240	240	270	270	270	660
8	0.00	0.00	0.02	0.13	0.36	0.70	1.07	1.48	1.93	2.43	2.93	3.94	5.08	6.33	7.59	9.80
	0	0	30	90	150	180	180	210	240	240	240	270	300	300	300	600
10	0.00	0.00	0.02	0.15	0.42	0.77	1.16	1.60	2.10	2.60	3.11	4.19	5.44	6.69	8.19	11.14
	0	0	30	90	150	180	210	240	240	240	240	300	300	300	600	960
15	0.00	0.00	0.03	0.21	0.52	0.90	1.35	1.85	2.35	2.85	3.42	4.67	5.92	7.23	10.54	15.24
	0	0	30	120	180	180	240	240	240	270	300	300	300	600	960	1320
20	0.00	0.00	0.04	0.26	0.60	0.98	1.48	1.98	2.51	3.08	3.68	4.93	6.18	8.55	12.73	17.85
	0	0	60	150	180	210	240	240	270	270	300	300	300	660	1020	1740
25	0.00	0.00	0.04	0.30	0.65	1.06	1.56	2.10	2.66	3.23	3.85	5.10	6.97	10.08	14.34	19.98
	0	0	60	150	180	240	240	270	270	300	300	300	660	1020	1020	1740
30	0.00	0.00	0.05	0.32	0.68	1.12	1.64	2.21	2.77	3.35	3.98	5.23	7.80	11.22	15.48	21.50
	0	0	90	150	180	240	270	270	270	300	300	300	660	1020	1020	1680
40	0.00	0.00	0.06	0.35	0.72	1.22	1.79	2.35	2.91	3.54	4.17	6.08	8.84	12.72	16.98	23.25
	0	0	90	150	180	270	270	270	300	300	300	660	660	1020	1020	1680
50	0.00	0.00	0.07	0.37	0.76	1.31	1.88	2.44	3.05	3.68	4.30	6.64	9.39	13.63	17.89	24.22
	0	0	120	180	240	270	270	270	300	300	300	660	660	1020	1020	1800
60	0.00	0.00	0.07	0.37	0.81	1.37	1.94	2.53	3.16	3.78	4.41	6.91	9.95	14.21	18.47	24.58
	0	0	90	180	270	270	270	300	300	300	300	660	1020	1020	1020	1800
70	0.00	0.00	0.07	0.37	0.85	1.42	1.99	2.62	3.25	3.87	4.81	7.14	10.41	14.71	19.21	25.09
	0	0	90	210	270	270	300	300	300	300	540	600	960	1080	1080	1500
80	0.00	0.00	0.07	0.40	0.88	1.45	2.07	2.70	3.32	4.07	5.19	7.50	11.30	15.84	20.60	26.00
	0	0	90	210	270	300	300	300	300	540	540	600	1080	1140	1140	1500
90	0.00	0.00	0.07	0.42	0.90	1.51	2.14	2.77	3.39	4.40	5.53	7.80	12.45	17.21	21.97	26.82
	0	0	90	210	270	300	300	300	300	540	540	600	1140	1140	1140	1500
100	0.00	0.00	0.07	0.44	0.95	1.58	2.20	2.83	3.57	4.70	5.82	8.94	13.70	18.46	23.22	27.98
	0	0	90	210	300	300	300	300	540	540	540	1140	1140	1140	1140	1140

03137000 Kokosing River at Millwood, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.31	1.40	1.22	1.15	1.48	1.96	3.73
3	1.14	1.23	1.10	1.00	1.00	1.11	1.31
4	1.07	1.12	1.01	1.00	1.00	1.00	1.12
5	1.00	1.06	1.00	1.00	1.00	1.00	1.07
6	1.00	1.02	1.00	1.00	1.00	1.00	1.03
7	1.35	1.43	1.25	1.56	1.96	5.50	15.33
8	1.15	1.28	1.13	1.06	1.14	1.60	2.69
9	1.13	1.28	1.15	1.11	1.38	1.75	5.02
10	1.14	1.20	1.10	1.17	1.24	1.73	4.84
11	1.11	1.18	1.08	1.30	1.26	1.84	5.29
12	1.19	1.35	1.17	1.04	1.32	1.77	3.91
13	1.12	1.19	1.07	1.09	1.20	1.52	2.02
14	1.08	1.14	1.08	1.15	1.25	1.54	2.28
15	1.03	1.11	1.08	1.29	1.26	1.69	2.92
16	1.04	1.10	1.17	1.37	1.26	1.97	3.97
17	1.09	1.14	1.04	1.09	1.20	1.37	1.87
18	1.02	1.11	1.07	1.16	1.25	1.47	2.18
19	1.00	1.08	1.08	1.29	1.27	1.62	2.33
20	1.02	1.12	1.18	1.37	1.27	1.92	2.88

03137000 Kokosing River at Millwood, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
76.00	2.222	239.50	210.08	234.37	268.18	286.38	309.28	338.97
70.00	2.190	236.55	209.58	230.50	263.02	281.52	304.47	336.79
60.00	2.128	230.94	208.63	223.14	253.20	272.28	295.31	332.64
50.00	2.054	224.13	207.48	214.21	241.29	261.08	284.21	327.61
40.00	1.960	215.54	206.02	202.94	226.26	246.94	270.20	321.27
30.00	1.834	199.61	184.78	192.47	211.24	233.11	258.01	296.38
25.00	1.751	188.35	169.28	186.01	202.67	225.06	251.08	278.78
20.00	1.645	172.05	168.85	174.65	201.82	220.45	245.29	274.20
10.00	1.282	148.93	137.52	148.24	162.61	183.78	211.20	233.81
5.00	0.841	120.60	98.69	107.86	134.36	146.38	168.85	184.03
2.00	0.000	76.54	51.02	56.06	65.68	85.26	100.33	118.03

03139000 Killbuck Creek at Killbuck, Ohio

Location: Latitude 40°28′53″, longitude 81°59′10″, Holmes County, Hydrologic Unit 05040003

Drainage area, in square miles: 464.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1930-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 80.

Mean annual streamflow, in inches: 12.51

Location of station used for precipitation data: Cadiz, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
68.00	4.21	0.54	3.72	5.61	10.24	20.51	29.74	37.86
60.00	4.09	0.55	3.83	5.78	10.40	20.61	29.79	38.59
50.00	3.90	0.58	3.98	6.02	10.64	20.75	29.86	39.64
40.00	3.68	0.60	4.17	6.31	10.94	20.93	29.94	40.94
30.00	3.38	0.66	4.45	6.92	11.16	21.27	30.02	41.95
25.00	3.20	0.73	4.64	7.50	11.17	21.57	30.05	42.03
20.00	2.97	0.82	4.81	7.84	12.13	22.83	31.44	44.30
10.00	2.25	0.95	5.34	9.48	16.31	27.70	44.63	59.46
5.23	1.55	1.09	6.55	12.14	19.50	38.36	56.38	–

03139000 Killbuck Creek at Killbuck, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.00	0.01	0.08	0.26	0.52	0.78	1.09	1.40	1.74	2.15	2.97	3.79	4.67	5.70	6.73
	0	0	30	60	150	150	180	180	180	240	240	240	240	300	300	300
6	0.00	0.00	0.02	0.09	0.27	0.52	0.78	1.09	1.42	1.81	2.22	3.04	3.86	4.82	5.84	7.39
	0	0	30	60	150	150	150	180	210	240	240	240	240	300	300	600
8	0.00	0.00	0.02	0.12	0.31	0.56	0.81	1.16	1.52	1.94	2.35	3.23	4.16	5.08	6.43	8.48
	0	0	30	90	120	150	180	210	240	240	240	270	270	270	600	600
10	0.00	0.00	0.02	0.14	0.34	0.59	0.88	1.24	1.63	2.04	2.49	3.42	4.34	5.27	7.26	9.89
	0	0	30	90	120	150	210	210	240	240	270	270	270	270	600	840
15	0.00	0.00	0.04	0.19	0.41	0.67	1.02	1.42	1.83	2.26	2.72	3.65	4.58	6.63	9.64	13.97
	0	0	60	120	150	150	210	240	240	270	270	270	600	660	960	1320
20	0.00	0.00	0.05	0.22	0.46	0.75	1.14	1.55	1.96	2.38	2.84	3.77	5.56	8.44	12.30	17.49
	0	0	90	120	150	210	240	240	240	270	270	270	660	1020	1320	1740
25	0.00	0.00	0.06	0.25	0.50	0.82	1.23	1.64	2.05	2.46	2.92	4.07	6.43	9.93	14.50	20.46
	0	0	90	150	180	210	240	240	240	270	270	660	1020	1020	1740	1740
30	0.00	0.00	0.07	0.27	0.55	0.88	1.29	1.70	2.11	2.53	2.99	4.58	7.38	11.01	16.38	22.34
	0	0	90	150	180	210	240	240	240	270	270	660	1020	1380	1740	1740
40	0.00	0.00	0.08	0.31	0.62	0.97	1.37	1.78	2.20	2.65	3.16	5.19	8.38	12.47	18.29	24.25
	0	0	90	150	180	210	240	240	240	300	300	660	1020	1380	1740	1740
50	0.00	0.00	0.08	0.35	0.68	1.04	1.42	1.83	2.28	2.80	3.48	5.54	8.72	12.96	18.81	24.77
	0	0	90	180	210	210	240	240	300	300	600	600	1020	1380	1740	1740
60	0.00	0.00	0.09	0.38	0.73	1.09	1.45	1.90	2.40	2.92	3.77	5.82	8.72	12.96	18.81	24.77
	0	0	150	180	210	210	210	270	300	300	600	600	960	1380	1740	1740
70	0.00	0.00	0.10	0.42	0.78	1.14	1.51	1.98	2.50	3.01	3.97	6.02	8.95	12.96	18.81	24.77
	0	0	150	210	210	210	270	300	300	300	600	600	960	1380	1740	1740
80	0.00	0.00	0.11	0.46	0.82	1.18	1.58	2.06	2.58	3.09	4.12	6.17	9.10	12.96	18.81	24.77
	0	0	150	210	210	210	270	300	300	300	600	600	960	1380	1740	1740
90	0.00	0.00	0.13	0.49	0.85	1.21	1.65	2.13	2.65	3.20	4.23	6.28	9.19	12.96	18.81	24.77
	0	0	210	210	210	210	270	300	300	600	600	600	960	1380	1740	1740
100	0.00	0.00	0.16	0.52	0.88	1.25	1.71	2.19	2.71	3.28	4.31	6.37	9.23	12.96	18.81	24.77
	0	0	210	210	210	270	270	300	300	600	600	600	960	1380	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.97	2.14	1.91	2.26	2.72	3.00	6.48
3	1.09	1.07	1.01	1.00	1.02	1.27	1.34
4	1.04	1.02	1.00	1.00	1.00	1.00	1.10
5	1.02	1.00	1.00	1.00	1.00	1.00	1.04
6	1.01	1.00	1.00	1.00	1.00	1.00	1.01
7	1.97	2.27	2.43	2.96	3.49	9.76	15.61
8	1.10	1.08	1.02	1.04	1.26	1.68	2.63
9	1.10	1.07	1.04	1.06	1.39	2.02	4.02
10	1.05	1.07	1.05	1.05	1.19	1.82	3.26
11	1.03	1.06	1.05	1.08	1.25	2.06	4.05
12	1.17	1.09	1.03	1.39	1.65	2.32	3.41
13	1.05	1.05	1.04	1.03	1.10	1.57	2.41
14	1.04	1.04	1.04	1.05	1.16	1.64	2.74
15	1.04	1.06	1.06	1.06	1.24	1.73	3.17
16	1.02	1.06	1.07	1.06	1.33	2.11	3.72
17	1.04	1.02	1.04	1.03	1.09	1.47	2.04
18	1.03	1.04	1.04	1.05	1.16	1.54	2.53
19	1.02	1.07	1.05	1.07	1.24	1.62	3.08
20	1.03	1.06	1.07	1.05	1.32	2.11	3.68

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
68.00	2.178	267.05	234.68	240.54	242.14	241.15	262.94	303.99
60.00	2.128	260.17	231.76	235.06	237.97	238.92	261.61	300.49
50.00	2.054	249.94	227.41	226.91	231.76	235.61	259.63	295.28
40.00	1.960	237.01	221.92	216.62	223.91	231.42	257.14	288.70
30.00	1.834	226.15	211.30	203.63	207.15	222.29	248.46	279.28
25.00	1.751	224.43	201.57	195.76	190.87	213.32	238.27	272.56
20.00	1.645	220.34	179.34	178.89	180.82	198.65	228.49	265.49
10.00	1.282	172.95	138.12	135.58	155.53	166.94	203.53	239.02
5.00	0.841	142.77	98.44	105.81	123.61	152.72	178.25	203.51
2.00	0.000	110.54	62.06	62.06	66.81	80.00	110.58	132.22

03140000 Mill Creek near Coshocton, Ohio

Location: Latitude 40°21′46″, longitude 81°51′45″, Coshocton County, Hydrologic Unit 05040003

Drainage area, in square miles: 27.2

Station used for record extension: None

Time period of systematic or extended record analyzed: 1936-11-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 2.2

Mean annual streamflow, in inches: 14.00

Location of station used for precipitation data: Cadiz, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
61.00	4.10	0.19	3.77	4.71	10.57	19.07	28.85	45.13
60.00	4.09	0.19	3.78	4.77	10.67	19.29	29.06	45.23
50.00	3.90	0.19	3.88	5.38	11.77	21.73	31.43	46.33
40.00	3.68	0.19	4.01	6.13	13.13	24.72	34.34	47.69
30.00	3.38	0.19	4.24	7.06	14.82	28.38	37.89	49.35
25.00	3.20	0.22	4.98	7.32	15.32	28.58	37.97	49.45
20.00	2.97	0.27	5.84	7.78	15.90	28.81	38.09	49.81
10.00	2.25	0.41	6.45	11.26	18.02	32.73	46.92	63.95
5.08	1.52	0.76	7.81	12.61	22.22	39.82	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.01	0.06	0.22	0.49	0.78	1.07	1.35	1.69	2.04	2.43	2.88	3.80	4.72	5.64	6.56	8.31
	30	60	90	150	150	150	150	180	180	210	240	240	240	240	240	540
6	0.01	0.07	0.24	0.49	0.78	1.11	1.45	1.80	2.15	2.58	3.04	3.96	4.88	5.90	6.93	8.31
	30	60	120	150	150	180	180	180	210	240	240	240	240	270	270	540
8	0.01	0.08	0.28	0.55	0.89	1.24	1.58	1.93	2.39	2.86	3.38	4.42	5.45	6.49	7.52	9.55
	30	60	120	180	180	180	180	210	240	270	270	270	270	270	270	900
10	0.02	0.09	0.31	0.62	0.97	1.31	1.67	2.14	2.66	3.18	3.69	4.73	5.76	6.80	8.07	11.11
	30	90	120	180	180	180	240	270	270	270	270	270	270	270	600	960
15	0.02	0.12	0.38	0.73	1.07	1.50	1.99	2.51	3.03	3.54	4.06	5.10	6.13	7.63	10.85	17.29
	60	120	180	180	180	240	270	270	270	270	270	270	270	600	1680	1680
20	0.03	0.14	0.43	0.78	1.18	1.64	2.15	2.67	3.18	3.70	4.22	5.25	6.53	8.83	13.20	19.64
	60	120	180	180	240	240	270	270	270	270	270	270	600	600	1680	1680
25	0.04	0.16	0.46	0.80	1.26	1.72	2.23	2.75	3.26	3.78	4.30	5.37	7.38	9.68	14.20	20.87
	90	120	180	180	240	240	270	270	270	270	270	300	600	600	1680	1740
30	0.04	0.17	0.48	0.84	1.30	1.76	2.28	2.79	3.31	3.83	4.35	5.70	8.00	10.30	15.06	21.73
	90	150	180	210	240	240	270	270	270	270	270	600	600	600	1740	1740
40	0.05	0.19	0.50	0.89	1.33	1.80	2.32	2.83	3.35	3.87	4.43	6.57	8.87	11.91	16.97	22.97
	90	150	180	210	240	270	270	270	270	270	540	600	600	1320	1320	1740
50	0.05	0.20	0.52	0.92	1.33	1.80	2.32	2.84	3.35	4.08	5.11	7.18	10.04	15.08	20.14	25.20
	90	150	210	210	240	270	270	270	270	540	540	540	960	1320	1320	1320
60	0.05	0.20	0.53	0.94	1.34	1.80	2.32	2.84	3.53	4.56	5.60	8.60	13.02	18.08	23.14	28.30
	90	150	210	210	210	270	270	270	540	540	540	960	1320	1320	1320	1380
70	0.05	0.20	0.54	0.94	1.35	1.80	2.32	2.86	3.89	5.42	7.14	10.71	15.77	21.04	26.33	31.62
	90	150	210	210	210	270	270	540	540	900	900	1320	1320	1380	1380	1380
80	0.05	0.20	0.55	0.95	1.35	1.80	2.32	3.66	5.38	7.11	8.83	13.47	18.76	24.05	29.34	34.63
	90	150	210	210	210	270	270	900	900	900	900	1380	1380	1380	1380	1380
90	0.05	0.20	0.55	0.95	1.35	1.80	3.34	5.06	6.79	8.51	10.83	16.12	21.41	26.70	31.99	37.28
	90	150	210	210	210	270	900	900	900	900	1380	1380	1380	1380	1380	1380
100	0.05	0.20	0.55	0.95	1.35	2.87	4.51	6.23	7.96	10.50	13.14	18.43	23.72	29.01	34.30	39.59
	90	150	210	210	210	840	900	900	900	1380	1380	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	12.38	3.35	2.91	3.01	3.12	3.21	4.78
3	1.35	1.15	1.14	1.04	1.06	1.24	1.38
4	1.06	1.06	1.06	1.00	1.00	1.00	1.11
5	1.01	1.01	1.03	1.00	1.00	1.00	1.05
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	13.25	3.83	3.65	3.85	3.91	8.23	12.73
8	1.36	1.20	1.18	1.18	1.20	2.04	2.62
9	1.37	1.21	1.24	1.24	1.41	2.26	3.44
10	1.15	1.20	1.20	1.25	1.26	2.11	3.15
11	1.12	1.22	1.16	1.28	1.29	2.50	3.62
12	1.51	1.27	1.22	1.41	1.81	2.54	2.99
13	1.16	1.17	1.19	1.18	1.22	1.72	2.55
14	1.07	1.15	1.14	1.19	1.23	1.90	2.70
15	1.06	1.12	1.12	1.22	1.26	2.24	3.21
16	1.04	1.10	1.09	1.22	1.30	2.58	3.55
17	1.09	1.13	1.14	1.15	1.19	1.61	2.21
18	1.03	1.09	1.12	1.16	1.20	1.84	2.39
19	1.04	1.10	1.07	1.24	1.26	2.02	3.04
20	1.05	1.08	1.09	1.24	1.30	2.42	3.41

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
61.00	2.135	187.99	181.58	184.78	206.17	229.78	257.83	325.06
60.00	2.128	187.95	181.35	184.69	206.07	229.54	257.58	324.02
50.00	2.054	187.49	178.74	183.70	204.94	226.79	254.80	312.29
40.00	1.960	186.92	175.45	182.46	203.51	223.33	251.28	297.48
30.00	1.834	185.43	170.09	179.97	201.14	218.29	246.44	278.11
25.00	1.751	176.91	156.53	169.72	194.87	210.87	242.08	270.88
20.00	1.645	165.83	140.43	156.45	185.59	201.89	236.50	262.31
10.00	1.282	125.18	117.79	130.95	142.41	164.00	187.34	236.55
5.00	0.841	109.72	100.80	104.15	116.45	143.16	164.95	179.45
2.03	0.021	81.41	60.36	57.49	68.16	87.84	110.86	124.88

03142200 Salt Fork near Cambridge, Ohio

Location: Latitude 40°05′05″, longitude 81°27′20″, Guernsey County, Hydrologic Unit 05040005

Drainage area, in square miles: 55.6

Station used for record extension: 03110000

Time period of systematic or extended record analyzed: 1940-11-01 to 1997-09-30

Percentage of estimated values in extended record: 80.2

Eighty-percent-duration streamflow, in cubic feet per second: 1.2

Mean annual streamflow, in inches: 15.53

Location of station used for precipitation data: Cadiz, Ohio

Location of station used for potential evapotranspiration data: Pittsburgh, Pennsylvania

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
57.00	4.03	0.07	3.70	6.44	15.94	27.81	39.54	52.63
50.00	3.90	0.08	3.95	6.77	15.94	28.13	40.14	53.68
40.00	3.68	0.10	4.37	7.34	15.94	28.68	41.17	55.48
30.00	3.38	0.12	4.92	8.08	15.94	29.38	42.50	57.80
25.00	3.20	0.14	5.15	8.47	16.02	29.95	43.28	58.27
20.00	2.97	0.18	5.38	8.91	16.16	30.71	44.21	58.34
10.00	2.25	0.34	6.71	10.86	18.22	33.76	47.87	73.15
5.18	1.54	0.55	7.70	13.89	23.19	41.44	61.40	–

03142200 Salt Fork near Cambridge, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.04	0.13	0.37	0.68	1.00	1.37	1.75	2.13	2.54	3.03	3.54	4.56	5.59	6.61	7.63	9.99
	60	90	120	150	150	180	180	180	210	240	240	240	240	240	240	600
6	0.04	0.15	0.38	0.68	1.04	1.43	1.81	2.19	2.58	3.03	3.54	4.56	5.59	6.61	8.35	10.90
	60	90	120	150	180	180	180	180	180	240	240	240	240	240	600	600
8	0.06	0.17	0.42	0.75	1.14	1.52	1.90	2.29	2.67	3.09	3.61	4.66	5.81	7.16	9.76	12.56
	90	90	150	180	180	180	180	180	180	240	240	270	270	600	660	660
10	0.06	0.18	0.47	0.82	1.20	1.59	1.97	2.35	2.82	3.33	3.84	4.95	6.10	8.13	10.93	13.74
	90	120	150	180	180	180	180	180	240	240	240	270	270	660	660	660
15	0.07	0.23	0.55	0.92	1.30	1.74	2.25	2.76	3.27	3.78	4.29	5.37	7.05	9.60	12.27	18.00
	90	150	150	180	180	240	240	240	240	240	240	270	600	600	660	1680
20	0.08	0.27	0.59	0.98	1.46	1.97	2.48	2.99	3.50	4.01	4.52	5.61	7.87	10.42	14.17	20.74
	120	150	180	210	240	240	240	240	240	240	240	270	600	600	1380	1680
25	0.09	0.28	0.62	1.07	1.58	2.09	2.60	3.11	3.62	4.13	4.64	5.81	8.36	10.91	15.28	21.89
	150	150	180	240	240	240	240	240	240	240	240	600	600	600	1380	1680
30	0.10	0.29	0.66	1.13	1.64	2.15	2.66	3.17	3.69	4.20	4.76	6.12	8.67	11.22	16.04	22.45
	150	150	210	240	240	240	240	240	240	240	270	600	600	600	1320	1680
40	0.10	0.29	0.69	1.19	1.70	2.21	2.72	3.23	3.80	4.38	4.95	6.57	8.98	11.58	16.78	23.44
	150	150	210	240	240	240	240	270	270	270	270	540	600	960	1320	1740
50	0.10	0.31	0.69	1.19	1.70	2.22	2.79	3.36	3.94	4.51	5.12	7.16	9.32	12.04	17.08	24.48
	150	180	210	240	240	270	270	270	270	270	480	480	540	960	1740	1740
60	0.10	0.32	0.70	1.19	1.74	2.32	2.89	3.47	4.04	4.61	5.62	7.66	9.70	12.29	18.23	25.63
	150	180	180	240	270	270	270	270	270	270	480	480	480	960	1740	1740
70	0.10	0.33	0.71	1.25	1.82	2.40	2.97	3.55	4.12	5.00	6.02	8.06	10.10	12.43	19.49	26.89
	150	180	180	270	270	270	270	270	270	480	480	480	480	960	1740	1740
80	0.10	0.33	0.74	1.31	1.89	2.46	3.04	3.61	4.31	5.33	6.35	8.39	10.43	13.45	20.84	28.24
	180	180	270	270	270	270	270	270	480	480	480	480	480	1740	1740	1740
90	0.11	0.34	0.79	1.37	1.94	2.51	3.09	3.66	4.59	5.62	6.64	8.68	10.72	14.86	22.26	29.66
	180	180	270	270	270	270	270	270	480	480	480	480	480	1740	1740	1740
100	0.11	0.34	0.83	1.41	1.98	2.56	3.13	3.82	4.84	5.86	6.88	8.92	10.96	16.32	23.72	31.11
	180	180	270	270	270	270	270	480	480	480	480	480	480	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.42	1.05	1.00	1.03	1.26	1.77	5.01
3	1.22	1.01	1.00	1.00	1.02	1.00	1.00
4	1.02	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.46	1.12	1.07	1.33	1.96	7.27	14.38
8	1.26	1.08	1.07	1.09	1.18	1.21	2.56
9	1.25	1.11	1.08	1.18	1.35	1.47	5.12
10	1.22	1.11	1.11	1.20	1.37	1.41	3.14
11	1.28	1.15	1.13	1.32	1.41	1.77	2.50
12	1.31	1.08	1.05	1.09	1.18	1.54	4.84
13	1.16	1.11	1.08	1.14	1.33	1.23	1.54
14	1.16	1.11	1.11	1.18	1.34	1.36	1.83
15	1.19	1.15	1.10	1.27	1.41	1.65	1.86
16	1.26	1.21	1.12	1.28	1.48	1.81	1.95
17	1.11	1.11	1.08	1.11	1.32	1.23	1.49
18	1.08	1.11	1.11	1.16	1.35	1.31	1.77
19	1.15	1.15	1.12	1.26	1.43	1.58	1.77
20	1.19	1.21	1.11	1.28	1.47	1.77	1.88

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
57.00	2.108	160.54	188.92	198.16	202.45	212.64	246.75	266.12
50.00	2.054	158.23	186.30	193.63	198.28	211.06	245.98	264.21
40.00	1.960	154.18	181.71	185.71	190.99	208.31	244.63	260.86
30.00	1.834	148.74	175.54	175.06	181.20	204.60	242.82	256.36
25.00	1.751	143.67	168.97	169.65	175.36	195.76	231.88	247.31
20.00	1.645	136.50	159.39	163.55	168.24	181.39	213.20	232.81
10.00	1.282	102.75	116.55	119.09	133.65	154.27	176.58	197.12
5.00	0.841	75.84	77.93	82.99	108.38	127.63	150.30	170.96
2.04	0.022	49.16	46.09	46.02	67.02	80.49	100.28	122.62

03144000 Wakatomika Creek near Frazeysburg, Ohio

Location: Latitude 40°07′57″, longitude 82°08′53″, Muskingum County, Hydrologic Unit 05040004

Drainage area, in square miles: 140.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1936-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 18.

Mean annual streamflow, in inches: 14.94

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
62.00	4.12	0.36	3.77	6.22	11.28	21.26	32.19	44.90
60.00	4.09	0.36	3.80	6.34	11.49	21.71	32.68	45.34
50.00	3.90	0.37	3.99	7.01	12.63	24.21	35.42	47.77
40.00	3.68	0.37	4.22	7.82	14.04	27.28	38.78	50.75
30.00	3.38	0.39	4.59	8.87	15.86	30.83	42.75	54.45
25.00	3.20	0.42	5.17	9.48	17.01	31.03	43.41	56.00
20.00	2.97	0.47	5.90	10.24	18.25	31.48	44.19	57.90
10.00	2.25	0.60	7.03	12.16	20.18	34.93	54.62	70.76
5.17	1.54	0.98	9.15	15.06	23.34	41.31	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.01	0.10	0.27	0.51	0.82	1.19	1.55	1.92	2.29	2.66	3.49	4.34	5.37	6.47	8.05
	0	30	60	90	120	180	180	180	180	180	180	210	210	270	270	600
6	0.00	0.01	0.12	0.33	0.61	0.96	1.33	1.70	2.07	2.44	2.84	3.70	4.64	5.64	6.74	9.06
	0	30	90	120	150	180	180	180	180	180	210	210	240	270	270	600
8	0.00	0.02	0.16	0.42	0.76	1.13	1.50	1.86	2.24	2.67	3.13	4.11	5.09	6.14	7.74	10.20
	0	30	90	150	180	180	180	180	210	210	240	240	240	270	600	600
10	0.00	0.02	0.19	0.49	0.85	1.22	1.59	1.97	2.40	2.90	3.39	4.37	5.42	6.52	8.39	11.03
	0	30	120	150	180	180	180	210	240	240	240	240	270	270	600	960
15	0.00	0.03	0.26	0.60	0.97	1.33	1.77	2.26	2.75	3.27	3.82	4.92	6.03	7.13	10.68	17.55
	0	60	150	180	180	180	240	240	240	270	270	270	270	270	1680	1680
20	0.00	0.04	0.29	0.65	1.02	1.45	1.94	2.50	3.05	3.60	4.15	5.26	6.41	7.66	12.14	19.01
	0	60	150	180	180	240	270	270	270	270	270	270	300	600	1680	1680
25	0.00	0.05	0.31	0.68	1.07	1.59	2.14	2.70	3.25	3.80	4.35	5.50	6.73	8.33	12.43	19.30
	0	90	180	180	240	270	270	270	270	270	270	300	300	660	1680	1680
30	0.00	0.06	0.33	0.70	1.17	1.72	2.27	2.83	3.38	3.93	4.49	5.72	6.95	9.10	13.08	19.71
	0	90	180	180	270	270	270	270	270	270	300	300	300	660	1620	1620
40	0.00	0.06	0.36	0.77	1.32	1.87	2.42	2.97	3.54	4.15	4.76	5.99	7.82	10.98	16.63	22.27
	0	90	180	270	270	270	270	270	300	300	300	300	660	1380	1380	1380
50	0.00	0.07	0.37	0.84	1.39	1.94	2.50	3.08	3.69	4.30	4.92	6.37	9.97	14.80	20.44	26.09
	0	90	180	270	270	270	270	300	300	300	300	660	960	1320	1380	1380
60	0.00	0.07	0.39	0.87	1.43	1.98	2.55	3.17	3.78	4.39	5.01	8.84	13.31	18.70	24.10	29.58
	0	90	210	270	270	270	300	300	300	300	900	960	1320	1320	1320	1380
70	0.00	0.07	0.41	0.90	1.44	2.00	2.61	3.22	3.84	5.47	7.35	11.44	16.84	22.23	27.63	33.03
	0	90	240	240	270	300	300	300	300	900	960	1320	1320	1320	1320	1320
80	0.00	0.07	0.44	0.93	1.44	2.03	2.64	3.73	5.57	7.46	9.42	14.54	19.94	25.33	30.73	36.13
	0	90	240	240	270	300	300	900	900	960	960	1320	1320	1320	1320	1320
90	0.00	0.07	0.46	0.95	1.45	2.05	3.51	5.35	7.22	9.19	11.82	17.21	22.61	28.01	33.41	39.44
	0	90	240	240	240	300	900	900	960	960	1320	1320	1320	1320	1320	1680
100	0.00	0.07	0.48	0.98	1.47	3.00	4.84	6.70	8.71	11.40	14.10	19.50	24.90	30.30	36.17	43.04
	0	90	240	240	240	900	900	960	1320	1320	1320	1320	1320	1320	1680	1680

03144000 Wakatomika Creek near Frazeysburg, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.97	1.27	1.10	1.36	1.75	2.12	3.58
3	1.29	1.09	1.00	1.00	1.00	1.00	1.13
4	1.19	1.01	1.00	1.00	1.00	1.00	1.00
5	1.04	1.00	1.00	1.00	1.00	1.00	1.00
6	1.01	1.00	1.00	1.00	1.00	1.00	1.00
7	1.97	1.32	1.35	1.75	2.21	4.50	12.62
8	1.30	1.14	1.06	1.04	1.06	1.31	2.33
9	1.30	1.17	1.10	1.07	1.11	1.52	3.19
10	1.24	1.10	1.10	1.11	1.16	1.59	3.00
11	1.26	1.22	1.14	1.10	1.21	1.92	3.91
12	1.34	1.16	1.06	1.04	1.04	1.63	2.55
13	1.25	1.13	1.10	1.07	1.10	1.26	2.16
14	1.17	1.09	1.10	1.11	1.16	1.36	2.65
15	1.11	1.21	1.13	1.12	1.20	1.68	3.12
16	1.10	1.24	1.18	1.16	1.20	2.14	3.43
17	1.22	1.11	1.10	1.07	1.10	1.14	1.98
18	1.06	1.09	1.10	1.11	1.16	1.21	2.50
19	1.06	1.21	1.15	1.11	1.21	1.57	3.02
20	1.09	1.24	1.18	1.16	1.21	2.08	3.32

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
62.00	2.142	229.28	257.42	285.53	298.28	299.99	307.82	315.34
60.00	2.128	229.08	255.93	283.03	295.36	297.03	306.22	314.06
50.00	2.054	227.96	247.48	268.89	278.79	280.29	297.12	306.78
40.00	1.960	226.54	236.80	251.04	257.87	259.15	285.64	297.58
30.00	1.834	222.51	224.06	229.29	231.80	233.69	270.62	285.40
25.00	1.751	209.26	223.68	226.17	224.82	231.72	262.70	278.22
20.00	1.645	193.71	218.05	218.85	215.42	228.30	251.64	267.39
10.00	1.282	157.83	163.25	167.31	174.55	188.72	204.41	233.91
5.00	0.841	112.99	108.83	115.98	123.57	142.59	165.16	181.31
2.00	0.000	79.82	69.36	73.49	82.95	93.38	110.43	121.91

03144500 Muskingum River at Dresden, Ohio

Location: Latitude 40°07′13″, longitude 81°59′59″, Muskingum County, Hydrologic Unit 05040004

Drainage area, in square miles: 5,993.

Station used for record extension: 03139000

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 82.7

Eighty-percent-duration streamflow, in cubic feet per second: 1,050.

Mean annual streamflow, in inches: 19.20

Location of station used for precipitation data: Wooster, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.79	4.93	6.78	12.43	25.23	37.52	46.11
70.00	4.24	0.81	4.97	7.15	13.05	26.39	38.94	48.07
60.00	4.09	0.85	5.04	7.86	14.22	28.57	41.60	51.75
50.00	3.90	0.90	5.12	8.69	15.60	31.15	44.75	56.11
40.00	3.68	0.97	5.23	9.71	17.29	34.31	48.61	61.46
30.00	3.38	1.10	6.45	10.09	18.13	35.40	49.92	64.46
25.00	3.20	1.18	7.33	10.24	18.45	35.68	50.23	65.95
20.00	2.97	1.25	7.47	11.14	18.48	36.13	50.46	69.72
10.00	2.25	1.58	8.86	16.94	26.56	45.35	74.15	95.12
5.07	1.52	2.10	11.31	20.62	33.29	59.29	89.32	–

03144500 Muskingum River at Dresden, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.04	0.14	0.33	0.63	0.94	1.31	1.70	2.10	2.65	3.75	4.98	6.24	7.50	8.91
	0	0	30	60	90	120	120	150	150	150	210	210	240	240	240	300
6	0.00	0.00	0.05	0.16	0.38	0.69	1.04	1.43	1.83	2.35	2.90	4.03	5.30	6.56	7.93	9.45
	0	0	30	60	90	120	150	150	150	210	210	240	240	240	270	300
8	0.00	0.00	0.05	0.21	0.46	0.80	1.19	1.61	2.11	2.66	3.22	4.47	5.73	7.14	8.59	11.41
	0	0	30	90	120	150	150	180	210	210	210	240	240	270	300	600
10	0.00	0.00	0.06	0.25	0.53	0.90	1.30	1.77	2.30	2.87	3.50	4.76	6.11	7.53	9.95	14.44
	0	0	60	90	120	150	180	180	210	240	240	240	270	270	600	900
15	0.00	0.00	0.09	0.32	0.64	1.05	1.52	2.03	2.66	3.29	3.92	5.23	6.65	10.09	14.82	19.55
	0	0	60	90	150	180	180	240	240	240	240	270	270	900	900	900
20	0.00	0.00	0.12	0.38	0.72	1.16	1.64	2.26	2.89	3.53	4.16	5.53	8.17	12.77	17.50	22.81
	0	0	90	120	150	180	180	240	240	240	240	270	540	900	900	1740
25	0.00	0.00	0.15	0.42	0.78	1.24	1.78	2.41	3.04	3.67	4.30	6.42	9.65	14.38	19.11	27.74
	0	0	90	120	150	180	240	240	240	240	270	540	900	900	900	1740
30	0.00	0.00	0.16	0.45	0.83	1.30	1.87	2.50	3.14	3.77	4.45	7.22	10.69	15.42	22.30	31.45
	0	0	90	120	180	180	240	240	240	240	270	540	900	900	1740	1740
40	0.00	0.00	0.18	0.49	0.92	1.42	1.99	2.62	3.25	4.05	5.47	8.37	11.87	18.47	27.62	36.77
	0	30	90	150	180	210	240	240	240	540	540	600	900	1740	1740	1740
50	0.00	0.00	0.19	0.53	0.98	1.52	2.07	2.68	3.38	4.76	6.20	9.36	13.36	22.22	31.36	40.51
	0	30	120	150	180	210	210	240	270	540	600	600	1620	1740	1740	1740
60	0.00	0.00	0.20	0.57	1.05	1.60	2.16	2.78	3.84	5.39	6.97	10.12	16.20	25.06	34.30	43.77
	0	30	120	150	210	210	210	270	540	600	600	600	1620	1740	1800	1800
70	0.00	0.01	0.21	0.60	1.12	1.67	2.23	2.87	4.43	6.01	7.59	10.74	18.51	27.67	37.13	46.59
	0	30	120	180	210	210	210	270	600	600	600	600	1620	1800	1800	1800
80	0.00	0.01	0.23	0.64	1.18	1.74	2.29	3.37	4.95	6.52	8.10	11.91	20.62	30.09	39.55	49.01
	0	30	150	180	210	210	210	600	600	600	600	1620	1800	1800	1800	1800
90	0.00	0.01	0.25	0.69	1.24	1.79	2.34	3.81	5.38	6.96	8.54	13.56	22.74	32.21	41.67	51.13
	0	30	150	210	210	210	210	600	600	600	600	1620	1800	1800	1800	1800
100	0.00	0.01	0.27	0.73	1.29	1.84	2.61	4.19	5.76	7.34	8.92	15.16	24.63	34.09	43.55	53.01
	0	30	150	210	210	210	600	600	600	600	600	1800	1800	1800	1800	1800

03144500 Muskingum River at Dresden, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.23	1.25	1.20	1.05	1.31	1.91	1.80
3	1.03	1.10	1.15	1.02	1.00	1.29	1.06
4	1.00	1.00	1.10	1.00	1.00	1.06	1.00
5	1.00	1.00	1.05	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.23	1.31	1.26	1.34	1.84	3.20	3.45
8	1.03	1.20	1.26	1.09	1.17	1.90	1.91
9	1.04	1.21	1.28	1.12	1.44	2.31	2.62
10	1.03	1.25	1.35	1.15	1.35	2.19	2.72
11	1.04	1.27	1.35	1.18	1.45	2.33	2.95
12	1.11	1.24	1.23	1.09	1.34	2.05	2.09
13	1.03	1.16	1.24	1.11	1.20	1.92	2.04
14	1.03	1.20	1.29	1.14	1.23	2.12	2.38
15	1.04	1.18	1.28	1.18	1.29	2.33	2.71
16	1.07	1.18	1.28	1.22	1.50	2.44	3.16
17	1.02	1.14	1.22	1.11	1.19	1.86	1.75
18	1.03	1.15	1.25	1.14	1.22	2.11	2.24
19	1.04	1.12	1.25	1.18	1.29	2.33	2.60
20	1.07	1.13	1.28	1.22	1.42	2.44	3.14

03144500 Muskingum River at Dresden, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
76.00	2.222	170.60	165.49	172.18	206.21	219.59	238.35	370.76
70.00	2.190	168.41	163.32	170.66	202.60	215.33	237.39	362.33
60.00	2.128	164.23	159.18	167.77	195.73	207.21	235.57	346.29
50.00	2.054	159.17	154.16	164.27	187.41	197.38	233.36	326.85
40.00	1.960	152.78	147.83	159.85	176.89	184.96	230.57	302.31
30.00	1.834	137.46	122.02	136.73	149.03	180.04	211.20	268.00
25.00	1.751	125.91	103.59	119.93	130.20	177.34	197.03	245.79
20.00	1.645	103.22	96.58	112.24	130.08	156.51	191.90	227.67
10.00	1.282	79.16	74.18	89.26	109.12	132.19	147.10	206.02
5.00	0.841	62.95	51.17	50.72	62.10	93.95	126.41	151.78
2.00	0.000	54.39	24.59	21.74	24.74	31.47	52.10	74.36

03146000 North Fork Licking River at Utica, Ohio

Location: Latitude 40°13′41″, longitude 82°27′06″, Licking County, Hydrologic Unit 05040006

Drainage area, in square miles: 116.

Station used for record extension: 03146500

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Percentage of estimated values in extended record: 62.0

Eighty-percent-duration streamflow, in cubic feet per second: 10.

Mean annual streamflow, in inches: 16.59

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.21	3.09	3.71	7.39	16.90	26.75	40.74
50.00	3.90	0.21	3.20	4.80	9.58	20.53	30.00	44.14
40.00	3.68	0.21	3.34	6.27	12.53	25.43	34.39	48.73
30.00	3.38	0.21	3.53	8.17	16.35	31.77	40.07	54.67
25.00	3.20	0.24	4.06	8.28	16.71	32.76	42.10	55.44
20.00	2.97	0.29	4.77	8.28	16.90	33.60	44.41	56.02
10.00	2.25	0.35	6.63	12.51	19.53	36.33	55.22	78.62
5.36	1.58	0.65	8.52	16.20	23.52	45.19	65.29	–

03146000 North Fork Licking River at Utica, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.05	0.24	0.51	0.91	1.32	1.73	2.14	2.55	2.96	3.37	4.32	5.47	6.70	7.93	9.89
	0	60	90	150	180	180	180	180	180	180	180	210	270	270	270	960
6	0.00	0.06	0.26	0.62	1.03	1.44	1.85	2.26	2.69	3.17	3.65	4.87	6.10	7.32	8.65	11.40
	30	60	150	180	180	180	180	180	210	210	210	270	270	270	300	960
8	0.00	0.07	0.36	0.76	1.16	1.57	2.05	2.53	3.06	3.64	4.26	5.57	6.93	8.30	11.04	14.04
	30	60	150	180	180	210	210	210	240	270	270	300	300	300	660	660
10	0.00	0.08	0.42	0.83	1.26	1.74	2.27	2.81	3.36	3.95	4.61	5.97	7.33	9.04	12.03	15.03
	30	90	180	180	210	210	240	240	240	270	300	300	300	660	660	660
15	0.01	0.14	0.52	0.98	1.50	2.04	2.59	3.13	3.70	4.31	4.98	6.35	7.71	9.69	12.69	17.81
	30	150	180	210	240	240	240	240	270	270	300	300	300	660	660	1680
20	0.01	0.16	0.58	1.09	1.63	2.18	2.72	3.27	3.89	4.50	5.15	6.52	8.34	10.67	15.69	23.32
	30	150	210	240	240	240	240	270	270	270	300	300	480	540	1680	1680
25	0.01	0.18	0.62	1.16	1.70	2.25	2.79	3.40	4.02	4.63	5.29	7.06	9.16	11.97	19.60	27.42
	60	150	210	240	240	240	240	270	270	270	300	420	480	1680	1680	1740
30	0.01	0.19	0.66	1.21	1.75	2.30	2.89	3.50	4.11	4.74	5.66	7.62	9.97	14.93	22.61	30.51
	60	150	240	240	240	240	270	270	270	300	420	480	540	1680	1740	1740
40	0.01	0.20	0.71	1.26	1.81	2.42	3.04	3.65	4.32	5.30	6.48	10.03	14.37	19.49	27.00	34.91
	90	180	240	240	270	270	270	270	300	480	540	900	960	1380	1740	1740
50	0.01	0.21	0.75	1.31	1.93	2.54	3.18	3.95	5.67	7.85	10.03	14.39	19.06	25.33	31.60	38.17
	90	150	240	270	270	270	300	540	960	960	960	960	1380	1380	1380	1800
60	0.01	0.22	0.79	1.40	2.02	2.70	4.57	6.76	8.94	11.12	13.30	17.70	23.93	30.20	36.47	42.74
	90	240	270	270	300	300	960	960	960	960	960	1320	1380	1380	1380	1380
70	0.01	0.25	0.86	1.50	2.59	4.77	6.95	9.13	11.31	13.49	15.80	21.61	27.88	34.15	40.42	46.69
	90	270	270	300	960	960	960	960	960	960	1020	1380	1380	1380	1380	1380
80	0.01	0.30	0.94	2.11	4.29	6.47	8.67	10.99	13.30	16.02	18.88	24.78	31.05	37.32	43.59	49.86
	90	270	300	960	960	960	1020	1020	1020	1260	1260	1380	1380	1380	1380	1380
90	0.01	0.36	1.15	3.33	5.55	7.87	10.18	12.77	15.63	18.50	21.36	27.31	33.58	39.84	46.11	52.38
	90	300	960	960	1020	1020	1020	1260	1260	1260	1260	1380	1380	1380	1380	1380
100	0.03	0.43	2.02	4.30	6.62	8.94	11.76	14.63	17.49	20.35	23.21	29.31	35.58	41.85	48.12	54.39
	300	300	960	1020	1020	1020	1260	1260	1260	1260	1260	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.64	1.29	1.40	1.80	2.22	3.37	4.43
3	1.17	1.01	1.00	1.00	1.03	1.54	1.34
4	1.06	1.00	1.00	1.00	1.01	1.22	1.08
5	1.00	1.00	1.00	1.00	1.00	1.12	1.05
6	1.00	1.00	1.00	1.00	1.00	1.05	1.02
7	1.69	1.46	1.77	2.19	2.81	9.45	10.88
8	1.18	1.05	1.04	1.06	1.45	2.48	3.07
9	1.19	1.07	1.07	1.12	1.70	2.89	5.28
10	1.12	1.09	1.07	1.14	1.74	2.88	4.02
11	1.10	1.12	1.09	1.14	1.99	2.91	3.86
12	1.20	1.04	1.03	1.05	1.73	2.60	4.49
13	1.12	1.08	1.07	1.11	1.27	2.51	2.33
14	1.05	1.08	1.07	1.12	1.33	2.49	1.91
15	1.04	1.12	1.09	1.12	1.65	2.58	2.01
16	1.02	1.13	1.10	1.12	1.96	2.67	2.04
17	1.08	1.07	1.06	1.09	1.12	2.23	1.80
18	1.01	1.08	1.07	1.10	1.16	2.41	1.81
19	1.03	1.12	1.09	1.12	1.47	2.53	1.91
20	1.02	1.13	1.10	1.10	1.79	2.60	1.98

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	271.31	301.47	307.98	308.11	307.63	364.97	604.65
50.00	2.054	261.59	284.95	294.61	298.23	298.79	356.80	571.25
40.00	1.960	248.09	261.99	276.03	284.51	286.51	345.46	524.84
30.00	1.834	229.93	231.14	251.06	266.06	270.01	330.21	462.46
25.00	1.751	228.74	221.30	231.03	237.77	250.76	310.89	453.71
20.00	1.645	228.59	210.11	205.12	199.76	225.22	285.16	446.69
10.00	1.282	177.56	135.79	166.67	190.35	210.07	247.74	284.86
5.00	0.841	131.67	114.65	117.20	132.55	154.83	176.89	203.36
2.03	0.021	99.73	77.85	81.26	88.12	97.10	128.39	147.26

03146500 Licking River near Newark, Ohio

Location: Latitude 40°03′33″, longitude 82°20′23″, Licking County, Hydrologic Unit 05040006

Drainage area, in square miles: 537.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 96.

Mean annual streamflow, in inches: 15.71

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.61	3.93	5.04	9.46	18.74	28.13	41.97
50.00	3.90	0.63	4.10	5.87	11.08	21.86	31.18	44.90
40.00	3.68	0.65	4.32	6.98	13.28	26.08	35.31	48.86
30.00	3.38	0.68	4.61	8.43	16.11	31.53	40.65	53.99
25.00	3.20	0.69	4.74	8.84	16.55	32.14	41.63	54.41
20.00	2.97	0.70	4.88	9.30	16.92	32.54	42.53	54.58
10.00	2.25	0.94	6.20	13.47	20.28	36.76	56.00	73.35
5.36	1.58	1.20	9.04	16.07	23.90	44.45	65.12	–

03146500 Licking River near Newark, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.03	0.18	0.37	0.67	1.04	1.43	1.82	2.20	2.59	3.36	4.24	5.17	6.46	7.75
	0	0	30	90	90	150	180	180	180	180	180	180	210	300	300	300
6	0.00	0.00	0.04	0.18	0.41	0.77	1.15	1.54	1.93	2.32	2.72	3.62	4.75	5.99	7.28	9.03
	0	0	30	90	150	180	180	180	180	180	210	210	270	300	300	660
8	0.00	0.00	0.05	0.21	0.53	0.92	1.31	1.71	2.16	2.65	3.20	4.36	5.52	6.75	8.65	11.48
	0	0	60	120	180	180	180	210	210	240	270	270	270	300	660	660
10	0.00	0.00	0.06	0.26	0.63	1.02	1.45	1.95	2.46	2.98	3.50	4.65	5.81	7.09	9.72	12.55
	0	0	60	150	180	180	210	240	240	240	240	270	270	300	660	660
15	0.00	0.00	0.07	0.38	0.79	1.25	1.75	2.27	2.78	3.30	3.82	4.88	6.17	8.03	10.87	16.27
	0	0	60	180	210	210	240	240	240	240	240	300	300	660	660	1680
20	0.00	0.00	0.11	0.46	0.91	1.36	1.87	2.39	2.90	3.42	3.93	5.07	6.51	8.91	13.36	20.64
	0	0	150	210	210	210	240	240	240	240	240	300	480	600	1680	1740
25	0.00	0.00	0.14	0.52	0.97	1.42	1.93	2.45	2.97	3.48	4.00	5.28	7.48	9.81	16.66	24.14
	0	0	150	210	210	210	240	240	240	240	240	420	540	600	1740	1740
30	0.00	0.00	0.17	0.56	1.01	1.47	1.98	2.50	3.01	3.53	4.10	5.97	8.29	11.80	19.28	26.76
	0	0	150	210	210	240	240	240	240	240	300	540	540	1740	1740	1740
40	0.00	0.00	0.19	0.59	1.04	1.55	2.06	2.58	3.13	3.77	4.91	7.58	11.45	16.16	23.01	30.49
	0	0	150	210	210	240	240	240	300	300	540	900	900	1380	1740	1740
50	0.00	0.00	0.20	0.59	1.11	1.62	2.14	2.78	3.53	4.74	6.68	10.81	15.00	20.87	26.81	33.08
	0	0	150	210	240	240	270	300	540	900	960	960	1320	1380	1380	1740
60	0.00	0.00	0.20	0.67	1.22	1.80	2.40	3.36	5.42	7.49	9.55	13.68	18.97	24.88	30.81	36.75
	0	0	150	240	270	270	300	960	960	960	960	960	1320	1380	1380	1380
70	0.00	0.00	0.27	0.85	1.43	2.01	3.57	5.64	7.70	9.76	11.83	16.63	22.32	28.25	34.19	40.12
	0	0	270	270	270	270	960	960	960	960	960	1320	1380	1380	1380	1380
80	0.00	0.00	0.45	1.03	1.61	3.30	5.37	7.43	9.50	11.56	14.16	19.58	25.15	31.08	37.02	42.95
	0	0	270	270	270	960	960	960	960	960	1260	1260	1380	1380	1380	1380
90	0.00	0.02	0.60	1.18	2.65	4.71	6.78	8.84	11.24	13.95	16.66	22.08	27.52	33.45	39.39	45.32
	0	270	270	270	960	960	960	960	1260	1260	1260	1260	1380	1380	1380	1380
100	0.00	0.13	0.71	1.69	3.76	5.82	7.97	10.54	13.25	15.96	18.67	24.09	29.51	35.44	41.37	47.31
	0	270	270	960	960	960	1020	1260	1260	1260	1260	1260	1260	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.73	1.30	1.36	1.72	2.13	3.21	3.67
3	1.09	1.01	1.00	1.00	1.02	1.55	1.29
4	1.00	1.00	1.00	1.00	1.00	1.18	1.06
5	1.00	1.00	1.00	1.00	1.00	1.06	1.02
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.72	1.44	1.62	2.14	2.69	8.41	8.78
8	1.10	1.04	1.05	1.04	1.28	2.58	2.46
9	1.08	1.07	1.05	1.09	1.48	2.98	3.83
10	1.02	1.08	1.08	1.12	1.48	2.98	3.26
11	1.01	1.11	1.08	1.14	1.55	3.07	3.34
12	1.14	1.04	1.03	1.02	1.62	2.75	3.56
13	1.02	1.06	1.06	1.09	1.13	2.47	1.89
14	1.02	1.07	1.08	1.11	1.15	2.62	1.97
15	1.01	1.12	1.07	1.14	1.15	2.82	2.06
16	1.03	1.14	1.09	1.11	1.54	2.91	2.35
17	1.01	1.06	1.06	1.07	1.12	2.29	1.79
18	1.02	1.07	1.08	1.10	1.13	2.55	1.90
19	1.01	1.12	1.08	1.11	1.14	2.75	2.02
20	1.01	1.12	1.09	1.09	1.41	2.85	2.18

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	271.82	298.97	306.44	307.63	305.97	322.19	576.64
50.00	2.054	262.71	278.52	289.09	292.98	292.94	318.29	543.37
40.00	1.960	250.06	250.12	264.98	272.63	274.84	312.87	497.14
30.00	1.834	233.06	211.94	232.58	245.28	250.50	305.58	435.01
25.00	1.751	224.94	209.63	219.72	225.03	236.67	285.88	429.03
20.00	1.645	215.01	209.59	204.44	199.01	219.36	258.95	425.87
10.00	1.282	176.23	131.17	153.18	183.12	207.31	240.04	273.80
5.00	0.841	133.88	114.62	114.97	128.77	148.66	169.14	198.99
2.03	0.021	90.00	75.83	73.07	83.84	90.36	112.48	138.26

03147000 Licking River at Toboso, Ohio

Location: Latitude 40°03′26″, longitude 82°13′12″, Licking County, Hydrologic Unit 05040006

Drainage area, in square miles: 672.

Station used for record extension: 03146500

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 48.0

Eighty-percent-duration streamflow, in cubic feet per second: 100.

Mean annual streamflow, in inches: 15.08

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.57	2.08	4.71	9.21	19.40	28.85	38.96
70.00	4.24	0.58	2.22	4.76	9.30	19.79	29.63	39.51
60.00	4.09	0.59	2.48	4.85	9.47	20.53	31.11	40.53
50.00	3.90	0.61	2.79	4.96	9.66	21.40	32.85	41.74
40.00	3.68	0.63	3.17	5.09	9.90	22.47	34.99	43.23
30.00	3.38	0.68	3.80	5.30	12.99	27.46	38.74	49.76
25.00	3.20	0.72	4.21	5.54	15.19	30.91	41.15	54.26
20.00	2.97	0.75	4.60	7.50	15.60	31.54	42.39	55.11
10.00	2.25	0.95	6.01	12.05	19.25	35.79	49.74	70.90
5.07	1.52	1.23	8.99	16.79	25.19	43.91	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.02	0.13	0.34	0.62	0.98	1.35	1.72	2.09	2.47	3.27	4.36	5.59	6.83	8.07
	0	0	30	60	120	150	180	180	180	180	180	210	300	300	300	300
6	0.00	0.00	0.03	0.14	0.37	0.69	1.06	1.43	1.80	2.17	2.61	3.47	4.52	5.76	7.00	8.24
	0	0	30	90	120	180	180	180	180	210	210	210	300	300	300	300
8	0.00	0.00	0.03	0.18	0.43	0.80	1.17	1.56	2.00	2.48	2.97	3.96	5.08	6.19	7.48	10.21
	0	0	30	90	180	180	180	210	210	240	240	240	270	270	660	660
10	0.00	0.00	0.04	0.21	0.52	0.89	1.29	1.75	2.24	2.74	3.23	4.29	5.40	6.53	9.03	11.75
	0	0	60	120	180	180	210	240	240	240	240	270	270	300	660	660
15	0.00	0.00	0.05	0.30	0.65	1.07	1.57	2.07	2.56	3.06	3.61	4.73	6.94	9.42	11.89	15.15
	0	0	90	150	180	240	240	240	240	240	270	300	600	600	600	1260
20	0.00	0.00	0.07	0.37	0.76	1.23	1.72	2.22	2.73	3.30	4.06	6.29	8.68	11.16	13.70	20.01
	0	0	90	150	210	240	240	240	270	300	540	540	600	600	900	1680
25	0.00	0.00	0.10	0.41	0.83	1.32	1.82	2.35	2.97	3.91	5.02	7.28	9.76	12.23	16.47	23.41
	0	0	150	150	210	240	240	300	300	540	540	600	600	600	1680	1680
30	0.00	0.00	0.13	0.45	0.90	1.39	1.94	2.56	3.40	4.52	5.63	7.98	10.46	13.24	18.94	26.12
	0	0	150	210	240	240	300	300	540	540	540	600	600	900	1740	1740
40	0.00	0.00	0.16	0.52	0.99	1.58	2.19	2.94	4.06	5.17	6.32	8.80	11.51	15.40	22.55	29.74
	0	0	150	210	240	300	300	540	540	540	600	600	900	960	1740	1740
50	0.00	0.00	0.17	0.56	1.11	1.73	2.35	3.21	4.32	5.47	6.71	9.19	13.04	17.53	24.71	31.94
	0	0	150	240	300	300	300	540	540	600	600	600	960	1740	1740	1800
60	0.00	0.00	0.17	0.62	1.21	1.82	2.44	3.27	4.39	5.63	6.87	10.28	14.25	19.12	26.36	33.80
	0	0	150	240	300	300	300	540	600	600	600	960	960	1320	1800	1800
70	0.00	0.00	0.17	0.67	1.27	1.89	2.54	3.27	4.42	5.66	7.26	11.23	15.46	20.91	27.72	35.15
	0	0	210	240	300	300	330	540	600	600	960	960	1320	1320	1800	1800
80	0.00	0.00	0.21	0.72	1.31	1.97	2.65	3.34	4.55	6.05	8.03	11.99	17.02	22.56	28.73	36.16
	0	0	240	270	300	330	330	330	660	960	960	960	1320	1380	1800	1800
90	0.00	0.00	0.25	0.78	1.38	2.07	2.75	3.51	4.87	6.68	8.67	13.04	18.51	24.21	29.90	36.94
	0	0	240	270	330	330	330	660	660	960	960	1260	1380	1380	1380	1800
100	0.00	0.00	0.28	0.82	1.46	2.14	2.88	3.79	5.24	7.22	9.26	14.46	19.98	25.68	31.38	37.54
	0	0	240	270	330	330	360	660	960	960	1260	1260	1380	1380	1380	1800

03147000 Licking River at Toboso, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.18	1.05	1.05	1.04	1.38	2.09	4.68
3	1.08	1.00	1.00	1.02	1.00	1.21	1.22
4	1.04	1.00	1.00	1.00	1.00	1.08	1.06
5	1.03	1.00	1.00	1.00	1.00	1.01	1.02
6	1.01	1.00	1.00	1.00	1.00	1.00	1.00
7	1.19	1.09	1.10	1.41	1.97	8.49	12.34
8	1.10	1.02	1.06	1.10	1.16	1.85	2.22
9	1.08	1.04	1.08	1.16	1.27	2.20	4.87
10	1.11	1.06	1.08	1.20	1.39	2.32	3.11
11	1.08	1.07	1.14	1.22	1.47	2.51	3.54
12	1.10	1.04	1.07	1.09	1.18	2.06	4.27
13	1.06	1.04	1.05	1.15	1.13	1.79	2.17
14	1.08	1.06	1.07	1.20	1.28	2.13	2.32
15	1.08	1.07	1.11	1.22	1.34	2.41	2.51
16	1.04	1.11	1.15	1.25	1.41	2.52	2.73
17	1.05	1.04	1.05	1.14	1.13	1.69	2.04
18	1.07	1.06	1.07	1.20	1.18	2.08	2.23
19	1.04	1.07	1.11	1.22	1.23	2.36	2.45
20	1.03	1.11	1.15	1.25	1.33	2.50	2.69

03147000 Licking River at Toboso, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
76.00	2.222	273.38	299.50	299.58	311.74	334.83	351.66	454.74
70.00	2.190	271.69	294.18	296.58	310.53	334.54	351.65	454.15
60.00	2.128	268.49	284.05	290.87	308.23	334.00	351.62	453.02
50.00	2.054	264.60	271.77	283.95	305.45	333.34	351.58	451.66
40.00	1.960	259.69	256.27	275.21	301.93	332.51	351.54	449.93
30.00	1.834	243.13	232.10	247.74	296.38	313.95	343.00	429.79
25.00	1.751	229.11	214.77	227.94	289.13	297.33	335.72	414.73
20.00	1.645	184.25	178.28	211.23	224.44	245.48	319.17	407.09
10.00	1.282	152.46	131.03	139.21	158.43	193.40	227.55	289.90
5.00	0.841	123.75	101.13	104.25	117.51	137.52	175.64	196.60
2.00	0.000	83.58	59.54	65.54	73.12	84.54	108.79	127.68

03147500 Licking River below Dillon Dam near Dillon Falls, Ohio

Location: Latitude 39°59′18″, longitude 82°04′50″, Muskingum County, Hydrologic Unit 05040006

Drainage area, in square miles: 742.

Station used for record extension: 03147000

Time period of systematic or extended record analyzed: 1922-10-01 to 1961-09-30

Percentage of estimated values in extended record: 51.3

Eighty-percent-duration streamflow, in cubic feet per second: 110.

Mean annual streamflow, in inches: 13.70

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
40.00	3.68	0.58	2.14	4.84	9.46	19.97	29.57	39.37
30.00	3.38	0.65	2.65	5.02	9.88	21.18	32.14	41.51
25.00	3.20	0.70	2.98	5.13	10.15	21.95	33.77	42.87
20.00	2.97	0.75	3.38	5.27	10.48	22.90	35.78	44.55
10.00	2.25	0.88	5.27	8.16	15.98	31.84	48.10	67.53
5.71	1.65	1.11	7.26	13.88	20.22	41.55	62.39	–

03147500 Licking River below Dillon Dam near Dillon Falls, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.02	0.17	0.35	0.58	0.84	1.15	1.49	1.90	2.35	3.33	4.45	5.58	7.67	10.15
	0	0	60	90	120	120	150	180	180	240	240	300	300	300	660	660
6	0.00	0.00	0.02	0.17	0.35	0.66	0.99	1.33	1.69	2.10	2.55	3.52	4.53	5.58	7.67	10.15
	0	0	60	90	120	180	180	180	210	240	240	270	270	300	660	660
8	0.00	0.00	0.02	0.17	0.47	0.80	1.14	1.53	1.93	2.35	2.80	3.76	5.06	7.09	9.11	11.24
	0	0	30	90	180	180	180	210	210	240	240	270	540	540	540	600
10	0.00	0.00	0.03	0.20	0.52	0.86	1.24	1.63	2.04	2.49	2.94	4.66	6.68	8.71	10.75	13.23
	0	0	30	150	180	180	210	210	240	240	240	540	540	540	600	900
15	0.00	0.00	0.04	0.29	0.57	0.94	1.37	1.82	2.30	3.31	4.33	6.39	8.64	10.89	13.62	17.95
	0	0	90	150	180	210	240	240	540	540	540	600	600	600	900	1680
20	0.00	0.00	0.06	0.33	0.62	1.07	1.52	1.97	2.92	4.04	5.17	7.42	9.67	12.14	17.59	24.11
	0	0	120	150	240	240	240	300	540	600	600	600	600	960	1680	1740
25	0.00	0.00	0.08	0.36	0.73	1.18	1.72	2.29	3.36	4.49	5.61	7.86	10.12	14.30	20.83	27.36
	0	0	120	150	240	240	300	300	600	600	600	600	600	1740	1740	1740
30	0.00	0.00	0.09	0.38	0.83	1.37	1.93	2.54	3.49	4.62	5.74	8.00	11.08	15.44	22.18	28.93
	0	0	120	240	240	300	300	330	600	600	600	600	960	1740	1800	1800
40	0.00	0.00	0.10	0.53	1.04	1.62	2.24	2.86	3.49	4.62	5.74	8.89	12.49	17.36	22.31	28.93
	0	0	210	240	300	330	330	330	600	600	600	960	960	1320	1320	1800
50	0.00	0.00	0.24	0.74	1.25	1.77	2.39	3.01	3.62	4.62	6.21	10.24	15.19	20.22	25.40	30.57
	0	0	270	270	270	330	330	330	330	600	960	1320	1320	1380	1380	1380
60	0.00	0.00	0.42	0.92	1.43	1.94	2.48	3.26	4.29	5.86	7.66	12.61	17.65	22.83	28.00	33.18
	0	0	270	270	270	270	420	420	840	840	1320	1320	1380	1380	1380	1380
70	0.00	0.05	0.55	1.06	1.57	2.12	2.91	3.90	5.47	7.22	9.69	14.67	19.85	25.02	30.20	35.38
	0	270	270	270	270	420	420	840	840	1320	1320	1380	1380	1380	1380	1380
80	0.00	0.15	0.66	1.16	1.70	2.48	3.35	4.93	6.50	8.97	11.45	16.54	21.72	26.89	32.07	37.24
	0	270	270	270	420	420	840	840	840	1320	1320	1380	1380	1380	1380	1380
90	0.00	0.23	0.73	1.24	1.99	2.78	4.24	5.81	8.01	10.49	12.96	18.14	23.32	28.49	33.67	38.85
	0	270	270	270	420	420	840	840	1320	1320	1380	1380	1380	1380	1380	1380
100	0.00	0.29	0.79	1.44	2.23	3.42	5.00	6.85	9.33	11.80	14.35	19.52	24.70	29.87	35.05	40.23
	0	270	270	420	420	840	840	1320	1320	1320	1380	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.14	1.05	1.05	1.06	1.17	1.86	2.20
3	1.08	1.00	1.00	1.03	1.00	1.02	1.14
4	1.05	1.00	1.00	1.01	1.00	1.00	1.06
5	1.03	1.00	1.00	1.00	1.00	1.00	1.03
6	1.02	1.00	1.00	1.00	1.00	1.00	1.01
7	1.15	1.09	1.09	1.11	1.79	2.83	5.75
8	1.08	1.04	1.04	1.11	1.08	1.39	2.12
9	1.11	1.04	1.06	1.16	1.14	1.65	2.63
10	1.05	1.08	1.07	1.20	1.18	1.71	2.54
11	1.08	1.09	1.09	1.25	1.23	2.07	2.65
12	1.10	1.04	1.05	1.10	1.08	1.65	2.34
13	1.06	1.04	1.06	1.15	1.14	1.48	1.93
14	1.04	1.08	1.08	1.19	1.18	1.58	2.24
15	1.06	1.09	1.09	1.25	1.20	1.98	2.53
16	1.06	1.12	1.13	1.26	1.21	2.25	2.67
17	1.05	1.04	1.06	1.14	1.14	1.42	1.84
18	1.03	1.09	1.08	1.19	1.18	1.52	2.17
19	1.04	1.09	1.09	1.25	1.20	1.96	2.42
20	1.03	1.12	1.13	1.26	1.20	2.25	2.60

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
40.00	1.960	274.19	298.63	299.04	302.78	329.31	347.58	385.27
30.00	1.834	267.15	264.22	262.45	297.66	328.14	347.39	384.09
25.00	1.751	262.51	241.50	238.29	294.27	327.37	347.27	383.31
20.00	1.645	256.60	212.61	207.57	289.97	326.39	347.11	382.32
10.00	1.282	167.03	122.32	140.30	175.71	192.43	230.23	319.20
5.00	0.841	131.55	104.56	104.79	123.01	151.89	179.03	221.76
2.00	0.000	90.40	61.66	62.73	75.74	91.12	115.29	127.51

03149500 Salt Creek near Chandlersville, Ohio

Location: Latitude 39°54′31″, longitude 81°51′38″, Muskingum County, Hydrologic Unit 05040004

Drainage area, in square miles: 75.7

Station used for record extension: 03144000

Time period of systematic or extended record analyzed: 1935-10-01 to 1997-09-30

Percentage of estimated values in extended record: 80.6

Eighty-percent-duration streamflow, in cubic feet per second: 5.4

Mean annual streamflow, in inches: 16.09

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
63.00	4.14	0.11	3.25	5.73	10.78	21.30	33.01	46.64
60.00	4.09	0.11	3.31	5.92	11.12	22.08	33.80	47.37
50.00	3.90	0.11	3.53	6.62	12.40	25.00	36.77	50.12
40.00	3.68	0.12	3.79	7.48	13.96	28.58	40.41	53.49
30.00	3.38	0.12	4.29	8.59	16.02	32.43	44.40	57.30
25.00	3.20	0.14	5.06	9.26	17.45	32.45	44.71	58.03
20.00	2.97	0.17	5.95	10.03	18.96	32.75	45.38	59.11
10.00	2.25	0.30	6.85	12.29	21.20	40.43	58.06	75.96
5.25	1.55	0.59	9.25	15.73	24.75	46.26	–	–

03149500 Salt Creek near Chandlersville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.08	0.27	0.54	0.92	1.32	1.71	2.11	2.51	2.90	3.35	4.28	5.37	6.55	7.74	8.93
	30	60	120	120	180	180	180	180	180	180	210	210	270	270	270	270
6	0.02	0.09	0.33	0.64	1.03	1.42	1.82	2.22	2.61	3.07	3.53	4.57	5.62	6.75	7.94	10.34
	30	90	120	150	180	180	180	180	180	210	210	240	240	270	270	600
8	0.02	0.12	0.42	0.77	1.17	1.57	1.96	2.39	2.85	3.37	3.90	4.96	6.03	7.22	9.33	11.98
	30	90	150	180	180	180	180	210	210	240	240	240	270	270	600	600
10	0.03	0.15	0.48	0.86	1.26	1.65	2.08	2.57	3.10	3.63	4.16	5.24	6.43	7.62	10.22	13.22
	60	120	150	180	180	180	210	240	240	240	240	270	270	270	600	960
15	0.04	0.21	0.58	0.97	1.37	1.87	2.40	2.93	3.52	4.11	4.71	5.90	7.09	8.79	12.43	19.83
	90	150	180	180	210	240	240	240	270	270	270	270	270	600	1680	1680
20	0.05	0.23	0.63	1.03	1.52	2.08	2.67	3.27	3.86	4.46	5.05	6.28	7.60	9.59	15.44	22.84
	90	150	180	180	240	270	270	270	270	270	270	300	300	600	1680	1680
25	0.06	0.26	0.66	1.11	1.68	2.28	2.87	3.47	4.06	4.66	5.32	6.64	7.96	10.27	16.81	24.21
	90	180	180	240	270	270	270	270	270	300	300	300	300	600	1680	1680
30	0.06	0.27	0.67	1.21	1.81	2.40	3.00	3.59	4.22	4.88	5.55	6.87	8.27	11.10	17.72	25.12
	120	180	180	270	270	270	270	270	300	300	300	300	600	660	1680	1680
40	0.07	0.29	0.76	1.35	1.95	2.54	3.16	3.82	4.48	5.14	5.80	7.12	9.73	13.56	19.64	26.81
	120	180	270	270	270	270	300	300	300	300	300	300	660	1380	1380	1680
50	0.07	0.29	0.83	1.42	2.02	2.63	3.29	3.95	4.61	5.27	5.93	8.15	12.07	17.63	23.71	29.79
	120	180	270	270	270	300	300	300	300	300	300	660	960	1380	1380	1380
60	0.07	0.31	0.87	1.46	2.06	2.70	3.36	4.02	4.68	5.34	6.89	11.12	15.87	21.68	27.50	33.51
	120	210	270	270	270	300	300	300	300	300	960	960	1320	1320	1320	1380
70	0.07	0.33	0.89	1.49	2.08	2.74	3.40	4.06	5.46	7.57	9.69	13.92	19.71	25.53	31.34	37.16
	120	240	270	270	270	300	300	300	960	960	960	960	1320	1320	1320	1320
80	0.07	0.35	0.90	1.50	2.10	2.76	3.56	5.65	7.77	9.88	12.00	17.27	23.08	28.90	34.71	40.53
	120	240	270	270	300	300	900	960	960	960	960	1320	1320	1320	1320	1320
90	0.07	0.36	0.91	1.50	2.11	3.29	5.41	7.52	9.64	11.75	14.35	20.16	25.97	31.79	37.60	43.42
	120	240	270	270	300	960	960	960	960	960	1320	1320	1320	1320	1320	1320
100	0.07	0.37	0.91	1.50	2.67	4.79	6.90	9.01	11.13	13.88	16.79	22.60	28.42	34.23	40.05	45.86
	120	240	270	270	960	960	960	960	960	1320	1320	1320	1320	1320	1320	1320

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.35	1.12	1.07	1.40	1.70	1.99	3.20
3	1.13	1.03	1.00	1.00	1.00	1.00	1.18
4	1.06	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.35	1.18	1.25	1.65	2.05	3.75	8.35
8	1.14	1.06	1.06	1.02	1.06	1.32	2.10
9	1.16	1.10	1.05	1.05	1.10	1.50	2.64
10	1.12	1.11	1.09	1.07	1.13	1.51	2.57
11	1.07	1.11	1.09	1.09	1.17	1.96	2.76
12	1.18	1.09	1.04	1.02	1.05	1.53	2.17
13	1.11	1.09	1.05	1.05	1.10	1.24	1.94
14	1.12	1.11	1.09	1.07	1.14	1.25	2.31
15	1.03	1.10	1.09	1.07	1.17	1.71	2.54
16	1.11	1.10	1.10	1.13	1.18	1.99	2.76
17	1.12	1.09	1.05	1.05	1.09	1.12	1.83
18	1.08	1.11	1.09	1.06	1.13	1.13	2.23
19	1.12	1.10	1.09	1.08	1.18	1.56	2.49
20	1.11	1.10	1.09	1.13	1.19	1.89	2.68

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
63.00	2.148	248.60	266.16	281.53	286.25	286.02	295.32	304.44
60.00	2.128	247.61	264.03	278.68	282.82	283.29	294.22	303.60
50.00	2.054	243.86	255.91	267.81	269.78	272.88	290.01	300.41
40.00	1.960	239.12	245.66	254.09	253.31	259.73	284.71	296.38
30.00	1.834	231.09	232.31	236.07	231.91	243.71	276.36	289.59
25.00	1.751	220.54	224.83	225.47	220.13	238.31	267.00	280.75
20.00	1.645	206.32	210.76	210.12	205.54	228.83	251.76	266.06
10.00	1.282	154.68	156.07	161.14	174.80	186.34	200.74	227.57
5.00	0.841	125.85	108.00	117.32	124.45	140.31	162.76	183.46
2.03	0.020	86.40	70.68	66.90	71.32	87.75	113.08	120.78

03157000 Clear Creek near Rockbridge, Ohio

Location: Latitude 39°35′18″, longitude 82°34′43″, Hocking County, Hydrologic Unit 05030204

Drainage area, in square miles: 89.0

Station used for record extension: None

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 21.

Mean annual streamflow, in inches: 13.81

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	1.06	4.02	5.77	10.35	18.72	28.25	38.43
50.00	3.90	1.06	4.27	6.55	11.51	20.24	30.93	41.51
40.00	3.68	1.06	4.62	7.60	13.07	22.28	34.55	45.66
30.00	3.38	1.06	5.06	8.96	15.09	24.93	39.24	51.04
25.00	3.20	1.10	5.71	9.20	15.64	26.95	40.64	53.18
20.00	2.97	1.17	6.55	9.42	16.22	29.47	42.18	55.66
10.00	2.25	1.40	6.73	11.69	17.83	33.10	44.92	61.31
5.36	1.58	1.63	8.14	13.19	23.25	44.29	–	–

03157000 Clear Creek near Rockbridge, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.00	0.00	0.03	0.10	0.27	0.50	0.75	1.09	1.43	1.77	2.56	3.50	4.52	5.54	7.01
	0	0	0	30	60	120	120	180	180	180	180	240	270	270	270	540
6	0.00	0.00	0.00	0.03	0.11	0.30	0.52	0.81	1.15	1.49	1.84	2.71	3.61	4.53	5.60	7.64
	0	0	0	30	60	120	120	180	180	180	210	240	240	270	540	540
8	0.00	0.00	0.00	0.03	0.15	0.34	0.60	0.91	1.25	1.64	2.04	2.92	3.82	4.73	6.90	10.31
	0	0	0	30	90	120	150	180	180	210	210	240	240	240	900	900
10	0.00	0.00	0.00	0.03	0.18	0.39	0.67	1.00	1.36	1.75	2.15	3.06	3.97	4.94	8.18	11.58
	0	0	0	30	90	150	150	180	210	210	240	240	240	600	900	900
15	0.00	0.00	0.00	0.04	0.22	0.49	0.80	1.14	1.50	1.92	2.37	3.30	4.36	5.96	9.17	13.23
	0	0	0	60	120	150	180	180	210	240	240	270	300	600	900	1680
20	0.00	0.00	0.00	0.05	0.26	0.54	0.88	1.22	1.59	2.05	2.56	3.62	4.76	6.69	9.99	15.03
	0	0	0	90	150	150	180	180	240	270	270	300	300	600	960	1680
25	0.00	0.00	0.00	0.05	0.29	0.59	0.93	1.27	1.72	2.23	2.74	3.86	5.08	7.43	11.06	16.47
	0	0	0	90	150	180	180	180	270	270	270	300	540	960	960	1680
30	0.00	0.00	0.00	0.06	0.31	0.62	0.96	1.32	1.83	2.34	2.86	3.99	5.70	8.57	12.20	17.99
	0	0	0	120	150	180	180	270	270	270	300	300	540	960	960	1680
40	0.00	0.00	0.00	0.07	0.33	0.65	0.99	1.43	1.94	2.45	2.96	4.77	7.32	10.95	15.14	21.61
	0	0	0	120	150	180	180	270	270	270	270	540	960	960	1680	1740
50	0.00	0.00	0.00	0.07	0.33	0.65	0.99	1.44	1.95	2.65	3.67	6.01	9.63	13.65	19.21	25.78
	0	0	0	120	150	180	180	270	270	540	540	960	960	1320	1740	1740
60	0.00	0.00	0.00	0.07	0.33	0.65	1.02	1.46	2.43	3.45	4.50	8.13	12.76	17.90	23.43	30.02
	0	0	0	120	150	180	210	240	540	540	960	960	1320	1380	1740	1800
70	0.00	0.00	0.00	0.07	0.33	0.66	1.08	2.10	3.12	4.70	6.50	11.49	16.59	21.81	27.47	34.15
	0	0	0	120	150	210	540	540	540	900	1320	1320	1380	1380	1740	1800
80	0.00	0.00	0.00	0.07	0.33	0.70	1.66	3.04	4.74	7.24	9.73	14.79	20.01	25.23	31.21	37.93
	0	0	0	120	150	210	540	900	900	1320	1320	1380	1380	1380	1740	1800
90	0.00	0.00	0.00	0.08	0.34	1.18	2.82	4.98	7.47	9.97	12.48	17.70	22.92	28.13	34.59	41.35
	0	0	0	90	210	840	900	1320	1320	1320	1380	1380	1380	1380	1740	1800
100	0.00	0.00	0.00	0.08	0.74	2.36	4.76	7.25	9.75	12.30	14.91	20.13	25.35	31.02	37.60	44.40
	0	0	30	90	840	900	1320	1320	1320	1380	1380	1380	1380	1740	1740	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.56	1.53	1.44	1.65	2.13	2.45	3.57
3	1.24	1.08	1.05	1.06	1.09	1.17	1.39
4	1.02	1.00	1.00	1.00	1.03	1.06	1.08
5	1.01	1.00	1.00	1.00	1.01	1.03	1.02
6	1.03	1.00	1.00	1.00	1.00	1.01	1.01
7	1.56	1.53	1.52	2.13	3.00	5.78	7.52
8	1.25	1.10	1.08	1.15	1.57	2.18	3.49
9	1.25	1.11	1.12	1.18	1.72	2.51	5.51
10	1.21	1.10	1.09	1.16	1.79	2.84	5.59
11	1.08	1.11	1.14	1.16	1.80	2.99	6.23
12	1.28	1.12	1.11	1.21	1.68	2.17	4.20
13	1.19	1.06	1.07	1.13	1.52	2.13	3.15
14	1.01	1.07	1.08	1.13	1.59	2.51	3.43
15	1.07	1.11	1.15	1.12	1.64	2.66	4.20
16	1.07	1.14	1.16	1.15	1.90	2.80	4.73
17	1.05	1.05	1.06	1.11	1.38	1.86	2.25
18	1.07	1.04	1.09	1.11	1.48	2.27	2.49
19	1.06	1.12	1.14	1.14	1.59	2.48	3.35
20	1.02	1.14	1.16	1.15	1.80	2.68	3.88

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	219.85	192.05	199.03	209.92	219.82	323.83	440.00
50.00	2.054	215.33	189.74	198.98	209.50	219.06	306.70	418.59
40.00	1.960	209.06	186.53	198.90	208.91	218.00	282.90	388.84
30.00	1.834	200.62	182.22	198.81	208.13	216.58	250.91	348.85
25.00	1.751	191.51	180.66	190.52	197.97	204.64	248.54	323.07
20.00	1.645	179.47	178.83	178.94	183.85	188.06	247.89	290.37
10.00	1.282	162.65	112.05	133.09	159.03	170.23	196.38	223.36
5.00	0.841	116.73	99.65	105.20	116.70	138.05	161.38	188.86
2.03	0.021	90.69	54.24	57.90	65.94	82.34	105.06	121.89

03157500 Hocking River at Enterprise, Ohio

Location: Latitude 39°33′54″, longitude 82°28′29″, Hocking County, Hydrologic Unit 05030204

Drainage area, in square miles: 459.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1931-05-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 80.

Mean annual streamflow, in inches: 13.97

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
67.00	4.20	0.61	3.07	4.19	8.45	17.20	26.16	38.49
60.00	4.09	0.63	3.27	4.69	9.35	18.29	28.45	40.43
50.00	3.90	0.67	3.61	5.52	10.85	20.09	32.24	43.64
40.00	3.68	0.72	4.03	6.54	12.68	22.30	36.89	47.57
30.00	3.38	0.80	4.56	7.88	14.37	24.76	40.77	51.60
25.00	3.20	0.85	4.89	8.77	14.76	25.92	41.05	53.08
20.00	2.97	0.91	5.39	9.61	15.12	27.68	41.34	54.45
10.00	2.25	1.06	6.30	10.64	17.89	31.55	44.71	60.30
5.15	1.53	1.24	8.20	13.28	24.10	38.83	–	–

03157500 Hocking River at Enterprise, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.02	0.11	0.34	0.58	0.87	1.21	1.55	1.92	2.37	3.29	4.21	5.24	6.27	7.30
	0	0	30	120	120	150	180	180	180	210	240	240	240	270	270	270
6	0.00	0.00	0.02	0.11	0.34	0.59	0.91	1.26	1.61	2.01	2.45	3.36	4.28	5.29	6.33	8.49
	0	0	30	90	120	150	180	180	210	210	240	240	240	270	270	600
8	0.00	0.00	0.02	0.13	0.35	0.63	0.98	1.33	1.73	2.13	2.56	3.48	4.44	5.47	7.62	9.91
	0	0	30	90	120	150	180	210	210	210	240	240	270	270	600	600
10	0.00	0.00	0.03	0.14	0.39	0.68	1.02	1.40	1.80	2.21	2.65	3.58	4.62	6.07	8.36	12.35
	0	0	30	90	150	180	180	210	210	210	240	270	270	600	600	1320
15	0.00	0.00	0.03	0.19	0.46	0.76	1.12	1.52	1.92	2.39	2.91	3.94	5.06	7.11	9.61	15.09
	0	0	30	120	150	180	210	210	210	270	270	270	300	600	660	1740
20	0.00	0.00	0.04	0.23	0.51	0.82	1.20	1.60	2.12	2.63	3.15	4.23	5.56	8.06	10.58	16.81
	0	0	60	120	150	180	210	270	270	270	270	300	600	660	660	1740
25	0.00	0.00	0.05	0.26	0.55	0.86	1.26	1.77	2.28	2.80	3.31	4.44	6.34	8.86	11.39	17.65
	0	0	60	150	150	180	210	270	270	270	270	300	660	660	660	1740
30	0.00	0.00	0.06	0.29	0.58	0.91	1.37	1.88	2.40	2.91	3.44	4.61	7.04	9.57	12.64	18.51
	0	0	90	150	150	210	270	270	270	270	300	600	660	660	1020	1740
40	0.00	0.00	0.08	0.33	0.63	1.00	1.51	2.03	2.54	3.06	3.61	5.84	8.26	11.64	15.54	20.92
	0	0	120	150	180	270	270	270	270	270	300	600	660	1020	1020	1740
50	0.00	0.00	0.10	0.36	0.69	1.09	1.59	2.11	2.62	3.62	4.65	6.94	10.48	14.35	18.25	24.17
	0	0	120	150	180	240	270	270	270	540	540	600	960	1020	1020	1740
60	0.00	0.00	0.11	0.39	0.74	1.18	1.64	2.50	3.53	4.56	5.61	9.28	12.95	17.25	22.52	27.88
	0	0	120	180	180	240	240	540	540	540	600	960	960	1380	1380	1740
70	0.00	0.00	0.12	0.44	0.79	1.25	2.25	3.28	4.31	5.91	7.75	11.42	16.03	21.30	26.58	31.86
	0	0	120	180	240	240	540	540	540	960	960	960	1380	1380	1380	1380
80	0.00	0.00	0.13	0.48	0.85	1.87	2.90	4.05	5.89	7.72	9.56	14.34	19.60	24.87	30.15	35.45
	0	0	180	180	240	540	540	960	960	960	960	1320	1380	1380	1380	1740
90	0.00	0.00	0.17	0.51	1.37	2.40	3.73	5.57	7.40	9.71	12.23	17.37	22.65	27.92	33.20	39.09
	0	0	180	180	540	540	960	960	960	1320	1320	1380	1380	1380	1380	1800
100	0.00	0.00	0.20	0.78	1.82	3.15	4.98	7.10	9.63	12.15	14.67	19.93	25.21	30.48	35.76	42.43
	0	0	180	540	540	960	960	1320	1320	1320	1320	1380	1380	1380	1380	1800

03157500 Hocking River at Enterprise, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.53	1.51	1.50	1.77	2.12	1.77	2.56
3	1.04	1.02	1.04	1.12	1.08	1.06	1.20
4	1.02	1.00	1.00	1.03	1.01	1.00	1.03
5	1.01	1.00	1.00	1.00	1.00	1.00	1.01
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.53	1.54	1.60	2.21	2.69	3.89	6.91
8	1.05	1.04	1.10	1.20	1.50	1.73	1.88
9	1.07	1.08	1.10	1.19	1.63	2.00	3.32
10	1.05	1.06	1.08	1.21	1.77	2.14	2.95
11	1.04	1.08	1.07	1.20	1.89	2.24	3.17
12	1.14	1.11	1.14	1.29	1.57	1.81	2.66
13	1.04	1.05	1.05	1.14	1.50	1.67	2.01
14	1.03	1.05	1.05	1.16	1.65	2.01	2.11
15	1.03	1.07	1.05	1.18	1.84	2.16	2.24
16	1.03	1.08	1.04	1.15	1.89	2.35	2.38
17	1.03	1.05	1.03	1.11	1.39	1.57	1.90
18	1.03	1.05	1.04	1.15	1.59	1.97	2.00
19	1.03	1.07	1.05	1.15	1.78	2.15	2.17
20	1.05	1.08	1.04	1.13	1.89	2.34	2.34

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
67.00	2.172	223.42	216.95	214.21	210.31	233.23	375.34	473.83
60.00	2.128	221.18	211.55	208.21	206.14	229.96	359.66	447.96
50.00	2.054	217.39	202.44	198.08	199.09	224.44	333.19	404.28
40.00	1.960	212.61	190.94	185.30	190.20	217.48	299.77	349.15
30.00	1.834	205.62	174.67	172.77	182.09	204.14	266.08	295.56
25.00	1.751	200.43	163.08	169.34	180.71	191.22	255.46	281.42
20.00	1.645	186.07	155.41	163.59	175.15	180.93	237.33	266.86
10.00	1.282	136.71	124.94	135.72	142.67	159.05	195.83	219.20
5.00	0.841	112.02	94.95	103.65	115.85	142.66	165.99	187.15
2.03	0.019	81.56	51.81	57.40	67.86	81.61	105.83	132.42

03159500 Hocking River at Athens, Ohio

Location: Latitude 39°19′44″, longitude 82°05′16″, Athens County, Hydrologic Unit 05030204

Drainage area, in square miles: 943.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 130.

Mean annual streamflow, in inches: 14.60

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.34	1.91	4.13	9.65	18.47	28.48	43.05
70.00	4.24	0.36	2.06	4.53	10.28	19.20	29.78	43.24
60.00	4.09	0.39	2.34	5.27	11.47	20.58	32.23	43.59
50.00	3.90	0.43	2.66	6.14	12.88	22.21	35.12	44.01
40.00	3.68	0.48	3.07	7.22	14.60	24.21	38.67	44.52
30.00	3.38	0.54	4.19	7.64	15.15	25.11	41.01	50.54
25.00	3.20	0.57	4.99	7.81	15.30	25.67	42.20	54.87
20.00	2.97	0.62	5.97	8.53	16.08	30.00	43.92	56.41
10.00	2.25	0.85	6.66	11.21	18.67	33.24	47.11	65.89
5.07	1.52	1.03	8.70	13.90	24.73	46.45	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.08	0.23	0.48	0.78	1.13	1.49	1.85	2.21	2.61	3.51	4.56	5.64	6.72	8.13
	0	0	60	120	150	150	180	180	180	180	210	240	270	270	270	600
6	0.00	0.00	0.08	0.27	0.53	0.83	1.19	1.55	1.91	2.32	2.74	3.70	4.65	5.73	6.96	9.35
	0	0	60	120	150	180	180	180	180	210	210	240	240	270	600	600
8	0.00	0.00	0.10	0.31	0.59	0.92	1.28	1.64	2.06	2.49	2.97	3.93	4.89	6.03	8.43	10.83
	0	0	90	120	150	180	180	210	210	240	240	240	240	600	600	600
10	0.00	0.00	0.12	0.34	0.64	0.98	1.34	1.75	2.17	2.65	3.13	4.09	5.12	6.93	9.33	12.23
	0	30	90	120	150	180	180	210	240	240	240	240	270	600	600	900
15	0.00	0.01	0.14	0.41	0.73	1.09	1.50	1.95	2.43	2.91	3.42	4.50	5.88	8.28	10.68	15.89
	0	30	120	150	180	180	210	240	240	240	270	270	600	600	600	1740
20	0.00	0.01	0.16	0.45	0.80	1.19	1.64	2.12	2.66	3.20	3.74	4.82	6.75	9.15	12.70	19.66
	0	30	120	150	180	210	240	270	270	270	270	270	600	600	1740	1740
25	0.00	0.01	0.18	0.50	0.86	1.28	1.81	2.34	2.88	3.42	3.96	5.10	7.43	9.83	14.84	21.80
	0	30	150	180	180	240	270	270	270	270	270	300	600	600	1740	1740
30	0.00	0.01	0.21	0.54	0.92	1.43	1.97	2.51	3.05	3.59	4.18	5.61	8.00	10.40	16.29	23.25
	0	30	150	180	210	270	270	270	270	270	300	600	600	600	1740	1740
40	0.00	0.02	0.25	0.61	1.13	1.67	2.21	2.75	3.35	3.95	4.55	6.56	8.96	11.59	18.34	25.30
	0	30	150	180	270	270	270	270	300	300	300	600	600	1020	1740	1740
50	0.00	0.02	0.30	0.75	1.28	1.82	2.38	2.98	3.59	4.25	4.96	7.35	9.80	13.75	19.94	26.89
	0	30	180	270	270	270	300	300	330	330	600	600	960	1020	1740	1740
60	0.00	0.02	0.34	0.85	1.39	1.93	2.53	3.17	3.83	4.58	5.66	8.03	11.80	15.70	21.36	28.32
	0	60	180	270	270	270	300	330	330	540	540	600	960	1020	1740	1740
70	0.00	0.03	0.41	0.94	1.48	2.04	2.69	3.35	4.12	5.20	6.28	9.78	13.62	17.91	23.43	29.67
	0	120	240	270	270	300	330	330	540	540	540	960	960	1380	1380	1740
80	0.00	0.04	0.48	1.00	1.54	2.16	2.82	3.57	4.65	5.73	7.56	11.40	15.38	20.90	26.42	31.94
	0	120	240	270	270	330	330	540	540	540	960	960	1380	1380	1380	1380
90	0.00	0.06	0.53	1.05	1.60	2.26	2.95	4.03	5.15	7.07	8.99	12.83	18.12	23.64	29.15	34.67
	0	120	240	270	330	330	540	540	960	960	960	960	1380	1380	1380	1380
100	0.00	0.10	0.58	1.09	1.68	2.34	3.34	4.57	6.41	8.33	10.24	15.06	20.58	26.10	31.61	37.13
	0	240	240	270	330	330	540	900	960	960	960	1380	1380	1380	1380	1380

03159500 Hocking River at Athens, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.03	1.00	1.00	1.00	1.35	1.79	2.50
3	1.02	1.00	1.00	1.00	1.00	1.12	1.04
4	1.01	1.00	1.00	1.00	1.00	1.03	1.01
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.03	1.00	1.00	1.19	1.83	4.31	7.93
8	1.02	1.01	1.01	1.03	1.09	1.43	1.77
9	1.03	1.01	1.00	1.05	1.21	1.58	2.47
10	1.02	1.02	1.04	1.10	1.23	1.77	2.10
11	1.02	1.02	1.06	1.19	1.25	1.95	2.26
12	1.03	1.00	1.01	1.02	1.17	1.63	2.06
13	1.02	1.01	1.01	1.05	1.19	1.47	1.73
14	1.02	1.03	1.04	1.10	1.23	1.59	1.89
15	1.02	1.02	1.06	1.19	1.25	1.83	2.07
16	1.03	1.02	1.07	1.22	1.35	2.19	2.26
17	1.02	1.01	1.01	1.06	1.19	1.45	1.61
18	1.02	1.03	1.04	1.10	1.23	1.57	1.87
19	1.02	1.03	1.06	1.20	1.24	1.76	2.05
20	1.03	1.02	1.07	1.22	1.32	2.14	2.23

03159500 Hocking River at Athens, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
76.00	2.222	340.63	333.42	323.26	316.26	317.19	338.94	432.22
70.00	2.190	332.30	319.76	310.04	305.75	314.18	338.22	423.75
60.00	2.128	316.44	293.75	284.86	285.73	308.46	336.86	407.63
50.00	2.054	297.23	262.23	254.35	261.48	301.52	335.21	388.09
40.00	1.960	272.97	222.44	215.84	230.86	292.75	333.12	363.42
30.00	1.834	263.36	209.31	203.25	219.89	268.56	332.33	356.23
25.00	1.751	259.08	205.50	200.28	216.31	250.61	329.80	352.60
20.00	1.645	235.25	188.45	194.57	202.86	223.98	290.09	308.02
10.00	1.282	196.37	161.81	158.67	158.98	177.42	208.34	231.11
5.00	0.841	167.20	107.06	112.65	132.59	148.08	173.00	183.65
2.00	0.000	131.50	80.24	80.64	87.62	96.44	111.57	130.71

03159540 Shade River near Chester, Ohio

Location: Latitude 39°03′49″, longitude 81°52′55″, Meigs County, Hydrologic Unit 05030202

Drainage area, in square miles: 156.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1965-06-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 11.

Mean annual streamflow, in inches: 15.07

Location of station used for precipitation data: Parkersburg, West Virginia

Location of station used for potential evapotranspiration data: Charleston, West Virginia

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
33.00	3.48	0.06	3.95	4.12	10.89	21.15	34.54	47.27
30.00	3.38	0.07	4.41	4.89	12.11	22.97	36.40	49.35
25.00	3.20	0.10	5.28	6.37	14.46	26.47	39.97	53.35
20.00	2.97	0.12	6.36	8.19	17.35	30.77	44.36	58.26
10.00	2.25	0.47	7.84	11.96	21.28	35.30	51.72	71.30
5.50	1.61	0.73	8.53	13.72	23.04	38.16	63.28	–

03159540 Shade River near Chester, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.03	0.10	0.34	0.62	0.93	1.24	1.61	1.98	2.35	2.73	3.10	3.86	4.80	5.79	6.78	10.58
	60	60	120	150	150	180	180	180	180	180	180	210	240	240	240	1560
6	0.03	0.10	0.34	0.62	0.93	1.24	1.61	1.98	2.35	2.73	3.10	3.89	4.80	5.79	7.46	10.58
	60	60	120	150	150	180	180	180	180	180	180	210	240	240	600	1560
8	0.03	0.10	0.34	0.62	0.93	1.25	1.62	1.99	2.40	2.83	3.26	4.13	5.00	5.86	8.26	11.78
	60	60	120	150	150	180	180	180	210	210	210	210	210	210	600	960
10	0.03	0.11	0.40	0.71	1.05	1.42	1.79	2.20	2.64	3.07	3.50	4.37	5.24	6.14	8.62	12.40
	60	90	150	150	180	180	180	210	210	210	210	210	210	600	600	960
15	0.05	0.24	0.55	0.92	1.29	1.70	2.14	2.57	3.01	3.50	4.00	4.99	5.98	7.54	10.02	14.39
	150	150	180	180	180	210	210	210	240	240	240	240	240	600	600	1320
20	0.09	0.27	0.64	1.01	1.44	1.88	2.38	2.87	3.37	3.86	4.36	5.35	7.22	9.70	12.72	18.17
	150	150	180	180	210	240	240	240	240	240	240	240	600	600	1320	1680
25	0.10	0.30	0.67	1.08	1.54	2.04	2.53	3.03	3.52	4.02	4.55	7.03	9.50	11.98	16.41	22.73
	150	180	180	210	240	240	240	240	240	240	600	600	600	600	1320	1680
30	0.10	0.31	0.70	1.13	1.61	2.11	2.60	3.10	4.08	5.32	6.55	9.03	11.51	14.46	20.16	27.09
	150	180	210	210	240	240	240	240	600	600	600	600	600	1320	1680	1680
40	0.10	0.31	0.74	1.17	1.93	3.17	4.41	5.65	6.88	8.12	9.36	12.55	16.76	21.10	28.03	34.97
	150	180	210	210	600	600	600	600	600	600	600	1020	1020	1680	1680	1680
50	0.10	0.32	0.97	2.21	3.45	4.69	5.93	7.16	8.79	10.90	13.00	17.21	21.42	27.68	34.61	41.55
	150	210	600	600	600	600	600	600	1020	1020	1020	1020	1020	1680	1680	1680
60	0.10	0.50	1.74	2.98	4.21	5.51	7.61	9.72	11.82	13.93	16.03	20.53	26.48	33.03	39.97	46.90
	150	600	600	600	600	1020	1020	1020	1020	1020	1020	1440	1440	1680	1680	1680
70	0.13	0.87	2.11	3.35	5.30	7.40	9.51	11.61	13.72	15.96	18.86	24.81	30.75	37.33	44.26	51.19
	600	600	600	600	1020	1020	1020	1020	1020	1260	1440	1440	1440	1680	1680	1680
80	0.31	1.06	2.30	4.37	6.48	8.58	10.69	13.04	16.01	18.98	21.95	27.89	33.84	40.76	47.69	54.62
	600	600	600	1020	1020	1020	1020	1440	1440	1440	1440	1440	1440	1680	1680	1680
90	0.40	1.15	2.99	5.10	7.20	9.40	12.27	15.24	18.21	21.19	24.16	30.10	36.56	43.49	50.43	57.36
	600	600	1020	1020	1020	1260	1440	1440	1440	1440	1440	1440	1680	1680	1680	1680
100	0.45	1.34	3.44	5.55	7.90	10.87	13.84	16.81	19.78	22.76	25.73	31.82	38.75	45.68	52.62	59.55
	600	1020	1020	1020	1440	1440	1440	1440	1440	1440	1440	1680	1680	1680	1680	1680

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.85	1.50	1.48	1.50	1.62	1.92	1.90
3	1.16	1.02	1.01	1.00	1.03	1.59	1.34
4	1.10	1.00	1.00	1.00	1.00	1.30	1.18
5	1.05	1.00	1.00	1.00	1.00	1.09	1.08
6	1.01	1.00	1.00	1.00	1.00	1.00	1.03
7	1.85	1.53	1.52	1.59	1.85	2.99	5.60
8	1.17	1.04	1.03	1.03	1.49	2.05	1.95
9	1.16	1.05	1.04	1.05	1.67	2.36	2.52
10	1.14	1.02	1.03	1.05	1.71	2.33	2.38
11	1.13	1.04	1.06	1.06	1.84	2.32	2.28
12	1.21	1.04	1.03	1.04	1.56	2.04	2.18
13	1.13	1.02	1.03	1.03	1.37	2.17	1.90
14	1.11	1.02	1.03	1.03	1.43	2.16	1.86
15	1.06	1.04	1.06	1.06	1.59	2.12	1.86
16	1.02	1.05	1.06	1.10	1.48	2.07	1.82
17	1.10	1.01	1.03	1.02	1.18	2.06	1.71
18	1.06	1.02	1.03	1.04	1.24	2.01	1.68
19	1.04	1.03	1.06	1.06	1.37	2.00	1.66
20	1.01	1.03	1.05	1.10	1.22	1.98	1.67

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
33.00	1.877	215.16	225.51	224.39	225.36	225.40	239.20	335.10
30.00	1.834	213.91	219.82	219.58	221.53	222.16	235.34	325.03
25.00	1.751	211.45	208.66	210.16	214.03	215.81	227.79	305.30
20.00	1.645	208.33	194.48	198.18	204.48	207.74	218.17	280.21
10.00	1.282	126.14	104.97	111.92	130.37	141.61	165.37	177.49
5.00	0.841	97.17	94.97	92.06	100.11	117.02	144.74	161.30
2.06	0.038	62.54	46.57	45.88	55.84	74.13	95.98	115.88

03201600 Sandy Run above Big Four Hollow Creek near Lake Hope, Ohio

Location: Latitude 39°21′45″, longitude 82°18′47″, Vinton County, Hydrologic Unit 05090101

Drainage area, in square miles: 0.98

Station used for record extension: 03201700

Time period of systematic or extended record analyzed: 1957-10-01 to 1983-06-30

Percentage of estimated values in extended record: 57.3

Eighty-percent-duration streamflow, in cubic feet per second: 0.1

Mean annual streamflow, in inches: 14.65

Location of station used for precipitation data: Parkersburg, West Virginia

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
26.00	3.24	0.29	4.32	6.17	16.12	30.77	42.87	58.13
25.00	3.20	0.29	4.41	6.43	16.25	30.84	42.92	58.39
20.00	2.97	0.31	4.89	7.91	16.97	31.25	43.22	59.85
10.00	2.25	0.36	6.98	11.56	18.97	32.73	48.83	65.76
5.20	1.54	0.52	8.22	12.30	21.67	39.49	54.67	–

03201600 Sandy Run above Big Four Hollow Creek near Lake Hope, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.03	0.25	0.55	0.91	1.34	1.76	2.18	2.60	3.02	3.44	4.28	5.20	6.17	7.18	9.34
	0	60	150	150	210	210	210	210	210	210	210	210	240	240	540	540
6	0.00	0.03	0.28	0.59	0.95	1.37	1.79	2.21	2.63	3.06	3.54	4.50	5.46	6.43	7.49	10.10
	0	60	150	180	180	210	210	210	210	240	240	240	240	240	270	660
8	0.00	0.03	0.32	0.66	1.03	1.45	1.87	2.29	2.74	3.22	3.70	4.67	5.63	6.70	8.32	11.38
	0	60	150	180	210	210	210	210	240	240	240	240	240	270	600	960
10	0.00	0.04	0.35	0.71	1.10	1.53	1.95	2.37	2.79	3.26	3.74	4.70	5.68	6.76	9.16	12.97
	0	120	180	180	210	210	210	210	210	240	240	240	270	270	600	960
15	0.00	0.06	0.41	0.79	1.22	1.64	2.06	2.48	2.90	3.32	3.77	4.73	6.28	8.69	11.58	17.02
	0	120	180	210	210	210	210	210	210	210	240	240	600	600	1260	1680
20	0.00	0.07	0.43	0.84	1.26	1.68	2.10	2.52	2.94	3.38	3.89	5.69	8.10	10.50	12.91	18.99
	0	120	180	210	210	210	210	210	210	240	270	600	600	600	600	1680
25	0.00	0.07	0.43	0.85	1.27	1.69	2.11	2.62	3.16	3.70	4.89	7.29	9.70	12.11	14.51	18.99
	0	150	180	210	210	210	210	270	270	270	600	600	600	600	600	1680
30	0.00	0.08	0.43	0.85	1.32	1.86	2.41	2.95	3.83	5.03	6.24	8.64	11.05	13.46	15.87	18.99
	0	150	180	210	270	270	270	270	600	600	600	600	600	600	600	1680
40	0.00	0.16	0.70	1.24	1.78	2.46	3.54	4.64	5.84	7.05	8.25	10.66	13.06	15.47	17.99	25.17
	0	270	270	270	270	540	540	600	600	600	600	600	600	600	1500	1800
50	0.06	0.38	0.93	1.51	2.59	3.68	4.76	5.94	7.15	8.35	9.55	11.96	14.37	19.64	26.86	34.08
	270	270	270	540	540	540	540	600	600	600	600	600	600	1800	1800	1800
60	0.15	0.48	1.13	2.22	3.30	4.38	5.58	6.78	7.99	9.19	10.39	13.27	20.49	27.71	34.93	42.15
	270	270	540	540	540	540	600	600	600	600	600	1800	1800	1800	1800	1800
70	0.19	0.52	1.55	2.63	3.72	4.92	6.12	7.33	8.53	9.73	12.81	20.03	27.25	34.47	41.69	48.91
	270	270	540	540	600	600	600	600	600	600	1800	1800	1800	1800	1800	1800
80	0.21	0.70	1.79	2.87	4.07	5.27	6.48	7.68	11.01	14.62	18.23	25.45	32.67	39.89	47.11	54.33
	270	540	540	540	600	600	600	600	1800	1800	1800	1800	1800	1800	1800	1800
90	0.21	0.85	1.93	3.10	4.30	5.51	8.03	11.64	15.25	18.86	22.47	29.69	36.91	44.13	51.35	58.57
	270	540	540	600	600	600	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
100	0.29	0.94	2.05	3.26	4.46	7.68	11.29	14.91	18.52	22.13	25.74	32.96	40.18	47.40	54.62	61.84
	540	540	600	600	600	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.52	1.60	1.62	1.84	2.78	4.15	6.42
3	1.12	1.01	1.00	1.02	1.04	1.22	1.31
4	1.05	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.52	1.64	1.71	2.67	3.91	8.14	11.48
8	1.12	1.02	1.02	1.07	1.20	1.66	3.50
9	1.12	1.02	1.03	1.08	1.28	2.32	4.93
10	1.09	1.02	1.02	1.07	1.12	1.54	3.84
11	1.04	1.03	1.02	1.09	1.17	1.59	3.19
12	1.13	1.08	1.20	1.39	1.51	2.89	4.87
13	1.08	1.02	1.01	1.04	1.09	1.34	2.51
14	1.03	1.02	1.01	1.05	1.11	1.39	1.73
15	1.00	1.01	1.01	1.08	1.17	1.42	1.78
16	1.00	1.01	1.04	1.07	1.17	1.42	1.81
17	1.05	1.01	1.00	1.03	1.09	1.21	1.58
18	1.00	1.01	1.01	1.07	1.12	1.25	1.67
19	1.00	1.02	1.02	1.08	1.18	1.28	1.73
20	1.00	1.02	1.03	1.07	1.17	1.33	1.77

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
26.00	1.769	263.93	244.10	237.23	230.16	235.06	247.37	261.86
25.00	1.751	262.44	242.02	235.38	229.87	234.73	246.36	260.23
20.00	1.645	253.72	229.86	224.58	228.20	232.77	240.48	250.71
10.00	1.282	218.37	195.30	196.06	204.48	207.88	219.38	227.02
5.00	0.841	156.38	132.37	138.02	160.15	171.28	189.96	203.14
2.00	0.000	100.71	60.54	68.47	79.72	98.10	113.28	136.10

03201700 Big Four Hollow Creek near Lake Hope, Ohio

Location: Latitude 39°21′48″, longitude 82°18′51″, Vinton County, Hydrologic Unit 05090101

Drainage area, in square miles: 1.01

Station used for record extension: 03201800

Time period of systematic or extended record analyzed: 1957-10-01 to 1983-06-30

Percentage of estimated values in extended record: 50.5

Eighty-percent-duration streamflow, in cubic feet per second: 0.1

Mean annual streamflow, in inches: 15.09

Location of station used for precipitation data: Parkersburg, West Virginia

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
26.00	3.24	0.10	4.17	5.91	16.14	29.48	44.48	59.48
25.00	3.20	0.10	4.26	6.11	16.14	29.59	44.51	59.67
20.00	2.97	0.12	4.76	7.25	16.17	30.21	44.65	60.78
10.00	2.25	0.19	6.37	10.23	17.88	31.89	45.94	64.33
5.20	1.54	0.37	8.00	12.22	24.64	40.40	60.71	80.91

03201700 Big Four Hollow Creek near Lake Hope, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.12	0.40	0.72	1.12	1.55	1.98	2.42	2.85	3.29	3.72	4.61	5.60	6.59	7.65	9.88
	60	120	150	180	210	210	210	210	210	210	210	240	240	240	540	540
6	0.03	0.12	0.43	0.78	1.17	1.60	2.04	2.47	2.90	3.38	3.87	4.86	5.86	6.85	8.88	11.42
	60	150	150	180	210	210	210	210	210	240	240	240	240	240	600	660
8	0.03	0.17	0.49	0.87	1.27	1.71	2.14	2.57	3.04	3.54	4.03	5.02	6.02	7.97	10.45	13.17
	60	150	180	180	210	210	210	210	240	240	240	240	240	600	600	900
10	0.03	0.19	0.55	0.92	1.35	1.79	2.22	2.65	3.09	3.57	4.07	5.06	6.10	8.23	11.57	16.65
	90	150	180	180	210	210	210	210	210	240	240	240	270	600	900	1260
15	0.06	0.24	0.61	1.03	1.46	1.90	2.33	2.76	3.20	3.63	4.11	5.13	7.07	9.63	14.77	19.97
	120	180	180	210	210	210	210	210	210	210	240	270	480	840	1260	1260
20	0.07	0.27	0.64	1.08	1.51	1.95	2.38	2.81	3.25	3.73	4.29	6.12	8.35	10.58	15.13	20.34
	120	180	210	210	210	210	210	210	210	270	270	540	540	540	1260	1260
25	0.07	0.28	0.67	1.10	1.53	1.97	2.40	2.95	3.50	4.13	5.37	7.85	10.33	12.81	15.29	20.34
	150	180	210	210	210	210	210	270	270	600	600	600	600	600	600	1260
30	0.07	0.28	0.67	1.11	1.57	2.13	2.68	3.75	4.99	6.23	7.47	9.95	12.43	14.91	17.39	20.34
	150	180	210	210	270	270	270	600	600	600	600	600	600	600	600	1260
40	0.08	0.28	0.84	1.62	2.86	4.10	5.34	6.58	7.82	9.06	10.30	12.78	15.26	17.74	22.06	28.76
	150	270	270	600	600	600	600	600	600	600	600	600	600	600	1620	1620
50	0.12	0.45	1.67	2.91	4.15	5.39	6.63	7.87	9.11	10.35	11.59	14.07	17.66	24.35	31.05	37.74
	270	270	600	600	600	600	600	600	600	600	600	600	1620	1620	1620	1620
60	0.20	0.94	2.18	3.42	4.66	5.90	7.14	8.38	9.62	10.86	12.10	18.69	25.38	32.08	38.77	45.46
	600	600	600	600	600	600	600	600	600	600	600	1620	1620	1620	1620	1620
70	0.39	1.13	2.37	3.61	4.85	6.09	7.33	8.57	11.35	14.70	18.04	24.74	31.43	38.12	44.82	51.51
	600	600	600	600	600	600	600	600	1620	1620	1620	1620	1620	1620	1620	1620
80	0.46	1.20	2.44	3.68	4.92	6.16	9.16	12.50	15.85	19.20	22.54	29.24	35.93	42.63	49.32	56.01
	600	600	600	600	600	600	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
90	0.48	1.23	2.47	3.71	5.71	9.06	12.41	15.75	19.10	22.45	25.79	32.49	39.18	45.88	52.57	59.26
	600	600	600	600	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
100	0.49	1.23	2.47	4.67	8.02	11.37	14.71	18.06	21.41	24.75	28.10	34.79	41.49	48.18	54.88	61.57
	600	600	600	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.84	1.65	1.68	2.03	2.89	4.34	6.73
3	1.15	1.02	1.00	1.03	1.05	1.22	1.39
4	1.07	1.01	1.01	1.00	1.00	1.00	1.03
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.84	1.69	1.82	2.66	4.04	8.03	11.81
8	1.15	1.02	1.02	1.06	1.20	1.88	3.82
9	1.15	1.02	1.03	1.08	1.28	2.39	5.47
10	1.11	1.01	1.03	1.06	1.12	1.59	4.28
11	1.08	1.03	1.02	1.08	1.17	1.62	3.59
12	1.18	1.12	1.25	1.38	1.50	2.94	5.23
13	1.11	1.01	1.01	1.03	1.09	1.36	2.76
14	1.05	1.02	1.02	1.05	1.11	1.44	1.77
15	1.00	1.01	1.02	1.08	1.16	1.46	1.79
16	1.00	1.00	1.04	1.09	1.19	1.50	1.80
17	1.06	1.02	1.01	1.02	1.08	1.24	1.61
18	1.00	1.00	1.01	1.06	1.11	1.31	1.69
19	1.00	1.01	1.01	1.08	1.18	1.32	1.73
20	1.00	1.01	1.03	1.10	1.19	1.40	1.76

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
26.00	1.769	261.72	244.81	237.08	230.39	235.52	249.86	262.43
25.00	1.751	260.17	242.80	235.30	230.18	235.17	248.74	260.77
20.00	1.645	251.12	231.08	224.93	228.95	233.15	242.19	251.08
10.00	1.282	215.93	197.13	197.04	205.51	208.33	220.71	227.62
5.00	0.841	161.83	135.86	141.56	158.74	170.94	191.21	205.80
2.00	0.000	100.64	65.08	75.66	93.46	102.34	115.05	130.91

03201800 Sandy Run near Lake Hope, Ohio

Location: Latitude 39°20′01″, longitude 82°19′56″, Vinton County, Hydrologic Unit 05090101

Drainage area, in square miles: 4.99

Station used for record extension: 03201700

Time period of systematic or extended record analyzed: 1957-10-01 to 1983-06-30

Percentage of estimated values in extended record: 18.4

Eighty-percent-duration streamflow, in cubic feet per second: 0.2

Mean annual streamflow, in inches: 17.30

Location of station used for precipitation data: Parkersburg, West Virginia

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
26.00	3.24	0.47	6.91	9.81	19.24	33.67	52.57	70.63
25.00	3.20	0.48	6.99	9.95	19.29	33.86	52.84	70.87
20.00	2.97	0.52	7.41	10.78	19.60	34.92	54.35	72.21
10.00	2.25	0.64	8.51	12.88	23.16	39.37	57.72	75.32
5.20	1.54	0.68	9.04	16.84	29.32	44.12	70.03	–

03201800 Sandy Run near Lake Hope, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.01	0.09	0.30	0.63	1.04	1.46	1.89	2.31	2.74	3.17	3.62	4.61	5.61	6.60	7.60	9.04
	30	90	90	150	180	180	180	180	180	180	210	210	210	210	210	600
6	0.02	0.09	0.31	0.63	1.04	1.46	1.89	2.31	2.79	3.28	3.78	4.77	5.77	6.76	8.52	11.08
	30	90	90	150	180	180	180	180	210	210	210	210	210	210	540	540
8	0.02	0.10	0.31	0.64	1.04	1.46	1.93	2.43	2.93	3.42	3.92	4.92	5.91	7.71	10.43	13.55
	30	60	120	150	180	180	210	210	210	210	210	210	210	540	660	660
10	0.02	0.10	0.35	0.64	1.07	1.49	1.98	2.48	2.98	3.47	3.97	4.97	5.96	7.95	10.70	14.51
	30	60	120	150	180	180	210	210	210	210	210	210	210	540	660	1740
15	0.03	0.11	0.39	0.71	1.14	1.56	2.01	2.51	3.00	3.50	4.00	4.99	6.14	7.95	12.13	18.09
	30	90	120	180	180	180	210	210	210	210	210	210	270	540	1020	1260
20	0.03	0.13	0.41	0.76	1.19	1.62	2.04	2.51	3.00	3.50	4.00	4.99	6.80	10.22	14.56	20.52
	30	120	120	180	180	180	180	210	210	210	210	210	480	840	1260	1260
25	0.03	0.14	0.42	0.80	1.23	1.65	2.08	2.51	3.01	3.50	4.00	5.79	8.06	11.55	16.46	22.43
	30	90	120	180	180	180	180	210	210	210	210	480	480	840	1260	1260
30	0.03	0.16	0.44	0.83	1.25	1.68	2.10	2.53	3.02	3.61	4.74	7.06	9.62	12.26	18.14	24.73
	90	90	150	180	180	180	180	180	210	480	480	540	540	840	1260	1740
40	0.05	0.18	0.50	0.86	1.28	1.71	2.77	4.05	5.33	6.61	7.89	13.43	21.67	29.91	38.16	46.40
	90	90	150	180	180	180	540	540	540	540	540	1740	1740	1740	1740	1740
50	0.07	0.19	0.55	1.19	2.47	3.75	5.24	9.36	13.48	17.61	21.73	29.97	38.21	46.45	54.70	62.94
	90	90	150	540	540	540	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
60	0.07	0.23	1.19	2.67	6.79	10.91	15.04	19.16	23.28	27.40	31.52	39.76	48.00	56.25	64.49	72.73
	90	150	540	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
70	0.08	0.59	3.65	7.78	11.90	16.02	20.14	24.26	28.38	32.50	36.62	44.87	53.11	61.35	69.59	77.83
	90	540	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
80	0.17	2.01	6.13	10.25	14.37	18.49	22.62	26.74	30.86	34.98	39.10	47.34	55.58	63.83	72.07	80.31
	540	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740
90	0.69	3.16	7.29	11.41	15.53	19.65	23.77	27.89	32.01	36.13	40.25	48.50	56.99	65.51	74.04	82.56
	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800	1800	1800
100	1.22	3.69	7.81	11.93	16.05	20.18	24.30	28.42	32.65	36.91	41.17	49.70	58.23	66.75	75.28	83.80
	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800	1800	1800	1800	1800	1800	1800

03201800 Sandy Run near Lake Hope, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.59	1.40	1.39	1.38	1.56	2.36	2.88
3	1.78	1.20	1.13	1.22	1.22	1.09	1.27
4	1.38	1.07	1.04	1.04	1.13	1.06	1.00
5	1.12	1.01	1.00	1.00	1.07	1.03	1.00
6	1.02	1.00	1.00	1.00	1.04	1.00	1.00
7	2.54	1.70	1.61	1.62	3.08	5.19	12.11
8	1.79	1.26	1.33	1.48	1.55	1.94	2.80
9	1.87	1.37	1.37	1.65	1.72	2.33	3.76
10	1.54	1.26	1.30	1.83	1.72	2.07	3.27
11	1.62	1.36	1.52	1.82	1.72	2.03	2.80
12	2.03	1.42	1.41	1.50	1.57	2.45	3.52
13	1.59	1.25	1.27	1.62	1.66	1.58	2.35
14	1.31	1.26	1.20	1.74	1.67	1.45	2.27
15	1.31	1.25	1.51	1.75	1.67	1.42	2.17
16	1.18	1.29	1.71	1.79	1.70	1.46	2.40
17	1.44	1.19	1.22	1.61	1.63	1.37	1.80
18	1.13	1.16	1.18	1.74	1.63	1.38	1.90
19	1.13	1.23	1.51	1.74	1.66	1.40	1.82
20	1.03	1.22	1.71	1.78	1.65	1.39	2.12

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
26.00	1.769	39.00	73.03	85.57	100.60	118.58	154.11	179.00
25.00	1.751	38.83	72.33	85.11	100.38	118.57	154.09	178.76
20.00	1.645	37.86	68.24	82.44	99.11	118.50	153.94	177.33
10.00	1.282	35.31	52.81	69.50	87.87	113.60	153.25	172.28
5.00	0.841	27.21	41.48	45.46	73.35	105.06	142.88	164.43
2.00	0.000	8.00	19.12	22.49	28.14	48.26	93.64	102.83

03202000 Raccoon Creek at Adamsville, Ohio

Location: Latitude 38°51′32″, longitude 82°21′43″, Gallia County, Hydrologic Unit 05090101

Drainage area, in square miles: 585.

Station used for record extension: 03159500

Time period of systematic or extended record analyzed: 1926-01-01 to 1997-09-30

Percentage of estimated values in extended record: 10.7

Eighty-percent-duration streamflow, in cubic feet per second: 49.

Mean annual streamflow, in inches: 14.88

Location of station used for precipitation data: Charleston, West Virginia

Location of station used for potential evapotranspiration data: Charleston, West Virginia

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
72.00	4.27	0.11	1.82	5.17	12.28	22.41	35.61	47.02
70.00	4.24	0.11	1.91	5.25	12.34	22.48	35.68	47.11
60.00	4.09	0.12	2.41	5.68	12.66	22.84	36.08	47.63
50.00	3.90	0.14	2.99	6.20	13.05	23.28	36.54	48.24
40.00	3.68	0.15	3.71	6.83	13.52	23.81	37.12	48.99
30.00	3.38	0.16	4.44	7.70	14.97	25.21	39.20	50.65
25.00	3.20	0.16	4.82	8.26	16.20	26.36	41.02	51.96
20.00	2.97	0.20	5.39	8.70	16.68	27.31	41.47	53.98
10.00	2.25	0.35	6.94	10.76	18.12	34.75	47.13	66.48
5.14	1.53	0.69	8.05	12.94	24.18	46.74	73.22	–

03202000 Raccoon Creek at Adamsville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.08	0.31	0.58	0.88	1.19	1.54	1.97	2.40	2.83	3.26	4.11	5.05	6.03	7.01	8.79
	30	60	120	150	150	150	210	210	210	210	210	210	240	240	240	540
6	0.01	0.09	0.32	0.61	0.92	1.22	1.65	2.08	2.50	2.93	3.36	4.28	5.26	6.24	7.67	9.86
	30	90	120	150	150	150	210	210	210	210	210	240	240	240	540	540
8	0.01	0.11	0.37	0.67	1.01	1.38	1.80	2.23	2.66	3.09	3.56	4.54	5.52	6.69	8.93	11.38
	60	90	150	150	180	180	210	210	210	210	240	240	240	540	600	600
10	0.02	0.13	0.41	0.73	1.10	1.48	1.91	2.34	2.77	3.23	3.72	4.70	5.76	7.57	10.02	14.53
	60	120	150	180	180	210	210	210	210	240	240	240	270	600	600	1260
15	0.03	0.17	0.47	0.84	1.22	1.65	2.08	2.51	3.00	3.48	4.01	5.11	6.75	9.20	13.43	18.81
	90	150	150	180	210	210	210	240	240	240	270	270	600	600	1320	1320
20	0.04	0.20	0.52	0.89	1.32	1.74	2.18	2.66	3.19	3.74	4.29	5.39	7.68	10.12	15.30	22.23
	90	150	180	210	210	210	240	240	270	270	270	270	600	600	1320	1740
25	0.04	0.21	0.55	0.95	1.38	1.81	2.29	2.84	3.39	3.94	4.49	5.85	8.30	10.95	17.19	24.27
	120	150	180	210	210	210	270	270	270	270	270	600	600	1320	1740	1740
30	0.05	0.22	0.57	0.99	1.42	1.90	2.44	2.99	3.54	4.10	4.71	6.29	8.74	11.76	18.40	25.48
	120	150	180	210	210	270	270	270	270	300	300	600	600	960	1740	1740
40	0.05	0.23	0.62	1.05	1.56	2.11	2.66	3.24	3.86	4.47	5.08	6.89	9.33	13.28	19.56	26.65
	120	150	210	210	270	270	270	300	300	300	300	600	600	1020	1740	1740
50	0.05	0.24	0.66	1.16	1.71	2.26	2.86	3.48	4.09	4.70	5.31	7.28	10.22	14.33	19.90	26.99
	120	180	210	270	270	270	300	300	300	300	300	600	960	1020	1740	1740
60	0.05	0.25	0.72	1.26	1.81	2.41	3.02	3.63	4.24	4.89	5.57	7.55	11.12	15.08	19.95	26.99
	120	210	240	270	270	300	300	300	300	330	330	600	960	1020	1680	1740
70	0.05	0.28	0.78	1.33	1.91	2.52	3.13	3.75	4.42	5.09	5.76	8.02	11.93	15.84	20.51	27.35
	120	240	270	270	300	300	300	330	330	330	330	960	960	960	1680	1680
80	0.05	0.32	0.84	1.39	2.00	2.61	3.23	3.90	4.57	5.24	6.19	8.75	12.66	16.57	21.25	27.87
	120	240	270	270	300	300	330	330	330	330	540	960	960	960	1380	1680
90	0.06	0.35	0.89	1.45	2.06	2.67	3.34	4.02	4.69	5.48	6.58	9.42	13.33	17.24	22.51	28.99
	240	240	270	300	300	300	330	330	330	540	540	960	960	960	1380	1620
100	0.08	0.37	0.92	1.50	2.11	2.76	3.44	4.11	4.78	5.83	6.93	10.16	13.95	18.13	23.79	30.38
	240	240	270	300	300	330	330	330	330	540	540	900	960	1380	1620	1620

03202000 Raccoon Creek at Adamsville, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.31	1.09	1.09	1.15	1.23	1.40	2.07
3	1.16	1.02	1.00	1.00	1.00	1.00	1.04
4	1.10	1.00	1.00	1.00	1.00	1.00	1.00
5	1.06	1.00	1.00	1.00	1.00	1.00	1.00
6	1.02	1.00	1.00	1.00	1.00	1.00	1.00
7	1.32	1.13	1.16	1.28	1.48	2.71	7.29
8	1.17	1.02	1.02	1.06	1.07	1.18	1.42
9	1.17	1.04	1.03	1.09	1.13	1.29	1.71
10	1.14	1.03	1.05	1.12	1.15	1.28	1.74
11	1.12	1.05	1.10	1.14	1.17	1.31	1.86
12	1.19	1.03	1.02	1.05	1.09	1.23	1.67
13	1.14	1.03	1.03	1.09	1.13	1.12	1.39
14	1.11	1.03	1.05	1.12	1.15	1.15	1.50
15	1.08	1.05	1.10	1.14	1.18	1.21	1.64
16	1.06	1.04	1.13	1.17	1.18	1.30	2.09
17	1.11	1.03	1.03	1.09	1.13	1.12	1.34
18	1.08	1.03	1.05	1.12	1.15	1.14	1.45
19	1.04	1.05	1.10	1.14	1.19	1.17	1.65
20	1.03	1.04	1.13	1.17	1.18	1.30	2.11

03202000 Raccoon Creek at Adamsville, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
72.00	2.201	253.34	280.41	282.79	285.48	294.18	309.09	317.88
70.00	2.190	252.71	278.30	280.50	283.32	291.92	306.79	316.65
60.00	2.128	249.24	266.65	267.87	271.37	279.44	294.07	309.85
50.00	2.054	245.04	252.53	252.56	256.89	264.32	278.66	301.61
40.00	1.960	239.73	234.71	233.23	238.61	245.24	259.21	291.21
30.00	1.834	232.08	218.94	223.37	225.05	231.71	247.55	275.15
25.00	1.751	226.83	211.58	222.88	220.21	227.30	245.25	263.77
20.00	1.645	220.95	208.59	208.82	212.33	223.83	243.96	260.99
10.00	1.282	175.48	175.51	177.38	174.29	182.50	209.86	229.11
5.00	0.841	138.47	130.62	138.03	146.83	148.82	174.33	184.90
2.00	0.000	88.57	72.82	71.35	80.43	94.90	123.06	132.74

03217500 Scioto River at Larue, Ohio

Location: Latitude 40°34′28″, longitude 83°23′15″, Marion County, Hydrologic Unit 05060001

Drainage area, in square miles: 257.

Station used for record extension: 03265000

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 70.7

Eighty-percent-duration streamflow, in cubic feet per second: 12.

Mean annual streamflow, in inches: 12.20

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Fort Wayne, Indiana

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.14	1.90	3.38	6.75	14.56	22.18	29.52
70.00	4.24	0.14	1.93	3.44	7.02	15.08	22.87	30.30
60.00	4.09	0.14	1.97	3.56	7.53	16.06	24.17	31.77
50.00	3.90	0.15	2.03	3.70	8.13	17.22	25.71	33.51
40.00	3.68	0.15	2.10	3.87	8.87	18.64	27.60	35.65
30.00	3.38	0.17	2.14	4.13	9.55	19.27	28.79	36.61
25.00	3.20	0.19	2.16	4.30	9.94	19.50	29.36	36.97
20.00	2.97	0.20	2.26	4.54	10.33	19.59	29.64	37.41
10.00	2.25	0.28	3.70	5.68	11.72	24.71	41.08	54.43
5.07	1.52	0.43	5.99	11.66	18.86	37.93	–	–

03217500 Scioto River at Larue, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.04	0.22	0.46	0.76	1.06	1.36	1.69	2.05	2.40	2.75	3.45	4.21	5.15	6.15	7.15
	0	90	120	180	180	180	180	210	210	210	210	210	240	300	300	300
6	0.00	0.05	0.24	0.51	0.82	1.14	1.49	1.84	2.19	2.57	2.97	3.81	4.71	5.63	7.25	9.11
	30	90	150	180	180	210	210	210	210	240	240	270	270	300	540	600
8	0.00	0.06	0.28	0.59	0.94	1.29	1.68	2.08	2.50	2.95	3.40	4.30	5.71	7.52	9.46	11.46
	30	90	180	210	210	210	240	240	270	270	270	270	540	540	600	600
10	0.00	0.07	0.33	0.66	1.02	1.42	1.82	2.25	2.70	3.15	3.60	4.87	6.67	8.67	10.68	12.78
	30	120	180	210	240	240	240	270	270	270	270	540	540	600	600	960
15	0.00	0.09	0.39	0.75	1.15	1.55	2.00	2.45	2.90	3.37	4.08	6.08	8.08	10.09	12.57	16.70
	30	150	210	240	240	240	270	270	270	300	540	600	600	600	960	1680
20	0.00	0.11	0.43	0.80	1.20	1.62	2.07	2.54	3.04	3.70	4.70	6.70	8.71	10.75	15.04	20.65
	30	180	210	240	240	270	270	300	300	600	600	600	600	960	1680	1680
25	0.00	0.13	0.45	0.83	1.23	1.66	2.13	2.64	3.14	4.04	5.05	7.05	9.06	11.64	17.24	22.85
	30	180	210	240	240	270	300	300	300	600	600	600	600	960	1680	1680
30	0.00	0.14	0.47	0.85	1.25	1.69	2.19	2.69	3.26	4.26	5.26	7.27	9.27	13.03	18.72	24.53
	30	180	210	240	240	300	300	300	600	600	600	600	600	1680	1740	1740
40	0.01	0.15	0.49	0.88	1.28	1.75	2.25	2.75	3.51	4.51	5.52	7.52	10.30	15.00	20.81	26.62
	30	180	210	240	240	300	300	300	600	600	600	600	960	1740	1740	1740
50	0.01	0.16	0.51	0.91	1.31	1.77	2.27	2.77	3.66	4.66	5.66	8.11	11.32	16.15	21.97	27.96
	30	180	240	240	270	300	300	300	600	600	600	960	960	1740	1740	1800
60	0.01	0.16	0.53	0.93	1.35	1.80	2.28	2.78	3.75	4.75	5.83	9.03	12.24	17.04	23.05	29.07
	30	180	240	240	270	270	300	300	600	600	960	960	960	1800	1800	1800
70	0.01	0.17	0.56	0.96	1.39	1.84	2.29	2.87	3.86	5.07	6.67	9.88	13.18	17.87	23.88	29.90
	30	210	240	240	270	270	270	540	660	960	960	960	1320	1800	1800	1800
80	0.01	0.18	0.58	0.98	1.42	1.87	2.32	3.15	4.26	5.85	7.45	10.66	14.53	18.94	24.54	30.55
	60	240	240	240	270	270	270	660	660	960	960	960	1320	1320	1800	1800
90	0.01	0.20	0.60	1.00	1.45	1.90	2.42	3.52	4.96	6.56	8.16	11.39	15.80	20.21	25.07	31.08
	120	240	240	270	270	270	660	660	960	960	960	1320	1320	1320	1800	1800
100	0.01	0.21	0.62	1.03	1.48	1.93	2.75	4.00	5.61	7.21	8.82	12.58	16.99	21.40	25.81	31.53
	120	240	240	270	270	270	660	960	960	960	960	1320	1320	1320	1320	1800

03217500 Scioto River at Larue, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.26	1.18	1.37	1.62	2.15	14.60	25.85
3	1.08	1.03	1.00	1.00	1.00	1.35	1.60
4	1.05	1.00	1.00	1.00	1.00	1.11	1.18
5	1.04	1.00	1.00	1.00	1.00	1.00	1.04
6	1.01	1.00	1.00	1.00	1.00	1.00	1.01
7	1.26	1.52	1.72	2.16	14.80	49.16	52.00
8	1.10	1.06	1.09	1.10	1.35	2.86	9.67
9	1.08	1.08	1.11	1.14	1.44	3.91	20.49
10	1.12	1.09	1.18	1.16	1.37	3.27	9.30
11	1.14	1.12	1.22	1.17	1.30	2.87	6.65
12	1.11	1.07	1.06	1.17	1.50	4.29	20.32
13	1.06	1.06	1.09	1.13	1.19	2.32	3.53
14	1.10	1.08	1.16	1.16	1.12	2.33	3.19
15	1.10	1.13	1.21	1.18	1.17	2.40	3.07
16	1.08	1.11	1.20	1.20	1.20	2.46	3.09
17	1.06	1.05	1.09	1.14	1.09	2.09	2.69
18	1.07	1.08	1.15	1.16	1.10	2.09	2.43
19	1.06	1.12	1.21	1.19	1.15	2.21	2.47
20	1.08	1.10	1.20	1.19	1.20	2.32	2.59

03217500 Scioto River at Larue, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
76.00	2.222	247.04	245.32	255.54	272.13	287.97	294.16	382.35
70.00	2.190	244.30	242.78	251.86	271.40	286.11	292.26	379.28
60.00	2.128	239.07	237.95	244.85	270.02	282.58	288.66	373.43
50.00	2.054	232.74	232.10	236.35	268.34	278.29	284.28	366.34
40.00	1.960	224.74	224.71	225.63	266.23	272.88	278.76	357.40
30.00	1.834	217.33	222.01	219.76	245.82	257.68	275.73	344.52
25.00	1.751	212.97	220.01	216.75	230.81	247.24	274.10	335.25
20.00	1.645	208.64	197.93	207.76	226.26	245.16	268.27	313.14
10.00	1.282	177.14	166.07	178.14	195.63	212.35	246.51	281.57
5.00	0.841	134.76	119.62	126.34	142.34	165.52	192.41	242.30
2.00	0.000	82.52	66.39	72.05	91.75	111.63	138.12	154.38

03218000 Little Scioto River above Marion, Ohio

Location: Latitude 40°37′43″, longitude 83°10′11″, Marion County, Hydrologic Unit 05060001

Drainage area, in square miles: 72.4

Station used for record extension: 03223000

Time period of systematic or extended record analyzed: 1938-10-01 to 1997-09-30

Percentage of estimated values in extended record: 44.1

Eighty-percent-duration streamflow, in cubic feet per second: 0.6

Mean annual streamflow, in inches: 10.49

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
60.00	4.09	0.01	1.73	3.50	5.49	12.41	18.52	24.14
50.00	3.90	0.01	1.93	3.96	6.12	13.19	20.23	26.21
40.00	3.68	0.02	2.18	4.52	6.89	14.16	22.32	28.75
30.00	3.38	0.02	2.50	5.25	7.88	15.40	25.03	32.04
25.00	3.20	0.02	2.63	5.38	8.74	16.81	25.93	35.11
20.00	2.97	0.02	2.79	5.54	9.79	18.55	27.03	38.89
10.00	2.25	0.07	3.32	6.99	10.79	23.65	34.51	46.05
5.45	1.60	0.13	4.22	9.67	17.43	30.11	49.66	–

03218000 Little Scioto River above Marion, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.03	0.16	0.39	0.65	0.91	1.17	1.45	1.80	2.14	2.49	2.85	3.63	4.40	5.18	5.95	6.73
	90	120	180	180	180	180	240	240	240	240	270	270	270	270	270	270
6	0.04	0.16	0.39	0.65	0.91	1.20	1.51	1.85	2.19	2.54	2.90	3.67	4.45	5.22	6.04	6.97
	90	120	180	180	180	210	210	240	240	240	270	270	270	270	300	600
8	0.05	0.17	0.41	0.70	1.00	1.30	1.61	1.96	2.30	2.65	3.01	3.78	4.64	5.54	7.26	8.98
	120	150	180	210	210	210	240	240	240	240	270	300	300	600	600	600
10	0.06	0.18	0.45	0.75	1.05	1.35	1.70	2.04	2.39	2.73	3.13	3.99	4.85	6.41	8.13	9.85
	120	150	210	210	210	240	240	240	240	240	300	300	300	600	600	600
15	0.08	0.22	0.51	0.81	1.14	1.49	1.83	2.18	2.55	2.98	3.41	4.27	5.55	7.27	9.16	12.31
	150	180	210	210	240	240	240	240	300	300	300	300	600	600	660	1380
20	0.08	0.23	0.53	0.86	1.21	1.55	1.90	2.26	2.69	3.12	3.55	4.42	6.13	8.21	10.95	15.15
	150	180	210	240	240	240	240	300	300	300	300	300	660	900	960	1740
25	0.08	0.24	0.55	0.90	1.24	1.59	1.93	2.35	2.78	3.21	3.64	4.79	6.95	9.70	12.57	17.54
	150	210	240	240	240	240	240	300	300	300	300	660	960	960	1680	1740
30	0.08	0.25	0.57	0.92	1.26	1.61	1.98	2.40	2.83	3.27	3.70	5.35	8.11	10.87	14.59	19.46
	150	210	240	240	240	240	270	300	300	300	300	960	960	960	1680	1740
40	0.09	0.26	0.60	0.94	1.29	1.66	2.05	2.47	2.90	3.33	4.32	7.08	9.83	12.71	17.58	22.58
	180	210	240	240	240	270	270	300	300	300	960	960	960	1680	1740	1740
50	0.09	0.27	0.61	0.95	1.31	1.70	2.09	2.51	2.98	4.17	5.55	8.30	11.06	15.17	20.16	25.16
	180	210	240	240	270	270	270	300	660	960	960	960	960	1740	1740	1740
60	0.09	0.27	0.61	0.95	1.34	1.73	2.11	2.64	3.72	5.10	6.48	9.28	13.24	17.40	22.54	27.71
	180	210	240	240	270	270	270	660	960	960	960	1380	1380	1740	1800	1800
70	0.09	0.27	0.61	0.97	1.36	1.75	2.21	3.15	4.46	5.84	7.25	11.19	15.15	20.01	25.18	30.35
	210	210	240	270	270	270	660	660	960	960	1020	1380	1380	1800	1800	1800
80	0.10	0.27	0.61	0.98	1.37	1.76	2.65	3.69	5.13	6.90	8.89	12.85	17.23	22.40	27.57	32.74
	210	210	240	270	270	270	660	960	1020	1380	1380	1380	1800	1800	1800	1800
90	0.10	0.28	0.61	0.99	1.38	2.09	3.04	4.37	6.36	8.34	10.32	14.28	19.38	24.55	29.72	34.89
	210	210	240	270	270	660	660	1380	1380	1380	1380	1380	1800	1800	1800	1800
100	0.10	0.28	0.61	1.00	1.47	2.42	3.63	5.61	7.59	9.57	11.56	16.12	21.29	26.46	31.63	36.80
	210	210	270	270	660	660	1380	1380	1380	1380	1380	1800	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.04	1.26	1.33	1.74	2.39	4.94	7.88
3	1.00	1.00	1.00	1.00	1.00	1.50	2.04
4	1.00	1.00	1.00	1.00	1.00	1.00	1.34
5	1.00	1.00	1.00	1.00	1.00	1.00	1.14
6	1.00	1.00	1.00	1.00	1.00	1.00	1.06
7	1.10	1.42	1.62	2.69	4.27	12.21	22.88
8	1.05	1.05	1.06	1.15	1.29	2.71	4.32
9	1.09	1.11	1.10	1.22	1.43	3.15	6.31
10	1.06	1.15	1.13	1.24	1.31	2.81	4.73
11	1.11	1.21	1.20	1.27	1.39	2.61	3.61
12	1.05	1.04	1.06	1.14	1.77	3.02	6.35
13	1.08	1.14	1.09	1.21	1.14	2.26	2.86
14	1.06	1.15	1.14	1.24	1.16	2.23	2.75
15	1.10	1.20	1.21	1.27	1.18	2.27	2.79
16	1.12	1.21	1.23	1.29	1.25	2.31	2.72
17	1.07	1.14	1.11	1.22	1.14	1.94	2.52
18	1.07	1.15	1.12	1.25	1.17	1.96	2.48
19	1.10	1.20	1.21	1.27	1.19	2.05	2.56
20	1.12	1.21	1.23	1.29	1.25	2.13	2.59

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
60.00	2.128	260.20	226.53	234.75	239.19	262.38	277.69	317.74
50.00	2.054	255.02	223.99	230.32	239.14	258.91	276.32	310.79
40.00	1.960	248.48	220.78	224.73	239.07	254.52	274.59	302.01
30.00	1.834	239.69	216.47	217.21	238.98	248.63	272.26	290.21
25.00	1.751	237.92	214.24	210.97	227.72	247.16	263.10	288.30
20.00	1.645	235.66	211.41	203.04	213.40	245.30	251.45	285.86
10.00	1.282	164.73	149.05	152.72	175.90	201.48	226.45	242.58
5.00	0.841	150.16	110.31	121.99	150.05	168.25	195.61	207.65
2.00	0.000	113.79	55.84	59.46	75.05	94.51	122.46	133.75

03219500 Scioto River near Prospect, Ohio

Location: Latitude 40°25′10″, longitude 83°11′50″, Delaware County, Hydrologic Unit 05060001

Drainage area, in square miles: 567.

Station used for record extension: none

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 29.

Mean annual streamflow, in inches: 11.08

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.16	1.96	3.41	7.51	14.83	21.89	27.28
50.00	3.90	0.17	2.16	3.90	8.18	16.06	23.08	29.12
40.00	3.68	0.18	2.44	4.55	9.08	17.72	24.68	31.62
30.00	3.38	0.19	2.80	5.40	10.25	19.87	26.76	34.84
25.00	3.20	0.19	2.86	5.76	10.34	20.36	27.27	35.26
20.00	2.97	0.20	2.92	6.17	10.37	20.84	27.80	35.57
10.00	2.25	0.30	3.64	6.70	11.37	25.01	39.63	47.69
5.36	1.58	0.38	4.31	8.68	16.84	31.38	–	–

03219500 Scioto River near Prospect, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.03	0.19	0.42	0.68	0.96	1.23	1.55	1.91	2.28	2.64	3.37	4.17	4.99	6.22	7.86
	0	60	150	150	180	180	180	240	240	240	240	240	270	270	540	540
6	0.00	0.03	0.22	0.46	0.73	1.00	1.31	1.67	2.04	2.40	2.76	3.56	4.38	5.26	6.56	8.48
	0	60	150	180	180	180	210	240	240	240	240	270	270	300	540	660
8	0.00	0.04	0.24	0.51	0.80	1.12	1.46	1.83	2.19	2.57	2.98	3.81	4.72	5.67	7.49	9.47
	0	90	150	180	210	210	240	240	240	270	270	300	300	600	600	660
10	0.00	0.04	0.27	0.55	0.87	1.19	1.56	1.92	2.31	2.72	3.13	4.03	4.94	6.32	8.14	10.14
	0	90	180	210	210	240	240	240	270	270	270	300	300	600	600	660
15	0.00	0.06	0.32	0.64	0.96	1.33	1.69	2.08	2.49	2.95	3.40	4.32	5.55	7.37	9.34	14.24
	0	150	210	210	240	240	240	270	300	300	300	300	600	600	900	1740
20	0.00	0.07	0.36	0.68	1.03	1.40	1.77	2.18	2.64	3.09	3.55	4.46	6.20	8.20	13.00	18.28
	0	150	210	210	240	240	270	300	300	300	300	300	600	900	1740	1740
25	0.00	0.08	0.39	0.72	1.08	1.44	1.82	2.27	2.72	3.18	3.63	4.84	6.66	10.21	15.49	20.77
	0	180	210	240	240	240	270	300	300	300	300	600	600	1740	1740	1740
30	0.00	0.09	0.40	0.75	1.11	1.48	1.87	2.33	2.78	3.24	3.69	5.19	7.46	11.91	17.19	22.47
	30	180	210	240	240	240	300	300	300	300	300	600	900	1740	1740	1740
40	0.00	0.10	0.43	0.79	1.16	1.52	1.94	2.40	2.85	3.31	3.88	6.12	9.04	14.08	19.35	24.63
	30	210	240	240	240	240	300	300	300	300	600	960	960	1740	1740	1740
50	0.00	0.11	0.46	0.82	1.18	1.55	1.98	2.44	2.89	3.47	4.45	7.36	10.61	15.37	20.65	25.93
	30	210	240	240	240	240	300	300	330	540	960	960	1380	1740	1740	1740
60	0.00	0.12	0.48	0.84	1.20	1.57	2.01	2.48	2.98	3.95	5.40	8.31	11.98	16.22	21.50	26.78
	30	210	240	240	240	240	300	330	330	960	960	960	1380	1680	1740	1740
70	0.00	0.13	0.49	0.85	1.22	1.58	2.05	2.55	3.25	4.71	6.17	9.08	13.08	17.27	22.24	27.36
	30	240	240	240	240	240	330	330	960	960	960	960	1380	1380	1680	1740
80	0.00	0.14	0.50	0.87	1.23	1.61	2.11	2.64	3.88	5.34	6.80	9.79	13.98	18.17	22.96	28.06
	30	240	240	240	240	330	330	540	960	960	960	1380	1380	1380	1680	1680
90	0.00	0.15	0.51	0.88	1.24	1.65	2.15	2.96	4.41	5.87	7.33	10.55	14.74	18.92	23.55	28.64
	30	240	240	240	240	330	330	960	960	960	960	1380	1380	1380	1680	1680
100	0.00	0.16	0.52	0.88	1.25	1.69	2.19	3.41	4.87	6.32	7.78	11.20	15.39	19.57	24.04	29.14
	30	240	240	240	240	330	330	960	960	960	1020	1380	1380	1380	1680	1680

03219500 Scioto River near Prospect, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.33	1.18	1.31	1.59	2.09	5.28	10.26
3	1.11	1.00	1.00	1.00	1.00	1.25	1.77
4	1.06	1.00	1.00	1.00	1.00	1.00	1.10
5	1.02	1.00	1.00	1.00	1.00	1.00	1.02
6	1.01	1.00	1.00	1.00	1.00	1.00	1.00
7	1.34	1.36	1.54	2.16	4.99	16.58	24.67
8	1.13	1.02	1.01	1.08	1.24	2.35	4.84
9	1.13	1.01	1.04	1.08	1.47	2.78	6.68
10	1.13	1.04	1.06	1.12	1.35	2.39	4.71
11	1.13	1.05	1.05	1.15	1.30	2.27	3.58
12	1.13	1.01	1.01	1.06	1.66	3.65	7.05
13	1.10	1.01	1.03	1.08	1.15	1.93	2.58
14	1.09	1.05	1.06	1.12	1.22	1.82	2.52
15	1.12	1.05	1.05	1.16	1.30	1.87	2.52
16	1.10	1.07	1.06	1.16	1.34	1.92	2.64
17	1.08	1.01	1.03	1.08	1.15	1.59	2.26
18	1.08	1.05	1.06	1.12	1.22	1.55	2.20
19	1.11	1.05	1.05	1.17	1.28	1.66	2.33
20	1.08	1.06	1.06	1.16	1.34	1.73	2.53

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	269.45	273.67	268.80	266.12	278.21	297.25	337.42
50.00	2.054	269.09	271.60	266.94	264.63	275.91	291.26	332.76
40.00	1.960	268.60	268.73	264.36	262.55	272.71	282.95	326.28
30.00	1.834	267.93	264.86	260.90	259.76	268.42	271.77	317.58
25.00	1.751	256.69	249.17	249.57	250.50	257.72	268.48	303.68
20.00	1.645	241.02	227.55	234.04	237.79	243.13	264.81	284.97
10.00	1.282	180.44	173.45	174.58	180.73	204.55	232.52	258.50
5.00	0.841	157.60	143.01	146.95	161.05	171.00	199.07	227.11
2.03	0.021	102.42	82.03	85.23	88.68	114.15	139.52	156.74

03219590 Bokes Creek near Warrensburg, Ohio

Location: Latitude 40°19′20″, longitude 83°10′30″, Delaware County, Hydrologic Unit 05060001

Drainage area, in square miles: 83.2

Station used for record extension: 03220000

Time period of systematic or extended record analyzed: 1943-10-01 to 1997-09-30

Percentage of estimated values in extended record: 71.5

Eighty-percent-duration streamflow, in cubic feet per second: 1.3

Mean annual streamflow, in inches: 10.84

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
55.00	4.00	–	1.01	4.00	7.31	15.05	22.34	29.83
50.00	3.90	–	1.18	4.11	7.35	15.55	22.69	29.95
40.00	3.68	–	1.57	4.36	7.43	16.73	23.50	30.22
30.00	3.38	0.01	2.08	4.69	7.55	18.26	24.55	30.57
25.00	3.20	0.01	2.30	4.89	8.16	19.03	25.31	33.40
20.00	2.97	0.01	2.43	5.12	9.52	19.77	26.34	39.78
10.00	2.25	0.06	2.87	6.14	11.38	23.07	36.76	46.75
5.50	1.61	0.11	4.44	8.64	14.89	29.27	56.66	–

03219590 Bokes Creek near Warrensburg, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.07	0.20	0.46	0.77	1.08	1.39	1.71	2.02	2.33	2.64	2.95	3.75	4.55	5.35	6.16	7.23
	150	150	210	210	210	210	210	210	210	210	210	270	270	270	270	540
6	0.07	0.20	0.46	0.77	1.08	1.39	1.71	2.02	2.33	2.64	3.00	3.80	4.61	5.41	6.69	8.29
	150	150	210	210	210	210	210	210	210	210	270	270	270	270	540	540
8	0.07	0.20	0.46	0.77	1.08	1.43	1.78	2.14	2.50	2.85	3.21	4.06	4.95	6.27	8.05	9.83
	120	150	210	210	210	240	240	240	240	240	240	300	300	600	600	600
10	0.08	0.21	0.48	0.82	1.18	1.54	1.89	2.25	2.60	3.03	3.47	4.36	5.25	6.94	8.72	11.42
	150	150	180	240	240	240	240	240	240	300	300	300	300	600	600	1320
15	0.09	0.25	0.56	0.92	1.27	1.63	2.04	2.48	2.93	3.37	3.82	4.71	5.75	7.70	10.83	14.75
	150	210	240	240	240	240	300	300	300	300	300	300	600	660	1320	1320
20	0.10	0.28	0.60	0.96	1.32	1.74	2.18	2.63	3.09	3.58	4.07	5.05	6.38	8.54	12.20	17.14
	210	210	240	240	240	300	300	300	330	330	330	330	660	1020	1320	1680
25	0.11	0.30	0.63	0.99	1.36	1.81	2.29	2.77	3.26	3.75	4.24	5.22	6.80	9.71	14.44	19.43
	210	210	240	240	300	300	330	330	330	330	330	330	660	1020	1680	1680
30	0.11	0.30	0.65	1.01	1.40	1.88	2.37	2.86	3.35	3.84	4.33	5.31	7.56	10.92	15.91	20.89
	210	210	240	240	300	330	330	330	330	330	330	330	1020	1680	1680	1680
40	0.12	0.32	0.68	1.04	1.44	1.92	2.41	2.90	3.39	3.88	4.37	5.85	8.84	12.64	17.46	22.64
	210	240	240	270	270	330	330	330	330	330	330	960	1020	1380	1680	1800
50	0.12	0.34	0.69	1.06	1.46	1.92	2.41	2.90	3.39	3.88	4.37	6.99	10.17	14.26	18.36	23.67
	240	240	240	270	270	330	330	330	330	330	330	960	1380	1380	1380	1800
60	0.13	0.35	0.70	1.07	1.47	1.92	2.41	2.90	3.43	3.97	5.14	7.99	11.62	15.65	19.75	24.21
	240	240	240	270	270	330	330	360	360	360	960	960	1320	1380	1380	1800
70	0.14	0.35	0.71	1.07	1.56	2.10	2.63	3.17	3.70	4.60	6.20	9.94	13.68	17.41	21.16	25.08
	240	240	240	270	360	360	360	360	360	960	1260	1260	1260	1260	1320	1320
80	0.14	0.35	0.71	1.22	1.75	2.28	2.82	3.35	4.32	6.18	8.05	11.79	15.53	19.27	23.01	26.74
	240	240	240	360	360	360	360	360	1260	1260	1260	1260	1260	1260	1260	1260
90	0.14	0.35	0.81	1.34	1.88	2.41	2.95	4.07	5.94	7.80	9.67	13.41	17.15	20.89	24.63	28.36
	240	240	360	360	360	360	360	1260	1260	1260	1260	1260	1260	1260	1260	1260
100	0.14	0.36	0.90	1.43	1.96	2.50	3.59	5.46	7.33	9.20	11.07	14.81	18.55	22.28	26.02	29.76
	240	360	360	360	360	360	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.75	1.58	1.76	2.15	3.14	6.80	9.84
3	1.01	1.00	1.00	1.00	1.10	1.66	2.19
4	1.00	1.00	1.00	1.00	1.00	1.16	1.40
5	1.00	1.00	1.00	1.00	1.00	1.00	1.18
6	1.02	1.00	1.00	1.00	1.00	1.00	1.03
7	1.87	1.81	2.03	2.67	6.49	12.96	20.14
8	1.02	1.03	1.01	1.04	1.57	2.65	6.58
9	1.02	1.03	1.03	1.12	1.85	3.24	8.95
10	1.02	1.04	1.03	1.07	1.68	2.42	7.16
11	1.02	1.06	1.06	1.11	1.51	2.13	5.98
12	1.06	1.02	1.04	1.32	2.05	4.39	8.86
13	1.02	1.02	1.03	1.02	1.42	1.96	4.01
14	1.00	1.03	1.04	1.05	1.32	1.80	2.65
15	1.06	1.06	1.03	1.09	1.23	1.68	2.63
16	1.08	1.07	1.05	1.15	1.25	1.74	2.61
17	1.00	1.03	1.03	1.02	1.15	1.71	2.33
18	1.03	1.03	1.03	1.05	1.17	1.60	2.22
19	1.05	1.06	1.04	1.08	1.22	1.44	2.22
20	1.09	1.06	1.04	1.17	1.24	1.46	2.31

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
55.00	2.093	308.89	286.97	280.31	270.72	279.28	293.93	311.16
50.00	2.054	306.17	282.23	277.22	269.05	276.46	292.70	310.08
40.00	1.960	299.65	270.87	269.80	265.06	269.70	289.74	307.50
30.00	1.834	290.89	255.60	259.84	259.69	260.62	285.76	304.03
25.00	1.751	285.63	245.61	249.69	253.96	256.44	279.07	301.51
20.00	1.645	279.53	233.02	232.71	244.19	253.20	265.90	298.06
10.00	1.282	238.38	192.27	193.08	200.45	215.08	253.75	261.68
5.00	0.841	215.48	162.96	163.96	161.70	170.61	207.28	227.52
2.04	0.023	164.74	96.87	100.69	116.44	121.62	144.56	153.52

03220000 Mill Creek near Bellepoint, Ohio

Location: Latitude 40°14′54″, longitude 83°10′26″, Delaware County, Hydrologic Unit 05060001

Drainage area, in square miles: 178.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1943-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 7.0

Mean annual streamflow, in inches: 12.28

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
55.00	4.00	0.09	1.94	4.60	8.14	17.16	25.30	33.68
50.00	3.90	0.09	2.02	4.74	8.26	17.83	25.80	33.96
40.00	3.68	0.09	2.20	5.05	8.54	19.41	26.96	34.60
30.00	3.38	0.09	2.44	5.47	8.90	21.44	28.46	35.44
25.00	3.20	0.11	2.60	5.97	9.62	22.17	29.36	38.42
20.00	2.97	0.15	2.82	6.85	11.05	22.44	30.41	44.82
10.00	2.25	0.20	3.38	7.49	13.42	26.67	39.75	55.08
5.50	1.61	0.29	4.88	9.95	18.50	36.19	64.04	–

03220000 Mill Creek near Bellepoint, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.01	0.09	0.34	0.68	1.04	1.39	1.74	2.10	2.45	2.80	3.16	3.87	4.78	5.69	6.59	7.52
	30	120	180	210	210	210	210	210	210	210	210	270	270	270	270	540
6	0.01	0.10	0.34	0.68	1.04	1.39	1.74	2.10	2.45	2.80	3.22	4.12	5.03	5.94	6.87	8.68
	30	120	180	210	210	210	210	210	210	210	270	270	270	270	540	540
8	0.02	0.11	0.37	0.68	1.04	1.40	1.80	2.21	2.61	3.03	3.54	4.55	5.56	6.56	8.39	10.40
	60	120	180	210	210	240	240	240	240	300	300	300	300	300	600	600
10	0.02	0.13	0.40	0.72	1.12	1.52	1.93	2.33	2.84	3.34	3.84	4.85	5.86	7.25	9.32	11.54
	60	150	180	240	240	240	240	300	300	300	300	300	300	600	660	660
15	0.03	0.16	0.45	0.84	1.25	1.65	2.11	2.61	3.12	3.62	4.13	5.14	6.29	8.51	10.81	15.20
	90	150	180	240	240	240	300	300	300	300	300	300	660	660	960	1440
20	0.03	0.18	0.50	0.90	1.30	1.71	2.21	2.71	3.22	3.78	4.33	5.44	6.99	9.47	12.87	18.52
	120	150	210	240	240	300	300	300	330	330	330	330	660	960	1680	1680
25	0.04	0.19	0.54	0.93	1.34	1.76	2.31	2.87	3.42	3.98	4.53	5.64	7.61	10.84	15.92	21.57
	150	180	210	240	240	300	330	330	330	330	330	330	960	960	1680	1680
30	0.04	0.21	0.56	0.96	1.36	1.87	2.42	2.98	3.53	4.09	4.64	5.75	8.67	12.21	17.86	23.51
	150	210	210	240	240	330	330	330	330	330	330	330	960	1680	1680	1680
40	0.05	0.23	0.60	1.00	1.41	1.96	2.52	3.07	3.63	4.18	4.74	7.01	10.24	14.16	19.90	25.95
	150	210	240	240	240	330	330	330	330	330	330	960	960	1680	1800	1800
50	0.05	0.24	0.63	1.04	1.47	1.96	2.52	3.07	3.63	4.18	4.91	8.14	11.36	15.78	20.97	27.02
	150	210	240	240	270	330	330	330	330	330	960	960	960	1380	1800	1800
60	0.05	0.26	0.66	1.07	1.53	1.98	2.52	3.07	3.63	4.18	5.77	9.21	13.86	18.50	23.14	27.78
	150	240	240	270	270	270	330	330	330	330	960	1380	1380	1380	1380	1380
70	0.05	0.28	0.69	1.12	1.57	2.02	2.53	3.07	3.63	5.06	7.18	11.62	16.26	20.90	25.54	30.18
	150	240	240	270	270	270	300	330	330	1260	1260	1380	1380	1380	1380	1380
80	0.06	0.30	0.71	1.15	1.61	2.07	2.58	3.08	5.11	7.23	9.35	13.72	18.36	23.00	27.64	32.28
	240	240	240	270	270	300	300	300	1260	1260	1260	1380	1380	1380	1380	1380
90	0.08	0.32	0.73	1.18	1.64	2.12	2.80	4.85	6.97	9.09	11.21	15.55	20.19	24.83	29.47	34.11
	240	240	270	270	270	300	1200	1260	1260	1260	1260	1380	1380	1380	1380	1380
100	0.09	0.33	0.75	1.21	1.66	2.41	4.43	6.45	8.56	10.68	12.79	17.13	21.77	26.41	31.05	35.69
	240	240	270	270	270	1200	1200	1200	1260	1260	1260	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.44	1.17	1.24	1.93	3.79	8.62	14.35
3	1.14	1.00	1.00	1.00	1.24	2.00	3.02
4	1.07	1.00	1.00	1.00	1.00	1.31	1.45
5	1.06	1.00	1.00	1.00	1.00	1.03	1.23
6	1.03	1.00	1.00	1.00	1.00	1.00	1.08
7	1.46	1.27	1.71	3.39	8.70	19.27	25.63
8	1.16	1.05	1.04	1.29	1.85	4.87	9.86
9	1.15	1.06	1.05	1.39	2.31	7.18	14.26
10	1.14	1.08	1.07	1.30	1.86	3.89	9.18
11	1.11	1.11	1.08	1.26	1.82	2.70	7.39
12	1.18	1.03	1.03	1.54	2.51	7.96	14.74
13	1.12	1.06	1.06	1.12	1.75	2.47	6.43
14	1.09	1.08	1.07	1.17	1.56	2.11	4.21
15	1.09	1.12	1.09	1.22	1.44	1.94	2.72
16	1.11	1.14	1.10	1.23	1.31	1.94	2.60
17	1.09	1.06	1.06	1.11	1.53	1.86	3.23
18	1.08	1.07	1.07	1.14	1.29	1.69	2.42
19	1.08	1.12	1.08	1.19	1.23	1.64	2.28
20	1.05	1.14	1.10	1.23	1.27	1.63	2.28

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
55.00	2.093	248.06	265.14	267.35	265.14	283.94	301.54	322.89
50.00	2.054	247.44	261.72	265.04	263.75	280.52	298.26	320.28
40.00	1.960	245.96	253.50	259.52	260.41	272.32	290.38	314.02
30.00	1.834	243.96	242.46	252.08	255.92	261.29	279.79	305.61
25.00	1.751	238.27	232.08	238.91	243.74	251.83	274.35	300.17
20.00	1.645	226.02	215.33	212.68	217.69	237.32	269.19	293.38
10.00	1.282	178.68	167.91	173.90	192.26	213.14	250.29	267.08
5.00	0.841	150.55	137.05	149.71	161.63	174.37	207.29	232.54
2.04	0.023	114.99	79.57	84.65	106.34	117.95	145.16	163.53

03223000 Olentangy River at Claridon, Ohio

Location: Latitude 40°34′58″, longitude 82°59′20″, Marion County, Hydrologic Unit 05060001

Drainage area, in square miles: 157.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1946-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 8.7

Mean annual streamflow, in inches: 13.67

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
52.00	3.94	0.13	3.44	6.82	10.47	19.61	28.70	39.39
50.00	3.90	0.13	3.46	6.86	10.59	19.86	28.93	39.50
40.00	3.68	0.15	3.57	7.07	11.27	21.31	30.22	40.14
30.00	3.38	0.16	3.71	7.34	12.15	23.18	31.89	40.97
25.00	3.20	0.17	3.81	7.56	12.66	24.53	33.35	42.57
20.00	2.97	0.20	3.95	8.10	13.04	26.93	36.91	49.39
10.00	2.25	0.28	4.84	10.33	17.30	30.93	45.31	63.29
5.20	1.54	0.41	7.22	12.94	20.88	39.83	–	–

03223000 Olentangy River at Claridon, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.07	0.34	0.62	0.93	1.27	1.60	1.94	2.28	2.69	3.14	4.04	4.94	5.84	6.78	8.34
	30	120	150	150	180	180	180	180	210	240	240	240	240	240	300	600
6	0.01	0.08	0.34	0.64	0.97	1.31	1.68	2.07	2.46	2.90	3.35	4.25	5.20	6.33	7.45	9.40
	30	90	150	180	180	180	210	210	210	240	240	240	300	300	300	600
8	0.02	0.09	0.36	0.69	1.05	1.44	1.84	2.23	2.68	3.12	3.59	4.60	5.72	6.84	8.45	10.70
	30	90	180	180	210	210	210	210	240	240	270	270	300	300	600	600
10	0.02	0.11	0.39	0.73	1.12	1.52	1.91	2.34	2.79	3.25	3.75	4.78	5.90	7.02	9.23	11.53
	60	120	180	180	210	210	210	240	240	270	270	300	300	300	600	900
15	0.02	0.15	0.45	0.80	1.19	1.60	2.05	2.50	2.95	3.40	3.86	4.90	6.03	8.09	10.38	15.03
	60	150	180	210	210	240	240	240	240	240	270	300	300	600	660	1380
20	0.03	0.18	0.48	0.83	1.24	1.69	2.14	2.59	3.04	3.49	3.93	4.98	6.56	9.03	13.36	19.79
	90	150	180	210	240	240	240	240	240	240	240	300	660	660	1680	1740
25	0.04	0.20	0.50	0.85	1.30	1.75	2.20	2.65	3.10	3.55	4.00	5.08	7.32	10.72	17.01	23.41
	90	150	180	240	240	240	240	240	240	240	240	300	660	1680	1680	1800
30	0.04	0.21	0.51	0.90	1.35	1.80	2.25	2.70	3.15	3.60	4.10	5.41	7.88	12.90	19.19	25.74
	120	150	180	240	240	240	240	240	240	240	300	660	660	1680	1680	1800
40	0.05	0.22	0.53	0.98	1.43	1.88	2.32	2.77	3.29	3.85	4.41	6.15	9.06	14.68	21.23	27.97
	90	150	180	240	240	240	240	240	300	300	300	660	1020	1680	1800	1800
50	0.05	0.22	0.59	1.04	1.48	1.93	2.46	3.02	3.58	4.19	4.81	7.47	11.57	16.74	21.90	28.37
	90	150	240	240	240	240	300	300	300	330	330	1020	1380	1380	1380	1800
60	0.05	0.22	0.63	1.08	1.58	2.14	2.71	3.33	3.95	4.57	5.57	9.39	13.92	19.08	24.25	29.42
	90	180	240	240	300	300	330	330	330	330	1020	1020	1380	1380	1380	1380
70	0.05	0.22	0.67	1.20	1.77	2.38	3.00	3.62	4.23	5.32	7.23	11.05	16.02	21.18	26.35	31.52
	90	180	240	300	300	330	330	330	330	1020	1020	1020	1380	1380	1380	1380
80	0.05	0.25	0.78	1.36	1.97	2.59	3.21	3.83	4.87	6.75	8.66	12.73	17.90	23.06	28.23	33.40
	90	240	300	330	330	330	330	330	960	1020	1020	1380	1380	1380	1380	1380
90	0.06	0.32	0.89	1.50	2.12	2.74	3.36	4.29	6.09	7.98	9.89	14.41	19.58	24.75	29.91	35.08
	90	300	330	330	330	330	330	960	960	1020	1020	1380	1380	1380	1380	1380
100	0.06	0.39	0.99	1.61	2.23	2.85	3.54	5.34	7.14	9.04	10.95	15.92	21.08	26.25	31.42	36.58
	90	300	330	330	330	330	960	960	960	1020	1020	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.37	1.40	1.44	1.93	2.27	5.55	8.40
3	1.08	1.10	1.05	1.03	1.01	1.20	1.86
4	1.00	1.02	1.02	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.42	1.48	1.91	2.55	4.89	12.01	19.86
8	1.10	1.13	1.08	1.13	1.25	2.37	5.54
9	1.11	1.13	1.13	1.17	1.44	2.92	8.34
10	1.04	1.10	1.09	1.22	1.25	2.34	5.72
11	1.06	1.11	1.09	1.23	1.23	2.16	4.71
12	1.19	1.15	1.14	1.14	1.44	3.62	8.06
13	1.03	1.09	1.08	1.16	1.15	1.74	3.13
14	1.05	1.07	1.08	1.21	1.17	1.45	2.35
15	1.05	1.07	1.09	1.20	1.23	1.33	2.36
16	1.06	1.07	1.13	1.31	1.19	1.31	2.16
17	1.02	1.06	1.08	1.15	1.11	1.32	2.08
18	1.05	1.03	1.08	1.19	1.17	1.29	1.88
19	1.06	1.04	1.09	1.21	1.21	1.27	1.90
20	1.06	1.04	1.11	1.31	1.19	1.30	1.87

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
52.00	2.070	224.77	201.97	208.31	228.57	257.12	273.77	299.26
50.00	2.054	223.51	201.72	207.78	227.10	255.26	272.47	297.35
40.00	1.960	216.16	200.29	204.68	218.53	244.44	264.90	286.25
30.00	1.834	206.28	198.37	200.52	207.01	229.89	254.73	271.33
25.00	1.751	198.92	193.20	194.94	200.44	222.35	248.14	262.07
20.00	1.645	185.74	168.77	174.91	196.84	222.20	240.33	253.03
10.00	1.282	143.69	142.37	154.16	174.69	196.93	220.86	230.25
5.00	0.841	127.51	103.40	122.21	136.42	168.66	189.71	198.46
2.00	0.000	95.31	66.14	69.28	80.60	100.87	119.05	137.51

03224500 Whetstone Creek near Ashley, Ohio

Location: Latitude 40°27′18″, longitude 82°57′28″, Morrow County, Hydrologic Unit 05060001

Drainage area, in square miles: 98.7

Station used for record extension: 03136500

Time period of systematic or extended record analyzed: 1953-03-01 to 1997-09-30

Percentage of estimated values in extended record: 55.2

Eighty-percent-duration streamflow, in cubic feet per second: 6.9

Mean annual streamflow, in inches: 14.37

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
45.00	3.80	0.17	3.21	4.36	9.01	19.11	30.09	47.05
40.00	3.68	0.17	3.32	5.00	9.79	20.51	31.15	47.08
30.00	3.38	0.18	3.60	6.58	11.72	23.95	33.76	47.16
25.00	3.20	0.19	3.77	7.59	12.94	26.13	35.42	47.21
20.00	2.97	0.21	3.90	8.61	14.37	27.95	38.77	50.10
10.00	2.25	0.38	4.97	10.01	17.05	30.49	45.47	60.27
5.62	1.63	0.58	6.55	12.44	20.38	40.09	57.75	85.76

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.01	0.06	0.25	0.50	0.84	1.19	1.57	1.99	2.40	2.81	3.23	4.05	4.88	5.74	7.77	10.37
	30	60	120	150	180	180	210	210	210	210	210	210	210	270	660	660
6	0.01	0.06	0.25	0.53	0.89	1.24	1.64	2.06	2.47	2.88	3.30	4.18	5.24	6.37	8.03	10.62
	30	60	120	180	180	180	210	210	210	210	210	270	270	300	660	660
8	0.01	0.08	0.29	0.63	0.98	1.37	1.78	2.25	2.73	3.20	3.69	4.75	5.90	7.40	9.76	12.12
	30	90	150	180	180	210	240	240	240	240	270	270	300	600	600	600
10	0.02	0.09	0.34	0.70	1.06	1.52	1.99	2.46	2.93	3.45	3.98	5.06	6.24	7.83	10.19	12.55
	30	90	180	180	210	240	240	240	240	270	270	300	300	600	600	600
15	0.02	0.12	0.45	0.80	1.25	1.72	2.19	2.71	3.24	3.77	4.30	5.46	6.64	7.83	11.83	18.44
	30	150	180	210	240	240	240	270	270	270	270	300	300	600	1680	1680
20	0.02	0.15	0.49	0.88	1.33	1.80	2.33	2.86	3.39	3.92	4.50	5.68	6.86	8.93	14.68	21.53
	60	150	180	210	240	240	270	270	270	270	300	300	300	660	1740	1740
25	0.02	0.17	0.52	0.92	1.37	1.88	2.42	2.95	3.48	4.07	4.66	5.84	7.55	10.15	16.27	23.11
	60	150	180	210	240	270	270	270	270	300	300	300	660	660	1740	1740
30	0.03	0.18	0.54	0.95	1.41	1.94	2.48	3.02	3.61	4.20	4.79	6.06	8.66	11.26	17.11	23.96
	60	150	210	210	270	270	270	300	300	300	300	660	660	660	1740	1740
40	0.03	0.19	0.55	0.98	1.49	2.06	2.65	3.24	3.83	4.42	5.46	7.92	10.52	14.26	19.44	25.07
	60	150	210	240	270	300	300	300	300	300	540	660	660	1020	1380	1440
50	0.03	0.19	0.55	1.05	1.64	2.23	2.82	3.99	5.17	6.35	7.53	9.89	13.14	17.11	22.78	28.44
	60	150	210	300	300	300	300	600	600	600	600	600	900	1440	1440	1440
60	0.03	0.19	0.60	1.19	2.01	3.19	4.37	5.55	6.73	7.91	9.10	12.03	15.58	20.17	25.83	31.50
	60	150	300	300	600	600	600	600	600	600	600	900	900	1440	1440	1440
70	0.04	0.19	0.72	1.87	3.05	4.23	5.41	6.59	7.77	8.95	10.46	14.00	17.55	22.90	28.57	34.23
	60	150	330	600	600	600	600	600	600	600	900	900	900	1440	1440	1440
80	0.04	0.24	1.34	2.52	3.70	4.88	6.06	7.24	8.48	10.26	12.03	15.57	19.66	25.33	30.99	36.66
	60	330	600	600	600	600	600	600	900	900	900	900	1440	1440	1440	1440
90	0.04	0.56	1.74	2.92	4.10	5.28	6.46	7.94	9.71	11.48	13.25	17.15	21.81	27.47	33.14	38.80
	60	600	600	600	600	600	600	900	900	900	900	1080	1440	1440	1440	1440
100	0.10	0.81	1.99	3.17	4.35	5.53	7.12	8.89	10.66	12.44	14.35	18.60	23.70	29.37	35.03	40.70
	600	600	600	600	600	600	900	900	900	900	1080	1080	1440	1440	1440	1440

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.30	1.28	1.33	1.44	1.73	3.23	5.47
3	1.09	1.13	1.13	1.04	1.01	1.23	1.50
4	1.00	1.02	1.08	1.02	1.00	1.00	1.15
5	1.00	1.00	1.04	1.00	1.00	1.00	1.09
6	1.00	1.00	1.02	1.00	1.00	1.00	1.04
7	1.32	1.40	1.48	1.96	2.61	7.36	14.06
8	1.12	1.17	1.20	1.14	1.29	1.85	4.36
9	1.13	1.18	1.21	1.15	1.38	2.03	6.80
10	1.02	1.17	1.22	1.20	1.34	1.96	5.65
11	1.04	1.15	1.23	1.27	1.32	1.88	5.02
12	1.13	1.19	1.23	1.15	1.49	2.09	6.01
13	1.02	1.14	1.17	1.13	1.20	1.60	3.17
14	1.02	1.14	1.17	1.18	1.29	1.56	2.22
15	1.04	1.09	1.21	1.24	1.33	1.54	2.10
16	1.04	1.12	1.17	1.35	1.36	1.59	2.26
17	1.02	1.11	1.16	1.13	1.20	1.41	1.83
18	1.02	1.10	1.18	1.18	1.29	1.47	1.82
19	1.04	1.06	1.18	1.24	1.33	1.48	1.92
20	1.04	1.10	1.13	1.35	1.34	1.52	2.02

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
45.00	2.010	225.06	206.09	208.21	238.85	267.79	300.55	335.36
40.00	1.960	220.56	204.11	206.39	234.06	260.99	292.08	332.53
30.00	1.834	209.18	199.12	201.78	221.97	243.83	270.69	325.39
25.00	1.751	201.67	195.83	198.74	213.99	232.49	256.57	320.68
20.00	1.645	183.32	179.96	192.07	206.97	223.31	246.02	304.39
10.00	1.282	140.03	114.92	120.32	154.90	186.34	214.77	243.47
5.00	0.841	119.10	104.02	112.31	128.84	151.50	176.29	194.41
2.05	0.028	82.62	57.22	63.62	76.10	98.60	117.08	134.95

03225500 Olentangy River near Delaware, Ohio

Location: Latitude 40°21′18″, longitude 83°04′02″, Delaware County, Hydrologic Unit 05060001

Drainage area, in square miles: 393.

Station used for record extension: 03226500 and 03218000

Time period of systematic or extended record analyzed: 1922-10-01 to 1974-09-30

Percentage of estimated values in extended record: 63.5

Eighty-percent-duration streamflow, in cubic feet per second: 15.

Mean annual streamflow, in inches: 11.59

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
53.00	3.96	0.06	1.75	2.72	5.62	14.11	22.22	30.31
50.00	3.90	0.06	1.79	2.78	5.73	14.47	22.84	31.02
40.00	3.68	0.06	1.93	3.01	6.15	15.83	25.21	33.74
30.00	3.38	0.06	2.12	3.30	6.69	17.60	28.28	37.25
25.00	3.20	0.06	2.20	3.87	7.41	18.96	29.64	38.88
20.00	2.97	0.08	2.21	5.56	9.31	21.23	29.78	39.30
10.00	2.25	0.21	4.06	7.35	14.02	25.94	37.23	55.14
5.30	1.57	0.29	5.67	10.00	16.63	31.63	52.54	–

03225500 Olentangy River near Delaware, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.02	0.09	0.30	0.57	0.89	1.22	1.55	1.89	2.22	2.60	3.03	3.89	4.75	5.60	7.07	8.97
	60	120	150	180	210	210	210	210	210	270	270	270	270	270	600	600
6	0.02	0.09	0.30	0.57	0.89	1.22	1.56	1.89	2.27	2.66	3.09	3.94	4.83	5.78	7.14	9.04
	60	120	150	180	210	210	210	240	240	270	270	270	300	300	600	600
8	0.02	0.09	0.33	0.62	0.96	1.31	1.69	2.07	2.45	2.87	3.33	4.28	5.23	6.19	7.65	9.56
	60	120	180	210	210	240	240	240	240	270	300	300	300	300	600	600
10	0.02	0.12	0.38	0.70	1.06	1.44	1.82	2.20	2.63	3.11	3.58	4.53	5.48	6.44	8.31	11.40
	60	150	180	210	240	240	240	270	270	300	300	300	300	300	600	1020
15	0.04	0.17	0.48	0.85	1.23	1.64	2.07	2.50	2.97	3.45	3.92	4.87	6.43	8.52	11.35	15.38
	120	180	210	240	240	270	270	270	300	300	300	300	660	660	900	1320
20	0.05	0.21	0.55	0.93	1.35	1.78	2.21	2.67	3.14	3.62	4.09	5.94	8.05	10.90	14.07	18.26
	120	180	240	240	270	270	270	300	300	300	300	660	900	900	1320	1320
25	0.06	0.23	0.59	1.00	1.43	1.85	2.29	2.77	3.25	3.84	4.89	6.98	9.60	12.46	16.11	20.29
	150	210	240	270	270	270	300	300	300	660	660	660	900	900	1320	1320
30	0.07	0.24	0.61	1.04	1.47	1.89	2.36	2.84	3.50	4.55	5.59	7.81	10.66	13.52	17.69	21.88
	150	210	270	270	270	270	300	300	660	660	660	900	900	900	1320	1320
40	0.07	0.25	0.64	1.07	1.50	1.97	2.45	3.30	4.35	5.39	6.44	9.11	11.96	15.90	20.09	24.28
	150	210	270	270	270	300	300	660	660	660	660	900	900	1320	1320	1320
50	0.07	0.25	0.65	1.07	1.55	2.02	2.75	3.75	4.80	5.84	7.15	10.20	13.51	17.70	21.89	26.14
	150	210	270	270	300	300	600	660	660	660	960	960	1320	1320	1320	1380
60	0.07	0.25	0.65	1.10	1.58	2.26	3.21	4.16	5.12	6.64	8.17	11.21	15.32	19.69	24.07	28.45
	150	210	270	300	300	600	600	600	960	960	960	960	1380	1380	1380	1380
70	0.07	0.25	0.65	1.12	1.64	2.59	3.55	4.50	5.92	7.50	9.12	12.92	17.30	21.68	26.06	30.43
	150	210	300	300	600	600	600	600	960	1020	1020	1380	1380	1380	1380	1380
80	0.07	0.25	0.66	1.14	1.90	2.86	3.81	5.31	6.93	8.55	10.24	14.62	19.00	23.38	27.76	32.13
	150	210	300	300	600	600	600	1020	1020	1020	1380	1380	1380	1380	1380	1380
90	0.07	0.25	0.67	1.16	2.11	3.06	4.57	6.19	7.80	9.51	11.70	16.08	20.46	24.84	29.21	33.59
	150	210	300	600	600	600	1020	1020	1020	1380	1380	1380	1380	1380	1380	1380
100	0.07	0.25	0.68	1.33	2.28	3.68	5.30	6.92	8.58	10.77	12.95	17.33	21.71	26.09	30.47	34.84
	150	210	300	600	600	1020	1020	1020	1380	1380	1380	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.32	1.21	1.35	1.53	1.98	3.42	6.74
3	1.12	1.06	1.07	1.00	1.00	1.32	1.39
4	1.03	1.00	1.00	1.00	1.00	1.15	1.07
5	1.00	1.00	1.00	1.00	1.00	1.06	1.02
6	1.00	1.00	1.00	1.00	1.00	1.00	1.01
7	1.34	1.37	1.56	2.12	2.60	11.95	14.16
8	1.15	1.11	1.11	1.12	1.26	2.09	2.92
9	1.15	1.12	1.14	1.12	1.43	2.42	4.81
10	1.14	1.05	1.20	1.23	1.32	2.39	3.27
11	1.10	1.04	1.24	1.33	1.30	2.38	2.58
12	1.19	1.16	1.15	1.21	1.42	2.36	5.57
13	1.11	1.04	1.13	1.12	1.18	1.86	2.17
14	1.06	1.02	1.18	1.24	1.21	2.06	2.27
15	1.02	1.03	1.22	1.32	1.22	2.20	2.29
16	1.04	1.05	1.19	1.34	1.24	2.56	2.32
17	1.06	1.01	1.11	1.13	1.18	1.67	1.94
18	1.03	1.02	1.16	1.25	1.22	1.92	2.06
19	1.02	1.03	1.21	1.33	1.22	2.08	2.13
20	1.04	1.05	1.17	1.32	1.24	2.45	2.17

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
53.00	2.078	264.41	255.87	251.88	281.63	301.08	320.39	435.94
50.00	2.054	263.49	254.25	251.84	280.48	299.67	319.28	431.48
40.00	1.960	259.91	247.91	251.67	275.99	294.16	314.94	414.04
30.00	1.834	255.09	239.39	251.44	269.96	286.75	309.11	390.59
25.00	1.751	252.75	235.07	250.24	265.11	280.42	301.18	378.58
20.00	1.645	251.99	233.04	245.92	256.60	268.52	280.24	372.52
10.00	1.282	165.58	150.87	165.59	187.28	212.59	237.50	313.34
5.00	0.841	130.92	121.95	132.27	151.31	176.87	200.23	241.08
2.04	0.024	84.97	71.63	78.62	90.67	105.05	128.53	154.04

03226500 Olentangy River at Stratford, Ohio

Location: Latitude 40°15′29″, longitude 83°03′44″, Delaware County, Hydrologic Unit 05060001

Drainage area, in square miles: 445.

Station used for record extension: 03137000

Time period of systematic or extended record analyzed: 1922-10-01 to 1974-09-30

Percentage of estimated values in extended record: 78.5

Eighty-percent-duration streamflow, in cubic feet per second: 16.

Mean annual streamflow, in inches: 10.37

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
53.00	3.96	0.05	0.96	2.34	5.44	12.50	19.65	26.78
50.00	3.90	0.05	1.00	2.36	5.49	12.86	20.17	27.04
40.00	3.68	0.05	1.14	2.44	5.67	14.23	22.15	28.06
30.00	3.38	0.06	1.33	2.55	5.91	16.00	24.72	29.36
25.00	3.20	0.06	1.48	2.65	6.52	16.89	26.00	30.81
20.00	2.97	0.07	1.74	2.90	8.46	17.33	26.67	34.19
10.00	2.25	0.15	3.75	6.63	12.29	22.85	32.56	49.56
5.30	1.57	0.28	4.96	8.96	14.69	31.24	50.80	–

03226500 Olentangy River at Stratford, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.02	0.09	0.27	0.48	0.72	0.97	1.25	1.57	1.91	2.26	2.64	3.41	4.17	4.96	6.66	8.37
	60	120	150	150	180	180	210	240	240	270	270	270	270	600	600	600
6	0.02	0.09	0.28	0.51	0.79	1.09	1.41	1.75	2.09	2.43	2.78	3.55	4.31	5.13	6.66	8.37
	60	120	150	180	210	210	240	240	240	240	270	270	270	300	600	600
8	0.02	0.10	0.33	0.62	0.93	1.27	1.61	1.95	2.29	2.66	3.04	3.87	4.72	5.58	6.94	8.77
	60	150	180	210	240	240	240	240	240	270	270	300	300	300	600	1020
10	0.02	0.12	0.38	0.69	1.03	1.37	1.72	2.08	2.46	2.87	3.30	4.15	5.00	6.29	7.99	10.50
	90	150	210	240	240	240	240	270	270	300	300	300	300	600	600	1020
15	0.03	0.17	0.47	0.81	1.17	1.56	1.95	2.37	2.80	3.23	3.65	5.00	6.70	8.41	10.45	13.21
	120	180	240	240	270	270	300	300	300	300	300	600	600	600	900	1320
20	0.04	0.19	0.51	0.89	1.27	1.67	2.10	2.53	2.95	3.70	4.50	6.20	7.91	9.70	12.32	17.26
	150	180	240	270	270	300	300	300	300	540	600	600	600	900	1740	1740
25	0.05	0.20	0.56	0.94	1.32	1.75	2.18	2.71	3.48	4.33	5.18	6.88	8.59	10.94	14.91	20.03
	150	180	270	270	300	300	300	540	540	600	600	600	600	900	1800	1800
30	0.06	0.21	0.58	0.96	1.37	1.79	2.24	3.01	3.87	4.72	5.57	7.27	9.30	11.93	16.75	21.87
	150	240	270	270	300	300	540	600	600	600	600	600	900	960	1800	1800
40	0.06	0.21	0.59	0.98	1.40	1.82	2.51	3.36	4.21	5.06	5.91	8.11	10.83	13.92	18.67	23.78
	150	240	270	270	300	300	600	600	600	600	600	960	960	1320	1800	1800
50	0.06	0.22	0.59	0.98	1.40	1.82	2.54	3.40	4.25	5.18	6.54	9.27	12.23	15.98	19.73	24.43
	150	210	270	270	300	300	600	600	600	960	960	960	1320	1320	1320	1800
60	0.06	0.22	0.59	0.98	1.40	1.82	2.54	3.40	4.70	6.06	7.42	10.62	14.54	18.46	22.38	26.30
	150	210	270	270	300	300	600	600	960	960	960	1380	1380	1380	1380	1380
70	0.06	0.23	0.59	0.98	1.40	1.82	2.66	4.08	5.53	6.99	8.95	12.87	16.79	20.71	24.63	28.55
	150	210	270	270	300	300	960	1020	1020	1380	1380	1380	1380	1380	1380	1380
80	0.06	0.23	0.59	0.98	1.40	2.15	3.60	5.04	6.90	8.86	10.82	14.74	18.66	22.58	26.50	30.42
	150	210	270	270	300	1020	1020	1020	1380	1380	1380	1380	1380	1380	1380	1380
90	0.06	0.24	0.59	0.98	1.50	2.94	4.52	6.48	8.44	10.40	12.36	16.27	20.19	24.11	28.03	31.95
	150	210	270	270	1020	1020	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
100	0.06	0.24	0.59	0.98	2.16	3.82	5.78	7.74	9.70	11.66	13.62	17.54	21.45	25.37	29.29	33.21
	210	210	270	270	1020	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.46	1.43	1.37	1.72	2.07	4.11	7.53
3	1.18	1.16	1.08	1.00	1.00	1.31	1.51
4	1.11	1.05	1.00	1.00	1.00	1.18	1.15
5	1.04	1.01	1.00	1.00	1.00	1.09	1.07
6	1.02	1.00	1.00	1.00	1.00	1.04	1.02
7	1.57	1.61	1.75	2.29	2.92	12.44	14.77
8	1.19	1.18	1.13	1.12	1.29	2.24	3.34
9	1.21	1.18	1.13	1.14	1.44	2.63	5.60
10	1.18	1.15	1.14	1.23	1.41	2.55	4.01
11	1.15	1.12	1.20	1.31	1.51	2.72	3.22
12	1.18	1.24	1.15	1.10	1.42	2.46	6.27
13	1.16	1.12	1.10	1.13	1.19	1.99	2.29
14	1.12	1.09	1.13	1.24	1.27	2.21	2.46
15	1.08	1.12	1.21	1.32	1.40	2.46	2.43
16	1.00	1.13	1.23	1.32	1.33	2.62	2.52
17	1.14	1.08	1.11	1.13	1.17	1.83	2.09
18	1.07	1.05	1.13	1.24	1.20	2.10	2.26
19	1.04	1.10	1.23	1.31	1.31	2.33	2.25
20	1.00	1.13	1.23	1.30	1.23	2.51	2.34

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
53.00	2.078	289.03	248.23	257.21	288.51	307.81	325.03	434.20
50.00	2.054	286.78	247.10	256.49	287.46	306.59	325.03	432.89
40.00	1.960	277.97	242.69	253.70	283.37	301.81	325.01	427.76
30.00	1.834	266.14	236.77	249.94	277.86	295.38	324.98	420.88
25.00	1.751	259.14	234.00	247.68	272.59	289.57	324.43	411.04
20.00	1.645	252.43	233.54	245.41	261.52	278.02	322.32	384.46
10.00	1.282	212.18	184.89	188.92	209.43	252.68	268.90	352.48
5.00	0.841	168.39	133.61	142.23	162.68	182.99	209.49	252.59
2.04	0.024	121.96	82.01	84.18	96.50	115.54	141.04	154.66

03228000 Scioto Big Run at Briggsdale, Ohio

Location: Latitude 39°54′56″, longitude 83°03′55″, Franklin County, Hydrologic Unit 05060001

Drainage area, in square miles: 11.0

Station used for record extension: 03268500

Time period of systematic or extended record analyzed: 1942-10-01 to 1958-09-30

Percentage of estimated values in extended record: 25.4

Eighty-percent-duration streamflow, in cubic feet per second: 0.1

Mean annual streamflow, in inches: 12.38

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
17.00	2.80	–	2.44	4.27	5.95	16.26	24.32	31.60
10.00	2.25	0.04	4.63	6.16	12.35	24.14	34.22	49.33
5.67	1.64	0.11	5.49	8.59	14.73	43.42	63.67	–

03228000 Scioto Big Run at Briggsdale, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.08	0.22	0.47	0.82	1.17	1.53	1.88	2.24	2.63	3.04	3.45	4.32	5.31	6.33	7.75	9.58
	120	150	150	210	210	210	210	210	240	240	240	270	300	300	540	540
6	0.08	0.23	0.50	0.85	1.21	1.56	1.92	2.27	2.65	3.06	3.46	4.48	5.50	6.63	8.46	10.29
	120	150	180	210	210	210	210	210	240	240	300	300	300	540	540	540
8	0.09	0.25	0.56	0.90	1.25	1.61	1.96	2.32	2.68	3.08	3.58	4.59	5.75	7.58	9.62	11.85
	150	180	180	210	210	210	210	210	210	240	300	300	540	540	660	660
10	0.10	0.28	0.59	0.93	1.28	1.64	2.00	2.37	2.78	3.18	3.62	4.66	6.76	8.99	11.23	13.68
	180	180	180	210	210	210	210	240	240	240	300	540	660	660	660	1020
15	0.12	0.30	0.67	1.08	1.49	1.89	2.32	2.78	3.23	4.29	5.40	7.64	10.40	13.86	17.31	20.77
	180	180	240	240	240	240	270	270	270	660	660	660	1020	1020	1020	1020
20	0.14	0.39	0.79	1.24	1.70	2.95	4.58	6.20	7.83	9.46	11.09	14.34	17.60	20.85	24.10	27.36
	240	240	240	270	270	960	960	960	960	960	960	960	960	960	960	960

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.74	1.51	1.56	2.09	2.83	4.03	4.70
3	1.13	1.03	1.06	1.09	1.02	1.77	2.11
4	1.06	1.01	1.01	1.04	1.00	1.00	1.42
5	1.00	1.00	1.00	1.02	1.00	1.00	1.20
6	1.00	1.00	1.00	1.00	1.00	1.00	1.07
7	1.74	1.66	2.06	3.21	4.08	7.12	7.22
8	1.13	1.05	1.10	1.12	1.56	3.17	3.34
9	1.13	1.06	1.12	1.14	1.87	3.62	3.91
10	1.12	1.05	1.07	1.12	1.50	3.43	3.47
11	1.08	1.03	1.06	1.14	1.39	3.26	3.40
12	1.15	1.07	1.12	1.15	2.10	3.66	3.96
13	1.12	1.02	1.08	1.12	1.06	2.82	2.97
14	1.04	1.02	1.02	1.10	1.07	2.56	2.90
15	1.00	1.01	1.02	1.12	1.08	2.53	2.92
16	1.01	1.01	1.00	1.12	1.09	2.65	2.85
17	1.06	1.01	1.03	1.11	1.04	2.31	2.66
18	1.00	1.02	1.02	1.09	1.07	2.27	2.61
19	1.00	1.00	1.00	1.10	1.08	2.26	2.63
20	1.01	1.01	1.00	1.12	1.08	2.45	2.62

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
17.00	1.565	255.77	240.62	232.21	228.22	249.81	259.29	337.08
10.00	1.282	236.51	209.32	205.00	225.19	231.07	237.08	316.39
5.00	0.841	176.97	164.15	175.36	176.90	186.42	214.73	255.79
2.12	0.074	122.07	98.02	117.73	125.67	139.80	169.51	182.97

03228500 Big Walnut Creek at Central College, Ohio

Location: Latitude 40°06′13″, longitude 82°53′03″, Franklin County, Hydrologic Unit 05060001

Drainage area, in square miles: 190.

Station used for record extension: 03229000

Time period of systematic or extended record analyzed: 1922-10-01 to 1974-09-30

Percentage of estimated values in extended record: 71.2

Eighty-percent-duration streamflow, in cubic feet per second: 5.6

Mean annual streamflow, in inches: 13.83

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
53.00	3.96	0.06	1.73	3.49	5.95	16.72	25.98	36.21
50.00	3.90	0.06	1.74	3.61	6.12	16.98	26.70	36.93
40.00	3.68	0.08	1.75	4.07	6.77	17.96	29.45	39.67
30.00	3.38	0.09	1.78	4.67	7.61	19.24	33.01	43.22
25.00	3.20	0.10	1.97	4.93	8.80	20.79	34.97	45.12
20.00	2.97	0.11	2.68	4.94	11.97	24.64	36.57	46.54
10.00	2.25	0.23	4.37	8.26	15.59	29.46	48.27	65.55
5.30	1.57	0.39	7.24	12.75	19.68	36.78	55.81	–

03228500 Big Walnut Creek at Central College, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.12	0.32	0.59	0.93	1.27	1.61	1.95	2.29	2.74	3.25	4.36	5.50	6.63	8.01	10.28
	60	90	120	180	180	180	180	180	180	270	270	300	300	300	600	600
6	0.02	0.12	0.33	0.65	0.99	1.33	1.68	2.08	2.48	2.99	3.50	4.52	5.63	6.77	8.17	10.44
	60	90	120	180	180	180	210	210	240	270	270	270	300	300	600	600
8	0.03	0.13	0.40	0.74	1.10	1.50	1.95	2.40	2.86	3.33	3.84	4.86	6.00	7.14	9.27	11.54
	60	120	180	180	210	210	240	240	240	270	270	270	300	300	600	600
10	0.03	0.15	0.46	0.82	1.21	1.66	2.12	2.57	3.04	3.55	4.06	5.19	6.32	8.33	10.53	12.80
	60	120	180	210	210	240	240	240	270	270	270	300	300	540	600	600
15	0.05	0.22	0.55	0.95	1.39	1.85	2.32	2.86	3.43	3.99	4.56	6.10	8.37	10.64	13.51	18.75
	120	150	210	210	240	240	270	300	300	300	300	600	600	600	900	1680
20	0.07	0.24	0.60	1.02	1.47	1.98	2.54	3.11	3.68	4.25	5.26	7.53	10.43	13.84	17.81	22.81
	150	150	210	240	240	300	300	300	300	300	600	600	900	900	1320	1320
25	0.08	0.25	0.63	1.07	1.54	2.11	2.68	3.25	3.87	5.01	6.14	9.20	12.61	16.14	21.13	26.13
	150	180	210	240	300	300	300	300	600	600	600	900	900	1320	1320	1320
30	0.09	0.27	0.66	1.11	1.62	2.19	2.76	3.35	4.44	5.57	7.08	10.49	13.89	18.19	23.19	28.19
	150	180	240	240	300	300	300	330	600	600	900	900	900	1320	1320	1320
40	0.09	0.28	0.71	1.17	1.68	2.25	2.82	3.93	5.07	6.53	8.24	11.64	15.18	20.18	25.17	30.17
	150	180	240	240	300	300	300	600	600	900	900	900	1320	1320	1320	1320
50	0.09	0.30	0.75	1.21	1.68	2.25	3.19	4.44	5.69	6.93	8.39	12.00	15.64	20.57	25.57	31.09
	150	240	240	240	300	300	660	660	660	660	900	960	960	1320	1380	1800
60	0.09	0.33	0.79	1.24	1.69	2.46	3.71	4.96	6.20	7.45	8.70	12.44	17.25	22.47	27.70	33.51
	150	240	240	240	240	660	660	660	660	660	660	1020	1380	1380	1380	1740
70	0.09	0.36	0.81	1.26	1.72	2.83	4.08	5.33	6.58	7.83	9.21	13.74	18.96	24.18	30.55	37.13
	150	240	240	240	240	660	660	660	660	660	1020	1380	1380	1380	1740	1740
80	0.10	0.37	0.83	1.28	1.87	3.12	4.37	5.62	6.86	8.11	9.93	15.15	20.88	27.47	34.05	40.64
	240	240	240	240	660	660	660	660	660	660	1380	1380	1740	1740	1740	1740
90	0.12	0.39	0.84	1.30	2.09	3.34	4.59	5.84	7.08	8.51	11.12	17.56	24.14	30.73	37.32	43.90
	240	240	240	240	660	660	660	660	660	1380	1380	1740	1740	1740	1740	1740
100	0.13	0.40	0.86	1.31	2.26	3.51	4.76	6.01	7.34	10.63	13.93	20.52	27.10	33.69	40.28	46.86
	240	240	240	240	660	660	660	660	1740	1740	1740	1740	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.20	1.24	1.21	1.60	2.13	3.63	7.32
3	1.06	1.03	1.02	1.00	1.00	1.36	1.53
4	1.05	1.00	1.01	1.00	1.00	1.19	1.10
5	1.03	1.00	1.00	1.00	1.00	1.08	1.05
6	1.02	1.00	1.00	1.00	1.00	1.00	1.01
7	1.24	1.37	1.55	2.19	3.01	13.66	15.91
8	1.05	1.12	1.10	1.07	1.38	2.54	4.80
9	1.05	1.15	1.12	1.12	1.61	3.01	9.35
10	1.05	1.19	1.15	1.19	1.61	2.88	5.74
11	1.03	1.18	1.20	1.30	1.67	2.96	4.29
12	1.08	1.11	1.09	1.05	1.50	2.69	8.00
13	1.05	1.14	1.11	1.11	1.37	2.31	2.57
14	1.04	1.17	1.14	1.19	1.42	2.16	2.32
15	1.02	1.16	1.20	1.29	1.48	2.27	2.23
16	1.01	1.20	1.19	1.34	1.72	2.26	2.22
17	1.05	1.13	1.10	1.10	1.28	1.87	2.08
18	1.02	1.16	1.15	1.19	1.32	2.02	2.03
19	1.02	1.14	1.20	1.28	1.38	2.06	1.99
20	1.01	1.19	1.19	1.34	1.57	2.13	1.99

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
53.00	2.078	243.69	226.35	240.53	256.37	263.10	296.51	419.80
50.00	2.054	243.50	224.38	237.01	254.06	263.07	295.42	418.29
40.00	1.960	242.75	216.70	223.27	245.04	262.95	291.15	412.40
30.00	1.834	241.75	206.37	204.80	232.91	262.78	285.41	404.49
25.00	1.751	237.78	201.17	196.48	226.94	259.47	281.38	389.78
20.00	1.645	223.96	198.91	196.19	224.75	246.75	275.58	345.87
10.00	1.282	172.69	136.34	139.71	180.23	209.63	247.89	291.36
5.00	0.841	120.30	89.62	105.74	123.38	142.86	196.06	226.93
2.04	0.024	83.45	46.43	50.65	71.80	92.70	118.74	136.56

03229000 Alum Creek at Columbus, Ohio

Location: Latitude 39°56′42″, longitude 82°56′28″, Franklin County, Hydrologic Unit 05060001

Drainage area, in square miles: 189.

Station used for record extension: 03228000

Time period of systematic or extended record analyzed: 1922-10-01 to 1974-09-30

Percentage of estimated values in extended record: 9.6

Eighty-percent-duration streamflow, in cubic feet per second: 11.

Mean annual streamflow, in inches: 12.00

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
53.00	3.96	0.11	1.76	3.42	5.72	15.55	23.63	32.06
50.00	3.90	0.11	1.77	3.50	5.85	15.74	24.21	32.68
40.00	3.68	0.13	1.80	3.82	6.37	16.48	26.41	35.04
30.00	3.38	0.14	1.84	4.22	7.04	17.43	29.27	38.09
25.00	3.20	0.15	1.97	4.45	8.03	18.78	30.80	39.74
20.00	2.97	0.17	2.39	4.63	10.73	22.39	31.97	41.03
10.00	2.25	0.33	3.91	7.73	13.94	25.95	42.18	57.14
5.30	1.57	0.46	6.53	11.22	17.43	31.91	48.46	–

03229000 Alum Creek at Columbus, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.07	0.23	0.43	0.69	0.99	1.28	1.58	1.88	2.17	2.51	3.40	4.39	5.37	7.27	9.24
	30	90	120	120	180	180	180	180	180	180	210	300	300	300	600	600
6	0.01	0.07	0.23	0.44	0.73	1.03	1.33	1.66	2.00	2.37	2.82	3.70	4.63	5.62	7.27	9.24
	30	90	120	180	180	180	180	210	210	240	270	270	300	300	600	600
8	0.02	0.07	0.24	0.52	0.82	1.16	1.53	1.92	2.32	2.76	3.21	4.09	5.04	6.02	7.73	9.70
	30	90	120	180	210	210	240	240	270	270	270	270	300	300	600	600
10	0.02	0.07	0.28	0.58	0.93	1.29	1.68	2.08	2.52	2.96	3.41	4.34	5.32	6.77	8.74	10.71
	30	120	180	210	210	240	240	270	270	270	270	300	300	540	600	600
15	0.02	0.13	0.37	0.70	1.06	1.45	1.87	2.31	2.78	3.27	3.77	4.93	6.90	8.87	11.39	16.02
	90	120	180	210	240	240	270	270	300	300	300	600	600	600	900	1680
20	0.04	0.15	0.42	0.76	1.13	1.53	2.00	2.50	2.99	3.48	4.25	6.22	8.78	11.73	14.69	18.71
	90	120	180	210	240	270	300	300	300	300	600	600	900	900	900	1320
25	0.05	0.17	0.45	0.78	1.17	1.62	2.12	2.61	3.12	4.05	5.04	7.72	10.67	13.63	17.05	21.39
	120	150	180	210	240	300	300	300	330	600	600	900	900	900	1320	1320
30	0.06	0.19	0.46	0.80	1.20	1.69	2.18	2.68	3.56	4.55	5.85	8.81	11.76	14.72	18.83	23.17
	120	150	180	240	240	300	300	330	600	600	900	900	900	900	1320	1320
40	0.06	0.21	0.48	0.84	1.25	1.75	2.24	3.08	4.07	5.27	6.74	9.70	12.65	16.50	20.83	25.17
	120	150	180	240	300	300	300	600	600	900	900	900	900	1320	1320	1320
50	0.07	0.22	0.48	0.88	1.27	1.75	2.29	3.38	4.46	5.54	6.74	9.88	13.03	17.34	21.68	26.31
	150	150	240	240	270	300	660	660	660	660	900	960	960	1320	1320	1800
60	0.08	0.22	0.51	0.90	1.30	1.75	2.70	3.78	4.87	5.95	7.04	10.32	14.44	18.97	23.50	28.32
	150	150	240	240	270	300	660	660	660	660	660	1020	1380	1380	1380	1740
70	0.08	0.23	0.53	0.92	1.32	1.90	2.99	4.07	5.15	6.24	7.67	11.49	16.02	20.55	25.57	31.28
	150	150	240	240	240	660	660	660	660	660	1020	1380	1380	1380	1740	1740
80	0.08	0.23	0.55	0.94	1.34	2.11	3.19	4.28	5.36	6.53	8.28	12.81	17.34	22.74	28.46	34.17
	150	150	240	240	240	660	660	660	660	1020	1380	1380	1380	1740	1740	1740
90	0.08	0.23	0.57	0.96	1.35	2.26	3.35	4.43	5.51	7.13	9.40	14.03	19.74	25.46	31.17	36.89
	150	150	240	240	240	660	660	660	660	1380	1380	1740	1740	1740	1740	1740
100	0.09	0.23	0.58	0.98	1.37	2.38	3.46	4.54	5.83	8.09	10.81	16.52	22.23	27.95	33.66	39.38
	150	150	240	240	240	660	660	660	1380	1380	1740	1740	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.97	1.53	1.63	1.81	2.09	4.21	7.42
3	1.85	1.11	1.13	1.00	1.00	1.37	1.46
4	1.70	1.02	1.03	1.00	1.00	1.21	1.08
5	1.60	1.00	1.01	1.00	1.00	1.11	1.04
6	1.01	1.00	1.00	1.00	1.00	1.04	1.01
7	2.98	1.70	2.06	2.32	3.04	13.53	15.70
8	1.87	1.14	1.18	1.14	1.36	2.41	4.98
9	1.87	1.17	1.20	1.19	1.57	2.91	9.18
10	1.86	1.11	1.19	1.26	1.56	2.82	6.35
11	1.78	1.06	1.18	1.39	1.63	2.95	5.29
12	1.91	1.19	1.21	1.11	1.46	2.56	8.01
13	1.87	1.11	1.14	1.19	1.33	2.23	2.67
14	1.69	1.04	1.17	1.26	1.37	2.16	2.36
15	1.59	1.06	1.16	1.38	1.46	2.29	2.28
16	1.61	1.08	1.25	1.43	1.65	2.25	2.31
17	1.72	1.04	1.11	1.19	1.25	1.85	2.07
18	1.60	1.03	1.17	1.26	1.30	2.01	2.09
19	1.58	1.04	1.16	1.38	1.34	2.09	2.07
20	1.54	1.05	1.25	1.43	1.51	2.12	2.12

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
53.00	2.078	140.03	205.90	206.43	242.48	271.69	301.15	431.38
50.00	2.054	138.75	204.36	206.20	242.17	270.40	300.88	430.01
40.00	1.960	133.74	198.34	205.32	240.94	265.38	299.82	424.63
30.00	1.834	127.01	190.25	204.13	239.30	258.63	298.40	417.42
25.00	1.751	122.75	183.24	200.93	235.12	254.23	295.15	401.90
20.00	1.645	117.83	169.89	190.42	221.59	248.80	284.89	353.57
10.00	1.282	75.37	135.03	149.98	175.62	198.97	251.65	299.91
5.00	0.841	42.58	100.80	109.21	130.33	149.81	200.61	231.64
2.04	0.024	24.43	53.50	59.93	75.61	102.16	126.11	143.25

03229500 Big Walnut Creek at Rees, Ohio

Location: Latitude 39°51′24″, longitude 82°57′26″, Franklin County, Hydrologic Unit 05060001

Drainage area, in square miles: 544.

Station used for record extension: 03147000

Time period of systematic or extended record analyzed: 1922-10-01 to 1961-09-30

Percentage of estimated values in extended record: 21.3

Eighty-percent-duration streamflow, in cubic feet per second: 34.

Mean annual streamflow, in inches: 12.35

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
40.00	3.68	0.25	1.52	3.66	6.64	15.56	22.81	33.40
30.00	3.38	0.26	1.79	4.03	7.15	17.80	26.68	35.67
25.00	3.20	0.27	1.97	4.26	7.47	19.22	29.14	37.11
20.00	2.97	0.28	2.18	4.55	7.87	20.97	32.17	38.89
10.00	2.25	0.33	4.26	6.62	14.26	25.31	45.03	66.43
5.71	1.65	0.52	5.44	10.86	15.24	33.50	50.69	–

03229500 Big Walnut Creek at Rees, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.03	0.19	0.39	0.63	1.04	1.44	1.85	2.25	2.66	3.07	4.02	5.14	6.53	8.97	11.40
	0	60	120	120	240	240	240	240	240	240	240	330	330	720	720	720
6	0.00	0.03	0.21	0.41	0.70	1.04	1.44	1.85	2.25	2.66	3.07	4.02	5.14	6.53	8.97	11.40
	0	60	120	120	180	240	240	240	240	240	240	330	330	720	720	720
8	0.00	0.04	0.24	0.52	0.82	1.14	1.49	1.85	2.31	2.76	3.22	4.13	5.51	7.54	9.57	11.60
	0	90	150	180	180	210	210	270	270	270	270	270	600	600	600	600
10	0.00	0.04	0.28	0.57	0.88	1.23	1.59	1.99	2.44	2.90	3.35	4.86	6.69	8.71	10.74	12.77
	0	90	150	180	210	210	210	270	270	270	270	540	540	600	600	600
15	0.00	0.06	0.32	0.62	1.00	1.41	1.81	2.22	2.73	3.37	4.38	6.41	8.44	10.89	13.94	16.98
	0	120	180	180	240	240	240	300	300	600	600	600	600	900	900	900
20	0.00	0.08	0.34	0.72	1.13	1.53	1.95	2.45	3.23	4.25	5.26	7.49	10.53	13.58	17.41	23.50
	0	120	180	240	240	240	300	300	600	600	600	900	900	900	1800	1800
25	0.00	0.09	0.37	0.78	1.18	1.61	2.17	2.73	3.71	4.72	5.76	8.80	11.85	15.03	21.12	27.20
	30	120	240	240	240	330	330	330	600	600	900	900	900	1800	1800	1800
30	0.00	0.09	0.39	0.80	1.21	1.74	2.29	2.95	3.98	5.10	6.33	9.38	12.42	16.56	22.51	28.59
	30	120	240	240	240	330	330	600	660	660	900	900	900	1320	1800	1800
40	0.01	0.12	0.39	0.80	1.25	1.74	2.30	3.18	4.29	5.41	6.59	9.84	14.26	18.93	23.59	28.59
	60	150	240	240	270	330	330	660	660	660	960	960	1380	1380	1380	1800
50	0.02	0.14	0.43	0.89	1.35	1.80	2.30	3.18	4.35	6.08	8.23	12.89	17.56	22.22	26.89	31.56
	90	150	270	270	270	270	330	660	1020	1020	1380	1380	1380	1380	1380	1380
60	0.03	0.16	0.51	0.97	1.43	1.88	2.34	3.95	6.12	8.46	10.79	15.45	20.12	24.79	29.45	34.12
	90	150	270	270	270	270	270	1020	1380	1380	1380	1380	1380	1380	1380	1380
70	0.04	0.18	0.58	1.03	1.49	1.95	3.49	5.82	8.15	10.48	12.82	17.48	22.15	26.82	31.48	36.15
	90	150	270	270	270	270	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
80	0.05	0.20	0.63	1.09	1.54	2.78	5.11	7.45	9.78	12.11	14.45	19.11	23.78	28.44	33.11	37.78
	90	150	270	270	270	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
90	0.06	0.22	0.67	1.13	1.77	4.10	6.44	8.77	11.10	13.43	15.77	20.43	25.10	29.77	34.43	39.10
	150	270	270	270	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
100	0.07	0.25	0.71	1.16	2.85	5.19	7.52	9.85	12.19	14.52	16.85	21.52	26.18	30.85	35.52	40.18
	150	270	270	270	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.16	1.13	1.09	1.49	2.00	2.53	4.58
3	1.87	1.01	1.00	1.00	1.00	1.32	1.49
4	1.70	1.00	1.00	1.00	1.00	1.13	1.08
5	1.03	1.00	1.00	1.00	1.00	1.02	1.04
6	1.00	1.00	1.00	1.00	1.00	1.00	1.02
7	2.16	1.25	1.45	2.20	2.71	7.98	10.80
8	1.90	1.06	1.10	1.18	1.33	2.36	2.63
9	1.87	1.09	1.17	1.28	1.48	2.79	5.22
10	1.83	1.16	1.33	1.36	1.46	2.65	3.35
11	1.81	1.18	1.43	1.39	1.51	2.60	2.93
12	2.00	1.04	1.07	1.17	1.46	2.62	4.56
13	1.76	1.10	1.16	1.28	1.25	2.03	2.30
14	1.81	1.16	1.33	1.36	1.33	2.04	2.29
15	1.06	1.20	1.42	1.39	1.40	2.26	2.30
16	1.06	1.33	1.51	1.45	1.43	2.40	2.58
17	1.74	1.11	1.16	1.28	1.25	1.77	2.03
18	1.75	1.17	1.33	1.36	1.33	1.88	2.06
19	1.06	1.20	1.42	1.39	1.40	2.13	2.17
20	1.06	1.33	1.51	1.45	1.43	2.28	2.49

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
40.00	1.960	127.76	196.70	209.89	242.93	270.46	299.75	407.00
30.00	1.834	125.40	196.46	204.12	230.13	257.09	297.50	392.04
25.00	1.751	123.84	196.30	200.31	221.67	248.26	296.02	382.16
20.00	1.645	121.86	196.10	195.46	210.92	237.03	294.13	369.60
10.00	1.282	86.86	149.21	155.93	181.11	213.65	251.65	328.98
5.00	0.841	65.81	109.23	118.62	143.35	159.43	197.63	250.40
2.00	0.000	27.37	59.36	66.49	93.92	103.22	120.90	140.32

03230500 Big Darby Creek at Darbyville, Ohio

Location: Latitude 39°42′02″, longitude 83°06′37″, Pickaway County, Hydrologic Unit 05060001

Drainage area, in square miles: 534.

Station used for record extension: 03147000

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 4.0

Eighty-percent-duration streamflow, in cubic feet per second: 41.

Mean annual streamflow, in inches: 12.04

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.18	1.13	2.29	5.63	15.40	24.02	29.81
70.00	4.24	0.18	1.14	2.46	5.83	15.80	24.44	30.31
60.00	4.09	0.18	1.15	2.78	6.20	16.54	25.22	31.24
50.00	3.90	0.18	1.16	3.15	6.64	17.42	26.16	32.34
40.00	3.68	0.18	1.18	3.61	7.18	18.50	27.30	33.70
30.00	3.38	0.18	1.74	3.78	9.08	19.26	28.95	34.75
25.00	3.20	0.18	2.19	3.86	10.39	19.65	30.11	35.54
20.00	2.97	0.20	2.78	4.31	11.08	20.15	32.77	40.03
10.00	2.25	0.37	4.09	7.30	12.97	25.49	39.84	55.84
5.07	1.52	0.56	5.86	10.78	18.90	39.14	–	–

03230500 Big Darby Creek at Darbyville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.03	0.16	0.36	0.59	0.88	1.18	1.48	1.77	2.09	2.43	3.13	4.02	5.00	5.99	7.08
	0	60	120	120	150	180	180	180	180	210	210	210	300	300	300	540
6	0.00	0.03	0.19	0.40	0.66	0.96	1.26	1.58	1.93	2.27	2.62	3.40	4.29	5.27	6.26	8.22
	0	60	120	150	180	180	180	210	210	210	210	270	270	300	300	600
8	0.00	0.05	0.22	0.48	0.77	1.11	1.46	1.80	2.17	2.57	3.00	3.89	4.78	6.10	8.08	10.24
	30	90	120	180	180	210	210	210	240	240	270	270	270	600	600	660
10	0.00	0.06	0.26	0.55	0.89	1.23	1.60	2.00	2.41	2.86	3.30	4.19	5.24	7.21	9.19	11.38
	30	90	150	180	210	210	240	240	270	270	270	270	600	600	600	1020
15	0.01	0.08	0.35	0.69	1.08	1.47	1.91	2.35	2.80	3.24	3.73	4.89	6.85	8.83	11.36	14.71
	30	120	210	210	240	240	270	270	270	270	300	540	600	600	960	1320
20	0.01	0.10	0.41	0.80	1.20	1.64	2.08	2.54	3.03	3.53	4.09	5.83	7.80	10.31	13.38	18.90
	60	150	210	240	240	270	270	300	300	300	480	540	600	900	960	1740
25	0.01	0.11	0.47	0.86	1.29	1.73	2.21	2.70	3.20	3.94	4.73	6.49	8.79	11.75	16.67	22.41
	60	180	240	240	270	270	300	300	300	480	480	600	900	900	1740	1740
30	0.01	0.13	0.50	0.90	1.34	1.82	2.31	2.81	3.55	4.34	5.13	7.01	9.78	13.29	19.03	24.76
	60	180	240	270	270	300	300	300	480	480	480	600	900	1740	1740	1740
40	0.02	0.14	0.53	0.96	1.44	1.93	2.43	3.19	3.98	4.81	5.80	8.03	11.00	16.03	21.76	27.50
	60	210	240	270	300	300	300	480	480	600	600	900	900	1740	1740	1740
50	0.02	0.14	0.54	1.00	1.49	1.99	2.59	3.39	4.38	5.37	6.36	8.69	11.65	17.29	23.02	28.76
	60	240	240	300	300	300	480	600	600	600	600	900	900	1740	1740	1740
60	0.02	0.14	0.55	1.02	1.52	2.02	2.84	3.82	4.81	5.80	6.79	9.04	12.01	17.72	23.46	29.22
	60	240	270	300	300	330	600	600	600	600	600	900	900	1740	1740	1800
70	0.02	0.14	0.55	1.03	1.53	2.20	3.19	4.18	5.22	6.30	7.39	9.57	12.94	17.72	23.46	29.37
	60	240	270	300	330	600	600	600	660	660	660	660	1320	1740	1740	1800
80	0.02	0.14	0.55	1.03	1.57	2.49	3.58	4.67	5.75	6.84	7.93	10.10	14.12	18.47	23.46	29.37
	60	240	270	330	330	660	660	660	660	660	660	660	1320	1320	1740	1800
90	0.02	0.14	0.55	1.06	1.85	2.94	4.02	5.11	6.20	7.29	8.38	10.84	15.19	19.54	23.97	29.37
	60	240	270	330	660	660	660	660	660	660	660	1320	1320	1320	1380	1800
100	0.02	0.14	0.55	1.13	2.22	3.31	4.40	5.49	6.57	7.66	8.75	11.82	16.18	20.53	24.94	29.49
	60	240	270	660	660	660	660	660	660	660	660	1320	1320	1320	1380	1380

03230500 Big Darby Creek at Darbyville, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.43	1.36	1.40	1.37	1.42	2.44	5.54
3	1.16	1.00	1.02	1.00	1.08	1.08	1.03
4	1.04	1.00	1.00	1.00	1.00	1.03	1.01
5	1.02	1.00	1.00	1.00	1.00	1.01	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.43	1.45	1.52	1.52	2.24	8.20	12.47
8	1.16	1.04	1.08	1.09	1.39	1.32	2.43
9	1.16	1.06	1.13	1.16	1.53	1.60	4.77
10	1.10	1.04	1.14	1.20	1.58	1.58	2.83
11	1.06	1.08	1.16	1.28	1.73	1.53	2.50
12	1.09	1.06	1.09	1.21	1.44	1.46	4.68
13	1.09	1.01	1.10	1.16	1.45	1.36	1.61
14	1.05	1.02	1.13	1.21	1.49	1.46	1.70
15	1.02	1.08	1.16	1.28	1.66	1.51	1.85
16	1.01	1.13	1.23	1.29	1.85	1.52	1.86
17	1.05	1.00	1.09	1.17	1.39	1.34	1.46
18	1.03	1.01	1.13	1.21	1.44	1.45	1.59
19	1.02	1.08	1.16	1.28	1.62	1.50	1.76
20	1.00	1.11	1.23	1.29	1.81	1.52	1.80

03230500 Big Darby Creek at Darbyville, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
76.00	2.222	314.55	285.13	285.92	310.99	333.83	472.15	555.85
70.00	2.190	312.80	284.29	284.47	310.44	333.01	468.62	554.52
60.00	2.128	309.46	282.69	281.70	309.40	331.44	461.89	551.98
50.00	2.054	305.41	280.76	278.35	308.14	329.53	453.74	548.91
40.00	1.960	300.31	278.31	274.12	306.55	327.13	443.45	545.03
30.00	1.834	295.78	269.74	273.01	289.55	315.82	395.96	464.89
25.00	1.751	292.62	263.13	271.98	276.99	307.16	362.05	404.78
20.00	1.645	280.54	251.29	255.79	272.91	295.23	353.30	380.77
10.00	1.282	234.61	194.95	193.00	202.30	230.25	278.30	302.54
5.00	0.841	174.58	144.57	145.70	157.54	176.13	210.25	239.78
2.00	0.000	111.48	80.82	75.58	96.79	114.90	133.20	154.90

03230800 Deer Creek at Mount Sterling, Ohio

Location: Latitude 39°42′54″, longitude 83°15′26″, Madison County, Hydrologic Unit 05060002

Drainage area, in square miles: 228.

Station used for record extension: 03241500

Time period of systematic or extended record analyzed: 1952-09-01 to 1997-09-30

Percentage of estimated values in extended record: 62.2

Eighty-percent-duration streamflow, in cubic feet per second: 34.

Mean annual streamflow, in inches: 13.09

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.20	1.54	2.02	5.24	14.39	26.62	39.43
40.00	3.68	0.23	2.01	3.03	6.62	16.40	28.64	41.14
30.00	3.38	0.29	2.97	5.10	9.47	20.56	32.80	44.68
25.00	3.20	0.32	3.58	6.42	11.29	23.21	35.45	46.94
20.00	2.97	0.38	3.94	7.19	12.43	24.57	37.15	49.10
10.00	2.25	0.50	5.35	8.51	15.22	28.71	38.95	54.48
5.11	1.52	0.86	6.61	12.34	18.30	37.41	–	–

03230800 Deer Creek at Mount Sterling, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.01	0.13	0.29	0.48	0.74	1.06	1.42	1.79	2.17	2.55	3.30	4.05	4.80	5.59	7.53
	0	30	90	90	120	180	180	210	210	210	210	210	210	210	240	600
6	0.00	0.02	0.14	0.34	0.59	0.91	1.23	1.59	1.97	2.34	2.72	3.48	4.34	5.28	6.41	8.56
	0	30	90	120	180	180	180	210	210	210	210	240	240	270	600	600
8	0.00	0.02	0.19	0.43	0.73	1.05	1.38	1.74	2.12	2.55	2.98	3.93	4.90	5.94	7.88	12.03
	0	30	120	150	180	180	180	210	240	240	240	270	270	540	540	1260
10	0.00	0.03	0.21	0.47	0.79	1.12	1.44	1.84	2.27	2.70	3.15	4.11	5.08	6.53	10.08	14.59
	0	60	120	180	180	180	180	240	240	240	270	270	270	540	1260	1260
15	0.00	0.04	0.24	0.54	0.86	1.19	1.56	1.99	2.42	2.85	3.28	4.25	5.80	7.95	10.94	15.24
	30	90	150	180	180	180	240	240	240	240	270	270	600	600	960	1740
20	0.00	0.06	0.27	0.59	0.91	1.23	1.66	2.09	2.52	2.95	3.38	5.16	7.31	9.46	12.34	15.61
	30	90	150	180	180	240	240	240	240	240	270	600	600	600	900	1740
25	0.00	0.07	0.30	0.63	0.95	1.34	1.77	2.20	2.63	3.27	4.35	6.50	8.65	10.83	14.06	17.28
	30	90	180	180	180	240	240	240	240	600	600	600	600	900	900	900
30	0.00	0.08	0.34	0.66	1.03	1.46	1.89	2.32	3.34	4.42	5.49	7.64	9.79	12.53	15.75	18.98
	30	90	180	180	240	240	240	240	600	600	600	600	600	900	900	900
40	0.00	0.09	0.41	0.80	1.23	1.96	2.93	4.01	5.08	6.16	7.23	9.38	12.36	15.58	18.81	24.04
	30	150	180	240	240	540	600	600	600	600	600	600	900	900	900	1620
50	0.00	0.15	0.53	1.27	2.24	3.21	4.18	5.17	6.25	7.41	8.92	12.19	16.28	20.44	25.63	31.44
	30	180	240	540	540	540	540	600	600	840	840	1140	1140	1260	1620	1620
60	0.01	0.22	1.04	2.01	2.97	3.94	4.91	6.53	8.57	10.61	12.66	17.09	21.61	26.38	32.18	37.99
	120	210	540	540	540	540	540	1140	1140	1140	1140	1260	1260	1620	1620	1620
70	0.05	0.48	1.45	2.41	3.40	5.45	7.49	9.70	11.96	14.21	16.47	20.99	25.85	31.66	37.46	43.27
	210	540	540	540	1140	1140	1140	1260	1260	1260	1260	1260	1620	1620	1620	1620
80	0.12	0.70	1.67	3.25	5.40	7.66	9.92	12.18	14.43	16.69	18.95	24.09	29.90	35.70	41.51	47.31
	540	540	540	1140	1260	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620
90	0.24	0.82	2.39	4.65	6.91	9.17	11.42	13.68	15.94	18.38	21.29	27.09	32.90	38.70	44.51	50.31
	540	540	1260	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620	1620	1620
100	0.31	1.03	3.29	5.54	7.80	10.06	12.32	14.77	17.67	20.57	23.47	29.28	35.09	40.89	46.70	52.50
	540	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620	1620	1620	1620	1620

03230800 Deer Creek at Mount Sterling, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.19	2.02	1.82	1.86	1.44	2.07	3.48
3	1.29	1.27	1.32	1.49	1.16	1.02	1.09
4	1.09	1.04	1.00	1.17	1.05	1.00	1.00
5	1.04	1.02	1.00	1.00	1.02	1.00	1.00
6	1.02	1.00	1.00	1.00	1.01	1.00	1.00
7	2.19	2.04	1.86	2.12	1.90	4.79	8.36
8	1.29	1.31	1.46	1.65	1.30	1.26	2.09
9	1.29	1.34	1.44	1.74	1.33	1.40	3.58
10	1.13	1.11	1.31	1.70	1.35	1.34	2.81
11	1.09	1.07	1.14	1.64	1.36	1.38	2.52
12	1.74	1.66	1.60	1.73	1.34	1.37	3.35
13	1.13	1.09	1.11	1.57	1.28	1.20	1.49
14	1.08	1.08	1.12	1.53	1.31	1.24	1.57
15	1.06	1.06	1.14	1.50	1.34	1.30	1.61
16	1.03	1.11	1.18	1.51	1.37	1.38	1.71
17	1.09	1.06	1.04	1.46	1.25	1.16	1.40
18	1.04	1.06	1.12	1.43	1.30	1.24	1.49
19	1.02	1.04	1.14	1.40	1.33	1.29	1.54
20	1.00	1.11	1.18	1.45	1.37	1.37	1.65

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	231.52	244.52	268.08	290.43	428.42	540.40	573.61
40.00	1.960	229.63	235.23	262.29	290.23	406.90	501.71	543.03
30.00	1.834	225.59	215.41	249.95	289.80	361.01	419.18	477.82
25.00	1.751	222.92	202.32	241.80	289.52	330.70	364.68	434.75
20.00	1.645	220.76	195.52	225.44	259.92	282.52	314.96	390.73
10.00	1.282	212.58	181.69	185.47	194.17	209.65	240.38	270.05
5.00	0.841	145.77	141.37	141.54	141.17	156.71	191.10	220.53
2.00	0.000	106.84	85.82	91.32	100.62	117.59	140.23	150.58

03231000 Deer Creek at Williamsport, Ohio

Location: Latitude 39°35′09″, longitude 83°07′22″, Pickaway County, Hydrologic Unit 05060002

Drainage area, in square miles: 333.

Station used for record extension: 03230500

Time period of systematic or extended record analyzed: 1922-10-01 to 1967-09-30

Percentage of estimated values in extended record: 28.3

Eighty-percent-duration streamflow, in cubic feet per second: 36.

Mean annual streamflow, in inches: 11.59

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.18	1.33	2.83	6.68	15.90	24.22	30.39
40.00	3.68	0.18	1.33	3.02	6.80	16.73	25.86	31.88
30.00	3.38	0.18	1.34	3.41	7.04	18.45	29.23	34.97
25.00	3.20	0.18	1.35	3.66	7.19	19.55	31.38	36.93
20.00	2.97	0.20	1.72	4.06	8.36	20.56	32.78	39.22
10.00	2.25	0.26	2.74	5.49	11.89	25.68	35.31	50.36
5.11	1.52	0.41	4.83	10.62	16.47	38.78	60.56	–

03231000 Deer Creek at Williamsport, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.04	0.19	0.45	0.74	1.03	1.34	1.67	2.00	2.35	2.78	3.64	4.52	5.53	7.23	9.33
	0	60	120	180	180	180	210	210	210	270	270	270	300	330	660	660
6	0.00	0.04	0.23	0.50	0.79	1.13	1.46	1.79	2.13	2.53	2.95	3.81	4.67	5.53	7.23	9.33
	0	90	150	180	210	210	210	210	240	270	270	270	270	300	660	660
8	0.00	0.06	0.27	0.57	0.91	1.27	1.65	2.03	2.41	2.79	3.21	4.07	5.49	7.20	9.05	10.95
	30	90	150	210	210	240	240	240	240	240	270	270	540	540	600	600
10	0.00	0.07	0.30	0.63	1.00	1.38	1.76	2.15	2.53	2.95	3.38	4.79	6.51	8.22	10.12	12.02
	30	120	180	210	240	240	240	240	240	270	270	540	540	540	600	600
15	0.01	0.09	0.35	0.72	1.11	1.49	1.93	2.41	2.88	3.44	4.20	5.85	7.68	9.58	11.49	16.18
	30	120	180	240	240	240	300	300	300	480	480	540	600	600	600	1740
20	0.01	0.10	0.38	0.76	1.21	1.69	2.16	2.64	3.16	3.80	4.61	6.52	8.42	10.68	13.86	19.38
	60	150	240	240	300	300	300	300	330	480	600	600	600	780	1740	1740
25	0.01	0.11	0.39	0.84	1.32	1.80	2.30	2.82	3.34	4.18	5.13	7.11	9.20	11.65	15.65	21.18
	60	150	240	300	300	300	330	330	330	600	600	660	660	780	1740	1740
30	0.01	0.11	0.42	0.89	1.37	1.86	2.39	2.91	3.63	4.59	5.64	7.73	9.83	12.09	16.99	22.51
	60	150	300	300	300	330	330	330	600	660	660	660	660	780	1740	1740
40	0.01	0.11	0.43	0.91	1.38	1.90	2.42	3.30	4.29	5.34	6.39	8.48	10.92	14.06	19.27	24.85
	60	150	300	300	300	330	330	600	660	660	660	660	960	1320	1740	1800
50	0.01	0.11	0.45	0.91	1.38	1.90	2.82	3.77	4.73	5.73	6.78	9.39	13.02	17.40	22.16	27.87
	60	150	240	300	300	330	600	600	600	660	660	960	1380	1380	1800	1800
60	0.01	0.11	0.47	0.91	1.38	2.25	3.21	4.16	5.11	6.45	8.64	13.02	17.40	21.78	26.16	30.93
	60	210	240	300	300	600	600	600	600	1380	1380	1380	1380	1380	1380	1800
70	0.01	0.13	0.49	0.91	1.62	2.57	3.52	5.57	7.76	9.95	12.14	16.52	20.90	25.28	29.66	34.04
	60	210	240	300	600	600	600	1380	1380	1380	1380	1380	1380	1380	1380	1380
80	0.01	0.15	0.52	0.93	1.88	3.85	6.04	8.23	10.42	12.61	14.80	19.18	23.56	27.94	32.57	37.52
	60	210	240	600	600	1380	1380	1380	1380	1380	1380	1380	1380	1380	1560	1560
90	0.01	0.16	0.54	1.44	3.63	5.82	8.01	10.20	12.39	14.58	16.77	21.15	25.61	30.56	35.51	40.47
	60	210	240	1380	1380	1380	1380	1380	1380	1380	1380	1380	1560	1560	1560	1560
100	0.01	0.18	0.69	2.88	5.07	7.26	9.45	11.64	13.83	16.02	18.21	22.95	27.90	32.85	37.80	42.75
	60	240	1380	1380	1380	1380	1380	1380	1380	1380	1380	1560	1560	1560	1560	1560

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.35	1.77	1.51	1.64	1.99	3.88	6.37
3	1.32	1.25	1.06	1.01	1.10	1.12	1.15
4	1.12	1.10	1.03	1.00	1.00	1.06	1.05
5	1.06	1.04	1.01	1.00	1.00	1.04	1.03
6	1.00	1.02	1.00	1.00	1.00	1.02	1.01
7	2.38	1.94	1.78	2.08	3.64	8.93	11.20
8	1.33	1.28	1.13	1.06	1.42	1.55	2.67
9	1.34	1.27	1.17	1.11	1.53	1.83	4.38
10	1.25	1.28	1.19	1.14	1.56	1.79	2.83
11	1.23	1.29	1.22	1.17	1.69	1.68	2.46
12	1.38	1.31	1.12	1.21	1.45	1.94	4.84
13	1.26	1.20	1.15	1.12	1.40	1.41	1.81
14	1.15	1.23	1.17	1.14	1.46	1.50	1.83
15	1.13	1.23	1.20	1.17	1.62	1.50	1.88
16	1.06	1.28	1.26	1.21	1.79	1.60	1.95
17	1.17	1.18	1.13	1.12	1.32	1.39	1.60
18	1.08	1.18	1.17	1.13	1.41	1.46	1.67
19	1.02	1.21	1.20	1.18	1.56	1.48	1.76
20	1.01	1.27	1.26	1.23	1.77	1.56	1.86

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	279.50	245.07	285.96	320.21	333.43	450.62	529.93
40.00	1.960	276.16	243.47	284.73	319.88	333.33	438.33	523.48
30.00	1.834	269.03	240.07	282.10	319.19	333.11	412.11	509.73
25.00	1.751	264.32	237.82	280.37	318.73	332.97	394.80	500.64
20.00	1.645	259.42	233.17	273.38	309.79	328.70	376.02	465.98
10.00	1.282	240.59	219.78	231.03	256.75	263.13	327.61	369.22
5.00	0.841	215.76	199.29	206.38	221.75	231.07	259.41	289.88
2.00	0.000	146.97	113.91	125.55	127.94	139.97	172.39	191.06

03232000 Paint Creek near Greenfield, Ohio

Location: Latitude 39°22′45″, longitude 83°22′32″, Fayette County, Hydrologic Unit 05060003

Drainage area, in square miles: 249.

Station used for record extension: 03231000

Time period of systematic or extended record analyzed: 1922-10-01 to 1981-09-30

Percentage of estimated values in extended record: 27.1

Eighty-percent-duration streamflow, in cubic feet per second: 11.

Mean annual streamflow, in inches: 12.81

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
60.00	4.09	0.04	0.80	3.30	6.31	13.81	21.59	30.13
50.00	3.90	0.05	1.07	3.48	7.16	15.60	24.42	32.99
40.00	3.68	0.05	1.40	3.70	8.21	17.79	27.90	36.51
30.00	3.38	0.06	1.83	3.98	9.56	20.63	32.39	41.05
25.00	3.20	0.06	1.91	4.15	9.66	22.29	35.27	42.97
20.00	2.97	0.07	2.00	4.36	9.78	24.34	38.82	45.34
10.00	2.25	0.23	3.49	7.11	14.26	27.37	41.92	60.91
5.45	1.60	0.30	6.48	11.35	16.91	30.35	57.16	–

03232000 Paint Creek near Greenfield, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.02	0.11	0.36	0.67	0.99	1.30	1.62	1.94	2.27	2.64	3.01	3.89	4.83	5.78	6.73	8.81
	60	90	180	180	180	180	180	180	210	210	210	270	270	270	270	960
6	0.02	0.11	0.36	0.67	0.99	1.30	1.62	1.97	2.34	2.71	3.17	4.11	5.06	6.01	7.21	9.53
	60	120	180	180	180	180	180	210	210	210	270	270	270	270	660	660
8	0.03	0.14	0.39	0.69	1.01	1.35	1.72	2.13	2.56	3.00	3.47	4.43	5.49	6.95	9.05	11.16
	60	120	150	180	180	210	210	240	240	270	270	300	300	600	600	600
10	0.03	0.16	0.42	0.74	1.07	1.47	1.89	2.31	2.73	3.20	3.70	4.75	6.43	8.28	10.38	12.48
	60	150	180	180	210	240	240	240	240	270	300	300	480	600	600	600
15	0.05	0.20	0.51	0.83	1.25	1.67	2.09	2.56	3.05	3.57	4.39	6.07	8.07	10.18	12.28	14.74
	120	150	180	240	240	240	240	270	300	300	480	480	600	600	600	1320
20	0.06	0.23	0.55	0.93	1.35	1.80	2.27	2.75	3.27	4.03	4.87	6.96	9.07	11.17	13.98	19.13
	150	180	180	240	240	270	270	300	300	480	480	600	600	600	900	1740
25	0.07	0.25	0.58	1.00	1.44	1.92	2.39	2.94	3.52	4.40	5.45	7.56	9.66	12.68	16.21	22.31
	150	180	240	240	270	270	270	330	330	600	600	600	600	900	1740	1740
30	0.08	0.27	0.62	1.05	1.53	2.00	2.56	3.13	3.73	4.79	5.84	7.94	10.88	14.03	18.55	24.66
	150	180	240	270	270	270	330	330	600	600	600	600	900	900	1740	1740
40	0.09	0.27	0.69	1.17	1.66	2.23	2.80	3.38	4.17	5.23	6.36	9.51	12.67	15.92	21.93	28.04
	180	180	270	270	300	330	330	330	600	600	900	900	900	960	1740	1740
50	0.09	0.30	0.76	1.26	1.80	2.38	2.96	3.54	4.39	5.88	7.46	10.73	14.10	18.28	24.38	30.48
	180	240	270	300	330	330	330	330	600	900	900	960	960	1740	1740	1740
60	0.09	0.33	0.83	1.36	1.91	2.48	3.06	3.64	5.14	6.83	8.51	12.01	16.64	21.39	26.56	32.88
	180	270	300	300	330	330	330	330	960	960	960	1320	1320	1380	1800	1800
70	0.10	0.37	0.89	1.42	1.98	2.56	3.14	4.35	6.08	8.19	10.61	15.45	20.28	25.12	29.96	35.58
	240	300	300	300	330	330	330	960	1020	1380	1380	1380	1380	1380	1380	1800
80	0.11	0.41	0.94	1.46	2.04	2.61	3.96	6.37	8.79	11.21	13.63	18.47	23.31	28.15	32.99	38.04
	240	300	300	300	330	330	1020	1380	1380	1380	1380	1380	1380	1380	1380	1800
90	0.13	0.44	0.97	1.50	2.08	3.93	6.35	8.77	11.19	13.61	16.03	20.87	25.71	30.54	35.38	40.27
	300	300	300	330	330	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1800
100	0.15	0.47	0.99	1.53	3.38	5.80	8.22	10.64	13.06	15.48	17.90	22.73	27.57	32.41	37.25	42.29
	300	300	300	330	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1800

03232000 Paint Creek near Greenfield, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.22	1.09	1.04	1.01	1.25	1.81	2.31
3	1.18	1.07	1.02	1.00	1.00	1.06	1.40
4	1.10	1.04	1.00	1.00	1.00	1.00	1.04
5	1.04	1.02	1.00	1.00	1.00	1.00	1.00
6	1.01	1.00	1.00	1.00	1.00	1.00	1.00
7	1.22	1.11	1.07	1.20	1.82	3.26	8.00
8	1.18	1.10	1.07	1.07	1.10	1.70	2.26
9	1.18	1.10	1.11	1.11	1.22	2.01	2.83
10	1.15	1.14	1.15	1.15	1.21	1.88	2.56
11	1.11	1.17	1.16	1.23	1.23	1.81	2.59
12	1.20	1.09	1.07	1.07	1.18	1.91	2.42
13	1.14	1.08	1.11	1.11	1.16	1.42	2.25
14	1.09	1.13	1.15	1.15	1.20	1.51	2.23
15	1.07	1.15	1.14	1.23	1.23	1.62	2.41
16	1.04	1.21	1.22	1.28	1.25	1.82	2.58
17	1.10	1.06	1.10	1.12	1.16	1.23	1.99
18	1.06	1.12	1.15	1.15	1.20	1.38	2.10
19	1.03	1.12	1.14	1.23	1.23	1.57	2.31
20	1.02	1.21	1.22	1.28	1.25	1.83	2.52

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
60.00	2.128	264.00	277.33	292.37	312.18	321.60	338.47	350.31
50.00	2.054	262.93	271.64	281.58	303.13	319.50	337.92	349.99
40.00	1.960	261.59	264.45	267.95	291.71	316.85	337.24	349.59
30.00	1.834	259.78	254.79	249.64	276.36	313.29	336.31	349.05
25.00	1.751	246.68	241.39	239.88	263.33	295.49	317.43	343.43
20.00	1.645	230.01	224.35	227.46	246.76	272.84	293.41	336.29
10.00	1.282	193.59	190.92	185.61	202.20	217.73	243.10	269.24
5.00	0.841	155.87	147.01	144.58	145.88	179.76	188.57	221.69
2.00	0.000	92.02	72.52	70.99	87.30	104.03	123.86	141.69

03232300 Rattlesnake Creek at Centerfield, Ohio

Location: Latitude 39°19′44″, longitude 83°28′32″, Highland County, Hydrologic Unit 05060003

Drainage area, in square miles: 209.

Station used for record extension: 03232000

Time period of systematic or extended record analyzed: 1922-10-01 to 1981-10-09

Percentage of estimated values in extended record: 82.9

Eighty-percent-duration streamflow, in cubic feet per second: 23.

Mean annual streamflow, in inches: 12.89

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
60.00	4.09	0.03	0.64	3.04	5.77	13.17	21.00	29.51
50.00	3.90	0.03	0.89	3.17	6.64	14.93	23.77	32.31
40.00	3.68	0.04	1.21	3.32	7.71	17.08	27.17	35.74
30.00	3.38	0.04	1.61	3.52	9.10	19.87	31.57	40.18
25.00	3.20	0.04	1.67	3.72	9.14	22.36	34.74	42.45
20.00	2.97	0.05	1.74	3.96	9.20	25.42	38.64	45.25
10.00	2.25	0.15	3.17	6.67	13.83	27.19	42.25	60.64
5.45	1.60	0.22	6.20	11.35	16.71	30.26	56.60	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.03	0.14	0.43	0.75	1.07	1.40	1.77	2.14	2.51	2.88	3.31	4.26	5.22	6.17	7.35	9.68
	90	150	180	180	180	210	210	210	210	210	270	270	270	270	660	660
6	0.03	0.15	0.43	0.75	1.07	1.43	1.80	2.17	2.55	3.03	3.51	4.46	5.41	6.37	7.81	10.14
	90	150	180	180	180	210	210	210	270	270	270	270	270	270	660	660
8	0.04	0.18	0.46	0.78	1.12	1.49	1.90	2.33	2.80	3.28	3.77	4.83	5.89	7.33	9.45	11.57
	120	150	180	180	210	210	240	270	270	270	300	300	300	600	600	600
10	0.05	0.20	0.50	0.81	1.19	1.61	2.04	2.49	3.00	3.53	4.06	5.12	6.78	8.71	10.82	12.94
	120	150	180	180	240	240	240	270	300	300	300	300	480	600	600	600
15	0.07	0.24	0.56	0.94	1.36	1.78	2.26	2.79	3.32	3.92	4.77	6.47	8.59	10.71	12.82	14.94
	150	180	180	240	240	240	300	300	300	480	480	600	600	600	600	600
20	0.08	0.27	0.60	1.02	1.45	1.93	2.43	2.96	3.57	4.42	5.39	7.51	9.63	11.74	14.16	19.95
	150	180	240	240	270	270	300	300	480	480	600	600	600	600	900	1740
25	0.09	0.28	0.66	1.08	1.55	2.03	2.60	3.18	3.88	4.94	6.00	8.12	10.23	12.98	17.35	23.49
	180	180	240	240	270	270	330	330	600	600	600	600	600	900	1740	1740
30	0.10	0.29	0.69	1.15	1.63	2.17	2.76	3.34	4.26	5.32	6.38	8.50	11.27	14.44	19.88	26.02
	180	180	240	270	270	330	330	330	600	600	600	600	900	900	1740	1740
40	0.10	0.32	0.77	1.25	1.81	2.39	2.97	3.62	4.68	5.73	6.88	10.05	13.23	17.16	23.30	29.44
	180	240	270	270	330	330	330	600	600	600	900	900	900	1740	1740	1740
50	0.10	0.35	0.83	1.36	1.94	2.52	3.10	3.79	4.93	6.52	8.10	11.49	14.88	19.39	25.53	31.67
	180	270	300	300	330	330	330	600	900	900	900	960	960	1740	1740	1740
60	0.11	0.39	0.91	1.45	2.03	2.61	3.20	4.26	5.95	7.64	9.34	12.80	17.45	22.28	27.51	33.86
	240	270	300	330	330	330	330	960	960	960	960	1320	1320	1380	1800	1800
70	0.13	0.43	0.96	1.52	2.10	2.68	3.51	5.21	6.98	8.85	11.29	16.16	21.03	25.90	30.77	36.34
	270	300	300	330	330	330	960	960	1020	1380	1380	1380	1380	1380	1380	1800
80	0.15	0.47	1.00	1.56	2.15	3.04	4.84	6.90	9.34	11.77	14.21	19.08	23.95	28.82	33.69	38.57
	300	300	300	330	330	1020	1020	1380	1380	1380	1380	1380	1380	1380	1380	1800
90	0.17	0.49	1.02	1.60	2.40	4.34	6.77	9.21	11.64	14.08	16.51	21.38	26.25	31.12	35.99	40.86
	300	300	300	330	1020	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
100	0.19	0.50	1.05	1.65	3.70	6.13	8.57	11.00	13.44	15.87	18.31	23.18	28.05	32.92	37.79	42.66
	300	300	330	360	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.76	1.59	1.63	1.71	1.95	3.29	4.98
3	1.07	1.00	1.00	1.00	1.07	1.42	1.51
4	1.04	1.00	1.00	1.00	1.00	1.01	1.09
5	1.03	1.00	1.00	1.00	1.00	1.00	1.02
6	1.01	1.00	1.00	1.00	1.00	1.00	1.00
7	1.76	1.61	1.67	1.89	2.31	6.84	8.76
8	1.07	1.00	1.00	1.03	1.23	1.97	2.44
9	1.08	1.00	1.02	1.09	1.31	2.25	3.80
10	1.04	1.02	1.06	1.07	1.13	2.08	2.35
11	1.04	1.03	1.08	1.11	1.11	1.94	2.11
12	1.09	1.00	1.04	1.15	1.54	2.21	3.88
13	1.05	1.00	1.03	1.05	1.08	1.79	1.94
14	1.03	1.02	1.05	1.07	1.09	1.68	1.89
15	1.02	1.03	1.08	1.10	1.11	1.67	1.93
16	1.01	1.03	1.11	1.11	1.11	1.86	1.99
17	1.04	1.00	1.03	1.05	1.07	1.49	1.74
18	1.03	1.02	1.05	1.08	1.09	1.55	1.77
19	1.01	1.03	1.08	1.10	1.11	1.60	1.83
20	1.00	1.03	1.11	1.11	1.11	1.84	1.92

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
60.00	2.128	383.20	369.77	362.52	364.75	364.67	369.67	461.00
50.00	2.054	377.70	356.33	355.81	362.80	363.76	369.28	444.69
40.00	1.960	370.75	339.36	347.34	360.34	362.61	368.78	424.11
30.00	1.834	361.41	316.55	335.96	357.04	361.06	368.11	396.44
25.00	1.751	346.76	316.13	323.62	341.66	345.33	354.68	388.15
20.00	1.645	328.12	315.59	307.92	322.09	325.31	337.59	377.60
10.00	1.282	282.55	249.64	255.70	265.75	267.26	282.57	337.81
5.00	0.841	234.11	218.05	205.42	198.91	210.98	248.04	262.53
2.00	0.000	175.17	126.26	121.77	123.49	133.10	154.85	175.75

03232500 Rocky Fork near Barretts Mills, Ohio

Location: Latitude 39°13′06″, longitude 83°23′08″, Highland County, Hydrologic Unit 05060003

Drainage area, in square miles: 140.

Station used for record extension: 03247500

Time period of systematic or extended record analyzed: 1925-04-01 to 1951-09-30

Percentage of estimated values in extended record: 54.7

Eighty-percent-duration streamflow, in cubic feet per second: 18.

Mean annual streamflow, in inches: 16.43

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
27.00	3.28	0.33	2.17	8.19	15.69	27.98	42.91	56.46
25.00	3.20	0.35	2.47	8.24	15.99	28.55	44.19	56.86
20.00	2.97	0.40	3.34	8.37	16.85	30.20	47.90	58.04
10.00	2.25	0.62	5.56	9.02	19.15	34.26	56.63	75.06
5.40	1.59	1.20	7.90	17.90	25.30	46.33	76.13	–

03232500 Rocky Fork near Barretts Mills, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.03	0.16	0.36	0.61	0.94	1.28	1.62	1.96	2.31	2.71	3.52	4.61	5.96	7.31	8.78
	0	30	90	90	150	150	150	150	150	180	180	180	300	300	300	330
6	0.00	0.03	0.18	0.38	0.61	0.99	1.39	1.80	2.30	2.84	3.38	4.60	5.95	7.29	9.39	12.08
	0	30	90	90	150	180	180	180	240	240	240	300	300	300	600	600
8	0.00	0.04	0.20	0.46	0.87	1.29	1.76	2.33	2.93	3.54	4.15	5.84	8.27	10.88	13.58	16.28
	0	60	90	180	180	210	210	270	270	270	270	540	540	600	600	600
10	0.00	0.06	0.23	0.60	1.01	1.43	1.90	2.43	3.03	3.64	4.25	6.37	8.95	11.64	14.34	17.04
	0	60	90	180	180	210	210	270	270	270	270	540	600	600	600	600
15	0.01	0.08	0.36	0.76	1.16	1.58	2.05	2.52	3.03	3.64	4.25	6.37	8.95	11.64	15.85	23.95
	30	60	150	180	180	210	210	210	270	270	270	540	600	600	1800	1800
20	0.01	0.08	0.43	0.83	1.25	1.72	2.19	2.90	3.65	4.39	5.13	6.62	8.95	11.99	20.08	28.18
	30	150	180	180	210	210	210	330	330	330	330	330	600	1800	1800	1800
25	0.01	0.09	0.47	0.94	1.49	2.16	2.89	3.63	4.37	5.11	5.85	7.34	8.95	12.85	20.40	28.18
	30	90	180	210	300	300	330	330	330	330	330	330	600	1680	1680	1800
30	0.01	0.19	0.73	1.37	2.05	2.72	3.40	4.14	4.88	5.62	6.36	8.04	10.68	16.36	23.92	31.48
	30	240	240	300	300	300	300	330	330	330	330	480	900	1680	1680	1680
40	0.16	0.53	1.20	1.88	2.55	3.39	4.47	5.55	6.63	7.71	8.79	14.44	20.65	26.86	33.75	40.77
	240	300	300	300	300	480	480	480	480	480	480	1380	1380	1380	1560	1560
50	0.24	0.65	1.50	2.58	3.66	4.78	5.99	8.00	11.10	14.21	17.31	23.52	29.79	36.26	43.14	50.15
	300	300	480	480	480	540	540	1380	1380	1380	1380	1380	1440	1440	1560	1560
60	0.27	0.89	2.00	3.21	4.47	7.57	10.68	13.78	16.89	20.03	23.27	29.74	36.22	42.86	49.88	56.90
	300	480	540	540	1380	1380	1380	1380	1380	1440	1440	1440	1440	1560	1560	1560
70	0.38	1.08	2.30	4.80	7.91	11.01	14.20	17.43	20.67	23.91	27.15	33.63	40.43	47.45	54.47	61.49
	480	540	540	1380	1380	1380	1440	1440	1440	1440	1440	1440	1560	1560	1560	1560
80	0.45	1.17	3.67	6.77	9.98	13.22	16.46	19.69	22.93	26.17	29.44	36.45	43.47	50.49	57.51	64.52
	540	540	1380	1380	1440	1440	1440	1440	1440	1440	1560	1560	1560	1560	1560	1560
90	0.47	1.68	4.79	8.03	11.27	14.51	17.75	20.98	24.40	27.91	31.41	38.43	45.45	52.47	59.49	66.50
	540	1380	1440	1440	1440	1440	1440	1440	1560	1560	1560	1560	1560	1560	1560	1560
100	0.49	2.30	5.52	8.76	12.00	15.24	18.66	22.17	25.68	29.19	32.70	39.71	46.73	53.75	60.77	67.79
	600	1380	1440	1440	1440	1440	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.65	1.33	1.19	1.13	1.05	1.02	2.66
3	1.44	1.23	1.13	1.09	1.02	1.00	1.00
4	1.29	1.13	1.03	1.05	1.00	1.00	1.00
5	1.17	1.08	1.00	1.02	1.00	1.00	1.00
6	1.07	1.04	1.00	1.00	1.00	1.00	1.00
7	1.65	1.37	1.25	1.18	1.11	3.31	5.88
8	1.50	1.29	1.20	1.15	1.08	1.08	2.45
9	1.49	1.33	1.22	1.18	1.09	1.24	3.81
10	1.44	1.28	1.20	1.20	1.11	1.31	3.58
11	1.39	1.25	1.18	1.18	1.16	1.35	3.87
12	1.57	1.32	1.22	1.16	1.08	1.12	2.97
13	1.40	1.26	1.18	1.16	1.07	1.12	2.13
14	1.35	1.22	1.13	1.18	1.11	1.13	2.20
15	1.27	1.19	1.14	1.15	1.16	1.18	2.26
16	1.22	1.19	1.15	1.20	1.17	1.18	2.26
17	1.34	1.20	1.13	1.14	1.07	1.11	1.59
18	1.26	1.19	1.11	1.15	1.11	1.13	1.61
19	1.19	1.15	1.14	1.13	1.16	1.15	1.71
20	1.15	1.16	1.15	1.20	1.17	1.17	1.79

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
27.00	1.787	188.36	230.46	256.82	274.02	302.66	321.20	333.25
25.00	1.751	182.67	223.89	248.93	265.29	291.76	316.48	330.96
20.00	1.645	165.73	204.30	225.43	239.27	259.29	302.42	324.14
10.00	1.282	133.74	135.40	146.64	165.73	192.38	232.07	258.15
5.00	0.841	122.33	108.36	117.71	126.33	157.40	199.78	213.09
2.08	0.046	87.18	68.95	74.22	76.89	86.25	107.33	118.75

03234000 Paint Creek near Bourneville, Ohio

Location: Latitude 39°15′49″, longitude 83°10′01″, Ross County, Hydrologic Unit 05060003

Drainage area, in square miles: 807.

Station used for record extension: 03157500

Time period of systematic or extended record analyzed: 1923-10-01 to 1997-09-30

Percentage of estimated values in extended record: 65.2

Eighty-percent-duration streamflow, in cubic feet per second: 56.

Mean annual streamflow, in inches: 13.55

Location of station used for precipitation data: Cincinnati, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
75.00	4.31	0.17	2.07	2.68	6.36	14.11	22.37	33.76
70.00	4.24	0.18	2.17	2.98	6.93	14.80	23.68	35.02
60.00	4.09	0.21	2.39	3.66	8.21	16.36	26.62	37.85
50.00	3.90	0.24	2.65	4.46	9.72	18.19	30.10	41.20
40.00	3.68	0.28	2.97	5.44	11.58	20.45	34.37	45.31
30.00	3.38	0.31	3.18	5.76	12.19	22.09	36.42	46.97
25.00	3.20	0.32	3.27	5.80	12.24	22.90	37.08	47.36
20.00	2.97	0.33	3.80	6.12	12.91	24.64	38.53	51.06
10.00	2.25	0.49	5.04	8.83	16.24	29.17	42.18	57.58
5.36	1.58	0.65	6.91	12.13	22.82	40.13	–	–

03234000 Paint Creek near Bourneville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.04	0.19	0.41	0.68	0.99	1.33	1.72	2.13	2.57	3.02	3.91	4.80	5.69	6.66	8.15
	0	60	90	120	150	180	180	210	240	240	240	240	240	240	270	600
6	0.00	0.04	0.21	0.45	0.72	1.05	1.40	1.79	2.20	2.65	3.09	3.98	4.92	5.92	6.95	9.22
	30	60	120	150	150	180	210	210	240	240	240	240	270	270	600	660
8	0.00	0.05	0.25	0.50	0.79	1.13	1.51	1.90	2.32	2.76	3.24	4.24	5.25	6.29	8.45	10.85
	30	90	120	150	180	180	210	210	240	240	270	270	270	300	600	660
10	0.00	0.06	0.27	0.54	0.85	1.19	1.58	1.97	2.44	2.94	3.44	4.45	5.48	7.30	9.55	12.00
	30	90	120	150	180	210	210	210	270	270	270	270	300	600	660	660
15	0.00	0.07	0.32	0.60	0.93	1.31	1.72	2.22	2.72	3.23	3.73	4.79	6.82	9.05	11.42	15.53
	30	120	150	180	180	210	270	270	270	270	270	300	600	600	660	1320
20	0.01	0.09	0.35	0.65	0.99	1.38	1.87	2.38	2.88	3.38	3.90	5.70	7.93	10.16	13.91	18.81
	30	120	150	180	210	210	270	270	270	270	300	600	600	600	1320	1320
25	0.01	0.10	0.37	0.69	1.04	1.47	1.97	2.47	2.97	3.48	4.26	6.49	8.71	11.34	16.24	21.38
	30	120	150	180	210	270	270	270	270	300	600	600	600	1320	1320	1740
30	0.01	0.11	0.38	0.72	1.08	1.54	2.04	2.54	3.04	3.74	4.85	7.08	9.31	13.11	18.01	23.64
	30	120	150	180	210	270	270	270	270	600	600	600	600	1320	1320	1740
40	0.01	0.12	0.42	0.75	1.14	1.63	2.13	2.63	3.56	4.60	5.71	7.94	11.30	15.68	20.58	26.77
	60	120	180	180	240	270	270	270	540	600	600	600	960	1320	1320	1740
50	0.01	0.14	0.45	0.78	1.21	1.69	2.19	3.15	4.16	5.20	6.31	9.41	12.98	17.51	22.42	28.88
	60	150	180	180	240	270	270	540	540	600	600	960	960	1320	1740	1740
60	0.01	0.15	0.47	0.81	1.26	1.73	2.60	3.60	4.60	5.65	7.17	10.70	14.26	18.91	23.95	30.41
	60	150	180	240	240	270	540	540	540	600	900	960	960	1320	1740	1740
70	0.01	0.16	0.48	0.86	1.30	1.94	2.94	3.94	4.95	6.49	8.16	11.72	15.28	20.02	25.13	31.59
	90	150	180	240	240	540	540	540	540	900	900	960	960	1320	1740	1740
80	0.02	0.16	0.50	0.89	1.34	2.22	3.22	4.22	5.62	7.29	8.99	12.55	16.16	21.05	26.17	32.53
	90	150	180	240	240	540	540	540	900	900	960	960	1020	1380	1380	1740
90	0.02	0.17	0.51	0.92	1.45	2.45	3.45	4.62	6.29	7.96	9.68	13.25	16.95	21.94	27.06	33.30
	90	180	180	240	540	540	540	900	900	900	960	960	1020	1380	1380	1740
100	0.02	0.18	0.52	0.95	1.64	2.64	3.64	5.19	6.86	8.53	10.28	13.85	17.63	22.70	27.82	33.95
	90	180	180	240	540	540	540	900	900	900	960	1020	1020	1380	1380	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.45	1.35	1.37	1.54	1.76	1.62	2.00
3	1.15	1.01	1.00	1.09	1.06	1.05	1.09
4	1.06	1.00	1.00	1.01	1.01	1.00	1.00
5	1.03	1.00	1.00	1.00	1.00	1.00	1.00
6	1.01	1.00	1.00	1.00	1.00	1.00	1.00
7	1.44	1.43	1.49	1.73	2.34	3.64	7.20
8	1.16	1.03	1.08	1.19	1.43	1.54	1.78
9	1.18	1.06	1.11	1.19	1.57	1.77	2.38
10	1.13	1.04	1.09	1.19	1.70	2.05	2.16
11	1.09	1.11	1.10	1.20	1.76	2.16	2.36
12	1.27	1.07	1.13	1.19	1.54	1.58	1.86
13	1.11	1.04	1.07	1.15	1.37	1.56	1.89
14	1.06	1.03	1.09	1.17	1.58	1.93	2.00
15	1.08	1.10	1.08	1.15	1.72	2.11	2.20
16	1.09	1.09	1.10	1.19	1.92	2.35	2.23
17	1.07	1.05	1.08	1.10	1.27	1.45	1.78
18	1.05	1.03	1.07	1.13	1.53	1.90	1.94
19	1.05	1.11	1.08	1.16	1.65	2.11	2.13
20	1.08	1.07	1.09	1.17	1.93	2.35	2.18

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
75.00	2.217	218.82	220.96	216.66	212.58	228.33	363.24	454.97
70.00	2.190	217.20	218.08	213.82	210.49	227.59	355.02	439.93
60.00	2.128	213.51	211.55	207.38	205.74	225.92	336.35	405.78
50.00	2.054	209.04	203.64	199.56	199.98	223.90	313.73	364.39
40.00	1.960	203.40	193.65	189.70	192.71	221.34	285.17	312.14
30.00	1.834	198.49	189.87	183.12	185.97	201.58	268.23	290.84
25.00	1.751	195.75	189.17	180.02	182.09	185.49	261.05	285.92
20.00	1.645	177.19	168.95	175.36	181.01	185.27	242.40	276.34
10.00	1.282	143.01	142.67	139.16	139.21	159.48	201.56	214.26
5.00	0.841	109.16	96.19	98.31	116.55	135.76	169.82	191.77
2.03	0.017	89.84	52.54	56.35	68.47	80.25	105.14	124.65

03235000 Salt Creek at Tarlton, Ohio

Location: Latitude 39°33′20″, longitude 82°46′51″, Pickaway County, Hydrologic Unit 05060002

Drainage area, in square miles: 11.5

Station used for record extension: 03157000

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Percentage of estimated values in extended record: 74.1

Eighty-percent-duration streamflow, in cubic feet per second: 0.3

Mean annual streamflow, in inches: 13.37

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.09	2.42	5.35	8.29	18.27	26.45	38.58
50.00	3.90	0.10	2.56	5.40	9.03	18.40	28.44	40.37
40.00	3.68	0.12	2.75	5.46	10.02	18.57	31.12	42.78
30.00	3.38	0.15	3.00	5.54	11.30	18.80	34.60	45.90
25.00	3.20	0.17	3.51	5.98	12.05	22.00	35.63	47.59
20.00	2.97	0.19	4.19	6.57	12.95	26.32	36.75	49.64
10.00	2.25	0.32	5.22	9.77	15.38	28.97	41.17	57.97
5.36	1.58	0.53	6.18	10.79	21.34	40.30	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.08	0.30	0.53	0.80	1.08	1.38	1.80	2.24	2.68	3.12	3.99	4.87	5.75	7.72	9.91
	30	120	120	150	150	150	180	240	240	240	240	240	240	240	600	600
6	0.02	0.11	0.31	0.56	0.84	1.17	1.50	1.92	2.35	2.79	3.23	4.11	4.99	5.91	7.72	9.91
	60	90	120	150	180	180	180	240	240	240	240	240	240	270	600	600
8	0.03	0.13	0.35	0.63	0.96	1.30	1.68	2.07	2.51	2.95	3.39	4.27	5.22	6.21	7.99	11.28
	60	90	150	180	180	210	210	240	240	240	240	240	270	270	900	900
10	0.03	0.14	0.39	0.69	1.02	1.38	1.76	2.18	2.62	3.06	3.49	4.44	5.43	6.42	9.58	13.10
	90	120	150	180	180	210	210	240	240	240	240	270	270	270	900	1320
15	0.05	0.18	0.45	0.77	1.10	1.46	1.89	2.33	2.79	3.28	3.77	4.76	5.91	8.72	12.02	16.89
	120	120	150	180	180	210	240	240	270	270	270	270	660	900	900	1680
20	0.06	0.20	0.48	0.81	1.14	1.55	1.99	2.48	2.97	3.47	4.02	5.12	7.23	10.21	13.50	18.85
	120	150	150	180	180	240	240	270	270	300	300	300	600	900	900	1680
25	0.07	0.22	0.50	0.83	1.17	1.61	2.10	2.60	3.14	3.69	4.24	5.92	8.12	11.27	14.72	20.03
	120	150	180	180	240	270	270	270	300	300	300	600	600	900	960	1680
30	0.07	0.22	0.52	0.85	1.21	1.70	2.19	2.73	3.28	3.83	4.38	6.48	8.81	12.27	15.83	21.05
	120	150	180	180	240	270	270	300	300	300	300	600	900	960	1020	1680
40	0.07	0.23	0.54	0.87	1.32	1.82	2.31	2.86	3.41	3.96	4.84	7.03	10.45	13.96	17.49	23.16
	120	150	180	180	270	270	300	300	300	300	600	600	960	960	1020	1680
50	0.07	0.23	0.56	0.92	1.40	1.89	2.39	2.90	3.45	4.00	4.95	8.26	11.78	15.29	20.14	25.68
	120	150	180	210	270	270	270	300	300	300	600	960	960	960	1380	1740
60	0.07	0.24	0.58	0.97	1.45	1.95	2.44	2.94	3.45	4.09	5.85	9.36	13.26	18.31	23.36	28.41
	120	180	210	210	270	270	270	270	300	960	960	960	1380	1380	1380	1380
70	0.07	0.25	0.62	1.00	1.50	1.99	2.48	2.98	3.54	5.02	6.78	11.25	16.30	21.35	26.40	31.45
	120	180	210	210	270	270	270	270	420	960	960	1380	1380	1380	1380	1380
80	0.07	0.27	0.65	1.04	1.53	2.02	2.52	3.01	4.17	6.41	8.94	13.99	19.04	24.09	29.14	34.19
	120	210	210	270	270	270	270	270	720	1380	1380	1380	1380	1380	1380	1380
90	0.07	0.29	0.67	1.06	1.56	2.05	2.54	3.77	6.30	8.83	11.35	16.40	21.45	26.50	31.55	36.61
	120	210	210	270	270	270	270	1380	1380	1380	1380	1380	1380	1380	1380	1380
100	0.08	0.31	0.69	1.08	1.58	2.07	3.34	5.87	8.39	10.92	13.44	18.49	23.55	28.60	33.65	38.85
	210	210	210	270	270	270	1380	1380	1380	1380	1380	1380	1380	1380	1380	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.24	1.24	1.23	1.34	1.50	3.17	6.46
3	2.05	1.15	1.07	1.02	1.04	1.04	1.22
4	1.00	1.08	1.01	1.00	1.00	1.01	1.00
5	1.00	1.05	1.00	1.00	1.00	1.00	1.00
6	1.00	1.03	1.00	1.00	1.00	1.00	1.00
7	2.23	1.32	1.46	1.60	2.25	8.89	14.29
8	2.06	1.17	1.17	1.16	1.22	1.77	5.42
9	2.06	1.18	1.21	1.23	1.28	2.21	8.68
10	1.03	1.22	1.23	1.23	1.30	2.41	7.74
11	1.01	1.19	1.31	1.24	1.37	2.39	6.46
12	2.16	1.21	1.16	1.17	1.33	2.23	7.45
13	1.03	1.20	1.20	1.16	1.24	1.40	3.83
14	1.03	1.19	1.21	1.18	1.27	1.66	3.10
15	1.01	1.17	1.31	1.22	1.38	1.76	3.12
16	1.09	1.26	1.32	1.24	1.46	1.93	3.28
17	1.01	1.17	1.17	1.14	1.23	1.28	2.51
18	1.03	1.17	1.23	1.17	1.27	1.48	2.68
19	1.01	1.14	1.31	1.21	1.38	1.69	2.78
20	1.09	1.29	1.32	1.24	1.46	1.82	2.98

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	112.16	161.89	174.95	199.40	211.31	239.15	259.28
50.00	2.054	110.33	160.63	174.23	196.68	208.03	234.25	257.61
40.00	1.960	107.78	158.87	173.23	192.89	203.47	227.43	255.29
30.00	1.834	104.36	156.51	171.89	187.80	197.35	218.28	252.18
25.00	1.751	100.64	155.93	169.52	184.42	191.45	214.00	238.75
20.00	1.645	95.71	155.32	166.31	180.10	183.72	208.79	220.25
10.00	1.282	65.28	97.98	109.76	135.51	155.79	187.15	205.91
5.00	0.841	39.91	74.59	91.14	112.50	125.70	148.89	181.15
2.03	0.021	22.00	42.69	49.45	60.95	76.01	100.98	114.52

03235500 Tar Hollow Creek at Tar Hollow State Park, Ohio

Location: Latitude 39°23′22″, longitude 82°45′03″, Ross County, Hydrologic Unit 05060002

Drainage area, in square miles: 1.35

Station used for record extension: 03236000

Time period of systematic or extended record analyzed: 1938-10-01 to 1978-09-30

Percentage of estimated values in extended record: 20.3

Eighty-percent-duration streamflow, in cubic feet per second: 0.0

Mean annual streamflow, in inches: 12.06

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
41.00	3.70	0.00	2.37	2.43	7.40	14.78	22.36	34.54
40.00	3.68	0.00	2.40	2.51	7.54	14.96	22.66	34.74
30.00	3.38	0.00	2.76	3.49	9.15	17.08	26.12	37.09
25.00	3.20	0.00	2.98	4.11	10.17	18.43	28.32	38.59
20.00	2.97	0.00	3.27	4.94	11.41	20.33	31.22	40.68
10.00	2.25	0.00	4.05	8.42	15.35	27.09	39.41	57.31
5.12	1.53	0.02	5.74	10.24	18.62	36.77	68.12	–

03235500 Tar Hollow Creek at Tar Hollow State Park, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.10	0.27	0.56	0.86	1.16	1.55	1.95	2.34	2.74	3.14	3.53	4.33	5.12	6.00	6.89	8.18
	150	180	180	180	180	240	240	240	240	240	240	240	240	270	270	540
6	0.13	0.34	0.69	1.03	1.38	1.75	2.14	2.54	2.96	3.41	3.85	4.75	5.64	6.53	7.70	9.68
	210	210	210	210	210	240	240	240	270	270	270	270	270	270	600	600
8	0.14	0.35	0.69	1.06	1.48	1.93	2.37	2.82	3.26	3.71	4.15	5.05	5.94	6.83	8.72	10.70
	210	210	210	240	270	270	270	270	270	270	270	270	270	270	600	600
10	0.14	0.35	0.70	1.12	1.57	2.01	2.46	2.91	3.35	3.80	4.24	5.13	6.03	6.92	8.88	11.66
	210	210	240	270	270	270	270	270	270	270	270	270	270	270	600	1320
15	0.14	0.35	0.74	1.19	1.64	2.08	2.53	2.97	3.42	3.86	4.31	5.20	6.09	7.79	11.06	15.58
	210	210	270	270	270	270	270	270	270	270	270	270	270	540	1320	1740
20	0.14	0.37	0.77	1.21	1.66	2.10	2.55	3.00	3.44	3.89	4.33	5.49	7.27	10.13	15.25	20.99
	210	240	240	270	270	270	270	270	270	270	270	540	540	960	1740	1740
25	0.15	0.39	0.78	1.23	1.67	2.12	2.57	3.01	3.48	3.98	4.67	6.45	8.90	12.40	18.14	23.88
	240	240	270	270	270	270	270	270	300	300	540	540	960	1740	1740	1740
30	0.16	0.39	0.80	1.24	1.69	2.13	2.59	3.08	3.62	4.51	5.40	7.24	10.41	13.87	19.61	25.36
	240	240	270	270	270	270	300	300	540	540	540	960	960	1740	1740	1740
40	0.16	0.40	0.82	1.27	1.72	2.19	3.17	4.16	5.15	6.14	7.13	9.86	14.08	18.63	23.19	27.75
	240	240	270	270	270	300	600	600	600	600	600	1020	1380	1380	1380	1380
50	0.16	0.40	0.85	1.57	2.56	3.55	4.54	5.53	6.52	7.63	9.90	14.46	19.02	23.57	28.13	32.68
	240	270	270	600	600	600	600	600	600	1380	1380	1380	1380	1380	1380	1380
60	0.16	0.42	1.30	2.29	3.28	4.27	5.26	6.88	9.15	11.43	13.71	18.26	22.82	27.38	31.93	36.49
	240	270	600	600	600	600	600	1380	1380	1380	1380	1380	1380	1380	1380	1380
70	0.16	0.67	1.66	2.65	3.64	5.09	7.37	9.64	11.92	14.20	16.48	21.03	25.59	30.15	34.70	39.26
	270	600	600	600	600	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
80	0.24	0.84	1.83	2.82	4.77	7.04	9.32	11.60	13.88	16.16	18.43	22.99	27.54	32.10	36.66	41.21
	600	600	600	600	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380
90	0.32	0.92	1.91	3.84	6.12	8.40	10.68	12.96	15.23	17.51	19.79	24.34	28.90	33.46	38.03	42.79
	600	600	600	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1440	1440
100	0.36	0.96	2.50	4.78	7.05	9.33	11.61	13.89	16.17	18.44	20.72	25.28	29.87	34.63	39.38	44.13
	600	600	1380	1380	1380	1380	1380	1380	1380	1380	1380	1380	1440	1440	1440	1440

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.11	2.36	2.40	2.48	2.76	4.32	4.59
3	1.00	1.00	1.00	1.03	1.17	1.54	1.36
4	1.00	1.00	1.00	1.00	1.00	1.13	1.07
5	1.00	1.00	1.00	1.00	1.00	1.02	1.04
6	1.00	1.00	1.00	1.00	1.00	1.00	1.02
7	2.10	2.36	2.41	2.56	3.73	6.51	7.13
8	1.00	1.00	1.00	1.04	1.41	1.85	1.83
9	1.00	1.00	1.00	1.11	1.49	1.92	2.52
10	1.01	1.02	1.00	1.01	1.25	1.68	1.91
11	1.01	1.00	1.00	1.01	1.16	1.68	2.05
12	1.20	1.32	1.34	1.51	1.86	2.23	2.82
13	1.01	1.01	1.00	1.01	1.11	1.53	1.65
14	1.01	1.00	1.00	1.00	1.07	1.57	1.60
15	1.00	1.00	1.00	1.01	1.15	1.63	1.75
16	1.01	1.01	1.01	1.02	1.14	1.61	1.76
17	1.00	1.00	1.00	1.01	1.04	1.45	1.41
18	1.01	1.01	1.00	1.01	1.06	1.53	1.47
19	1.00	1.01	1.00	1.03	1.15	1.60	1.64
20	1.01	1.00	1.00	1.02	1.14	1.57	1.67

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
41.00	1.971	398.48	316.86	302.18	288.27	282.11	287.40	385.27
40.00	1.960	398.12	316.54	301.69	287.65	282.00	287.25	382.34
30.00	1.834	393.86	312.65	295.79	280.24	280.63	285.51	347.19
25.00	1.751	391.05	310.09	291.89	275.35	279.73	284.35	323.98
20.00	1.645	387.79	306.55	286.92	269.76	277.76	282.85	297.81
10.00	1.282	359.09	288.98	274.43	259.86	259.65	271.38	285.63
5.00	0.841	256.17	210.85	199.89	199.61	209.73	222.96	239.32
2.05	0.031	183.77	122.11	125.11	122.13	121.74	137.91	154.03

03236000 Salt Creek near Londonderry, Ohio

Location: Latitude 39°15′22″, longitude 82°46′12″, Ross County, Hydrologic Unit 05060002

Drainage area, in square miles: 286.

Station used for record extension: 03235500

Time period of systematic or extended record analyzed: 1938-10-01 to 1978-09-30

Percentage of estimated values in extended record: 70.0

Eighty-percent-duration streamflow, in cubic feet per second: 22.

Mean annual streamflow, in inches: 11.94

Location of station used for precipitation data: McConnelsville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
41.00	3.70	0.18	2.65	2.86	7.52	14.39	21.59	32.59
40.00	3.68	0.18	2.70	3.05	7.70	14.76	22.08	32.98
30.00	3.38	0.18	3.23	5.32	9.84	19.03	27.82	37.54
25.00	3.20	0.18	3.57	6.76	11.20	21.76	31.47	40.44
20.00	2.97	0.18	4.01	8.34	12.80	24.82	35.61	44.13
10.00	2.25	0.18	5.28	8.38	15.32	26.53	39.77	55.24
5.12	1.53	0.21	6.26	10.43	20.63	39.77	54.61	–

03236000 Salt Creek near Londonderry, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.09	0.38	0.68	0.97	1.27	1.56	1.93	2.32	2.71	3.10	3.89	4.67	5.46	6.24	7.10
	0	180	180	180	180	180	180	240	240	240	240	240	240	240	240	300
6	0.00	0.10	0.40	0.69	1.02	1.36	1.73	2.12	2.51	2.90	3.30	4.15	5.04	5.92	6.80	8.41
	0	180	180	180	210	210	240	240	240	240	240	270	270	270	270	600
8	0.00	0.13	0.47	0.81	1.16	1.51	1.95	2.39	2.83	3.27	3.72	4.60	5.48	6.36	7.84	10.84
	0	210	210	210	210	240	270	270	270	270	270	270	270	270	900	960
10	0.00	0.16	0.50	0.84	1.22	1.66	2.10	2.54	2.99	3.43	3.87	4.75	5.63	6.52	8.43	11.58
	0	210	210	210	270	270	270	270	270	270	270	270	270	270	900	1260
15	0.00	0.16	0.50	0.89	1.33	1.78	2.22	2.66	3.10	3.54	3.98	4.87	5.75	6.63	8.49	12.57
	0	210	210	270	270	270	270	270	270	270	270	270	270	270	660	1740
20	0.00	0.16	0.53	0.92	1.36	1.80	2.25	2.69	3.13	3.57	4.01	4.90	5.88	7.79	9.94	14.56
	0	210	240	270	270	270	270	270	270	270	270	300	300	660	660	1740
25	0.00	0.16	0.54	0.93	1.37	1.82	2.26	2.70	3.14	3.58	4.07	5.06	7.01	9.16	11.46	16.71
	0	210	240	270	270	270	270	270	270	300	300	300	660	660	1380	1740
30	0.00	0.16	0.54	0.94	1.38	1.82	2.27	2.71	3.18	3.68	4.23	6.19	8.25	10.46	14.97	19.53
	0	210	240	270	270	270	270	270	300	300	600	600	660	1380	1380	1740
40	0.00	0.16	0.55	0.96	1.41	1.85	2.59	3.57	4.55	5.54	6.52	9.12	13.48	17.99	22.50	27.01
	0	210	240	270	270	270	600	600	600	600	600	1020	1380	1380	1380	1380
50	0.00	0.19	0.55	1.12	2.10	3.08	4.06	5.11	6.77	8.48	10.73	15.25	19.76	24.27	28.78	33.54
	0	210	270	540	600	600	600	1020	1020	1380	1380	1380	1380	1380	1380	1680
60	0.04	0.24	1.05	1.97	2.95	4.56	6.23	8.41	10.66	12.92	15.17	19.69	24.20	28.78	34.28	39.77
	210	210	540	600	600	1020	1020	1380	1380	1380	1380	1380	1380	1680	1680	1680
70	0.08	0.56	1.44	2.88	4.55	6.78	9.04	11.30	13.55	15.81	18.06	22.58	27.99	33.49	38.98	44.47
	210	540	600	1020	1020	1380	1380	1380	1380	1380	1380	1380	1680	1680	1680	1680
80	0.21	0.74	2.16	4.07	6.32	8.58	10.84	13.09	15.35	17.63	20.37	25.87	31.36	36.85	42.35	47.90
	540	540	1020	1380	1380	1380	1380	1380	1380	1680	1680	1680	1680	1680	1680	1740
90	0.29	1.02	2.90	5.16	7.41	9.67	11.93	14.46	17.21	19.96	22.70	28.20	33.69	39.18	44.85	50.54
	540	1020	1380	1380	1380	1380	1380	1680	1680	1680	1680	1680	1680	1680	1740	1740
100	0.32	1.31	3.55	5.81	8.07	10.55	13.30	16.05	18.79	21.54	24.29	29.78	35.36	41.05	46.74	52.56
	540	1020	1380	1380	1380	1680	1680	1680	1680	1680	1680	1680	1740	1740	1740	1800

03236000 Salt Creek near Londonderry, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	3.13	3.12	3.05	2.96	3.29	4.95	5.17
3	1.05	1.10	1.09	1.08	1.21	1.48	1.38
4	1.03	1.00	1.00	1.00	1.00	1.13	1.06
5	1.00	1.00	1.00	1.00	1.00	1.06	1.04
6	1.00	1.00	1.00	1.00	1.00	1.03	1.02
7	3.13	3.12	3.04	2.96	3.55	6.84	7.59
8	1.05	1.10	1.09	1.09	1.48	1.83	2.57
9	1.05	1.10	1.09	1.09	1.45	2.14	4.15
10	1.00	1.01	1.00	1.01	1.38	1.93	3.04
11	1.04	1.01	1.01	1.01	1.31	1.83	3.12
12	1.52	1.60	1.56	1.58	1.81	2.18	4.03
13	1.00	1.00	1.01	1.00	1.10	1.56	1.84
14	1.00	1.01	1.00	1.00	1.12	1.63	1.92
15	1.00	1.00	1.00	1.01	1.17	1.66	1.97
16	1.04	1.01	1.00	1.03	1.18	1.75	2.03
17	1.00	1.00	1.00	1.00	1.02	1.50	1.65
18	1.04	1.00	1.00	1.01	1.08	1.60	1.72
19	1.00	1.01	1.00	1.00	1.17	1.64	1.80
20	1.00	1.01	1.00	1.03	1.17	1.71	1.90

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
41.00	1.971	380.09	301.26	290.62	283.08	278.67	315.30	424.06
40.00	1.960	379.11	300.66	289.91	282.55	278.62	314.30	419.94
30.00	1.834	367.39	293.52	281.40	276.18	278.02	302.34	370.49
25.00	1.751	359.65	288.81	275.79	271.97	277.62	294.44	337.83
20.00	1.645	350.53	283.46	269.45	266.73	276.31	285.48	300.98
10.00	1.282	326.02	278.54	266.90	257.61	258.49	277.05	282.38
5.00	0.841	226.10	179.20	176.26	186.97	194.14	205.56	220.05
2.05	0.031	149.35	98.13	99.08	101.24	114.53	138.23	153.67

03237280 Upper Twin Creek at Mcgaw, Ohio

Location: Latitude 38°38′37″, longitude 83°12′57″, Scioto County, Hydrologic Unit 05090201

Drainage area, in square miles: 12.2

Station used for record extension: None

Time period of systematic or extended record analyzed: 1963-07-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 0.3

Mean annual streamflow, in inches: 15.47

Location of station used for precipitation data: Charleston, West Virginia

Location of station used for potential evapotranspiration data: Charleston, West Virginia

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
35.00	3.54	0.07	4.55	6.38	14.74	24.13	37.30	52.25
30.00	3.38	0.07	4.95	6.64	15.08	24.71	38.49	53.38
25.00	3.20	0.07	5.42	6.95	15.48	25.39	39.89	54.72
20.00	2.97	0.08	5.99	7.33	15.97	26.23	41.62	56.36
10.00	2.25	0.19	7.02	10.41	19.16	32.87	46.21	66.06
5.83	1.67	0.29	7.60	12.87	23.84	39.00	–	–

03237280 Upper Twin Creek at Mcgaw, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.04	0.19	0.51	0.89	1.27	1.65	2.03	2.52	3.03	3.54	4.05	5.06	6.08	7.10	9.06	11.60
	60	120	180	180	180	180	180	240	240	240	240	240	240	240	600	600
6	0.05	0.19	0.51	0.89	1.27	1.65	2.03	2.52	3.03	3.54	4.05	5.06	6.08	7.10	9.06	11.60
	90	120	180	180	180	180	210	240	240	240	240	240	240	240	600	600
8	0.06	0.22	0.53	0.90	1.28	1.70	2.14	2.59	3.03	3.54	4.05	5.06	6.08	7.22	9.76	12.72
	90	150	150	180	180	210	210	210	210	240	240	240	240	600	600	900
10	0.06	0.24	0.57	0.95	1.33	1.78	2.22	2.67	3.11	3.56	4.05	5.06	6.21	8.75	11.29	15.86
	90	150	180	180	180	210	210	210	210	210	240	240	600	600	600	1320
15	0.07	0.28	0.66	1.04	1.45	1.89	2.34	2.78	3.23	3.73	4.24	6.43	8.97	11.51	14.97	21.20
	120	180	180	180	210	210	210	210	210	240	240	600	600	600	900	1680
20	0.08	0.31	0.69	1.07	1.51	1.96	2.40	2.85	3.34	3.96	5.23	7.77	10.31	13.14	17.46	23.00
	180	180	180	180	210	210	210	210	240	600	600	600	600	1020	1020	1680
25	0.09	0.32	0.70	1.11	1.55	2.00	2.44	2.90	3.41	4.50	5.77	8.31	10.85	14.22	18.54	24.41
	180	180	180	210	210	210	210	240	240	600	600	600	600	1020	1020	1680
30	0.09	0.32	0.70	1.14	1.58	2.02	2.47	2.94	3.45	4.57	5.84	8.38	10.92	14.38	19.04	26.16
	180	180	180	210	210	210	210	240	240	600	600	600	600	1020	1680	1680
40	0.09	0.32	0.73	1.17	1.62	2.06	2.50	2.95	3.50	4.57	5.84	8.38	10.92	16.56	23.68	30.93
	180	180	210	210	210	210	210	210	270	600	600	600	600	1680	1680	1740
50	0.09	0.32	0.75	1.19	1.64	2.08	2.56	3.13	3.70	4.57	7.32	13.47	19.82	26.18	32.53	38.88
	180	180	210	210	210	210	270	270	270	600	1440	1500	1500	1500	1500	1500
60	0.09	0.32	0.76	1.21	1.65	2.14	3.01	6.06	9.11	12.29	15.46	21.82	28.17	34.52	40.88	47.23
	180	180	210	210	210	270	1440	1440	1500	1500	1500	1500	1500	1500	1500	1500
70	0.09	0.33	0.77	1.22	2.58	5.63	8.74	11.92	15.09	18.27	21.44	27.80	34.15	40.50	46.86	53.21
	180	210	210	210	1440	1440	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
80	0.09	0.34	0.78	3.28	6.35	9.53	12.71	15.88	19.06	22.24	25.41	31.77	38.12	44.47	50.82	57.18
	180	210	210	1440	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
90	0.09	0.34	2.59	5.69	8.86	12.04	15.22	18.39	21.57	24.75	27.92	34.28	40.63	46.98	53.34	59.69
	180	210	1440	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
100	0.09	0.97	4.06	7.23	10.41	13.59	16.76	19.94	23.11	26.29	29.47	35.82	42.17	48.53	55.36	62.73
	180	1440	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.35	1.31	1.33	1.40	1.47	2.46	3.62
3	1.27	1.17	1.07	1.00	1.01	1.11	1.50
4	1.21	1.09	1.04	1.00	1.00	1.00	1.11
5	1.14	1.05	1.02	1.00	1.00	1.00	1.00
6	1.06	1.03	1.00	1.00	1.00	1.00	1.00
7	1.35	1.50	1.53	1.55	2.16	4.29	7.61
8	1.28	1.22	1.10	1.08	1.09	1.69	2.39
9	1.28	1.23	1.14	1.11	1.10	1.81	3.20
10	1.26	1.20	1.16	1.14	1.13	1.93	2.62
11	1.28	1.19	1.17	1.14	1.16	1.96	2.51
12	1.31	1.24	1.13	1.08	1.07	1.68	3.34
13	1.25	1.20	1.13	1.10	1.08	1.56	2.05
14	1.25	1.17	1.14	1.14	1.11	1.66	2.04
15	1.25	1.17	1.19	1.14	1.14	1.63	2.01
16	1.20	1.16	1.17	1.17	1.19	1.54	2.37
17	1.23	1.16	1.11	1.10	1.08	1.34	1.90
18	1.20	1.15	1.14	1.14	1.10	1.42	1.89
19	1.16	1.14	1.19	1.13	1.14	1.38	1.86
20	1.09	1.13	1.17	1.17	1.19	1.43	2.12

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
35.00	1.903	157.20	170.04	184.48	198.34	208.52	215.30	219.85
30.00	1.834	156.41	167.09	181.62	197.35	206.50	213.63	219.41
25.00	1.751	155.44	163.50	178.14	196.15	204.03	211.60	218.88
20.00	1.645	154.20	158.93	173.71	194.63	200.89	209.01	218.20
10.00	1.282	120.00	129.35	146.50	154.89	169.63	187.14	199.67
5.00	0.841	90.29	106.46	113.99	136.25	150.58	169.33	179.71
2.06	0.036	50.38	60.78	62.46	72.22	92.50	112.17	129.91

03237500 Ohio Brush Creek near West Union, Ohio

Location: Latitude 38°48′13″, longitude 83°25′16″, Adams County, Hydrologic Unit 05090201

Drainage area, in square miles: 387.

Station used for record extension: 03247500

Time period of systematic or extended record analyzed: 1925-04-01 to 1997-09-30

Percentage of estimated values in extended record: 9.0

Eighty-percent-duration streamflow, in cubic feet per second: 16.

Mean annual streamflow, in inches: 16.18

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Covington, Kentucy

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.07	2.12	6.20	11.87	22.51	36.10	52.50
70.00	4.24	0.07	2.18	6.26	12.00	22.74	36.51	52.64
60.00	4.09	0.08	2.39	6.49	12.48	23.59	38.02	53.14
50.00	3.90	0.09	2.63	6.75	13.04	24.59	39.81	53.73
40.00	3.68	0.10	2.94	7.08	13.74	25.82	42.01	54.45
30.00	3.38	0.12	3.87	7.24	15.23	28.13	43.93	57.14
25.00	3.20	0.14	4.62	7.28	16.35	29.80	44.89	59.38
20.00	2.97	0.14	4.85	7.31	16.86	30.98	45.23	61.43
10.00	2.25	0.20	6.52	10.59	19.96	38.65	51.46	71.97
5.21	1.55	0.68	8.28	15.20	25.23	50.00	71.61	–

03237500 Ohio Brush Creek near West Union, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.03	0.14	0.34	0.62	0.95	1.28	1.61	1.94	2.30	2.72	3.26	4.32	5.38	6.44	7.51	8.92
	60	90	120	150	150	150	150	150	180	240	240	240	240	240	240	660
6	0.04	0.15	0.39	0.72	1.08	1.48	1.88	2.33	2.79	3.26	3.73	4.67	5.73	6.80	7.90	10.65
	60	90	150	150	180	180	180	210	210	210	210	240	240	240	270	660
8	0.05	0.17	0.52	0.92	1.31	1.78	2.24	2.71	3.17	3.64	4.10	5.05	6.12	7.74	10.40	13.06
	90	120	180	180	180	210	210	210	210	210	210	240	240	600	600	600
10	0.05	0.21	0.59	0.99	1.44	1.91	2.37	2.84	3.30	3.77	4.23	5.27	6.59	9.25	11.90	14.56
	90	150	180	180	210	210	210	210	210	210	210	240	600	600	600	600
15	0.07	0.26	0.65	1.08	1.55	2.01	2.48	2.94	3.42	3.95	4.48	5.87	8.53	11.18	13.84	19.06
	120	150	180	210	210	210	210	210	240	240	240	600	600	600	600	1680
20	0.08	0.28	0.66	1.11	1.58	2.04	2.51	3.04	3.57	4.13	4.73	6.79	9.45	12.11	15.41	22.86
	150	150	180	210	210	210	210	240	240	270	270	600	600	600	1680	1680
25	0.09	0.29	0.67	1.13	1.59	2.08	2.61	3.14	3.74	4.34	4.93	7.32	9.97	12.63	17.53	24.98
	150	150	180	210	210	240	240	270	270	270	270	600	600	600	1680	1680
30	0.10	0.30	0.68	1.14	1.62	2.15	2.70	3.30	3.89	4.49	5.09	7.64	10.30	13.04	18.82	26.26
	150	150	210	210	240	240	270	270	270	270	270	600	600	900	1680	1680
40	0.11	0.31	0.70	1.20	1.73	2.33	2.92	3.52	4.12	4.72	5.44	7.98	10.64	14.66	20.15	27.59
	150	150	210	240	240	270	270	270	270	270	540	600	600	960	1680	1680
50	0.11	0.31	0.75	1.29	1.88	2.48	3.08	3.68	4.28	4.94	5.62	8.12	11.78	16.03	20.65	28.20
	150	150	240	270	270	270	270	270	270	300	540	600	960	960	1680	1740
60	0.12	0.32	0.80	1.40	2.00	2.59	3.25	3.92	4.58	5.25	5.91	8.57	12.82	17.07	21.35	29.04
	150	150	240	270	270	270	300	300	300	300	300	960	960	960	1380	1740
70	0.12	0.32	0.88	1.48	2.14	2.81	3.47	4.14	4.80	5.46	6.19	9.38	13.63	17.89	23.09	29.74
	150	180	270	270	300	300	300	300	300	300	330	960	960	960	1380	1740
80	0.12	0.35	0.96	1.63	2.29	2.96	3.62	4.29	4.95	5.67	6.40	10.04	14.30	18.81	24.79	30.90
	150	240	300	300	300	300	300	300	300	330	330	960	960	1020	1380	1380
90	0.12	0.40	1.07	1.73	2.40	3.06	3.73	4.39	5.11	5.84	6.57	10.73	15.25	20.32	26.43	32.54
	150	300	300	300	300	300	300	300	330	330	330	1020	1020	1380	1380	1380
100	0.12	0.48	1.14	1.81	2.47	3.14	3.80	4.52	5.25	5.98	7.07	11.59	16.11	21.89	28.00	34.11
	150	300	300	300	300	300	300	330	330	330	1020	1020	1020	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.53	1.50	1.54	1.33	1.26	1.90	6.17
3	1.03	1.03	1.18	1.13	1.04	1.07	1.27
4	1.00	1.00	1.10	1.09	1.01	1.00	1.00
5	1.00	1.00	1.05	1.05	1.00	1.00	1.00
6	1.00	1.00	1.02	1.02	1.00	1.00	1.00
7	1.54	1.58	1.64	1.43	1.52	8.11	15.92
8	1.03	1.13	1.33	1.23	1.13	1.58	3.61
9	1.02	1.16	1.41	1.27	1.18	1.90	6.93
10	1.02	1.16	1.42	1.31	1.19	1.99	4.71
11	1.00	1.22	1.42	1.32	1.18	1.95	4.00
12	1.03	1.15	1.34	1.23	1.13	1.67	6.45
13	1.00	1.08	1.37	1.25	1.17	1.50	2.23
14	1.01	1.09	1.37	1.28	1.18	1.56	2.16
15	1.01	1.13	1.37	1.29	1.18	1.57	2.25
16	1.03	1.14	1.38	1.29	1.22	1.56	2.33
17	1.01	1.02	1.34	1.23	1.15	1.26	1.99
18	1.00	1.04	1.34	1.26	1.18	1.26	1.98
19	1.01	1.10	1.34	1.25	1.18	1.28	2.07
20	1.01	1.12	1.34	1.29	1.22	1.26	2.20

03237500 Ohio Brush Creek near West Union, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
73.00	2.206	272.78	224.02	211.86	250.80	284.60	307.51	317.32
70.00	2.190	272.77	223.72	211.76	248.86	281.29	304.24	314.75
60.00	2.128	272.74	222.60	211.38	241.64	268.99	292.12	305.23
50.00	2.054	272.69	221.25	210.92	232.89	254.09	277.42	293.68
40.00	1.960	272.64	219.55	210.33	221.85	235.27	258.87	279.11
30.00	1.834	268.68	217.26	206.78	217.06	225.98	247.31	267.15
25.00	1.751	264.88	215.76	203.59	216.93	224.67	243.70	261.55
20.00	1.645	234.05	200.47	202.29	206.80	222.70	236.23	250.51
10.00	1.282	178.86	173.77	167.10	183.38	209.41	219.84	229.02
5.00	0.841	148.51	119.92	116.55	128.45	139.97	163.33	189.54
2.03	0.017	108.34	75.84	71.00	78.26	93.97	124.46	134.53

03238500 Whiteoak Creek near Georgetown, Ohio

Location: Latitude 38°51′29″, longitude 83°55′43″, Brown County, Hydrologic Unit 05090201

Drainage area, in square miles: 218.

Station used for record extension: 03247500

Time period of systematic or extended record analyzed: 1924-10-01 to 1997-09-18

Percentage of estimated values in extended record: 5.5

Eighty-percent-duration streamflow, in cubic feet per second: 7.3

Mean annual streamflow, in inches: 16.38

Location of station used for precipitation data: Cincinnati, Ohio

Location of station used for potential evapotranspiration data: Covington, Kentucy

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.07	1.58	5.85	12.85	24.50	39.64	52.75
70.00	4.24	0.07	1.67	5.88	12.88	24.59	39.72	52.98
60.00	4.09	0.07	2.00	5.98	12.98	24.94	40.03	53.84
50.00	3.90	0.08	2.39	6.11	13.11	25.36	40.39	54.85
40.00	3.68	0.08	2.86	6.26	13.26	25.86	40.83	56.09
30.00	3.38	0.09	3.33	6.38	13.96	27.72	42.43	56.60
25.00	3.20	0.10	3.57	6.43	14.55	29.25	43.75	56.61
20.00	2.97	0.13	4.22	7.56	15.45	29.96	44.75	57.55
10.00	2.25	0.23	6.37	9.57	20.84	35.18	52.74	76.35
5.21	1.55	0.63	7.65	14.10	23.47	49.26	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.04	0.15	0.37	0.64	0.97	1.30	1.75	2.22	2.69	3.16	3.68	4.75	5.83	6.91	7.98	9.48
	60	90	120	120	150	150	210	210	210	210	240	240	240	240	240	660
6	0.04	0.15	0.40	0.74	1.10	1.51	1.97	2.44	2.97	3.51	4.05	5.12	6.20	7.28	8.64	11.33
	60	90	120	150	180	180	210	210	240	240	240	240	240	240	600	600
8	0.05	0.18	0.51	0.90	1.30	1.75	2.22	2.74	3.28	3.82	4.36	5.45	6.66	8.89	11.58	14.27
	60	120	150	180	180	210	210	240	240	240	240	270	270	600	600	600
10	0.05	0.22	0.58	0.99	1.42	1.89	2.36	2.87	3.41	3.95	4.56	5.77	7.72	10.41	13.11	16.28
	90	150	180	180	210	210	210	240	240	270	270	270	600	600	600	1320
15	0.07	0.26	0.67	1.12	1.59	2.06	2.53	3.09	3.70	4.30	4.91	6.81	9.50	12.19	14.88	20.80
	120	150	180	210	210	210	210	270	270	270	270	600	600	600	600	1320
20	0.08	0.29	0.72	1.19	1.66	2.13	2.66	3.26	3.87	4.47	5.08	7.59	10.28	12.97	16.30	23.89
	150	180	210	210	210	210	270	270	270	270	270	600	600	600	1320	1740
25	0.09	0.31	0.75	1.23	1.70	2.17	2.78	3.38	3.99	4.59	5.38	8.01	10.70	13.39	17.82	25.62
	150	180	210	210	210	270	270	270	270	270	540	600	600	600	1740	1740
30	0.09	0.32	0.78	1.25	1.72	2.27	2.88	3.48	4.09	4.69	5.74	8.27	10.96	13.65	18.82	26.62
	150	180	210	210	210	270	270	270	270	270	540	600	600	600	1740	1740
40	0.10	0.33	0.80	1.27	1.83	2.43	3.04	3.67	4.41	5.15	6.13	8.58	11.27	14.08	20.01	27.81
	150	210	210	210	270	270	270	330	330	330	540	600	600	900	1740	1740
50	0.10	0.34	0.82	1.35	1.96	2.57	3.29	4.03	4.77	5.51	6.28	8.75	11.45	15.40	20.87	28.66
	150	210	210	270	270	300	330	330	330	330	540	600	600	960	1680	1740
60	0.10	0.35	0.85	1.45	2.10	2.81	3.55	4.28	5.02	5.76	6.50	8.87	12.30	16.61	22.05	29.59
	150	210	240	270	300	330	330	330	330	330	330	600	960	960	1680	1680
70	0.10	0.37	0.92	1.59	2.26	3.00	3.74	4.48	5.22	5.96	6.70	9.06	13.37	17.67	23.17	30.71
	150	240	270	300	300	330	330	330	330	330	330	960	960	960	1680	1680
80	0.10	0.42	1.02	1.70	2.40	3.14	3.88	4.62	5.36	6.10	6.84	10.02	14.33	18.63	24.32	31.79
	150	240	300	300	330	330	330	330	330	330	330	960	960	960	1620	1680
90	0.13	0.45	1.11	1.78	2.51	3.25	3.99	4.73	5.47	6.21	6.95	10.89	15.20	19.50	26.35	33.62
	240	240	300	300	330	330	330	330	330	330	330	960	960	960	1620	1620
100	0.15	0.49	1.16	1.86	2.60	3.34	4.08	4.82	5.56	6.30	7.38	11.68	15.99	21.10	28.36	35.62
	240	300	300	330	330	330	330	330	330	330	960	960	960	1620	1620	1620

03238500 Whiteoak Creek near Georgetown, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.61	1.40	1.34	1.22	1.42	9.77	19.29
3	1.30	1.14	1.16	1.07	1.05	1.26	1.60
4	1.13	1.05	1.08	1.04	1.03	1.00	1.14
5	1.04	1.00	1.05	1.03	1.02	1.00	1.00
6	1.01	1.00	1.02	1.02	1.00	1.00	1.00
7	1.63	1.44	1.42	1.57	8.21	25.43	35.09
8	1.31	1.23	1.28	1.17	1.39	3.22	15.03
9	1.31	1.28	1.35	1.22	1.53	8.77	22.66
10	1.25	1.26	1.35	1.29	1.41	2.29	14.48
11	1.17	1.24	1.33	1.28	1.34	1.84	9.22
12	1.33	1.27	1.30	1.17	1.52	9.10	21.92
13	1.23	1.17	1.30	1.20	1.25	1.71	8.07
14	1.15	1.21	1.31	1.27	1.24	1.53	2.68
15	1.07	1.22	1.31	1.26	1.23	1.39	1.91
16	1.05	1.27	1.33	1.31	1.25	1.36	2.01
17	1.17	1.15	1.27	1.19	1.19	1.41	1.96
18	1.07	1.19	1.30	1.24	1.22	1.28	1.76
19	1.03	1.22	1.29	1.25	1.19	1.20	1.71
20	1.05	1.23	1.29	1.30	1.25	1.17	1.83

03238500 Whiteoak Creek near Georgetown, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
73.00	2.206	214.21	210.03	221.36	268.67	290.16	321.41	337.90
70.00	2.190	212.68	209.70	221.30	266.98	287.40	318.86	335.39
60.00	2.128	206.99	208.46	221.07	260.72	277.17	309.40	326.08
50.00	2.054	200.09	206.96	220.79	253.12	264.76	297.94	314.80
40.00	1.960	191.38	205.07	220.44	243.54	249.10	283.46	300.55
30.00	1.834	183.87	199.57	213.26	230.36	238.81	264.48	294.10
25.00	1.751	180.19	195.05	206.49	221.58	235.26	252.09	293.67
20.00	1.645	174.89	188.63	204.61	218.22	231.23	248.02	271.45
10.00	1.282	147.80	157.26	165.14	183.74	210.26	235.61	249.36
5.00	0.841	119.89	116.05	118.22	134.31	150.30	175.81	211.26
2.03	0.017	84.34	69.70	67.87	79.41	93.78	120.18	137.66

03240000 Little Miami River near Oldtown, Ohio

Location: Latitude 39°44′54″, longitude 83°55′53″, Greene County, Hydrologic Unit 05090202

Drainage area, in square miles: 129.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1952-08-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 25.

Mean annual streamflow, in inches: 12.74

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.63	2.85	4.18	8.43	16.82	27.17	37.58
40.00	3.68	0.66	3.09	4.79	9.11	18.42	28.62	38.87
30.00	3.38	0.73	3.58	6.04	10.53	21.71	31.61	41.54
25.00	3.20	0.77	3.90	6.84	11.43	23.81	33.51	43.24
20.00	2.97	0.81	4.18	7.23	12.09	24.82	34.84	46.35
10.00	2.25	0.88	5.40	8.02	15.02	27.00	38.20	52.86
5.11	1.52	1.05	6.49	12.29	17.37	35.80	–	–

03240000 Little Miami River near Oldtown, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.01	0.10	0.27	0.50	0.79	1.11	1.42	1.73	2.07	2.81	3.54	4.32	5.47	7.77
	0	0	30	60	120	150	180	180	180	180	210	210	210	240	660	660
6	0.00	0.00	0.02	0.12	0.30	0.56	0.87	1.18	1.50	1.82	2.18	2.91	3.73	4.57	6.34	8.64
	0	0	30	60	120	150	180	180	180	210	210	210	240	240	660	660
8	0.00	0.00	0.02	0.15	0.36	0.63	0.95	1.26	1.59	1.96	2.34	3.18	4.37	6.26	8.14	12.09
	0	0	60	90	150	180	180	180	210	210	240	240	540	540	900	1260
10	0.00	0.00	0.03	0.17	0.38	0.67	0.99	1.32	1.68	2.09	2.51	3.38	5.08	6.96	10.26	14.65
	0	0	60	90	150	180	180	210	210	240	240	270	540	540	1260	1260
15	0.00	0.00	0.03	0.20	0.42	0.73	1.09	1.46	1.88	2.30	2.76	3.78	5.86	7.95	10.26	15.60
	0	0	60	120	150	180	210	240	240	240	270	540	600	600	1260	1740
20	0.00	0.00	0.04	0.22	0.45	0.80	1.17	1.57	1.99	2.45	2.92	4.60	6.69	8.78	10.87	16.48
	0	0	90	120	180	210	210	240	240	270	270	600	600	600	600	1740
25	0.00	0.00	0.04	0.23	0.49	0.85	1.22	1.64	2.09	2.56	3.17	5.27	7.36	9.45	11.66	17.34
	0	0	90	120	210	210	240	240	270	270	600	600	600	600	660	1740
30	0.00	0.00	0.04	0.24	0.53	0.89	1.27	1.70	2.17	2.71	3.76	5.85	7.94	10.06	12.62	18.70
	0	0	90	120	210	210	240	270	270	600	600	600	600	660	1740	1800
40	0.00	0.00	0.05	0.30	0.59	0.95	1.36	1.83	2.68	3.72	4.77	6.86	9.42	12.72	17.89	23.75
	0	0	120	150	210	210	270	270	600	600	600	600	900	1200	1680	1680
50	0.00	0.00	0.10	0.36	0.65	1.00	1.88	2.82	3.76	4.80	6.32	10.35	14.74	19.14	24.43	30.29
	0	0	150	150	180	210	540	540	540	840	900	1260	1260	1260	1680	1680
60	0.00	0.00	0.15	0.41	0.94	1.88	2.83	4.97	7.17	9.36	11.56	15.96	20.35	24.78	30.64	36.50
	0	0	150	150	540	540	540	1260	1260	1260	1260	1260	1260	1680	1680	1680
70	0.00	0.00	0.20	0.74	2.31	4.51	6.71	8.91	11.10	13.30	15.50	19.89	24.29	30.06	35.92	41.78
	0	0	150	540	1260	1260	1260	1260	1260	1260	1260	1260	1260	1680	1680	1680
80	0.00	0.00	0.48	2.67	4.87	7.07	9.27	11.46	13.66	15.86	18.05	22.57	28.43	34.29	40.15	46.01
	0	0	1260	1260	1260	1260	1260	1260	1260	1260	1260	1680	1680	1680	1680	1680
90	0.00	0.01	2.06	4.26	6.46	8.66	10.85	13.05	15.25	17.44	19.98	25.84	31.69	37.55	43.41	49.27
	0	150	1260	1260	1260	1260	1260	1260	1260	1260	1680	1680	1680	1680	1680	1680
100	0.00	0.83	3.02	5.22	7.42	9.61	11.81	14.01	16.58	19.51	22.44	28.30	34.16	40.02	45.88	51.73
	0	1260	1260	1260	1260	1260	1260	1260	1680	1680	1680	1680	1680	1680	1680	1680

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.56	1.73	1.68	1.95	2.13	1.73	3.23
3	1.03	1.02	1.00	1.24	1.56	1.11	1.09
4	1.03	1.00	1.00	1.00	1.26	1.05	1.03
5	1.02	1.00	1.00	1.00	1.11	1.02	1.02
6	1.00	1.00	1.00	1.00	1.04	1.01	1.01
7	1.56	1.80	1.78	2.34	2.77	4.69	7.58
8	1.03	1.04	1.03	1.61	1.91	1.37	2.59
9	1.03	1.05	1.04	1.74	2.08	1.55	4.46
10	1.00	1.04	1.06	1.53	2.06	1.64	4.50
11	1.06	1.08	1.05	1.48	2.08	1.74	5.55
12	1.11	1.09	1.27	1.79	1.98	1.49	3.46
13	1.00	1.04	1.03	1.38	1.91	1.38	1.94
14	1.04	1.04	1.06	1.23	1.92	1.58	2.33
15	1.04	1.08	1.07	1.21	2.00	1.69	3.58
16	1.05	1.10	1.07	1.22	2.17	1.81	4.77
17	1.03	1.05	1.03	1.13	1.80	1.33	1.63
18	1.06	1.03	1.06	1.17	1.86	1.55	1.80
19	1.04	1.08	1.05	1.19	1.95	1.66	2.34
20	1.05	1.07	1.05	1.22	2.10	1.79	3.80

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	239.28	227.15	233.86	233.66	249.47	437.62	504.50
40.00	1.960	237.88	220.73	228.28	230.38	249.02	410.87	470.07
30.00	1.834	234.89	207.02	216.37	223.38	248.07	353.81	396.62
25.00	1.751	232.92	197.98	208.50	218.76	247.44	316.13	348.13
20.00	1.645	228.61	192.07	197.55	209.16	242.34	292.18	323.18
10.00	1.282	213.06	179.89	174.97	183.75	207.28	242.78	281.44
5.00	0.841	169.09	129.49	139.41	161.55	171.50	206.50	229.40
2.00	0.000	110.81	78.89	84.67	84.89	90.65	133.40	155.60

03240500 North Fork Massie Creek at Cedarville, Ohio

Location: Latitude 39°45′25″, longitude 83°47′25″, Greene County, Hydrologic Unit 05090202

Drainage area, in square miles: 28.9

Station used for record extension: 03241500

Time period of systematic or extended record analyzed: 1952-09-01 to 1997-09-30

Percentage of estimated values in extended record: 68.4

Eighty-percent-duration streamflow, in cubic feet per second: 2.5

Mean annual streamflow, in inches: 13.59

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.07	1.47	1.95	5.66	15.03	26.67	40.14
40.00	3.68	0.12	2.01	2.87	6.87	17.08	28.87	41.67
30.00	3.38	0.22	3.13	4.76	9.38	21.31	33.40	44.82
25.00	3.20	0.29	3.84	5.97	10.98	24.01	36.29	46.82
20.00	2.97	0.33	4.21	6.89	11.92	25.42	37.71	49.23
10.00	2.25	0.42	5.56	8.92	15.89	29.00	42.03	57.84
5.11	1.52	0.83	6.94	12.80	19.13	38.62	–	–

03240500 North Fork Massie Creek at Cedarville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.04	0.18	0.35	0.57	0.79	1.11	1.50	1.89	2.28	2.67	3.55	4.45	5.34	6.23	8.29
	30	30	90	90	120	120	210	210	210	210	210	240	240	240	240	600
6	0.01	0.05	0.20	0.42	0.69	1.00	1.36	1.75	2.14	2.53	2.98	3.87	4.76	5.65	6.75	9.20
	30	60	90	120	150	180	210	210	210	210	240	240	240	240	660	660
8	0.02	0.08	0.26	0.54	0.87	1.20	1.54	1.91	2.32	2.76	3.21	4.13	5.13	6.23	8.21	12.90
	30	60	150	150	180	180	180	210	240	240	240	270	270	300	1260	1260
10	0.02	0.09	0.30	0.59	0.92	1.26	1.59	1.96	2.40	2.85	3.29	4.24	5.31	6.92	11.21	15.89
	60	60	150	180	180	180	180	210	240	240	240	270	300	540	1260	1260
15	0.03	0.11	0.32	0.63	0.96	1.30	1.63	2.07	2.51	2.96	3.41	4.31	6.29	8.52	11.21	17.12
	60	90	150	180	180	180	180	240	240	240	240	300	600	600	1260	1740
20	0.03	0.13	0.35	0.67	1.00	1.34	1.76	2.21	2.65	3.10	3.55	5.76	7.99	10.22	12.46	17.58
	60	90	120	180	180	180	240	240	240	240	240	600	600	600	600	1740
25	0.04	0.15	0.39	0.73	1.06	1.48	1.92	2.37	2.82	3.81	4.93	7.16	9.39	11.62	13.89	19.00
	90	120	180	180	180	240	240	240	240	600	600	600	600	600	960	1800
30	0.04	0.16	0.46	0.79	1.19	1.64	2.08	2.71	3.83	4.94	6.06	8.29	10.52	12.76	15.55	20.63
	90	120	180	180	240	240	240	600	600	600	600	600	600	600	840	1800
40	0.05	0.22	0.58	1.00	1.44	2.29	3.29	4.36	5.47	6.59	7.70	9.94	12.72	15.84	19.54	25.21
	120	180	210	240	240	540	540	600	600	600	600	600	840	840	1200	1620
50	0.08	0.30	0.71	1.44	2.44	3.45	4.45	5.45	6.54	7.66	9.12	12.24	16.75	22.08	28.10	34.13
	180	210	240	540	540	540	540	540	600	600	840	840	1260	1560	1620	1620
60	0.11	0.36	1.12	2.12	3.13	4.13	5.13	6.37	8.56	10.90	13.24	18.16	23.96	29.90	35.92	41.95
	210	270	540	540	540	540	540	840	1260	1260	1260	1560	1560	1620	1620	1620
70	0.14	0.50	1.51	2.51	3.52	5.54	7.88	10.23	12.57	15.16	18.06	23.87	29.86	35.88	41.91	47.93
	210	540	540	540	540	1260	1260	1260	1260	1560	1560	1560	1620	1620	1620	1620
80	0.17	0.72	1.73	3.39	5.73	8.08	10.42	13.30	16.20	19.10	22.05	28.07	34.10	40.13	46.15	52.18
	270	540	540	1260	1260	1260	1260	1560	1560	1560	1620	1620	1620	1620	1620	1620
90	0.24	0.85	2.58	4.92	7.27	10.09	12.99	15.89	18.89	21.91	24.92	30.95	36.97	43.00	49.02	55.05
	540	540	1260	1260	1260	1560	1560	1560	1620	1620	1620	1620	1620	1620	1620	1620
100	0.31	1.14	3.48	5.95	8.85	11.75	14.75	17.77	20.78	23.79	26.81	32.83	38.86	44.89	50.91	56.94
	540	1260	1260	1560	1560	1560	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.51	1.64	1.64	1.68	1.50	1.20	1.79
3	1.16	1.11	1.04	1.23	1.30	1.04	1.01
4	1.09	1.05	1.01	1.00	1.12	1.00	1.00
5	1.05	1.03	1.00	1.00	1.04	1.00	1.00
6	1.02	1.01	1.00	1.00	1.01	1.00	1.00
7	1.52	1.75	1.79	1.90	1.84	2.96	5.18
8	1.16	1.11	1.09	1.61	1.61	1.21	1.30
9	1.16	1.11	1.12	1.74	1.72	1.33	1.67
10	1.13	1.09	1.13	1.68	1.72	1.32	1.49
11	1.10	1.07	1.14	1.71	1.76	1.37	1.60
12	1.18	1.14	1.31	1.69	1.63	1.30	1.62
13	1.13	1.08	1.07	1.51	1.63	1.24	1.27
14	1.08	1.05	1.10	1.45	1.63	1.31	1.36
15	1.05	1.03	1.12	1.48	1.72	1.37	1.48
16	1.04	1.05	1.16	1.34	1.75	1.41	1.63
17	1.09	1.05	1.05	1.34	1.57	1.24	1.23
18	1.05	1.05	1.08	1.28	1.60	1.31	1.33
19	1.02	1.01	1.12	1.32	1.70	1.37	1.47
20	1.00	1.05	1.16	1.28	1.73	1.41	1.60

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	227.23	228.80	236.16	259.89	327.66	496.89	551.40
40.00	1.960	223.44	219.76	225.41	255.03	319.11	462.81	509.40
30.00	1.834	215.37	200.46	202.49	244.66	300.86	390.13	419.80
25.00	1.751	210.04	187.72	187.35	237.81	288.81	342.13	360.64
20.00	1.645	206.68	180.24	179.27	221.80	257.69	290.46	313.41
10.00	1.282	191.48	168.64	170.79	176.29	188.43	217.53	247.24
5.00	0.841	144.87	119.46	115.82	125.21	135.46	187.85	217.52
2.00	0.000	86.89	65.62	76.11	79.62	97.43	119.55	138.74

03241000 South Fork Massie Creek near Cedarville, Ohio

Location: Latitude 39°44′20″, longitude 83°45′50″, Greene County, Hydrologic Unit 05090202

Drainage area, in square miles: 17.1

Station used for record extension: 03241500

Time period of systematic or extended record analyzed: 1952-09-01 to 1997-09-30

Percentage of estimated values in extended record: 68.4

Eighty-percent-duration streamflow, in cubic feet per second: 0.8

Mean annual streamflow, in inches: 15.89

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.01	1.23	1.60	5.13	16.47	30.92	47.34
40.00	3.68	0.04	1.80	2.55	6.49	18.76	33.06	48.93
30.00	3.38	0.10	2.97	4.51	9.29	23.47	37.48	52.20
25.00	3.20	0.14	3.72	5.76	11.07	26.47	40.29	54.28
20.00	2.97	0.17	4.18	7.10	12.51	27.97	41.90	56.06
10.00	2.25	0.20	5.85	9.25	17.86	32.78	46.79	64.35
5.11	1.52	0.63	7.31	15.22	21.88	53.65	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.04	0.15	0.37	0.63	0.89	1.22	1.68	2.14	2.59	3.05	3.51	4.44	5.48	6.53	7.65	10.07
	60	90	120	120	120	210	210	210	210	210	210	240	240	240	270	660
6	0.04	0.15	0.37	0.73	1.12	1.51	1.94	2.40	2.85	3.31	3.83	4.90	6.07	7.25	8.63	11.29
	60	90	120	180	180	180	210	210	210	240	240	270	270	270	600	660
8	0.04	0.15	0.53	0.92	1.31	1.70	2.12	2.58	3.10	3.62	4.19	5.36	6.54	8.21	11.10	16.58
	60	90	180	180	180	180	210	240	240	240	270	270	270	540	1260	1260
10	0.04	0.20	0.57	0.96	1.35	1.74	2.17	2.68	3.21	3.73	4.29	5.46	6.70	9.33	14.81	20.29
	60	150	180	180	180	180	210	240	240	240	270	270	540	1260	1260	1260
15	0.08	0.25	0.58	0.98	1.37	1.80	2.29	2.82	3.34	3.86	4.38	5.92	8.53	11.14	14.84	21.69
	120	150	180	180	180	210	240	240	240	240	240	600	600	600	960	1740
20	0.09	0.28	0.61	1.00	1.43	1.91	2.43	2.96	3.48	4.00	5.19	7.80	10.41	13.02	15.84	22.36
	120	150	180	180	210	240	240	240	240	240	600	600	600	600	960	1740
25	0.10	0.29	0.65	1.08	1.54	2.06	2.59	3.11	4.18	5.48	6.79	9.40	12.01	14.66	17.66	23.13
	150	150	180	210	240	240	240	240	600	600	600	600	600	660	720	1800
30	0.11	0.31	0.71	1.17	1.68	2.20	2.87	4.17	5.48	6.78	8.09	10.70	13.31	16.18	19.79	24.46
	150	150	210	210	240	240	600	600	600	600	600	600	660	720	900	1800
40	0.13	0.37	0.84	1.36	2.32	3.49	4.74	6.04	7.35	8.66	9.96	12.88	16.54	20.19	24.05	31.09
	180	210	240	240	540	540	600	600	600	600	600	840	840	840	1620	1620
50	0.15	0.43	1.13	2.30	3.48	4.65	5.90	7.21	8.62	10.45	12.28	15.93	20.48	25.73	32.74	39.78
	180	240	540	540	540	540	600	600	840	840	840	840	1140	1260	1620	1620
60	0.17	0.56	1.74	2.91	4.09	5.31	7.06	8.88	10.71	13.28	16.02	21.50	26.98	33.51	40.55	47.60
	210	540	540	540	540	600	840	840	840	1260	1260	1260	1260	1620	1620	1620
70	0.21	0.87	2.05	3.22	4.78	6.89	9.63	12.37	15.11	17.85	20.59	26.07	32.76	39.81	46.86	53.91
	270	540	540	540	840	1260	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620
80	0.32	1.02	2.20	4.27	7.01	9.75	12.49	15.23	17.97	20.71	23.45	30.50	37.55	44.59	51.64	58.69
	540	540	540	1260	1260	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620
90	0.40	1.10	3.23	5.97	8.71	11.45	14.19	16.93	19.90	23.43	26.95	34.00	41.04	48.09	55.14	62.19
	540	540	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620	1620	1620	1620
100	0.43	1.47	4.22	6.96	9.70	12.44	15.35	18.88	22.40	25.93	29.45	36.50	43.54	50.59	57.64	64.69
	540	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.63	1.68	1.71	1.70	1.37	1.07	2.32
3	1.15	1.10	1.05	1.28	1.21	1.03	1.01
4	1.07	1.04	1.00	1.00	1.08	1.00	1.00
5	1.05	1.02	1.00	1.00	1.03	1.00	1.00
6	1.02	1.00	1.00	1.00	1.01	1.00	1.00
7	1.63	1.91	1.92	1.95	1.56	3.51	6.86
8	1.14	1.12	1.14	1.68	1.48	1.17	1.33
9	1.15	1.12	1.24	1.74	1.56	1.32	2.77
10	1.11	1.09	1.13	1.74	1.59	1.32	1.78
11	1.09	1.07	1.13	1.73	1.62	1.35	1.61
12	1.17	1.29	1.47	1.75	1.48	1.20	2.42
13	1.11	1.07	1.10	1.53	1.49	1.25	1.32
14	1.08	1.04	1.12	1.55	1.55	1.31	1.43
15	1.09	1.05	1.13	1.53	1.60	1.35	1.49
16	1.09	1.06	1.15	1.57	1.68	1.44	1.63
17	1.07	1.04	1.08	1.39	1.44	1.24	1.26
18	1.08	1.03	1.12	1.42	1.53	1.31	1.39
19	1.05	1.03	1.13	1.39	1.59	1.35	1.48
20	1.05	1.05	1.15	1.50	1.68	1.44	1.57

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	228.85	228.87	235.87	261.60	363.41	514.28	560.99
40.00	1.960	228.16	222.79	227.35	257.34	348.77	477.27	517.28
30.00	1.834	226.69	209.83	209.18	248.26	317.56	398.32	424.04
25.00	1.751	225.72	201.27	197.19	242.26	296.94	346.19	362.48
20.00	1.645	222.62	192.81	188.92	225.16	262.56	291.59	306.80
10.00	1.282	205.71	177.55	180.44	188.47	204.13	223.20	242.22
5.00	0.841	142.01	116.94	121.12	126.52	142.22	189.97	224.00
2.00	0.000	89.79	65.28	64.69	79.47	105.81	123.10	142.29

03241500 Massies Creek at Wilberforce, Ohio

Location: Latitude 39°43′22″, longitude 83°52′58″, Greene County, Hydrologic Unit 05090202

Drainage area, in square miles: 63.2

Station used for record extension: None

Time period of systematic or extended record analyzed: 1952-09-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 8.2

Mean annual streamflow, in inches: 13.85

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.19	1.70	2.22	5.88	15.26	27.77	41.15
40.00	3.68	0.23	2.25	3.14	7.12	17.39	29.92	43.00
30.00	3.38	0.30	3.39	5.04	9.67	21.79	34.35	46.81
25.00	3.20	0.35	4.12	6.25	11.29	24.59	37.18	49.24
20.00	2.97	0.41	4.46	7.25	12.39	25.97	38.86	51.16
10.00	2.25	0.55	5.69	9.15	16.41	30.12	42.46	58.51
5.11	1.52	0.96	7.17	12.81	19.03	45.80	–	–

03241500 Massies Creek at Wilberforce, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.02	0.14	0.31	0.50	0.77	1.13	1.53	1.93	2.32	2.72	3.57	4.48	5.39	6.30	8.06
	0	30	90	90	120	150	210	210	210	210	210	240	240	240	240	660
6	0.00	0.02	0.15	0.36	0.63	0.93	1.28	1.68	2.08	2.48	2.91	3.82	4.73	5.68	6.77	9.06
	0	30	90	120	150	180	210	210	210	210	240	240	240	270	600	900
8	0.00	0.03	0.20	0.45	0.76	1.10	1.44	1.81	2.22	2.68	3.13	4.12	5.14	6.21	8.54	13.32
	0	30	120	150	180	180	180	210	240	240	240	270	270	540	1260	1260
10	0.00	0.04	0.22	0.49	0.83	1.17	1.51	1.87	2.32	2.78	3.24	4.27	5.29	6.89	11.49	16.27
	0	60	120	150	180	180	180	240	240	240	270	270	270	540	1260	1260
15	0.00	0.05	0.25	0.56	0.90	1.24	1.58	2.02	2.47	2.93	3.38	4.38	6.22	8.50	11.49	16.43
	30	60	150	180	180	180	180	240	240	240	240	270	600	600	1260	1740
20	0.00	0.07	0.27	0.61	0.95	1.29	1.70	2.16	2.62	3.07	3.53	5.55	7.83	10.10	12.38	17.21
	30	90	150	180	180	180	240	240	240	240	240	600	600	600	600	1740
25	0.01	0.08	0.32	0.66	1.00	1.39	1.85	2.30	2.76	3.52	4.65	6.93	9.20	11.48	13.91	18.12
	30	90	180	180	180	240	240	240	240	600	600	600	600	600	720	1800
30	0.01	0.09	0.36	0.70	1.08	1.53	1.99	2.44	3.54	4.67	5.81	8.09	10.36	12.68	15.79	19.77
	30	90	180	180	240	240	240	240	600	600	600	600	600	660	900	1800
40	0.01	0.11	0.45	0.86	1.31	2.08	3.10	4.15	5.29	6.43	7.57	9.84	12.76	15.96	19.94	25.84
	30	150	180	240	240	540	540	600	600	600	600	600	840	900	1200	1620
50	0.01	0.18	0.57	1.24	2.27	3.29	4.32	5.34	6.47	7.61	9.15	12.63	17.02	21.80	27.49	33.63
	60	180	210	540	540	540	540	540	600	600	840	1140	1260	1260	1620	1620
60	0.03	0.25	0.97	1.99	3.01	4.04	5.06	6.39	8.74	11.13	13.52	18.30	23.08	28.31	34.45	40.59
	150	210	540	540	540	540	540	840	1260	1260	1260	1260	1260	1620	1620	1620
70	0.07	0.38	1.41	2.43	3.46	5.70	8.09	10.48	12.87	15.25	17.64	22.42	27.79	33.93	40.07	46.22
	210	540	540	540	540	1260	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620
80	0.12	0.65	1.67	3.51	5.90	8.29	10.68	13.07	15.46	17.85	20.23	25.93	32.07	38.22	44.36	50.50
	270	540	540	1260	1260	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620
90	0.18	0.80	2.68	5.07	7.46	9.84	12.23	14.62	17.01	19.87	22.95	29.09	35.23	41.38	47.52	53.66
	540	540	1260	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620	1620	1620
100	0.27	1.20	3.58	5.97	8.36	10.75	13.14	16.01	19.08	22.15	25.22	31.37	37.51	43.65	49.80	55.94
	540	1260	1260	1260	1260	1260	1260	1620	1620	1620	1620	1620	1620	1620	1620	1620

03241500 Massies Creek at Wilberforce, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.30	2.04	1.92	1.80	1.39	1.20	2.28
3	1.15	1.13	1.13	1.41	1.21	1.03	1.00
4	1.08	1.04	1.01	1.00	1.07	1.00	1.00
5	1.03	1.02	1.00	1.00	1.02	1.00	1.00
6	1.01	1.00	1.00	1.00	1.01	1.00	1.00
7	2.31	2.11	1.99	1.94	1.67	3.21	6.21
8	1.16	1.17	1.35	1.66	1.43	1.18	1.36
9	1.18	1.16	1.40	1.74	1.50	1.29	2.46
10	1.14	1.13	1.12	1.66	1.51	1.31	2.19
11	1.12	1.09	1.14	1.66	1.52	1.34	2.35
12	1.41	1.59	1.61	1.75	1.45	1.26	2.14
13	1.14	1.10	1.09	1.53	1.43	1.19	1.36
14	1.08	1.06	1.10	1.47	1.47	1.28	1.51
15	1.04	1.05	1.14	1.45	1.50	1.34	1.63
16	1.04	1.04	1.18	1.48	1.61	1.43	1.69
17	1.09	1.05	1.08	1.37	1.38	1.18	1.29
18	1.03	1.04	1.10	1.33	1.45	1.28	1.44
19	1.02	1.05	1.14	1.31	1.49	1.34	1.58
20	1.02	1.03	1.18	1.41	1.61	1.43	1.65

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	231.30	233.73	246.73	272.12	378.25	523.72	569.05
40.00	1.960	229.58	226.22	237.44	270.05	362.56	486.49	530.39
30.00	1.834	225.90	210.21	217.62	265.64	329.08	407.07	447.94
25.00	1.751	223.47	199.63	204.53	262.72	306.98	354.62	393.49
20.00	1.645	220.76	194.27	196.08	242.79	269.94	298.99	358.68
10.00	1.282	216.25	185.78	181.75	188.46	206.11	233.38	265.25
5.00	0.841	159.08	130.93	131.93	135.27	160.42	204.46	235.17
2.00	0.000	88.80	74.55	81.43	91.35	101.32	129.05	144.15

03242050 Little Miami River near Spring Valley, Ohio

Location: Latitude 39°35′00″, longitude 84°01′49″, Greene County, Hydrologic Unit 05090202

Drainage area, in square miles: 366.

Station used for record extension: 03241500

Time period of systematic or extended record analyzed: 1952-09-01 to 1997-09-30

Percentage of estimated values in extended record: 66.2

Eighty-percent-duration streamflow, in cubic feet per second: 92.

Mean annual streamflow, in inches: 14.19

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.63	3.17	4.32	8.99	19.40	32.60	46.35
40.00	3.68	0.70	3.73	5.24	10.17	21.19	34.75	48.10
30.00	3.38	0.86	4.90	7.13	12.60	24.89	39.20	51.72
25.00	3.20	0.96	5.64	8.33	14.14	27.25	42.02	54.02
20.00	2.97	1.11	6.08	9.49	15.37	28.87	43.56	56.16
10.00	2.25	1.42	7.17	11.54	18.73	32.86	44.88	62.33
5.11	1.52	1.90	8.68	14.02	21.17	45.81	–	–

03242050 Little Miami River near Spring Valley, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.04	0.13	0.30	0.48	0.65	0.91	1.24	1.64	2.46	3.38	4.31	5.24	6.80
	0	0	0	30	90	90	90	90	150	210	210	210	240	240	240	660
6	0.00	0.00	0.00	0.06	0.13	0.30	0.48	0.74	1.03	1.42	1.83	2.66	3.59	4.52	5.55	7.73
	0	0	0	30	90	90	90	150	150	210	210	240	240	240	540	900
8	0.00	0.00	0.02	0.08	0.16	0.34	0.59	0.89	1.24	1.60	2.01	2.88	3.84	4.89	6.71	11.10
	0	0	30	30	60	120	150	180	180	210	210	240	270	270	540	1260
10	0.00	0.00	0.03	0.09	0.20	0.42	0.68	1.01	1.36	1.71	2.10	3.01	4.05	5.18	9.15	14.05
	0	0	30	30	60	120	150	180	180	180	210	240	270	540	1260	1260
15	0.00	0.00	0.05	0.15	0.33	0.54	0.85	1.20	1.55	1.90	2.31	3.24	4.25	6.48	9.15	14.13
	0	0	30	60	90	120	180	180	180	180	240	240	270	600	1260	1740
20	0.00	0.00	0.07	0.23	0.40	0.64	0.99	1.34	1.69	2.07	2.54	3.47	5.51	7.84	10.17	14.13
	0	30	60	90	90	150	180	180	180	240	240	240	600	600	600	1740
25	0.00	0.01	0.09	0.27	0.45	0.75	1.10	1.45	1.83	2.29	2.76	4.45	6.78	9.12	11.56	15.05
	0	30	90	90	120	180	180	180	240	240	240	600	600	600	900	900
30	0.00	0.01	0.12	0.29	0.51	0.86	1.21	1.57	2.04	2.50	3.28	5.62	7.95	10.28	13.23	16.72
	0	30	90	90	150	180	180	240	240	240	600	600	600	600	900	900
40	0.00	0.01	0.13	0.34	0.68	1.05	1.47	2.05	3.10	4.15	5.24	7.57	9.90	13.12	16.77	21.93
	0	30	90	150	180	210	240	540	540	540	600	600	600	840	1200	1620
50	0.00	0.01	0.14	0.49	0.89	1.46	2.51	3.56	4.61	5.66	6.74	9.39	13.24	18.08	23.46	29.76
	0	30	120	210	210	540	540	540	540	540	600	840	1140	1260	1620	1620
60	0.00	0.01	0.27	0.68	1.51	2.56	3.61	4.66	5.71	7.26	9.71	14.60	19.50	24.73	30.79	37.08
	0	30	210	210	540	540	540	540	540	1260	1260	1260	1260	1560	1560	1620
70	0.00	0.01	0.41	1.24	2.29	3.34	4.72	7.17	9.62	12.06	14.51	19.41	24.77	30.83	36.96	43.25
	0	30	210	540	540	540	1260	1260	1260	1260	1260	1260	1560	1560	1620	1620
80	0.00	0.11	0.75	1.79	3.22	5.67	8.12	10.57	13.01	15.46	17.91	23.45	29.52	35.58	41.88	48.17
	0	210	540	540	1260	1260	1260	1260	1260	1260	1260	1560	1560	1620	1620	1620
90	0.00	0.19	1.13	3.08	5.53	7.97	10.42	12.87	15.32	17.92	20.95	27.01	33.08	39.37	45.67	51.96
	0	270	540	1260	1260	1260	1260	1260	1260	1560	1560	1560	1620	1620	1620	1620
100	0.00	0.35	2.15	4.60	7.05	9.49	11.94	14.48	17.51	20.54	23.57	29.65	35.94	42.24	48.93	55.69
	0	540	1260	1260	1260	1260	1260	1560	1560	1560	1560	1620	1620	1620	1740	1740

03242050 Little Miami River near Spring Valley, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.67	1.55	1.56	1.62	1.46	1.13	1.54
3	1.14	1.12	1.05	1.05	1.25	1.02	1.00
4	1.07	1.05	1.01	1.00	1.07	1.00	1.00
5	1.03	1.04	1.00	1.00	1.01	1.00	1.00
6	1.00	1.02	1.00	1.00	1.00	1.00	1.00
7	1.68	1.62	1.67	1.87	1.72	2.40	5.74
8	1.13	1.14	1.06	1.50	1.56	1.22	1.40
9	1.14	1.13	1.09	1.62	1.73	1.37	3.13
10	1.11	1.10	1.04	1.54	1.76	1.44	3.54
11	1.08	1.07	1.11	1.63	1.84	1.48	4.70
12	1.16	1.14	1.07	1.60	1.57	1.29	1.97
13	1.11	1.08	1.04	1.33	1.64	1.28	1.51
14	1.06	1.06	1.03	1.28	1.70	1.39	1.70
15	1.03	1.05	1.09	1.42	1.81	1.46	3.05
16	1.04	1.05	1.14	1.48	1.92	1.61	4.22
17	1.07	1.06	1.03	1.15	1.58	1.28	1.44
18	1.03	1.05	1.03	1.20	1.68	1.39	1.64
19	1.00	1.03	1.09	1.30	1.81	1.46	2.10
20	1.00	1.05	1.14	1.41	1.92	1.61	3.44

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	226.76	223.64	230.14	247.11	313.31	486.19	544.23
40.00	1.960	222.21	214.00	218.42	239.17	305.04	452.12	510.52
30.00	1.834	212.51	193.44	193.44	222.22	287.41	379.44	438.63
25.00	1.751	206.11	179.87	176.94	211.03	275.76	331.45	391.16
20.00	1.645	200.29	171.94	168.76	197.83	246.16	278.18	354.57
10.00	1.282	186.87	158.67	166.08	170.53	184.79	215.18	272.37
5.00	0.841	108.34	89.31	100.64	114.31	133.17	180.55	221.77
2.00	0.000	66.26	41.86	46.64	63.37	74.82	101.41	126.07

03242200 Anderson Fork near New Burlington, Ohio

Location: Latitude 39°33′59″, longitude 83°54′10″, Greene County, Hydrologic Unit 05090202

Drainage area, in square miles: 77.8

Station used for record extension: 03245500

Time period of systematic or extended record analyzed: 1925-03-11 to 1983-09-30

Percentage of estimated values in extended record: 74.0

Eighty-percent-duration streamflow, in cubic feet per second: 6.7

Mean annual streamflow, in inches: 12.50

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.04	0.65	2.10	6.08	14.90	23.82	32.45
50.00	3.90	0.04	0.83	2.16	6.55	15.73	25.33	33.95
40.00	3.68	0.05	1.06	2.24	7.18	16.85	27.36	35.97
30.00	3.38	0.05	1.37	2.34	7.99	18.30	30.00	38.59
25.00	3.20	0.07	1.43	2.82	8.15	18.44	31.22	39.39
20.00	2.97	0.09	1.50	3.45	8.29	18.51	32.66	40.27
10.00	2.25	0.13	3.10	6.50	12.39	25.73	40.93	57.44
5.36	1.58	0.26	5.51	11.24	17.18	31.17	–	–

03242200 Anderson Fork near New Burlington, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.04	0.16	0.37	0.66	0.97	1.28	1.59	1.90	2.23	2.59	2.97	3.79	4.62	5.44	6.37	7.30
	90	120	120	180	180	180	180	180	210	210	240	240	240	270	270	660
6	0.05	0.17	0.40	0.71	1.02	1.32	1.65	2.01	2.37	2.74	3.15	4.06	4.98	5.90	6.83	9.06
	120	120	150	180	180	180	210	210	210	240	240	270	270	270	270	660
8	0.05	0.18	0.45	0.76	1.08	1.44	1.80	2.24	2.70	3.22	3.73	4.75	5.78	7.67	9.73	11.78
	120	150	180	180	210	210	210	270	270	300	300	300	300	600	600	600
10	0.06	0.19	0.48	0.80	1.16	1.57	2.06	2.57	3.09	3.60	4.11	5.29	7.34	9.39	11.44	13.50
	120	150	180	210	210	270	300	300	300	300	300	600	600	600	600	600
15	0.06	0.21	0.54	0.93	1.40	1.90	2.41	2.92	3.47	4.19	5.21	7.27	9.32	11.37	13.42	17.76
	120	150	210	270	270	300	300	300	330	600	600	600	600	600	600	1320
20	0.06	0.23	0.60	1.05	1.52	2.03	2.57	3.26	4.18	5.10	6.06	8.12	10.17	12.22	16.25	21.74
	120	180	240	270	300	300	330	540	540	540	600	600	600	600	1320	1740
25	0.07	0.25	0.66	1.12	1.60	2.13	2.84	3.76	4.68	5.61	6.53	8.58	10.63	13.64	18.96	24.92
	150	210	270	270	300	330	540	540	540	540	540	600	600	1320	1740	1740
30	0.07	0.26	0.70	1.16	1.65	2.22	3.13	4.05	4.98	5.90	6.82	8.85	11.47	14.96	20.92	26.87
	150	210	270	270	300	330	540	540	540	540	540	600	900	1740	1740	1740
40	0.08	0.29	0.74	1.22	1.77	2.48	3.40	4.33	5.25	6.18	7.10	9.71	12.79	16.89	22.85	28.80
	150	240	270	300	330	540	540	540	540	540	540	900	960	1740	1740	1740
50	0.08	0.30	0.77	1.28	1.85	2.55	3.48	4.40	5.33	6.25	7.40	10.48	13.65	17.72	23.33	29.29
	150	270	300	330	330	540	540	540	540	540	900	900	960	1320	1740	1740
60	0.09	0.32	0.82	1.35	1.91	2.55	3.48	4.40	5.33	6.32	7.86	10.94	14.21	18.52	23.36	29.29
	180	270	300	330	330	540	540	540	540	900	900	900	960	1380	1680	1740
70	0.09	0.35	0.86	1.40	1.96	2.55	3.48	4.40	5.33	6.59	8.13	11.29	15.56	20.28	25.00	29.73
	180	300	300	330	330	540	540	540	540	900	900	960	1380	1380	1380	1380
80	0.10	0.38	0.89	1.44	2.01	2.57	3.48	4.40	5.33	6.74	8.28	12.42	17.14	21.86	26.58	31.30
	180	300	300	330	330	330	540	540	540	900	900	1380	1380	1380	1380	1380
90	0.10	0.41	0.92	1.48	2.04	2.61	3.48	4.40	5.33	7.02	9.11	13.83	18.55	23.27	27.99	32.72
	180	300	300	330	330	330	540	540	540	1020	1380	1380	1380	1380	1380	1380
100	0.12	0.43	0.94	1.51	2.07	2.64	3.48	4.40	5.76	8.01	10.37	15.10	19.82	24.54	29.26	33.98
	300	300	330	330	330	330	540	540	1020	1380	1380	1380	1380	1380	1380	1380

03242200 Anderson Fork near New Burlington, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	3.16	2.49	2.23	2.08	3.13	8.10	10.64
3	1.57	1.34	1.28	1.31	1.37	1.15	1.26
4	1.18	1.13	1.07	1.04	1.16	1.07	1.03
5	1.10	1.05	1.04	1.02	1.02	1.04	1.02
6	1.05	1.01	1.01	1.01	1.00	1.02	1.01
7	3.17	2.53	2.35	2.72	8.59	14.16	17.38
8	1.57	1.41	1.35	1.46	1.55	1.61	6.52
9	1.57	1.41	1.41	1.48	1.63	2.47	9.82
10	1.26	1.25	1.20	1.35	1.61	1.69	7.09
11	1.20	1.21	1.19	1.34	1.64	1.63	5.00
12	1.98	1.79	1.63	1.55	1.59	3.75	9.95
13	1.25	1.20	1.15	1.25	1.52	1.44	2.73
14	1.17	1.17	1.18	1.17	1.52	1.44	1.83
15	1.14	1.14	1.15	1.24	1.51	1.50	1.70
16	1.10	1.08	1.16	1.22	1.50	1.49	1.74
17	1.19	1.16	1.13	1.14	1.45	1.29	1.57
18	1.13	1.12	1.16	1.15	1.42	1.35	1.51
19	1.09	1.09	1.14	1.23	1.43	1.40	1.55
20	1.04	1.04	1.14	1.23	1.48	1.41	1.58

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	283.95	260.31	278.16	305.72	334.95	457.26	521.77
50.00	2.054	280.49	256.20	275.40	304.37	334.64	435.50	501.61
40.00	1.960	275.69	250.48	271.56	302.50	334.21	405.27	473.60
30.00	1.834	269.23	242.80	266.41	299.98	333.62	364.65	435.96
25.00	1.751	268.13	235.45	257.69	292.74	319.60	361.82	423.47
20.00	1.645	267.14	225.82	245.94	282.82	300.05	361.25	409.16
10.00	1.282	229.80	214.22	215.55	236.42	257.73	321.42	344.20
5.00	0.841	211.62	171.48	179.91	187.88	206.67	233.90	274.99
2.03	0.021	145.83	106.31	109.71	113.48	130.66	160.43	187.67

03242300 Caesar Creek at Harveysburg, Ohio

Location: Latitude 39°30′27″, longitude 84°00′42″, Warren County, Hydrologic Unit 05090202

Drainage area, in square miles: 209.

Station used for record extension: 03245500

Time period of systematic or extended record analyzed: 1925-03-11 to 1975-06-30

Percentage of estimated values in extended record: 70.7

Eighty-percent-duration streamflow, in cubic feet per second: 12.

Mean annual streamflow, in inches: 13.55

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
50.00	3.90	0.06	0.95	2.73	7.62	17.84	28.15	38.19
40.00	3.68	0.06	1.25	2.90	8.33	19.01	30.39	40.28
30.00	3.38	0.07	1.63	3.11	9.25	20.53	33.29	42.97
25.00	3.20	0.07	1.88	3.25	9.83	21.49	35.13	44.69
20.00	2.97	0.12	1.94	3.92	10.00	21.73	36.59	45.49
10.00	2.25	0.20	4.07	8.13	14.06	28.32	40.10	61.92
5.56	1.62	0.27	6.71	11.13	18.90	43.70	–	81.05

03242300 Caesar Creek at Harveysburg, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.15	0.43	0.77	1.10	1.43	1.79	2.18	2.57	2.96	3.35	4.13	4.94	5.83	6.72	8.23
	60	120	180	180	180	180	210	210	210	210	210	210	240	240	240	660
6	0.04	0.17	0.43	0.77	1.10	1.43	1.80	2.19	2.58	2.97	3.36	4.22	5.15	6.16	7.35	9.71
	120	120	180	180	180	180	210	210	210	210	210	240	270	270	600	660
8	0.05	0.18	0.46	0.77	1.11	1.49	1.88	2.31	2.81	3.32	3.82	4.88	5.99	7.99	10.21	12.44
	90	150	150	180	180	210	210	270	270	270	270	300	300	600	600	600
10	0.05	0.19	0.47	0.80	1.17	1.61	2.11	2.61	3.14	3.70	4.26	5.37	7.44	9.67	11.89	14.38
	90	150	150	180	210	270	270	270	300	300	300	300	600	600	600	1260
15	0.06	0.20	0.52	0.93	1.42	1.93	2.47	3.03	3.59	4.15	5.15	7.35	9.58	11.80	14.79	19.53
	120	150	180	240	270	270	300	300	300	540	540	600	600	600	1260	1320
20	0.06	0.22	0.60	1.05	1.55	2.08	2.64	3.26	4.27	5.27	6.27	8.33	10.56	13.01	17.18	23.31
	120	180	240	270	270	300	300	540	540	540	540	600	600	900	1320	1740
25	0.06	0.24	0.65	1.12	1.62	2.18	2.84	3.84	4.84	5.84	6.84	8.86	11.21	14.55	19.43	25.89
	120	180	240	270	270	300	540	540	540	540	540	600	900	900	1740	1740
30	0.07	0.26	0.68	1.17	1.69	2.29	3.14	4.14	5.14	6.15	7.15	9.16	12.23	15.57	20.93	27.39
	120	180	240	270	300	330	540	540	540	540	540	600	900	900	1740	1740
40	0.08	0.28	0.73	1.24	1.81	2.42	3.35	4.35	5.35	6.35	7.36	10.06	13.40	16.74	22.24	28.70
	150	210	270	300	330	330	540	540	540	540	540	900	900	900	1740	1740
50	0.10	0.29	0.77	1.32	1.90	2.51	3.35	4.35	5.35	6.35	7.36	10.60	13.97	18.01	22.98	28.95
	150	210	300	300	330	330	540	540	540	540	540	900	960	1320	1380	1680
60	0.10	0.29	0.83	1.39	1.96	2.58	3.35	4.35	5.35	6.35	7.45	11.23	15.61	20.73	25.85	30.97
	150	210	300	300	330	330	540	540	540	540	900	1020	1380	1380	1380	1380
70	0.11	0.33	0.89	1.44	2.01	2.63	3.35	4.35	5.35	7.00	8.89	13.08	18.20	23.32	28.44	33.56
	150	300	300	300	330	330	540	540	540	1020	1020	1380	1380	1380	1380	1380
80	0.11	0.37	0.93	1.49	2.06	2.67	3.35	4.47	6.36	8.26	10.26	15.38	20.50	25.62	30.74	35.86
	150	300	300	300	330	330	540	1020	1020	1020	1380	1380	1380	1380	1380	1380
90	0.11	0.41	0.97	1.52	2.09	2.70	3.67	5.56	7.46	9.70	12.26	17.38	22.50	27.83	33.17	38.52
	150	300	300	300	330	330	1020	1020	1020	1380	1380	1380	1380	1440	1440	1440
100	0.11	0.44	0.99	1.55	2.12	2.73	4.62	6.51	8.89	11.53	14.20	19.54	24.89	30.23	35.57	40.92
	150	300	300	300	330	330	1020	1020	1380	1440	1440	1440	1440	1440	1440	1440

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.01	1.83	1.70	1.62	1.68	2.45	6.52
3	1.25	1.20	1.16	1.09	1.21	1.22	1.10
4	1.10	1.08	1.04	1.05	1.01	1.11	1.05
5	1.01	1.05	1.01	1.03	1.00	1.05	1.03
6	1.00	1.02	1.00	1.02	1.00	1.03	1.01
7	2.02	1.89	1.80	1.85	2.08	9.99	14.21
8	1.29	1.23	1.21	1.22	1.49	1.46	2.09
9	1.29	1.27	1.24	1.31	1.56	1.72	5.39
10	1.20	1.18	1.22	1.27	1.59	1.68	3.03
11	1.16	1.17	1.19	1.29	1.66	1.72	2.74
12	1.41	1.30	1.26	1.47	1.53	1.61	5.05
13	1.18	1.18	1.17	1.19	1.43	1.48	1.63
14	1.12	1.10	1.14	1.26	1.43	1.51	1.62
15	1.04	1.12	1.17	1.28	1.48	1.59	1.72
16	1.04	1.13	1.17	1.29	1.52	1.62	1.79
17	1.12	1.13	1.13	1.18	1.30	1.44	1.47
18	1.04	1.08	1.09	1.24	1.29	1.51	1.54
19	1.02	1.09	1.13	1.26	1.37	1.56	1.64
20	1.04	1.10	1.16	1.26	1.42	1.59	1.70

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
50.00	2.054	233.49	222.42	231.82	258.12	287.93	367.54	457.24
40.00	1.960	231.18	211.33	224.76	255.50	285.40	354.46	426.93
30.00	1.834	228.07	196.43	215.27	251.98	281.99	336.89	386.18
25.00	1.751	226.02	186.59	209.01	249.65	279.74	325.29	359.29
20.00	1.645	225.77	185.60	197.86	241.56	274.10	324.59	351.99
10.00	1.282	190.80	178.34	179.37	185.34	248.35	292.62	316.72
5.00	0.841	154.33	141.21	145.28	165.79	185.41	218.18	244.63
2.00	0.000	101.79	84.03	85.47	93.45	106.14	136.47	159.15

03242500 Little Miami River near Fort Ancient, Ohio

Location: Latitude 39°22′42″, longitude 84°05′32″, Warren County, Hydrologic Unit 05090202

Drainage area, in square miles: 680.

Station used for record extension: 03245500

Time period of systematic or extended record analyzed: 1925-03-11 to 1974-09-30

Percentage of estimated values in extended record: 75.8

Eighty-percent-duration streamflow, in cubic feet per second: 100.

Mean annual streamflow, in inches: 13.46

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
50.00	3.90	0.58	2.27	4.31	9.92	20.45	31.16	41.77
40.00	3.68	0.59	2.49	4.38	10.16	20.73	32.53	42.68
30.00	3.38	0.61	2.77	4.48	10.46	21.10	34.29	43.86
25.00	3.20	0.62	2.95	4.54	10.66	21.33	35.42	44.61
20.00	2.97	0.69	3.05	5.52	11.36	22.90	38.31	46.20
10.00	2.25	0.81	5.42	8.93	15.78	30.71	40.95	59.56
5.56	1.62	1.10	7.72	12.59	19.97	42.82	56.68	79.07

03242500 Little Miami River near Fort Ancient, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.02	0.13	0.36	0.63	0.91	1.21	1.54	1.87	2.26	3.03	3.80	4.58	5.40	7.15
	0	0	30	60	150	150	150	180	180	180	210	210	210	210	240	900
6	0.00	0.00	0.03	0.16	0.41	0.69	1.00	1.33	1.68	2.07	2.46	3.23	4.08	5.03	6.03	8.09
	0	0	60	120	150	150	180	180	210	210	210	210	240	270	270	660
8	0.00	0.00	0.04	0.23	0.48	0.79	1.13	1.51	1.90	2.33	2.82	3.82	4.87	6.07	8.28	10.49
	0	0	60	120	150	180	210	210	210	270	270	270	300	600	600	600
10	0.00	0.00	0.05	0.26	0.53	0.86	1.24	1.67	2.16	2.66	3.18	4.29	5.65	7.86	10.07	12.29
	0	0	60	120	180	180	210	240	270	270	300	300	600	600	600	600
15	0.00	0.00	0.06	0.27	0.61	1.03	1.50	2.00	2.53	3.08	3.63	5.79	8.01	10.22	12.73	17.43
	0	0	90	180	180	240	270	270	300	300	300	600	600	600	1260	1320
20	0.00	0.00	0.07	0.31	0.69	1.14	1.62	2.12	2.74	3.73	4.73	6.85	9.06	11.30	15.57	21.99
	0	0	90	180	240	240	270	300	540	540	540	600	600	900	1740	1740
25	0.00	0.00	0.07	0.34	0.74	1.19	1.68	2.35	3.34	4.34	5.33	7.37	9.58	12.87	18.12	24.53
	0	0	90	180	240	240	330	540	540	540	540	600	600	900	1740	1740
30	0.00	0.00	0.08	0.36	0.77	1.22	1.79	2.66	3.66	4.65	5.65	7.64	10.47	13.78	19.38	25.79
	0	0	90	180	240	270	330	540	540	540	540	540	900	900	1740	1740
40	0.00	0.00	0.11	0.39	0.81	1.28	1.88	2.83	3.83	4.82	5.82	7.85	11.17	14.48	19.72	26.13
	0	0	150	180	240	270	330	540	540	540	540	900	900	900	1740	1740
50	0.00	0.00	0.15	0.43	0.85	1.37	1.93	2.83	3.83	4.82	5.82	7.85	11.17	14.62	19.72	26.13
	0	0	150	150	270	300	300	540	540	540	540	900	900	1320	1740	1740
60	0.00	0.00	0.19	0.47	0.95	1.50	2.06	2.83	3.83	4.82	5.82	7.85	11.17	16.07	21.16	26.24
	0	0	150	150	300	300	300	540	540	540	540	900	900	1380	1380	1380
70	0.00	0.01	0.23	0.53	1.08	1.63	2.19	2.83	3.83	4.82	5.82	7.85	12.58	17.67	22.76	27.84
	0	90	150	300	300	300	300	540	540	540	540	900	1380	1380	1380	1380
80	0.00	0.03	0.26	0.65	1.20	1.76	2.31	2.86	3.83	4.82	5.82	8.96	14.04	19.13	24.21	29.30
	0	120	150	300	300	300	300	300	540	540	540	1380	1380	1380	1380	1380
90	0.00	0.06	0.29	0.77	1.32	1.87	2.43	2.98	3.83	4.82	5.82	10.29	15.37	20.46	25.55	30.63
	0	120	150	300	300	300	300	300	540	540	540	1380	1380	1380	1380	1380
100	0.00	0.09	0.32	0.87	1.43	1.98	2.53	3.09	3.83	4.82	6.42	11.51	16.60	21.68	26.83	32.14
	0	120	300	300	300	300	300	300	540	540	1380	1380	1380	1380	1440	1440

03242500 Little Miami River near Fort Ancient, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.31	1.30	1.34	1.39	1.44	1.90	4.14
3	1.10	1.14	1.21	1.11	1.03	1.22	1.09
4	1.05	1.02	1.06	1.06	1.01	1.10	1.05
5	1.00	1.00	1.01	1.04	1.00	1.05	1.02
6	1.00	1.00	1.00	1.02	1.00	1.02	1.01
7	1.31	1.33	1.52	1.69	2.00	7.79	12.71
8	1.11	1.19	1.27	1.22	1.47	1.56	1.91
9	1.12	1.19	1.29	1.27	1.60	1.79	3.58
10	1.09	1.16	1.27	1.36	1.59	1.82	3.61
11	1.07	1.16	1.30	1.39	1.70	2.02	3.71
12	1.17	1.24	1.30	1.28	1.53	1.61	3.07
13	1.09	1.08	1.22	1.24	1.42	1.61	1.72
14	1.04	1.09	1.21	1.35	1.44	1.68	1.86
15	1.00	1.10	1.25	1.38	1.61	1.89	1.95
16	1.02	1.10	1.24	1.42	1.79	1.97	2.29
17	1.06	1.06	1.17	1.23	1.28	1.57	1.57
18	1.00	1.08	1.19	1.33	1.41	1.67	1.69
19	1.00	1.09	1.24	1.36	1.61	1.80	1.80
20	1.02	1.07	1.26	1.40	1.79	1.87	2.00

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
50.00	2.054	211.64	196.08	193.17	229.55	270.22	333.33	435.07
40.00	1.960	210.40	186.99	187.61	226.49	264.93	333.32	431.10
30.00	1.834	208.74	174.77	180.15	222.37	257.83	333.32	425.76
25.00	1.751	207.63	166.70	175.22	219.65	253.14	333.31	422.23
20.00	1.645	179.29	159.85	167.14	200.84	248.88	319.46	374.57
10.00	1.282	150.15	149.48	153.85	171.26	214.95	278.91	301.17
5.00	0.841	116.42	108.46	123.61	150.72	169.94	193.79	247.52
2.00	0.000	78.16	49.26	55.41	80.53	90.65	119.73	148.84

03245500 Little Miami River at Milford, Ohio

Location: Latitude 39°10′17″, longitude 84°17′53″, Clermont County, Hydrologic Unit 05090202

Drainage area, in square miles: 1,203

Station used for record extension: 03247500

Time period of systematic or extended record analyzed: 1925-03-11 to 1974-09-30

Percentage of estimated values in extended record: 4.0

Eighty-percent-duration streamflow, in cubic feet per second: 260.

Mean annual streamflow, in inches: 13.83

Location of station used for precipitation data: Cincinnati, Ohio

Location of station used for potential evapotranspiration data: Covington, Kentucky

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
50.00	3.90	0.42	1.86	4.01	9.23	19.89	30.69	41.32
40.00	3.68	0.43	2.14	4.24	9.93	20.95	32.75	43.09
30.00	3.38	0.44	2.51	4.53	10.83	22.33	35.42	45.38
25.00	3.20	0.45	2.74	4.72	11.40	23.20	37.12	46.84
20.00	2.97	0.53	2.79	5.30	11.56	23.56	39.05	47.45
10.00	2.25	0.63	5.04	9.27	15.55	30.71	41.53	60.33
5.56	1.62	0.90	7.54	12.63	20.07	38.91	59.10	81.67

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.08	0.25	0.53	0.82	1.16	1.53	1.92	2.32	2.72	3.51	4.31	5.11	6.02	7.40
	0	0	60	120	150	180	180	210	210	210	210	210	210	240	240	660
6	0.00	0.00	0.10	0.32	0.60	0.91	1.26	1.62	2.02	2.42	2.81	3.61	4.49	5.48	6.51	8.87
	0	0	90	120	150	180	180	210	210	210	210	210	240	270	270	660
8	0.00	0.00	0.14	0.38	0.68	1.02	1.36	1.76	2.16	2.60	3.11	4.13	5.27	6.84	9.11	11.39
	0	30	120	150	180	180	210	210	210	270	270	300	300	600	600	600
10	0.00	0.01	0.16	0.41	0.74	1.08	1.46	1.92	2.43	2.95	3.52	4.66	6.33	8.60	10.87	13.34
	0	30	120	150	180	180	210	270	270	300	300	300	600	600	600	1260
15	0.00	0.01	0.17	0.46	0.81	1.29	1.80	2.34	2.91	3.47	4.04	6.18	8.45	10.72	13.29	18.40
	0	30	120	180	210	270	270	300	300	300	300	600	600	600	1260	1680
20	0.00	0.01	0.17	0.50	0.95	1.46	1.97	2.54	3.12	4.07	5.09	7.14	9.40	11.67	16.01	22.60
	0	30	120	180	270	270	300	300	330	540	540	540	600	600	1740	1740
25	0.00	0.01	0.19	0.56	1.03	1.54	2.08	2.67	3.62	4.64	5.67	7.71	9.91	13.13	18.49	25.08
	0	30	150	240	270	270	300	330	540	540	540	540	600	900	1740	1740
30	0.00	0.01	0.21	0.60	1.09	1.60	2.16	2.92	3.94	4.96	5.98	8.03	10.74	14.14	19.85	26.44
	0	30	150	240	270	270	330	540	540	540	540	540	900	900	1740	1740
40	0.00	0.02	0.25	0.64	1.14	1.68	2.29	3.16	4.18	5.20	6.22	8.46	11.87	15.27	20.74	27.33
	0	60	150	240	270	300	330	540	540	540	540	900	900	900	1740	1740
50	0.00	0.04	0.29	0.66	1.18	1.75	2.36	3.16	4.18	5.20	6.22	8.93	12.33	16.22	21.24	27.33
	0	90	150	270	300	300	330	540	540	540	540	900	900	1320	1380	1740
60	0.00	0.06	0.33	0.68	1.25	1.82	2.41	3.16	4.18	5.20	6.22	9.19	13.61	18.83	24.06	29.28
	0	120	150	300	300	300	330	540	540	540	540	1020	1380	1380	1380	1380
70	0.00	0.09	0.37	0.74	1.31	1.88	2.44	3.16	4.18	5.20	6.57	10.97	16.20	21.42	26.64	31.87
	0	120	150	300	300	300	300	540	540	540	1020	1380	1380	1380	1380	1380
80	0.00	0.12	0.40	0.80	1.37	1.93	2.50	3.16	4.18	5.74	8.08	13.30	18.53	23.75	28.97	34.20
	0	120	150	300	300	300	300	540	540	1020	1380	1380	1380	1380	1380	1380
90	0.00	0.14	0.42	0.85	1.42	1.99	2.56	3.16	4.94	7.55	10.16	15.38	20.61	25.83	31.05	36.28
	120	120	150	300	300	300	300	540	1380	1380	1380	1380	1380	1380	1380	1380
100	0.02	0.16	0.44	0.90	1.47	2.04	2.61	4.16	6.78	9.39	12.00	17.22	22.45	27.67	32.89	38.12
	120	150	150	300	300	300	300	1380	1380	1380	1380	1380	1380	1380	1380	1380

03245500 Little Miami River at Milford, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.90	2.20	2.01	1.82	2.69	5.78	8.24
3	1.56	1.25	1.17	1.24	1.32	1.15	1.18
4	1.37	1.13	1.06	1.03	1.10	1.07	1.03
5	1.24	1.07	1.02	1.01	1.00	1.04	1.02
6	1.04	1.02	1.00	1.01	1.00	1.02	1.01
7	2.92	2.26	2.07	2.35	5.60	10.96	13.34
8	1.56	1.26	1.29	1.40	1.50	1.49	3.98
9	1.56	1.27	1.30	1.44	1.56	1.67	6.86
10	1.47	1.19	1.17	1.32	1.58	1.60	4.60
11	1.38	1.18	1.19	1.23	1.59	1.58	3.56
12	2.01	1.69	1.60	1.51	1.54	2.15	7.03
13	1.45	1.20	1.15	1.19	1.47	1.39	1.91
14	1.34	1.11	1.13	1.17	1.49	1.41	1.64
15	1.26	1.11	1.15	1.22	1.48	1.46	1.67
16	1.20	1.08	1.18	1.23	1.45	1.53	1.75
17	1.37	1.14	1.12	1.12	1.40	1.27	1.46
18	1.25	1.09	1.11	1.16	1.38	1.34	1.50
19	1.06	1.07	1.15	1.20	1.38	1.36	1.57
20	1.04	1.04	1.17	1.23	1.41	1.47	1.64

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
50.00	2.054	281.53	279.09	290.52	315.91	343.55	453.82	525.12
40.00	1.960	279.13	271.80	289.14	313.11	343.08	428.36	502.01
30.00	1.834	275.90	262.01	287.29	309.35	342.45	394.15	470.95
25.00	1.751	273.77	255.55	286.07	306.87	342.04	371.56	450.44
20.00	1.645	270.21	244.46	263.91	301.02	325.45	371.10	424.69
10.00	1.282	224.85	216.13	230.82	262.91	285.40	335.61	384.48
5.00	0.841	194.22	170.24	183.43	188.14	206.72	232.30	288.09
2.00	0.000	146.17	108.21	104.39	117.00	134.48	165.06	194.67

03246200 East Fork Little Miami River near Marathon, Ohio

Location: Latitude 39°06′52″, longitude 84°01′29″, Clermont County, Hydrologic Unit 05090202

Drainage area, in square miles: 195.

Station used for record extension: 03246500

Time period of systematic or extended record analyzed: 1924-10-01 to 1997-09-18

Percentage of estimated values in extended record: 79.2

Eighty-percent-duration streamflow, in cubic feet per second: 14.

Mean annual streamflow, in inches: 14.88

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Covington, Kentucy

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.08	1.58	5.79	11.73	22.56	36.79	49.58
70.00	4.24	0.08	1.66	5.82	11.80	22.69	36.90	49.70
60.00	4.09	0.08	1.95	5.92	12.07	23.17	37.32	50.13
50.00	3.90	0.08	2.29	6.05	12.39	23.74	37.82	50.64
40.00	3.68	0.08	2.71	6.20	12.78	24.43	38.43	51.27
30.00	3.38	0.09	2.99	6.28	13.19	25.97	38.86	51.72
25.00	3.20	0.10	3.09	6.30	13.43	27.15	39.03	51.90
20.00	2.97	0.14	3.42	7.00	14.49	27.86	41.24	52.07
10.00	2.25	0.32	5.22	10.03	17.25	32.61	48.79	69.06
5.21	1.55	0.66	7.25	14.13	22.10	41.40	–	–

03246200 East Fork Little Miami River near Marathon, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.03	0.13	0.34	0.65	0.95	1.26	1.61	1.98	2.36	2.78	3.21	4.07	4.97	5.95	6.93	7.90
	60	90	150	150	150	150	180	180	210	210	210	210	240	240	240	240
6	0.03	0.13	0.34	0.65	0.96	1.32	1.69	2.12	2.54	2.99	3.48	4.46	5.44	6.42	7.42	9.87
	60	90	150	150	180	180	180	210	210	240	240	240	240	240	300	600
8	0.04	0.14	0.37	0.71	1.08	1.48	1.91	2.37	2.85	3.34	3.83	4.81	5.82	7.43	9.87	12.32
	60	90	150	180	180	210	210	240	240	240	240	240	270	600	600	600
10	0.04	0.15	0.43	0.80	1.18	1.60	2.03	2.49	2.98	3.46	3.95	4.99	6.29	8.73	11.18	13.62
	60	90	180	180	210	210	210	240	240	240	240	270	600	600	600	600
15	0.05	0.18	0.55	0.91	1.33	1.76	2.19	2.62	3.10	3.65	4.20	5.40	7.85	10.29	12.73	17.75
	90	150	180	180	210	210	210	210	270	270	270	600	600	600	600	1740
20	0.06	0.23	0.60	0.98	1.41	1.84	2.26	2.72	3.27	3.82	4.37	6.16	8.55	10.99	14.37	21.46
	90	180	180	210	210	210	210	270	270	270	270	540	600	600	1740	1740
25	0.06	0.26	0.62	1.03	1.45	1.88	2.31	2.85	3.40	3.95	4.50	6.69	8.94	11.39	16.28	23.37
	120	180	180	210	210	210	210	270	270	270	270	540	600	600	1740	1740
30	0.07	0.27	0.64	1.06	1.49	1.91	2.42	2.97	3.52	4.07	4.82	7.02	9.22	11.64	17.36	24.45
	150	180	180	210	210	210	270	270	270	270	540	540	540	600	1740	1740
40	0.08	0.29	0.67	1.10	1.52	2.06	2.61	3.16	3.71	4.27	5.16	7.36	9.56	12.23	18.38	25.47
	150	180	210	210	210	270	270	270	270	300	540	540	540	900	1740	1740
50	0.08	0.29	0.69	1.12	1.67	2.22	2.77	3.37	4.00	4.67	5.35	7.47	9.72	13.29	18.73	25.82
	150	180	210	210	270	270	270	300	330	330	330	540	600	900	1740	1740
60	0.08	0.30	0.71	1.24	1.79	2.40	3.01	3.67	4.34	5.01	5.68	7.47	10.52	14.42	19.04	25.89
	150	180	210	270	270	300	300	330	330	330	330	540	900	960	1680	1680
70	0.08	0.30	0.79	1.36	1.97	2.58	3.26	3.93	4.60	5.27	5.95	7.70	11.61	15.52	19.43	26.18
	150	240	270	300	300	330	330	330	330	330	330	960	960	960	960	1680
80	0.08	0.36	0.88	1.49	2.11	2.78	3.45	4.13	4.80	5.47	6.14	8.72	12.63	16.54	20.45	26.42
	150	240	300	300	330	330	330	330	330	330	330	960	960	960	960	1680
90	0.11	0.40	0.98	1.59	2.26	2.93	3.60	4.27	4.94	5.62	6.29	9.66	13.57	17.48	21.39	26.64
	240	240	300	300	330	330	330	330	330	330	330	960	960	960	960	1680
100	0.13	0.44	1.05	1.69	2.36	3.04	3.71	4.38	5.05	5.73	6.61	10.52	14.43	18.35	22.26	27.10
	240	300	300	330	330	330	330	330	330	330	960	960	960	960	960	1320

03246200 East Fork Little Miami River near Marathon, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.00	1.51	1.41	1.47	1.79	6.02	10.41
3	1.33	1.21	1.18	1.10	1.06	1.25	1.37
4	1.16	1.07	1.10	1.06	1.04	1.01	1.11
5	1.04	1.03	1.05	1.03	1.02	1.00	1.00
6	1.00	1.01	1.02	1.02	1.01	1.00	1.00
7	1.99	1.57	1.52	1.66	4.72	12.37	18.81
8	1.35	1.23	1.23	1.14	1.33	1.59	5.99
9	1.34	1.24	1.22	1.20	1.41	2.41	9.02
10	1.22	1.20	1.23	1.20	1.25	1.65	5.96
11	1.19	1.17	1.21	1.20	1.17	1.65	3.95
12	1.41	1.28	1.23	1.25	1.48	3.29	9.42
13	1.20	1.18	1.18	1.17	1.15	1.42	2.58
14	1.23	1.15	1.20	1.18	1.17	1.31	1.90
15	1.19	1.11	1.17	1.19	1.15	1.28	1.79
16	1.02	1.10	1.18	1.21	1.13	1.21	1.84
17	1.16	1.13	1.16	1.16	1.13	1.28	1.62
18	1.09	1.10	1.16	1.17	1.14	1.14	1.63
19	1.01	1.09	1.13	1.16	1.12	1.13	1.62
20	1.03	1.08	1.13	1.19	1.13	1.14	1.66

03246200 East Fork Little Miami River near Marathon, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
73.00	2.206	246.39	247.55	255.62	278.83	297.52	320.46	334.17
70.00	2.190	245.84	247.47	254.50	276.35	294.36	317.21	331.39
60.00	2.128	243.78	247.20	250.36	267.16	282.61	305.12	321.09
50.00	2.054	241.29	246.86	245.33	256.02	268.38	290.47	308.60
40.00	1.960	238.15	246.43	238.99	241.96	250.41	271.98	292.83
30.00	1.834	232.71	233.20	230.32	235.71	240.58	257.61	284.36
25.00	1.751	228.74	220.66	224.54	235.40	238.40	251.28	282.61
20.00	1.645	223.97	216.73	221.52	226.62	235.42	243.23	262.14
10.00	1.282	189.36	171.42	163.35	171.67	206.15	227.09	240.60
5.00	0.841	169.69	141.96	145.19	146.42	158.99	187.92	209.67
2.03	0.017	123.97	82.80	81.99	88.72	98.78	119.32	140.55

03246500 East Fork Little Miami River at Williamsburg, Ohio

Location: Latitude 39°03′09″, longitude 84°03′02″, Clermont County, Hydrologic Unit 05090202

Drainage area, in square miles: 237.

Station used for record extension: 03238500

Time period of systematic or extended record analyzed: 1924-10-01 to 1997-09-18

Percentage of estimated values in extended record: 74.5

Eighty-percent-duration streamflow, in cubic feet per second: 5.5

Mean annual streamflow, in inches: 16.33

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Covington, Kentucy

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.06	1.58	5.88	12.18	23.54	38.90	53.49
70.00	4.24	0.06	1.66	5.91	12.25	23.72	39.05	53.56
60.00	4.09	0.06	1.94	6.02	12.52	24.40	39.62	53.83
50.00	3.90	0.07	2.28	6.16	12.83	25.21	40.29	54.15
40.00	3.68	0.07	2.69	6.32	13.22	26.19	41.11	54.54
30.00	3.38	0.07	2.98	6.42	13.98	28.03	41.65	55.78
25.00	3.20	0.07	3.08	6.45	14.54	29.37	41.83	56.79
20.00	2.97	0.10	3.45	7.56	15.41	29.96	44.91	57.07
10.00	2.25	0.30	5.67	10.54	18.60	35.39	53.25	75.08
5.21	1.55	0.64	7.43	14.88	23.49	48.01	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.04	0.16	0.43	0.77	1.10	1.48	1.88	2.29	2.72	3.18	3.65	4.59	5.63	6.71	7.78	9.90
	90	90	150	150	150	180	180	180	210	210	210	210	240	240	240	660
6	0.04	0.16	0.43	0.77	1.14	1.55	1.98	2.45	2.93	3.46	4.00	5.07	6.14	7.22	8.73	11.57
	60	90	150	150	180	180	210	210	240	240	240	240	240	240	600	660
8	0.05	0.17	0.46	0.86	1.27	1.74	2.22	2.75	3.29	3.83	4.36	5.44	6.61	8.85	11.53	14.21
	90	90	150	180	210	210	240	240	240	240	240	240	270	600	600	600
10	0.06	0.19	0.54	0.94	1.39	1.86	2.34	2.87	3.41	3.95	4.48	5.67	7.57	10.25	12.94	15.62
	90	120	180	180	210	210	240	240	240	240	240	270	600	600	600	600
15	0.07	0.25	0.65	1.07	1.54	2.01	2.48	2.97	3.57	4.17	4.78	6.47	9.15	11.84	14.52	20.18
	90	180	180	210	210	210	210	270	270	270	270	600	600	600	600	1740
20	0.08	0.30	0.70	1.14	1.61	2.08	2.55	3.14	3.74	4.34	4.95	7.14	9.83	12.51	16.58	24.36
	120	180	180	210	210	210	210	270	270	270	270	600	600	600	1740	1740
25	0.09	0.32	0.72	1.19	1.66	2.12	2.67	3.27	3.87	4.48	5.28	7.69	10.20	12.88	18.76	26.54
	120	180	180	210	210	210	270	270	270	270	540	540	600	600	1740	1740
30	0.09	0.33	0.74	1.21	1.68	2.18	2.78	3.39	3.99	4.59	5.63	8.05	10.46	13.13	20.01	27.79
	150	180	210	210	210	270	270	270	270	270	540	540	540	600	1740	1740
40	0.10	0.34	0.78	1.25	1.77	2.38	2.98	3.58	4.21	4.92	6.02	8.43	10.85	14.25	21.26	29.04
	150	180	210	210	270	270	270	270	300	330	540	540	540	900	1740	1740
50	0.11	0.35	0.80	1.33	1.93	2.53	3.18	3.86	4.60	5.34	6.17	8.59	11.44	15.48	21.76	29.54
	150	180	210	270	270	270	300	330	330	330	540	540	900	960	1740	1740
60	0.11	0.35	0.84	1.44	2.08	2.75	3.45	4.18	4.92	5.66	6.40	8.62	12.55	16.84	22.05	29.72
	150	180	270	270	300	300	330	330	330	330	330	540	960	960	1680	1740
70	0.11	0.38	0.93	1.58	2.25	2.95	3.69	4.43	5.16	5.90	6.64	9.48	13.77	18.07	22.54	30.06
	150	240	270	300	300	330	330	330	330	330	330	960	960	960	1680	1680
80	0.11	0.43	1.03	1.70	2.40	3.13	3.87	4.61	5.35	6.09	6.82	10.59	14.88	19.17	23.47	30.49
	150	240	300	300	330	330	330	330	330	330	330	960	960	960	960	1680
90	0.14	0.47	1.12	1.80	2.53	3.27	4.01	4.75	5.48	6.22	7.31	11.60	15.89	20.18	24.73	31.97
	240	240	300	330	330	330	330	330	330	330	960	960	960	960	1620	1620
100	0.17	0.51	1.18	1.90	2.64	3.37	4.11	4.85	5.59	6.32	8.23	12.52	16.81	21.10	26.30	33.54
	240	300	300	330	330	330	330	330	330	330	960	960	960	960	1620	1620

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.32	1.23	1.30	1.21	1.32	4.44	9.72
3	1.08	1.04	1.07	1.10	1.06	1.20	1.35
4	1.02	1.00	1.01	1.07	1.04	1.00	1.09
5	1.00	1.00	1.01	1.04	1.02	1.00	1.00
6	1.00	1.00	1.00	1.02	1.00	1.00	1.00
7	1.35	1.32	1.40	1.46	2.99	13.32	20.98
8	1.16	1.08	1.21	1.24	1.35	2.00	7.64
9	1.12	1.08	1.28	1.27	1.49	3.85	12.14
10	1.06	1.08	1.32	1.35	1.42	2.01	7.70
11	1.06	1.11	1.29	1.36	1.30	1.85	5.43
12	1.20	1.12	1.23	1.22	1.47	4.05	11.70
13	1.05	1.03	1.23	1.25	1.24	1.59	3.98
14	1.04	1.08	1.25	1.31	1.26	1.47	2.06
15	1.05	1.08	1.27	1.33	1.23	1.42	1.92
16	1.03	1.11	1.25	1.37	1.25	1.28	1.97
17	1.03	1.02	1.19	1.24	1.21	1.41	1.86
18	1.04	1.07	1.22	1.31	1.24	1.30	1.72
19	1.02	1.09	1.22	1.31	1.21	1.20	1.74
20	1.04	1.09	1.21	1.34	1.25	1.19	1.77

03246500 East Fork Little Miami River at Williamsburg, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
73.00	2.206	225.86	218.63	216.95	245.58	277.14	307.34	325.63
70.00	2.190	224.86	216.55	215.59	244.06	274.18	304.23	322.93
60.00	2.128	221.13	208.81	210.53	238.41	263.20	292.69	312.89
50.00	2.054	216.61	199.44	204.40	231.56	249.88	278.69	300.73
40.00	1.960	210.90	187.60	196.67	222.92	233.08	261.03	285.38
30.00	1.834	206.33	174.13	191.36	214.07	225.09	248.22	277.10
25.00	1.751	204.24	165.97	189.40	209.06	224.21	243.06	275.35
20.00	1.645	192.46	154.00	178.09	206.30	223.13	235.71	255.87
10.00	1.282	164.43	139.40	138.57	139.35	185.85	216.31	234.31
5.00	0.841	138.23	113.78	114.05	130.95	146.33	177.10	201.89
2.03	0.017	93.48	64.63	62.76	73.04	82.22	108.35	131.68

03247050 East Fork Little Miami River near Batavia, Ohio

Location: Latitude 39°03′36″, longitude 84°10′32″, Clermont County, Hydrologic Unit 05090202

Drainage area, in square miles: 352.

Station used for record extension: 03246500

Time period of systematic or extended record analyzed: 1924-10-01 to 1997-09-18

Percentage of estimated values in extended record: 84.6

Eighty-percent-duration streamflow, in cubic feet per second: 18.

Mean annual streamflow, in inches: 15.61

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Covington, Kentucy

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.07	1.64	6.23	12.51	24.03	38.88	53.01
70.00	4.24	0.07	1.72	6.25	12.59	24.15	39.03	53.12
60.00	4.09	0.07	2.04	6.33	12.89	24.61	39.59	53.52
50.00	3.90	0.07	2.40	6.42	13.24	25.15	40.26	54.00
40.00	3.68	0.07	2.85	6.52	13.67	25.81	41.07	54.58
30.00	3.38	0.07	3.18	6.67	13.88	27.42	42.55	54.87
25.00	3.20	0.08	3.30	6.77	13.91	28.67	43.62	54.92
20.00	2.97	0.11	3.63	7.30	15.14	29.40	43.80	55.36
10.00	2.25	0.32	5.87	11.20	19.15	34.09	51.25	70.82
5.21	1.55	0.69	7.79	14.70	23.38	45.21	–	–

03247050 East Fork Little Miami River near Batavia, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.03	0.14	0.38	0.70	1.02	1.34	1.67	2.06	2.44	2.83	3.28	4.18	5.08	6.07	7.10	8.73
	60	90	150	150	150	150	180	180	180	210	210	210	210	240	240	660
6	0.04	0.15	0.38	0.70	1.02	1.39	1.78	2.19	2.64	3.09	3.57	4.60	5.62	6.65	7.93	10.50
	60	90	150	150	150	180	180	210	210	210	240	240	240	240	600	600
8	0.04	0.15	0.41	0.77	1.16	1.57	2.02	2.46	2.97	3.48	3.99	5.02	6.05	7.60	10.16	12.72
	60	90	150	180	180	210	210	210	240	240	240	240	240	600	600	600
10	0.05	0.17	0.48	0.87	1.26	1.71	2.16	2.61	3.12	3.63	4.14	5.17	6.33	8.88	11.45	14.10
	90	120	180	180	210	210	210	210	240	240	240	270	270	600	600	1320
15	0.06	0.21	0.60	0.98	1.43	1.88	2.33	2.78	3.24	3.82	4.39	5.55	7.99	10.55	13.12	18.05
	90	180	180	180	210	210	210	210	270	270	270	270	600	600	600	1320
20	0.07	0.26	0.65	1.06	1.51	1.96	2.41	2.87	3.45	4.02	4.60	6.37	8.81	11.38	14.08	21.51
	120	180	180	210	210	210	210	270	270	270	270	540	600	600	1740	1740
25	0.08	0.29	0.67	1.10	1.55	2.00	2.45	3.03	3.61	4.18	4.76	6.97	9.30	11.87	16.01	23.44
	120	180	180	210	210	210	270	270	270	270	270	540	600	600	1740	1740
30	0.08	0.30	0.69	1.13	1.58	2.03	2.58	3.16	3.74	4.31	5.03	7.33	9.64	12.19	17.14	24.58
	150	180	180	210	210	210	270	270	270	270	540	540	540	600	1740	1740
40	0.09	0.32	0.72	1.17	1.64	2.21	2.79	3.37	3.94	4.52	5.39	7.70	10.02	12.59	18.27	25.71
	150	180	210	210	270	270	270	270	270	270	540	540	600	900	1740	1740
50	0.10	0.32	0.75	1.22	1.79	2.37	2.95	3.57	4.24	4.95	5.65	7.80	10.24	13.71	18.72	26.12
	150	180	210	270	270	270	270	300	330	330	330	540	600	900	1680	1740
60	0.10	0.32	0.77	1.34	1.91	2.55	3.19	3.88	4.59	5.29	6.00	7.82	10.78	14.80	19.20	26.38
	150	180	240	270	270	300	300	330	330	330	330	600	900	960	1680	1680
70	0.10	0.34	0.85	1.46	2.10	2.74	3.44	4.15	4.85	5.56	6.26	7.91	11.86	15.96	20.06	26.72
	150	240	240	300	300	300	330	330	330	330	330	600	960	960	960	1680
80	0.10	0.40	0.95	1.59	2.23	2.94	3.64	4.35	5.05	5.76	6.46	8.81	12.92	17.02	21.12	26.98
	150	240	300	300	300	330	330	330	330	330	330	960	960	960	960	1680
90	0.13	0.43	1.05	1.69	2.38	3.08	3.79	4.49	5.20	5.90	6.61	9.78	13.89	17.99	22.09	27.19
	240	240	300	300	330	330	330	330	330	330	330	960	960	960	960	1680
100	0.15	0.47	1.11	1.78	2.49	3.19	3.90	4.60	5.31	6.01	6.72	10.67	14.78	18.88	22.98	27.71
	240	300	300	330	330	330	330	330	330	330	330	960	960	960	960	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.67	1.41	1.36	1.31	1.45	5.00	9.60
3	1.18	1.13	1.17	1.10	1.07	1.22	1.36
4	1.03	1.02	1.09	1.07	1.05	1.01	1.08
5	1.02	1.01	1.04	1.03	1.03	1.00	1.00
6	1.01	1.00	1.02	1.02	1.01	1.00	1.00
7	1.67	1.42	1.39	1.59	3.57	12.01	19.06
8	1.23	1.20	1.27	1.15	1.33	1.56	5.76
9	1.21	1.21	1.30	1.21	1.41	2.62	8.96
10	1.24	1.18	1.29	1.24	1.28	1.64	5.14
11	1.12	1.16	1.29	1.26	1.22	1.61	3.05
12	1.28	1.24	1.27	1.20	1.48	3.12	9.35
13	1.14	1.12	1.25	1.18	1.19	1.44	2.38
14	1.04	1.10	1.22	1.21	1.20	1.32	1.77
15	1.05	1.09	1.25	1.23	1.18	1.31	1.65
16	1.03	1.09	1.24	1.24	1.18	1.20	1.68
17	1.04	1.06	1.21	1.17	1.17	1.30	1.58
18	1.04	1.07	1.19	1.21	1.18	1.15	1.56
19	1.03	1.07	1.20	1.22	1.16	1.14	1.44
20	1.03	1.05	1.19	1.23	1.18	1.16	1.50

03247050 East Fork Little Miami River near Batavia, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
73.00	2.206	234.33	236.09	235.28	267.65	287.41	312.67	328.65
70.00	2.190	233.26	234.46	234.94	265.47	284.37	309.44	325.67
60.00	2.128	229.27	228.41	233.67	257.39	273.10	297.46	314.62
50.00	2.054	224.43	221.08	232.14	247.58	259.44	282.95	301.23
40.00	1.960	218.33	211.83	230.20	235.21	242.19	264.62	284.32
30.00	1.834	215.39	203.32	219.64	228.46	233.52	251.84	276.51
25.00	1.751	215.02	198.89	210.27	226.98	232.16	246.97	275.84
20.00	1.645	208.94	190.82	207.30	218.65	230.46	239.33	258.24
10.00	1.282	171.68	152.32	148.37	162.91	196.97	221.93	237.64
5.00	0.841	150.10	128.42	134.26	141.41	154.16	178.43	197.11
2.03	0.017	112.06	77.36	74.97	81.91	91.31	110.85	130.26

03247500 East Fork Little Miami River at Perintown, Ohio

Location: Latitude 39°08′13″, longitude 84°14′17″, Clermont County, Hydrologic Unit 05090202

Drainage area, in square miles: 476.

Station used for record extension: 03238500

Time period of systematic or extended record analyzed: 1924-10-01 to 1997-09-18

Percentage of estimated values in extended record: 66.4

Eighty-percent-duration streamflow, in cubic feet per second: 14.

Mean annual streamflow, in inches: 16.33

Location of station used for precipitation data: Hillsboro, Ohio

Location of station used for potential evapotranspiration data: Covington, Kentucy

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.06	1.04	6.09	13.22	25.08	40.47	51.91
70.00	4.24	0.06	1.17	6.10	13.24	25.10	40.51	52.09
60.00	4.09	0.07	1.66	6.12	13.32	25.17	40.65	52.77
50.00	3.90	0.08	2.23	6.14	13.41	25.25	40.81	53.56
40.00	3.68	0.09	2.94	6.17	13.51	25.36	41.02	54.54
30.00	3.38	0.11	3.25	6.40	14.15	27.17	42.73	56.12
25.00	3.20	0.12	3.28	6.60	14.70	28.81	44.25	57.23
20.00	2.97	0.13	4.02	6.68	15.34	29.71	45.43	57.51
10.00	2.25	0.24	6.53	10.36	19.46	35.64	52.35	75.78
5.21	1.55	0.61	7.86	14.30	23.94	47.39	–	–

03247500 East Fork Little Miami River at Perintown, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.03	0.14	0.39	0.66	0.98	1.33	1.74	2.14	2.54	2.94	3.35	4.24	5.18	6.30	7.51	9.86
	60	90	120	120	150	180	180	180	180	180	180	210	240	270	270	660
6	0.03	0.15	0.42	0.75	1.12	1.53	1.93	2.36	2.83	3.30	3.81	4.88	5.95	7.11	8.31	11.08
	60	90	150	150	180	180	180	210	210	210	240	240	240	270	270	660
8	0.04	0.17	0.51	0.89	1.30	1.77	2.24	2.72	3.25	3.79	4.33	5.41	6.61	8.14	10.82	13.50
	90	150	150	180	210	210	210	240	240	240	240	270	270	600	600	600
10	0.05	0.21	0.57	0.97	1.44	1.91	2.38	2.88	3.42	3.95	4.52	5.72	7.09	9.77	12.45	15.71
	90	150	180	210	210	210	210	240	240	240	270	270	600	600	600	1020
15	0.06	0.25	0.64	1.10	1.57	2.04	2.51	3.07	3.67	4.27	4.88	6.66	9.35	12.03	14.71	20.69
	90	150	180	210	210	210	210	270	270	270	270	600	600	600	1320	1740
20	0.07	0.27	0.68	1.15	1.62	2.09	2.65	3.26	3.86	4.46	5.10	7.79	10.47	13.15	16.56	23.66
	120	180	210	210	210	210	270	270	270	270	600	600	600	600	1320	1740
25	0.07	0.29	0.71	1.18	1.65	2.19	2.79	3.40	4.00	4.60	5.74	8.42	11.10	13.78	17.50	25.02
	150	180	210	210	210	270	270	270	270	270	600	600	600	600	1320	1740
30	0.08	0.30	0.74	1.21	1.70	2.30	2.91	3.51	4.11	4.82	6.11	8.80	11.48	14.16	18.11	25.83
	150	180	210	210	270	270	270	270	270	540	600	600	600	600	1320	1740
40	0.08	0.32	0.78	1.28	1.88	2.49	3.09	3.78	4.51	5.25	6.46	9.14	11.83	14.51	19.27	27.04
	150	180	210	270	270	270	270	330	330	330	600	600	600	600	1740	1740
50	0.08	0.34	0.81	1.41	2.02	2.70	3.43	4.17	4.91	5.65	6.52	9.21	11.89	15.55	20.51	28.29
	180	210	270	270	270	330	330	330	330	330	600	600	600	960	1740	1740
60	0.09	0.36	0.91	1.54	2.24	2.98	3.71	4.45	5.19	5.93	6.66	9.21	12.18	16.47	21.94	29.72
	180	210	270	300	330	330	330	330	330	330	330	600	960	960	1740	1740
70	0.10	0.41	1.02	1.70	2.44	3.17	3.91	4.65	5.39	6.12	6.89	9.21	12.98	17.27	23.53	31.31
	210	240	300	330	330	330	330	330	330	330	360	600	960	960	1740	1740
80	0.14	0.46	1.13	1.84	2.58	3.31	4.05	4.79	5.53	6.32	7.12	9.40	13.69	17.98	25.23	33.01
	240	240	300	330	330	330	330	330	330	360	360	960	960	960	1740	1740
90	0.17	0.53	1.20	1.94	2.68	3.41	4.15	4.89	5.70	6.50	7.31	10.04	14.33	19.22	27.00	34.77
	240	300	330	330	330	330	330	360	360	360	360	960	960	1740	1740	1740
100	0.19	0.57	1.27	2.01	2.75	3.48	4.23	5.03	5.84	6.64	7.45	10.62	14.92	21.01	28.79	36.57
	240	300	330	330	330	330	360	360	360	360	360	960	960	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.28	1.22	1.14	1.07	1.17	4.57	9.37
3	1.13	1.14	1.09	1.05	1.01	1.09	1.26
4	1.03	1.05	1.02	1.02	1.00	1.00	1.01
5	1.00	1.01	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.31	1.29	1.21	1.25	3.08	12.47	19.55
8	1.15	1.24	1.17	1.13	1.18	1.70	6.72
9	1.18	1.27	1.20	1.15	1.31	3.32	10.53
10	1.14	1.26	1.19	1.16	1.23	1.70	6.03
11	1.12	1.25	1.25	1.17	1.18	1.58	3.87
12	1.19	1.25	1.18	1.12	1.29	3.98	10.60
13	1.12	1.21	1.15	1.13	1.12	1.38	3.00
14	1.08	1.19	1.17	1.15	1.14	1.28	1.78
15	1.05	1.15	1.20	1.15	1.18	1.23	1.68
16	1.02	1.17	1.19	1.19	1.20	1.17	1.74
17	1.06	1.17	1.14	1.13	1.12	1.24	1.61
18	1.03	1.15	1.15	1.14	1.14	1.12	1.50
19	1.01	1.15	1.16	1.15	1.18	1.12	1.48
20	1.02	1.17	1.17	1.19	1.20	1.13	1.56

03247500 East Fork Little Miami River at Perintown, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
73.00	2.206	227.32	245.36	267.38	294.56	316.30	338.46	346.76
70.00	2.190	226.20	243.24	263.93	290.57	311.44	336.45	345.90
60.00	2.128	222.06	235.38	251.10	275.73	293.40	329.00	342.71
50.00	2.054	217.04	225.85	235.55	257.76	271.54	319.97	338.83
40.00	1.960	210.70	213.82	215.92	235.07	243.94	308.57	333.95
30.00	1.834	203.74	199.29	204.64	223.52	232.20	286.18	309.23
25.00	1.751	199.62	190.18	201.74	221.61	232.09	269.27	287.43
20.00	1.645	194.43	182.34	199.12	215.38	229.77	252.51	266.93
10.00	1.282	176.34	157.30	170.29	181.33	206.93	233.10	240.67
5.00	0.841	145.08	118.53	120.55	133.41	157.33	174.65	206.86
2.03	0.017	111.35	70.60	72.36	80.97	92.59	119.86	141.51

03260700 Bokengehalas Creek near De Graff, Ohio

Location: Latitude 40°20′50″, longitude 83°53′28″, Logan County, Hydrologic Unit 05080001

Drainage area, in square miles: 36.3

Station used for record extension: 03267000

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Percentage of estimated values in extended record: 41.4

Eighty-percent-duration streamflow, in cubic feet per second: 8.4

Mean annual streamflow, in inches: 12.66

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.85	3.08	4.36	8.45	15.80	22.73	29.86
50.00	3.90	0.88	3.11	4.46	8.50	15.85	23.40	30.54
40.00	3.68	0.92	3.16	4.60	8.56	15.91	24.30	31.46
30.00	3.38	0.98	3.22	4.77	8.64	15.99	25.46	32.65
25.00	3.20	1.00	3.59	5.50	10.11	18.08	27.16	34.85
20.00	2.97	1.02	4.10	6.47	12.09	20.90	29.37	37.74
10.00	2.25	1.11	4.80	8.19	13.83	24.45	44.76	59.09
5.36	1.58	1.25	5.97	11.33	18.37	39.35	69.45	–

03260700 Bokengehalas Creek near De Graff, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.01	0.12	0.33	0.59	0.90	1.28	1.75	2.21	3.15	4.08	5.09	6.18	8.26
	0	0	0	30	120	150	180	180	270	270	270	270	270	300	600	600
6	0.00	0.00	0.00	0.01	0.14	0.37	0.66	0.97	1.37	1.80	2.27	3.20	4.21	5.25	6.74	9.00
	0	0	0	30	120	150	180	180	240	270	270	270	300	300	600	660
8	0.00	0.00	0.00	0.02	0.16	0.43	0.74	1.11	1.52	1.94	2.36	3.38	4.42	5.84	8.11	10.40
	0	0	0	30	150	180	210	240	240	240	270	300	300	540	660	660
10	0.00	0.00	0.00	0.02	0.18	0.47	0.82	1.19	1.61	2.03	2.47	3.51	4.90	6.80	9.08	11.61
	0	0	0	30	150	180	210	240	240	240	300	300	540	600	660	1020
15	0.00	0.00	0.00	0.03	0.22	0.54	0.90	1.31	1.72	2.16	2.68	4.44	6.43	8.93	13.44	18.23
	0	0	0	30	150	210	210	240	240	300	300	540	600	900	1380	1380
20	0.00	0.00	0.00	0.04	0.24	0.58	0.95	1.37	1.78	2.44	3.37	5.38	7.94	12.04	16.83	22.86
	0	0	0	60	150	210	240	240	240	540	540	600	900	1320	1740	1740
25	0.00	0.00	0.00	0.05	0.26	0.61	0.99	1.41	2.01	2.95	3.96	6.13	9.30	15.20	21.23	27.26
	0	0	0	60	150	210	240	240	540	540	600	900	1320	1740	1740	1740
30	0.00	0.00	0.00	0.06	0.28	0.63	1.02	1.44	2.36	3.37	4.41	7.00	11.93	17.96	23.99	30.02
	0	0	0	60	150	210	240	270	540	600	600	900	1740	1740	1740	1740
40	0.00	0.00	0.00	0.07	0.32	0.67	1.08	1.86	2.84	3.88	4.92	8.70	14.74	20.77	26.80	32.83
	0	0	30	60	150	210	270	540	600	600	600	1740	1740	1740	1740	1740
50	0.00	0.00	0.01	0.11	0.36	0.71	1.18	2.11	3.08	4.12	5.43	9.50	15.53	21.57	27.60	33.63
	0	0	30	120	150	210	540	540	600	600	900	1740	1740	1740	1740	1740
60	0.00	0.00	0.01	0.15	0.40	0.75	1.32	2.26	3.19	4.22	5.72	9.50	15.53	21.57	27.60	33.63
	0	0	30	120	180	210	540	540	540	600	960	1740	1740	1740	1740	1740
70	0.00	0.00	0.02	0.19	0.43	0.80	1.40	2.34	3.27	4.23	5.87	9.50	15.53	21.57	27.60	33.63
	0	0	30	120	180	270	540	540	540	900	960	1740	1740	1740	1740	1740
80	0.00	0.00	0.03	0.22	0.47	0.85	1.44	2.38	3.32	4.25	5.90	9.50	15.53	21.57	27.60	33.63
	0	0	90	120	180	270	540	540	540	540	960	1740	1740	1740	1740	1740
90	0.00	0.00	0.06	0.25	0.51	0.88	1.46	2.39	3.33	4.26	5.90	9.69	15.53	21.57	27.60	33.63
	0	0	90	120	210	270	540	540	540	540	960	1320	1740	1740	1740	1740
100	0.00	0.00	0.08	0.28	0.54	0.91	1.46	2.39	3.33	4.26	5.90	9.89	15.53	21.57	27.60	33.63
	0	0	90	120	210	270	540	540	540	540	960	1320	1740	1740	1740	1740

03260700 Bokengehalas Creek near De Graff, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	3.99	3.09	2.85	2.90	2.10	3.16	4.05
3	1.76	1.58	1.58	1.75	1.26	1.42	1.42
4	1.27	1.15	1.08	1.39	1.15	1.11	1.18
5	1.11	1.11	1.04	1.19	1.09	1.03	1.06
6	1.00	1.05	1.02	1.03	1.04	1.02	1.02
7	3.99	3.35	3.14	3.36	3.16	6.24	11.30
8	1.78	1.63	1.81	2.05	1.49	2.06	3.43
9	1.77	1.67	1.79	2.08	1.85	2.36	4.79
10	1.41	1.21	1.51	2.04	1.82	2.45	4.68
11	1.31	1.28	1.40	2.12	1.88	2.49	6.01
12	1.89	2.00	1.99	2.23	1.74	2.30	3.94
13	1.41	1.25	1.34	1.91	1.55	1.97	3.35
14	1.28	1.18	1.14	1.89	1.62	2.16	3.51
15	1.15	1.21	1.17	1.96	1.68	2.18	4.11
16	1.03	1.21	1.17	1.89	1.88	2.22	4.82
17	1.30	1.22	1.13	1.79	1.39	1.80	2.52
18	1.15	1.14	1.12	1.77	1.47	1.95	2.80
19	1.00	1.17	1.14	1.81	1.52	1.99	3.51
20	1.02	1.15	1.15	1.76	1.73	2.10	4.08

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	221.09	209.49	222.33	243.00	392.70	494.68	631.71
50.00	2.054	217.98	208.38	221.08	242.06	377.71	491.01	630.33
40.00	1.960	213.65	206.85	219.34	240.76	356.89	485.92	628.41
30.00	1.834	207.84	204.78	217.01	239.00	328.90	479.08	625.83
25.00	1.751	205.98	202.50	216.26	237.02	308.27	468.42	607.97
20.00	1.645	203.86	199.47	215.40	234.40	281.76	454.08	583.22
10.00	1.282	176.48	169.87	174.63	222.82	262.15	300.25	467.85
5.00	0.841	128.95	136.47	156.66	175.50	200.20	249.81	319.46
2.03	0.021	75.75	50.45	55.18	75.27	95.77	139.56	167.21

03260800 Stony Creek near De Graff, Ohio

Location: Latitude 40°17′27″, longitude 83°54′36″, Logan County, Hydrologic Unit 05080001

Drainage area, in square miles: 59.1

Station used for record extension: 03267000

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Percentage of estimated values in extended record: 68.9

Eighty-percent-duration streamflow, in cubic feet per second: 14.

Mean annual streamflow, in inches: 13.31

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.82	3.49	4.96	9.43	17.37	24.86	32.47
50.00	3.90	0.89	3.54	5.10	9.48	17.40	25.53	33.19
40.00	3.68	0.99	3.60	5.28	9.55	17.44	26.44	34.17
30.00	3.38	1.11	3.69	5.53	9.63	17.50	27.62	35.43
25.00	3.20	1.13	4.01	6.10	10.73	19.29	27.99	36.08
20.00	2.97	1.14	4.44	6.85	12.21	21.72	28.40	36.87
10.00	2.25	1.29	4.98	8.19	14.33	27.59	44.94	60.61
5.36	1.58	1.39	6.42	11.81	18.51	39.19	72.56	–

03260800 Stony Creek near De Graff, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.00	0.09	0.27	0.57	0.90	1.23	1.60	1.99	2.95	3.93	4.96	6.30	8.70
	0	0	0	30	60	150	180	180	180	210	240	270	270	300	660	660
6	0.00	0.00	0.00	0.01	0.10	0.32	0.62	0.96	1.34	1.74	2.18	3.12	4.14	5.23	7.40	9.80
	0	0	0	30	60	150	180	210	210	240	240	270	300	300	660	660
8	0.00	0.00	0.00	0.02	0.13	0.37	0.69	1.07	1.48	1.92	2.36	3.34	4.54	6.73	8.91	11.32
	0	0	0	30	120	150	210	210	240	240	240	300	600	600	660	660
10	0.00	0.00	0.00	0.02	0.15	0.40	0.74	1.13	1.56	2.00	2.44	3.49	5.49	7.68	9.92	12.81
	0	0	0	30	120	150	210	240	240	240	240	300	600	600	660	960
15	0.00	0.00	0.00	0.02	0.16	0.43	0.79	1.21	1.64	2.08	2.60	4.55	6.73	9.56	14.26	19.29
	0	0	0	30	120	150	210	240	240	240	300	600	600	960	1380	1380
20	0.00	0.00	0.00	0.03	0.19	0.46	0.84	1.25	1.69	2.19	3.17	5.20	8.28	12.69	18.10	24.44
	0	0	0	30	150	150	210	240	240	540	540	600	960	1380	1740	1740
25	0.00	0.00	0.00	0.03	0.22	0.50	0.88	1.30	1.76	2.62	3.60	6.17	9.71	15.89	22.24	28.58
	0	0	0	30	150	180	210	240	270	540	540	960	1320	1740	1740	1740
30	0.00	0.00	0.00	0.04	0.25	0.55	0.94	1.37	1.96	2.94	3.92	7.09	12.10	18.45	24.79	31.13
	0	0	0	30	150	210	210	270	540	540	540	960	1740	1740	1740	1740
40	0.00	0.00	0.00	0.06	0.32	0.68	1.07	1.57	2.41	3.40	4.72	8.28	14.62	20.96	27.30	33.65
	0	0	0	60	180	210	270	270	540	540	900	1740	1740	1740	1740	1740
50	0.00	0.00	0.00	0.10	0.42	0.80	1.26	1.76	2.75	3.73	5.12	8.90	15.24	21.58	27.93	34.27
	0	0	0	150	210	210	270	540	540	540	900	1740	1740	1740	1740	1740
60	0.00	0.00	0.01	0.17	0.54	0.93	1.42	2.02	3.01	4.06	5.19	8.90	15.24	21.58	27.93	34.27
	0	0	30	180	210	270	270	540	540	600	900	1740	1740	1740	1740	1740
70	0.00	0.00	0.02	0.27	0.65	1.08	1.58	2.24	3.30	4.40	5.49	8.90	15.24	21.58	27.93	34.27
	0	0	60	210	210	270	270	540	600	600	600	1740	1740	1740	1740	1740
80	0.00	0.00	0.03	0.37	0.75	1.22	1.71	2.51	3.60	4.70	5.79	8.90	15.24	21.58	27.93	34.27
	0	0	90	210	210	270	270	600	600	600	600	1740	1740	1740	1740	1740
90	0.00	0.00	0.07	0.46	0.85	1.34	1.83	2.78	3.87	4.97	6.06	8.90	15.24	21.58	27.93	34.27
	0	0	210	210	270	270	270	600	600	600	600	1740	1740	1740	1740	1740
100	0.00	0.00	0.15	0.54	0.95	1.44	1.94	3.03	4.12	5.22	6.31	8.90	15.24	21.58	27.93	34.27
	0	0	210	210	270	270	600	600	600	600	600	1740	1740	1740	1740	1740

03260800 Stony Creek near De Graff, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.27	1.63	1.68	2.08	2.22	3.52	4.27
3	1.08	1.02	1.04	1.22	1.30	1.23	1.41
4	1.04	1.00	1.00	1.00	1.17	1.06	1.18
5	1.02	1.00	1.00	1.00	1.10	1.04	1.06
6	1.01	1.00	1.00	1.00	1.04	1.02	1.02
7	2.27	1.74	1.94	2.41	3.65	6.76	11.56
8	1.08	1.03	1.05	1.47	1.56	2.60	5.12
9	1.08	1.05	1.07	1.51	1.86	4.36	7.18
10	1.05	1.01	1.02	1.63	2.06	3.93	7.95
11	1.03	1.03	1.03	1.72	2.28	4.43	8.75
12	1.33	1.18	1.27	1.49	1.73	3.48	5.53
13	1.05	1.01	1.02	1.32	1.64	2.18	4.93
14	1.04	1.01	1.03	1.49	1.86	2.37	5.45
15	1.02	1.03	1.03	1.59	2.06	2.48	5.86
16	1.00	1.04	1.04	1.60	2.18	2.58	6.67
17	1.04	1.01	1.01	1.22	1.59	1.98	3.94
18	1.02	1.01	1.03	1.38	1.70	2.15	4.39
19	1.02	1.04	1.03	1.45	1.93	2.28	4.92
20	1.00	1.04	1.04	1.48	2.03	2.43	5.72

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	295.81	291.33	280.01	268.71	323.97	459.93	567.67
50.00	2.054	286.43	271.13	260.89	256.43	313.44	451.35	566.82
40.00	1.960	273.40	243.07	234.34	239.36	298.80	439.42	565.63
30.00	1.834	255.89	205.35	198.64	216.42	279.13	423.40	564.04
25.00	1.751	237.42	199.79	194.91	213.88	264.16	404.53	540.58
20.00	1.645	213.07	195.17	192.66	212.25	244.86	379.49	507.92
10.00	1.282	187.97	169.85	184.37	185.50	219.96	255.19	392.50
5.00	0.841	143.83	124.16	142.44	160.42	179.09	224.63	276.58
2.03	0.021	93.55	37.73	35.85	44.20	62.73	111.22	151.59

03264000 Greenville Creek near Bradford, Ohio

Location: Latitude 40°06′08″, longitude 84°25′48″, Darke County, Hydrologic Unit 05080001

Drainage area, in square miles: 193.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1930-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 30.

Mean annual streamflow, in inches: 12.59

Location of station used for precipitation data: Greenville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
68.00	4.21	0.49	1.72	4.52	7.88	15.94	31.50	40.36
60.00	4.09	0.49	1.95	4.65	8.60	16.98	31.62	40.38
50.00	3.90	0.49	2.28	4.84	9.64	18.50	31.78	40.42
40.00	3.68	0.50	2.69	5.07	10.92	20.37	31.99	40.46
30.00	3.38	0.51	3.10	5.24	11.91	21.98	32.27	40.89
25.00	3.20	0.52	3.26	5.24	11.97	22.34	32.45	41.48
20.00	2.97	0.60	3.63	5.64	12.04	22.53	32.60	42.25
10.00	2.25	0.73	4.33	7.12	13.33	28.58	42.77	57.10
5.23	1.55	0.97	6.13	11.13	18.98	40.77	–	–

03264000 Greenville Creek near Bradford, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.00	0.03	0.13	0.31	0.57	0.88	1.21	1.57	1.98	2.40	3.22	4.10	5.03	5.96	7.30
	0	0	30	60	120	180	180	210	240	240	240	240	270	270	270	600
6	0.00	0.00	0.03	0.14	0.33	0.60	0.91	1.24	1.61	2.02	2.44	3.30	4.23	5.16	6.70	8.78
	0	0	60	90	150	180	180	210	240	240	240	270	270	270	600	660
8	0.00	0.00	0.04	0.16	0.39	0.68	0.99	1.35	1.75	2.16	2.58	3.51	4.45	6.38	8.44	10.88
	0	0	60	90	150	180	180	210	240	240	270	270	540	600	600	720
10	0.00	0.00	0.05	0.19	0.45	0.76	1.10	1.47	1.88	2.30	2.73	3.66	5.43	7.39	9.46	12.12
	0	0	60	150	150	180	210	240	240	240	270	270	540	600	600	1320
15	0.00	0.00	0.06	0.29	0.58	0.94	1.32	1.73	2.14	2.56	3.00	4.82	6.68	8.75	11.88	16.43
	0	0	60	150	210	210	240	240	240	240	270	540	540	600	1320	1320
20	0.00	0.00	0.09	0.34	0.70	1.06	1.48	1.89	2.30	2.72	3.57	5.43	7.38	9.58	13.17	18.40
	0	0	120	180	210	240	240	240	240	240	540	540	600	900	1260	1680
25	0.00	0.00	0.11	0.41	0.77	1.17	1.58	2.00	2.41	3.00	3.93	5.79	7.83	10.37	15.07	20.86
	0	0	150	210	210	240	240	240	240	540	540	540	600	900	1680	1680
30	0.00	0.00	0.13	0.46	0.82	1.24	1.65	2.06	2.49	3.23	4.16	6.08	8.15	10.94	16.57	22.36
	0	0	150	210	240	240	240	240	270	540	540	600	600	900	1680	1680
40	0.00	0.00	0.14	0.50	0.90	1.32	1.73	2.18	2.64	3.51	4.44	6.51	8.68	12.16	17.95	23.74
	0	30	210	210	240	240	240	270	270	540	600	600	900	1680	1680	1680
50	0.00	0.00	0.15	0.53	0.94	1.36	1.82	2.32	2.83	3.71	4.74	6.81	9.31	12.55	18.13	23.92
	0	30	210	240	240	270	270	300	300	600	600	600	900	960	1680	1680
60	0.00	0.00	0.15	0.54	0.98	1.46	1.98	2.49	3.01	3.93	4.97	7.21	10.10	14.15	18.70	23.92
	0	30	210	240	270	300	300	300	300	600	600	660	960	1320	1320	1680
70	0.00	0.00	0.15	0.59	1.09	1.61	2.13	2.68	3.30	4.42	5.55	7.83	11.41	15.96	20.51	25.06
	0	30	210	270	300	300	300	360	360	660	660	660	1320	1320	1320	1320
80	0.00	0.01	0.19	0.70	1.22	1.74	2.31	2.93	3.83	4.97	6.11	8.67	13.21	17.76	22.31	26.86
	0	30	300	300	300	300	360	360	660	660	660	1320	1320	1320	1320	1320
90	0.00	0.01	0.30	0.81	1.33	1.90	2.52	3.20	4.33	5.47	6.69	10.40	14.95	19.50	24.05	28.60
	0	30	300	300	300	360	360	660	660	660	720	1320	1320	1320	1320	1320
100	0.00	0.01	0.39	0.91	1.46	2.08	2.70	3.79	5.03	6.27	7.51	12.04	16.58	21.13	25.68	30.23
	0	30	300	300	360	360	360	720	720	720	720	1320	1320	1320	1320	1320

03264000 Greenville Creek near Bradford, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.60	1.31	1.27	1.35	1.60	2.56	5.30
3	1.16	1.12	1.08	1.01	1.00	1.27	1.28
4	1.12	1.05	1.03	1.00	1.00	1.11	1.11
5	1.04	1.01	1.02	1.00	1.00	1.01	1.06
6	1.00	1.00	1.00	1.00	1.00	1.00	1.03
7	1.60	1.37	1.45	1.64	2.28	8.81	16.29
8	1.17	1.15	1.11	1.05	1.21	1.96	3.44
9	1.16	1.16	1.12	1.07	1.39	2.78	6.64
10	1.17	1.13	1.11	1.11	1.38	2.34	4.73
11	1.16	1.12	1.11	1.16	1.41	2.28	4.64
12	1.18	1.16	1.11	1.03	1.28	2.51	5.20
13	1.15	1.12	1.09	1.07	1.25	1.89	2.73
14	1.15	1.09	1.11	1.12	1.22	1.99	2.58
15	1.08	1.09	1.09	1.16	1.26	1.97	2.42
16	1.05	1.06	1.12	1.17	1.28	1.94	2.51
17	1.13	1.09	1.07	1.07	1.15	1.70	2.02
18	1.09	1.06	1.10	1.12	1.13	1.82	1.99
19	1.01	1.05	1.08	1.16	1.20	1.78	2.05
20	1.00	1.05	1.12	1.17	1.26	1.80	2.03

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
68.00	2.178	309.21	293.81	302.00	322.82	333.55	344.77	420.16
60.00	2.128	308.67	290.73	299.12	315.32	328.12	344.47	408.72
50.00	2.054	307.88	286.14	294.84	304.15	320.04	344.03	391.69
40.00	1.960	306.87	280.35	289.44	290.06	309.85	343.46	370.19
30.00	1.834	294.04	268.95	276.19	275.22	297.31	330.02	354.02
25.00	1.751	275.95	258.39	262.43	268.87	290.03	310.52	354.01
20.00	1.645	263.47	239.57	240.75	253.30	281.62	289.00	345.35
10.00	1.282	219.24	184.31	194.19	214.08	230.12	238.91	280.11
5.00	0.841	157.83	139.11	138.53	166.10	175.76	205.69	248.35
2.00	0.000	113.19	83.70	84.02	94.75	106.84	130.39	151.88

03265000 Stillwater River at Pleasant Hill, Ohio

Location: Latitude 40°03′28″, longitude 84°21′22″, Miami County, Hydrologic Unit 05080001

Drainage area, in square miles: 503.

Station used for record extension: 03264000 and 03217500

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 8.0

Eighty-percent-duration streamflow, in cubic feet per second: 52.

Mean annual streamflow, in inches: 12.18

Location of station used for precipitation data: Greenville, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.27	1.40	3.65	7.10	15.24	28.53	36.39
70.00	4.24	0.27	1.41	3.68	7.10	15.37	28.65	36.41
60.00	4.09	0.28	1.43	3.74	7.11	15.63	28.87	36.43
50.00	3.90	0.29	1.45	3.80	7.12	15.93	29.14	36.47
40.00	3.68	0.30	1.47	3.88	7.14	16.30	29.47	36.51
30.00	3.38	0.30	1.85	3.93	8.64	18.25	29.60	37.67
25.00	3.20	0.30	2.13	3.97	9.73	19.61	29.73	38.58
20.00	2.97	0.35	2.42	4.28	10.10	19.81	31.11	40.15
10.00	2.25	0.42	3.18	5.87	11.48	25.72	39.98	51.82
5.07	1.52	0.64	5.83	11.84	19.19	37.74	–	–

03265000 Stillwater River at Pleasant Hill, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.01	0.11	0.30	0.55	0.85	1.18	1.53	1.88	2.25	2.65	3.49	4.39	5.30	6.20	7.17
	0	30	90	120	180	180	210	210	210	240	240	270	270	270	270	300
6	0.00	0.01	0.12	0.33	0.62	0.95	1.30	1.65	2.04	2.44	2.84	3.74	4.64	5.54	6.99	8.80
	0	30	90	150	180	210	210	210	240	240	270	270	270	270	540	600
8	0.00	0.01	0.15	0.41	0.74	1.09	1.47	1.87	2.27	2.69	3.14	4.04	5.54	7.34	9.26	11.33
	0	30	150	180	210	210	240	240	240	270	270	270	540	540	600	900
10	0.00	0.01	0.19	0.47	0.82	1.20	1.60	2.00	2.42	2.87	3.32	4.81	6.61	8.57	10.71	13.71
	0	30	150	210	210	240	240	240	270	270	270	540	540	600	900	900
15	0.00	0.02	0.23	0.58	0.97	1.37	1.77	2.21	2.66	3.29	4.19	6.14	8.14	10.38	13.38	17.23
	0	30	180	210	240	240	240	270	270	540	540	600	600	900	900	1320
20	0.00	0.02	0.28	0.65	1.05	1.45	1.87	2.32	2.88	3.82	4.82	6.82	8.82	11.51	14.71	18.71
	0	30	210	240	240	240	270	270	540	600	600	600	600	900	960	1320
25	0.00	0.02	0.31	0.69	1.09	1.49	1.94	2.43	3.19	4.19	5.19	7.19	9.19	12.36	15.56	20.95
	0	90	210	240	240	270	270	300	600	600	600	600	600	960	960	1680
30	0.00	0.03	0.33	0.72	1.12	1.54	2.01	2.52	3.40	4.40	5.40	7.40	9.72	12.93	16.91	22.52
	0	90	210	240	240	270	300	300	600	600	600	600	960	960	1680	1680
40	0.00	0.03	0.35	0.75	1.15	1.63	2.13	2.63	3.60	4.60	5.60	7.60	10.43	13.63	18.63	24.23
	0	120	240	240	240	300	300	300	600	600	600	600	960	960	1680	1680
50	0.00	0.04	0.36	0.76	1.19	1.69	2.19	2.70	3.65	4.65	5.65	7.85	10.85	14.06	19.31	24.92
	0	120	240	240	300	300	300	330	600	600	600	660	960	960	1680	1680
60	0.00	0.05	0.36	0.76	1.24	1.74	2.24	2.76	3.65	4.75	5.85	8.05	11.14	14.34	19.42	25.09
	0	120	240	240	300	300	300	330	600	660	660	660	960	960	1680	1740
70	0.00	0.06	0.36	0.77	1.27	1.77	2.27	2.81	3.79	4.89	5.99	8.20	11.35	14.81	19.42	25.13
	0	120	240	300	300	300	300	360	660	660	660	660	960	1320	1680	1740
80	0.00	0.06	0.36	0.79	1.29	1.79	2.29	2.86	3.90	5.00	6.10	8.31	11.59	15.99	20.40	25.13
	0	150	240	300	300	300	300	360	660	660	660	960	1320	1320	1320	1740
90	0.00	0.07	0.36	0.80	1.30	1.80	2.30	2.90	3.98	5.09	6.19	8.63	12.78	17.19	21.59	25.99
	0	150	240	300	300	300	300	360	660	660	660	840	1320	1320	1320	1320
100	0.00	0.08	0.36	0.81	1.31	1.81	2.33	2.95	4.05	5.15	6.27	9.56	13.96	18.36	22.77	27.17
	0	150	240	300	300	300	360	660	660	660	780	1320	1320	1320	1320	1320

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.73	1.62	1.66	1.73	2.08	4.21	9.98
3	1.04	1.07	1.07	1.05	1.01	1.28	1.77
4	1.01	1.03	1.00	1.02	1.00	1.11	1.13
5	1.00	1.01	1.00	1.00	1.00	1.00	1.07
6	1.00	1.00	1.00	1.00	1.00	1.00	1.03
7	1.73	1.73	1.85	2.33	3.39	15.23	22.14
8	1.05	1.08	1.14	1.13	1.30	2.75	5.70
9	1.05	1.10	1.16	1.19	1.47	3.64	11.84
10	1.03	1.08	1.16	1.23	1.40	2.84	7.00
11	1.03	1.08	1.22	1.25	1.40	2.37	5.37
12	1.07	1.14	1.15	1.15	1.53	3.47	10.47
13	1.02	1.06	1.10	1.18	1.26	2.00	3.17
14	1.02	1.05	1.11	1.22	1.23	1.98	2.65
15	1.00	1.05	1.16	1.23	1.22	1.94	2.32
16	1.00	1.08	1.18	1.24	1.29	1.90	2.11
17	1.01	1.06	1.07	1.18	1.13	1.81	2.24
18	1.00	1.02	1.11	1.21	1.14	1.80	1.91
19	1.00	1.07	1.15	1.24	1.15	1.78	1.96
20	1.04	1.06	1.17	1.24	1.21	1.74	1.93

03265000 Stillwater River at Pleasant Hill, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
76.00	2.222	329.88	281.32	278.15	296.41	325.10	340.81	407.42
70.00	2.190	327.40	280.08	277.40	295.48	322.48	338.28	405.49
60.00	2.128	322.69	277.73	275.97	293.72	317.49	333.46	401.80
50.00	2.054	316.97	274.87	274.24	291.59	311.44	327.63	397.34
40.00	1.960	309.76	271.27	272.06	288.89	303.81	320.26	391.71
30.00	1.834	304.64	268.29	263.60	281.41	286.74	309.20	389.30
25.00	1.751	301.40	266.07	257.31	275.28	274.94	301.55	387.61
20.00	1.645	289.27	254.83	250.61	256.88	266.68	288.72	372.18
10.00	1.282	254.73	215.30	207.99	209.68	238.64	277.18	310.46
5.00	0.841	197.41	149.11	156.72	163.44	189.38	245.71	274.40
2.00	0.000	137.66	89.17	89.64	108.93	134.49	145.27	166.85

03266500 Mad River at Zanesfield, Ohio

Location: Latitude 40°21′01″, longitude 83°40′28″, Logan County, Hydrologic Unit 05080001

Drainage area, in square miles: 7.31

Station used for record extension: 03260700

Time period of systematic or extended record analyzed: 1946-10-01 to 1991-09-30

Percentage of estimated values in extended record: 26.2

Eighty-percent-duration streamflow, in cubic feet per second: 1.6

Mean annual streamflow, in inches: 14.34

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
46.00	3.82	0.86	4.46	7.67	14.10	24.34	33.93	44.54
40.00	3.68	0.86	4.60	7.68	14.32	24.85	34.69	45.51
30.00	3.38	0.87	4.88	7.71	14.76	25.92	36.26	47.52
25.00	3.20	0.88	5.06	7.73	15.05	26.59	37.26	48.79
20.00	2.97	0.90	5.14	7.99	15.28	27.24	37.96	52.66
10.00	2.25	1.08	5.41	9.48	15.75	28.90	42.65	66.61
5.11	1.52	1.30	6.40	12.20	21.22	40.17	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.00	0.00	0.05	0.22	0.51	0.82	1.17	1.58	2.11	2.64	3.70	4.79	6.09	8.01	10.36
	0	0	0	30	150	150	180	180	270	270	270	270	330	330	600	600
6	0.00	0.00	0.00	0.05	0.23	0.52	0.88	1.24	1.66	2.16	2.69	3.75	4.81	6.09	8.30	10.66
	0	0	0	60	120	180	180	210	240	270	270	270	270	330	600	600
8	0.00	0.00	0.00	0.07	0.27	0.62	1.00	1.43	1.90	2.38	2.85	3.91	5.09	6.64	9.23	11.82
	0	0	0	60	180	180	210	240	240	240	240	300	300	660	660	660
10	0.00	0.00	0.00	0.09	0.34	0.70	1.11	1.58	2.05	2.52	3.00	4.16	5.34	7.30	9.88	14.92
	0	0	30	60	180	210	210	240	240	240	270	300	300	540	660	1320
15	0.00	0.00	0.01	0.13	0.46	0.87	1.30	1.77	2.24	2.76	3.35	4.53	6.36	8.48	12.97	18.39
	0	0	30	90	180	210	240	240	240	270	300	300	540	540	1380	1380
20	0.00	0.00	0.01	0.19	0.54	0.95	1.40	1.88	2.41	2.96	3.55	4.81	6.93	9.05	14.13	19.55
	0	0	30	150	210	210	240	270	270	300	300	540	540	540	1380	1380
25	0.00	0.00	0.01	0.22	0.58	0.99	1.46	1.99	2.52	3.08	3.66	5.09	7.21	9.63	16.23	22.83
	0	0	30	150	210	210	270	270	270	300	300	540	540	1680	1680	1680
30	0.00	0.00	0.02	0.24	0.60	1.02	1.52	2.05	2.58	3.14	3.73	5.21	7.33	11.83	18.43	25.03
	0	0	30	150	210	210	270	270	270	300	300	540	540	1680	1680	1680
40	0.00	0.00	0.02	0.24	0.61	1.04	1.57	2.10	2.63	3.21	3.80	5.21	7.50	13.35	19.95	26.55
	0	0	30	150	210	270	270	270	270	300	300	540	900	1680	1680	1680
50	0.00	0.00	0.02	0.24	0.61	1.04	1.57	2.10	2.63	3.21	3.80	5.21	8.58	13.76	19.95	26.55
	0	0	30	150	210	270	270	270	270	300	300	540	1320	1320	1680	1680
60	0.00	0.00	0.03	0.24	0.61	1.04	1.57	2.10	2.63	3.21	3.80	6.16	11.34	16.53	21.71	26.90
	0	0	30	120	210	270	270	270	270	300	300	1320	1320	1320	1320	1320
70	0.00	0.00	0.03	0.24	0.61	1.04	1.57	2.10	2.63	3.21	3.80	8.95	14.14	19.32	24.50	29.69
	0	0	30	120	210	270	270	270	270	300	300	1320	1320	1320	1320	1320
80	0.00	0.00	0.03	0.24	0.61	1.04	1.57	2.10	2.63	3.84	6.43	11.62	16.80	21.99	27.17	32.35
	0	0	30	120	210	270	270	270	270	1320	1320	1320	1320	1320	1320	1320
90	0.00	0.00	0.03	0.24	0.61	1.04	1.57	2.10	3.71	6.30	8.89	14.07	19.26	24.44	29.62	34.81
	0	0	30	120	210	270	270	270	1320	1320	1320	1320	1320	1320	1320	1320
100	0.00	0.00	0.04	0.24	0.61	1.04	1.57	3.33	5.92	8.51	11.10	16.28	21.47	26.65	31.84	37.02
	0	0	30	120	210	270	270	1320	1320	1320	1320	1320	1320	1320	1320	1320

03266500 Mad River at Zanesfield, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.05	1.56	1.57	1.79	2.26	4.52	8.15
3	1.16	1.08	1.10	1.01	1.00	1.18	2.08
4	1.00	1.05	1.02	1.00	1.00	1.00	1.14
5	1.00	1.03	1.00	1.00	1.00	1.00	1.00
6	1.00	1.01	1.00	1.00	1.00	1.00	1.00
7	2.03	1.61	1.93	2.42	3.40	12.79	26.50
8	1.17	1.16	1.21	1.08	1.16	2.50	6.53
9	1.17	1.18	1.26	1.12	1.27	3.23	10.78
10	1.03	1.27	1.26	1.14	1.15	2.64	10.40
11	1.00	1.23	1.29	1.18	1.22	2.61	12.22
12	1.27	1.15	1.22	1.09	1.53	3.09	8.62
13	1.03	1.12	1.21	1.11	1.11	1.95	5.40
14	1.00	1.22	1.22	1.13	1.16	1.61	5.19
15	1.00	1.13	1.28	1.17	1.22	1.72	6.69
16	1.00	1.08	1.29	1.16	1.25	1.77	9.73
17	1.01	1.08	1.19	1.11	1.11	1.41	3.12
18	1.00	1.15	1.21	1.15	1.16	1.46	3.27
19	1.00	1.09	1.25	1.18	1.22	1.58	3.87
20	1.00	1.07	1.27	1.17	1.25	1.74	6.46

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
46.00	2.020	230.29	224.42	234.85	273.26	287.26	297.77	306.83
40.00	1.960	222.72	216.28	227.67	264.24	280.45	294.72	305.29
30.00	1.834	206.57	198.93	212.36	245.01	265.91	288.20	301.99
25.00	1.751	195.91	187.47	202.24	232.32	256.31	283.90	299.82
20.00	1.645	190.85	178.15	196.97	225.22	247.86	273.67	294.33
10.00	1.282	144.56	162.56	172.21	200.59	208.99	232.68	276.59
5.00	0.841	97.19	97.86	135.06	161.97	190.45	208.41	243.79
2.00	0.000	60.26	47.33	45.24	57.23	78.70	97.93	119.32

03267000 Mad River near Urbana, Ohio

Location: Latitude 40°06′27″, longitude 83°47′57″, Champaign County, Hydrologic Unit 05080001

Drainage area, in square miles: 162.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 65.

Mean annual streamflow, in inches: 12.61

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	1.29	4.81	7.01	11.84	20.29	29.31	37.30
50.00	3.90	1.41	4.86	7.22	11.94	20.43	29.39	37.43
40.00	3.68	1.58	4.92	7.50	12.08	20.63	29.49	37.60
30.00	3.38	1.80	5.00	7.87	12.26	20.88	29.62	37.82
25.00	3.20	1.81	5.09	8.26	12.48	21.46	29.93	38.45
20.00	2.97	1.82	5.21	8.75	12.77	22.23	30.33	39.28
10.00	2.25	1.93	6.07	9.69	15.93	28.52	44.31	60.13
5.36	1.58	2.22	7.22	13.10	19.97	37.97	63.81	–

03267000 Mad River near Urbana, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.19	0.29	0.53	0.80	1.54	2.44	3.37	4.30	5.66
	0	0	0	0	0	0	60	60	60	150	180	240	270	270	270	660
6	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.19	0.40	0.69	1.02	1.77	2.61	3.55	4.76	6.93
	0	0	0	0	0	30	60	60	150	180	210	240	270	270	600	660
8	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.26	0.54	0.86	1.22	1.99	2.84	4.52	6.59	8.66
	0	0	0	0	0	30	60	150	180	210	210	240	300	600	600	600
10	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.30	0.59	0.93	1.29	2.09	3.34	5.41	7.48	9.90
	0	0	0	0	0	30	90	150	180	210	210	240	600	600	600	960
15	0.00	0.00	0.00	0.00	0.00	0.04	0.12	0.32	0.62	0.98	1.37	2.26	4.30	6.46	10.53	15.29
	0	0	0	0	0	30	60	150	180	210	240	300	600	960	1380	1380
20	0.00	0.00	0.00	0.00	0.00	0.05	0.15	0.34	0.66	1.04	1.46	2.63	4.85	8.61	13.38	19.30
	0	0	0	0	0	30	60	150	210	240	270	600	960	1380	1380	1740
25	0.00	0.00	0.00	0.00	0.01	0.07	0.18	0.37	0.71	1.14	1.61	2.89	5.86	10.83	16.84	22.85
	0	0	0	0	30	60	60	150	240	270	270	600	960	1740	1740	1740
30	0.00	0.00	0.00	0.00	0.01	0.09	0.20	0.42	0.81	1.28	1.75	3.23	6.92	12.93	18.94	24.95
	0	0	0	0	30	60	60	210	270	270	270	900	1740	1740	1740	1740
40	0.00	0.00	0.00	0.00	0.01	0.11	0.28	0.62	1.07	1.54	2.01	3.83	8.65	14.66	20.67	26.68
	0	0	0	0	30	60	150	240	270	270	270	900	1740	1740	1740	1740
50	0.00	0.00	0.00	0.00	0.02	0.15	0.45	0.85	1.31	1.77	2.24	3.98	8.65	14.66	20.67	26.68
	0	0	0	0	60	150	210	240	270	270	270	900	1740	1740	1740	1740
60	0.00	0.00	0.00	0.00	0.03	0.29	0.66	1.07	1.52	1.98	2.45	4.33	8.65	14.66	20.67	26.68
	0	0	0	0	120	210	240	240	270	270	270	600	1740	1740	1740	1740
70	0.00	0.00	0.00	0.00	0.14	0.48	0.86	1.27	1.70	2.17	2.87	4.74	8.65	14.66	20.67	26.68
	0	0	0	0	150	210	240	240	270	270	540	600	1740	1740	1740	1740
80	0.00	0.00	0.00	0.00	0.29	0.65	1.04	1.45	1.87	2.38	3.31	5.17	8.65	14.66	20.67	26.68
	0	0	0	120	210	210	240	240	240	540	540	540	1740	1740	1740	1740
90	0.00	0.00	0.00	0.09	0.43	0.80	1.20	1.62	2.03	2.79	3.72	5.59	8.65	14.66	20.67	26.68
	0	0	0	150	210	210	240	240	240	540	540	540	1740	1740	1740	1740
100	0.00	0.00	0.00	0.20	0.57	0.93	1.35	1.76	2.25	3.18	4.11	5.98	8.65	14.66	20.67	26.68
	0	0	0	210	210	240	240	240	540	540	540	540	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	28.60	2.05	2.12	2.61	4.12	5.62	5.63
3	1.28	1.12	1.18	1.36	1.36	1.55	2.48
4	1.02	1.00	1.00	1.00	1.11	1.10	1.23
5	1.00	1.00	1.00	1.00	1.06	1.03	1.05
6	1.00	1.00	1.00	1.00	1.02	1.01	1.02
7	28.59	2.21	2.49	4.39	6.97	10.29	11.64
8	1.28	1.16	1.26	1.52	1.66	4.74	6.74
9	1.29	1.18	1.30	1.64	2.00	6.36	9.73
10	1.05	1.02	1.01	1.44	1.95	6.64	13.07
11	1.02	1.02	1.03	1.52	2.11	8.37	15.96
12	1.65	1.46	1.50	1.68	2.13	5.53	7.16
13	1.05	1.00	1.01	1.35	1.56	4.02	7.07
14	1.01	1.01	1.01	1.33	1.76	4.47	10.11
15	1.00	1.02	1.05	1.39	1.94	6.22	13.64
16	1.01	1.01	1.03	1.37	2.08	7.75	17.33
17	1.02	1.00	1.01	1.23	1.45	2.53	5.98
18	1.00	1.02	1.01	1.24	1.62	3.24	8.35
19	1.00	1.01	1.04	1.32	1.83	4.90	12.38
20	1.01	1.02	1.03	1.31	1.98	6.70	16.23

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	360.39	354.82	341.12	328.15	382.76	498.13	746.72
50.00	2.054	344.92	329.24	320.38	318.03	373.36	497.34	738.82
40.00	1.960	323.43	293.70	291.57	303.97	360.31	496.23	727.85
30.00	1.834	294.53	245.93	252.85	285.07	342.76	494.75	713.11
25.00	1.751	286.65	239.23	248.14	268.15	327.71	484.18	704.89
20.00	1.645	278.03	233.84	244.79	246.08	308.15	469.53	694.62
10.00	1.282	233.21	216.72	213.01	232.58	250.63	353.27	664.48
5.00	0.841	197.48	159.50	165.48	181.43	207.24	258.88	499.23
2.03	0.021	111.01	58.13	64.41	86.64	106.29	142.49	254.53

03268000 Buck Creek at New Moorefield, Ohio

Location: Latitude 39°59′31″, longitude 83°42′53″, Clark County, Hydrologic Unit 05080001

Drainage area, in square miles: 65.3

Station used for record extension: 03267000

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Percentage of estimated values in extended record: 72.4

Eighty-percent-duration streamflow, in cubic feet per second: 27.

Mean annual streamflow, in inches: 13.64

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	1.35	5.39	8.37	13.69	22.57	32.34	42.00
50.00	3.90	1.51	5.49	8.47	13.73	22.91	32.39	42.17
40.00	3.68	1.73	5.62	8.61	13.79	23.37	32.46	42.40
30.00	3.38	2.01	5.79	8.78	13.87	23.97	32.54	42.69
25.00	3.20	2.06	5.81	9.18	14.07	24.23	32.99	42.83
20.00	2.97	2.11	5.83	9.71	14.34	24.55	33.58	42.99
10.00	2.25	2.26	6.72	11.04	17.25	31.32	47.83	64.42
5.36	1.58	2.57	8.14	15.22	23.44	40.93	64.95	–

03268000 Buck Creek at New Moorefield, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.17	0.28	0.39	0.73	1.55	2.47	3.50	4.62	5.74
	0	0	0	0	0	0	60	60	60	180	180	240	270	300	300	300
6	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.17	0.28	0.58	0.92	1.74	2.71	3.73	4.85	7.14
	0	0	0	0	0	0	30	60	120	180	180	240	270	300	300	660
8	0.00	0.00	0.00	0.00	0.00	0.02	0.08	0.18	0.44	0.74	1.11	1.92	2.93	4.63	6.87	9.28
	0	0	0	0	0	30	30	90	150	180	210	270	270	600	600	660
10	0.00	0.00	0.00	0.00	0.00	0.03	0.09	0.21	0.48	0.79	1.18	2.03	3.36	5.60	7.89	10.36
	0	0	0	0	0	30	30	90	150	180	210	270	600	600	660	660
15	0.00	0.00	0.00	0.00	0.00	0.05	0.13	0.24	0.50	0.84	1.23	2.18	4.37	6.61	10.19	15.30
	0	0	0	0	0	30	60	60	180	210	210	270	600	600	1320	1380
20	0.00	0.00	0.00	0.00	0.01	0.06	0.17	0.28	0.55	0.89	1.34	2.52	4.76	8.44	13.99	20.49
	0	0	0	0	30	30	60	60	180	240	240	600	600	1380	1740	1740
25	0.00	0.00	0.00	0.00	0.02	0.09	0.20	0.32	0.62	1.03	1.48	2.74	5.78	11.20	17.70	24.20
	0	0	0	0	30	60	60	60	180	240	240	600	960	1740	1740	1740
30	0.00	0.00	0.00	0.00	0.02	0.12	0.23	0.37	0.74	1.18	1.64	2.92	6.80	13.30	19.80	26.30
	0	0	0	0	30	60	60	180	240	240	270	600	1740	1740	1740	1740
40	0.00	0.00	0.00	0.00	0.03	0.14	0.25	0.60	1.05	1.50	2.00	3.49	8.23	14.73	21.23	27.73
	0	0	0	0	60	60	60	240	240	240	270	960	1740	1740	1740	1740
50	0.00	0.00	0.00	0.00	0.04	0.16	0.49	0.90	1.35	1.84	2.34	3.69	8.23	14.73	21.23	27.73
	0	0	0	0	60	150	210	240	240	270	270	960	1740	1740	1740	1740
60	0.00	0.00	0.00	0.00	0.08	0.37	0.76	1.18	1.65	2.15	2.66	4.00	8.23	14.73	21.23	27.73
	0	0	0	0	150	210	210	240	270	270	270	600	1740	1740	1740	1740
70	0.00	0.00	0.00	0.00	0.25	0.61	1.00	1.43	1.93	2.43	2.94	4.41	8.23	14.73	21.23	27.73
	0	0	0	0	150	210	210	270	270	270	270	600	1740	1740	1740	1740
80	0.00	0.00	0.00	0.12	0.43	0.82	1.21	1.67	2.18	2.68	3.19	4.81	8.23	14.73	21.23	27.73
	0	0	0	150	210	210	210	270	270	270	270	600	1740	1740	1740	1740
90	0.00	0.00	0.00	0.25	0.61	1.00	1.39	1.89	2.40	2.90	3.40	5.22	8.23	14.73	21.23	27.73
	0	0	0	150	210	210	210	270	270	270	270	600	1740	1740	1740	1740
100	0.00	0.00	0.08	0.37	0.76	1.15	1.58	2.08	2.59	3.09	3.59	5.61	8.23	14.73	21.23	27.73
	0	0	150	210	210	210	270	270	270	270	270	600	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.42	1.79	1.77	1.98	2.58	3.88	4.53
3	1.06	1.01	1.00	1.20	1.44	1.56	2.08
4	1.05	1.00	1.00	1.00	1.17	1.12	1.36
5	1.04	1.00	1.00	1.00	1.09	1.04	1.17
6	1.02	1.00	1.00	1.00	1.03	1.02	1.07
7	2.42	1.82	1.88	2.46	5.22	8.33	10.35
8	1.06	1.01	1.02	1.36	1.82	3.94	6.39
9	1.07	1.01	1.09	1.53	2.41	5.54	10.47
10	1.06	1.01	1.02	1.35	1.90	6.48	14.24
11	1.05	1.02	1.03	1.41	2.01	8.32	17.57
12	1.37	1.20	1.30	1.51	2.42	4.49	6.49
13	1.06	1.00	1.01	1.25	1.67	3.69	7.66
14	1.04	1.01	1.02	1.19	1.70	4.35	11.27
15	1.03	1.03	1.04	1.27	1.86	6.38	14.52
16	1.03	1.01	1.05	1.27	2.05	7.69	17.94
17	1.05	1.00	1.01	1.11	1.60	2.73	6.34
18	1.03	1.01	1.02	1.08	1.64	3.24	9.15
19	1.02	1.02	1.04	1.16	1.78	5.03	12.72
20	1.00	1.02	1.06	1.16	1.99	6.50	16.33

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
59.00	2.122	339.87	338.81	329.83	321.12	323.08	465.54	635.17
50.00	2.054	320.08	313.63	307.58	308.47	321.99	459.27	630.78
40.00	1.960	292.58	278.65	276.67	290.89	320.49	450.57	624.69
30.00	1.834	255.62	231.64	235.12	267.26	318.46	438.87	616.50
25.00	1.751	243.62	221.60	229.92	254.51	304.80	432.20	613.30
20.00	1.645	229.93	211.48	226.12	238.66	285.87	423.85	609.50
10.00	1.282	191.44	189.09	195.15	215.70	241.40	339.23	557.73
5.00	0.841	159.67	121.27	137.90	157.79	185.58	241.16	451.32
2.03	0.021	97.67	32.27	29.91	46.07	64.87	123.24	211.98

03268500 Beaver Creek near Springfield, Ohio

Location: Latitude 39°56′26″, longitude 83°44′56″, Clark County, Hydrologic Unit 05080001

Drainage area, in square miles: 39.2

Station used for record extension: 03268000

Time period of systematic or extended record analyzed: 1939-10-01 to 1997-09-30

Percentage of estimated values in extended record: 65.8

Eighty-percent-duration streamflow, in cubic feet per second: 9.1

Mean annual streamflow, in inches: 14.25

Location of station used for precipitation data: Columbus, Ohio

Location of station used for potential evapotranspiration data: Columbus, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
59.00	4.07	0.81	3.75	5.61	10.44	20.31	29.26	38.20
50.00	3.90	0.89	3.85	5.77	10.79	20.36	29.58	38.29
40.00	3.68	0.99	3.97	5.99	11.27	20.43	30.02	38.42
30.00	3.38	1.13	4.14	6.27	11.88	20.52	30.59	38.58
25.00	3.20	1.14	4.15	6.48	12.30	21.52	30.86	38.93
20.00	2.97	1.14	4.16	6.74	12.81	22.85	31.19	39.40
10.00	2.25	1.22	4.82	8.64	14.52	30.90	48.04	66.79
5.36	1.58	1.44	6.09	13.08	21.77	49.44	62.31	–

03268500 Beaver Creek near Springfield, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.00	0.00	0.02	0.13	0.29	0.65	1.06	1.47	1.88	2.29	3.31	4.48	5.65	6.82	7.99
	0	0	0	30	60	150	210	210	210	210	210	300	300	300	300	300
6	0.00	0.00	0.00	0.02	0.14	0.38	0.75	1.16	1.57	1.98	2.41	3.48	4.66	5.83	7.35	9.93
	0	0	0	30	90	150	210	210	210	210	270	300	300	300	660	660
8	0.00	0.00	0.00	0.03	0.18	0.50	0.86	1.27	1.68	2.15	2.65	3.75	5.18	7.52	10.07	12.64
	0	0	0	30	90	180	210	210	240	240	270	300	600	600	660	660
10	0.00	0.00	0.00	0.04	0.22	0.55	0.91	1.33	1.80	2.27	2.79	4.08	6.42	8.76	11.31	14.06
	0	0	0	60	150	180	210	240	240	270	270	600	600	600	660	1020
15	0.00	0.00	0.00	0.06	0.26	0.58	1.01	1.48	1.96	2.50	3.08	5.26	7.60	10.47	14.84	20.22
	0	0	0	60	150	180	240	240	270	300	300	600	600	1020	1380	1380
20	0.00	0.00	0.00	0.07	0.28	0.64	1.11	1.59	2.13	2.71	3.59	5.70	8.83	13.49	19.56	26.35
	0	0	0	60	150	240	240	270	300	300	540	540	960	1380	1740	1740
25	0.00	0.00	0.00	0.08	0.30	0.72	1.18	1.71	2.29	2.94	3.99	6.59	10.28	16.83	23.62	30.52
	0	0	0	60	150	240	240	270	300	540	540	900	1380	1740	1740	1800
30	0.00	0.00	0.00	0.09	0.33	0.79	1.28	1.83	2.41	3.21	4.26	7.42	12.32	19.10	25.98	33.01
	0	0	0	60	150	240	270	300	300	540	540	900	1740	1740	1800	1800
40	0.00	0.00	0.00	0.10	0.46	0.94	1.47	2.02	2.61	3.55	4.79	8.30	13.91	20.70	27.71	34.74
	0	0	0	150	240	270	270	300	300	540	900	900	1740	1740	1800	1800
50	0.00	0.00	0.00	0.17	0.60	1.09	1.62	2.17	2.75	3.76	5.11	8.62	13.91	20.70	27.71	34.74
	0	0	0	150	240	270	270	300	300	540	900	900	1740	1740	1800	1800
60	0.00	0.00	0.00	0.27	0.72	1.23	1.75	2.29	3.04	4.21	5.38	8.62	13.91	20.70	27.71	34.74
	0	0	0	210	240	270	270	300	600	600	600	900	1740	1740	1800	1800
70	0.00	0.00	0.01	0.37	0.83	1.34	1.87	2.42	3.59	4.76	5.93	8.62	13.91	20.70	27.71	34.74
	0	0	120	210	240	270	270	600	600	600	600	900	1740	1740	1800	1800
80	0.00	0.00	0.08	0.46	0.93	1.45	1.97	2.94	4.11	5.28	6.45	8.79	13.91	20.70	27.71	34.74
	0	0	180	240	240	270	270	600	600	600	600	600	1740	1740	1800	1800
90	0.00	0.00	0.15	0.55	1.02	1.54	2.27	3.44	4.61	5.78	6.95	9.29	13.91	20.70	27.71	34.74
	0	0	180	240	240	270	600	600	600	600	600	600	1740	1740	1800	1800
100	0.00	0.00	0.22	0.63	1.10	1.62	2.73	3.90	5.07	6.24	7.41	9.75	13.91	20.70	27.71	34.74
	0	0	180	240	240	270	600	600	600	600	600	600	1740	1740	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.70	1.52	1.62	1.82	2.56	4.79	6.12
3	1.07	1.00	1.00	1.20	1.50	1.47	1.98
4	1.05	1.00	1.00	1.00	1.07	1.13	1.19
5	1.04	1.00	1.00	1.00	1.00	1.00	1.05
6	1.02	1.00	1.00	1.00	1.00	1.00	1.02
7	1.70	1.66	1.72	2.55	5.68	9.11	11.62
8	1.07	1.03	1.07	1.47	1.78	3.46	6.19
9	1.07	1.03	1.11	1.56	1.85	4.74	8.46
10	1.06	1.04	1.04	1.34	1.80	4.37	9.50
11	1.10	1.04	1.04	1.20	1.68	4.26	10.73
12	1.07	1.25	1.34	1.62	2.21	4.57	6.97
13	1.07	1.02	1.02	1.26	1.64	2.28	5.66
14	1.05	1.04	1.03	1.10	1.54	2.41	6.42
15	1.08	1.03	1.04	1.11	1.64	2.41	7.04
16	1.06	1.06	1.06	1.15	1.71	2.53	7.54
17	1.06	1.03	1.02	1.06	1.44	1.69	4.35
18	1.04	1.04	1.04	1.08	1.50	1.80	4.95
19	1.07	1.04	1.04	1.08	1.60	1.87	5.69
20	1.04	1.06	1.05	1.14	1.70	1.94	6.12

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
59.00	2.122	323.71	333.26	327.52	319.35	315.63	409.48	507.77
50.00	2.054	303.32	305.68	303.34	304.85	308.28	394.44	503.12
40.00	1.960	275.00	267.37	269.74	284.69	298.08	373.54	496.67
30.00	1.834	236.92	215.86	224.58	257.61	284.36	345.45	487.99
25.00	1.751	227.07	210.65	218.52	244.63	266.51	337.49	467.93
20.00	1.645	216.48	207.66	213.83	228.75	242.71	328.71	440.61
10.00	1.282	172.49	174.12	176.42	198.49	215.99	284.75	330.44
5.00	0.841	140.96	114.78	139.71	149.13	187.92	225.85	267.34
2.03	0.021	89.99	36.11	34.57	61.09	94.65	129.47	156.23

03270800 Wolf Creek at Trotwood, Ohio

Location: Latitude 39°47′39″, longitude 84°18′36″, Montgomery County, Hydrologic Unit 05080002

Drainage area, in square miles: 22.7

Station used for record extension: 03271800

Time period of systematic or extended record analyzed: 1962-10-01 to 1997-09-30

Percentage of estimated values in extended record: 31.4

Eighty-percent-duration streamflow, in cubic feet per second: 1.6

Mean annual streamflow, in inches: 14.08

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
36.00	3.57	0.16	2.83	6.45	13.09	22.71	33.16	47.80
30.00	3.38	0.17	2.92	6.65	13.23	23.71	34.76	49.59
25.00	3.20	0.18	3.02	6.86	13.37	24.71	36.37	51.39
20.00	2.97	0.19	3.13	7.11	13.55	25.94	38.35	53.60
10.00	2.25	0.27	4.53	7.58	14.60	28.75	44.00	62.60
5.14	1.53	0.49	5.93	12.12	24.41	41.63	–	–

03270800 Wolf Creek at Trotwood, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.07	0.25	0.53	0.87	1.22	1.57	1.91	2.26	2.61	3.00	3.92	4.85	5.86	6.90	8.24
	30	60	120	180	180	180	180	180	180	180	210	240	240	270	270	540
6	0.01	0.08	0.30	0.64	0.98	1.33	1.75	2.21	2.67	3.14	3.60	4.53	5.47	6.51	8.57	10.65
	30	90	150	180	180	180	240	240	240	240	240	240	270	270	540	540
8	0.01	0.12	0.39	0.74	1.13	1.59	2.06	2.52	2.98	3.44	3.91	4.88	6.30	8.38	10.47	12.62
	60	120	150	180	210	240	240	240	240	240	240	270	540	540	540	600
10	0.02	0.15	0.44	0.80	1.21	1.64	2.10	2.57	3.03	3.49	4.00	5.04	6.95	9.03	11.29	15.43
	60	120	180	210	210	240	240	240	240	240	270	270	540	540	600	1260
15	0.04	0.18	0.49	0.85	1.26	1.66	2.10	2.64	3.22	3.80	4.38	5.62	7.30	9.81	13.28	16.86
	120	120	180	210	210	210	240	300	300	300	300	330	540	900	900	960
20	0.05	0.18	0.51	0.88	1.28	1.81	2.39	2.97	3.54	4.12	4.71	5.98	7.35	10.80	14.28	17.98
	120	120	180	210	210	300	300	300	300	300	330	330	540	900	960	960
25	0.05	0.19	0.52	0.91	1.40	1.98	2.56	3.13	3.71	4.29	4.87	6.06	7.83	11.30	14.77	18.47
	120	150	180	210	300	300	300	300	300	300	300	330	900	900	900	1620
30	0.05	0.20	0.54	0.94	1.49	2.07	2.65	3.23	3.80	4.38	4.96	6.12	8.13	11.60	15.07	20.42
	120	150	210	210	300	300	300	300	300	300	300	300	900	900	900	1500
40	0.05	0.21	0.68	1.20	1.72	2.24	2.76	3.30	3.88	4.45	5.03	7.00	11.86	16.72	21.58	26.43
	120	240	270	270	270	270	270	300	300	300	300	1260	1260	1260	1260	1260
50	0.08	0.36	0.85	1.37	1.89	2.41	2.93	3.45	4.86	7.29	9.72	14.58	19.44	24.29	29.15	34.01
	240	240	270	270	270	270	270	270	1260	1260	1260	1260	1260	1260	1260	1260
60	0.15	0.43	0.94	1.46	1.98	3.19	5.62	8.05	10.48	12.91	15.34	20.20	25.05	29.91	34.77	39.63
	240	240	270	270	270	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260
70	0.17	0.47	0.99	2.01	4.44	6.87	9.30	11.73	14.16	16.59	19.02	23.87	28.73	33.59	38.45	43.31
	240	270	270	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260
80	0.18	0.49	1.83	4.26	6.69	9.12	11.55	13.98	16.40	18.83	21.26	26.12	30.98	35.84	40.69	46.71
	270	270	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1800
90	0.20	0.72	3.15	5.58	8.00	10.43	12.86	15.29	17.72	20.15	22.58	27.44	32.29	37.15	43.73	50.67
	270	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1800	1800
100	0.20	1.47	3.90	6.33	8.76	11.19	13.61	16.04	18.47	20.90	23.33	28.19	33.25	40.08	47.02	53.96
	270	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1260	1320	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.22	1.45	1.43	1.57	1.75	2.27	3.92
3	1.01	1.21	1.15	1.03	1.00	1.14	1.44
4	1.04	1.10	1.08	1.00	1.00	1.00	1.00
5	1.02	1.02	1.05	1.00	1.00	1.00	1.00
6	1.00	1.00	1.02	1.00	1.00	1.00	1.00
7	1.22	1.51	1.69	1.89	2.26	5.94	12.14
8	1.01	1.23	1.18	1.13	1.13	1.74	2.95
9	1.01	1.26	1.21	1.17	1.31	2.20	5.23
10	1.05	1.22	1.21	1.23	1.20	1.62	3.66
11	1.05	1.19	1.23	1.25	1.22	1.54	3.38
12	1.04	1.26	1.20	1.12	1.43	2.19	3.97
13	1.04	1.19	1.18	1.17	1.14	1.39	2.07
14	1.05	1.17	1.18	1.24	1.19	1.32	1.90
15	1.04	1.13	1.21	1.25	1.20	1.32	1.89
16	1.00	1.12	1.22	1.30	1.20	1.41	1.89
17	1.04	1.15	1.16	1.18	1.14	1.20	1.64
18	1.03	1.10	1.16	1.24	1.17	1.18	1.58
19	1.01	1.08	1.18	1.25	1.19	1.22	1.66
20	1.00	1.07	1.24	1.30	1.20	1.28	1.62

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
36.00	1.915	252.24	200.21	211.54	251.33	281.40	292.71	307.22
30.00	1.834	247.33	198.05	208.71	242.14	268.00	278.61	296.65
25.00	1.751	242.25	195.81	205.78	232.64	254.16	264.05	285.72
20.00	1.645	235.80	192.97	202.06	220.57	236.55	245.53	271.83
10.00	1.282	207.98	184.73	181.30	181.90	203.79	230.18	252.43
5.00	0.841	150.85	123.27	118.27	146.54	163.42	199.57	225.88
2.00	0.000	95.97	59.94	60.63	65.46	88.26	105.37	129.59

03271000 Wolf Creek at Dayton, Ohio

Location: Latitude 39°46′00″, longitude 84°14′12″, Montgomery County, Hydrologic Unit 05080002

Drainage area, in square miles: 68.7

Station used for record extension: 03271800 and 03273500

Time period of systematic or extended record analyzed: 1937-10-01 to 1997-09-30

Percentage of estimated values in extended record: 63.3

Eighty-percent-duration streamflow, in cubic feet per second: 7.7

Mean annual streamflow, in inches: 13.23

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
61.00	4.10	0.35	2.74	6.64	12.86	23.40	33.78	45.79
60.00	4.09	0.35	2.74	6.64	12.86	23.40	33.78	45.80
50.00	3.90	0.35	2.74	6.64	12.86	23.40	33.78	45.96
40.00	3.68	0.35	2.74	6.64	12.86	23.40	33.78	46.15
30.00	3.38	0.35	2.81	6.67	12.90	23.40	33.98	46.76
25.00	3.20	0.36	3.55	6.99	13.39	23.44	36.25	50.82
20.00	2.97	0.38	4.40	7.35	13.95	23.48	38.82	55.44
10.00	2.25	0.54	5.21	8.55	14.74	27.64	42.81	57.78
5.08	1.52	0.86	7.79	11.84	19.30	44.25	–	–

03271000 Wolf Creek at Dayton, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.01	0.11	0.22	0.39	0.69	1.03	1.41	1.79	2.17	2.55	3.36	4.33	5.31	6.29	7.71
	0	30	60	60	120	180	210	210	210	210	210	270	270	270	270	540
6	0.00	0.01	0.11	0.24	0.48	0.81	1.13	1.46	1.84	2.22	2.60	3.39	4.34	5.31	6.87	8.83
	0	30	60	120	150	180	180	210	210	210	210	240	270	270	540	540
8	0.00	0.01	0.12	0.35	0.64	0.96	1.29	1.62	2.02	2.46	2.89	3.76	4.63	6.26	8.27	10.44
	0	30	90	150	180	180	180	210	240	240	240	240	240	540	600	600
10	0.00	0.02	0.16	0.42	0.74	1.06	1.39	1.81	2.24	2.68	3.11	3.98	5.07	7.03	9.13	11.84
	0	60	120	150	180	180	210	240	240	240	240	240	540	540	600	1260
15	0.00	0.03	0.23	0.54	0.88	1.26	1.66	2.10	2.53	3.01	3.50	4.48	6.05	8.60	11.86	15.63
	0	60	150	180	210	210	240	240	240	270	270	270	540	900	900	1260
20	0.00	0.04	0.28	0.62	1.00	1.38	1.84	2.33	2.87	3.42	3.96	5.05	7.06	10.32	13.58	17.26
	0	60	180	210	210	210	270	270	300	300	300	300	900	900	900	1320
25	0.00	0.04	0.31	0.69	1.07	1.54	2.08	2.62	3.17	3.71	4.25	5.34	8.02	11.28	14.54	18.69
	0	90	180	210	210	300	300	300	300	300	300	300	900	900	900	1320
30	0.00	0.05	0.34	0.72	1.14	1.69	2.23	2.77	3.32	3.86	4.41	5.49	8.56	11.82	15.08	19.59
	0	120	210	210	300	300	300	300	300	300	300	300	900	900	900	1320
40	0.00	0.05	0.35	0.73	1.24	1.78	2.33	2.87	3.42	3.96	4.50	5.68	8.94	12.20	15.69	20.47
	0	120	210	210	300	300	300	300	300	300	300	900	900	900	1320	1320
50	0.00	0.05	0.35	0.73	1.24	1.78	2.33	2.87	3.42	3.96	4.50	5.68	8.94	12.20	15.86	21.32
	0	120	210	210	300	300	300	300	300	300	300	900	900	900	1320	1680
60	0.00	0.05	0.35	0.73	1.24	1.78	2.33	2.87	3.42	3.96	4.50	5.94	8.94	12.20	16.58	22.23
	0	120	210	210	300	300	300	300	300	300	300	600	900	900	1560	1560
70	0.00	0.05	0.35	0.73	1.24	1.78	2.33	2.87	3.42	3.96	4.50	6.26	8.94	12.20	17.32	23.06
	0	120	210	210	300	300	300	300	300	300	300	600	900	900	1560	1620
80	0.00	0.05	0.35	0.73	1.24	1.78	2.33	2.87	3.42	3.96	4.50	6.55	8.94	12.28	18.12	23.99
	0	120	210	210	300	300	300	300	300	300	300	600	900	1560	1620	1620
90	0.00	0.05	0.35	0.73	1.24	1.78	2.33	2.87	3.42	3.96	4.65	6.83	9.00	13.13	19.00	24.87
	0	120	210	210	300	300	300	300	300	300	600	600	600	1620	1620	1620
100	0.00	0.05	0.35	0.73	1.24	1.78	2.33	2.87	3.42	3.96	4.91	7.09	9.26	13.95	19.82	25.69
	0	120	210	210	300	300	300	300	300	300	600	600	600	1620	1620	1620

03271000 Wolf Creek at Dayton, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.26	1.16	1.17	1.25	1.58	2.36	9.49
3	1.08	1.06	1.04	1.00	1.00	1.10	1.67
4	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.27	1.24	1.31	1.63	2.51	15.42	26.03
8	1.09	1.11	1.11	1.17	1.11	2.17	7.02
9	1.10	1.12	1.12	1.18	1.41	2.62	15.64
10	1.05	1.10	1.17	1.28	1.24	2.15	12.71
11	1.03	1.10	1.17	1.32	1.26	2.02	11.01
12	1.19	1.14	1.12	1.15	1.45	2.61	11.89
13	1.02	1.07	1.11	1.19	1.20	1.69	2.75
14	1.02	1.06	1.15	1.28	1.24	1.52	2.65
15	1.02	1.07	1.17	1.30	1.25	1.59	2.75
16	1.07	1.13	1.18	1.37	1.27	1.55	2.61
17	1.00	1.02	1.07	1.19	1.19	1.32	2.25
18	1.02	1.05	1.14	1.28	1.24	1.41	2.19
19	1.02	1.07	1.19	1.30	1.25	1.46	2.23
20	1.07	1.13	1.18	1.37	1.25	1.44	2.14

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
61.00	2.135	246.23	226.05	227.70	249.21	280.67	302.87	315.21
60.00	2.128	246.16	225.97	227.60	248.94	280.01	302.21	314.64
50.00	2.054	245.36	225.11	226.47	245.92	272.65	294.75	308.20
40.00	1.960	244.35	224.03	225.04	242.10	263.36	285.35	300.08
30.00	1.834	242.95	222.02	222.87	236.76	251.31	272.96	289.64
25.00	1.751	241.53	214.86	218.63	231.04	248.09	267.59	287.82
20.00	1.645	238.20	206.31	212.99	223.93	243.57	260.72	285.23
10.00	1.282	185.87	153.89	148.45	159.53	180.47	204.38	244.51
5.00	0.841	134.08	98.00	104.40	117.88	138.92	167.25	195.27
2.03	0.021	92.36	66.81	62.29	76.83	88.00	119.66	135.28

03271800 Twin Creek near Ingomar, Ohio

Location: Latitude 39°42′28″, longitude 84°31′30″, Preble County, Hydrologic Unit 05080002

Drainage area, in square miles: 197.

Station used for record extension: 03223000

Time period of systematic or extended record analyzed: 1960-07-01 to 1997-09-30

Percentage of estimated values in extended record: 6.0

Eighty-percent-duration streamflow, in cubic feet per second: 17.

Mean annual streamflow, in inches: 13.88

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
38.00	3.62	0.24	2.66	6.58	13.11	24.37	34.38	44.92
30.00	3.38	0.25	2.86	6.62	13.27	24.40	35.83	47.94
25.00	3.20	0.25	3.02	6.66	13.40	24.42	36.96	50.28
20.00	2.97	0.26	3.22	6.70	13.55	24.45	38.34	53.15
10.00	2.25	0.32	5.11	7.63	14.55	29.89	44.80	60.63
5.43	1.59	0.48	5.79	12.06	18.52	45.62	–	–

03271800 Twin Creek near Ingomar, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.04	0.23	0.52	0.86	1.21	1.55	1.90	2.30	2.70	3.10	3.97	5.00	6.03	7.05	8.51
	0	60	120	180	180	180	180	210	210	210	210	270	270	270	270	600
6	0.00	0.05	0.29	0.60	0.94	1.28	1.63	2.01	2.41	2.82	3.27	4.19	5.17	6.19	8.44	10.72
	0	60	150	180	180	180	180	210	210	240	240	240	270	270	600	600
8	0.00	0.07	0.35	0.68	1.02	1.37	1.77	2.18	2.64	3.09	3.55	4.46	6.04	8.09	10.14	12.40
	30	120	150	180	180	210	210	240	240	240	240	240	540	540	540	600
10	0.00	0.09	0.37	0.71	1.07	1.47	1.87	2.31	2.76	3.22	3.68	4.78	6.83	8.88	10.93	13.12
	30	120	180	180	210	210	210	240	240	240	240	540	540	540	540	900
15	0.00	0.10	0.41	0.80	1.20	1.60	2.00	2.56	3.13	3.70	4.27	5.41	7.39	9.44	12.12	16.20
	30	120	180	210	210	210	210	300	300	300	300	300	540	540	900	1380
20	0.00	0.11	0.46	0.86	1.25	1.73	2.30	2.87	3.44	4.01	4.58	5.72	7.47	10.12	13.54	17.87
	30	120	210	210	210	300	300	300	300	300	300	300	540	900	900	1380
25	0.00	0.11	0.48	0.88	1.30	1.87	2.44	3.01	3.58	4.15	4.72	5.86	7.63	11.06	14.48	19.40
	30	120	210	210	300	300	300	300	300	300	300	300	900	900	900	1680
30	0.00	0.12	0.48	0.88	1.36	1.93	2.50	3.07	3.64	4.21	4.78	5.92	8.30	11.72	15.51	21.89
	30	120	210	210	270	300	300	300	300	300	300	300	900	900	1680	1680
40	0.00	0.13	0.48	0.94	1.45	1.97	2.50	3.07	3.64	4.21	4.78	6.74	9.18	14.52	20.90	27.29
	30	150	210	270	270	270	300	300	300	300	300	600	900	1680	1680	1680
50	0.00	0.15	0.51	0.98	1.50	2.01	2.52	3.07	3.70	4.84	5.98	8.26	13.49	19.88	26.26	32.65
	30	150	240	270	270	270	270	300	600	600	600	600	1680	1680	1680	1680
60	0.01	0.17	0.58	1.04	1.51	2.03	2.73	3.87	5.01	6.15	7.29	12.02	18.41	24.79	31.18	37.57
	90	150	240	240	270	270	600	600	600	600	600	1680	1680	1680	1680	1680
70	0.02	0.18	0.64	1.09	1.55	2.63	3.77	4.91	6.05	7.19	9.95	16.33	22.72	29.10	35.49	41.87
	90	150	240	240	240	600	600	600	600	600	1680	1680	1680	1680	1680	1680
80	0.03	0.23	0.69	1.15	2.30	3.44	4.58	5.72	7.87	10.43	13.62	20.01	26.40	32.78	39.41	46.25
	90	240	240	600	600	600	600	600	1140	1680	1680	1680	1680	1680	1800	1800
90	0.04	0.27	0.72	1.76	2.90	4.04	5.89	8.06	10.33	13.52	16.72	23.10	29.49	36.29	43.13	49.97
	150	240	240	600	600	600	1140	1140	1680	1680	1680	1680	1680	1800	1800	1800
100	0.06	0.30	1.06	2.20	3.36	5.52	7.69	9.85	12.91	16.10	19.29	25.72	32.56	39.40	46.24	53.08
	150	240	600	600	1140	1140	1140	1140	1680	1680	1680	1800	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.38	1.31	1.29	1.36	1.79	2.51	4.99
3	1.12	1.09	1.05	1.01	1.00	1.16	1.68
4	1.04	1.00	1.00	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.37	1.39	1.41	1.85	2.50	6.86	13.69
8	1.14	1.13	1.09	1.11	1.15	2.11	3.18
9	1.13	1.12	1.13	1.14	1.34	2.73	6.27
10	1.10	1.12	1.11	1.20	1.22	2.26	3.99
11	1.07	1.11	1.10	1.23	1.23	1.95	3.49
12	1.17	1.14	1.13	1.08	1.45	2.59	4.94
13	1.07	1.08	1.11	1.13	1.13	1.67	2.78
14	1.07	1.05	1.08	1.20	1.21	1.36	2.50
15	1.02	1.08	1.10	1.21	1.22	1.42	2.48
16	1.04	1.10	1.14	1.27	1.23	1.47	2.51
17	1.03	1.04	1.09	1.13	1.13	1.26	2.21
18	1.04	1.05	1.09	1.20	1.21	1.24	1.97
19	1.02	1.09	1.10	1.21	1.22	1.30	1.97
20	1.05	1.07	1.14	1.27	1.21	1.32	2.01

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
38.00	1.938	254.05	233.16	237.39	262.03	285.18	301.23	312.00
30.00	1.834	253.09	230.18	235.76	255.44	272.09	286.62	303.48
25.00	1.751	252.32	227.80	234.46	250.16	261.63	274.93	296.66
20.00	1.645	251.34	224.78	232.81	243.45	248.31	260.07	287.99
10.00	1.282	235.69	195.26	199.70	199.40	205.15	222.66	256.08
5.00	0.841	191.46	153.32	151.38	161.67	173.01	208.53	220.79
2.00	0.000	117.02	69.17	78.00	94.53	107.46	125.64	137.13

03272700 Sevenmile Creek at Camden, Ohio

Location: Latitude 39°37′45″, longitude 84°38′40″, Preble County, Hydrologic Unit 05080002

Drainage area, in square miles: 69.0

Station used for record extension: 03272800

Time period of systematic or extended record analyzed: 1960-07-01 to 1997-09-30

Percentage of estimated values in extended record: 28.0

Eighty-percent-duration streamflow, in cubic feet per second: 6.8

Mean annual streamflow, in inches: 14.71

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
38.00	3.62	0.13	3.36	6.90	11.46	25.45	39.15	54.32
30.00	3.38	0.19	3.59	7.57	12.73	25.68	40.66	55.66
25.00	3.20	0.24	3.76	8.08	13.72	25.86	41.84	56.71
20.00	2.97	0.30	3.98	8.71	14.93	26.08	43.28	57.98
10.00	2.25	0.42	4.96	10.30	17.41	32.53	45.57	59.65
5.43	1.59	0.52	6.94	11.25	21.49	41.24	–	–

03272700 Sevenmile Creek at Camden, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.01	0.05	0.24	0.56	0.92	1.28	1.64	2.01	2.37	2.80	3.22	4.17	5.14	6.21	8.14	10.32
	30	30	150	180	180	180	180	180	210	210	210	240	240	270	540	540
6	0.01	0.05	0.25	0.61	0.97	1.33	1.70	2.12	2.54	2.97	3.44	4.45	5.54	6.63	8.45	11.10
	30	60	150	180	180	180	210	210	210	210	240	270	270	270	540	1260
8	0.01	0.08	0.29	0.65	1.01	1.42	1.84	2.26	2.69	3.11	3.65	4.74	5.83	7.00	9.14	12.80
	30	60	150	180	180	210	210	210	210	210	270	270	270	300	600	1260
10	0.01	0.09	0.33	0.67	1.06	1.48	1.90	2.32	2.75	3.19	3.74	4.91	6.12	7.56	10.21	13.95
	60	60	150	180	210	210	210	210	210	270	270	300	300	660	660	1380
15	0.03	0.14	0.41	0.72	1.14	1.57	1.99	2.41	2.91	3.52	4.12	5.33	6.82	9.48	12.59	16.84
	60	120	150	180	210	210	210	210	300	300	300	300	660	660	960	1680
20	0.04	0.17	0.46	0.80	1.22	1.65	2.07	2.58	3.19	3.79	4.40	5.60	7.75	10.40	13.84	17.74
	90	120	150	210	210	210	210	300	300	300	300	300	660	660	960	1020
25	0.04	0.19	0.49	0.88	1.30	1.73	2.21	2.82	3.42	4.03	4.63	5.84	8.21	10.89	14.57	18.44
	90	150	150	210	210	210	300	300	300	300	300	300	660	900	960	960
30	0.04	0.21	0.53	0.96	1.38	1.87	2.42	3.03	3.63	4.23	4.84	6.05	8.41	11.36	15.05	18.92
	120	150	210	210	210	270	300	300	300	300	300	300	660	900	960	960
40	0.05	0.25	0.65	1.18	1.72	2.26	2.81	3.37	3.97	4.57	5.18	6.77	9.18	12.05	15.67	21.85
	150	180	210	270	270	270	270	300	300	300	300	600	600	720	960	1680
50	0.08	0.32	0.86	1.41	1.95	2.49	3.04	3.62	4.22	4.82	5.43	7.84	10.74	13.64	19.30	26.07
	180	240	270	270	270	270	270	300	300	300	300	720	720	720	1680	1680
60	0.12	0.44	0.98	1.52	2.07	2.61	3.19	3.80	4.40	5.00	6.33	9.23	12.13	17.79	25.04	32.29
	240	270	270	270	270	270	300	300	300	300	720	720	720	1800	1800	1800
70	0.17	0.49	1.04	1.58	2.12	2.71	3.32	3.92	4.62	6.07	7.52	10.42	16.99	24.24	31.49	38.74
	270	270	270	270	270	300	300	300	720	720	720	720	1800	1800	1800	1800
80	0.19	0.52	1.06	1.61	2.20	2.80	3.41	4.19	5.64	7.09	8.63	15.53	22.78	30.03	37.28	44.53
	270	270	270	270	300	300	300	720	720	720	1500	1800	1800	1800	1800	1800
90	0.21	0.53	1.08	1.66	2.26	2.87	3.60	5.05	6.50	9.65	13.28	20.52	27.77	35.02	42.27	49.52
	270	270	270	300	300	300	720	720	720	1800	1800	1800	1800	1800	1800	1800
100	0.21	0.54	1.10	1.70	2.31	2.91	4.33	6.61	10.24	13.86	17.48	24.73	31.98	39.23	46.48	53.73
	270	270	300	300	300	300	720	1800	1800	1800	1800	1800	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.68	1.36	1.34	1.28	1.56	2.15	3.66
3	1.20	1.13	1.12	1.08	1.01	1.00	1.33
4	1.03	1.02	1.07	1.03	1.00	1.00	1.00
5	1.01	1.00	1.04	1.00	1.00	1.00	1.00
6	1.00	1.00	1.02	1.00	1.00	1.00	1.00
7	1.69	1.38	1.39	1.60	2.25	5.75	12.64
8	1.20	1.17	1.15	1.19	1.09	1.56	2.49
9	1.20	1.16	1.21	1.23	1.18	1.91	4.06
10	1.11	1.13	1.18	1.31	1.18	1.54	2.57
11	1.05	1.12	1.27	1.28	1.21	1.48	2.34
12	1.25	1.20	1.20	1.16	1.33	2.04	3.10
13	1.11	1.10	1.16	1.19	1.16	1.26	1.90
14	1.02	1.06	1.17	1.28	1.19	1.15	1.73
15	1.10	1.09	1.21	1.28	1.22	1.18	1.79
16	1.09	1.04	1.22	1.30	1.19	1.22	1.94
17	1.04	1.05	1.14	1.18	1.16	1.12	1.49
18	1.03	1.03	1.15	1.28	1.19	1.15	1.60
19	1.10	1.07	1.18	1.28	1.22	1.18	1.69
20	1.08	1.04	1.20	1.30	1.19	1.18	1.86

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
38.00	1.938	204.93	210.94	210.65	240.54	274.48	293.29	302.09
30.00	1.834	204.79	198.60	202.18	230.06	255.60	271.24	286.90
25.00	1.751	204.68	188.72	195.40	221.68	240.51	253.59	274.74
20.00	1.645	204.54	176.17	186.78	211.03	221.31	231.16	259.29
10.00	1.282	189.78	166.13	167.90	177.17	200.52	213.16	244.77
5.00	0.841	137.48	117.60	123.66	155.09	178.23	197.54	213.05
2.00	0.000	97.39	61.93	60.12	77.62	100.35	120.89	135.62

03272800 Sevenmile Creek at Collinsville, Ohio

Location: Latitude 39°31′23″, longitude 84°36′39″, Butler County, Hydrologic Unit 05080002

Drainage area, in square miles: 120.

Station used for record extension: 03272700

Time period of systematic or extended record analyzed: 1960-07-01 to 1997-09-30

Percentage of estimated values in extended record: 67.1

Eighty-percent-duration streamflow, in cubic feet per second: 8.5

Mean annual streamflow, in inches: 13.17

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
38.00	3.62	0.33	2.95	6.10	10.18	22.99	35.54	49.44
30.00	3.38	0.33	2.95	6.48	10.95	23.22	36.96	50.68
25.00	3.20	0.33	2.96	6.78	11.55	23.41	38.05	51.63
20.00	2.97	0.33	2.96	7.15	12.29	23.63	39.40	52.81
10.00	2.25	0.35	4.17	7.97	15.51	28.47	39.96	55.45
5.43	1.59	0.51	6.24	12.09	19.60	42.12	57.67	–

03272800 Sevenmile Creek at Collinsville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.04	0.21	0.48	0.75	1.06	1.39	1.72	2.10	2.48	2.86	3.62	4.37	5.13	5.89	7.91
	0	60	150	150	150	180	180	210	210	210	210	210	210	210	210	600
6	0.00	0.04	0.23	0.51	0.84	1.16	1.49	1.83	2.21	2.59	2.97	3.72	4.64	5.61	6.59	8.69
	0	60	150	180	180	180	180	210	210	210	210	210	270	270	270	600
8	0.00	0.04	0.27	0.60	0.92	1.25	1.60	1.98	2.38	2.82	3.31	4.28	5.26	6.54	8.48	11.07
	30	60	180	180	180	180	210	210	240	270	270	270	270	540	540	1320
10	0.00	0.05	0.30	0.63	0.95	1.31	1.69	2.07	2.52	3.01	3.49	4.47	5.51	7.35	9.96	14.12
	30	60	180	180	180	210	210	210	270	270	270	270	300	540	960	1320
15	0.01	0.06	0.32	0.67	1.04	1.42	1.80	2.23	2.77	3.31	3.85	4.96	6.79	9.73	13.03	16.49
	30	60	180	210	210	210	210	300	300	300	300	330	600	900	960	960
20	0.01	0.07	0.33	0.71	1.09	1.47	1.85	2.38	2.92	3.46	4.04	5.51	7.68	10.80	14.15	17.61
	30	120	210	210	210	210	210	300	300	300	330	600	600	900	960	960
25	0.01	0.08	0.34	0.72	1.10	1.48	1.87	2.41	2.95	3.52	4.12	5.92	8.09	11.09	14.46	17.92
	30	120	210	210	210	210	300	300	300	330	330	600	600	900	960	960
30	0.01	0.09	0.34	0.72	1.10	1.48	1.87	2.41	2.95	3.52	4.12	6.06	8.22	11.09	14.46	17.92
	30	120	210	210	210	210	300	300	300	330	330	600	600	900	960	960
40	0.01	0.09	0.34	0.72	1.10	1.48	1.87	2.41	2.95	3.52	4.12	6.06	8.22	11.09	14.46	19.47
	30	90	210	210	210	210	300	300	300	330	330	600	600	900	960	1680
50	0.01	0.11	0.34	0.72	1.10	1.50	1.99	2.48	2.96	3.52	4.49	6.44	8.95	13.30	19.35	25.41
	30	90	210	210	210	270	270	270	270	330	540	540	720	1680	1680	1680
60	0.02	0.12	0.36	0.77	1.22	1.71	2.20	2.68	3.27	4.22	5.19	7.79	13.34	19.39	25.45	31.51
	90	90	180	240	270	270	270	270	480	540	540	1440	1680	1680	1680	1680
70	0.03	0.13	0.49	0.92	1.40	1.89	2.38	3.00	3.89	5.25	7.95	13.36	18.91	24.97	31.03	37.09
	90	90	240	240	270	270	270	480	540	1500	1500	1500	1680	1680	1680	1680
80	0.04	0.17	0.60	1.06	1.55	2.03	2.66	4.41	7.12	9.82	12.53	17.94	23.71	29.76	35.82	41.88
	90	240	240	270	270	270	480	1500	1500	1500	1500	1500	1680	1680	1680	1680
90	0.05	0.25	0.68	1.17	1.66	2.60	5.30	8.01	10.71	13.42	16.12	21.61	27.66	33.72	39.78	45.84
	90	240	240	270	270	1500	1500	1500	1500	1500	1500	1680	1680	1680	1680	1680
100	0.05	0.31	0.76	1.25	2.65	5.35	8.06	10.76	13.47	16.17	18.88	24.80	30.86	36.92	42.98	49.03
	90	240	270	270	1500	1500	1500	1500	1500	1500	1500	1680	1680	1680	1680	1680

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.85	1.47	1.23	1.25	1.37	1.93	2.07
3	1.09	1.17	1.05	1.00	1.00	1.06	1.20
4	1.00	1.05	1.01	1.00	1.00	1.00	1.02
5	1.00	1.01	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	2.97	1.57	1.35	1.46	1.95	3.45	12.55
8	1.12	1.28	1.16	1.03	1.12	1.61	2.09
9	1.18	1.36	1.19	1.07	1.22	1.84	2.40
10	1.10	1.32	1.17	1.06	1.30	1.70	2.48
11	1.15	1.39	1.20	1.12	1.27	1.75	2.42
12	1.30	1.33	1.15	1.03	1.17	1.94	2.27
13	1.06	1.27	1.17	1.07	1.17	1.34	1.99
14	1.10	1.26	1.18	1.05	1.25	1.45	2.00
15	1.15	1.35	1.21	1.11	1.22	1.49	2.04
16	1.12	1.33	1.20	1.10	1.32	1.53	2.28
17	1.06	1.25	1.15	1.07	1.12	1.33	1.70
18	1.10	1.22	1.18	1.06	1.21	1.44	1.87
19	1.15	1.32	1.21	1.11	1.20	1.50	1.93
20	1.12	1.33	1.21	1.10	1.30	1.53	2.18

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
38.00	1.938	90.96	155.74	192.09	216.34	218.64	221.25	248.64
30.00	1.834	83.58	153.85	188.48	213.40	216.81	220.64	248.36
25.00	1.751	77.68	152.34	185.58	211.05	215.34	220.16	248.13
20.00	1.645	70.18	150.41	181.91	208.07	213.47	219.54	247.85
10.00	1.282	61.78	131.78	155.00	170.67	193.45	207.14	234.66
5.00	0.841	56.55	90.09	103.87	128.89	148.35	175.42	194.99
2.00	0.000	21.00	49.85	53.81	66.04	90.48	110.17	129.60

03273500 Fourmile Creek near Hamilton, Ohio

Location: Latitude 39°27′30″, longitude 84°32′50″, Butler County, Hydrologic Unit 05080002

Drainage area, in square miles: 307.

Station used for record extension: 03241500

Time period of systematic or extended record analyzed: 1937-10-01 to 1997-09-30

Percentage of estimated values in extended record: 61.7

Eighty-percent-duration streamflow, in cubic feet per second: 13.

Mean annual streamflow, in inches: 17.46

Location of station used for precipitation data: Dayton, Ohio

Location of station used for potential evapotranspiration data: Dayton, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
61.00	4.10	0.09	1.53	1.94	5.86	18.16	31.65	43.11
60.00	4.09	0.09	1.54	1.96	5.92	18.16	31.73	43.33
50.00	3.90	0.10	1.66	2.16	6.61	18.17	32.59	45.82
40.00	3.68	0.10	1.80	2.40	7.46	18.18	33.64	48.86
30.00	3.38	0.11	2.07	2.89	8.61	18.80	35.43	52.89
25.00	3.20	0.17	3.09	4.96	9.93	25.38	41.11	56.37
20.00	2.97	0.23	4.27	7.33	11.57	32.89	47.65	60.54
10.00	2.25	0.37	5.16	10.71	18.63	38.01	55.36	76.75
5.08	1.52	0.55	8.15	15.35	23.77	44.49	–	–

03273500 Fourmile Creek near Hamilton, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.14	0.43	0.79	1.22	1.65	2.11	2.62	3.17	3.74	4.32	5.46	6.72	8.01	9.30	13.28
	30	120	120	180	180	180	210	210	240	240	240	240	270	270	270	900
6	0.02	0.15	0.43	0.81	1.24	1.67	2.15	2.66	3.23	3.80	4.38	5.61	6.90	8.27	9.71	13.28
	30	120	120	180	180	180	210	240	240	240	240	270	270	300	300	900
8	0.02	0.16	0.46	0.86	1.29	1.73	2.23	2.79	3.36	3.94	4.56	5.92	7.35	8.79	11.21	14.37
	60	120	150	180	180	210	210	240	240	240	270	300	300	300	660	660
10	0.02	0.17	0.49	0.92	1.35	1.81	2.33	2.91	3.48	4.09	4.74	6.16	7.59	10.12	13.28	18.46
	60	120	150	180	180	210	240	240	240	270	270	300	300	660	660	1260
15	0.03	0.19	0.59	1.02	1.46	2.00	2.57	3.14	3.76	4.41	5.35	8.15	11.02	13.90	17.59	23.40
	60	120	180	180	210	240	240	240	270	270	540	600	600	660	900	1740
20	0.04	0.23	0.65	1.08	1.59	2.16	2.73	3.53	4.82	6.16	7.59	10.46	13.33	17.08	21.38	27.11
	90	150	180	180	240	240	240	540	540	600	600	600	600	900	900	1800
25	0.05	0.26	0.69	1.14	1.71	2.28	3.46	4.76	6.10	7.54	8.97	11.84	15.27	19.57	23.87	30.15
	120	180	180	210	240	240	540	540	600	600	600	600	900	900	900	1620
30	0.06	0.29	0.72	1.22	1.80	2.95	4.24	5.54	6.98	8.41	9.85	12.72	16.94	21.25	25.55	32.67
	120	180	180	240	240	540	540	600	600	600	600	600	900	900	900	1620
40	0.08	0.32	0.78	1.35	2.55	3.84	5.13	6.53	7.97	9.40	10.84	14.63	18.93	23.23	29.14	36.88
	150	180	210	240	540	540	540	600	600	600	600	900	900	900	1620	1620
50	0.09	0.34	0.85	1.73	3.02	4.31	5.60	7.02	8.46	9.89	11.41	15.63	19.93	25.08	32.83	40.57
	150	180	240	540	540	540	540	600	600	600	840	900	900	1620	1620	1620
60	0.10	0.37	0.91	1.99	3.28	4.57	5.86	7.27	8.71	10.22	12.23	16.24	21.09	29.12	37.15	45.34
	150	210	240	540	540	540	540	600	600	840	840	840	1680	1680	1680	1740
70	0.11	0.39	0.98	2.14	3.44	4.73	6.02	7.39	8.84	10.75	12.76	17.64	25.67	33.70	41.79	50.11
	150	210	270	540	540	540	540	600	660	840	840	1680	1680	1680	1740	1740
80	0.11	0.41	1.07	2.24	3.53	4.82	6.11	7.45	9.09	11.10	13.88	21.81	29.84	37.87	46.16	54.48
	150	210	300	540	540	540	540	660	840	840	1260	1680	1680	1680	1740	1740
90	0.12	0.45	1.16	2.28	3.57	4.86	6.16	7.58	10.39	13.47	17.48	25.51	33.55	41.76	50.08	58.40
	210	300	300	540	540	540	540	660	1260	1680	1680	1680	1680	1740	1740	1740
100	0.14	0.51	1.23	2.30	3.59	4.88	6.55	9.56	12.69	16.71	20.73	28.76	36.90	45.22	53.54	61.85
	210	300	300	540	540	540	1260	1260	1680	1680	1680	1680	1740	1740	1740	1740

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.01	1.10	1.27	1.50	1.52	1.22	3.93
3	1.00	1.01	1.04	1.00	1.28	1.09	1.09
4	1.00	1.00	1.00	1.00	1.10	1.00	1.02
5	1.00	1.00	1.00	1.00	1.03	1.00	1.00
6	1.00	1.00	1.00	1.00	1.01	1.00	1.00
7	1.01	1.22	1.42	1.84	1.91	6.65	12.54
8	1.01	1.04	1.06	1.47	1.75	1.42	2.90
9	1.01	1.04	1.10	1.63	1.95	1.62	5.87
10	1.01	1.05	1.11	1.65	2.04	1.70	4.84
11	1.01	1.07	1.14	1.68	2.08	1.79	3.78
12	1.01	1.06	1.07	1.53	1.75	1.42	5.01
13	1.01	1.01	1.09	1.39	1.83	1.47	2.03
14	1.01	1.04	1.11	1.43	1.92	1.54	2.12
15	1.00	1.10	1.12	1.47	1.94	1.65	2.18
16	1.00	1.14	1.13	1.52	1.99	1.71	2.63
17	1.01	1.01	1.09	1.20	1.74	1.37	1.55
18	1.00	1.05	1.11	1.30	1.81	1.43	1.66
19	1.00	1.09	1.15	1.33	1.83	1.56	1.71
20	1.00	1.13	1.13	1.45	1.94	1.60	2.12

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
61.00	2.135	210.57	192.88	190.68	207.85	261.82	419.96	477.60
60.00	2.128	209.93	192.59	190.66	207.77	261.11	419.31	477.34
50.00	2.054	202.79	189.34	190.48	206.81	253.18	412.00	474.36
40.00	1.960	193.76	185.23	190.25	205.61	243.16	402.78	470.61
30.00	1.834	182.28	179.11	188.64	203.86	230.18	386.04	458.63
25.00	1.751	181.59	168.77	173.76	201.23	226.71	328.82	376.97
20.00	1.645	179.74	156.10	155.93	196.34	222.12	260.62	279.96
10.00	1.282	136.84	137.93	139.64	155.74	181.84	210.27	241.94
5.00	0.841	102.62	96.72	106.11	128.43	149.94	172.90	199.96
2.03	0.021	49.46	39.23	45.43	56.13	79.71	104.63	132.25

04177000 Ottawa River at University of Toledo Toledo, Ohio

Location: Latitude 41°39′29″, longitude 83°37′19″, Lucas County, Hydrologic Unit 04100001

Drainage area, in square miles: 150.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1976-08-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 15.

Mean annual streamflow, in inches: 11.87

Location of station used for precipitation data: Toledo, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
22.00	3.07	0.50	4.75	7.03	11.40	20.92	33.86	47.82
20.00	2.97	0.53	4.78	7.55	11.94	21.53	34.27	48.40
10.00	2.25	0.70	5.16	11.02	16.14	26.13	38.61	52.96
5.50	1.61	0.87	7.25	12.09	19.65	34.97	48.01	62.19

04177000 Ottawa River at University of Toledo Toledo, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.02	0.07	0.21	0.41	0.60	0.80	1.08	1.42	1.76	2.10	2.79	3.47	4.15	4.83	6.17
	0	30	60	90	120	120	120	210	210	210	210	210	210	210	210	840
6	0.00	0.02	0.09	0.25	0.44	0.65	0.94	1.23	1.53	1.82	2.11	2.79	3.47	4.16	4.84	6.17
	0	30	90	120	120	180	180	180	180	180	180	210	210	210	210	840
8	0.00	0.02	0.10	0.28	0.50	0.74	1.03	1.33	1.62	1.91	2.20	2.81	3.49	4.42	5.49	8.44
	0	30	90	120	150	180	180	180	180	180	180	210	210	330	330	960
10	0.00	0.02	0.10	0.28	0.51	0.76	1.05	1.35	1.64	1.93	2.22	2.86	3.63	4.56	5.89	9.27
	0	30	90	120	150	180	180	180	180	180	180	210	240	330	900	1140
15	0.00	0.02	0.11	0.28	0.51	0.81	1.10	1.39	1.71	2.05	2.39	3.08	4.32	6.46	9.79	14.08
	0	30	90	120	150	180	180	180	210	210	210	300	660	660	1320	1320
20	0.00	0.03	0.13	0.33	0.62	0.93	1.27	1.61	1.95	2.29	2.64	3.79	5.94	8.15	12.44	16.73
	30	30	90	180	180	210	210	210	210	210	210	660	660	1320	1320	1320
25	0.01	0.04	0.16	0.46	0.80	1.14	1.48	1.82	2.16	2.50	3.00	5.00	8.12	11.24	14.36	17.48
	30	30	180	210	210	210	210	210	210	210	600	960	960	960	960	960
30	0.01	0.04	0.29	0.62	0.96	1.30	1.64	1.98	2.59	4.15	5.71	8.83	11.95	15.07	18.19	21.37
	30	30	180	210	210	210	210	210	960	960	960	960	960	960	960	1020
40	0.02	0.16	0.48	0.82	1.69	3.25	4.81	6.37	7.93	9.49	11.05	14.17	17.36	20.67	23.98	27.30
	30	180	210	210	960	960	960	960	960	960	960	960	1020	1020	1020	1020
50	0.06	0.24	1.20	2.76	4.32	5.88	7.44	9.00	10.59	12.25	13.91	17.22	20.54	23.85	27.17	30.48
	180	210	960	960	960	960	960	960	1020	1020	1020	1020	1020	1020	1020	1020
60	0.10	0.78	2.34	3.90	5.46	7.12	8.78	10.44	12.09	13.75	15.41	18.72	22.04	25.35	28.67	33.11
	180	960	960	960	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1800
70	0.31	1.25	2.81	4.47	6.13	7.78	9.44	11.10	12.76	14.41	16.07	19.39	22.70	26.03	31.88	37.73
	960	960	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1800	1800	1800
80	0.50	1.44	3.10	4.76	6.41	8.07	9.73	11.39	13.04	14.70	16.36	19.67	24.00	29.85	35.70	41.55
	960	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1020	1800	1800	1800	1800
90	0.57	1.56	3.22	4.88	6.54	8.19	9.85	11.51	13.17	14.85	16.70	21.28	27.13	32.98	38.83	44.68
	960	1020	1020	1020	1020	1020	1020	1020	1020	1140	1140	1800	1800	1800	1800	1800
100	0.62	1.62	3.27	4.93	6.59	8.25	9.92	11.77	13.63	15.48	17.98	23.83	29.68	35.53	41.38	47.22
	1020	1020	1020	1020	1020	1020	1140	1140	1140	1140	1800	1800	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.60	1.98	1.89	1.25	1.06	2.04	5.95
3	1.06	1.47	1.54	1.13	1.02	1.00	1.21
4	1.00	1.06	1.16	1.04	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.60	2.21	2.08	1.34	1.91	8.77	16.02
8	1.06	1.76	1.73	1.27	1.10	1.73	2.73
9	1.06	1.91	1.86	1.32	1.23	2.33	5.88
10	1.01	1.58	1.71	1.33	1.28	1.95	3.06
11	1.07	1.49	1.61	1.50	1.32	2.03	2.74
12	1.14	1.90	1.87	1.27	1.11	2.07	5.81
13	1.03	1.52	1.68	1.26	1.24	1.64	2.43
14	1.01	1.18	1.52	1.28	1.29	1.61	2.36
15	1.07	1.26	1.46	1.49	1.34	1.77	2.34
16	1.07	1.28	1.52	1.52	1.37	1.83	2.44
17	1.03	1.21	1.53	1.23	1.24	1.38	2.05
18	1.01	1.18	1.41	1.28	1.28	1.42	2.24
19	1.07	1.26	1.31	1.49	1.34	1.58	2.20
20	1.07	1.29	1.40	1.52	1.37	1.67	2.35

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
22.00	1.691	69.19	72.22	84.62	140.34	176.70	195.86	202.03
20.00	1.645	65.56	71.55	83.03	136.87	174.80	194.98	201.57
10.00	1.282	40.82	64.52	71.65	111.53	154.89	181.70	193.71
5.00	0.841	39.58	50.76	55.10	91.64	115.31	141.40	169.90
2.00	0.000	24.00	36.51	39.06	60.01	82.47	120.84	134.93

04184500 Bean Creek at Powers, Ohio

Location: Latitude 41°40′39″, longitude 84°13′56″, Fulton County, Hydrologic Unit 04100006

Drainage area, in square miles: 206.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1955-01-01 to 1981-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 24.

Mean annual streamflow, in inches: 10.85

Location of station used for precipitation data: Toledo, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
27.00	3.28	0.34	1.85	2.65	5.68	11.48	19.03	28.00
25.00	3.20	0.35	2.07	3.19	6.51	12.86	20.58	30.09
20.00	2.97	0.37	2.73	4.77	8.93	16.87	25.10	36.18
10.00	2.25	0.50	4.07	8.23	13.38	25.78	37.49	49.84
5.40	1.59	0.77	5.78	8.71	16.91	29.50	–	–

04184500 Bean Creek at Powers, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.04	0.16	0.33	0.55	0.79	1.06	1.36	1.67	1.99	2.79	3.60	4.43	5.55	7.33
	0	0	60	90	150	150	180	180	210	210	270	270	270	300	540	600
6	0.00	0.00	0.05	0.17	0.37	0.62	0.93	1.24	1.55	1.87	2.21	2.92	3.64	4.43	5.88	7.66
	0	0	60	120	150	210	210	210	210	210	240	240	240	300	600	600
8	0.00	0.00	0.06	0.23	0.51	0.82	1.13	1.45	1.81	2.17	2.52	3.24	4.01	4.90	5.91	7.93
	0	0	60	150	210	210	210	240	240	240	240	240	300	300	600	720
10	0.00	0.00	0.08	0.31	0.61	0.93	1.28	1.64	2.00	2.39	2.81	3.71	4.60	5.49	6.47	8.41
	0	30	120	180	210	240	240	240	240	270	300	300	300	300	480	1260
15	0.00	0.00	0.16	0.47	0.87	1.27	1.72	2.16	2.61	3.05	3.50	4.39	5.29	6.50	9.22	12.15
	0	30	150	270	270	270	300	300	300	300	300	300	330	480	960	1320
20	0.00	0.00	0.19	0.59	0.99	1.41	1.86	2.30	2.75	3.19	3.65	5.37	8.22	11.07	13.92	17.56
	0	30	180	270	270	300	300	300	300	300	330	960	960	960	960	1440
25	0.00	0.01	0.19	0.59	0.99	1.41	1.86	2.40	3.41	4.84	6.26	9.11	11.96	14.82	19.04	24.03
	0	60	180	270	270	300	300	600	960	960	960	960	960	960	1680	1680
30	0.00	0.01	0.19	0.59	1.24	2.13	3.31	4.82	6.34	7.85	9.36	12.39	16.11	21.10	26.08	31.07
	0	60	180	270	540	600	1020	1020	1020	1020	1020	1020	1680	1680	1680	1680
40	0.00	0.13	1.05	2.57	4.08	5.60	7.11	8.63	10.99	13.49	15.98	20.97	25.96	30.95	35.94	40.93
	0	540	1020	1020	1020	1020	1020	1020	1680	1680	1680	1680	1680	1680	1680	1680
50	0.11	0.88	2.39	3.91	6.02	8.52	11.01	13.51	16.00	18.50	20.99	25.98	30.97	35.96	41.00	46.34
	600	1020	1020	1020	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1800	1800
60	0.40	1.31	3.30	5.80	8.29	10.79	13.28	15.78	18.27	20.76	23.26	28.35	33.70	39.04	44.39	49.73
	1020	1020	1680	1680	1680	1680	1680	1680	1680	1680	1680	1800	1800	1800	1800	1800
70	0.54	1.78	4.28	6.77	9.27	11.76	14.26	16.77	19.44	22.12	24.79	30.13	35.48	40.82	46.17	51.51
	1020	1680	1680	1680	1680	1680	1680	1800	1800	1800	1800	1800	1800	1800	1800	1800
80	0.70	2.20	4.69	7.18	9.68	12.35	15.02	17.70	20.37	23.04	25.71	31.06	36.40	41.75	47.09	52.44
	1680	1680	1680	1680	1680	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
90	0.87	2.37	4.86	7.48	10.16	12.83	15.50	18.17	20.85	23.52	26.19	31.54	36.88	42.23	47.57	52.92
	1680	1680	1680	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
100	0.94	2.44	5.06	7.73	10.41	13.08	15.75	18.42	21.10	23.77	26.44	31.79	37.13	42.48	47.82	53.17
	1680	1680	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800

04184500 Bean Creek at Powers, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	3.28	2.78	2.63	2.63	2.79	2.54	2.34
3	1.00	1.00	1.00	1.20	1.79	1.62	1.21
4	1.00	1.00	1.00	1.00	1.00	1.30	1.08
5	1.00	1.00	1.00	1.00	1.00	1.12	1.02
6	1.00	1.00	1.00	1.00	1.00	1.03	1.00
7	3.27	2.83	2.73	3.11	3.82	4.35	6.04
8	1.00	1.00	1.01	1.61	2.38	1.96	1.81
9	1.01	1.02	1.06	1.86	2.45	2.14	2.59
10	1.01	1.02	1.02	1.16	2.36	2.15	2.29
11	1.02	1.01	1.02	1.11	2.22	2.15	2.21
12	1.75	1.67	1.78	2.17	2.54	2.19	2.33
13	1.01	1.02	1.02	1.09	2.00	1.94	1.64
14	1.01	1.02	1.02	1.10	1.89	2.01	1.61
15	1.02	1.03	1.02	1.11	1.76	2.03	1.69
16	1.02	1.03	1.06	1.17	1.86	2.10	1.91
17	1.01	1.02	1.01	1.09	1.63	1.81	1.46
18	1.01	1.02	1.02	1.10	1.54	1.92	1.49
19	1.02	1.01	1.02	1.12	1.64	1.96	1.58
20	1.02	1.03	1.06	1.17	1.85	2.04	1.77

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
27.00	1.787	307.29	294.45	290.58	286.50	297.75	446.66	672.27
25.00	1.751	306.13	290.80	286.58	284.84	296.32	432.62	650.18
20.00	1.645	302.69	279.92	274.66	279.89	292.06	390.77	584.36
10.00	1.282	265.59	231.26	227.74	234.94	252.56	308.04	373.10
5.00	0.841	142.14	121.19	124.54	160.93	188.34	209.45	253.34
2.08	0.046	99.11	77.76	79.98	86.73	108.56	141.62	173.07

04185000 Tiffin River at Stryker, Ohio

Location: Latitude 41°30′16″, longitude 84°25′47″, Williams County, Hydrologic Unit 04100006

Drainage area, in square miles: 410.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1940-10-01 to 1977-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 36.

Mean annual streamflow, in inches: 10.21

Location of station used for precipitation data: Lima, Ohio

Location of station used for potential evapotranspiration data: Fort Wayne, Indiana

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
38.00	3.62	0.25	1.59	2.23	4.82	10.13	18.15	27.08
30.00	3.38	0.26	2.13	2.83	6.18	12.76	20.47	29.11
25.00	3.20	0.27	2.54	3.30	7.24	14.80	22.26	30.69
20.00	2.97	0.28	3.05	3.88	8.53	17.30	24.46	32.62
10.00	2.25	0.36	3.27	7.39	13.16	24.58	37.44	48.53
5.43	1.59	0.50	4.47	8.56	15.36	30.04	–	–

04185000 Tiffin River at Stryker, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.01	0.09	0.28	0.49	0.72	1.01	1.36	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	30	120	150	150	210	210	270	1800	1800	1800	1800	1800	1800	1800	1800
6	0.00	0.01	0.10	0.28	0.57	0.86	1.16	1.50	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	30	90	150	210	210	240	240	1800	1800	1800	1800	1800	1800	1800	1800
8	0.00	0.02	0.13	0.40	0.69	1.03	1.36	1.70	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	30	90	210	240	240	240	240	1800	1800	1800	1800	1800	1800	1800	1800
10	0.00	0.02	0.15	0.45	0.77	1.10	1.44	1.77	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	60	210	210	240	240	240	240	1800	1800	1800	1800	1800	1800	1800	1800
15	0.00	0.03	0.21	0.49	0.82	1.16	1.50	1.87	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	60	150	210	240	240	270	270	1800	1800	1800	1800	1800	1800	1800	1800
20	0.00	0.04	0.24	0.51	0.85	1.23	1.61	2.02	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	90	150	210	270	270	270	300	1800	1800	1800	1800	1800	1800	1800	1800
25	0.00	0.05	0.25	0.54	0.91	1.29	1.70	2.26	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	120	150	270	270	270	300	600	1800	1800	1800	1800	1800	1800	1800	1800
30	0.00	0.05	0.25	0.57	0.95	1.32	1.94	2.77	3.83	6.34	8.86	13.89	18.93	23.96	29.00	34.03
	0	120	150	270	270	270	600	600	1800	1800	1800	1800	1800	1800	1800	1800
40	0.00	0.05	0.28	0.59	0.96	1.65	2.72	4.07	5.41	6.79	8.86	13.89	18.93	23.96	29.00	34.03
	30	90	210	240	270	540	960	960	960	1020	1800	1800	1800	1800	1800	1800
50	0.00	0.06	0.32	0.65	1.69	3.12	4.54	5.97	7.40	8.82	10.25	13.89	18.93	23.96	29.00	34.03
	30	90	210	240	1020	1020	1020	1020	1020	1020	1020	1800	1800	1800	1800	1800
60	0.01	0.07	0.51	1.58	3.00	4.43	5.86	7.28	8.71	10.14	12.05	16.41	20.77	25.14	29.50	34.03
	30	210	360	1020	1020	1020	1020	1020	1020	1020	1560	1560	1560	1560	1560	1800
70	0.01	0.22	1.01	2.44	3.86	5.29	6.72	8.49	10.67	12.85	15.03	19.40	23.76	28.12	32.48	36.85
	30	360	1020	1020	1020	1020	1020	1560	1560	1560	1560	1560	1560	1560	1560	1560
80	0.05	0.35	1.58	3.00	4.43	6.23	8.41	10.60	12.78	14.96	17.14	21.50	25.86	30.23	34.59	38.95
	360	360	1020	1020	1020	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560
90	0.11	0.53	1.96	3.39	5.51	7.69	9.88	12.06	14.24	16.42	18.60	22.96	27.33	31.69	36.05	40.42
	360	1020	1020	1020	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560
100	0.15	0.79	2.22	4.34	6.52	8.70	10.88	13.06	15.24	17.43	19.61	23.97	28.33	32.69	37.06	41.42
	360	1020	1020	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	3.54	2.91	2.82	2.59	2.87	3.04	3.06
3	1.16	1.01	1.01	1.15	1.81	1.64	1.17
4	1.01	1.00	1.00	1.00	1.00	1.29	1.05
5	1.00	1.00	1.00	1.00	1.00	1.13	1.00
6	1.00	1.00	1.00	1.00	1.00	1.04	1.00
7	3.57	3.00	2.99	2.96	3.79	5.81	7.18
8	1.17	1.02	1.05	1.60	2.38	2.04	1.93
9	1.17	1.03	1.06	1.81	2.60	2.31	3.05
10	1.09	1.04	1.07	1.27	2.44	2.21	2.43
11	1.02	1.04	1.10	1.25	2.17	2.19	1.92
12	1.61	1.58	1.80	2.06	2.59	2.35	2.88
13	1.09	1.03	1.03	1.12	2.10	1.97	1.57
14	1.01	1.01	1.06	1.12	1.91	2.07	1.49
15	1.01	1.02	1.10	1.14	1.66	2.05	1.54
16	1.00	1.03	1.15	1.17	1.82	2.19	1.62
17	1.02	1.02	1.03	1.08	1.66	1.86	1.42
18	1.01	1.01	1.06	1.12	1.51	1.98	1.47
19	1.00	1.03	1.11	1.13	1.52	1.99	1.53
20	1.00	1.03	1.14	1.17	1.77	2.18	1.61

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
38.00	1.938	338.67	274.62	262.63	279.88	288.39	431.27	683.71
30.00	1.834	332.56	265.93	257.64	278.34	286.83	393.82	618.65
25.00	1.751	327.68	258.98	253.65	277.10	285.58	363.87	566.61
20.00	1.645	321.47	250.14	248.57	275.53	283.99	325.78	500.43
10.00	1.282	256.30	230.65	233.93	243.68	252.39	296.70	345.85
5.00	0.841	206.11	139.68	138.14	157.32	195.77	231.87	258.55
2.00	0.000	148.92	90.18	87.14	95.43	105.88	136.10	169.99

04185440 Unnamed Trib to Lost Cr near Farmers, Ohio

Location: Latitude 41°21′42″, longitude 84°41′28″, Defiance County, Hydrologic Unit 04100006

Drainage area, in square miles: 4.23

Station used for record extension: None

Time period of systematic or extended record analyzed: 1985-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 0.1

Mean annual streamflow, in inches: 13.87

Location of station used for precipitation data: Lima, Ohio

Location of station used for potential evapotranspiration data: Fort Wayne, Indiana

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
13.00	2.53	0.21	3.82	6.49	9.68	20.06	36.26	49.80
10.00	2.25	0.22	4.13	8.50	13.86	24.51	40.60	57.57
6.50	1.79	0.24	4.64	11.87	20.88	31.96	47.88	70.59

04185440 Unnamed Trib to Lost Cr near Farmers, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.04	0.15	0.46	0.80	1.14	1.49	1.83	2.17	2.51	2.85	3.19	3.88	4.80	5.83	6.85	8.51
	90	120	180	180	180	180	180	180	180	180	180	180	270	270	270	600
6	0.04	0.15	0.46	0.80	1.14	1.49	1.83	2.17	2.51	2.85	3.19	3.99	5.01	6.04	7.59	9.87
	90	120	180	180	180	180	180	180	180	180	180	270	270	270	600	600
8	0.05	0.17	0.46	0.80	1.14	1.49	1.83	2.17	2.56	3.01	3.47	4.41	5.98	8.48	10.99	13.49
	90	150	180	180	180	180	180	180	240	240	240	300	660	660	660	660
10	0.05	0.20	0.48	0.80	1.14	1.49	1.87	2.33	2.78	3.24	3.72	5.76	8.27	10.78	13.28	15.79
	90	150	150	180	180	180	240	240	240	240	300	660	660	660	660	660
15	0.07	0.24	0.59	0.99	1.39	1.79	2.18	2.58	3.89	5.26	6.62	9.36	12.09	14.82	17.56	20.29
	150	150	210	210	210	210	210	210	720	720	720	720	720	720	720	720

04185440 Unnamed Trib to Lost Cr near Farmers, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.22	1.08	1.09	1.67	2.04	2.63	4.88
3	1.12	1.01	1.00	1.08	1.21	1.67	1.90
4	1.09	1.00	1.00	1.01	1.04	1.09	1.49
5	1.06	1.00	1.00	1.00	1.01	1.00	1.22
6	1.03	1.00	1.00	1.00	1.00	1.00	1.04
7	1.21	1.14	1.33	2.14	2.77	6.41	8.42
8	1.12	1.06	1.08	1.19	1.81	2.17	3.24
9	1.13	1.09	1.14	1.44	2.10	2.53	5.25
10	1.12	1.09	1.08	1.34	1.64	2.21	3.15
11	1.10	1.04	1.13	1.36	1.42	2.07	3.11
12	1.16	1.09	1.12	1.52	2.12	2.54	4.99
13	1.11	1.02	1.05	1.24	1.50	2.01	2.67
14	1.10	1.03	1.04	1.31	1.29	1.81	2.21
15	1.07	1.01	1.07	1.32	1.28	1.76	2.30
16	1.06	1.00	1.08	1.36	1.30	1.75	2.26
17	1.10	1.02	1.02	1.22	1.24	1.79	2.09
18	1.06	1.01	1.02	1.29	1.27	1.56	1.90
19	1.02	1.01	1.04	1.29	1.28	1.46	1.98
20	1.00	1.00	1.04	1.28	1.30	1.49	1.96

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
13.00	1.426	158.85	166.56	167.25	165.08	175.10	202.70	212.99
10.00	1.282	158.22	159.68	154.63	158.54	174.43	199.25	210.42
5.00	0.841	132.25	126.92	123.82	144.25	170.84	191.84	201.45
2.17	0.096	58.19	56.05	56.79	93.32	117.97	134.46	140.19

04189000 Blanchard River near Findlay, Ohio

Location: Latitude 41°03′21″, longitude 83°41′17″, Hancock County, Hydrologic Unit 04100008

Drainage area, in square miles: 346.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1940-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 18.

Mean annual streamflow, in inches: 10.37

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
58.00	4.05	0.11	2.30	3.96	6.98	14.80	21.00	27.43
50.00	3.90	0.12	2.33	4.18	7.22	14.88	21.06	27.44
40.00	3.68	0.14	2.39	4.51	7.58	15.01	21.14	27.45
30.00	3.38	0.17	2.45	4.93	8.04	15.17	21.25	27.47
25.00	3.20	0.17	2.54	5.15	8.24	15.70	22.40	30.27
20.00	2.97	0.17	2.66	5.40	8.45	16.46	24.13	34.49
10.00	2.25	0.20	2.75	6.08	11.03	21.21	33.03	45.21
5.27	1.56	0.37	3.68	9.14	14.32	28.39	50.39	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.04	0.17	0.38	0.59	0.90	1.24	1.58	1.97	2.35	2.73	3.50	4.27	5.03	5.80	6.87
	0	60	120	150	150	240	240	270	270	270	270	270	270	270	300	660
6	0.00	0.05	0.21	0.43	0.69	0.95	1.28	1.64	2.02	2.40	2.79	3.55	4.39	5.24	6.37	8.25
	0	90	150	180	180	210	240	270	270	270	270	270	300	300	660	660
8	0.00	0.06	0.26	0.52	0.79	1.09	1.39	1.70	2.08	2.49	2.92	3.77	4.62	5.95	7.71	9.58
	30	120	180	180	210	210	210	270	270	300	300	300	300	600	660	660
10	0.00	0.07	0.30	0.56	0.86	1.16	1.45	1.76	2.15	2.57	3.00	3.85	4.86	6.56	8.33	10.55
	30	150	180	210	210	210	210	240	300	300	300	300	600	600	660	900
15	0.00	0.09	0.33	0.63	0.93	1.23	1.53	1.88	2.22	2.62	3.05	3.90	5.44	7.15	9.96	14.19
	30	150	210	210	210	210	240	240	240	300	300	300	600	720	1080	1800
20	0.01	0.10	0.36	0.66	0.96	1.28	1.62	1.96	2.30	2.71	3.18	4.11	5.77	8.63	13.41	18.53
	30	150	210	210	210	240	240	240	240	330	330	330	720	1440	1800	1800
25	0.01	0.11	0.38	0.68	1.00	1.34	1.68	2.02	2.37	2.84	3.31	4.25	6.27	10.69	15.79	20.90
	30	150	210	210	240	240	240	240	330	330	330	330	1380	1620	1800	1800
30	0.01	0.11	0.40	0.71	1.05	1.39	1.73	2.07	2.46	2.93	3.40	4.53	7.48	12.07	17.19	22.30
	60	150	210	240	240	240	240	240	330	330	330	780	1380	1800	1800	1800
40	0.01	0.13	0.44	0.78	1.12	1.46	1.80	2.15	2.55	3.02	3.49	5.13	9.05	13.42	18.53	23.64
	60	210	240	240	240	240	240	240	330	330	330	1380	1380	1800	1800	1800
50	0.01	0.15	0.49	0.83	1.17	1.51	1.85	2.19	2.59	3.06	3.62	6.34	10.01	13.93	18.90	24.02
	90	210	240	240	240	240	240	240	330	330	960	960	1380	1380	1800	1800
60	0.02	0.19	0.53	0.87	1.21	1.55	1.89	2.27	2.69	3.73	5.10	7.82	10.65	14.57	18.90	24.02
	120	240	240	240	240	240	240	300	300	960	960	960	1380	1380	1800	1800
70	0.02	0.21	0.55	0.89	1.23	1.57	1.97	2.39	3.69	5.06	6.42	9.14	11.87	15.02	18.94	24.02
	120	240	240	240	240	240	300	300	960	960	960	960	960	1380	1380	1800
80	0.03	0.23	0.57	0.91	1.25	1.65	2.12	3.48	4.84	6.21	7.57	10.29	13.02	15.75	19.29	24.02
	180	240	240	240	240	300	960	960	960	960	960	960	960	960	1320	1800
90	0.04	0.25	0.59	0.93	1.31	1.74	3.10	4.46	5.82	7.19	8.55	11.28	14.00	16.73	19.99	24.02
	240	240	240	240	300	300	960	960	960	960	960	960	960	960	1320	1800
100	0.06	0.26	0.60	0.96	1.39	2.56	3.93	5.29	6.65	8.02	9.38	12.11	14.83	17.56	20.63	24.38
	240	240	240	300	300	960	960	960	960	960	960	960	960	960	1320	1320

04189000 Blanchard River near Findlay, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.34	1.50	1.51	1.91	3.88	10.68	21.97
3	1.00	1.03	1.05	1.02	1.00	1.62	2.63
4	1.00	1.00	1.01	1.00	1.00	1.00	1.18
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.37	1.57	1.66	3.22	9.93	31.88	43.94
8	1.00	1.08	1.11	1.06	1.50	4.28	11.02
9	1.00	1.10	1.12	1.08	1.87	6.45	21.16
10	1.00	1.10	1.14	1.12	1.41	2.88	8.97
11	1.00	1.09	1.14	1.07	1.14	2.22	7.40
12	1.02	1.09	1.11	1.18	2.30	7.29	21.66
13	1.00	1.06	1.10	1.07	1.20	2.20	5.82
14	1.00	1.07	1.10	1.08	1.11	1.79	3.48
15	1.00	1.06	1.11	1.07	1.09	1.80	2.61
16	1.03	1.08	1.11	1.12	1.13	1.76	2.73
17	1.00	1.04	1.08	1.06	1.06	1.62	2.65
18	1.00	1.07	1.10	1.08	1.10	1.47	2.34
19	1.06	1.05	1.12	1.08	1.10	1.57	2.38
20	1.00	1.08	1.07	1.11	1.13	1.54	2.56

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
58.00	2.115	325.99	271.86	273.41	284.45	292.77	294.60	304.03
50.00	2.054	318.78	268.77	270.64	282.15	288.76	290.39	299.02
40.00	1.960	307.63	263.98	266.35	278.60	282.57	283.87	291.26
30.00	1.834	292.63	257.55	260.59	273.83	274.24	275.12	280.83
25.00	1.751	281.78	249.88	251.83	262.01	263.38	271.44	277.69
20.00	1.645	267.71	239.15	239.30	244.51	248.05	267.37	274.76
10.00	1.282	249.42	198.20	196.19	195.88	214.15	237.38	258.20
5.00	0.841	198.43	134.11	139.93	161.43	180.03	207.55	238.42
2.00	0.000	156.59	59.54	62.08	72.71	93.91	124.66	140.36

04195500 Portage River at Woodville, Ohio

Location: Latitude 41°26′58″, longitude 83°21′41″, Sandusky County, Hydrologic Unit 04100010

Drainage area, in square miles: 428.

Station used for record extension: 04189000

Time period of systematic or extended record analyzed: 1955-01-01 to 1997-09-30

Percentage of estimated values in extended record: 79.5

Eighty-percent-duration streamflow, in cubic feet per second: 8.3

Mean annual streamflow, in inches: 11.44

Location of station used for precipitation data: Toledo, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
43.00	3.75	0.13	2.50	5.15	8.53	15.51	22.19	28.70
40.00	3.68	0.13	2.52	5.21	8.55	15.70	22.94	29.89
30.00	3.38	0.14	2.61	5.47	8.64	16.45	25.93	34.62
25.00	3.20	0.14	2.66	5.63	8.69	16.92	27.84	37.63
20.00	2.97	0.14	2.72	5.85	8.89	17.44	30.11	41.04
10.00	2.25	0.22	2.94	6.71	12.08	22.99	36.12	48.71
5.38	1.58	0.32	3.78	9.97	15.07	30.07	53.38	–

04195500 Portage River at Woodville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.04	0.23	0.50	0.81	1.14	1.51	1.89	2.26	2.67	3.09	3.93	4.78	5.68	6.72	8.06
	0	60	150	180	210	210	240	240	240	270	270	270	270	330	330	720
6	0.00	0.05	0.25	0.53	0.82	1.16	1.54	1.96	2.39	2.81	3.23	4.08	4.92	5.86	7.30	9.37
	30	60	150	180	210	240	270	270	270	270	270	270	300	300	660	660
8	0.00	0.06	0.30	0.58	0.89	1.22	1.64	2.07	2.49	2.91	3.35	4.29	5.22	6.81	8.88	10.95
	30	90	180	180	210	210	270	270	270	270	300	300	300	660	660	660
10	0.00	0.08	0.34	0.64	0.97	1.30	1.67	2.09	2.53	3.00	3.47	4.41	5.57	7.59	9.66	12.41
	30	150	180	210	210	210	270	270	300	300	300	300	600	660	660	960
15	0.00	0.12	0.42	0.75	1.08	1.41	1.77	2.19	2.70	3.22	3.74	4.77	6.43	8.41	11.57	14.95
	30	180	210	210	210	210	240	330	330	330	330	330	600	660	1080	1080
20	0.00	0.15	0.47	0.80	1.13	1.47	1.89	2.41	2.92	3.44	3.96	4.99	6.82	9.76	13.14	16.52
	60	180	210	210	210	240	330	330	330	330	330	330	720	1080	1080	1080
25	0.01	0.17	0.50	0.83	1.15	1.53	2.00	2.51	3.03	3.55	4.06	5.09	7.25	10.62	14.01	17.54
	60	210	210	210	210	240	330	330	330	330	330	330	720	1080	1080	1140
30	0.01	0.18	0.50	0.83	1.19	1.57	2.04	2.55	3.07	3.59	4.10	5.17	7.73	11.11	14.65	19.81
	60	210	210	210	240	240	330	330	330	330	330	720	1080	1080	1140	1740
40	0.01	0.18	0.50	0.88	1.25	1.63	2.09	2.56	3.07	3.59	4.10	5.17	8.97	14.53	20.16	25.80
	60	210	210	240	240	270	300	300	330	330	330	720	1740	1800	1800	1800
50	0.01	0.18	0.54	0.93	1.36	1.78	2.24	2.71	3.18	3.65	4.67	9.72	15.36	20.99	26.63	32.27
	30	210	240	270	270	270	300	300	300	300	1560	1800	1800	1800	1800	1800
60	0.01	0.20	0.62	1.04	1.46	1.90	2.37	2.84	4.83	7.27	9.72	15.36	20.99	26.63	32.26	37.90
	30	270	270	270	270	300	300	300	1560	1560	1800	1800	1800	1800	1800	1800
70	0.02	0.27	0.69	1.12	1.54	2.00	3.91	6.35	8.79	11.47	14.29	19.92	25.56	31.19	36.83	42.46
	270	270	270	270	270	300	1560	1560	1560	1800	1800	1800	1800	1800	1800	1800
80	0.07	0.32	0.74	1.17	2.01	4.45	6.89	9.38	12.20	15.01	17.83	23.47	29.10	34.74	40.37	46.01
	270	270	270	270	1560	1560	1560	1800	1800	1800	1800	1800	1800	1800	1800	1800
90	0.10	0.36	0.78	1.76	4.20	6.64	9.25	12.06	14.88	17.70	20.52	26.15	31.79	37.42	43.06	48.70
	270	270	270	1560	1560	1560	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
100	0.12	0.38	0.90	3.34	5.78	8.44	11.25	14.07	16.89	19.71	22.52	28.16	33.79	39.43	45.07	50.70
	270	270	1560	1560	1560	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800

04195500 Portage River at Woodville, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.42	1.34	1.54	1.65	3.10	6.47	16.17
3	1.03	1.00	1.00	1.03	1.00	1.70	2.95
4	1.00	1.00	1.00	1.01	1.00	1.00	1.15
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.55	1.99	2.15	3.73	6.15	27.65	38.62
8	1.24	1.40	1.32	1.22	1.80	3.88	7.85
9	1.29	1.45	1.52	1.26	2.31	5.02	14.35
10	1.24	1.74	1.56	1.31	1.56	3.32	7.28
11	1.99	1.79	1.62	1.26	1.20	2.46	5.30
12	1.30	1.34	1.31	1.49	2.97	5.70	16.87
13	1.17	1.44	1.50	1.25	1.31	2.56	4.24
14	1.23	1.74	1.53	1.26	1.16	1.55	3.35
15	1.93	1.76	1.61	1.27	1.13	1.33	2.80
16	1.90	1.78	1.55	1.29	1.19	1.33	2.58
17	1.13	1.44	1.48	1.24	1.11	1.49	3.02
18	1.23	1.74	1.51	1.26	1.15	1.29	2.18
19	1.93	1.75	1.58	1.27	1.14	1.27	1.85
20	1.90	1.78	1.53	1.29	1.19	1.33	1.89

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
43.00	1.991	64.37	145.17	184.35	236.25	269.18	281.74	291.86
40.00	1.960	62.70	144.73	183.39	233.23	264.59	277.54	289.12
30.00	1.834	55.87	142.94	179.48	220.89	245.81	260.34	277.91
25.00	1.751	51.35	141.76	176.89	212.73	233.41	248.99	270.50
20.00	1.645	45.58	133.34	168.58	200.82	220.51	237.79	263.18
10.00	1.282	24.36	72.32	89.84	144.12	184.77	226.76	251.51
5.00	0.841	6.47	30.26	46.35	102.96	149.51	196.76	224.06
2.05	0.029	0.00	12.73	16.88	43.08	73.81	105.25	123.94

04196000 Sandusky River near Bucyrus, Ohio

Location: Latitude 40°48′13″, longitude 83°00′21″, Crawford County, Hydrologic Unit 04100011

Drainage area, in square miles: 88.8

Station used for record extension: 03218000

Time period of systematic or extended record analyzed: 1938-08-01 to 1981-09-30

Percentage of estimated values in extended record: 23.1

Eighty-percent-duration streamflow, in cubic feet per second: 5.4

Mean annual streamflow, in inches: 13.14

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
44.00	3.77	0.17	2.80	5.65	8.59	19.04	28.45	36.45
40.00	3.68	0.17	2.97	5.82	9.37	19.45	29.23	37.49
30.00	3.38	0.18	3.49	6.35	11.74	20.67	31.60	40.64
25.00	3.20	0.18	3.82	6.68	13.25	21.45	33.10	42.64
20.00	2.97	0.18	4.10	7.00	14.42	23.33	35.02	44.88
10.00	2.25	0.31	4.97	9.14	14.94	28.44	43.17	59.28
5.50	1.61	0.48	5.92	11.96	19.38	36.84	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.06	0.25	0.49	0.76	1.08	1.41	1.73	2.13	2.62	3.15	4.23	5.31	6.39	7.47	8.55
	30	60	120	150	180	180	180	180	270	270	300	300	300	300	300	300
6	0.00	0.07	0.25	0.49	0.82	1.14	1.50	1.89	2.33	2.76	3.27	4.35	5.43	6.51	7.59	9.24
	30	60	120	180	180	180	210	240	240	240	300	300	300	300	300	600
8	0.01	0.07	0.27	0.61	0.99	1.37	1.77	2.20	2.63	3.06	3.49	4.57	5.65	6.73	8.79	11.17
	60	60	180	210	210	210	240	240	240	240	240	300	300	300	660	660
10	0.01	0.08	0.34	0.71	1.09	1.49	1.92	2.35	2.78	3.21	3.69	4.75	5.83	7.17	9.55	12.31
	60	90	180	210	210	240	240	240	240	240	270	300	300	660	660	1320
15	0.01	0.13	0.43	0.80	1.22	1.65	2.08	2.54	3.02	3.51	3.99	5.03	6.11	8.12	11.61	17.00
	60	150	180	210	240	240	240	270	270	270	270	300	300	600	1320	1680
20	0.01	0.17	0.47	0.84	1.28	1.71	2.19	2.68	3.17	3.65	4.14	5.19	6.68	10.01	15.36	21.42
	120	150	180	240	240	270	270	270	270	270	270	300	600	1020	1680	1740
25	0.02	0.18	0.49	0.87	1.30	1.78	2.26	2.75	3.23	3.72	4.21	5.28	8.10	11.83	17.87	24.11
	120	150	180	240	240	270	270	270	270	270	270	300	1020	1680	1680	1740
30	0.03	0.19	0.49	0.87	1.32	1.80	2.29	2.78	3.26	3.75	4.26	5.87	9.54	13.32	19.55	25.81
	120	150	180	240	270	270	270	270	270	270	300	1020	1020	1680	1740	1740
40	0.03	0.19	0.49	0.87	1.32	1.80	2.29	2.78	3.26	3.77	4.75	8.20	11.80	16.01	21.39	27.65
	120	150	180	240	270	270	270	270	270	300	960	960	1020	1380	1740	1740
50	0.03	0.19	0.49	0.87	1.32	1.80	2.29	2.91	4.10	5.29	6.75	10.20	14.37	19.33	24.30	29.26
	120	150	210	240	270	270	270	660	660	660	960	960	1380	1380	1380	1380
60	0.03	0.19	0.51	0.89	1.32	2.12	3.31	4.49	5.68	6.88	8.37	12.39	17.35	22.32	27.29	32.25
	120	150	210	210	270	660	660	660	660	720	960	1380	1380	1380	1380	1380
70	0.03	0.19	0.53	0.92	2.10	3.29	4.57	5.86	7.16	8.46	10.03	15.00	19.96	24.93	29.90	34.86
	120	150	210	660	660	660	720	720	720	720	1380	1380	1380	1380	1380	1380
80	0.03	0.19	0.56	1.76	3.06	4.35	5.65	6.94	8.24	9.79	12.28	17.24	22.21	27.18	32.14	37.11
	120	150	660	720	720	720	720	720	720	1380	1380	1380	1380	1380	1380	1380
90	0.03	0.19	1.19	2.49	3.78	5.08	6.37	7.67	9.22	11.71	14.19	19.16	24.12	29.09	34.05	39.02
	120	150	720	720	720	720	720	720	1380	1380	1380	1380	1380	1380	1380	1380
100	0.03	0.38	1.67	2.97	4.26	5.56	6.85	8.36	10.84	13.32	15.81	20.77	25.74	30.70	35.67	40.64
	120	720	720	720	720	720	720	1380	1380	1380	1380	1380	1380	1380	1380	1380

04196000 Sandusky River near Bucyrus, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.21	1.18	1.26	1.35	2.03	6.62	12.35
3	1.04	1.00	1.00	1.00	1.00	1.38	2.06
4	1.01	1.00	1.00	1.00	1.00	1.00	1.34
5	1.00	1.00	1.00	1.00	1.00	1.00	1.17
6	1.00	1.00	1.00	1.00	1.00	1.00	1.07
7	1.23	1.23	1.44	2.00	4.64	18.60	27.77
8	1.04	1.00	1.12	1.10	1.23	2.84	7.54
9	1.05	1.01	1.20	1.16	1.42	3.45	12.67
10	1.06	1.00	1.27	1.23	1.39	3.14	8.13
11	1.04	1.16	1.32	1.26	1.55	2.88	5.41
12	1.13	1.00	1.10	1.08	1.62	3.15	12.44
13	1.04	1.00	1.20	1.15	1.23	2.49	3.24
14	1.04	1.00	1.27	1.19	1.31	2.42	3.11
15	1.03	1.16	1.32	1.23	1.34	2.48	3.06
16	1.03	1.21	1.33	1.28	1.37	2.58	2.95
17	1.04	1.00	1.21	1.14	1.23	2.11	2.83
18	1.04	1.00	1.27	1.19	1.30	2.13	2.74
19	1.03	1.16	1.30	1.23	1.33	2.25	2.74
20	1.03	1.21	1.33	1.29	1.37	2.39	2.80

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
44.00	2.001	241.89	206.99	202.84	227.13	236.79	262.74	295.40
40.00	1.960	240.33	206.25	202.26	224.46	236.32	262.07	292.04
30.00	1.834	235.47	203.96	200.46	216.17	234.85	259.98	281.58
25.00	1.751	232.26	202.44	199.28	210.69	233.88	258.60	274.67
20.00	1.645	222.09	198.18	197.05	204.32	231.68	255.39	269.20
10.00	1.282	165.82	127.44	140.43	165.75	197.68	235.03	260.60
5.00	0.841	127.14	111.84	124.77	134.45	158.25	183.99	203.16
2.00	0.000	93.15	53.38	54.27	72.13	106.41	145.76	161.21

04196500 Sandusky River near Upper Sandusky, Ohio

Location: Latitude 40°51′02″, longitude 83°15′23″, Wyandot County, Hydrologic Unit 04100011

Drainage area, in square miles: 298.

Station used for record extension: 03223000

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 24.6

Eighty-percent-duration streamflow, in cubic feet per second: 14.

Mean annual streamflow, in inches: 11.38

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.12	2.65	4.43	6.98	16.09	23.21	30.79
70.00	4.24	0.12	2.68	4.60	7.21	16.16	23.35	31.11
60.00	4.09	0.13	2.75	4.91	7.63	16.28	23.62	31.71
50.00	3.90	0.13	2.82	5.28	8.14	16.43	23.94	32.42
40.00	3.68	0.14	2.92	5.74	8.76	16.62	24.33	33.29
30.00	3.38	0.16	3.11	6.15	9.64	18.88	26.29	34.34
25.00	3.20	0.17	3.24	6.42	10.20	20.50	27.68	35.03
20.00	2.97	0.18	3.35	7.03	10.47	21.06	28.27	36.36
10.00	2.25	0.24	4.01	7.97	13.45	25.86	37.93	51.63
5.07	1.52	0.34	5.23	10.95	17.72	33.62	50.69	–

04196500 Sandusky River near Upper Sandusky, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.05	0.25	0.49	0.77	1.05	1.33	1.69	2.06	2.43	2.81	3.63	4.56	5.50	6.43	7.37
	30	60	150	180	180	180	180	240	240	240	240	300	300	300	300	300
6	0.01	0.06	0.26	0.53	0.81	1.09	1.42	1.79	2.16	2.53	2.91	3.74	4.67	5.61	6.54	8.00
	30	90	150	180	180	210	210	240	240	240	240	300	300	300	300	600
8	0.01	0.08	0.30	0.58	0.87	1.20	1.54	1.91	2.28	2.66	3.04	3.92	4.85	5.79	7.50	9.37
	30	120	180	180	210	210	240	240	240	240	270	300	300	300	600	600
10	0.01	0.09	0.33	0.61	0.92	1.25	1.61	1.98	2.36	2.74	3.16	4.06	4.99	6.27	8.14	10.06
	30	120	180	180	210	210	240	240	240	270	270	300	300	600	600	660
15	0.01	0.11	0.36	0.65	0.98	1.34	1.71	2.09	2.46	2.89	3.36	4.30	5.23	7.23	9.71	14.01
	60	150	180	210	210	240	240	240	270	300	300	300	300	660	1380	1380
20	0.02	0.13	0.38	0.67	1.02	1.40	1.77	2.15	2.58	3.05	3.51	4.45	5.87	8.04	12.78	18.20
	60	150	180	210	240	240	240	240	300	300	300	300	660	1380	1740	1740
25	0.02	0.14	0.40	0.69	1.06	1.44	1.81	2.22	2.68	3.15	3.62	4.56	6.38	9.87	15.29	20.71
	90	150	180	240	240	240	240	300	300	300	300	330	660	1740	1740	1740
30	0.02	0.15	0.40	0.72	1.09	1.46	1.84	2.29	2.76	3.23	3.69	4.74	7.28	11.47	16.90	22.32
	90	150	180	240	240	240	240	300	300	300	300	660	1020	1740	1740	1740
40	0.03	0.16	0.42	0.76	1.13	1.50	1.93	2.40	2.87	3.33	3.83	5.68	8.86	13.27	18.69	24.30
	90	150	180	240	240	240	300	300	300	300	330	1020	1020	1740	1740	1800
50	0.03	0.16	0.43	0.79	1.16	1.53	2.00	2.47	2.94	3.41	3.99	6.69	9.87	14.08	19.53	25.13
	90	150	210	240	240	240	300	300	300	330	660	1020	1020	1740	1800	1800
60	0.03	0.16	0.45	0.81	1.18	1.58	2.05	2.52	2.98	3.50	4.52	7.50	10.67	14.97	19.80	25.36
	90	150	210	240	240	300	300	300	300	660	660	960	1380	1380	1740	1800
70	0.03	0.16	0.47	0.83	1.20	1.62	2.08	2.55	3.02	3.97	5.18	8.17	11.52	15.83	20.13	25.36
	90	150	210	240	240	300	300	300	300	660	960	960	1380	1380	1380	1800
80	0.03	0.17	0.50	0.84	1.21	1.64	2.11	2.58	3.37	4.39	5.71	8.71	12.27	16.57	20.87	25.36
	90	210	210	240	240	300	300	300	660	660	960	960	1380	1380	1380	1800
90	0.03	0.19	0.51	0.85	1.23	1.66	2.13	2.72	3.75	4.78	6.16	9.15	12.94	17.24	21.54	25.84
	90	210	210	240	240	300	300	660	660	660	960	960	1380	1380	1380	1380
100	0.03	0.20	0.53	0.87	1.24	1.68	2.15	3.06	4.09	5.12	6.53	9.53	13.54	17.84	22.14	26.44
	90	210	210	240	240	300	300	660	660	660	960	960	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.86	1.37	1.46	2.09	2.66	13.84	27.27
3	1.21	1.14	1.04	1.00	1.02	1.33	2.16
4	1.04	1.08	1.01	1.00	1.00	1.00	1.22
5	1.01	1.04	1.00	1.00	1.00	1.00	1.09
6	1.00	1.02	1.00	1.00	1.00	1.00	1.02
7	1.86	1.70	1.93	2.77	11.68	45.29	62.46
8	1.23	1.22	1.10	1.07	1.28	2.69	10.80
9	1.23	1.24	1.14	1.09	1.63	3.09	22.18
10	1.14	1.24	1.14	1.19	1.38	2.89	10.88
11	1.06	1.27	1.15	1.23	1.30	2.48	4.92
12	1.26	1.21	1.11	1.09	1.83	3.84	21.76
13	1.14	1.21	1.12	1.05	1.20	2.17	3.20
14	1.05	1.21	1.13	1.16	1.24	2.20	2.86
15	1.04	1.27	1.17	1.21	1.29	1.98	2.90
16	1.07	1.26	1.15	1.25	1.31	2.24	2.85
17	1.05	1.19	1.12	1.06	1.20	1.72	2.66
18	1.04	1.21	1.13	1.15	1.24	1.84	2.48
19	1.03	1.24	1.17	1.20	1.29	1.82	2.61
20	1.07	1.22	1.14	1.23	1.31	1.98	2.71

04196500 Sandusky River near Upper Sandusky, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
76.00	2.222	201.62	204.91	229.56	244.37	249.95	273.34	296.34
70.00	2.190	199.58	203.72	225.83	240.39	248.15	271.82	295.89
60.00	2.128	195.71	201.44	218.73	232.82	244.73	268.92	295.02
50.00	2.054	191.01	198.69	210.12	223.65	240.58	265.41	293.97
40.00	1.960	185.08	195.21	199.26	212.07	235.34	260.98	292.65
30.00	1.834	180.85	188.68	194.46	209.25	230.54	257.40	284.86
25.00	1.751	178.42	183.54	192.48	208.76	227.72	255.14	279.11
20.00	1.645	172.98	167.75	187.20	201.68	224.67	248.65	275.61
10.00	1.282	125.23	138.82	155.70	181.67	201.73	225.83	243.98
5.00	0.841	107.34	106.33	126.66	152.64	165.93	188.57	202.19
2.00	0.000	68.24	63.52	67.47	91.46	106.34	126.83	134.47

04197000 Sandusky River near Mexico, Ohio

Location: Latitude 41°02′39″, longitude 83°11′42″, Seneca County, Hydrologic Unit 04100011

Drainage area, in square miles: 774.

Station used for record extension: 04198000

Time period of systematic or extended record analyzed: 1938-08-01 to 1997-09-30

Percentage of estimated values in extended record: 25.3

Eighty-percent-duration streamflow, in cubic feet per second: 39.

Mean annual streamflow, in inches: 10.96

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
60.00	4.09	0.18	2.44	4.06	6.43	14.63	21.65	28.00
50.00	3.90	0.18	2.54	4.28	7.33	15.37	22.79	29.59
40.00	3.68	0.18	2.67	4.55	8.43	16.28	24.18	31.54
30.00	3.38	0.18	2.83	4.90	9.85	17.46	25.98	34.06
25.00	3.20	0.21	2.89	5.00	10.15	17.95	26.27	34.25
20.00	2.97	0.24	2.96	5.13	10.51	18.55	26.62	34.48
10.00	2.25	0.28	3.86	7.26	12.18	21.74	37.53	50.15
5.45	1.60	0.36	4.79	9.47	15.99	31.27	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.03	0.20	0.44	0.71	0.98	1.25	1.54	1.90	2.26	2.62	3.40	4.21	5.02	5.83	6.70
	0	90	120	180	180	180	180	240	240	240	240	270	270	270	270	300
6	0.00	0.04	0.21	0.47	0.74	1.01	1.32	1.64	2.00	2.36	2.75	3.56	4.43	5.33	6.23	7.95
	0	90	150	180	180	180	210	240	240	240	270	270	300	300	300	600
8	0.00	0.04	0.24	0.51	0.81	1.13	1.44	1.76	2.12	2.53	2.97	3.87	4.77	5.91	7.71	9.61
	30	90	180	180	210	210	210	240	270	270	300	300	300	600	600	660
10	0.00	0.05	0.27	0.55	0.87	1.18	1.50	1.84	2.22	2.64	3.09	3.99	4.89	6.59	8.39	10.65
	30	90	180	210	210	210	210	240	270	300	300	300	300	600	600	960
15	0.00	0.06	0.30	0.60	0.92	1.24	1.60	1.96	2.34	2.75	3.18	4.08	5.46	7.26	10.26	14.04
	30	120	180	210	210	240	240	240	270	270	300	300	600	600	1260	1260
20	0.00	0.08	0.32	0.62	0.94	1.30	1.66	2.02	2.40	2.81	3.21	4.34	5.96	7.87	12.40	17.62
	30	150	180	210	240	240	240	240	270	270	270	540	540	1020	1740	1740
25	0.00	0.09	0.33	0.63	0.98	1.34	1.70	2.06	2.45	2.85	3.26	4.75	6.37	9.73	14.95	20.17
	30	150	180	210	240	240	240	240	270	270	270	540	540	1740	1740	1740
30	0.00	0.10	0.34	0.64	1.00	1.36	1.72	2.08	2.48	2.89	3.41	5.03	7.15	11.42	16.65	21.87
	60	150	180	210	240	240	240	240	270	270	540	540	1020	1740	1740	1740
40	0.01	0.11	0.35	0.67	1.03	1.39	1.75	2.13	2.55	3.00	3.75	5.84	8.90	13.50	18.72	23.94
	60	150	180	240	240	240	240	270	300	300	540	1020	1020	1740	1740	1740
50	0.01	0.11	0.37	0.69	1.05	1.41	1.81	2.26	2.71	3.37	4.36	7.25	10.31	14.67	19.89	25.11
	60	150	210	240	240	240	300	300	300	660	660	1020	1020	1740	1740	1740
60	0.01	0.11	0.39	0.71	1.07	1.52	1.97	2.42	3.29	4.59	6.03	8.91	11.97	16.11	20.63	26.03
	60	150	210	210	300	300	300	300	660	960	960	960	1380	1380	1800	1800
70	0.01	0.11	0.41	0.75	1.20	1.65	2.10	3.19	4.63	6.07	7.51	10.39	13.52	17.66	21.80	27.18
	60	150	210	300	300	300	300	960	960	960	960	960	1380	1380	1380	1800
80	0.01	0.12	0.44	0.87	1.32	1.78	3.00	4.44	5.88	7.32	8.76	11.64	14.92	19.06	23.20	28.21
	60	210	210	300	300	660	960	960	960	960	960	960	1380	1380	1380	1800
90	0.01	0.14	0.52	0.97	1.42	2.59	4.03	5.47	6.91	8.35	9.79	12.67	16.19	20.33	24.47	29.13
	90	210	300	300	300	960	960	960	960	960	960	960	1380	1380	1380	1800
100	0.01	0.16	0.59	1.04	2.00	3.44	4.88	6.32	7.76	9.20	10.64	13.52	17.34	21.48	25.62	29.99
	90	210	300	300	960	960	960	960	960	960	960	960	1380	1380	1380	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.30	1.31	1.31	1.96	2.67	9.40	15.65
3	1.03	1.02	1.01	1.00	1.00	1.31	1.94
4	1.00	1.00	1.00	1.00	1.00	1.00	1.26
5	1.00	1.00	1.00	1.00	1.00	1.00	1.06
6	1.00	1.00	1.00	1.00	1.00	1.00	1.02
7	1.33	1.53	1.76	2.96	9.13	26.90	37.35
8	1.05	1.12	1.10	1.10	1.37	2.57	7.37
9	1.04	1.14	1.14	1.15	1.56	4.10	12.76
10	1.00	1.19	1.17	1.10	1.48	2.63	6.27
11	1.01	1.22	1.19	1.14	1.23	2.62	4.49
12	1.12	1.11	1.08	1.11	1.89	5.07	14.10
13	1.00	1.13	1.14	1.07	1.13	2.17	3.66
14	1.00	1.17	1.17	1.11	1.17	2.20	2.63
15	1.01	1.24	1.18	1.14	1.22	2.26	2.70
16	1.02	1.26	1.18	1.16	1.28	2.43	2.80
17	1.02	1.12	1.14	1.08	1.10	1.91	2.36
18	1.00	1.17	1.16	1.11	1.16	1.93	2.47
19	1.01	1.24	1.18	1.15	1.22	2.08	2.64
20	1.02	1.26	1.18	1.17	1.27	2.29	2.75

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
60.00	2.128	235.80	223.60	236.26	246.36	262.42	285.55	331.32
50.00	2.054	234.15	220.98	229.16	242.53	257.57	278.48	325.66
40.00	1.960	232.06	217.67	220.20	237.70	251.45	269.55	318.52
30.00	1.834	229.26	213.22	208.16	231.20	243.23	257.54	308.91
25.00	1.751	222.54	198.31	203.48	223.58	241.16	254.82	308.10
20.00	1.645	213.98	179.34	197.53	213.89	238.53	251.35	307.08
10.00	1.282	177.68	154.35	168.49	201.63	210.95	235.01	265.74
5.00	0.841	142.62	133.67	144.95	158.00	166.55	198.14	233.67
2.00	0.000	99.81	66.42	69.79	76.15	88.38	131.08	141.55

04197020 Honey Creek near New Washington, Ohio

Location: Latitude 40°57′37″, longitude 82°47′19″, Crawford County, Hydrologic Unit 04100011

Drainage area, in square miles: 17.0

Station used for record extension: 04196000

Time period of systematic or extended record analyzed: 1964-01-01 to 1989-10-04

Percentage of estimated values in extended record: 59.8

Eighty-percent-duration streamflow, in cubic feet per second: 0.8

Mean annual streamflow, in inches: 11.72

Location of station used for precipitation data: Norwalk, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
26.00	3.24	0.19	3.91	6.72	11.54	23.92	32.39	41.42
25.00	3.20	0.19	3.93	6.73	11.66	24.00	32.60	41.96
20.00	2.97	0.19	4.03	6.77	12.34	24.47	33.78	45.01
10.00	2.25	0.20	4.24	8.22	14.29	26.62	38.31	51.70
5.20	1.54	0.22	6.70	9.91	17.17	37.08	52.31	69.46

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.12	0.36	0.64	0.93	1.22	1.51	1.80	2.09	2.38	2.67	3.24	3.89	4.75	6.21	8.14
	60	120	180	180	180	180	180	180	180	180	180	180	270	270	600	600
6	0.02	0.13	0.36	0.65	0.94	1.23	1.52	1.81	2.10	2.38	2.67	3.32	4.00	4.80	6.24	8.16
	90	120	180	180	180	180	180	180	180	180	180	210	210	270	600	600
8	0.03	0.15	0.37	0.66	0.95	1.24	1.53	1.82	2.14	2.48	2.82	3.49	4.26	5.17	7.10	9.30
	90	120	180	180	180	180	180	180	210	210	210	210	240	600	600	900
10	0.04	0.15	0.38	0.67	0.96	1.24	1.56	1.89	2.23	2.57	2.96	3.73	4.50	6.10	8.03	10.19
	120	120	180	180	180	180	210	210	210	240	240	240	240	600	600	1380
15	0.05	0.17	0.39	0.67	0.97	1.31	1.69	2.08	2.46	2.85	3.23	4.00	5.55	7.47	9.40	11.32
	120	120	150	180	210	240	240	240	240	240	240	240	600	600	600	600
20	0.06	0.17	0.39	0.68	1.01	1.39	1.78	2.16	2.55	2.93	3.32	4.11	5.87	7.80	9.72	11.65
	120	120	150	180	240	240	240	240	240	240	240	540	600	600	600	600
25	0.06	0.17	0.40	0.68	1.01	1.39	1.78	2.16	2.55	2.93	3.32	4.11	5.87	7.80	11.26	16.65
	120	120	150	180	240	240	240	240	240	240	240	540	600	900	1680	1680
30	0.06	0.17	0.41	0.68	1.01	1.39	1.78	2.16	2.55	2.93	3.32	5.86	8.75	13.68	19.07	24.46
	120	120	150	180	240	240	240	240	240	240	240	900	900	1680	1680	1680
40	0.06	0.19	0.43	0.68	1.01	1.81	3.25	4.70	6.14	8.15	10.85	16.24	21.63	27.02	32.42	37.81
	120	150	150	180	240	900	900	900	900	1680	1680	1680	1680	1680	1680	1680
50	0.06	0.20	0.66	2.10	3.55	5.54	8.23	10.93	13.62	16.32	19.01	24.41	29.80	35.19	40.58	45.97
	120	150	900	900	900	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680
60	0.07	0.59	2.03	4.37	7.07	9.77	12.46	15.16	17.85	20.55	23.24	28.64	34.03	39.42	44.81	50.20
	150	900	900	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680
70	0.26	1.13	3.70	6.40	9.09	11.79	14.48	17.18	19.87	22.57	25.27	30.66	36.05	41.44	46.83	52.22
	900	900	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680
80	0.46	1.93	4.63	7.33	10.02	12.72	15.41	18.11	20.80	23.50	26.20	31.59	36.99	42.58	48.16	53.74
	900	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1740	1740	1740	1740
90	0.74	2.35	5.05	7.74	10.44	13.14	15.83	18.53	21.22	23.99	26.78	32.37	37.95	43.54	49.12	54.71
	1680	1680	1680	1680	1680	1680	1680	1680	1680	1740	1740	1740	1740	1740	1740	1740
100	0.92	2.54	5.24	7.93	10.63	13.34	16.14	18.93	21.72	24.51	27.30	32.89	38.47	44.11	49.88	55.66
	1680	1680	1680	1680	1680	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.30	1.46	1.21	1.03	1.31	2.50	5.65
3	1.15	1.27	1.16	1.01	1.00	1.00	1.00
4	1.11	1.11	1.09	1.01	1.00	1.00	1.00
5	1.07	1.00	1.06	1.00	1.00	1.00	1.00
6	1.04	1.00	1.03	1.00	1.00	1.00	1.00
7	1.30	1.53	1.29	1.30	2.25	8.03	13.41
8	1.15	1.38	1.26	1.14	1.09	1.15	2.18
9	1.15	1.42	1.30	1.18	1.20	1.34	3.46
10	1.14	1.43	1.39	1.31	1.20	1.25	2.46
11	1.12	1.46	1.45	1.35	1.21	1.29	2.06
12	1.20	1.41	1.24	1.11	1.09	1.51	3.90
13	1.14	1.36	1.30	1.19	1.20	1.19	1.48
14	1.12	1.33	1.39	1.32	1.21	1.22	1.41
15	1.08	1.35	1.47	1.37	1.19	1.30	1.49
16	1.12	1.54	1.42	1.42	1.24	1.32	1.47
17	1.12	1.29	1.28	1.18	1.21	1.18	1.16
18	1.09	1.28	1.36	1.33	1.22	1.24	1.22
19	1.04	1.35	1.43	1.39	1.20	1.29	1.26
20	1.07	1.53	1.41	1.42	1.23	1.31	1.34

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
26.00	1.769	109.23	153.52	178.82	211.70	226.76	241.15	255.63
25.00	1.751	108.12	153.11	177.94	209.56	224.58	239.24	253.91
20.00	1.645	101.60	150.69	172.77	197.06	211.87	228.06	243.87
10.00	1.282	74.09	144.00	155.26	170.35	180.78	197.54	207.30
5.00	0.841	56.72	115.30	131.82	148.25	159.24	184.48	192.52
2.00	0.000	35.00	81.99	83.62	88.75	95.16	116.94	135.36

04197100 Honey Creek at Melmore, Ohio

Location: Latitude 41°01′20″, longitude 83°06′35″, Seneca County, Hydrologic Unit 04100011

Drainage area, in square miles: 149.

Station used for record extension: 04196500

Time period of systematic or extended record analyzed: 1922-10-01 to 1997-09-30

Percentage of estimated values in extended record: 71.1

Eighty-percent-duration streamflow, in cubic feet per second: 5.0

Mean annual streamflow, in inches: 10.95

Location of station used for precipitation data: Norwalk, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
76.00	4.32	0.04	2.13	3.85	6.10	14.91	21.71	28.85
70.00	4.24	0.04	2.17	4.03	6.34	14.99	21.85	29.17
60.00	4.09	0.04	2.24	4.36	6.79	15.13	22.10	29.77
50.00	3.90	0.05	2.32	4.75	7.33	15.30	22.40	30.48
40.00	3.68	0.05	2.42	5.24	7.99	15.50	22.77	31.35
30.00	3.38	0.06	2.63	5.35	8.79	17.65	24.64	32.20
25.00	3.20	0.07	2.77	5.40	9.25	19.17	25.95	32.75
20.00	2.97	0.07	2.85	6.28	9.27	19.32	26.61	34.20
10.00	2.25	0.09	3.34	7.41	12.01	24.89	37.31	48.75
5.07	1.52	0.18	4.69	10.06	17.83	35.21	49.67	–

04197100 Honey Creek at Melmore, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.03	0.13	0.36	0.63	0.90	1.24	1.60	1.96	2.32	2.68	3.04	3.77	4.58	5.48	6.38	7.28
	60	150	150	180	180	240	240	240	240	240	240	270	300	300	300	300
6	0.03	0.14	0.40	0.67	0.95	1.27	1.63	1.99	2.35	2.71	3.07	3.90	4.80	5.70	6.60	7.90
	90	150	180	180	210	240	240	240	240	240	240	300	300	300	300	600
8	0.03	0.16	0.43	0.71	1.02	1.34	1.69	2.05	2.41	2.81	3.26	4.16	5.06	5.96	7.64	9.48
	90	180	180	210	210	210	240	240	240	300	300	300	300	300	600	660
10	0.04	0.18	0.45	0.74	1.06	1.38	1.74	2.10	2.52	2.96	3.41	4.31	5.21	6.57	8.55	10.53
	120	180	180	210	210	240	240	240	300	300	300	300	300	660	660	660
15	0.05	0.19	0.47	0.78	1.11	1.47	1.83	2.27	2.72	3.17	3.62	4.52	5.72	7.70	10.08	14.20
	150	180	210	210	240	240	240	300	300	300	300	300	660	660	1320	1380
20	0.06	0.20	0.49	0.81	1.17	1.53	1.93	2.38	2.83	3.28	3.75	4.74	6.25	8.68	13.29	18.50
	150	180	210	240	240	240	300	300	300	300	330	330	660	1380	1740	1740
25	0.06	0.21	0.50	0.85	1.21	1.57	2.00	2.45	2.91	3.41	3.90	4.89	6.91	10.67	15.89	21.10
	150	180	210	240	240	240	300	300	330	330	330	330	1020	1740	1740	1740
30	0.07	0.21	0.52	0.87	1.23	1.60	2.05	2.52	3.01	3.51	4.00	4.99	7.95	12.30	17.51	22.73
	150	180	210	240	240	300	300	330	330	330	330	330	1020	1740	1740	1740
40	0.07	0.22	0.55	0.91	1.27	1.67	2.13	2.62	3.12	3.61	4.11	6.30	9.36	14.01	19.22	24.44
	150	210	240	240	240	300	330	330	330	330	330	1020	1020	1740	1740	1740
50	0.07	0.23	0.57	0.93	1.29	1.72	2.18	2.67	3.17	3.66	4.25	7.20	10.26	14.65	19.87	25.08
	150	210	240	240	240	300	330	330	330	330	660	1020	1020	1740	1740	1740
60	0.07	0.24	0.58	0.94	1.31	1.76	2.21	2.69	3.18	3.83	5.03	7.90	11.13	15.27	19.94	25.16
	150	210	240	240	300	300	300	330	330	660	960	960	1380	1380	1740	1740
70	0.07	0.25	0.59	0.95	1.34	1.78	2.23	2.69	3.37	4.36	5.65	8.53	11.84	15.98	20.11	25.16
	150	210	240	240	300	300	300	330	660	660	960	960	1380	1380	1380	1740
80	0.07	0.26	0.60	0.96	1.36	1.81	2.26	2.87	3.86	4.85	6.16	9.04	12.45	16.59	20.72	25.16
	180	210	240	240	300	300	300	660	660	660	960	960	1380	1380	1380	1740
90	0.08	0.26	0.60	0.96	1.38	1.83	2.31	3.30	4.29	5.28	6.59	9.46	12.99	17.12	21.26	25.39
	180	210	240	240	300	300	660	660	660	660	960	960	1380	1380	1380	1380
100	0.08	0.27	0.61	0.97	1.40	1.85	2.70	3.69	4.68	5.67	6.95	9.83	13.46	17.60	21.73	25.87
	210	210	240	240	300	300	660	660	660	660	960	960	1380	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.29	1.96	1.97	2.36	6.25	19.21	32.05
3	1.12	1.06	1.02	1.02	1.11	1.61	2.14
4	1.02	1.03	1.00	1.00	1.00	1.00	1.22
5	1.03	1.01	1.00	1.00	1.00	1.00	1.07
6	1.03	1.00	1.00	1.00	1.00	1.00	1.00
7	2.40	2.13	2.23	4.09	20.38	44.91	55.77
8	1.15	1.08	1.06	1.09	1.63	2.54	11.37
9	1.14	1.11	1.06	1.23	1.79	4.12	19.75
10	1.12	1.10	1.15	1.16	1.59	2.49	6.58
11	1.06	1.10	1.17	1.18	1.45	2.10	3.51
12	1.22	1.13	1.09	1.25	2.02	9.72	24.76
13	1.09	1.08	1.06	1.13	1.36	2.11	3.05
14	1.06	1.06	1.15	1.16	1.25	1.81	2.31
15	1.05	1.09	1.17	1.22	1.27	1.72	2.35
16	1.08	1.16	1.24	1.22	1.37	1.64	2.32
17	1.04	1.06	1.05	1.14	1.12	1.66	2.27
18	1.05	1.06	1.15	1.18	1.25	1.56	2.00
19	1.08	1.09	1.17	1.19	1.27	1.59	2.17
20	1.09	1.17	1.23	1.22	1.37	1.52	2.24

04197100 Honey Creek at Melmore, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
76.00	2.222	277.65	252.01	255.85	256.48	268.05	294.11	312.93
70.00	2.190	277.20	249.49	253.96	255.55	266.96	291.78	311.48
60.00	2.128	276.34	244.68	250.36	253.78	264.89	287.36	308.73
50.00	2.054	275.29	238.86	245.99	251.64	262.38	281.99	305.39
40.00	1.960	273.98	231.50	240.48	248.93	259.20	275.22	301.17
30.00	1.834	266.16	224.21	226.30	242.40	256.81	268.20	297.94
25.00	1.751	259.83	219.51	216.70	237.66	255.03	264.15	296.27
20.00	1.645	246.61	209.48	215.75	231.46	245.60	263.57	296.04
10.00	1.282	213.41	178.41	202.17	211.97	221.04	243.37	264.79
5.00	0.841	182.14	149.97	159.16	167.39	187.04	207.24	221.94
2.00	0.000	132.02	90.99	96.23	112.84	130.69	148.28	155.41

04197170 Rock Creek at Tiffin, Ohio

Location: Latitude 41°06′49″, longitude 83°10′06″, Seneca County, Hydrologic Unit 04100011

Drainage area, in square miles: 34.6

Station used for record extension: 04199000

Time period of systematic or extended record analyzed: 1950-04-01 to 1997-09-30

Percentage of estimated values in extended record: 69.8

Eighty-percent-duration streamflow, in cubic feet per second: 2.2

Mean annual streamflow, in inches: 11.51

Location of station used for precipitation data: Norwalk, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
48.00	3.86	0.19	2.15	3.87	6.49	15.18	24.39	35.07
40.00	3.68	0.20	2.21	4.30	7.13	16.22	26.33	36.87
30.00	3.38	0.21	2.29	4.97	8.16	17.87	29.41	39.73
25.00	3.20	0.22	2.35	5.40	8.80	18.92	31.36	41.54
20.00	2.97	0.24	2.36	5.72	10.56	21.38	33.98	43.64
10.00	2.25	0.31	3.10	8.59	14.48	25.98	40.60	50.19
5.33	1.57	0.59	4.22	10.03	17.13	34.59	54.16	–

04197170 Rock Creek at Tiffin, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.03	0.16	0.35	0.59	0.83	1.06	1.38	1.76	2.14	2.52	3.34	4.19	5.04	6.04	7.97
	0	60	90	150	150	150	150	240	240	240	240	270	270	270	600	660
6	0.00	0.03	0.18	0.38	0.62	0.89	1.23	1.61	1.99	2.42	2.84	3.70	4.55	5.40	6.25	7.97
	0	60	120	150	150	180	240	240	270	270	270	270	270	270	270	660
8	0.00	0.04	0.21	0.44	0.74	1.09	1.48	1.90	2.33	2.76	3.18	4.03	4.88	5.74	6.77	8.66
	0	60	120	180	210	240	270	270	270	270	270	270	270	270	600	600
10	0.00	0.04	0.23	0.51	0.84	1.21	1.63	2.06	2.48	2.91	3.34	4.19	5.12	6.16	7.66	9.82
	0	90	180	210	210	240	270	270	270	270	270	270	330	330	600	1020
15	0.00	0.05	0.30	0.63	0.96	1.36	1.79	2.21	2.64	3.06	3.53	4.57	5.68	7.57	9.46	12.16
	30	90	180	210	210	270	270	270	270	270	330	330	600	600	600	1020
20	0.01	0.06	0.34	0.67	1.00	1.41	1.84	2.27	2.70	3.22	3.74	4.90	6.79	8.68	10.58	13.74
	30	150	210	210	240	270	270	270	330	330	330	600	600	600	600	1020
25	0.01	0.07	0.36	0.69	1.03	1.43	1.86	2.32	2.82	3.34	3.86	5.60	7.49	9.38	11.82	15.41
	30	150	210	210	210	270	270	300	330	330	330	600	600	600	1020	1740
30	0.01	0.09	0.37	0.71	1.04	1.44	1.91	2.38	2.90	3.42	4.14	6.04	7.93	9.83	12.96	17.17
	30	150	210	210	210	270	300	300	330	330	600	600	600	660	1020	1740
40	0.01	0.10	0.38	0.71	1.04	1.50	1.98	2.49	3.01	3.65	4.59	6.52	8.79	11.70	15.94	20.29
	30	150	210	210	210	300	300	330	330	600	600	720	720	1020	1380	1380
50	0.01	0.11	0.38	0.71	1.06	1.53	2.05	2.57	3.09	3.94	5.07	7.34	10.33	14.68	19.03	23.38
	30	150	210	210	300	300	330	330	330	720	720	720	1380	1380	1380	1380
60	0.01	0.11	0.38	0.71	1.08	1.60	2.12	2.64	3.36	4.50	5.63	8.64	12.99	17.34	21.70	26.05
	30	150	210	210	330	330	330	330	720	720	720	1380	1380	1380	1380	1380
70	0.01	0.11	0.38	0.71	1.14	1.66	2.18	2.70	3.76	4.90	6.59	10.92	15.27	19.63	23.98	28.96
	30	150	210	210	330	330	330	330	720	720	1320	1380	1380	1380	1380	1680
80	0.02	0.12	0.38	0.71	1.19	1.71	2.23	2.92	4.33	6.41	8.52	12.87	17.22	21.72	26.44	31.74
	30	120	210	210	330	330	330	720	1320	1320	1380	1380	1380	1440	1680	1680
90	0.02	0.13	0.38	0.72	1.24	1.76	2.28	3.88	5.96	8.04	10.26	14.80	19.34	23.88	28.91	34.20
	30	120	210	330	330	330	330	1320	1320	1320	1440	1440	1440	1440	1680	1680
100	0.02	0.13	0.38	0.77	1.29	1.81	3.20	5.28	7.55	9.82	12.09	16.63	21.17	25.78	31.08	36.37
	120	120	210	330	330	330	1320	1440	1440	1440	1440	1440	1440	1680	1680	1680

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.41	1.55	1.15	1.00	1.18	10.95	21.89
3	2.08	1.41	1.08	1.01	1.00	1.00	1.63
4	1.75	1.23	1.00	1.00	1.00	1.00	1.01
5	1.06	1.06	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	2.44	1.58	1.23	1.07	4.75	29.58	38.83
8	2.08	1.45	1.19	1.12	1.08	3.85	20.17
9	2.11	1.51	1.26	1.17	1.12	12.34	29.28
10	1.94	1.47	1.31	1.17	1.25	4.77	20.94
11	1.79	1.56	1.28	1.21	1.32	2.50	15.71
12	2.24	1.51	1.19	1.12	1.05	11.29	26.54
13	1.92	1.43	1.23	1.17	1.17	1.99	13.30
14	1.69	1.39	1.28	1.18	1.24	1.89	4.56
15	1.10	1.47	1.28	1.20	1.34	1.79	3.37
16	1.08	1.54	1.39	1.21	1.36	1.91	3.58
17	1.77	1.34	1.19	1.17	1.16	1.68	3.59
18	1.10	1.32	1.26	1.18	1.24	1.57	2.71
19	1.08	1.38	1.28	1.22	1.35	1.51	2.73
20	1.08	1.50	1.39	1.21	1.36	1.62	2.95

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
48.00	2.037	125.02	180.44	230.58	258.86	266.13	276.59	290.74
40.00	1.960	123.02	177.59	228.37	257.79	263.86	274.59	289.18
30.00	1.834	119.74	172.92	224.74	256.03	260.15	271.32	286.61
25.00	1.751	117.58	169.84	222.34	254.87	257.69	269.16	284.92
20.00	1.645	113.21	167.72	207.06	233.95	239.25	264.58	282.35
10.00	1.282	105.92	147.96	155.51	167.70	201.21	240.52	261.87
5.00	0.841	90.57	119.92	130.74	137.74	162.73	199.33	226.49
2.00	0.000	35.73	67.01	80.27	96.36	116.39	145.81	160.06

04198000 Sandusky River near Fremont, Ohio

Location: Latitude 41°18′28″, longitude 83°09′32″, Sandusky County, Hydrologic Unit 04100011

Drainage area, in square miles: 1,251

Station used for record extension: None

Time period of systematic or extended record analyzed: 1938-08-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 62.

Mean annual streamflow, in inches: 11.35

Location of station used for precipitation data: Kenton, Ohio

Location of station used for potential evapotranspiration data: Toledo, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
60.00	4.09	0.16	2.54	4.30	7.00	15.58	22.73	30.15
50.00	3.90	0.16	2.55	4.38	7.75	16.10	23.83	31.60
40.00	3.68	0.17	2.55	4.48	8.68	16.73	25.18	33.38
30.00	3.38	0.17	2.56	4.60	9.87	17.55	26.93	35.69
25.00	3.20	0.19	2.93	4.98	10.40	18.45	27.28	35.78
20.00	2.97	0.22	3.39	5.45	11.06	19.56	27.72	35.89
10.00	2.25	0.26	3.82	7.95	13.56	21.86	39.35	51.82
5.45	1.60	0.37	4.77	9.14	16.54	32.39	–	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.04	0.22	0.45	0.73	1.01	1.29	1.64	2.01	2.38	2.76	3.56	4.40	5.29	6.22	7.84
	0	60	120	180	180	180	180	240	240	240	240	270	270	300	300	540
6	0.00	0.04	0.23	0.49	0.77	1.05	1.38	1.74	2.11	2.48	2.89	3.75	4.68	5.61	6.54	7.99
	30	60	150	180	180	210	210	240	240	240	270	300	300	300	300	600
8	0.00	0.05	0.26	0.54	0.86	1.19	1.52	1.85	2.23	2.65	3.08	4.01	4.94	5.88	7.57	9.44
	30	90	150	180	210	210	210	240	270	270	300	300	300	300	600	600
10	0.00	0.06	0.29	0.60	0.92	1.25	1.57	1.92	2.34	2.76	3.18	4.11	5.04	6.47	8.33	10.75
	30	90	180	210	210	210	210	270	270	270	270	300	300	600	600	960
15	0.01	0.08	0.33	0.65	0.98	1.30	1.65	2.07	2.48	2.90	3.32	4.19	5.58	7.45	10.54	14.64
	30	150	180	210	210	210	270	270	270	270	270	300	600	600	1320	1320
20	0.01	0.10	0.35	0.67	1.00	1.33	1.72	2.14	2.56	2.98	3.40	4.59	6.26	8.63	12.73	17.49
	30	150	180	210	210	240	270	270	270	270	270	540	540	1320	1320	1740
25	0.01	0.11	0.37	0.68	1.01	1.37	1.78	2.20	2.62	3.04	3.48	5.16	6.84	10.04	14.98	20.39
	60	150	180	210	210	240	270	270	270	270	540	540	540	1320	1740	1740
30	0.01	0.11	0.38	0.70	1.03	1.40	1.82	2.24	2.66	3.08	3.83	5.51	7.62	11.48	16.88	22.29
	60	150	180	210	240	240	270	270	270	270	540	540	1020	1740	1740	1740
40	0.01	0.12	0.40	0.72	1.09	1.46	1.88	2.30	2.75	3.33	4.17	6.09	9.26	13.64	19.05	24.45
	60	150	210	210	240	240	270	270	330	540	540	1020	1020	1740	1740	1740
50	0.02	0.13	0.43	0.76	1.14	1.51	1.94	2.41	2.89	3.52	4.54	7.30	10.47	14.68	20.02	25.43
	60	150	210	240	240	240	300	300	330	600	660	1020	1020	1380	1740	1740
60	0.02	0.13	0.45	0.80	1.18	1.64	2.11	2.57	3.22	4.40	5.89	8.88	11.86	16.09	20.38	25.79
	60	150	210	240	240	300	300	300	660	960	960	960	960	1380	1380	1800
70	0.02	0.15	0.48	0.85	1.31	1.78	2.25	2.84	4.33	5.82	7.31	10.29	13.28	17.37	21.66	26.74
	90	210	210	300	300	300	300	960	960	960	960	960	960	1380	1380	1800
80	0.02	0.18	0.50	0.96	1.43	1.89	2.56	4.05	5.54	7.03	8.53	11.51	14.49	18.54	22.83	27.54
	90	210	210	300	300	300	960	960	960	960	960	960	960	1380	1380	1800
90	0.02	0.20	0.59	1.05	1.52	2.10	3.59	5.08	6.57	8.06	9.55	12.53	15.51	19.61	23.90	28.25
	90	210	300	300	300	960	960	960	960	960	960	960	960	1380	1380	1800
100	0.02	0.21	0.66	1.13	1.59	2.96	4.45	5.94	7.43	8.92	10.41	13.39	16.38	20.59	24.88	29.17
	90	210	300	300	300	960	960	960	960	960	960	960	960	1380	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.59	1.30	1.38	1.94	2.53	8.98	16.27
3	1.12	1.00	1.00	1.02	1.00	1.30	1.88
4	1.00	1.00	1.00	1.00	1.00	1.00	1.21
5	1.00	1.00	1.00	1.00	1.00	1.00	1.08
6	1.00	1.00	1.00	1.00	1.00	1.00	1.03
7	1.65	1.52	1.71	2.76	7.86	25.45	38.79
8	1.19	1.07	1.06	1.09	1.34	2.29	6.99
9	1.17	1.07	1.09	1.13	1.59	3.51	12.48
10	1.22	1.13	1.09	1.13	1.45	2.22	5.71
11	1.16	1.14	1.10	1.16	1.24	2.31	4.79
12	1.17	1.04	1.08	1.10	1.76	4.60	13.88
13	1.11	1.07	1.08	1.09	1.19	1.90	3.36
14	1.19	1.12	1.10	1.13	1.13	1.84	2.53
15	1.09	1.14	1.10	1.16	1.16	1.99	2.68
16	1.21	1.14	1.10	1.17	1.16	2.11	2.75
17	1.06	1.07	1.08	1.10	1.09	1.59	2.27
18	1.12	1.12	1.09	1.14	1.13	1.60	2.44
19	1.07	1.14	1.11	1.15	1.16	1.80	2.60
20	1.21	1.16	1.11	1.17	1.17	1.95	2.67

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
60.00	2.128	236.69	252.84	254.92	256.22	275.68	288.56	313.68
50.00	2.054	234.71	244.14	243.71	249.25	267.72	279.26	312.48
40.00	1.960	232.20	233.16	229.56	240.46	257.66	267.52	310.96
30.00	1.834	228.84	218.40	210.53	228.63	244.15	251.74	308.92
25.00	1.751	222.28	210.84	206.44	227.93	242.82	251.67	291.44
20.00	1.645	213.93	201.22	201.23	227.03	241.12	251.58	269.21
10.00	1.282	180.20	160.79	185.25	193.13	204.75	238.20	255.76
5.00	0.841	147.28	130.74	139.88	148.54	167.27	200.15	230.87
2.00	0.000	107.00	69.42	68.70	76.08	102.79	132.13	140.75

04199000 Huron River at Milan, Ohio

Location: Latitude 41°18′06″, longitude 82°36′25″, Erie County, Hydrologic Unit 04100012

Drainage area, in square miles: 371.

Station used for record extension: 04197100

Time period of systematic or extended record analyzed: 1950-04-01 to 1997-09-30

Percentage of estimated values in extended record: 12.6

Eighty-percent-duration streamflow, in cubic feet per second: 25.

Mean annual streamflow, in inches: 12.07

Location of station used for precipitation data: Norwalk, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
48.00	3.86	0.23	2.98	5.17	8.80	18.20	28.97	40.53
40.00	3.68	0.24	3.00	5.76	9.73	19.53	30.62	42.03
30.00	3.38	0.25	3.04	6.69	11.20	21.64	33.23	44.39
25.00	3.20	0.26	3.06	7.28	12.14	22.98	34.90	45.90
20.00	2.97	0.31	3.16	7.69	13.05	24.01	36.99	47.40
10.00	2.25	0.55	4.59	9.45	15.85	26.49	42.95	52.39
5.33	1.57	0.79	5.47	10.72	19.19	34.22	57.96	–

04199000 Huron River at Milan, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.02	0.16	0.31	0.51	0.76	1.00	1.26	1.56	1.86	2.15	3.04	3.93	4.83	5.72	6.86
	0	30	90	120	120	150	150	180	180	180	180	270	270	270	270	540
6	0.00	0.02	0.16	0.34	0.54	0.79	1.04	1.32	1.62	1.95	2.38	3.27	4.16	5.05	5.95	7.24
	0	60	90	120	150	150	150	180	180	210	270	270	270	270	270	540
8	0.00	0.03	0.17	0.37	0.60	0.86	1.17	1.52	1.91	2.31	2.72	3.61	4.51	5.40	6.29	8.61
	0	60	120	120	150	180	210	210	240	240	270	270	270	270	270	1020
10	0.00	0.04	0.19	0.40	0.66	1.00	1.34	1.73	2.13	2.52	2.96	3.85	4.74	5.63	6.98	10.00
	0	60	120	150	180	210	210	240	240	240	270	270	270	270	600	1020
15	0.00	0.05	0.23	0.53	0.88	1.22	1.60	2.00	2.40	2.84	3.29	4.18	5.16	6.43	8.41	12.10
	30	60	150	210	210	210	240	240	270	270	270	270	330	600	600	1800
20	0.00	0.05	0.30	0.63	0.98	1.32	1.71	2.11	2.55	3.00	3.45	4.46	5.55	7.35	9.34	12.74
	30	60	180	210	210	210	240	270	270	270	270	330	330	600	600	1320
25	0.01	0.05	0.34	0.68	1.03	1.37	1.76	2.19	2.64	3.08	3.60	4.69	6.03	8.01	9.99	14.31
	30	60	180	210	210	210	240	270	270	270	330	330	600	600	600	1320
30	0.01	0.06	0.36	0.70	1.05	1.40	1.79	2.23	2.69	3.20	3.74	4.83	6.52	8.50	11.35	15.77
	30	150	180	210	210	210	270	270	300	330	330	330	600	600	1320	1380
40	0.01	0.08	0.37	0.71	1.06	1.41	1.82	2.32	2.82	3.36	3.91	5.22	7.20	9.44	13.90	18.46
	30	150	180	210	210	210	300	300	330	330	330	600	600	1320	1380	1380
50	0.01	0.10	0.37	0.71	1.06	1.41	1.89	2.39	2.90	3.44	3.99	5.73	8.22	11.59	16.05	21.17
	30	150	180	210	210	210	300	300	330	330	330	720	1020	1020	1380	1740
60	0.01	0.10	0.37	0.71	1.06	1.43	1.93	2.42	2.93	3.51	4.42	6.91	10.28	14.79	20.54	26.30
	30	150	180	210	210	300	300	300	330	540	720	1020	1020	1740	1740	1740
70	0.02	0.10	0.37	0.71	1.06	1.44	1.94	2.44	3.06	4.14	5.40	8.77	14.01	19.76	25.51	31.26
	30	150	180	210	210	300	300	300	540	720	1020	1020	1740	1740	1740	1740
80	0.02	0.11	0.37	0.71	1.06	1.45	1.94	2.55	3.73	5.35	7.04	12.75	18.50	24.25	30.01	35.96
	30	150	180	210	210	300	300	540	720	1020	1020	1740	1740	1740	1800	1800
90	0.02	0.11	0.37	0.71	1.06	1.45	2.02	3.40	5.15	8.02	10.90	16.65	22.40	28.35	34.30	40.25
	30	120	180	210	210	300	720	1020	1740	1740	1740	1740	1800	1800	1800	1800
100	0.02	0.12	0.37	0.71	1.06	1.45	2.93	5.57	8.45	11.32	14.20	20.09	26.03	31.98	37.93	43.88
	30	120	180	210	210	300	1020	1740	1740	1740	1740	1800	1800	1800	1800	1800

04199000 Huron River at Milan, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.74	1.37	1.13	1.09	1.02	2.16	11.76
3	1.39	1.29	1.09	1.03	1.00	1.00	1.03
4	1.00	1.18	1.04	1.00	1.00	1.00	1.00
5	1.00	1.12	1.00	1.00	1.00	1.00	1.00
6	1.00	1.06	1.00	1.00	1.00	1.00	1.00
7	1.75	1.44	1.25	1.18	1.55	20.41	34.30
8	1.41	1.32	1.14	1.21	1.12	1.32	3.20
9	1.44	1.40	1.25	1.26	1.15	1.71	11.89
10	1.17	1.32	1.18	1.30	1.19	1.69	4.62
11	1.14	1.37	1.23	1.35	1.29	1.62	3.28
12	1.57	1.36	1.15	1.19	1.11	1.54	10.03
13	1.12	1.33	1.15	1.24	1.16	1.31	2.13
14	1.04	1.29	1.13	1.31	1.19	1.36	2.12
15	1.03	1.31	1.17	1.33	1.28	1.44	2.21
16	1.02	1.27	1.23	1.38	1.31	1.55	2.59
17	1.04	1.31	1.12	1.22	1.16	1.31	1.81
18	1.00	1.23	1.12	1.29	1.19	1.36	1.87
19	1.01	1.26	1.17	1.32	1.28	1.46	2.04
20	1.02	1.26	1.23	1.38	1.29	1.55	2.39

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
48.00	2.037	109.00	135.36	170.59	194.88	225.15	240.23	255.90
40.00	1.960	106.73	135.34	166.62	194.28	221.31	237.26	253.28
30.00	1.834	103.02	135.30	160.11	193.30	215.02	232.39	248.99
25.00	1.751	100.56	135.28	155.81	192.65	210.87	229.18	246.16
20.00	1.645	93.83	133.76	148.92	186.12	203.11	224.25	243.43
10.00	1.282	83.96	128.82	135.04	143.38	159.02	208.39	234.37
5.00	0.841	70.20	102.10	104.94	117.74	137.46	162.15	182.82
2.00	0.000	24.00	53.64	68.48	77.73	99.30	112.45	135.47

04199500 Vermilion River near Vermilion, Ohio

Location: Latitude 41°22′55″, longitude 82°19′01″, Lorain County, Hydrologic Unit 04100012

Drainage area, in square miles: 262.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1950-04-01 to 1981-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 9.5

Mean annual streamflow, in inches: 13.42

Location of station used for precipitation data: Norwalk, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
32.00	3.45	0.03	2.87	5.40	9.69	21.18	30.50	39.68
30.00	3.38	0.04	2.95	5.50	9.91	21.27	30.56	40.03
25.00	3.20	0.07	3.17	5.77	10.55	21.54	30.72	41.02
20.00	2.97	0.10	3.45	6.10	11.33	21.86	30.92	42.23
10.00	2.25	0.15	4.33	9.51	13.32	27.53	39.39	58.30
5.33	1.57	0.21	5.06	10.31	18.81	32.28	–	–

04199500 Vermilion River near Vermilion, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.04	0.13	0.43	0.76	1.09	1.43	1.76	2.14	2.52	3.00	3.49	4.49	5.48	6.47	8.23	10.21
	90	90	180	180	180	180	180	210	210	270	270	270	270	270	540	540
6	0.04	0.15	0.46	0.79	1.13	1.48	1.86	2.25	2.71	3.21	3.70	4.73	5.84	6.94	8.44	10.87
	90	150	180	180	180	210	210	210	270	270	270	300	300	300	660	660
8	0.04	0.17	0.49	0.82	1.19	1.58	1.96	2.39	2.89	3.38	3.88	4.98	6.09	7.54	9.97	12.40
	90	150	180	180	210	210	210	240	270	270	300	300	300	660	660	660
10	0.04	0.18	0.50	0.86	1.24	1.63	2.06	2.50	2.98	3.48	3.97	5.02	6.22	8.19	11.18	15.34
	120	150	180	210	210	210	240	240	270	270	270	300	330	660	1020	1380
15	0.06	0.20	0.56	0.94	1.36	1.80	2.24	2.70	3.20	3.69	4.19	5.33	8.43	12.65	17.51	22.83
	120	150	210	210	240	240	240	270	270	270	270	330	900	1320	1320	1740
20	0.07	0.24	0.62	1.04	1.48	1.93	2.43	2.92	3.42	3.92	4.42	6.88	10.59	15.22	21.50	27.90
	120	210	210	240	240	270	270	270	270	270	300	900	1260	1260	1740	1740
25	0.07	0.29	0.69	1.13	1.62	2.11	2.61	3.16	3.71	4.26	4.82	7.18	10.90	16.20	22.59	28.99
	150	210	240	240	270	270	270	300	300	300	300	900	1260	1740	1740	1740
30	0.09	0.32	0.76	1.26	1.81	2.36	2.91	3.46	4.01	4.56	5.63	8.06	10.90	16.20	22.59	28.99
	210	210	270	300	300	300	300	300	300	300	660	660	1260	1740	1740	1740
40	0.13	0.45	1.00	1.55	2.10	2.65	3.20	4.15	5.36	6.58	7.79	10.21	12.64	17.91	23.87	29.82
	210	300	300	300	300	300	300	660	660	660	660	660	660	1620	1620	1620
50	0.20	0.53	1.08	1.63	2.18	3.26	4.47	5.69	6.90	8.11	9.33	12.06	18.01	23.97	29.92	35.88
	300	300	300	300	300	660	660	660	660	660	660	1620	1620	1620	1620	1620
60	0.22	0.55	1.10	1.86	3.07	4.28	5.49	6.71	7.92	9.13	11.76	17.71	23.67	29.62	35.57	41.53
	300	300	300	660	660	660	660	660	660	660	1620	1620	1620	1620	1620	1620
70	0.22	0.55	1.30	2.51	3.72	4.94	6.15	7.54	10.51	13.49	16.47	22.42	28.38	34.33	40.29	46.24
	300	300	660	660	660	660	660	1620	1620	1620	1620	1620	1620	1620	1620	1620
80	0.22	0.55	1.71	2.92	4.14	5.35	8.24	11.22	14.19	17.17	20.15	26.10	32.06	38.01	43.96	49.92
	300	300	660	660	660	660	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
90	0.22	0.76	1.97	3.18	5.04	8.02	10.99	13.97	16.95	19.93	22.90	28.86	34.81	40.77	46.72	52.67
	300	660	660	660	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620
100	0.22	0.92	2.13	4.07	7.05	10.03	13.00	15.98	18.96	21.94	24.91	30.87	36.82	42.78	48.73	54.68
	300	660	660	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620	1620

04199500 Vermilion River near Vermilion, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.50	1.42	1.47	1.60	2.07	6.71	9.86
3	1.00	1.00	1.00	1.01	1.00	1.10	1.62
4	1.00	1.00	1.00	1.00	1.00	1.00	1.01
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.51	1.49	1.59	1.93	6.51	12.92	18.78
8	1.01	1.01	1.03	1.11	1.15	2.02	6.97
9	1.01	1.02	1.11	1.16	1.22	4.24	10.16
10	1.02	1.04	1.09	1.20	1.15	1.95	6.95
11	1.01	1.06	1.14	1.23	1.17	1.55	5.63
12	1.00	1.02	1.08	1.27	1.36	5.24	9.85
13	1.01	1.02	1.06	1.16	1.12	1.34	4.05
14	1.02	1.03	1.08	1.20	1.15	1.34	2.19
15	1.01	1.06	1.14	1.22	1.17	1.42	1.89
16	1.03	1.07	1.16	1.26	1.21	1.51	1.82
17	1.01	1.01	1.06	1.16	1.12	1.23	1.82
18	1.01	1.02	1.09	1.20	1.15	1.24	1.66
19	1.01	1.06	1.14	1.22	1.18	1.31	1.74
20	1.03	1.07	1.16	1.26	1.20	1.42	1.75

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
32.00	1.863	297.24	285.09	277.25	290.20	313.45	325.67	331.90
30.00	1.834	289.95	276.72	269.98	283.71	306.67	318.92	326.09
25.00	1.751	268.87	252.52	248.95	264.92	287.07	299.40	309.26
20.00	1.645	242.07	221.74	222.21	241.02	262.14	274.57	287.87
10.00	1.282	203.21	173.36	181.40	203.25	221.98	239.76	251.89
5.00	0.841	157.97	138.61	147.87	164.63	187.71	204.59	224.46
2.00	0.000	102.47	80.43	82.06	100.08	117.15	129.69	149.94

04201500 Rocky River near Berea, Ohio

Location: Latitude 41°24′24″, longitude 81°53′14″, Cuyahoga County, Hydrologic Unit 04110001

Drainage area, in square miles: 267.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1943-10-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 22.

Mean annual streamflow, in inches: 14.77

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
55.00	4.00	0.18	4.29	6.15	11.79	24.50	33.60	42.88
50.00	3.90	0.19	4.51	6.49	12.09	24.80	34.15	44.11
40.00	3.68	0.23	5.03	7.30	12.80	25.51	35.42	47.00
30.00	3.38	0.27	5.71	8.33	13.72	26.42	37.08	50.74
25.00	3.20	0.28	5.97	8.73	14.21	26.93	39.06	53.64
20.00	2.97	0.29	6.10	8.91	14.70	27.46	42.54	57.79
10.00	2.25	0.44	7.04	12.03	21.09	35.26	52.34	68.61
5.50	1.61	0.79	7.98	14.14	22.38	40.76	63.51	–

04201500 Rocky River near Berea, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.05	0.22	0.46	0.76	1.07	1.37	1.68	2.04	2.41	2.77	3.64	4.61	5.58	6.55	7.61
	30	60	90	150	150	150	150	180	180	180	180	240	240	240	240	720
6	0.01	0.06	0.24	0.52	0.83	1.13	1.49	1.85	2.25	2.68	3.14	4.11	5.08	6.05	7.02	8.36
	30	60	120	150	150	150	180	180	210	210	240	240	240	240	240	600
8	0.01	0.07	0.29	0.60	0.93	1.32	1.75	2.17	2.62	3.11	3.59	4.56	5.54	6.51	7.56	9.79
	30	90	150	150	180	210	210	210	240	240	240	240	240	240	270	600
10	0.01	0.08	0.33	0.64	1.06	1.49	1.91	2.36	2.84	3.33	3.81	4.79	5.76	6.73	8.35	11.80
	30	90	150	180	210	210	210	240	240	240	240	240	240	240	600	900
15	0.01	0.10	0.39	0.81	1.24	1.66	2.12	2.61	3.09	3.58	4.06	5.03	6.00	8.58	12.22	15.94
	30	90	210	210	210	210	240	240	240	240	240	240	240	900	900	960
20	0.01	0.11	0.46	0.88	1.31	1.75	2.23	2.72	3.20	3.69	4.17	5.14	7.20	10.84	14.64	18.62
	30	150	210	210	210	240	240	240	240	240	240	240	900	900	960	1020
25	0.01	0.13	0.49	0.92	1.34	1.81	2.30	2.78	3.27	3.75	4.24	5.21	8.46	12.24	16.32	21.00
	30	150	210	210	210	240	240	240	240	240	240	240	900	960	1020	1380
30	0.01	0.14	0.51	0.94	1.37	1.86	2.34	2.83	3.31	3.80	4.29	5.58	9.18	13.27	17.39	22.72
	30	150	210	210	240	240	240	240	240	240	240	600	960	1020	1020	1380
40	0.01	0.16	0.53	0.96	1.44	1.92	2.41	2.89	3.44	4.05	4.66	6.79	9.98	14.11	19.76	26.80
	30	150	210	210	240	240	240	240	300	300	300	600	1020	1020	1740	1740
50	0.01	0.18	0.54	1.00	1.49	2.00	2.61	3.22	3.82	4.43	5.29	7.74	10.41	15.97	23.01	30.05
	60	150	210	240	240	300	300	300	300	300	600	660	660	1740	1740	1740
60	0.02	0.19	0.56	1.07	1.68	2.29	2.89	3.50	4.11	4.83	6.05	8.47	11.63	18.67	25.71	32.75
	120	180	180	300	300	300	300	300	300	600	600	600	1740	1740	1740	1740
70	0.03	0.21	0.67	1.28	1.89	2.49	3.10	3.71	4.31	5.45	6.67	9.10	13.95	20.99	28.03	35.06
	120	180	300	300	300	300	300	300	300	600	600	600	1740	1740	1740	1740
80	0.04	0.23	0.82	1.43	2.03	2.64	3.25	3.85	4.77	5.98	7.19	10.14	16.70	23.25	30.05	37.09
	120	180	300	300	300	300	300	300	600	600	600	1620	1620	1620	1740	1740
90	0.05	0.32	0.93	1.53	2.14	2.75	3.35	4.00	5.21	6.43	7.64	12.66	19.22	25.77	32.32	38.89
	120	300	300	300	300	300	300	600	600	600	600	1620	1620	1620	1620	1740
100	0.06	0.40	1.00	1.61	2.22	2.82	3.43	4.39	5.60	6.82	8.40	14.95	21.51	28.06	34.61	41.17
	120	300	300	300	300	300	300	600	600	600	1620	1620	1620	1620	1620	1620

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.70	1.33	1.33	1.44	1.52	5.29	8.69
3	1.26	1.04	1.02	1.02	1.01	1.10	1.33
4	1.02	1.00	1.01	1.00	1.00	1.00	1.00
5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	1.71	1.39	1.46	1.65	4.70	10.81	15.22
8	1.26	1.04	1.06	1.11	1.22	1.73	5.40
9	1.30	1.06	1.06	1.20	1.35	2.48	8.74
10	1.08	1.07	1.08	1.21	1.27	1.90	5.77
11	1.05	1.07	1.16	1.31	1.34	1.58	5.25
12	1.33	1.09	1.07	1.11	1.43	2.61	8.19
13	1.11	1.04	1.04	1.18	1.23	1.35	2.98
14	1.03	1.05	1.05	1.21	1.28	1.40	2.60
15	1.05	1.05	1.11	1.31	1.33	1.42	2.87
16	1.02	1.08	1.15	1.35	1.34	1.61	2.92
17	1.03	1.02	1.04	1.19	1.23	1.21	2.08
18	1.00	1.05	1.07	1.22	1.28	1.27	1.97
19	1.03	1.05	1.09	1.30	1.33	1.27	2.25
20	1.01	1.08	1.12	1.36	1.33	1.53	2.36

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
55.00	2.093	216.78	213.13	213.71	223.70	250.27	288.59	301.47
50.00	2.054	215.59	207.86	209.13	223.50	248.40	283.81	295.85
40.00	1.960	212.74	195.22	198.13	223.02	243.92	272.34	282.39
30.00	1.834	208.90	178.22	183.36	222.37	237.90	256.93	264.29
25.00	1.751	207.03	169.77	174.07	218.22	236.00	250.18	255.72
20.00	1.645	205.40	162.18	162.77	208.67	235.96	245.52	248.70
10.00	1.282	154.22	137.97	153.41	161.50	189.21	213.09	225.35
5.00	0.841	107.33	98.15	114.84	135.76	142.33	165.10	179.27
2.04	0.023	67.77	37.66	39.71	50.04	61.81	85.25	98.79

04207200 Tinkers Creek at Bedford, Ohio

Location: Latitude 41°23′04″, longitude 81°31′39″, Cuyahoga County, Hydrologic Unit 04110002

Drainage area, in square miles: 83.9

Station used for record extension: None

Time period of systematic or extended record analyzed: 1962-12-01 to 1994-10-31

Eighty-percent-duration streamflow, in cubic feet per second: 28.

Mean annual streamflow, in inches: 21.71

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
32.00	3.45	1.09	10.19	14.27	25.00	40.82	54.65	69.33
30.00	3.38	1.10	10.37	14.55	25.24	41.50	56.41	72.20
25.00	3.20	1.13	10.88	15.36	25.94	43.44	61.41	80.33
20.00	2.97	1.16	11.51	16.35	26.79	45.82	67.55	90.32
10.00	2.25	1.79	12.98	22.21	32.01	53.45	77.62	101.08
5.33	1.57	3.03	13.42	26.40	39.95	59.63	89.84	–

04207200 Tinkers Creek at Bedford, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.00	0.00	0.01	0.11	0.29	0.47	0.64	0.87	1.14	1.56	2.18	3.43	4.68	6.17	7.77	9.38
	0	0	30	60	60	60	60	90	90	180	210	210	210	270	270	270
6	0.00	0.00	0.03	0.12	0.30	0.54	0.81	1.17	1.62	2.06	2.58	3.65	4.72	6.17	7.77	9.38
	0	0	30	60	60	90	90	150	150	150	180	180	180	270	270	270
8	0.00	0.00	0.04	0.19	0.46	0.88	1.33	1.77	2.22	2.70	3.23	4.30	5.37	6.75	8.18	9.61
	0	0	30	90	90	150	150	150	150	180	180	180	180	240	240	240
10	0.00	0.00	0.05	0.27	0.65	1.10	1.54	2.02	2.56	3.09	3.63	4.70	6.12	7.55	8.97	12.67
	0	0	30	90	150	150	150	180	180	180	180	180	240	240	240	900
15	0.00	0.00	0.08	0.37	0.88	1.42	1.95	2.52	3.15	3.79	4.50	5.93	7.35	8.78	13.42	18.77
	0	0	60	150	180	180	180	210	210	240	240	240	240	240	900	900
20	0.00	0.00	0.11	0.51	1.06	1.69	2.31	2.94	3.64	4.35	5.06	6.49	7.92	11.49	16.84	22.19
	0	0	60	180	210	210	210	210	240	240	240	240	240	900	900	900
25	0.00	0.00	0.13	0.57	1.20	1.82	2.47	3.18	3.89	4.61	5.32	6.75	8.55	13.27	18.62	24.15
	0	0	90	210	210	210	240	240	240	240	240	240	600	900	900	1320
30	0.00	0.00	0.15	0.57	1.20	1.85	2.56	3.28	3.99	4.70	5.42	6.98	9.46	14.02	23.64	33.79
	0	0	90	210	210	240	240	240	240	240	240	300	600	900	1680	1740
40	0.00	0.00	0.20	0.94	1.83	2.72	3.61	4.51	5.40	6.29	10.01	20.35	30.70	41.04	51.38	61.72
	0	0	90	300	300	300	300	300	300	300	1740	1740	1740	1740	1740	1740
50	0.00	0.14	1.03	1.92	2.82	3.87	9.04	14.21	19.39	24.56	29.73	40.07	50.41	60.76	71.12	81.82
	0	300	300	300	300	1740	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800
60	0.04	0.58	1.47	4.73	9.91	15.08	20.25	25.42	30.59	35.76	40.93	51.41	62.10	72.80	83.50	94.20
	300	300	300	1740	1740	1740	1740	1740	1740	1740	1740	1800	1800	1800	1800	1800
70	0.23	0.76	5.27	10.44	15.61	20.78	25.96	31.20	36.55	41.90	47.25	57.95	68.64	79.34	90.04	100.7
	300	300	1740	1740	1740	1740	1740	1800	1800	1800	1800	1800	1800	1800	1800	1800
80	0.30	2.84	8.01	13.18	18.41	23.76	29.11	34.46	39.81	45.16	50.51	61.21	71.90	82.60	93.30	104.0
	300	1740	1740	1740	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
90	0.35	4.11	9.28	14.63	19.98	25.33	30.68	36.03	41.38	46.73	52.08	62.78	73.48	84.18	94.88	105.6
	330	1740	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
100	0.51	4.69	10.03	15.38	20.73	26.08	31.43	36.78	42.13	47.48	52.83	63.53	74.23	84.92	95.62	106.3
	1620	1740	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	3.44	2.81	2.18	1.88	1.99	2.82	3.63
3	2.14	1.77	1.36	1.16	1.04	1.27	1.44
4	1.74	1.48	1.16	1.09	1.01	1.00	1.10
5	1.41	1.29	1.08	1.04	1.00	1.00	1.00
6	1.13	1.12	1.03	1.01	1.00	1.00	1.00
7	3.43	2.87	2.26	2.10	2.74	4.17	8.13
8	2.15	1.79	1.40	1.24	1.26	1.56	2.83
9	2.15	1.79	1.44	1.26	1.34	1.97	3.69
10	1.88	1.60	1.33	1.25	1.11	1.57	3.12
11	1.75	1.55	1.36	1.29	1.17	1.52	3.16
12	2.30	1.89	1.45	1.50	1.50	2.21	3.45
13	1.89	1.58	1.34	1.21	1.12	1.42	2.29
14	1.65	1.44	1.21	1.21	1.10	1.30	2.06
15	1.41	1.33	1.25	1.24	1.17	1.23	2.24
16	1.20	1.30	1.19	1.24	1.19	1.22	2.52
17	1.74	1.49	1.25	1.19	1.11	1.22	1.51
18	1.40	1.30	1.13	1.17	1.10	1.13	1.43
19	1.14	1.18	1.17	1.22	1.17	1.20	1.68
20	1.01	1.16	1.16	1.24	1.19	1.21	2.00

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
32.00	1.863	112.31	125.47	162.08	199.18	234.20	254.99	266.24
30.00	1.834	111.10	124.17	157.75	197.17	231.30	251.46	262.83
25.00	1.751	107.62	120.41	145.21	191.37	222.90	241.26	252.98
20.00	1.645	103.18	115.62	129.26	183.99	212.22	228.29	240.44
10.00	1.282	92.53	97.11	100.78	125.37	153.75	168.25	177.04
5.00	0.841	55.12	52.79	52.65	65.70	75.83	107.21	135.31
2.00	0.000	33.96	28.94	29.80	31.63	44.10	57.92	78.07

04210000 Phelps Creek near Windsor, Ohio

Location: Latitude 41°30′56″, longitude 80°56′07″, Ashtabula County, Hydrologic Unit 04110004

Drainage area, in square miles: 25.6

Station used for record extension: 04211000

Time period of systematic or extended record analyzed: 1942-04-01 to 1966-09-30

Percentage of estimated values in extended record: 29.9

Eighty-percent-duration streamflow, in cubic feet per second: 1.2

Mean annual streamflow, in inches: 17.44

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
25.00	3.20	0.24	4.89	7.40	12.47	25.88	40.16	55.51
20.00	2.97	0.24	5.76	8.40	14.59	31.03	46.15	63.88
10.00	2.25	0.26	8.80	11.93	22.80	44.65	59.79	81.77
6.25	1.75	0.28	10.40	14.52	26.09	50.71	86.74	–

04210000 Phelps Creek near Windsor, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.01	0.15	0.53	0.96	1.41	1.91	2.42	2.92	3.42	3.92	4.42	5.56	6.70	7.85	8.99	10.94
	30	120	180	180	210	210	210	210	210	210	210	240	240	240	240	600
6	0.02	0.16	0.57	1.00	1.50	2.00	2.50	3.00	3.50	4.04	4.61	5.75	6.90	8.05	9.59	12.46
	30	150	180	180	210	210	210	210	210	240	240	240	240	240	600	600
8	0.03	0.18	0.60	1.04	1.54	2.05	2.55	3.08	3.65	4.22	4.80	5.94	7.14	8.59	11.45	14.32
	90	150	180	210	210	210	210	240	240	240	240	240	270	600	600	600
10	0.03	0.18	0.61	1.05	1.55	2.05	2.59	3.17	3.74	4.33	4.98	6.26	7.55	9.83	12.70	15.56
	90	150	180	210	210	210	240	240	240	270	270	270	270	600	600	600
15	0.04	0.20	0.61	1.05	1.55	2.14	2.78	3.43	4.07	4.72	5.36	6.65	9.23	12.09	15.17	18.32
	90	150	180	210	240	270	270	270	270	270	270	270	600	600	660	660
20	0.05	0.21	0.61	1.06	1.62	2.19	2.80	3.44	4.08	4.73	5.37	8.12	11.13	14.28	19.08	25.00
	90	150	180	210	240	240	270	270	270	270	270	600	660	660	1020	1380
25	0.05	0.22	0.62	1.10	1.67	2.25	2.82	3.44	4.08	5.27	6.70	10.73	15.60	20.47	26.79	33.38
	90	150	180	210	240	240	240	270	270	600	600	1020	1020	1020	1380	1380

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.04	1.00	1.00	1.01	1.91	4.33	8.48
3	1.01	1.00	1.00	1.00	1.00	1.32	1.81
4	1.00	1.00	1.00	1.00	1.00	1.00	1.27
5	1.00	1.00	1.00	1.00	1.00	1.00	1.15
6	1.00	1.00	1.00	1.00	1.00	1.00	1.05
7	1.10	1.04	1.05	1.78	3.10	11.26	15.75
8	1.01	1.05	1.05	1.27	1.34	2.33	3.82
9	1.02	1.07	1.21	1.31	1.71	2.75	6.92
10	1.04	1.12	1.31	1.29	1.59	2.33	3.58
11	1.07	1.17	1.35	1.33	1.46	2.14	3.48
12	1.01	1.04	1.05	1.28	1.56	3.00	7.72
13	1.02	1.07	1.20	1.30	1.27	2.00	2.78
14	1.06	1.12	1.29	1.28	1.24	1.84	2.87
15	1.07	1.17	1.33	1.32	1.31	1.94	2.84
16	1.07	1.33	1.31	1.34	1.33	1.99	2.85
17	1.04	1.07	1.17	1.29	1.18	1.76	2.40
18	1.06	1.12	1.26	1.30	1.24	1.71	2.45
19	1.05	1.17	1.30	1.32	1.30	1.81	2.54
20	1.07	1.31	1.31	1.35	1.32	1.86	2.62

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
25.00	1.751	176.42	182.01	183.81	188.15	212.42	228.09	244.19
20.00	1.645	174.64	171.90	175.85	187.60	210.35	227.64	243.50
10.00	1.282	170.32	148.81	157.41	185.57	201.02	222.72	236.77
5.00	0.841	149.55	129.04	147.33	172.21	190.05	199.93	222.96
2.08	0.050	92.73	90.28	101.81	116.93	128.32	146.32	160.90

04211000 Rock Creek near Rock Creek, Ohio

Location: Latitude 41°45′10″, longitude 80°48′00″, Ashtabula County, Hydrologic Unit 04110004

Drainage area, in square miles: 69.2

Station used for record extension: 04212500

Time period of systematic or extended record analyzed: 1922-10-01 to 1994-09-30

Percentage of estimated values in extended record: 66.0

Eighty-percent-duration streamflow, in cubic feet per second: 0.6

Mean annual streamflow, in inches: 15.39

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.05	3.61	6.13	10.91	22.91	34.70	47.23
70.00	4.24	0.05	3.66	6.27	11.16	23.08	34.81	47.25
60.00	4.09	0.05	3.84	6.77	12.07	23.72	35.21	47.34
50.00	3.90	0.06	4.05	7.37	13.15	24.47	35.68	47.45
40.00	3.68	0.06	4.31	8.10	14.48	25.39	36.26	47.58
30.00	3.38	0.06	4.53	8.52	15.64	26.74	40.64	56.24
25.00	3.20	0.07	4.63	8.62	16.22	27.64	44.50	64.27
20.00	2.97	0.07	5.59	8.97	16.93	28.75	47.01	65.54
10.00	2.25	0.14	7.13	11.27	20.13	35.51	52.13	69.26
5.21	1.55	0.21	8.74	15.35	25.31	44.12	68.27	–

04211000 Rock Creek near Rock Creek, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.08	0.24	0.55	0.91	1.29	1.67	2.05	2.43	2.80	3.18	3.58	4.47	5.35	6.24	7.24	8.26
	120	150	150	180	180	180	180	180	180	180	210	210	210	210	240	240
6	0.08	0.25	0.56	0.94	1.32	1.69	2.08	2.52	2.96	3.40	3.85	4.73	5.62	6.57	7.58	9.14
	120	150	150	180	180	180	210	210	210	210	210	210	210	240	240	600
8	0.08	0.26	0.60	0.98	1.39	1.83	2.28	2.72	3.16	3.60	4.05	4.97	6.11	7.25	8.60	11.13
	120	150	180	180	210	210	210	210	210	210	210	270	270	270	600	600
10	0.08	0.27	0.62	1.03	1.47	1.91	2.35	2.79	3.24	3.68	4.19	5.33	6.46	7.60	9.78	12.42
	150	150	180	210	210	210	210	210	210	210	270	270	270	270	600	900
15	0.10	0.29	0.66	1.09	1.53	1.97	2.44	2.94	3.45	3.96	4.53	5.66	6.80	8.90	11.63	15.68
	150	150	180	210	210	210	240	240	240	270	270	270	270	600	960	960
20	0.11	0.30	0.68	1.11	1.56	2.06	2.57	3.07	3.58	4.09	4.66	5.80	7.33	10.23	14.28	18.32
	150	180	180	210	240	240	240	240	240	270	270	270	600	960	960	960
25	0.11	0.31	0.69	1.12	1.63	2.13	2.64	3.14	3.65	4.18	4.75	5.89	8.02	12.07	16.11	20.16
	150	180	180	240	240	240	240	240	240	270	270	270	960	960	960	960
30	0.12	0.32	0.70	1.17	1.67	2.18	2.68	3.19	3.69	4.25	4.82	6.03	9.35	13.40	17.45	21.79
	150	180	180	240	240	240	240	240	240	270	270	600	960	960	960	1680
40	0.12	0.33	0.71	1.21	1.72	2.22	2.73	3.24	3.81	4.37	4.98	7.09	11.14	15.19	19.23	25.62
	150	180	240	240	240	240	240	270	270	270	300	960	960	960	960	1680
50	0.12	0.33	0.73	1.24	1.74	2.25	2.78	3.35	3.92	4.49	5.11	8.20	12.25	16.29	21.31	28.39
	150	180	240	240	240	240	270	270	270	270	300	960	960	960	1680	1680
60	0.12	0.33	0.74	1.25	1.75	2.31	2.88	3.45	4.02	4.59	5.60	8.93	12.97	17.02	23.45	30.53
	150	180	240	240	240	270	270	270	270	270	600	960	960	960	1680	1680
70	0.12	0.33	0.74	1.26	1.83	2.40	2.97	3.53	4.10	4.82	6.08	9.41	13.58	18.19	25.20	32.27
	150	180	240	270	270	270	270	270	270	600	600	960	1020	1380	1680	1680
80	0.12	0.33	0.76	1.33	1.90	2.47	3.04	3.61	4.18	5.25	6.60	10.25	14.54	19.98	26.65	33.73
	150	180	270	270	270	270	270	270	270	600	660	1020	1020	1380	1680	1680
90	0.12	0.33	0.83	1.40	1.96	2.53	3.10	3.67	4.58	5.97	7.36	11.10	16.11	21.67	27.90	34.98
	150	180	270	270	270	270	270	270	660	660	660	1020	1320	1320	1680	1680
100	0.13	0.33	0.88	1.45	2.02	2.59	3.15	3.86	5.25	6.64	8.03	12.14	17.70	23.27	29.00	36.08
	150	180	270	270	270	270	270	660	660	660	660	1320	1320	1320	1680	1680

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.12	1.00	1.06	1.25	2.55	8.91	15.57
3	1.06	1.01	1.02	1.21	1.14	1.08	1.62
4	1.00	1.00	1.00	1.15	1.08	1.01	1.02
5	1.00	1.00	1.00	1.09	1.04	1.00	1.00
6	1.00	1.00	1.00	1.02	1.01	1.00	1.00
7	1.06	1.16	1.30	2.60	8.09	20.47	31.10
8	1.10	1.13	1.22	1.40	1.26	2.21	4.32
9	1.10	1.19	1.40	1.45	1.49	2.75	9.84
10	1.08	1.20	1.35	1.48	1.33	1.72	3.28
11	1.12	1.30	1.39	1.49	1.28	1.65	3.09
12	1.09	1.13	1.25	1.41	1.38	3.39	12.55
13	1.06	1.17	1.33	1.42	1.28	1.57	2.67
14	1.05	1.17	1.30	1.43	1.26	1.43	2.00
15	1.09	1.22	1.33	1.43	1.25	1.41	2.05
16	1.05	1.15	1.27	1.41	1.26	1.56	2.07
17	1.04	1.14	1.30	1.38	1.25	1.40	1.64
18	1.02	1.10	1.26	1.37	1.22	1.24	1.72
19	1.05	1.15	1.27	1.36	1.22	1.29	1.83
20	1.05	1.14	1.18	1.35	1.27	1.45	1.95

04211000 Rock Creek near Rock Creek, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
73.00	2.206	225.00	200.80	196.59	195.05	227.29	266.07	278.97
70.00	2.190	224.16	199.66	195.75	194.91	226.22	263.93	276.83
60.00	2.128	221.04	195.45	192.61	194.39	222.27	255.96	268.87
50.00	2.054	217.26	190.34	188.82	193.75	217.47	246.31	259.23
40.00	1.960	212.49	183.89	184.03	192.96	211.42	234.12	247.06
30.00	1.834	209.87	173.45	181.38	192.12	206.26	225.35	241.16
25.00	1.751	209.29	166.03	180.78	191.63	203.76	221.86	240.41
20.00	1.645	206.16	163.75	178.91	189.12	200.77	221.28	234.93
10.00	1.282	186.51	157.99	162.16	178.12	193.39	213.53	224.72
5.00	0.841	160.05	127.89	130.45	147.72	171.55	183.76	197.03
2.03	0.017	114.45	71.81	78.95	91.81	117.98	133.70	141.99

04212000 Grand River near Madison, Ohio

Location: Latitude 41°44′26″, longitude 81°02′48″, Lake County, Hydrologic Unit 04110004

Drainage area, in square miles: 581.

Station used for record extension: 03102950

Time period of systematic or extended record analyzed: 1922-10-01 to 1994-09-30

Percentage of estimated values in extended record: 31.2

Eighty-percent-duration streamflow, in cubic feet per second: 21.

Mean annual streamflow, in inches: 17.48

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.21	5.55	9.00	14.76	28.30	41.40	55.08
70.00	4.24	0.21	5.55	9.02	14.92	28.84	41.95	55.84
60.00	4.09	0.21	5.55	9.09	15.49	30.83	43.98	58.63
50.00	3.90	0.21	5.55	9.17	16.18	33.18	46.39	61.94
40.00	3.68	0.21	5.55	9.28	17.02	36.07	49.34	65.99
30.00	3.38	0.25	5.88	11.11	20.50	37.54	52.06	70.20
25.00	3.20	0.28	6.18	12.78	23.42	37.80	53.47	72.57
20.00	2.97	0.32	6.23	13.03	23.89	38.83	55.49	75.11
10.00	2.25	0.35	8.94	14.24	25.97	43.19	62.16	80.25
5.21	1.55	0.73	10.63	17.84	28.05	55.69	77.26	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.02	0.13	0.41	0.71	1.07	1.44	1.87	2.30	2.73	3.16	3.59	4.52	5.53	6.53	7.74	9.04
	30	120	120	150	150	180	180	180	180	180	180	210	210	210	270	270
6	0.02	0.14	0.43	0.77	1.18	1.61	2.04	2.47	2.90	3.33	3.79	4.80	5.80	6.82	7.97	9.12
	30	120	120	150	180	180	180	180	180	180	210	210	210	240	240	240
8	0.02	0.16	0.47	0.89	1.32	1.75	2.18	2.61	3.06	3.56	4.07	5.07	6.15	7.29	8.44	10.27
	60	120	150	180	180	180	180	180	210	210	210	210	240	240	240	600
10	0.02	0.17	0.52	0.95	1.38	1.81	2.24	2.69	3.19	3.69	4.20	5.33	6.48	7.63	8.91	11.25
	60	120	180	180	180	180	180	210	210	210	210	240	240	240	300	600
15	0.04	0.19	0.56	0.99	1.43	1.86	2.35	2.93	3.50	4.07	4.65	5.80	7.05	8.49	10.10	13.31
	90	150	180	180	180	180	240	240	240	240	240	240	300	300	600	900
20	0.04	0.21	0.58	1.01	1.44	2.00	2.57	3.15	3.72	4.30	4.89	6.18	7.55	8.99	11.31	15.21
	90	150	180	180	180	240	240	240	240	240	270	270	300	300	600	900
25	0.05	0.22	0.58	1.01	1.54	2.12	2.69	3.27	3.87	4.52	5.16	6.46	7.83	9.37	12.37	16.67
	90	150	180	180	240	240	240	240	270	270	270	270	300	600	900	900
30	0.05	0.23	0.59	1.04	1.61	2.18	2.76	3.39	4.04	4.68	5.33	6.62	7.99	10.14	13.56	17.87
	90	150	180	240	240	240	240	270	270	270	270	270	300	600	900	900
40	0.06	0.23	0.60	1.09	1.66	2.27	2.92	3.56	4.21	4.86	5.50	6.79	8.49	11.36	15.47	21.15
	90	150	180	240	240	270	270	270	270	270	270	270	600	600	900	1320
50	0.06	0.24	0.62	1.09	1.69	2.33	2.98	3.62	4.27	4.92	5.56	6.86	9.43	12.67	17.98	25.16
	90	150	180	240	270	270	270	270	270	270	270	270	600	900	1320	1680
60	0.06	0.24	0.64	1.09	1.69	2.34	2.98	3.63	4.28	4.92	5.57	7.33	10.20	14.52	21.09	29.13
	90	150	180	240	270	270	270	270	270	270	270	600	600	1320	1680	1680
70	0.06	0.24	0.66	1.09	1.69	2.34	2.98	3.63	4.28	4.92	5.57	7.98	11.80	17.12	24.84	32.88
	90	150	180	240	270	270	270	270	270	270	270	600	960	1320	1680	1680
80	0.06	0.25	0.68	1.11	1.69	2.34	2.98	3.63	4.28	4.92	5.66	9.18	14.06	20.30	28.34	36.38
	90	180	180	180	270	270	270	270	270	270	600	1020	1020	1680	1680	1680
90	0.07	0.26	0.69	1.13	1.69	2.34	2.98	3.63	4.28	4.92	6.42	11.30	16.18	23.54	31.59	39.63
	90	180	180	180	270	270	270	270	270	270	1020	1020	1020	1680	1680	1680
100	0.07	0.28	0.71	1.14	1.69	2.34	2.98	3.63	4.28	5.87	8.31	13.20	18.70	26.54	34.58	42.62
	90	180	180	180	270	270	270	270	270	1020	1020	1020	1620	1680	1680	1680

04212000 Grand River near Madison, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	2.31	1.22	1.09	1.08	1.21	2.20	5.37
3	1.94	1.11	1.05	1.02	1.15	1.07	1.05
4	1.00	1.00	1.00	1.00	1.08	1.02	1.00
5	1.00	1.01	1.00	1.00	1.01	1.00	1.00
6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	2.15	1.32	1.31	1.38	2.56	9.28	20.97
8	2.11	1.22	1.27	1.35	1.37	1.48	2.06
9	2.07	1.31	1.37	1.41	1.40	1.74	2.57
10	1.79	1.45	1.44	1.42	1.44	1.63	2.33
11	1.70	1.43	1.46	1.41	1.45	1.64	2.22
12	2.08	1.27	1.27	1.35	1.35	2.01	2.73
13	1.69	1.25	1.30	1.37	1.37	1.32	1.81
14	1.61	1.35	1.36	1.38	1.40	1.34	1.74
15	1.98	1.40	1.39	1.34	1.39	1.35	1.85
16	1.94	1.50	1.37	1.36	1.42	1.36	1.96
17	1.91	1.22	1.25	1.33	1.34	1.17	1.57
18	1.98	1.32	1.35	1.32	1.35	1.19	1.57
19	2.01	1.39	1.35	1.25	1.33	1.33	1.71
20	1.96	1.50	1.36	1.26	1.40	1.36	1.81

04212000 Grand River near Madison, Ohio—Continued

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
73.00	2.206	96.64	147.63	167.69	188.07	199.00	239.71	260.59
70.00	2.190	96.55	146.65	167.28	187.89	198.74	238.55	259.38
60.00	2.128	96.19	143.03	165.74	187.21	197.76	234.27	254.90
50.00	2.054	95.77	138.63	163.88	186.39	196.59	229.07	249.46
40.00	1.960	95.23	133.08	161.53	185.36	195.10	222.50	242.60
30.00	1.834	95.00	130.73	159.86	182.47	190.76	214.15	234.52
25.00	1.751	95.00	130.72	159.20	180.11	187.19	208.77	229.52
20.00	1.645	92.10	129.39	152.91	167.77	186.11	207.35	218.96
10.00	1.282	79.85	119.71	128.53	145.48	166.88	190.56	196.08
5.00	0.841	52.65	87.13	103.32	125.22	140.75	152.24	173.76
2.03	0.017	24.62	46.31	54.27	78.50	78.53	108.25	122.62

04212100 Grand River near Painesville, Ohio

Location: Latitude 41°43′08″, longitude 81°13′41″, Lake County, Hydrologic Unit 04110004

Drainage area, in square miles: 685.

Station used for record extension: 03102950

Time period of systematic or extended record analyzed: 1965-10-01 to 1997-09-30

Percentage of estimated values in extended record: 31.2

Eighty-percent-duration streamflow, in cubic feet per second: 90.

Mean annual streamflow, in inches: 19.97

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
33.00	3.48	0.37	8.11	14.20	27.59	43.49	60.84	76.60
30.00	3.38	0.40	8.40	14.50	27.61	43.72	61.82	77.71
25.00	3.20	0.46	8.96	15.07	27.65	44.15	63.70	79.85
20.00	2.97	0.54	9.65	15.78	27.69	44.68	66.01	82.47
10.00	2.25	0.84	11.46	17.08	30.38	49.91	69.65	92.90
5.50	1.61	1.35	12.69	20.35	32.22	56.22	75.99	–

04212100 Grand River near Painesville, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
5	0.02	0.08	0.29	0.58	0.91	1.23	1.56	1.95	2.44	2.93	3.42	4.41	5.39	6.38	7.36	14.70
	30	60	90	120	120	120	120	180	180	180	180	180	180	180	180	1680
6	0.02	0.08	0.31	0.61	0.94	1.32	1.73	2.17	2.66	3.16	3.65	4.63	5.61	6.73	7.88	14.70
	30	60	90	120	120	150	150	180	180	180	180	180	180	210	210	1680
8	0.02	0.08	0.36	0.74	1.15	1.56	1.97	2.44	2.93	3.42	3.91	4.95	6.10	7.25	8.87	14.70
	30	90	120	150	150	150	150	180	180	180	180	210	210	210	540	1680
10	0.02	0.10	0.42	0.82	1.23	1.64	2.10	2.59	3.09	3.58	4.07	5.20	6.35	7.50	9.55	14.70
	30	90	120	150	150	150	180	180	180	180	180	210	210	210	600	1680
15	0.02	0.16	0.49	0.88	1.33	1.82	2.32	2.81	3.30	3.82	4.39	5.69	7.00	8.32	11.56	16.48
	30	120	120	150	180	180	180	180	180	210	210	240	240	240	900	900
20	0.02	0.19	0.52	0.96	1.45	1.94	2.43	3.02	3.67	4.33	4.98	6.30	7.61	8.92	13.24	20.77
	30	120	120	180	180	180	180	240	240	240	240	240	240	240	900	1680
25	0.03	0.20	0.54	1.03	1.52	2.01	2.62	3.27	3.93	4.58	5.24	6.55	7.86	9.18	14.13	23.31
	60	120	150	180	180	180	240	240	240	240	240	240	240	240	1680	1680
30	0.04	0.20	0.59	1.08	1.57	2.15	2.72	3.36	4.02	4.67	5.33	6.64	7.98	9.46	14.17	23.35
	90	120	180	180	180	210	210	240	240	240	240	240	270	270	1680	1680
40	0.05	0.25	0.69	1.26	1.84	2.41	3.12	3.85	4.59	5.33	6.07	7.54	9.04	10.76	14.85	23.63
	90	150	210	210	210	210	270	270	270	270	270	270	300	540	1260	1620
50	0.07	0.31	0.86	1.51	2.25	2.99	3.72	4.46	5.20	5.94	6.72	8.36	10.00	13.71	20.59	27.48
	150	150	210	270	270	270	270	270	270	270	300	300	300	1260	1260	1260
60	0.11	0.40	1.10	1.84	2.58	3.32	4.05	4.85	5.67	6.49	7.31	8.95	12.17	19.06	25.94	32.83
	150	210	270	270	270	270	270	300	300	300	300	300	1260	1260	1260	1260
70	0.13	0.54	1.28	2.02	2.75	3.57	4.39	5.21	6.03	6.85	7.67	10.15	16.96	23.85	30.74	37.62
	150	270	270	270	270	300	300	300	300	300	300	540	1260	1260	1260	1260
80	0.19	0.63	1.37	2.14	2.96	3.78	4.60	5.42	6.24	7.06	8.52	14.27	21.16	28.05	34.94	41.82
	270	270	270	300	300	300	300	300	300	300	540	1260	1260	1260	1260	1260
90	0.24	0.68	1.45	2.27	3.09	3.91	4.73	5.55	6.68	8.15	11.03	17.91	24.80	31.69	38.58	45.46
	270	270	300	300	300	300	300	300	540	540	1260	1260	1260	1260	1260	1260
100	0.26	0.71	1.52	2.34	3.16	3.98	4.80	6.11	7.59	10.72	14.16	21.05	27.94	34.83	41.71	48.60
	270	270	300	300	300	300	300	540	540	1260	1260	1260	1260	1260	1260	1260

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.33	1.03	1.01	1.04	1.00	1.00	1.20
3	1.25	1.00	1.00	1.01	1.00	1.00	1.00
4	1.16	1.00	1.00	1.00	1.00	1.00	1.00
5	1.12	1.00	1.00	1.00	1.00	1.00	1.00
6	1.05	1.00	1.00	1.00	1.00	1.00	1.00
7	1.33	1.05	1.03	1.10	1.07	1.64	4.91
8	1.26	1.00	1.01	1.10	1.08	1.15	1.17
9	1.25	1.00	1.00	1.12	1.14	1.21	1.22
10	1.22	1.02	1.04	1.19	1.18	1.28	1.26
11	1.15	1.03	1.06	1.25	1.23	1.30	1.30
12	1.29	1.01	1.00	1.09	1.08	1.12	1.15
13	1.20	1.00	1.00	1.13	1.14	1.22	1.21
14	1.19	1.02	1.03	1.18	1.17	1.28	1.27
15	1.12	1.03	1.06	1.24	1.21	1.31	1.28
16	1.14	1.04	1.09	1.32	1.29	1.33	1.35
17	1.16	1.01	1.00	1.12	1.14	1.22	1.22
18	1.15	1.02	1.03	1.18	1.18	1.28	1.26
19	1.06	1.03	1.06	1.24	1.23	1.31	1.29
20	1.06	1.04	1.09	1.32	1.29	1.32	1.36

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
33.00	1.877	159.04	201.37	201.01	198.40	213.78	224.47	234.82
30.00	1.834	154.07	191.63	193.07	194.77	209.73	220.08	229.47
25.00	1.751	144.34	172.56	177.52	187.64	201.80	211.48	218.97
20.00	1.645	131.96	148.29	157.74	178.59	191.71	200.54	205.62
10.00	1.282	105.35	121.35	136.51	146.40	155.88	166.64	183.55
5.00	0.841	88.19	97.18	100.04	105.93	122.69	138.92	151.41
2.06	0.038	67.71	61.84	60.88	71.50	85.92	96.20	106.48

04212500 Ashtabula River near Ashtabula, Ohio

Location: Latitude 41°51′20″, longitude 80°45′44″, Ashtabula County, Hydrologic Unit 04110003

Drainage area, in square miles: 121.

Station used for record extension: 04212000

Time period of systematic or extended record analyzed: 1922-10-01 to 1994-09-30

Percentage of estimated values in extended record: 30.8

Eighty-percent-duration streamflow, in cubic feet per second: 2.6

Mean annual streamflow, in inches: 17.57

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
73.00	4.28	0.16	4.66	10.09	17.89	30.26	42.54	55.02
70.00	4.24	0.16	4.66	10.10	18.01	30.42	42.79	55.34
60.00	4.09	0.17	4.66	10.14	18.47	31.00	43.72	56.51
50.00	3.90	0.17	4.66	10.19	19.02	31.68	44.82	57.89
40.00	3.68	0.18	4.66	10.25	19.69	32.52	46.17	59.59
30.00	3.38	0.18	5.30	10.75	20.02	33.00	49.57	67.47
25.00	3.20	0.18	5.90	11.19	20.08	33.12	52.22	74.17
20.00	2.97	0.21	6.94	11.26	20.56	33.57	54.45	75.69
10.00	2.25	0.25	8.45	12.83	24.34	40.74	61.05	79.24
5.21	1.55	0.35	10.02	18.06	29.45	49.29	77.88	–

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.07	0.23	0.58	0.95	1.36	1.80	2.23	2.66	3.09	3.53	3.96	4.83	5.69	6.66	7.67	8.75
	90	120	150	150	180	180	180	180	180	180	180	180	180	210	210	240
6	0.07	0.24	0.60	0.96	1.40	1.83	2.26	2.69	3.13	3.56	3.99	4.97	5.98	6.99	8.00	10.13
	120	120	150	180	180	180	180	180	180	180	180	210	210	210	210	600
8	0.08	0.26	0.62	1.01	1.44	1.87	2.31	2.76	3.26	3.77	4.27	5.28	6.29	7.37	9.54	12.42
	120	150	150	180	180	180	180	210	210	210	210	210	210	270	600	600
10	0.09	0.27	0.63	1.03	1.47	1.90	2.40	2.90	3.41	3.91	4.42	5.43	6.65	8.03	10.68	13.63
	120	150	150	180	180	180	210	210	210	210	210	210	270	540	600	960
15	0.09	0.29	0.65	1.07	1.54	2.05	2.55	3.06	3.56	4.16	4.80	6.10	7.40	9.14	12.77	17.38
	120	150	150	180	210	210	210	210	210	270	270	270	270	540	960	960
20	0.09	0.30	0.66	1.09	1.60	2.10	2.63	3.21	3.86	4.51	5.16	6.46	7.76	10.26	14.88	19.50
	120	150	180	180	210	210	240	270	270	270	270	270	270	960	960	960
25	0.10	0.31	0.67	1.12	1.62	2.19	2.77	3.42	4.07	4.72	5.37	6.67	7.97	11.64	16.25	20.87
	120	150	180	210	210	240	270	270	270	270	270	270	270	960	960	960
30	0.10	0.32	0.68	1.13	1.70	2.28	2.90	3.55	4.20	4.85	5.50	6.80	8.10	12.60	17.22	21.84
	120	150	180	210	240	240	270	270	270	270	270	270	270	960	960	960
40	0.11	0.33	0.69	1.22	1.80	2.41	3.06	3.71	4.36	5.01	5.66	6.96	9.24	13.86	18.48	25.59
	150	150	180	240	240	270	270	270	270	270	270	270	960	960	960	1680
50	0.12	0.34	0.70	1.26	1.85	2.50	3.15	3.80	4.45	5.10	5.75	7.06	10.01	14.63	20.74	28.82
	150	150	180	240	270	270	270	270	270	270	270	300	960	960	1680	1680
60	0.13	0.34	0.70	1.27	1.91	2.56	3.21	3.86	4.51	5.15	5.80	7.15	10.51	15.46	23.54	31.62
	150	150	150	240	270	270	270	270	270	270	270	300	960	1680	1680	1680
70	0.13	0.35	0.71	1.29	1.94	2.59	3.24	3.89	4.54	5.19	5.84	7.19	10.85	17.95	26.03	34.11
	150	150	150	270	270	270	270	270	270	270	270	300	960	1680	1680	1680
80	0.14	0.35	0.71	1.32	1.97	2.61	3.26	3.91	4.56	5.21	5.86	7.21	12.13	20.21	28.29	36.41
	150	150	150	270	270	270	270	270	270	270	270	300	1680	1680	1680	1740
90	0.14	0.35	0.71	1.33	1.98	2.63	3.28	3.93	4.58	5.23	5.88	7.47	14.20	22.28	30.58	38.95
	150	150	150	270	270	270	270	270	270	270	270	600	1680	1680	1740	1740
100	0.14	0.36	0.72	1.34	1.99	2.64	3.29	3.94	4.59	5.23	5.88	8.49	16.24	24.61	32.98	41.35
	150	150	150	270	270	270	270	270	270	270	270	1320	1740	1740	1740	1740

04212500 Ashtabula River near Ashtabula, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	0.010	0.020	0.050	0.100	0.200	0.300
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.05	1.00	1.06	1.22	1.47	2.84	8.67
3	1.03	1.00	1.02	1.15	1.16	1.04	1.01
4	1.01	1.00	1.00	1.08	1.09	1.01	1.00
5	1.00	1.00	1.00	1.02	1.06	1.00	1.00
6	1.00	1.00	1.00	1.00	1.02	1.00	1.00
7	1.06	1.15	1.25	1.41	2.74	11.81	22.36
8	1.05	1.11	1.22	1.40	1.29	1.12	2.72
9	1.06	1.17	1.25	1.40	1.31	1.90	3.72
10	1.08	1.16	1.30	1.42	1.36	1.28	2.80
11	1.09	1.16	1.31	1.38	1.35	1.16	2.76
12	1.05	1.11	1.21	1.39	1.27	2.22	4.36
13	1.04	1.14	1.18	1.36	1.29	1.15	2.03
14	1.06	1.10	1.22	1.36	1.32	1.15	1.61
15	1.09	1.09	1.23	1.32	1.31	1.16	1.56
16	1.10	1.10	1.14	1.36	1.30	1.17	1.55
17	1.03	1.08	1.14	1.32	1.26	1.14	1.37
18	1.06	1.07	1.17	1.30	1.28	1.15	1.25
19	1.09	1.09	1.15	1.28	1.30	1.16	1.19
20	1.10	1.10	1.13	1.28	1.32	1.18	1.18

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	0.0100	0.0200	0.0500	0.1000	0.2000	0.3000
73.00	2.206	205.26	198.34	193.04	190.21	212.30	251.54	267.20
70.00	2.190	204.91	197.13	192.04	189.56	211.22	250.36	265.96
60.00	2.128	203.59	192.65	188.31	187.14	207.19	245.98	261.34
50.00	2.054	202.00	187.21	183.79	184.21	202.31	240.66	255.75
40.00	1.960	199.99	180.35	178.08	180.52	196.15	233.95	248.69
30.00	1.834	193.41	169.30	172.13	176.61	192.16	219.95	232.25
25.00	1.751	187.90	161.45	168.72	174.35	190.81	209.19	219.31
20.00	1.645	180.02	157.75	163.71	172.28	189.40	204.98	216.57
10.00	1.282	152.60	146.81	155.59	160.79	174.45	192.88	201.25
5.00	0.841	142.35	124.42	135.48	147.05	165.26	181.36	184.63
2.03	0.017	97.34	68.66	71.37	92.51	107.06	125.78	134.94

04213000 Conneaut Creek at Conneaut, Ohio

Location: Latitude 41°55′37″, longitude 80°36′15″, Ashtabula County, Hydrologic Unit 04120101

Drainage area, in square miles: 175.

Station used for record extension: None

Time period of systematic or extended record analyzed: 1950-04-01 to 1997-09-30

Eighty-percent-duration streamflow, in cubic feet per second: 22.

Mean annual streamflow, in inches: 22.58

Location of station used for precipitation data: Hiram, Ohio

Location of station used for potential evapotranspiration data: Cleveland, Ohio

[–, indicates a value that could not be determined because there were too few average low-flow values less than the mean streamflow for the indicated duration]

Recurrence interval (years)	Extreme-value variate	Minimum runoff (in inches) for indicated duration (in days)						
		180	360	540	720	1080	1440	1800
48.00	3.86	0.40	10.31	14.89	24.79	40.22	56.19	75.68
40.00	3.68	0.44	10.37	15.21	25.55	42.72	59.96	79.90
30.00	3.38	0.52	10.46	15.71	26.76	46.68	65.92	86.58
25.00	3.20	0.56	10.52	16.03	27.53	49.20	69.71	90.83
20.00	2.97	0.64	10.66	16.19	28.33	49.86	73.25	93.30
10.00	2.25	0.93	12.38	17.09	32.35	54.34	78.16	105.25
5.33	1.57	1.16	14.65	23.69	38.83	67.12	94.92	–

04213000 Conneaut Creek at Conneaut, Ohio—Continued

Recurrence interval (years)	Impounding reservoir storage required (in inches) and critical-drawdown duration (in days; shown in gray) for indicated draft rate (in fraction of the mean annual streamflow)															
	0.02	**0.05**	**0.10**	**0.15**	**0.20**	**0.25**	**0.30**	**0.35**	**0.40**	**0.45**	**0.50**	**0.60**	**0.70**	**0.80**	**0.90**	**1.00**
5	0.00	0.06	0.32	0.69	1.15	1.62	2.15	2.71	3.26	3.82	4.38	5.49	6.60	7.90	9.39	10.87
	0	60	90	150	150	150	180	180	180	180	180	180	180	240	240	240
6	0.00	0.07	0.36	0.76	1.22	1.68	2.18	2.74	3.30	3.85	4.41	5.52	6.63	7.90	9.39	10.98
	30	60	120	150	150	150	180	180	180	180	180	180	180	240	240	540
8	0.00	0.10	0.44	0.84	1.30	1.77	2.29	2.84	3.40	3.96	4.51	5.63	6.82	8.12	11.02	14.36
	30	90	120	150	150	150	180	180	180	180	180	180	210	210	540	540
10	0.01	0.11	0.47	0.89	1.36	1.84	2.39	2.95	3.51	4.06	4.62	5.81	7.11	9.13	12.47	15.80
	30	90	120	150	150	180	180	180	180	180	180	210	210	540	540	540
15	0.01	0.13	0.50	0.97	1.48	2.04	2.59	3.15	3.71	4.36	5.01	6.31	7.61	10.35	13.69	17.38
	30	120	150	150	180	180	180	180	210	210	210	210	210	540	540	600
20	0.01	0.14	0.55	1.05	1.60	2.16	2.71	3.35	4.00	4.65	5.30	6.80	8.47	10.85	14.56	20.23
	30	120	150	180	180	180	180	210	210	210	210	270	270	600	600	1740
25	0.01	0.14	0.58	1.12	1.68	2.24	2.88	3.53	4.20	4.94	5.68	7.33	9.00	11.41	15.54	23.47
	30	120	150	180	180	180	210	210	240	240	240	270	270	600	960	1740
30	0.01	0.15	0.62	1.18	1.73	2.35	3.00	3.67	4.41	5.15	5.94	7.61	9.28	11.81	17.62	26.61
	30	120	180	180	180	210	210	240	240	240	270	270	270	600	1260	1740
40	0.01	0.18	0.68	1.24	1.85	2.50	3.14	3.80	4.55	5.29	6.08	7.75	9.42	14.90	23.06	33.34
	30	150	180	180	210	210	210	240	240	240	270	270	270	1260	1620	1680
50	0.02	0.21	0.72	1.27	1.92	2.57	3.22	3.87	4.55	5.29	6.08	7.75	12.60	20.76	30.49	40.87
	30	150	180	210	210	210	210	210	240	240	270	270	1320	1320	1680	1680
60	0.02	0.24	0.73	1.32	1.97	2.62	3.26	3.91	4.56	5.29	6.08	10.16	18.32	27.37	37.76	48.15
	30	150	180	210	210	210	210	210	210	240	270	1320	1320	1680	1680	1680
70	0.02	0.26	0.74	1.34	1.99	2.64	3.29	3.94	4.59	5.29	7.06	15.22	23.71	34.10	44.48	54.87
	30	150	180	210	210	210	210	210	210	240	1320	1320	1680	1680	1680	1680
80	0.02	0.28	0.74	1.35	2.00	2.65	3.30	3.95	4.60	7.39	11.47	19.63	29.77	40.16	50.54	60.93
	30	150	150	210	210	210	210	210	210	1320	1320	1320	1680	1680	1680	1680
90	0.03	0.29	0.75	1.35	2.00	2.65	3.30	3.95	7.12	11.20	15.28	24.76	35.14	45.53	55.92	66.30
	120	150	150	210	210	210	210	210	1320	1320	1320	1680	1680	1680	1680	1680
100	0.04	0.30	0.77	1.35	2.00	2.65	3.30	6.33	10.41	14.49	19.09	29.48	39.86	50.25	60.64	71.03
	120	150	150	210	210	210	210	1320	1320	1320	1680	1680	1680	1680	1680	1680

04213000 Conneaut Creek at Conneaut, Ohio—Continued

Pump set	Ratio of storage required for pump set to storage required for the primary pump relation (pump set 1) for indicated demand (in fraction of mean annual streamflow)						
	0.002	**0.010**	**0.020**	**0.050**	**0.100**	**0.200**	**0.300**
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.43	1.02	1.00	1.00	1.00	1.85	3.87
3	1.25	1.00	1.00	1.00	1.00	1.00	1.00
4	1.18	1.00	1.00	1.00	1.00	1.00	1.00
5	1.11	1.00	1.00	1.00	1.00	1.00	1.00
6	1.04	1.00	1.00	1.00	1.00	1.00	1.00
7	1.42	1.02	1.03	1.07	1.47	5.27	11.90
8	1.26	1.01	1.03	1.08	1.08	1.08	2.18
9	1.28	1.03	1.07	1.12	1.11	1.25	3.38
10	1.20	1.04	1.13	1.15	1.14	1.19	2.61
11	1.24	1.06	1.19	1.17	1.17	1.30	2.52
12	1.34	1.01	1.01	1.07	1.07	1.29	3.00
13	1.21	1.00	1.07	1.13	1.11	1.15	1.69
14	1.17	1.05	1.14	1.16	1.15	1.20	1.56
15	1.16	1.09	1.21	1.18	1.17	1.26	1.73
16	1.08	1.12	1.27	1.19	1.18	1.30	2.03
17	1.20	1.01	1.07	1.13	1.12	1.14	1.26
18	1.13	1.08	1.16	1.17	1.14	1.21	1.37
19	1.09	1.09	1.21	1.18	1.18	1.27	1.55
20	1.08	1.12	1.28	1.19	1.18	1.28	1.91

Recurrence interval (years)	Normal variate	Side-channel storage required (in demand days) for primary pump relation to meet indicated demand (in fraction of mean annual streamflow)						
		0.0020	**0.0100**	**0.0200**	**0.0500**	**0.1000**	**0.2000**	**0.3000**
48.00	2.037	158.17	198.73	200.03	211.88	217.93	224.31	228.16
40.00	1.960	150.67	188.63	193.76	206.82	212.45	218.11	225.06
30.00	1.834	138.38	172.08	183.48	198.52	203.46	207.94	219.98
25.00	1.751	130.27	161.15	176.69	193.04	197.52	201.23	216.62
20.00	1.645	127.11	153.48	167.03	179.82	184.32	195.86	210.39
10.00	1.282	110.42	137.98	137.89	148.98	162.32	178.71	184.25
5.00	0.841	91.30	96.07	99.31	123.42	136.80	160.60	171.77
2.00	0.000	55.79	50.67	56.15	66.62	80.54	98.59	105.30