Low Flows of Illinois Streams for Impounding Reservoir Design

by JOHN B. STALL

ILLINOIS STATE WATER SURVEY

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merit of a family of maximum net lake evaporation magnitudes for various durations and recurrence intervals;
7) the evaluation of reservoir sedimentation and provision for seepage losses; and
8) the subtraction of the losses from the gross reservoir yield to furnish the net reservoir yield.

One of the principal advantages of this design approach is the wide scope of the final results. The traditional mass-curve analysis would furnish the reservoir capacity and critical drawdown for the worst drought of record. The approach here will furnish this same solution for the worst conditions of record, but it furnishes, also, a great number of additional solutions, all based on other recorded events. This background of solutions reveals the inter-relationship of draft rate, reservoir capacity, critical drawdown period, and drought recurrence interval, and consequently aids the engineer's judgment in selecting an optimum design.

Draft-storage-recurrence data, to enable determination of gross reservoir yield in any region of the state, are presented in both graphic and tabular forms. Similar processed data on evaporation and sedimentation are included to allow the evaluation of these losses for determining the net yield for a reservoir site, either existing or proposed.

This report has two principal parts. Part 1 describes the development and support of the analytical methods for both gross and net yield computations, and includes a study of calculated risks associated with reservoir yield, for practical interpretation of low flow analyses.

Part 2 consists of the low flow data for the entire state, arranged by physiographic divisions. An example of the step-by-step use of the low flow data to compute the yield of a reservoir is given at the beginning of Part 2.

ACKNOWLEDGMENT

This study has been carried out by the author under the guidance of H. F. Smith, Head of the Engineering Section, and William C. Ackermann, Chief, Illinois State Water Survey. A number of Water Survey personnel have aided in the production of this report. Dr. James C. Neill, Statistician, furnished sustained help and advice. In the exploratory phase, Dr. Neill furnished counsel on the development, interpretation, and substantiation of the partial series of drought events. He wrote a number of computer programs for different phases, including the major computer program finally used to furnish the tabular output of draft-storage-recurrence data and the outputs that enabled the machine-plotting of both the low-flow-recurrence curves and the draft-storage-recurrence curves. Dr. Neill also contributed to the development of the calculated risks study. W. J. Roberts, Engineer, furnished most of the pan evaporation data and aided in the compilation and interpretation of the total evaporation data used. Roger L. Corinth, Assistant Engineer, furnished the data on reservoir sedimentation. Stanley A. Changnon, Jr., Climatologist, aided in the compilation of Illinois climatic data for the computations of evaporation. Others assisting were Marvin Clevenger, Machine Supervisor for the card processing; Mrs. J. Loreena Ivens, Technical Editor; and John Brother, Engineering Assistant and advisor on drafting.

A number of part-time Water Survey employees, principally engineering students at the University of Illinois, contributed considerably to the production work. Robert Sinclair, directed by Dr. Neill, punched the streamflow data for all 164 stations onto tape for the Illiac computer, coordinated the processing of data by the Illiac, and spent many hours manipulating the automatic data-plotter for the low-flow-recurrence and draft-storage-recurrence curves. Mr. Sinclair also punched the data and supervised the Illiac processing of numerous special-purpose programs and outputs in support of this report, and wrote the IBM 7090 computer program for evaporation. Others who assisted in carrying out various plotting, computing, and lettering tasks included: James Madden, Michael Terstriep, Bruce Barker, Wayne Stewart, Marvin Wolter, Richard Johnson, Richard L. Holmes, Willie Childress, Ramanand Prasad, and Ray Linaweaver.

Much information for this report was furnished by personnel of the Champaign District office of the U. S. Geological Survey, particularly Mr. William D. Mitchell, District Engineer; Warren Daniels, Assistant District Engineer; and Delbert Winget and John Lawrence, Hydraulic Engineers. The Division of Waterways, Illinois Department of Public Works and Buildings, also cooperated by furnishing data, through Thomas B. Casey, Chief Waterway Engineer; Ralph Fisher, Principal Hydraulic Engineer; and Murray Pipkin, Hydraulic Engineer.

The University of Illinois Digital Computer Laboratory's computer facilities, principally the Illiac computer, and to a lesser extent the IBM 7090-1401 system, were used in carrying out the data processing for this report. Dr. Ven Te Chow, Professor of Hydraulic Engineering, Civil Engineering Department of the University, furnished valuable advice regarding some of the probability aspects of the methodology.
Part 1. Analytical Methods

STREAMFLOW DATA AVAILABLE

Total Stations

The data from 164 stream gaging station records were analyzed for this study. At the beginning, a search was made to locate all stream gaging records for Illinois both current and past. From this search, 210 stations were found which had, with very minor exceptions, at least three years of record. After considerable study, 46 of the 210 records were omitted from the analysis, leaving 164 to provide statewide coverage. One station is physically located in Buncombe, Wisconsin, but its records apply to an area of Illinois that otherwise lacks suitable coverage. Locations and names of all 210 gaging stations are given in Part 2.

To group the stations into regions of the state having some hydrologic uniformity, the physiographic divisions laid out by the State Geological Survey were used. These divisions, with slight alterations, have been useful in several important studies of Illinois hydrology, including the latest study on floods. Data for all stations in Part 2 are arranged according to these physiographic divisions (see figure 26 in Part 2).

The compilation of flow records for this study began extensively in 1960, and the machine-processing was completed in 1962. Therefore, all gaging records used, with a few exceptions, include the data for water year 1959 but exclude any later records.

Areal Primary or 'Index' Stations

Inspection of the records showed that 12 stream gaging stations in Illinois had been in continuous operation for either 44 or 45 years, up to and including the water year 1959. An additional 10 records of from 31 to 42 years were available; four of these had short record gaps which were filled synthetically, as described later, to bring them to 44 years. Thus, 22 "long-record" stations were selected for this study, of which 16 had records of 44 years or more and the remaining 6 had records of 30 years or more.

These 22 gages were considered areal primary stations, or "index" stations, in that each was located on a watershed truly representing its region. Further, records from these stations were generally free of intersectional influences and were of sufficient length to be useful in the "time sampling" of low flows. These 22 stations also were well distributed over the state and consequently furnished a fair "place sampling."

Areal Secondary Stations

In addition to the 22 primary records, 142 stream gaging records varying in length from 3 to 29 years were available. Records from these areal secondary gages were the principal source of streamflow information in this study, and their use has furnished a suitable "place sampling" of virtually the entire state. It is believed that the hydrologic representation of the various regional conditions within the state is at least equal to that available for any other area of comparable size and complexity in the nation.

Ideally, to solve a particular reservoir design problem, a streamflow record and the derived low flow series of events should be available from a location near the problem site. Since ideal flow records seldom exist, information from a site hydrologically similar to the problem site must be substituted. The 142 short-term gaging records were used to provide this important areal coverage of the state.

In this investigation the principle of correlation of flows at the short-term "areal secondary station" with flows at a hydrologically similar long-record "index" station was employed to make use of the shorter records. By using a curve-of-relation of flows, described later, it was possible to extend the length of the short-term stream gaging record to equal that at the long-term station. The synthetic record thus produced was used in addition to the total actual record for these short-term stations.

The 46 gaging station records not used in the analysis were omitted for varying reasons. New stations had been established during 1959-62, as part of an effort to increase areal coverage of the state, but their records were not long enough to be of value in this study. Other records were omitted because of duplications or various interferences affecting regional significance. The reason for each omission is specified in the divisional listings of these stations in Part 2.

Extent of Stream Gaging Program

Stream gaging in Illinois, as well as in the entire United States, is carried out principally by one federal agency, the U.S. Geological Survey, Department of the Interior. In this national stream gaging program, which includes about 7000 gages, the U. S. Geological Survey is the action agency that provides the technical and administrative personnel to accomplish all the gaging, thus assuring uniform standards of
results. This gaging work, however, is done under a long-
standing 50-50 cooperative arrangement with other "spon-
soring" agencies that pay half the cost of the gaging pro-
gram. The sponsoring agencies are usually state, county, or
other federal agencies, which sponsor particular gages and
often obtain special flow data for their own use as well as
data of general value.

As of 1963 in Illinois, 149 full-time or complete-record
stream gaging stations were in operation under this coopera-
tive program. Cooperating agencies contributing half the
cost of these stations included: the Illinois State Water Sur-
vey; the Illinois Division of Waterways; the Cook County
Highway Department; the Fountainhead Drainage District;
and the offices of the U. S. Army Corps of Engineers at Chi-
cago, Louisville, Rock Island, and St. Louis. Figure 1 shows
the distribution of this sponsorship of Illinois gages.

The stream gaging stations in Illinois have been classified
as to basic purpose, such as the "areal primary" and "areal
secondary" stations explained earlier. Other categories in-
clude "mainstream primary" and "mainstream secondary"
stations, and, although these have a relationship similar to
that between areal stations, the mainstream network covers
the over-all national system of rivers or main streams. One
other category, called "water management" stations, includes
special-purpose stations for administrative, legal, or research
purposes. Figure 2 shows the distribution in 1963 of the
149 Illinois stations under these five classifications.

It will be noted in figure 2 that the totals for "areal pri-
mary" and "areal secondary" classifications differ from the
totals used in this study. This occurs because many of the
current 45 "areal primary" stations were so designated only
recently, with the intention of continuing their operation
without lapses; obviously such stations were not suitable for
use as index stations in this study. Further, several of the
22 "long-record" stations used here have since been discon-
tinued to avoid duplication with other stations found to be
superior. Also in this changing of the gaging program, some
areal secondary stations have been shifted to other classifi-
cations and some discontinued.

In addition to the network of 149 complete-record gaging
stations, there are several special networks of partial-record
stations. Since 1956 the U. S. Geological Survey in Illinois
has, as a general policy, installed crest-stage gages at dis-
continued stations to maintain a record of annual peaks. In
1963 there were 13 such crest-stage gages.

The U. S. Geological Survey also currently operates four
recently established networks of partial-record stations. These are:

1) A crest-stage gage network of 226 stations in north-
eastern Illinois established to collect data for the flood-
inundation mapping program, for the Northeastern Illinois
Metropolitan Area Planning Commission;
2) A statewide crest-stage gage network of 97 stations to
collect data on flood flows from small drainage areas, for
the Illinois Division of Highways;
3) A low flow network of 39 stations in northeastern
Illinois to study base flow characteristics and water qual-
ity determinations, for the Illinois State Water Survey;
4) A low flow network of 40 stations in the East St. Louis
area, to determine the base flow characteristics of streams
at the sites of potential reservoirs, for the Illinois State
Water Survey.

Sources of Data

The basic streamflow data used in this study were obtained
principally from published records of the U. S. Geological
Survey. Monthly flow values in inches were obtained in
summarized form through the water year 1950 from USGS
compilation reports covering the Upper Mississippi River
Basin,\textsuperscript{5} the Ohio River Basin,\textsuperscript{6} and the St. Lawrence River
Basin.\textsuperscript{7} Similar monthly flow values for the water years 1951
through 1959 were obtained from the USGS annual Water Supply Papers for the same basins. A secondary source of data was provided by the Illinois Division of Waterways. Previously unpublished flow data from three stream gaging stations have been used. These data were obtained directly from the Illinois Division of Waterways and are from special-purpose gages operated by that Division. Results are presented for stations at Lick Creek near Curran, Sugar Creek near Auburn, and Pecumsaugan Creek near Utica, which are described in Part 2.

**Conversion of Units**

Most of the terminology used in this report for volumes of water and rates of flow consists of units having a common meaning and understanding. To aid the user in applying the processed data to a selected drainage area, the results are presented in inches.

A volume of water expressed as inches, or "equivalent inches on drainage area," is that quantity which would have this depth in inches if allowed to cover the entire drainage area at a uniform depth. The mean flow at each gaging station is given as a mean rate of runoff, expressed as inches per month.

The following list provides several equalities which may be useful in converting volumes:

1 square mile = 640 acres
1 acre = 43,560 square feet
1 acre-foot = 43,560 cubic feet
1 acre-foot = 325,830 gallons
or .326 million gallons
1 cubic foot = 7.48 gallons

Considerable conversion of units often is required in the manipulation of the various rates and volumes involved in inflow rates, draft rates, and reservoir storage capacities. Furnished below are several useful conversion equations.

\[ 0.01875 \times \frac{A}{B} = C \]  
(1)

where:

- \( A \) = volume in acre-feet
- \( B \) = drainage area in square miles (sq mi)
- \( C \) = volume in equivalent inches on drainage area

\[ 0.8845 D = E \]  
(2)

where:

- \( D \) = flow rate in inches per month
- \( E \) = flow in cubic feet per second per square mile (cfs/sq mi)

\[ 0.646 F = G \]  
(3)

where:

- \( F \) = flow rate in cfs
- \( G \) = flow rate in million gallons per day (mgd)

\[ 92.3 G = H \]  
(4)

and

\[ 0.011 H = G \]  
(5)

Table 1. Values of Mean Recurrence Interval and Extreme-Value Reduced Variate

<table>
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<th>Variate, Z</th>
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Figure 3. Nomograph and equation relating reservoir capacity in units of inches and millions of gallons to drainage area
(Any straight line intersecting the three scales determines a solution)

INCHES x DRAINAGE AREA x 17,3775 = MILLION GALLONS
Figure 4. Nomograph for the conversion of water flow rates (Any straight horizontal line intersects equal flow rates on all scales)

MILLION GALLONS PER DAY - mgd

CUBIC FEET PER SECOND - cfs

ACRE-FEET PER MONTH (or 30.4 days) - \( \frac{ac-ft}{mo} \)

ACRE-FEET PER YEAR - \( \frac{ac-ft}{yr} \)

GALLONS PER MINUTE - gpm
figure 3 has been prepared for convenience in solving equation 7. This nomograph shows the relation between reservoir capacity in million gallons, the drainage area in square miles, and the reservoir capacity in equivalent inches on the drainage area. Reservoir capacity necessary to meet a particular draft rate given in inches of runoff at the particular drainage area can be converted to million gallons by use of figure 3. Figure 4 is a nomograph for the quick conversion of flow rates between the several units in common use.

The graphs for all stations in Part 2 of this publication, which will be exemplified in figures 7 and 9, use an abscissa scale that is laid out according to the theory of extreme values. In the use of the data, it may be desirable to replot portions of the draft-storage-recurrence curves for analysis of a particular reservoir (see example in figure 11). Table 1 is presented as a practical aid to this plotting. Given are corresponding values of the mean recurrence interval, MRI, in years, and the extreme-value reduced variate, Z. The Z values can be plotted on an arithmetic scale to produce the desired recurrence interval scale. The values in table 1 represent solutions of the equation:

$$Z = \frac{-\log e}{\log(1 - 1/MRI)}$$

This equation can be used to furnish additional values for table 1 if desired.

### GROSS YIELD OF A RESERVOIR

#### Extending Streamflow Data

An empirical, graphical method of associating flow at one stream gage with the flow at another has been used to extend streamflow data in this study. The method of construction, the interpretation, and the use of curves-of-relation of flows were described by Langbein and Hardison in 1955 and by Searcy in 1960.

The construction and interpretation of a curve-of-relation is illustrated with the following example, based on stream gaging records from the Sangamon River at Monticello and from Salt Creek near Rowell, both in central Illinois. The Monticello gage has a total of 45 years of record, for water years 1915-59. This is one of the longest records available in Illinois, and the Monticello gage is considered an areal primary or "index" gaging station. Streamflow data are available on Salt Creek near Rowell for the water years 1943-59, a period of 17 years, and the Rowell gage is considered an areal secondary gaging station. In this example, the flows at Rowell were correlated with the flows at Monticello so that the 17-year record at Rowell could be extended to equal the 45-year record at Monticello.

To accomplish correlation, the flows at Rowell were plotted against the concurrent flows at Monticello for the 17 years 1943-59, or 204 months, the period for which data were available at both stations. This plot is shown in figure 5. The 45-degree dashed line represents the line of equality, and the solid curve represents the unique relation between the flows at these two gaging stations. In the middle and upper ranges of flows shown, the flow at Rowell is slightly less than that at Monticello; that is, for a particular flow value at Monticello the corresponding Rowell value is slightly below the line of equality. Near the lower end of this curve-of-relation, however, there is a strong tendency for the flow to be better sustained at Rowell than at Monticello.

This curve-of-relation reveals a well correlated relation between the flows of the two stations. This relation is unique for these particular two stations; it illustrates the basic difference in their flow regimes. This difference is greatest during times when flow is low; consequently, the unique quality of the relation is doubly important in a study of low flow events.

![Figure 5. Example curve-of-relation for a primary and secondary gaging station](image)

**Confidence Limits**

Another desirable feature of the graphical correlation method is that, once the curve-of-relation has been established, it is possible to draw graphical confidence limits. In figure 5 the two dashed curves are similar in shape to the solid curve-of-relation. However, these curves are displaced vertically by an amount that places two-thirds of the plotted points in the area between these two curves. Consequently, it can be stated that these lines, though graphically determined, represent the 67 percent confidence limits of the basic curve-of-relation.
### Table 2. Runoff in Inches for Salt Creek near Rowell, for the 45 Water Years 1915-59

<table>
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<tr>
<th>Year</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
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</table>

The accuracy of the basic curve-of-relation can be expressed as the standard error of the points about the basic curve, and the two dashed curves aid in the determination of this accuracy. Thus, in figure 5 it has been determined graphically that the 67 percent confidence limits expressed by the dashed curves represent a plus error of .153 log units, or +41 percent, and a minus error of .110 log units, or —22 percent.

### Use of the Curve-of-Relation

After construction of the curve-of-relation and computation of the statistical measures necessary for understanding the limits of accuracies associated with the correlation, the curve was used to extend the 17-year record for Salt Creek near Rowell on the basis of the 45-year flow record for the Sangamon River at Monticello. Monthly flow values at Monticello for the period 1915-42 and the principal curve-of-relation shown in figure 5 were used to compile a synthetic table of monthly flows for Salt Creek near Rowell. These data are shown in table 2. The basic data used for all secondary stations in Part 2 of this report include synthetic flow data devised in this manner.

The estimated monthly runoff values in the synthetic portion of the record in table 2 contain considerably greater error than would be present if the stream were actually.
However, for many purposes the synthetic record is extremely useful. It contains the same variability characteristics as would an actual record. The synthetic data are statistically similar to the actual record and are based upon the unique hydrologic relation exhibited in figure 5.

**Low Flow Series**

Past experience in analyzing the 1952-55 drouth in Illinois revealed that impounding reservoirs in Illinois are frequently under draft and drawdown for periods in excess of one year and may possibly be subject to drawdowns for as long as five years. For this reason it was necessary that the series of low flow events be selected in a manner not restricted to the annual fluctuations of runoff. A partial duration series of low flow events was selected as being most flexible and meaningful in this type of analysis. However, the partial series was selected only after intensive study, comparison, and evaluation of both the partial series and the more common and more easily interpreted annual series. Development of the partial series and its theoretical support are described below.

**Development**

The initial step in the development of the partial low flow series was the selection of a duration with which to work. Eventually, separate series were developed for various durations, but for illustration, the development of a series of low flow events each having a length of 30 months will be described, again for Salt Creek at Rowell. These 30-month low flow periods were to be selected without regard to the calendar year and in such a manner as to insure their chronological independence.

The monthly flow data were converted to running totals for the 30-month duration, for the period of record 1914-59.
These running totals were then inspected, and the lowest 30-month period on record was noted. For Salt Creek near Rowell the lowest 30-month flow on record occurred between August 1953 and January 1956. This particular period was then marked off the tabulated data. For this lowest 30-month period on record, the runoff in inches amounted to 5.52 inches, and this quantity is plotted for the appropriate period in figure 6.

After the lowest-ranking flow value for a 30-month period was selected, all of the remaining running totals which overlapped to include any of the 30 months within this lowest period were excluded from further consideration. The remainder of the 45-year record was selected to locate the 30-month low flow periods of descending rank, which were in turn marked off the tabulated data. In this example only 10 independent low flow periods were selected, as explained below; these are shown in figure 6 and table 3.

### Table 3. 30-Month Low Flow Series for Salt Creek near Rowell

(Runoff in inches for the 10 driest 30-month periods on record; based on partially synthetic 45-year flow record for water years 1915-59)

<table>
<thead>
<tr>
<th>Rank of event</th>
<th>Recurrence interval, years</th>
<th>30-month flow, inches</th>
<th>Dates of low flow period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45.0</td>
<td>5.52</td>
<td>Aug 1953 – Jan 1956</td>
</tr>
<tr>
<td>2</td>
<td>22.5</td>
<td>6.35</td>
<td>Jun 1930 – Nov 1932</td>
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<td>3</td>
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<td>Apr 1939 – Sep 1941</td>
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<td>4</td>
<td>11.3</td>
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<td>Jul 1943 – Dec 1945</td>
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<td>Jun 1947 – Nov 1949</td>
</tr>
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<td>Jul 1936 – Dec 1938</td>
</tr>
<tr>
<td>10</td>
<td>4.5</td>
<td>23.01</td>
<td>Jul 1956 – Dec 1958</td>
</tr>
</tbody>
</table>

As this development progressed, some of the series produced low flow values which were greater than the mean flow at the station. This occurred because several months of record were usually lost between the periods selected. These high flow values thus were not a legitimate part of the series because they were generated by the selection procedure. For this reason every series was ended when the flow for the duration in question reached an amount equal to the mean flow for the station. This is illustrated in the 30-month example in table 3 where the 10th-ranking low flow value was 23.01 inches and the mean flow at this station is 23.70 inches; since the 11th-ranking value exceeded this mean flow, it was excluded from the series.

### Theoretical Support

The basic series utilized in this study is exemplified by the 10 low flow events in table 3. This series is partial in nature in that it contains only a portion of the original data. Since the present study is concerned with only low flows, the mean flow at the station was selected as the base or upper limit, and the resulting partial series retains only events below this particular base.

The use of a partial duration series in the analysis of hydrologic events is not a new idea. Hudson and Roberts used it; the development and interpretation of this series has been described elsewhere in published form by the author, and other authors have used this series for flood data. Chow used it for precipitation data and discussed it comparatively with the more familiar annual series.

As described by Chow, a series of annual extreme events is usually obtained by selecting the single most extreme event that occurred during each year of record; the number of extreme events is equal to the number of years of record. Another series, partial in nature, can be devised in which all of the events that occurred during the entire period of record are ranked without regard to the year. The top-ranking values are selected; the number included is made equal to the number of years of record, and these events are labeled annual exceedances. The extreme events that make up this partial series of exceedances are selected in such a manner that more than one may occur in one year. Some years may not be represented at all. Two extreme events occurring during the same year are included in the exceedance series, but the lesser one is excluded from the annual series because the two events may be dependent. In interpreting these two events it can be said that the combination of the many causative climatic and physical factors of the event of primary severity may have influenced the event of secondary severity in the same year.

The combination of causative factors which produces an extreme event is governed very strongly by the 12-month solar cycle. It is the established strength of this cycle that justifies the difference in interpretation between a series of annual extremes and a partial series of exceedances. This cycle justifies the exclusion of secondary events from the annual series and is the underlying factor in the conception that these events are dependent.

Knowledge of these important differences between a series of annual maximum events and a partial series of exceedances helps in the proper interpretation of the events included in the series presented in this study. For example, the selection procedure for the ten 30-month low flow events shown in table 3 insures that the events are independent chronologically. If two of these events were to be considered dependent in any other sense, it would be necessary to show that two 30-month events were the result of at least a portion of the same combination of causative climatic factors. In an exceedance series, the dependence of a secondary 30-month low flow event on a more extreme 30-month low flow event could be caused by the presence of a multi-year cycle in the causative climatic factors. Although multi-year cycles have been shown to exist to some degree by various authors, the magnitude of these cycles is not so pronounced as that.
of the 12-month solar cycle. Consequently, current evidence of multi-year cycles is hardly justification for assuming that any particular 30-month low flow event could be associated with the same causative factors that produced another 30-month low flow event.

Thus, the theoretical support for the use of the partial series is based on two main principles:

1) The events in this series are considered to be independent to the extent that each is the result of a separate combination of the complex causative climatic and physical factors which affect streamflow; and
2) The events in this series are considered to be the result of so many causative factors that their occurrence is distributed in accord with the laws of chance, and consequently the events are randomly distributed.

**Recurrence Interval**

The mean recurrence interval for the partial series of low flow events was computed as follows:

\[ MRI = \frac{N}{m} \]  

where:
- \( MRI \) = mean recurrence interval in years
- \( N \) = number of years of data available
- \( m \) = rank when the low flow events are arrayed in order of magnitude, number 1 being the lowest

For a 45-year record, the most extreme event had a recurrence interval of 45 years; the second event, a recurrence interval of 22.5 years, and so forth.

Table 3 shows the recurrence interval for each of the events in the 30-month low flow series. These ten 30-month flows and their assigned recurrence intervals furnish an estimate of the average length of time in years which can be expected to elapse between the beginnings of the various 30-month events. For example, the third-ranking event in this series has a recurrence interval of 15 years. Thus, it can be said that in any year the probability is 1 to 15 for the start of a 30-month period during which the total flow will be as low as 10.99 inches. The meanings of computed recurrence intervals and their further translation for practical use are discussed in a later section dealing with calculated risks.

**The Resulting Series Family**

A separate series of low flow events was determined by the procedure described above for 36 different durations, which were for multiples of one month from 1 to 12 months and for multiples of two months from 14 to 60 months.

Several of these series for Salt Creek near Rowell have been plotted in figure 7. Those series shown are for all multiples of 6 months through 60 months. The vertical scale in figure 7 is logarithmic, and the horizontal scale follows the extreme value law. By experimentation it was found that this particular set of coordinates gave the most nearly straight family of curves. Moreover, the curves denote the "family" relation between the various series, thereby giving confidence in their use. This set of coordinates has also been used by Gumbel\(^{15}\) and Velz.\(^{16}\)

Table 4 contains the complete results of the low flow analysis for Salt Creek near Rowell, giving the actual series of low values for all the durations.

**Nonsequential Mass Analysis**

The most common method for determining the yield of an impounding reservoir is the Rippl mass diagram method.\(^{17}\) Essentially the method determines the reservoir capacity necessary to meet a particular draft rate as the difference between accumulative draft and accumulative inflow for a critical period of time. For a particular mass curve of flow at a particular gaging station, the reservoir capacity necessary is determined by locating the critical period which gives the largest reservoir capacity for a particular draft rate. The length or duration of the critical period is also determined; the critical period occurs during the driest year or years of record.

Use of the partial series of low flow events previously described allows the mass-curve type of analysis to be carried out on a recurrence interval basis, which is depicted in figure 8. The lowermost irregular curve in figure 8 shows the most extreme low flow period on record for Salt Creek near Rowell for a particular duration in months. To illustrate, the series developed earlier for table 4 showed that
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</table>

Table 4. Low Flow Series for Various Durations, Salt Creek near Rowell
the lowest 30-month flow of record was 5.52 inches; in figure 8 the lowermost curve shows that for a duration of 30 months the inflow was 5.52 inches, this being the lowest of record. Similarly, the lowermost curve shows that the lowest 18-month flow of record was 1.88 inches and the lowest 12-month flow of record was .91 inches.

All the low flows (which occurred at nonrelated times) connected by the lowermost line in figure 8 have a recurrence interval of 45 years, since in every case the low flow shown on this curve was the lowest on record for that particular duration. This curve represents a nonsequential series.

In a similar manner, the second lowest curve in figure 8 connects the points showing the runoff in inches to be expected for a particular duration in months, this series being the second lowest of record. The points along this curve can be expected to have a recurrence interval of 22.5 years. Continuing in this manner, the third, fourth, and fifth curves represent low flows having recurrence intervals of 15, 11.3, and 9.0 years, respectively.

In figure 8 the mean flow at this gaging station is represented by a straight line having a slope of approximately 45 degrees. This represents the maximum draft that could be
developed on this watershed. Also shown is a straight sloping line representing a draft rate of 50 percent of the mean flow which is used in the example of mass analysis below.

Since the following analysis concerns gross reservoir yield, no refined consideration is given to evaporation or other losses from the reservoir. These losses are detailed in later sections of this report, but at this point can be considered a part of the draft rate.

To determine the reservoir capacity to meet a draft rate equal to 50 percent of the mean, it was necessary to find the duration of low flow in months for which the maximum ordinate exists between the accumulative draft rate curve and accumulative inflow curve. Figure 8 shows that this occurs at a duration of 44 months, and that a reservoir capacity of 6.49 inches is necessary to meet this draft rate during the most severe 44-month period on record.

Figure 8 also indicates that to meet the draft rate of 50 percent of the mean during the second most severe low flow of record would require a reservoir capacity of 5.50 inches and that the critical duration would be 30 months. Reservoir capacity to meet the third, fourth, and fifth lowest droughts of record likewise are shown. These data and the associated recurrence intervals are itemized in table 5. In addition, results for the 9th, 15th, and 22nd most severe low flow periods of record are presented in figure 8 and table 5.

Table 5. Results of Mass Curve Analysis for a Draft Rate of 50 Percent of Mean Flow, for Salt Creek near Rowell

<table>
<thead>
<tr>
<th>Rank</th>
<th>Recurrence interval of low flow, year</th>
<th>Duration of critical period, months</th>
<th>Total draft for critical period, inches</th>
<th>Total inflow during critical period, inches</th>
<th>Reservoir capacity required, inches</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>45</td>
<td>44</td>
<td>17.38</td>
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<td>6.49</td>
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<td>22.5</td>
<td>30</td>
<td>11.85</td>
<td>6.35</td>
<td>5.50</td>
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<tr>
<td>3</td>
<td>15</td>
<td>16</td>
<td>6.32</td>
<td>2.09</td>
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<tr>
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<td>9</td>
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<td>3.56</td>
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<td>3.16</td>
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<td>5</td>
<td>1.48</td>
<td>.55</td>
<td>1.43</td>
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</table>

Draft-Storage-Recurrence Data

By means of the mass curve analysis it was possible to determine the reservoir capacity necessary for a particular gross draft rate or yield based upon various low flows having recurrence intervals ranging from 2 to 45 years. With the aid of an electronic computer, it was possible to produce a complete array of results for a particular stream gaging record for a number of different draft rates.

As an example, a complete series of draft rates was studied utilizing the flow records for Salt Creek near Rowell. An analysis was made for 20 different draft rates, expressed as various percentages of the mean flow ranging from 5 to 100 percent, as shown in figure 9. The mass-type analysis shows the reservoir capacity necessary to meet each of these draft rates for various recurrence intervals. This analytical method also produces, for every reservoir capacity, the duration of the critical period which is the period of time for which the reservoir will be under draft.

The complete mass analysis results for this station are given in table 6. This table presents, for the recurrence intervals ranging from 2 to 45 years, and to meet gross draft rates from 5 to 100 percent of the mean flow at this station, the required reservoir capacity in inches and the duration of the critical period in months. The draft-storage-recurrence curves of figure 9 are the graphical representation of the data in table 6, except that the duration of the critical period is shown only in the table.

This report provides in Part 2, for each of the 164 stream gaging records selected for analysis, a draft-storage-recurrence table similar to table 6 and a graph of draft-storage-recurrence curves similar to figure 9. The array of results furnished in the table and graph provides the designer with the essential information for an adequate design under particular circumstances based upon the actual draft rate necessary, the reservoir sites available, and the finances available for a reservoir.

Duration of the Critical Period

As was mentioned, the nonsequential mass analysis furnished the duration of the critical drawdown period, which represents the governing time period during which the draft from the reservoir would exceed the inflow by the greatest amount. At the beginning of the critical period the reservoir would be full, and at the end of the critical period it would be empty. Immediately after the critical period ends the reservoir would begin to refill. With the reservoir in actual operation, under a specified draft and during a specified recurrence interval drought, many other periods would occur, both shorter and longer than the critical period, during which draft might exceed inflow. The mass analysis shows, however, that none of these periods would be more severe than the critical duration.

The change in the duration of the critical period is not continuous and may vary widely within selected ranges of draft, inflow, and recurrence interval. Because the critical period is the resultant of a great number of combinations of these three parameters, this variation can be expected. This lack of continuity is present in the traditional mass analysis and in the nonsequential mass analysis described above; it is due essentially to the 12-month cycle present in the flows of most streams of the world.

Table 6 reveals this noncontinuity. As an example, inspection of the values of critical periods for a recurrence interval of 9.0 years shows that, for draft rates from 5 to 50 percent of the mean, the critical period increases from 4 to 9 months; for a draft rate of 55 percent, the critical period jumps to...
Figure 9. Reservoir capacity needed to meet various gross draft rates at various recurrence intervals.
20 months. Similarly, for a draft rate of 90 percent of the mean, the critical period is 22 months, but as the draft rate increases to 95 percent, the critical period jumps upward to 40 months.

These "jumps" or noncontinuity tendencies of the duration of the critical period are a legitimate result of the methodology. They are accounted for by the "steep" and "flat" portions of the mass curves of inflow. One draft rate may intersect the "steep" portion of the mass inflow curve; a slight increase in the draft rate may make it miss this "steep" portion so that it must continue past the next "flat" portion of the curve to intersect the next "steep" portion, many months later. As will be shown later, however, the net yields available from a particular reservoir are relatively continuous, and not seriously interrupted by the noncontinuity of the duration of the critical period involved.

### Analysis at a Selected Recurrence Interval

Data in figure 9 and table 6 can be utilized to show the gross draft rate obtainable from reservoirs of various capacities during a drouth of selected recurrence interval. Table 7 shows the results of such an analysis, for Salt Creek near Rowell where the drainage area is 334 square miles.

<table>
<thead>
<tr>
<th>Reservoir capacity required (acres-ft)</th>
<th>Gross draft rate</th>
<th>equivalent inches on drainage area (from fig. 9)</th>
<th>million gallons</th>
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### Table 7. Reservoir Capacities Required to Furnish Various Draft Rates During a 40-Year-Recurrence Drouth, Salt Creek near Rowell

Drainage area = 334 square miles

<table>
<thead>
<tr>
<th>Reservoir area</th>
<th>Reservoir capacities required (acres-ft)</th>
<th>Gross draft rate</th>
<th>equivalent inches on drainage area (from fig. 9)</th>
<th>million gallons</th>
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Figure 10. Gross draft rates available during a 40-year recurrence drouth from various reservoir capacities, for Salt Creek near Rowell

results were obtained by taking a vertical section through figure 9 at the selected recurrence interval of 40 years. Table 7 gives the gross draft rate both in percent of mean flow and in million gallons per day. The reservoir capacities required during a 40-year-recurrence drouth to meet the various draft rates are given in equivalent inches on the drainage area, as read from figure 9, and are also expressed as million gallons and acre-feet.

The results shown in table 7 have been plotted in figure 10. and consideration of the shape of this curve allows the reservoir designer to choose an optimum design. For example, the slope of the curve is quite steep up to 40 billion gallons of reservoir capacity. Decrease of the curve slope above this value indicates that further increments of reservoir capacity provide lesser increments of available draft rate. As an added benefit to the designer, the reservoir capacity scale could easily be converted to dollar cost by applying appropriate construction cost data.

Analysis of a Particular Reservoir Site

The analytical results shown in figure 9 and table 6 can also be used effectively in the evaluation of a particular reservoir site. A theoretical reservoir on Salt Creek near Rowell that would have a storage capacity of 3 equivalent inches on the drainage area (17,411 million gallons or 53,437 acre-feet) was used as an example. That this size would be within reasonable limits was determined by comparison with two existing lakes in central Illinois.

To analyze the theoretical reservoir, a horizontal section was taken through figure 9 at a value of 3 inches of storage capacity, and this is shown at an enlarged scale in figure 11. Reservoir capacity for a range between 2.7 and 3.3 inches is included, and the heavy horizontal line at 3 inches represents the theoretical reservoir site. The gross draft rates in percent of mean flow which intersect the 3-inch reservoir capacity line are given. The durations of the critical drawdown periods in months, also shown, were taken from table 6. The durations of these critical periods vary, but the duration which would govern the proposed reservoir can be selected from figure 11.

The performance of the theoretical reservoir under various draft rates and various recurrence intervals also can be determined by using figure 11. Table 8 shows the results of such an analysis for five drouth recurrence intervals. It shows, for example, that during a 40-year-recurrence drouth the theoretical reservoir could serve a proposed draft rate of 53 million gallons per day (mgd) and would be subject to drawdown for an 18-month period.

The performance results in table 8 are also presented
Table 8. Gross Draft Rates During Selected Drouths for Theoretical Reservoir on Salt Creek near Rowell

<table>
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<th>Drought recurrence interval</th>
<th>Gross draft rate (from Eq. 11)</th>
<th>Duration of critical period (from Eq. 11)</th>
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</tbody>
</table>

A graphically in figure 12. The shape of the curve in figure 12 can be useful to the designer in the further evaluation of the proposed lake site. For example, the lower right end of this curve shows again that during a 40-year-recurrence drouth the proposed reservoir could furnish a gross draft rate of 53 mfd. If the reservoir were constructed to meet such a draft rate, its performance under an increased draft rate also can be evaluated; that is, if the draft rate were to increase from 53 to 60 mfd, the curve shows that a water shortage could then be expected during a drouth having a recurrence interval of 18 years.

RESERVOIR LOSSES

Evaporation Loss

Evaporation loss is of major importance in the operation of a surface water impounding reservoir. Thus, a means by which the evaporative loss can be evaluated so that the gross yield of a reservoir can be reduced to the net yield is likewise of importance to the designer. In this analysis the net evaporation loss is determined as the difference between a maximum expected gross evaporation minus the minimum expected precipitation for various recurrence intervals and for critical periods having various durations.

Data Available

The principal evaporation data used in this study consisted of records from two Class A evaporation pans in Illinois, operated by the State Water Survey at Rockford and Carbondale. Also used were data from a pan operated at Springfield by the U. S. Weather Bureau. Each pan is 48 inches in diameter, 12 inches deep, and is filled to a depth of 10 inches; Water level in the pan is measured daily with a hook gage in a stilling basin. Pan evaporation was observed generally during the months of April through October at each station. Stations were established at Springfield in 1941, at Carbondale in 1947, and at Rockford in 1950; locations are shown in figure 13. Through 1962, the observed records totaled 16 years at Carbondale, 13 years at Rockford, and 22 years at Springfield.

The variability of evaporation amounts in Illinois is believed to be far less than the variability of streamflow, and for this reason the use of only the three stations was considered a reasonable "place" sampling. To improve the "time" sampling, however, a considerable effort was made to synthesize these evaporation records for longer periods. This was done principally by computation of both pan evaporation and lake evaporation from equations using climatic data which are available for long periods of time at most first-order stations of the U. S. Weather Bureau. These equations, developed by the Weather Bureau\(^\text{18}\) in 1955, utilize four principal climatic data items: air temperature, dew point temperature, wind movement, and solar radiation. In 1959, the Weather Bureau\(^\text{19}\) used these equations extensively in computing evaporation data at 255 first-order weather stations in the United States for the 10-year period 1946-55.

For the present study, the required climatic data items were compiled for as long a period as possible. These enabled the computation of evaporation and the confirmation of the equation by the comparison of computed pan evaporation with observed pan evaporation for the period both were available. This comparison of computed and observed pan
evaporation values for the 22 years, 1941-62, for Springfield is shown in figure 14. At Rockford and Carbondale, no long-term climatic data were available, but "adjusted" relations were developed for the computation of Rockford evaporation using climatic data from Moline, and for the computation of Carbondale evaporation using Evansville, Indiana, climatic data.

For Springfield, the computation procedure for pan evaporation was used to compute the lake evaporation for the 31-year period 1910-40 for which only climatic data were available. The results, as shown in table 9, exemplify the basic evaporation data used in this study. In table 9 the lake evaporation values for the years 1910-40, and for the winter months November through March for the years 1941-62, were computed by the use of climatic data. The values for the summer months April through October for 1941-62 were computed from the actual observed pan evaporation and pan-to-lake coefficients.

Evaporation Data Analysis

The evaporation data for Springfield in table 9 form a continuous record of lake evaporation by months extending from January 1910 through December 1962. In order that these data furnish the most meaningful information for this study, a partial series of maximum gross evaporation magnitudes was developed for a number of durations varying from 1 to 60 months, and a recurrence interval was assigned to each event in the series. The methods for development of the series and the assignment of recurrence intervals were the same as those for the low flow series.

The magnitudes of the gross evaporation for various durations and recurrence intervals are shown graphically in figure 15. The lower portion of this figure shows the gross evaporation curves for periods of 1 to 26 months; the upper portion shows the gross evaporation curves at an enlarged vertical scale for periods varying from 28 through 60 months. The curves for some of the longer durations are foreshortened on the left because the table of basic data furnished only a few values for these durations.

Precipitation Data

Monthly precipitation data at Springfield, from the published records of the U. S. Weather Bureau, were used to
Table 9. Monthly Lake Evaporation in Inches at Springfield
Year

1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
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1932
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1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954

Jan

.42
.33
.23
.32
.40
.16
.36
.62
.25
.81
.35
.60
.63
.52
.32
.42
.33
.34
.43
.27
.20
.67
.45
.81
.56
.44
.11
.34
.41
.49
.61
.22
.57
.27
.59
.20
.60
.50
.48
.81
.67
.61
.66
.45
.82

Feb

.74
.78
.52
.56
.43
.69
.50
.75
.86
.77
.80
.80
1.06
.58
.53
.80
.61
1.02
.58
.48
1.05
.94
1.04
1.06
.83
.56
.31
.81
.63
.63
.32
.65
.36
1.24
.81
.55
1.04
.82
.63
.88
.69
.77
.97
1.26
1.47

Mar

3.29
2.18
1.01
1.53
1.39.
1.34
1.62
2.39
2.90
1.86
2.28
2.25
1.48
1.66
.86
2.41
1.19
1.67
1.96
2.16
2.02
1.28
1.47
1.60
1.67
1.65
2.04
1.85
2.21
2.51
1.31
1.75
2.87
2.22
2.02
2.25
1.45
1.51
1.41
1.95
1.57
1.44
1.67
1.82
2.06

Apr

May

2.83
2.51
3.30
3.21
2.70
4.45
2.61
2.95
2.08
2.93
2.30
3.34
3.00
3.25
3.56
3.99
2.65
2.56
2.90
3.26
3.57
3.54
3.20
2.94
4.09
2.44
3.04
2.45
3.57
2.64
2.36
4.20
3.64
3.50
2.20
3.07
4.23
2.77
4.48
3.30
2.96
2.74
4.28
3.19
4.23

4.05
6.19
5.09
4.71
5.69
3.97
4.39
4.00
5.39
3.63
4.60
5.50
4.95
4.78
3.42
5.11
5.24
3.53
5.60
3.94
5.14
3.95
5.78
3.64
6.83
2.86
5.95
4.82
4.28
5.73
3.73
5.36
4.33
4.04
4.60
3.48
3.41
4.64
4.07
5.19
5.03
5.24
4.40
4.75
4.74

Jun

5.76
6.41
5.40
6.69
6.30
5.15
5.20
5.48
5.91
6.11
6.33
6.19
6.87
5.86
4.42
6.04
5.46
5.13
4.47
4.85
5.84
6.13
6.25
7.84
7.44
4.81
6.66
5.43
5.63
4.94
5.57
5.62
4.35
4.94
6.02
3.23
6.48
5.20
4.50
5.04
5.31
3.92
6.39
7.38
7.01

Jul

5.49
6.42
5.54
6.80
6.79
5.09
7.20
6.56
6.25
7.31
6.66
6.91
6.14
6.67
5.31
5.91
6.46
6.27
6.35
5.92
7.12
6.88
6.73
7.39
7.10
6.88
8.08
6.66
6.69
5.66
7.06
6.67
6.24
6.26
7.04
4.54
6.43
6.71
4.74
4.88
5.11
4.57
6.11
6.45
8.77

Aug

5.00
4.74
4.63
5.87
5.08
3.54
5.07
4.69
5.11
5.58
4.49
4.44
5.58
4.90
5.17
5.16
4.56
4.32
5.28
5.01
5.82
4.96
5.55
5.43
4.72
5.79
6.71
5.57
5.62
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4.63
5.11
4.56
5.88
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3.69
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4.82
5.58
4.23

Sep

Oct

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3.69
2.60

Nov

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1.73
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Dec

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.62
1.06
.56

1955

.48

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2.19

3.85

4.76

5.32

5.54

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5.41

2.77

1.27

.74

1956
1957
1958
1959
1960
1961
1962

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.72
.76

22


determine the recurrence interval of various low rainfall events. With this record, a partial series was developed for minimum precipitation expected at various recurrence intervals for various durations from 1 to 60 months. Methodology was identical to that used for the evaporation data. A graph of the minimum precipitation expected at Springfield based on this analysis is shown in figure 16.

**Net Evaporation Loss**

Values of maximum gross evaporation from figure 15 and the minimum expected precipitation from figure 16 were used to determine the net evaporation loss for various periods and various recurrence intervals. An example of this computation for a lake surface at Springfield is given in table 10. For a recurrence interval of 5 years, 7.06 inches of net evaporation loss can be expected during a 1-month period; this increases to a maximum of 24 inches net loss for an 18-month period, then decreases to 1 inch net loss for a 36-month period, and reaches a zero net loss for a 38-month period or longer. Table 11 provides the net lake evaporation at Springfield for various recurrence intervals and various durations, obtained by this procedure. Similar data for Rockford are given in table 12, and for Carbondale in table 13.
In this analysis the assumption has been made that the periods of maximum evaporation and minimum precipitation will coincide. Since both extreme phenomena are the result of the same complex of climatic factors, they logically could occur together.

Figure 17 was constructed to obtain a more complete picture of the variation of the net lake evaporation at Springfield. The over-all shape exhibited by this graph indicates that this net evaporation represents continuity for the range of values studied. Such continuity furnishes confidence for the further use of these data as here processed.

**Use of Evaporation Data**

To illustrate the computation of net reservoir yield, calculations are shown for a theoretical reservoir on Salt Creek near Rowell, described in table 8. Since Rowell is only 40 miles northeast of Springfield, it is reasonable to assume that the Springfield evaporation data apply. The evaporation computations are carried out for a recurrence interval of 40 years. The reservoir analysis is shown graphically in figure 18, and data are given in table 14.

Table 14 shows that for a 40-year recurrence interval the gross draft rate which this reservoir will yield is 53 mgd
Table 11. Net Evaporation from a Lake Surface at Springfield

| Duration of critical period, months | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   | 24   | 25   | 26   | 27   | 28   | 29   | 30   | 31   | 32   | 33   | 34   | 35   | 36   | 37   | 38   | 39   | 40   | 41   | 42   | 43   | 44   | 45   | 46   | 47   | 48   | 49   | 50   | 51   | 52   | 53   | 54   | 55   | 56   | 57   | 58   | 59   | 60   |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1                                 | 6.26 | 6.68 | 6.80 | 7.06 | 7.11 | 7.18 | 7.32 | 7.64 | 7.95 | 8.12 | 8.30 | 8.40 | 8.50 | 8.60 | 8.70 | 8.80 | 8.90 | 9.00 | 9.10 | 9.20 | 9.30 | 9.40 | 9.50 | 9.60 | 9.70 | 9.80 | 9.90 | 10.0 | 10.1 | 10.2 | 10.3 | 10.4 | 10.5 | 10.6 | 10.7 | 10.8 | 10.9 | 11.0 | 11.1 | 11.2 | 11.3 | 11.4 | 11.5 | 11.6 | 11.7 |
Table 12. Net Evaporation from a Lake Surface at Rockford

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Table 13. Net Evaporation from a Lake Surface at Carbondale

<table>
<thead>
<tr>
<th>Duration of critical period, months</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaporation, in inches, for given recurrence interval, years</td>
<td>5.20</td>
<td>5.47</td>
<td>5.66</td>
<td>5.77</td>
<td>5.80</td>
<td>6.01</td>
<td>6.05</td>
<td>6.17</td>
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<td>6.26</td>
<td>6.27</td>
<td>6.3</td>
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</tr>
</tbody>
</table>

27
and the critical drawdown period is 18 months or 548 days. The net evaporation loss from the proposed reservoir during this 18 months, as read from table 11, will be 46 inches or 3.83 feet.

As discussed earlier, the reservoir will be full at the beginning of the critical drawdown period, which is 18 months in this example, and empty at the end of it; however, during this period, the lake level will fluctuate and the surface area exposed to evaporation will vary, in this case from 5344 acres to zero. Hudson and Roberts recommend that the effective evaporative surface area for the critical period be 65 percent of the lake surface area when full, and this factor has been used in this study.

The following computations illustrate the determinations shown in figure 18 and table 14 for a 40-year recurrence interval which has an 18-month critical period.

The total gross draft is
\[ 53 \text{ mgd} \times 548 \text{ days} = 29,044 \text{ mil gal} \]
The inflow to the reservoir is total gross draft minus total reservoir capacity, or
\[ 29,044 - 17,411 = 11,633 \text{ mil gpl} \]
The effective evaporative surface area of the lake is
\[ 5344 \text{ acres} \times .65 = 3474 \text{ acres} \]
The evaporative loss is
\[ 3.83 \text{ feet} \times 3474 \text{ acres} = 13,305 \text{ acre-feet}, \text{ or} \]
\[ 4337 \text{ mil gal} \]
The net usable reservoir capacity is the total reservoir capacity minus the evaporative loss, or
\[ 17,411 - 13,074 = 13,074 \text{ mil gal} \]
The total net draft which the reservoir can furnish is the net usable reservoir capacity plus the inflow, or
\[ 13,074 + 11,633 = 24,707 \text{ mil gal} \]
The net draft rate, or the net yield, which the reservoir can furnish is the total net draft divided by total days in the critical period, or
\[ 24,707 \text{ mil gal} / 548 \text{ days} = 45 \text{ mgd} \]

All of the net draft rates given in table 14 were determined by the computations just described. In each case the net draft rate is shown to be less than the gross draft rate in column 2 of the table. The differences are considered to be a rational evaluation of the probable evaporative losses. The designer would also make provision for seepage losses at this point.

Figure 19 shows a graph of gross reservoir yield versus the net reservoir yield for the theoretical reservoir on Salt Creek near Rowell. The departure of the curve below the line of equality represents the evaporative loss.

Table 14. Analysis of Evaporation Loss for Theoretical Reservoir on Salt Creek near Rowell

<table>
<thead>
<tr>
<th>Gross yield data (from table 8)</th>
<th>Net evaporation loss (from table 11), inches</th>
<th>Net draft rate, mgd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breach recurrence interval, year</td>
<td>Gross draft, mgd</td>
<td>Duration of critical period, months</td>
</tr>
<tr>
<td>2</td>
<td>128</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>89</td>
<td>9</td>
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<tr>
<td>10</td>
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<td>18</td>
</tr>
<tr>
<td>40</td>
<td>53</td>
<td>18</td>
</tr>
</tbody>
</table>
The measurement of sediment in Illinois reservoirs and the evaluation of the various reservoir and watershed characteristics that affect sedimentation have been the subject of a comprehensive research project for about 30 years. The 85 reservoirs on which sedimentation surveys have been made are listed in table 15, and their locations are shown on the map in figure 20. This research has been carried out cooperatively by the State Water Survey, the Illinois Agricultural Experiment Station, and the U. S. Department of Agriculture.

From these studies, 11 reports have been published for particular reservoirs and their respective watersheds, the most recent a study of Crab Orchard Lake in southern Illinois. A regional analysis has been published of sedimentation data from 20 lakes and their watersheds located in the deep loess soils area of central Illinois near Springfield. Two similar regional studies are underway, for lakes in the claypan soils of southern Illinois and in the deep loess soils of the Galesburg Plain in western Illinois. No statewide, comprehensive analysis is available; however, selected data have been used to provide an empirical equation which is dimensionally correct and seems adequate to accommodate the complex reservoir and watershed factors influencing sedimentation rates in Illinois.

Several findings are evident from studies to date. One is that the rate of soil erosion on many watersheds in Illinois is excessive for the long-term protection of the land resource base. A second is that soil loss from erosion can be drastically reduced by the application of soil conservation practices such as contour farming. In many cases such a conservation program on a watershed has significantly reduced the rate of reservoir sedimentation. The prevention of soil erosion is, of course, a primary measure in preventing reservoir sedimentation; and, in reservoir development, application of an intensive watershed conservation program should be considered.

### Sedimentation Rates

Several of the published analyses of reservoir sedimentation mentioned provide methodology for determining the probable rate of sedimentation in a proposed reservoir by a detailed study of the characteristics of the watershed and the reservoir. On a statewide basis, only a simplified approach using generalized data is possible. Such a generalized
The second parameter on which figure 21 is based is the actual size of the drainage area in square miles. As the drainage area increases, the unit rate of sediment production per square mile decreases. For any particular region in Illinois, it can be assumed that the average over-all rate of soil loss from erosion would be uniform for large and small drainage basins. For a relatively small drainage area, most of this sediment is transported the short distance downstream to the reservoir. For larger and larger drainage areas, however, there is an ever-increasing tendency for much of this sediment to be transported only a short distance where it is deposited at a fence, along ditches, streams, or on bottomlands along the major stream; thus, a smaller percentage of the total watershed soil loss is actually carried all the way downstream to deposit in the reservoir. This tendency is reflected in figure 21 in that all the curves slope downward to the right.

Figure 21 may be used to estimate annual capacity loss for a particular proposed reservoir. Starting with the size of the drainage area under consideration and following this line upward to the curve representing the capacity for the proposed reservoir will indicate the annual percent loss of reservoir storage capacity on the left scale. A determination of the accuracy of this graph by analysis of the 85 observations used to devise it showed that the chances are 2 out of 3 that the annual capacity loss determined will not be more than 60 percent in error in either direction.

This annual rate of capacity loss to sedimentation can be converted to total capacity loss by selecting a future time, say 25 years, as a basis for planning. This 25-year total to be allocated for sediment storage can then be subtracted from the original reservoir capacity estimate to provide the amount of capacity that would be available for water supply at the end of 25 years. This procedure is the most straightforward way to evaluate the effects of sedimentation on yield; however, this approach is conservative since the storage space allocated to sediment is actually filled with sediment gradually during the 25-year period.
Figure 21. Generalized reservoir sedimentation relation for Illinois

CALCULATED RISKS OF IMPOUNDING RESERVOIR YIELD

Value of a Risk Outlook

One of the most meaningful ways to develop a common understanding of impounding reservoir yield is to interpret this yield on the basis of the associated risks. Risks are ever-present and easily understood. The advantages and the simplicity of water project analysis on a risk basis have been shown by several writers in recent years, notably Langbein and Alexander. The following discussion shows how risks can be computed and interpreted; it comprises methods developed by the author and previously published.

A water supply impounding reservoir is one of many hydrologic structures commonly designed to meet a natural event having a selected recurrence interval. For example, a reservoir may be designed to meet a 25-year recurrence interval drought. The reservoir is subject to lesser and greater droughts, however, which affect the yield. Several significant characteristics are known regarding the distribution of...
droughts; and considerable evidence is available as to the probability that droughts of various severities will occur during this year (any year), during the next five years (any five-year period), or during any selected design period. By developing an array of probabilities of occurrence of various droughts during various design periods, the design engineer can gain an improved concept of the risks associated with the development.

This array of risks allows the engineer to state the numerical odds accompanying various yields. These odds range from a virtual certainty that an extremely severe event will not happen soon to an identical certainty that a mildly severe event will happen soon. A statement of these risks in this objective numerical form allows the designer to select a series of risks that, in his judgment, are most appropriate for a particular reservoir operation.

Many authors have studied carefully the distribution of natural events and the confidence associated with the knowledge of their frequency and magnitude. Riggs has been the most recent writer to bring together earlier thinking, and he has introduced the "design period" concept.

Because in this report the method of determining net yield of an impounding reservoir allows net yield to be associated with mean recurrence intervals by means of a cumulative frequency curve, it has been possible to use the design period approach. Although the design period concept is based on a frequency curve of annual events, the frequency curve of net yield developed from a partial series of events is considered adequate for application of this concept. It is believed that the simplicity of the design period approach and its support by deeply-rooted probability principles justify its broader acceptance and use.

**Frequency Relations**

The cumulative frequency curve is a common method of expressing the association between various magnitudes of natural events and their mean recurrence interval.

Implicit in the use of a frequency curve is the fact that the "most probable" magnitude that can be estimated anywhere along the curve is that value depicted by the mean curve. Where confidence intervals can be determined for the magnitudes, they indicate the reliability of the sample frequency relation. The mean curve and associated confidence intervals represent, from the practical viewpoint, the most efficient representation of the data. To more readily convey the "general" nature of a frequency relation Wilson suggests that it be drawn by a brush technique rather than by a pen line.

**Recurrence Interval Concept**

The basic premise involved in the use of a cumulative frequency curve is that an event and the average length of time between exceedances of this event can be estimated from past records. Such a recurrence interval, however, is an average or mean. The actual intervals of time between exceedances of this magnitude vary widely from the mean.

However, the mean recurrence interval has considerable meaning as a representative value and as an aid to judgment. It has even more meaning if the dispersion of the individual intervals about the mean can be determined. Fortunately, for many natural hydrologic events the variations in actual intervals with respect to the mean recurrence interval can be considered random.

Two authors, Riggs and Thorn, recently examined methods of assessing the dispersion of individual time intervals about the mean recurrence interval. Thom suggested an application of the Poisson distribution, and Riggs used an application of the binomial distribution. The two applications have been compared, and the differences were relatively small for the commonly used design periods of five years and greater. Consequently, the Riggs approach was followed here since it stressed the design period concept.

**Design Period Concept**

A conventional cumulative frequency curve of annual events shows the probability that a single random event will exceed a given magnitude E. It is assumed that such a frequency curve based on observed experience is available to define the relationship between mean recurrence interval MRI in years and magnitude E of events. For this curve, E is expressed as a function of MRI, as

\[ E = f(MRI) \]  

MRI is the reciprocal of \( P_1 \) stated as

\[ 1/MRI = P_1 \]  

where:

\[ P_1 = \text{the probability that event } E \text{ will be exceeded during any one year} \]

Further, \( 1 - P_1 \) is the probability that E will not be exceeded in any one year.

Then, by the multiplicative law as described by Riggs,

\[ P_n = (1 - P_1)^n \]  

where:

\[ P_n = \text{the probability of not exceeding event } E \text{ in } n \text{ years} \]

\[ n = \text{the number of years in the design period} \]

Substituting \( 1/MRI \) for \( P_1 \) from equation 14 into equation 15, gives

\[ P_n = [1 - (1/MRI)]^n \]  

from which,

\[ n = \log P_n / \log [1 - (1/MRI)] \]  

Equation 17 relates the mean recurrence interval MRI of an event to the probability \( P_n \) that the magnitude of the event will not be exceeded during a selected design period n.

The solution of equation 17 for n using various selected values of mean recurrence interval and probabilities \( P_n \) furnishes values of the associated design period. Table 16 shows
Figure 22. Relation (from equation 17) between recurrence interval, design period, and probability that an event will not be exceeded during design period (Point A refers to example in text)

Figure 23. Frequency curve of net yield and yield-probability curves for theoretical reservoir on Salt Creek near Rowell

Table 16. Design Periods for Various Recurrence Intervals and Probabilities

<table>
<thead>
<tr>
<th>Mean recurrence interval, years</th>
<th>Design period, in years, for which event will not occur</th>
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<tbody>
<tr>
<td>3</td>
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<tr>
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<td>21 10 7 5.4 4.1 3.1 2.3 1.6 1.0 1.0 1.0 1.0 1.0 1.0 1.0</td>
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<td>50</td>
<td>60 45 34 25 18 11 5.2 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5</td>
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Use of Design Period Information

The theoretical reservoir on Salt Creek near Rowell has been analyzed to illustrate the development of the calculated risks associated with a particular reservoir. Table 8 provides the physical data, and table 14 shows the net yield in million gallons per day available from this reservoir during droughts having recurrence intervals from 2 to 40 years. The availability of this type of yield data is one of the prerequisites to the development of the calculated risks associated with the yield.

A plot of the net yield data of this reservoir is shown in figure 23. The points represent the yield data values taken from table 14, and the solid line represents the generalized relation between the net yield of this reservoir and the recurrence interval. The dashed lines, called yield-probability curves, were drawn by use of the relationship shown in figure 22, and show the net yield versus the design period for various values of \( P_n \), which is the probability that such yield will be met successfully during a particular design period. This family of curves appears again in figure 24.
and shows the probability that various yields will be met by this reservoir. This can also be interpreted as being the "probability against failure."

The information in figure 24 furnishes a complete picture of the probabilities or the risks associated with various yields available from this particular reservoir. For the engineer to utilize this information to its best advantage in culminating a reservoir design, or in determining a pumpage pattern to minimize damage and inconvenience due to pumpage restrictions, it is desirable that the information be further processed as shown in figure 25.

In this case, pumpage from this reservoir is to be limited to an amount that could be met during a drouth having a recurrence interval of 25 years. Reference to the solid line in figure 23 shows that the 25-year recurrence interval drouth is of such a severity that the net yield of the proposed reservoir would be 50.5 mgd. It has been assumed in this example that the reservoir will be operated at a pumpage of 50.5 mgd. Consequently, this reservoir will be able to meet this pumpage during a 25-year recurrence drouth; but, during a more severe drouth, say one of 26-year severity, some water shortage would occur. The actual calculated risks associated with this reservoir development and its pumpage are shown in figure 25.

Figure 25 can be interpreted as follows: With this reservoir in operation at the design pumpage of 50.5 mgd there is a probability of .9 (or 9 chances out of 10) that this pumpage will be met during the next 3-year period without failure. There are 8 chances out of 10 that this pumpage will be met during the next 6-year period without fail. Continuing across, there is a .5 probability that this pumpage rate will be met during the next 19-year period, and a probability of about .4 that it will be met during the next 24 years.

If, however, pumpage were restricted by 30 percent, there is a probability of about .8 that such a pumpage could be met for 25 years without fail. And, if pumpage were increased above the design rate, say at an overpumpage of about +30 percent, there is a .4 probability that such a rate could be met without failure for the next 10 years.
REFERENCES


Part 2. Low Flow Data

EXTENT OF DATA

Arrangement

Processed low flow data for each of 164 stream gaging stations in Illinois are presented in this section. The stations have been grouped according to physiographic divisions, as shown on figure 26, and as previously discussed under the heading “Total Stations.” Page numbers on figure 26 show where each division starts.

An enlarged map at the beginning of each division provides locations of all gaging stations therein; stations are identified by numbers keyed to an accompanying list of stations. The processed data for the stations are then presented in the numerical order of this list.

Locations of all stream gage stations, by number, also are shown on the state map in figure 27, on which physiographic divisions and principal rivers are indicated. Some of the stations located near divisional boundaries have been included with the division, upstream from the gage, in which the major portion of its drainage area lies.

Major Data Items

Four major items of data, arranged on facing pages, are given for each of the 164 stations; these items include the station description, the low flow recurrence curves, the draft-storage-recurrence table, and the draft-storage-recurrence curves.

Station descriptions include the surveyor’s location and the drainage area upstream from the gage, as well as pertinent facts about the gaging record. Periods of actual flow data are given up to and including the water year 1959. Where synthetic flow data have been used, the name of the index station and the period of the coincident record are given; the method of synthesis has been described under “Extending Streamflow Data.” The total data analyzed includes both actual and synthetic data. The mean discharge, given in units of inches per month, represents the mean rate of runoff for the station for the entire period, and is equivalent to the total runoff rate available for development at that location.

The small graph for each station provides a family of 10 selected low flow recurrence curves. Low flow values for drought durations from 6 to 60 months are given, and recurrence intervals for these low flow events are indicated. Derivation of the low flow recurrence curves was described with figure 7 in Part 1.

The table of data for each station, obtained by the mass analysis, is similar to table 6 in Part 1. These tabular data provide the required reservoir capacity, in inches, and the duration of the critical period, in months, for recurrence intervals of from 2 to 45 years, and to meet gross draft rates from 5 to 100 percent of the mean flow of the stations. The draft-storage-recurrence curves in the large graph on the facing page, which is similar to figure 9, represent the same data as in the table, except for the duration of the critical period. The table of complete data allows the user to replot, for his own use, any desired portion of the family of curves on the graph.

The enlarged maps and station information at the beginning of each physiographic division will provide the best guide to selection of the appropriate gaging station record for use with a particular reservoir site.

Example of Use of Data

To illustrate the procedure for using the low flow data in this publication to evaluate the yield of an impounding reservoir, a complete example of computations is given in table 17. Unit equivalents and conversion equations used throughout this example are given in Part 1 under the heading “Conversion of Units.”

In this example the yield analysis has been made for a potential impounding reservoir on Maple Creek in the Em-barrass River Basin, to be located in sec 21, T8N, R13W, Crawford County, or about 8 miles north of Oblong, Illinois. This potential site has been evaluated to provide necessary physical data on reservoir capacity, surface area, and drainage area, as shown at the top of table 17.

Figure 26 shows that Crawford County lies within the Springfield Plain physiographic division, and information from the enlarged division map indicates that the nearest gaging record is that for Station 6, North Fork of the Em-barrass River near Oblong. The low flow data for Station 6 (see pages 130-131) have been used in the analysis.

As a first step in using these data, the reservoir capacity in acre-feet was converted to equivalent inches on the drainage area, hereafter referred to as "inches," as shown in lines 3 and 4 of the table.

Before going further in the analysis, the probable loss of this reservoir capacity to sedimentation was estimated (lines 5-8). The percent of capacity loss per year for this reservoir was obtained by reading the graph in figure 21, and 25 years was selected as a meaningful length of time for the sediment loss estimate. The reduced reservoir capacity in inches obtained (line 8) represents, conservatively, the useful reservoir capacity during the next 25 years, and this figure was used for the remaining yield computations.
Figure 26. Physiographic divisions for Illinois keyed to pages that show enlarged divisional maps.
The mean flow for Station 6, as given in the station description, was converted to appropriate units and then used with the drainage area for the new site to obtain the long-time mean flow into the proposed reservoir (lines 9-12).

At this point key items of gross yield (lines 13-14) were obtained by careful study of the draft-storage-recurrence curves and table for Station 6, North Fork, Embarrass River, near Oblong.

The selected drought recurrence interval of 25 years and the computed reservoir capacity of 3.53 inches were applied to the drought-storage-recurrence curves for North Fork, and the intersection of these two values showed a gross draft rate of 29 percent of the mean flow (line 13). The table of draft-storage-recurrence data for Station 6 was then examined to find the appropriate duration of critical drawdown. Although the conditions were not identical, the 22.5-year recurrence interval and 30 percent of mean flow on the table were nearest to the desired values, and their entry in the table showed 16 months as the duration of the critical drawdown period (line 14). Interpolation of the table to determine the duration to use is not required.

As the next major step in the analysis, the evaporation loss for the proposed reservoir was determined (lines 15-19). From figure 13 in Part 1, Springfield was located as the nearest evaporation station for the Crawford County site, and the Springfield evaporation data in table 11 were then used. Established values of recurrence interval and critical duration were applied to table 11, giving the net evaporation loss in inches (line 16). This value, converted to feet, was applied to the evaporative surface area (line 18) to determine total evaporative loss, in acre-feet, from this reservoir during the critical period of 16 months.

The gross draft rate from lines 12 and 13 was converted to acre-feet in order to compute in comparable units the total gross draft for the critical period (line 22). Total evaporative loss was then subtracted from the total draft to furnish the net draft for the critical period (line 25). Although no calculation was made here for seepage loss, the designer could include seepage estimates at this point for a still more refined net draft figure. As a final solution in this yield analysis, the net yield was computed as a rate (line 26) and converted to million gallons per day and rounded off (line 27).

The analysis in table 17 provides the information that the net yield of the potential Maple Creek reservoir during a drought having a recurrence interval of 25 years is 1.9 mgd, and that this would be true even 25 years after construction since sedimentation loss for that time period was considered.

For a more complete evaluation of the potential reservoir, this analysis could be carried out for a number of different recurrence interval droughts. And, if further insight were desired, these additional computations would allow the plotting of a frequency curve of net yield and a family of yield-probability curves, as exemplified in figures 23, 24, and 25.

The choice as to the most representative gaging station record for use with a particular problem reservoir may not always be so clear-cut as in this example. Although the 164 processed records published here are believed to furnish satisfactory areal coverage of the state, a particular site might happen to be almost midway between two or more of these stations. In such instances, it is suggested that yield analyses for the site based on more than one station record might provide a meaningful evaluation.

It is believed that the relatively high degree of processing of these data, and the relative brevity of the net yield computation, will allow the user to carry out in a reasonable length of time the net yield computation for a variety of conditions pertinent to a problem reservoir, and that these computations should furnish excellent support for the user's judgment concerning the net yield of the project.
Table 17. Yield Analysis Computations for a Potential Impounding Reservoir, for a 25-Year Recurrence Drought

Maple Creek Reservoir, Embarrass River Basin, Crawford County, Sec 21, T8N, R13W, or about 8 miles north of Oblong. Drainage area = 14.9 square miles
Reservoir capacity = 2970 acre-feet  Reservoir surface area = 330 acres

1. PHYSIOGRAPHIC DIVISION: SPRINGFIELD PLAIN
2. CAGING STATION DATA USED: STATION 6, NORTH FORK, EMBARRASS RIVER
3. Reservoir Capacity Converted to Inches: \[ \frac{2970 \text{ acre-feet}}{14.9 \text{ sq mi}} = \frac{199 \text{ acre-feet/sq mi}}{0.01875} = 3.73 \text{ inches on drainage area} \]
4. \[ \frac{199 \times 0.01875}{14.9} = 3.73 \text{ inches} \]
5. Sedimentation Rate, from figure 21: \[ \frac{21}{25} \text{ percent per year} \]
6. Sedimentation Loss, in 25 years: \[ \frac{21}{25} \text{ percent} \times 25 \text{ years} = 5.3 \text{ percent} \]
7. Reduced Reservoir Capacity, after 25 years: \[ 100 \text{ percent} - 5.3 \text{ percent} = 94.7 \text{ percent} \]
8. \[ \frac{3.73 \text{ inches} \times 0.947}{3.53} \]
9. Mean Flow, from Station 6 data: \[ \frac{93}{25} \text{ inches per month} \]
10. \[ \frac{93}{8845} = \frac{0.82}{\text{cfs/sq mi}} \]
11. \[ \frac{0.82}{14.9} \text{ sq mi} = 12.2 \text{ cfs} \]
12. \[ \frac{12.2}{0.01875} = 7.88 \text{ mgd} \]
13. Gross Yield, from Station 6 graph, for 25-year recurrence drought: \[ 29 \text{ percent of mean flow} \]
14. Duration of Critical Drawdown, from Station 6 table: \[ 16 \text{ months} \]
15. Evaporation Data (Used): SPRINGFIELD
16. Net Evaporation Loss, from table 11: \[ \frac{38}{12} \text{ inches} = 3.17 \text{ feet} \]
17. Evaporative Loss: \[ \frac{38}{12} \text{ inches} = 3.17 \text{ feet} \]
18. Evaporative Surface Area: \[ \frac{330 \text{ acres} \times 0.65}{215 \text{ acres}} = 682 \text{ acre-feet per month} \]
19. \[ \frac{3.17}{215} \text{ feet} \times 215 \text{ acres} = 682 \text{ acre-feet} \]
20. Gross Draft Rate: \[ \frac{29}{211} \times 7.88 \text{ mgd} = 2.29 \text{ mgd} \]
21. \[ \frac{2.29}{92.3} \times 211 \text{ acre-feet per month} \]
22. Gross Critical Period Draft: \[ \frac{211}{16} \text{ months} = 3376 \text{ acre-feet} \]
23. Minus evaporative loss = 682 \text{ acre-feet} \]
24. (Minus seepage loss = 682 \text{ acre-feet})
25. Net critical period draft = 2694 \text{ acre-feet}
26. Net Yield of Reservoir: \[ \frac{2694 \text{ acre-feet}}{16 \text{ months}} = 168 \text{ acre-feet per month} \]
27. \[ \frac{168 \text{ acre-feet}}{0.011} = 1.85 \text{ mgd} = \frac{1.9}{\text{mgd}} \]
Gaging Stations in Bloomington Ridged Plain — South

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
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<td>42</td>
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<td>13</td>
<td>West Branch, Salt Fork at Urbana</td>
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<td>17</td>
<td>Vermilion River near Catlin</td>
<td>46</td>
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<tr>
<td>18</td>
<td>Vermilion River near Danville</td>
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<td>19</td>
<td>Salt Fork, Vermilion River near Homer</td>
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STATIONS OMITTED

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<td>Embarrass River near Camargo</td>
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BLUEGRASS CREEK AT POTOMAC

STATION 1

LOCATION
In SE ¼ NE ¼ sec 34, T22N, R13W, Vermilion County, at highway bridge 1.0 mile north of Potomac

DRAINAGE AREA
34.5 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1915-49
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 10 years; water years 1950-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 1.18 inches per month

Draft-Storage-Recurrence Data for Bluegrass Creek at Potomac

![Recurrence Curves](chart.png)

**Recurrence Interval in Years**

| Recurrence Interval | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|--------------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mean Discharge     | 1.18 inches per month | | | | | | | | | | | | | | | | | | | | | | |
WEST BRANCH, SALT FORK AT URBANA

STATION 13

LOCATION
In NE ¼ SW ¼ sec 9, T19N, R9E, Champaign County, at Champaign-Urbana sewage plant 1.0 mile east of Urbana

DRAINAGE AREA
71.4 square miles

ACTUAL FLOW DATA
PERIOD: July 1936 thru Sept 1958; gaging discontinued Oct 1, 1958
CONTINUOUS RECORD: 22 years; water years 1937-58

SYNTHETIC FLOW DATA
PERIOD: 23 years; water years 1915-36, 1959
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 22 years; water years 1937-58

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.83 inch per month

Draft-Storage-Recurrence Data for West Branch, Salt Fork at Urbana

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DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
WEST BRANCH SALT FORK AT URBANA

RECURRENT INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESEVOIR STORAGE CAPACITY IN INCHES

5% DRAFT RATE NEEDS ZERO STORAGE
VERMILION RIVER NEAR CATLIN

STATION 17

LOCATION
In SE ¼ SE ¼ sec 16, T19N, R12W, Vermilion County, 12.5 miles northwest of Catlin and 14.5 miles southwest of Danville

DRAINAGE AREA
959 square miles

ACTUAL FLOW DATA
PERIOD: May 1940 thru Sept 1958; gaging discontinued Oct. 1, 1958
CONTINUOUS RECORD: 19 years; water years 1940-58

SYNTHETIC FLOW DATA
PERIOD: 12 years; water years 1929-39, 1959
INDEX STATION: Vermilion River near Danville
COINCIDENT RECORD: 19 years; water years 1940-58

TOTAL DATA ANALYZED
PERIOD: 31 years; water years 1929-59
MEAN DISCHARGE: 0.82 inch per month

Draft-Storage-Recurrence Data for Vermilion River near Catlin

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals (Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>Mean Discharge: 0.82 inch per month</th>
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(Continued on page 46)
Vermilion River near Danville

Station 18

Location
In SE ¼ NW ¼ sec 22, T19N, R11W, Vermilion County, 0.25 mile downstream from sewage treatment plant, 2.5 miles southeast of Danville

Drainage Area
1280 square miles, approximately

Actual Flow Data
Period: Oct 1914 thru Sept 1921, June 1928 thru Sept 1959

Continuous Record: 31 years; water years 1929-59

Synthetic Flow Data
None; this station utilized as an index station

Total Data Analyzed
Period: 31 years; water years 1929-59

Mean Discharge: 0.83 inch per month

Draft-Storage-Recurrence Data for Vermilion River near Danville

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drawdown period in months shown below each capacity value)

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<tr>
<th>Recurrence interval in years</th>
<th>Mean draft rate in percent of mean flow</th>
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Draft-Storage-Recurrence Data for Vermilion River near Danville

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>Mean draft rate in percent of mean flow</th>
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Draft-Storage-Recurrence Data for Vermilion River near Danville

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DRAFT STORAGE RECURRANCE CURVES
BASED ON
VERMILION RIVER NEAR DANVILLE

RECURRENT INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES
STATION 19

LOCATION
In SW ¼ SW ¼ sec 33, T19N, R14W, Champaign County, at Ill. 49 bridge 1.1 miles north of Homer

DRAINAGE AREA
344 square miles

ACTUAL FLOW DATA
CONTINUOUS RECORD: 14 years; water years 1945-58

SYNTHETIC FLOW DATA
PERIOD: 17 years; water years 1929-44, 1959
INDEX STATION: Vermilion River near Danville
COINCIDENT RECORD: 14 years; water years 1945-58

TOTAL DATA ANALYZED
PERIOD: 31 years; water years 1929-59
MEAN DISCHARGE: 0.81 inch per month

Draft-Storage-Recurrence Data for Salt Fork, Vermilion River near Homer

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>20</th>
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</table>

MEAN DISCHARGE: 0.81 inch per month
ASA CREEK AT SULLIVAN

LOCATION
In NW ¼ NW ¼ sec 36, T14N, R5E, Moultrie County, at highway bridge 0.8 mile north of Sullivan

DRAINAGE AREA
7.93 square miles

ACTUAL FLOW DATA
PERIOD: July 1950 thru Sept 1959
CONTINUOUS RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1915-50
INDEX-STATION: Sangamon River at Monticello
COINCIDENT RECORD: 9 years; water years 1951-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.78 inch per month

Draft-Storage-Recurrence Data for Asa Creek at Sullivan

<table>
<thead>
<tr>
<th>recurrence interval in years</th>
<th>5 10 15 25 50 75 90 100</th>
<th>5 10 15 25 50 75 90 100</th>
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Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
GOOSE CREEK NEAR DELAND

LOCATION
In NW ¼ sec 22, T19N, R5E, Piatt County, at bridge 2.0 miles southeast of DeLand

DRAINAGE AREA
47.3 square miles

ACTUAL FLOW DATA
PERIOD: May 1951 thru Sept 1959; gaging discontinued Oct 1, 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1915-51
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.77 inch per month

Draft-Storage-Recurrence Data for Goose Creek near DeLand

Recession storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each recurrence interval)

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<tr>
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Mean discharge: 0.77 inch per month
**HICKORY CREEK ABOVE LAKE BLOOMINGTON**

**LOCATION**
In SE ¼ sec 11, T25N, R2E, McLean County, 0.25 mile upstream from Lake Bloomington and 3.0 miles northeast of Hudson

**DRAINAGE AREA**
10.1 square miles

**ACTUAL FLOW DATA**
**PERIOD:** Oct 1938 thru Sept 1958; gaging discontinued Oct 1, 1958

**SYNTHETIC FLOW DATA**
**PERIOD:** 18 years; water years 1922-38, 1959

**INDEX STATION:** Mackinaw River near Green Valley

**COINCIDENT RECORD:** 18 years; water years 1939-56

**TOTAL DATA ANALYZED**
**PERIOD:** 38 years; water years 1922-59

**MEAN DISCHARGE:** 0.78 inch per month

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### Draft-Storage-Recurrence Data for Hickory Creek above Lake Bloomington

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</tbody>
</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Detroit of ordinate drawn at point in months shown below each capacity value)

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### Station 76

**LOCATION**
In SE ¼ sec 11, T25N, R2E, McLean County, 0.25 mile upstream from Lake Bloomington and 3.0 miles northeast of Hudson

**DRAINAGE AREA**
10.1 square miles

**ACTUAL FLOW DATA**
**PERIOD:** Oct 1938 thru Sept 1958; gaging discontinued Oct 1, 1958

**SYNTHETIC FLOW DATA**
**PERIOD:** 18 years; water years 1922-38, 1959

**INDEX STATION:** Mackinaw River near Green Valley

**COINCIDENT RECORD:** 18 years; water years 1939-56

**TOTAL DATA ANALYZED**
**PERIOD:** 38 years; water years 1922-59

**MEAN DISCHARGE:** 0.78 inch per month
**STATION 86**

**LOCATION**
In NW 1/4 NW 1/4 sec 18, T19N, R8E, Champaign County, at bridge on Ill. 10, 1.0 mile east of Bondville and 3.8 miles west of Champaign.

**DRAINAGE AREA**
12.3 square miles

**ACTUAL FLOW DATA**
PERIOD: Dec 1948 thru Sept 1959

**SYNTHETIC FLOW DATA**
PERIOD: 34 years; water years 1915-48

**INDEX STATION**: Sangamon River at Monticello

**COINCIDENT RECORD**: 11 years; water years 1949-59

**TOTAL DATA ANALYZED**
PERIOD: 45 years; water years 1915-59

**MEAN DISCHARGE**: 0.83 inch per month

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**Draft-Storage-Recurrence Data for Kaskaskia River at Bondville**

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
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<th>90</th>
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<tr>
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**Recurrence curve for Kaskaskia River at Bondville**

[Diagram showing recurrence curves]

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**Low-flow recurrence curves for Kaskaskia River at Bondville**

<table>
<thead>
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<th>Recurrence interval in years</th>
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<th>10</th>
<th>15</th>
<th>20</th>
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**Draft-Storage-Recurrence Data for Kaskaskia River at Bondville**

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<th>Recurrence interval in years</th>
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<th>25</th>
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**Draft-Storage-Recurrence Data for Kaskaskia River at Bondville**

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DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
KASKASKIA RIVER AT BONDVILLE

RECURRENT INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESEVOIR STORAGE CAPACITY IN INCHES
KASKASKIA RIVER AT SHELBYVILLE

LOCATION
In SE ¼ SW ¼ sec 8, T11N, R4E, Shelby County, 50 feet upstream from bridge on Ill. 16 in Shelbyville.

DRAINAGE AREA
1030 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Feb 1908 thru Sept 1912, Aug. thru Dec 1914, Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 26 years; water years 1915-40
INDEX STATION: Kaskaskia River at Vandalia
COINCIDENT RECORD: 13 years; water years 1941-53
Note: Some regulation present during water years 1954-59 at this station and the index station; these years omitted

TOTAL DATA ANALYZED
PERIOD: 39 years; water years 1915-53
MEAN DISCHARGE: 0.85 inch per month

Draft-Storage-Recurrence Data for Kaskaskia River at Shelbyville

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<th>Recurrence interval, years</th>
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Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

MEAN DISCHARGE: 0.85 inch per month
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
KASKASKIA RIVER AT SHELBYVILLE

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS
KICKAPOO CREEK NEAR LINCOLN

STATION 93

LOCATION
In NE ¼ NW ¼ sec 18, T20N, R2W, DeWitt County, at highway bridge 3.0 miles north of Lincoln

DRAINAGE AREA
306 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 30 years; water years 1915-44
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 15 years; water years 1945-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.73 inch per month

Draft-Storage-Recurrence Data for Kickapoo Creek near Lincoln

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<th>Recurrence Interval (years)</th>
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(Discharge in inches per month)

Draft-Storage-Recurrence Curves

Acme storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical flood period in months shown below each capacity value)
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
KICKAPOO CREEK NEAR LINCOLN

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS
KICKAPOO CREEK AT WAYNESVILLE

STATION 95

LOCATION
On line between sec 19 and 20, T21N, R1E, DeWitt County, at bridge 0.7 mile north of Waynesville and 5.5 miles east of Atlanta

DRAINAGE AREA
227 square miles

ACTUAL FLOW DATA
PERIOD: Jan 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 34 years; water years 1915-48
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 11 years; water years 1949-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.61 inch per month

Draft-Storage-Recurrence Data for Kickapoo Creek at Waynesville

<table>
<thead>
<tr>
<th>Recurrence Interval (Years)</th>
<th>Gross Cutoff</th>
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KICKAPOO CREEK AT WAYNESVILLE

STATION 95

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On line between sec 19 and 20, T21N, R1E, DeWitt County, at bridge 0.7 mile north of Waynesville and 5.5 miles east of Atlanta

DRAINAGE AREA
227 square miles

ACTUAL FLOW DATA
PERIOD: Jan 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 34 years; water years 1915-48
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 11 years; water years 1949-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.61 inch per month

Draft-Storage-Recurrence Data for Kickapoo Creek at Waynesville

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drought period in months shown below each capacity value)

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MONEY CREEK NEAR TOWANDA

LOCATION
In SW ¼ SW ¼ sec 20, T25N, R3E, McLean County, at highway bridge 3.0 miles north of Towanda and 8.0 miles northeast of Normal.

DRAINAGE AREA
47.9 square miles

ACTUAL FLOW DATA

PERIOD: May 1958 thru Sept 1959
Note: For 25 years, water years 1934-58, this stream was gaged one mile downstream "above Lake Bloomington"; records have been combined.

CONTINUOUS RECORD: 26 years; water years 1934-59

SYNTHETIC FLOW DATA

PERIOD: 12 years; water years 1922-33
INDEX STATION: Mackinaw River at Green Valley
COINCIDENT RECORD: 23 years; water years 1934-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.72 inch per month

Draft-Storage-Recurrence Data for Money Creek near Towanda

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical floods: period in years; above: below each capacity value)

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<tr>
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<td>5.6, 0.11</td>
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</tbody>
</table>

MEAN DISCHARGE: 0.72 inch per month
SALT CREEK NEAR ROWELL

LOCATION
In NE ¼ SE ¼ sec 11, T19N, R1E, DeWitt County, at highway bridge 0.5 mile upstream from U. S. 54, 3.2 miles northwest of Rowell, and 7.0 miles southwest of Clinton

DRAINAGE AREA
334 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1942 thru Sept 1959
CONTINUOUS RECORD: 17 years; water years 1943-59

SYNTHETIC FLOW DATA
PERIOD: 28 years; water years 1915-42
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 17 years; water years 1943-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE : 0.79 inch per month

Draft-Storage-Recurrence Data for Salt Creek near Rowell

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Cross drought rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>in years</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>35.6</td>
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<tr>
<td>10</td>
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</tr>
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<tr>
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<td>2.8</td>
</tr>
<tr>
<td>100</td>
<td>0.9</td>
</tr>
</tbody>
</table>

(Duration of critical drought period in months shown below each capacity value)
DRAFT STORAGE RECURRENT CURVES
BASED ON
SALT CREEK NEAR ROWELL

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS
**SANGAMON RIVER AT MAHOMET**

**STATION 133**

**LOCATION**
In NE ¼ SW ¼ sec 15, T20N, R7E, Champaign County, at bridge on U. S. 150 in Mahomet

**DRAINAGE AREA**
356 square miles

**ACTUAL FLOW DATA**
- **PERIOD:** Mar 1948 thru Sept 1959
- **CONTINUOUS RECORD:** 11 years; water years 1949-59

**SYNTHETIC FLOW DATA**
- **PERIOD:** 34 years; water years 1915-48
- **INDEX STATION:** Sangamon River at Monticello
- **COINCIDENT RECORD:** 11 years; water years 1949-59

**TOTAL DATA ANALYZED**
- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.82 inch per month

---

**Draft-Storage-Recurrence Data for Sangamon River at Mahomet**

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>G eats draft rate in percent of mean flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4.56</td>
<td>0.23</td>
<td>0.35</td>
<td>0.68</td>
<td>0.83</td>
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<td>1.15</td>
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<td>1.51</td>
<td>1.68</td>
<td>1.86</td>
<td>2.05</td>
<td>2.25</td>
<td>2.47</td>
<td>2.71</td>
<td>2.98</td>
<td>3.25</td>
<td>3.57</td>
<td>3.89</td>
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<tr>
<td>4.75</td>
<td>0.26</td>
<td>0.39</td>
<td>0.65</td>
<td>0.79</td>
<td>0.94</td>
<td>1.08</td>
<td>1.23</td>
<td>1.38</td>
<td>1.55</td>
<td>1.74</td>
<td>1.94</td>
<td>2.16</td>
<td>2.39</td>
<td>2.64</td>
<td>2.91</td>
<td>3.20</td>
<td>3.50</td>
<td>3.84</td>
<td>4.19</td>
<td>4.56</td>
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</tbody>
</table>

---

**DRAFT-STORE-DRECURRECE DATA FOR SANGAMON RIVER AT MAHOMET**

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
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</thead>
<tbody>
<tr>
<td>G eats draft rate in percent of mean flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4.56</td>
<td>0.23</td>
<td>0.35</td>
<td>0.68</td>
<td>0.83</td>
<td>1.02</td>
<td>1.15</td>
<td>1.25</td>
<td>1.37</td>
<td>1.51</td>
<td>1.68</td>
<td>1.86</td>
<td>2.05</td>
<td>2.25</td>
<td>2.47</td>
<td>2.71</td>
<td>2.98</td>
<td>3.25</td>
<td>3.57</td>
<td>3.89</td>
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<td>4.75</td>
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<td>0.39</td>
<td>0.65</td>
<td>0.79</td>
<td>0.94</td>
<td>1.08</td>
<td>1.23</td>
<td>1.38</td>
<td>1.55</td>
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<td>2.91</td>
<td>3.20</td>
<td>3.50</td>
<td>3.84</td>
<td>4.19</td>
<td>4.56</td>
</tr>
</tbody>
</table>

---

**TOTAL DATA ANALYZED**
- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.82 inch per month
SANGAMON RIVER AT MONTICELLO

LOCATION
In SW ¼ sec 12, T18N, R5E, Piatt County, at Illinois Central Railroad bridge 0.5 mile west of Monticello

DRAINAGE AREA
550 square miles

ACTUAL FLOW DATA
PERIOD: Feb 1908 thru Dec 1912, June 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.81 inch per month

Draft-Storage-Recurrence Data for Sangamon River at Monticello

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of event) drawn down period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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<td>.64</td>
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<td>.20</td>
<td>.28</td>
<td>.36</td>
<td>.44</td>
<td>.52</td>
<td>.60</td>
</tr>
</tbody>
</table>

MEAN DISCHARGE: 0.81 inch per month

72
LOCATION
In SW ¼ NE ¼ sec 24, T17N, R3E, Macon County, at bridge 3.0 miles north of Oakley and 9.0 miles northeast of Decatur

DRAINAGE AREA
750 square miles

ACTUAL FLOW DATA
PERIOD: July 1951 thru Sept 1959; fragmentary since Sept 1956

SYNTHETIC FLOW DATA
PERIOD: 40 years; water years 1915-51, 1957-59
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 5 years; water years 1952-56

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.82 inch per month

Draft-Storage-Recurrence Data for Sangamon River near Oakley

Reservoir storage capacity in inches required to meet draft norms at various recurrence intervals
(Evolution of critical droughts; period in months shown below each capacity value)
DRAFT STORAGE RECURRENCE CURVES
BASED ON
SANGAMON RIVER NEAR OAKLEY

RECURRENT INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT STORAGE CAPACITY IN INCHES

100
90
80
70
60
55
50
45
40
35
30
25
20
15
10
5

0.01
0.1
1
10
100
LOCATION
In NE ¼ NE ¼ sec 3, T20N, R3W, DeWitt County, at bridge on Ill. 121, 2.5 miles southeast of Hartsburg and 4.0 miles northwest of Lincoln.

DRAINAGE AREA
335 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 23 years; water years 1922-44
INDEX STATION: Mackinaw River near Green Valley
COINCIDENT RECORD: 12 years; water years 1945-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.68 inch per month
EMBARRASS RIVER NEAR DIONA

LOCATION
In NW ¼ sec 2, T10N, R9E, Cumberland County, at highway bridge 2.7 miles southwest of Diona and 6.0 miles north of Greenup

DRAINAGE AREA
903 square miles

ACTUAL FLOW DATA
PERIOD: Jan 1939 thru June 1940, July 1944 thru Sept 1947; gaging discontinued Oct 1, 1947
CONTINUOUS RECORD: 3 years; water years 1945-47

SYNTHETIC FLOW DATA
PERIOD: 42 years; water years 1915-44, 1948-59
INDEX STATION: Sangamon River at Monticello
COINCIDENT RECORD: 8 years; water years 1939-47 (fragmentary)

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.97 inch per month

Draft-Storage-Recurrence Data for Embarrass River near Diana

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

| Recurrence interval | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|---------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 4.0                 | .21| .36| .59| .99| 1.50| 1.90| 2.30| 2.70| 3.10| 3.60| 4.10| 4.60| 5.10| 5.60| 6.10| 6.60| 7.10| 7.60| 8.10| 8.60|
| 4.5                 | .21| .36| .59| .99| 1.50| 1.90| 2.30| 2.70| 3.10| 3.60| 4.10| 4.60| 5.10| 5.60| 6.10| 6.60| 7.10| 7.60| 8.10| 8.60|
| 5.0                 | .21| .36| .59| .99| 1.50| 1.90| 2.30| 2.70| 3.10| 3.60| 4.10| 4.60| 5.10| 5.60| 6.10| 6.60| 7.10| 7.60| 8.10| 8.60|
| 5.5                 | .21| .36| .59| .99| 1.50| 1.90| 2.30| 2.70| 3.10| 3.60| 4.10| 4.60| 5.10| 5.60| 6.10| 6.60| 7.10| 7.60| 8.10| 8.60|
| 6.0                 | .21| .36| .59| .99| 1.50| 1.90| 2.30| 2.70| 3.10| 3.60| 4.10| 4.60| 5.10| 5.60| 6.10| 6.60| 7.10| 7.60| 8.10| 8.60|

Draft-Storage-Recurrence Data for Embarrass River near Diana

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
MACKINAW RIVER NEAR GREEN VALLEY

LOCATION
In SE ¼, NW ¼ sec 15, T23N, R5W, Tazewell County, at bridge on Ill. 29, 3.0 miles north of Green Valley and 3.5 miles south of South Pekin

DRAINAGE AREA
1100 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Apr 1921 thru Sept 1956; gaging discontinued Oct 1, 1956
CONTINUOUS RECORD: 35 years; water years 1922-56

SYNTHETIC FLOW DATA
PERIOD: 3 years; water years 1957-59
INDEX STATION: Mackinaw River at Congerville
CONCORDENT RECORD: 12 years; water years 1945-56
This station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.70 inch per month

Draft-Storage-Recurrence Data for Mackinaw River near Green Valley

<table>
<thead>
<tr>
<th>Recurrence Interval (Years)</th>
<th>Mean Discharge (inches per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.61</td>
</tr>
<tr>
<td>10</td>
<td>0.70</td>
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<tr>
<td>100</td>
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</tr>
</tbody>
</table>

Below is a table showing the draft-storage-recurrence data for Mackinaw River near Green Valley. The data includes mean discharge values for different recurrence intervals.

**Recurrence Interval (Years)**
- 5
- 10
- 25
- 50
- 100

**Mean Discharge (inches per month)**
- 0.61
- 0.70
- 0.71
- 0.76
- 0.79

This table provides a summary of the mean discharge values for various recurrence intervals, which can be used to understand the storage and discharge characteristics of the Mackinaw River near Green Valley.
SALT FORK, VERMILION RIVER NEAR ST. JOSEPH

STATION 200

LOCATION
In NW ¼ SE ¼ sec 35, T20N, R10E, Champaign County, at township highway bridge 2.5 miles north of St. Joseph

DRAINAGE AREA
134 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1958 thru Sept 1959
CONTINUOUS RECORD: 1 year; water year 1959

SYNTHETIC FLOW DATA
PERIOD: 30 years; water years 1929-58
INDEX STATION: Vermilion River near Danville
COINCIDENT RECORD: 1 year; water year 1959

TOTAL DATA ANALYZED
PERIOD: 31 years; water years 1929-59
MEAN DISCHARGE: 0.93 inch per month

Draft-Storage-Recurrence Data for Salt Fork, Vermilion River near St. Joseph

Reservoir storage capacity in billions required to meet draft rates at various recurrence intervals
(Duration of critical droughts per period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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</tbody>
</table>

84
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
SALT FORK, VERMILION RIVER, NEAR ST. JOSEPH

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

5% DRAFT RATE NEEDS ZERO STORAGE

RECURRENT INTERVAL IN YEARS

RESEVOIR STORAGE CAPACITY IN INCHES
### Gaging Stations in Bloomington Ridged Plain — North

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Ackerman Creek at Farmdale</td>
<td>88</td>
</tr>
<tr>
<td>43</td>
<td>Bureau Creek at Princeton</td>
<td>90</td>
</tr>
<tr>
<td>44</td>
<td>East Bureau Creek near Bureau</td>
<td>92</td>
</tr>
<tr>
<td>45</td>
<td>West Bureau Creek at Wyantet</td>
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</tr>
<tr>
<td>51</td>
<td>Crow Creek (West) near Henry</td>
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<tr>
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<td>Crow Creek near Washburn</td>
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<td>Farm Creek at Farmdale</td>
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<td>Farm Creek at East Peoria</td>
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<td>Fondulac Creek near East Peoria</td>
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<td>Fox River at Dayton</td>
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<tr>
<td>67</td>
<td>Gimlet Creek at Sparland</td>
<td>108</td>
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<td>Kickapoo Creek near Kickapoo</td>
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<td>Kickapoo Creek at Peoria</td>
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<td>Mackinaw River near Congerville</td>
<td>114</td>
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<td>117</td>
<td>East Branch, Panther Creek near Gridley</td>
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<td>118</td>
<td>East Branch, Panther Creek at El Paso</td>
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<td>Panther Creek near El Paso</td>
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<td>South Branch, Kishwaukee River at DeKalb</td>
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<td>213</td>
<td>Pecumsaugan Creek near Utica</td>
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#### STATIONS OMITTED

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<td>170</td>
<td>Fox River at Wedron</td>
<td>Combined with record for Station 66</td>
</tr>
<tr>
<td>208</td>
<td>Blackberry Creek near Yorkville</td>
<td>Record too short</td>
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</table>

#### Legend

- **SYNTHETIC**
- **ACTUAL**
ACKERMAN CREEK AT FARMDALE

LOCATION
In SE 1/4 SE 1/4 sec 36, T26N, R4W, Tazewell County, at New York, Chicago and St. Louis Railroad bridge 0.45 miles southeast of Farmdale

DRAINAGE AREA
11.8 square miles

ACTUAL FLOW DATA
PERIOD: Dec 1954 thru Sept 1959
CONTINUOUS RECORD: 5 years; water years 1955-59

SYNTHETIC FLOW DATA
PERIOD: 33 years; water years 1922-54
INDEX STATION: Mackinaw River at Green Valley
COINCIDENT RECORD: 2 years; water years 1955-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.58 inch per month

Draft-Storage-Recurrence Data for Ackerman Creek at Farmdale

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drawdown period in months shown below each capacity value)

Draft-Storage-Recurrence Curves for Ackerman Creek at Farmdale

<table>
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<tr>
<th>Recurrence interval years</th>
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88
DRAFT- STORAGE- RECURRENT CURVES
BASED ON
ACKERMAN CREEK AT FARMDALE
BUREAU CREEK AT PRINCETON

LOCATION
In SW ¼ SE ¼ sec 18, T16N, R8W, Bureau County near a bridge on U. S. 6 and U. S. 34, 1.5 miles west of Princeton

DRAINAGE AREA
186 square miles

ACTUAL FLOW DATA
PERIOD: Mar 1936 thru Sept 1959
CONTINUOUS RECORD: 23 years; water years 1937-59

SYNTHETIC FLOW DATA
PERIOD: 22 years; water years 1915-36
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 23 years; water years 1937-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.72 inch per month

Draft-Storage-Recurrence Data for Bureau Creek at Princeton

Reservoir storage capacity in inches required to meet drought rates at various recurrence intervals.
(Based on ordnadedraw-down period in months shown below each capacity value)

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<th>Recurrence interval (years)</th>
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</table>

90
EAST BUREAU CREEK NEAR BUREAU

LOCATION
In SW ¼ SE ¼ sec 30, T16N, R10E, Bureau County, at county highway bridge 3.5 miles north of Bureau

DRAINAGE AREA
101 square miles

ACTUAL FLOW DATA
PERIOD: Mar 1936 thru Sept 1959
CONTINUOUS RECORD: 23 years; water years 1937-59

SYNTHETIC FLOW DATA
PERIOD: 22 years; water years 1915-36
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 23 years; water years 1937-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.58 inch per month

Draft-Storage-Recurrence Data for East Bureau Creek near Bureau

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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STATION 44

SYNTHETIC FLOW DATA
PERIOD: 22 years; water years 1915-36
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 23 years; water years 1937-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.58 inch per month
DRAFT STORAGE-RECURRENCE CURVES
BASED ON
EAST BUREAU CREEK NEAR BUREAU

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS

0.01 0.1 1 10 100
2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 100
LOCATION
At northeast corner of sec 21, T16N, R8E, Bureau County, at bridge on U. S. 6 and U. S. 34, 0.5 mile east of Wyanet

DRAINAGE AREA
83.3 square miles

ACTUAL FLOW DATA
PERIOD: Mar 1936 thru Sept 1959
CONTINUOUS RECORD: 23 years; water years 1937-59

SYNTHETIC FLOW DATA
PERIOD: 23 years; water years 1915-36
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 23 years; water years 1937-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.65 inch per month

Draft-Storage-Recurrence Data for West Bureau Creek at Wyanet

Reservoir storage capacity in index required to meet draft rates at various recurrence intervals

Duration of critical drawdown period in months above each capacity value

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<td>Draft Rate (in percent of mean flow)</td>
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</tr>
</tbody>
</table>

94
DRAFT- STORAGE- RECURRENCE CURVES
BASED ON
WEST BUREAU CREEK AT WYANEtid

RECURRENT INTERVAL IN YEARS
CROW CREEK (WEST) NEAR HENRY

LOCATION
In SW ¼ SE ¼ sec 36, T14N, R9E, Putnam County, at bridge No. 7, 2.4 miles west of Ill. 29, and 3.6 miles northwest of Henry

DRAINAGE AREA
55.3 square miles

ACTUAL FLOW DATA
PERIOD: May 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1915-49
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 10 years; water years 1950-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.70 inch per month

Draft-Storage-Recurrence Data for Crow Creek (West) near Henry

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Mean Discharge (inches per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.69</td>
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<tr>
<td>10</td>
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<tr>
<td>15</td>
<td>0.71</td>
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Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

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<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Capacity (inches)</th>
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<td>95</td>
<td>0.87</td>
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<td>100</td>
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DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
CROW CREEK (west) NEAR HENRY

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS
CROW CREEK NEAR WASHBURN

STATION 52

LOCATION
In SW ¼ sec 23, T29N, R2W, Marshall County, at highway bridge 2.5 miles northwest of Washburn

DRAINAGE AREA
123 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 23 years; water years 1922-44
INDEX STATION: Mackinaw River near Green Valley
COINCIDENT RECORD: 12 years; water years 1945-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.58 inch per month

| Recurrence interval, years | 2  | 5  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|---------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Low flow recurrence curves |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Draft-Storage-Recurrence Data for Crow Creek near Washburn

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown periods in months shown below each capacity value)

| Duration of critical drawdown periods in months | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|------------------------------------------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 2,4 | 0.25 | 0.16 | 0.09 | 0.07 | 0.05 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 2,2 | 0.25 | 0.16 | 0.09 | 0.07 | 0.05 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 2,1 | 0.25 | 0.16 | 0.09 | 0.07 | 0.05 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 2,0 | 0.25 | 0.16 | 0.09 | 0.07 | 0.05 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

98
**FARM CREEK AT FARMDALE**

**LOCATION**
In NE ¼ SE ¼ sec 36, T26N, R4W, Tazewell County, near bridge on County Road, 0.3 mile east of Farmdale

**DRAINAGE AREA**
27.6 square miles

**ACTUAL FLOW DATA**
- PERIOD: Oct 1949 thru Sept 1959
- CONTINUOUS RECORD: 11 years; water years 1949-59

**SYNTHETIC FLOW DATA**
- PERIOD: 27 years; water years 1922-48
- INDEX STATION: Mackinaw River near Green Valley
- COINCIDENT RECORD: 8 years; water years 1949-56

**TOTAL DATA ANALYZED**
- PERIOD: 38 years; water years 1922-59
- MEAN DISCHARGE: 0.64 inch per month

---

**Draft-Storage-Recurrence Data for Farm Creek at Farndale**

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>2</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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<td>3.25</td>
<td>4.00</td>
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<td>3.90</td>
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<td>11.40</td>
<td>12.15</td>
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</tr>
</tbody>
</table>

**LOW FLOW RECURRENCE CURVES**

100
FARM CREEK AT EAST PEORIA

STATION 61

LOCATION
In SW ¼ NW ¼ sec 33, T26N, R4W, Tazewell County, about 30 feet upstream from Main Street Bridge in East Peoria

DRAINAGE AREA
60.9 square miles

ACTUAL FLOW DATA
PERIOD: May 1943 thru Sept 1959
CONTINUOUS RECORD: 16 years; water years 1944-59

SYNTHETIC FLOW DATA
PERIOD: 22 years; water years 1922-43
INDEX STATION: Mackinaw River near Green Valley
COINCIDENT RECORD: 13 years; water years 1944-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.70 inch per month

Draft-Storage-Recurrence Data for Farm Creek at East Peoria

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>Cross-recurrence flow in percent of mean flow</th>
</tr>
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</tr>
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</tr>
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Flood-Storage-Recurrence Data for Farm Creek at East Peoria

Rearrange storage capacity in inches required to meet flow rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
FARM CREEK AT EAST PEORIA

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS
FONDULAC CREEK NEAR EAST PEORIA

LOCATION
On line between SW ¼ and SE ¼ sec 26, T26N, R4W, Tazewell County, at bridge on U. S. 24, 3.0 miles northeast of East Peoria

DRAINAGE AREA
5.47 square miles

ACTUAL FLOW DATA
PERIOD: Jan 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 27 years; water years 1922-48
INDEX STATION: Mackinaw River near Green Valley
COINCIDENT RECORD: 8 years; water years 1949-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.64 inch per month

Draft-Storage-Recurrence Data for Fondulac Creek near East Peoria

Reservoir storage capacity in inches required to meet drought rates at various recurrence intervals
(Duration of critical draw-down period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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<th>85</th>
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<td>363</td>
<td>517</td>
<td>710</td>
<td>1006</td>
<td>1543</td>
<td>2425</td>
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</tr>
<tr>
<td>40</td>
<td>10.4</td>
<td>17.4</td>
<td>30.3</td>
<td>53.9</td>
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<td>170</td>
<td>268</td>
<td>422</td>
<td>615</td>
<td>853</td>
<td>1216</td>
<td>1825</td>
<td>2837</td>
<td>4302</td>
<td>6454</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>12.0</td>
<td>20.9</td>
<td>37.6</td>
<td>76.1</td>
<td>170</td>
<td>268</td>
<td>422</td>
<td>615</td>
<td>853</td>
<td>1216</td>
<td>1825</td>
<td>2837</td>
<td>4302</td>
<td>6454</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>13.7</td>
<td>24.5</td>
<td>50.0</td>
<td>100.0</td>
<td>170</td>
<td>268</td>
<td>422</td>
<td>615</td>
<td>853</td>
<td>1216</td>
<td>1825</td>
<td>2837</td>
<td>4302</td>
<td>6454</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>15.3</td>
<td>28.1</td>
<td>70.8</td>
<td>100.0</td>
<td>170</td>
<td>268</td>
<td>422</td>
<td>615</td>
<td>853</td>
<td>1216</td>
<td>1825</td>
<td>2837</td>
<td>4302</td>
<td>6454</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>17.0</td>
<td>31.3</td>
<td>100.0</td>
<td>100.0</td>
<td>170</td>
<td>268</td>
<td>422</td>
<td>615</td>
<td>853</td>
<td>1216</td>
<td>1825</td>
<td>2837</td>
<td>4302</td>
<td>6454</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean discharge: 0.64 inch per month

Total data analyzed: 38 years; water years 1922-59

Draft-Storage-Recurrence Data for Fondulac Creek near East Peoria

Reservoir storage capacity in inches required to meet drought rates at various recurrence intervals
(Duration of critical draw-down period in months shown below each capacity value)
LOCATION
In SE ¼ sec 29, T34N, R4E, LaSalle County, at tailwater of North Counties Hydro-Electric Co. plant at Dayton, 4.0 miles northeast of Ottawa

DRAINAGE AREA
2570 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Nov. 1914 thru Sept 1959; prior to Apr 1925 published as "at Wedron"

CONTINUOUS RECORD: 44 years; water years 1916-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.65 inch per month

Draft-Storage-Recurrence Data for Fox River at Dayton

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals:
(Duration of critical draft period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>112</td>
<td>90</td>
<td>75</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>16</td>
<td>13</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

MEAN DISCHARGE: 0.65 inch per month
GIMLET CREEK AT SPARLAND

LOCATION
In SE ¼ NW ¼ sec 14, T12N, R9E, Marshall County, about 120 feet upstream from bridge on Ill. 29 in Sparland

DRAINAGE AREA
5.42 square miles

ACTUAL FLOW DATA
CONTINUOUS RECORD: 12 years; water years 1946-47, 1950-59

SYNTHETIC FLOW DATA
PERIOD: 33 years; water years 1915-45, 1948-49
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 12 years; water years 1946-47, 1950-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.83 inch per month

Draft-Storage-Recurrence Data for Gimlet Creek at Sparland

| Recurrence interval (years) | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|-----------------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Low runoff in inches       | 73| 76 | 79 | 82 | 86 | 90 | 94 | 98 | 102| 106| 110| 114| 118| 122| 126| 130| 134| 138| 142| 146|
| Duration in years          | 71| 72 | 74 | 76 | 79 | 82 | 85 | 88 | 91 | 94 | 97 | 100| 103| 106| 110| 113| 116| 119| 122| 125|

Draft-Storage-Recurrence Curves

Station 67

LOCATION
In SE ¼ NW ¼ sec 14, T12N, R9E, Marshall County, about 120 feet upstream from bridge on Ill. 29 in Sparland

DRAINAGE AREA
5.42 square miles

ACTUAL FLOW DATA
CONTINUOUS RECORD: 12 years; water years 1946-47, 1950-59

SYNTHETIC FLOW DATA
PERIOD: 33 years; water years 1915-45, 1948-49
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 12 years; water years 1946-47, 1950-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.83 inch per month

Draft-Storage-Recurrence Data for Gimlet Creek at Sparland

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Portion of critical recurrence period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low runoff in inches</td>
<td>73</td>
<td>76</td>
<td>79</td>
<td>82</td>
<td>86</td>
<td>90</td>
<td>94</td>
<td>98</td>
<td>102</td>
<td>106</td>
<td>110</td>
<td>114</td>
<td>118</td>
<td>122</td>
<td>126</td>
<td>130</td>
<td>134</td>
<td>138</td>
<td>142</td>
<td>146</td>
</tr>
<tr>
<td>Duration in years</td>
<td>71</td>
<td>72</td>
<td>74</td>
<td>76</td>
<td>79</td>
<td>82</td>
<td>85</td>
<td>88</td>
<td>91</td>
<td>94</td>
<td>97</td>
<td>100</td>
<td>103</td>
<td>106</td>
<td>110</td>
<td>113</td>
<td>116</td>
<td>119</td>
<td>122</td>
<td>125</td>
</tr>
</tbody>
</table>

Draft-Storage-Recurrence Curves
KICKAPOO CREEK NEAR KICKAPOO

LOCATION
In SW ¼ SE ¼ sec 34, T10N, R6E, Peoria County, at bridge on U. S. 150, 2.5 miles northwest of Kickapoo

STATION 92

DRAINAGE AREA
120 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59
SYNTHETIC FLOW DATA
PERIOD: 20 years; water years 1915-44
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 15 years; water years 1945-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.69 inch per month

Draft-Storage-Recurrence Data for Kickapoo Creek near Kickapoo

LOW RUNOFF IN INCHES

RECURRANCE CURVES

LOW FLOW IN INCHES

DURATION OF LOW FLOW IN MONTHS

RECURRANCE INTERVAL IN YEARS

0.0
10
20
30
40
50
60
70
80
90
100

KICKAPOO CREEK AT PEORIA

LOCATION
In NW 1/4 sec 13, T8N, R7E, Peoria County, at bridge on Ill. 116, 10 mile west of Peoria

DRAINAGE AREA
296 square miles

ACTUAL FLOW DATA
PERIOD: Apr 1942 thru Sept 1959
CONTINUOUS RECORD: 17 years; water years 1943-59

SYNTHETIC FLOW DATA
PERIOD: 28 years; water years 1915-42
INDEX STATION: Spoon River near Seville
COINCIDENT RECORD: 17 years; water years 1943-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN Discharge: 0.64 inch per month

Draft-Storage-Recurrence Data for Kickapoo Creek at Peoria

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical flow-loss period in months, shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Gross draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.8</td>
</tr>
<tr>
<td>5</td>
<td>10.0</td>
</tr>
<tr>
<td>10</td>
<td>11.6</td>
</tr>
<tr>
<td>20</td>
<td>13.2</td>
</tr>
<tr>
<td>50</td>
<td>15.6</td>
</tr>
<tr>
<td>100</td>
<td>17.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
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</tr>
<tr>
<td>50</td>
<td>15.6</td>
</tr>
<tr>
<td>100</td>
<td>17.8</td>
</tr>
</tbody>
</table>

Draft-Storage-Recurrence Curves for Kickapoo Creek at Peoria

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical flow-loss period in months, shown below each capacity value)

<table>
<thead>
<tr>
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<th>Gross draft rate in percent of mean flow</th>
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<tr>
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<td>8.8</td>
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</tr>
<tr>
<td>10</td>
<td>11.6</td>
</tr>
<tr>
<td>20</td>
<td>13.2</td>
</tr>
<tr>
<td>50</td>
<td>15.6</td>
</tr>
<tr>
<td>100</td>
<td>17.8</td>
</tr>
</tbody>
</table>

Draft-Storage-Recurrence Data for Kickapoo Creek at Peoria

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical flow-loss period in months, shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Gross draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.8</td>
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<tr>
<td>5</td>
<td>10.0</td>
</tr>
<tr>
<td>10</td>
<td>11.6</td>
</tr>
<tr>
<td>20</td>
<td>13.2</td>
</tr>
<tr>
<td>50</td>
<td>15.6</td>
</tr>
<tr>
<td>100</td>
<td>17.8</td>
</tr>
</tbody>
</table>
MACKINAW RIVER NEAR CONGERVILLE

LOCATION
In NE ¼ SW ¼ sec 17, T25N, R1W, Woodford County, at bridge on U. S. 150, 2.0 miles northwest of Congerville

DRAINAGE AREA
764 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 23 years; water years 1922-44
INDEX STATION: Mackinaw River near Green Valley
COINCIDENT RECORD: 12 years; water years 1945-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.70 inch per month

Draft-Storage-Recurrence Data for Mackinaw River near Congerville

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Mean storage capacity (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1.48</td>
</tr>
<tr>
<td>15</td>
<td>1.78</td>
</tr>
<tr>
<td>30</td>
<td>2.48</td>
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<tr>
<td>45</td>
<td>3.48</td>
</tr>
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<td>60</td>
<td>4.48</td>
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<tr>
<td>75</td>
<td>5.48</td>
</tr>
<tr>
<td>90</td>
<td>6.48</td>
</tr>
<tr>
<td>100</td>
<td>7.48</td>
</tr>
</tbody>
</table>

114
STATION 117

LOCATION
Between secs 29 and 30, T27N, R3E, Livingston County, at highway bridge 2.0 miles northwest of Gridley

DRAINAGE AREA
6.3 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1942 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 28 years; water years 1922-49
INDEX STATION: Mackinaw River near Green Valley
COINCIDENT RECORD: 7 years; water years 1950-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.74 inch per month

Draft-Storage-Recurrence Data for East Branch, Panther Creek near Gridley

Recurrence storage capacity in inches required to meet mean draft rate at various recurrence intervals. (Duration of critical drought period in months shown below each capacity value.)

<table>
<thead>
<tr>
<th>Recurrence intervals</th>
<th>5</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity, inches</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Draft rate, inches</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

MEAN DISCHARGE: 0.74 inch per month
EAST BRANCH, PANTHER CREEK AT EL PASO

LOCATION
At line between secs 32 and 33, T27N, R2E, Woodford County, at highway bridge 0.9 mile north of El Paso

DRAINAGE AREA
28.8 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 28 years; water years 1922-49
INDEX STATION: Mackinaw River near Green Valley
COINCIDENT RECORD: 7 years; water years 1950-56

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.71 inch per month

Draft-Storage-Recurrence Data for East Branch, Panther Creek at El Paso

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Durations of critical drought period in months above each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

MEAN DISCHARGE: 0.71 inch per month

118
**STATION 119**

**LOCATION**
Near center of sec 26, T27N, R1E, Woodford County, at highway bridge just downstream from East Branch, Panther Creek, and 3.75 miles northwest of El Paso

**DRAINAGE AREA**
95 square miles

**ACTUAL FLOW DATA**
- PERIOD: Oct 1949 thru Sept 1959
- CONTINUOUS RECORD: 10 years; water years 1950-59

**SYNTHETIC FLOW DATA**
- PERIOD: 28 years; water years 1922-49
- INDEX STATION: Mackinaw River near Green Valley
- COINCIDENT RECORD: 7 years; water years 1950-57

**TOTAL DATA ANALYZED**
- PERIOD: 38 years; water years 1922-59
- MEAN DISCHARGE: 0.70 inch per month

---

**Draft-Storage-Recurrence Data for Panther Creek near El Paso**

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>Mean Discharge in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.70</td>
</tr>
<tr>
<td>2</td>
<td>0.50</td>
</tr>
<tr>
<td>5</td>
<td>0.40</td>
</tr>
<tr>
<td>10</td>
<td>0.30</td>
</tr>
<tr>
<td>25</td>
<td>0.20</td>
</tr>
<tr>
<td>50</td>
<td>0.10</td>
</tr>
<tr>
<td>100</td>
<td>0.05</td>
</tr>
</tbody>
</table>

---

**Draft-Storage-Recurrence Data for Panther Creek near El Paso**

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>Mean Discharge in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.70</td>
</tr>
<tr>
<td>2</td>
<td>0.50</td>
</tr>
<tr>
<td>5</td>
<td>0.40</td>
</tr>
<tr>
<td>10</td>
<td>0.30</td>
</tr>
<tr>
<td>25</td>
<td>0.20</td>
</tr>
<tr>
<td>50</td>
<td>0.10</td>
</tr>
<tr>
<td>100</td>
<td>0.05</td>
</tr>
</tbody>
</table>

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**Diagram**

- **LOW FLOW RECURRENCE CURVES**
- Axes: Recurrence Interval in Years vs. Mean Discharge in Inches
- Data points for various recurrence intervals shown below indicate discharge values.

---

**Legend**

- LOW FLOW RECURRENCE CURVES
- Mean Discharge: 0.70 inch per month

---

**Notes**

- Duration of critical flow is shown in months below curve capacity value.
- Data analyzed for 38 years, water years 1922-59.
SOUTH BRANCH, KISHWAUKEE RIVER AT DE KALB

LOCATION
In SW ¼ NE ¼ sec 22, T40N, R4E, DeKalb County, at bridge on U. S. Alt. 30 in DeKalb

DRAINAGE AREA
70 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Aug 1925 thru Oct 1934; gaging discontinued Oct 1, 1934
CONTINUOUS RECORD: 8 years; water years 1926-33

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1916-25, 1934-59
INDEX STATION: Fox River at Dayton
COINCIDENT RECORD: 8 years; water years 1926-33

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.77 inch per month

Draft-Storage-Recurrence Data for South Branch, Kishwaukee River at DeKalb

<table>
<thead>
<tr>
<th>Recurrence Interval</th>
<th>Gross runoff ratio in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of critical flow periods in months shown below each capacity value</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interval</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
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<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

Station 174

Draft-Storage-Recurrence Data for South Branch, Kishwaukee River at DeKalb

(South Branch, Kishwaukee River at DeKalb)

122
PECUMSAUGAN CREEK NEAR UTICA

STATION 213

LOCATION
In NE ¼ NW ¼ sec 7, T33N, R2E, LaSalle County, at culvert on U. S. 6, about 2 miles northwest of Utica and 3.5 miles northeast of LaSalle

DRAINAGE AREA
32.3 square miles

ACTUAL FLOW DATA
PERIOD: Intermittent from May 1951 thru Sept 1959
INTERMITTENT RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA
PERIOD: 14 + years; water years 1937-50, parts 1951-59
INDEX STATION: East Bureau Creek near Bureau
COINCIDENT RECORD: 9 years; water years intermittent, 1951-59

TOTAL DATA ANALYZED
PERIOD: 23 years; water years 1937-59
MEAN DISCHARGE: 0.39 inch per month

Draft-Storage-Recurrence Data for Pecumsaugan Creek near Utica

| Recurrence Interval in Years | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|-----------------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Low Flow Curves             | 23.0 | .19 | .21 | .24 | .34 | .54 | .93 | 1.32 | 1.71 | 2.10 | 2.49 | 2.88 | 3.27 | 3.66 | 4.18 | 4.92 | .04 | .13 | .22 | .35 | .50 |
| High Flow Curves            | 11.5 | .09 | .10 | .12 | .14 | .16 | .18 | .20 | .22 | .24 | .26 | .28 | .30 | .32 | .34 | .36 | .38 | .40 | .42 | .44 | .46 |
| Mean Discharge              | 3.6  | .05 | .13 | .24 | .36 | .48 | .64 | .80 | .97 | 1.15 | 1.33 | 1.50 | 1.68 | 1.86 | 2.03 | .20 | .29 | .38 | .47 | .56 | .65 |
| Synthetic Flow Data         | 2.6  | .08 | .12 | .23 | .36 | .50 | .63 | .78 | .93 | 1.09 | 1.25 | 1.40 | 1.56 | 1.71 | 1.87 | 2.03 | 2.18 | 2.34 | 2.48 | 2.63 | 2.78 |
| Mean Discharge              | 2.3  | .04 | .12 | .23 | .34 | .47 | .60 | .78 | .95 | 1.10 | 1.26 | 1.41 | 1.58 | 1.75 | 1.92 | 2.09 | 2.26 | 2.42 | 2.59 | 2.76 | 2.93 |
| Mean Discharge              | 2.1  | .03 | .12 | .23 | .34 | .47 | .60 | .78 | .95 | 1.10 | 1.26 | 1.41 | 1.58 | 1.75 | 1.92 | 2.09 | 2.26 | 2.42 | 2.59 | 2.76 | 2.93 |

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals (Duration of critical drawdown period in months shown below each capacity value)
### Gaging Stations in Springfield Plain

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Embarrass River at St. Marie</td>
<td>128</td>
</tr>
<tr>
<td>6</td>
<td>North Fork, Embarrass River near Oblong</td>
<td>130</td>
</tr>
<tr>
<td>11</td>
<td>Little Wabash River below Clay City</td>
<td>132</td>
</tr>
<tr>
<td>12</td>
<td>Range Creek near Casey</td>
<td>134</td>
</tr>
<tr>
<td>46</td>
<td>Canteen Creek at Caseyville</td>
<td>136</td>
</tr>
<tr>
<td>50</td>
<td>Crane Creek near Easton</td>
<td>138</td>
</tr>
<tr>
<td>63</td>
<td>Flat Branch near Taylorville</td>
<td>140</td>
</tr>
<tr>
<td>77</td>
<td>Hurricane Creek near Roodhouse</td>
<td>142</td>
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<td>81</td>
<td>Indian Creek at Wanda</td>
<td>144</td>
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<tr>
<td>87</td>
<td>Kaskaskia River at Carlyle</td>
<td>146</td>
</tr>
<tr>
<td>89</td>
<td>Kaskaskia River at New Athens</td>
<td>148</td>
</tr>
<tr>
<td>91</td>
<td>Kaskaskia River at Vandalia</td>
<td>150</td>
</tr>
<tr>
<td>100</td>
<td>Lake Fork near Cornland</td>
<td>152</td>
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<tr>
<td>105</td>
<td>Macoupin Creek near Kane</td>
<td>154</td>
</tr>
<tr>
<td>108</td>
<td>North Fork, Mauvaise Terre Creek near Jacksonville</td>
<td>156</td>
</tr>
<tr>
<td>130</td>
<td>Salt Creek near Greenview</td>
<td>158</td>
</tr>
<tr>
<td>135</td>
<td>Sangamon River near Oakford</td>
<td>160</td>
</tr>
<tr>
<td>137</td>
<td>Shoal Creek near Breese</td>
<td>162</td>
</tr>
<tr>
<td>140</td>
<td>South Fork, Sangamon River at Kincaid</td>
<td>164</td>
</tr>
<tr>
<td>141</td>
<td>South Fork, Sangamon River near Nokomis...</td>
<td>166</td>
</tr>
<tr>
<td>142</td>
<td>South Fork, Sangamon River near Rochester...</td>
<td>168</td>
</tr>
<tr>
<td>145</td>
<td>Spring Creek near Springfield</td>
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<tr>
<td>159</td>
<td>Embarrass River at Lawrenceville</td>
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</tr>
<tr>
<td>187</td>
<td>Sangamon River at Riverton</td>
<td>174</td>
</tr>
<tr>
<td>211</td>
<td>Lick Creek near Curran</td>
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</tr>
<tr>
<td>212</td>
<td>Sugar Creek at Auburn</td>
<td>178</td>
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**STATIONS OMITTED**

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<th>NAME OF STATION</th>
<th>REASON</th>
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<tr>
<td>160</td>
<td>Embarrass River at Newton</td>
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<tr>
<td>166</td>
<td>Cahokia Creek near Poag</td>
<td>Record too short</td>
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<tr>
<td>187</td>
<td>Silver Creek near Lebanon</td>
<td>Regulation</td>
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<tr>
<td>201</td>
<td>Wolf Creek near Beecher City</td>
<td>Record too short</td>
</tr>
<tr>
<td>203</td>
<td>Otter Creek near Palmyra</td>
<td>Record too short</td>
</tr>
<tr>
<td>205</td>
<td>Blue Grass Creek near Raymond</td>
<td>Record too short</td>
</tr>
<tr>
<td>214</td>
<td>Richland Creek at Belleville</td>
<td>Record too short</td>
</tr>
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</table>
STATION 5

LOCATION
In NW ¼ NW ¼ sec 30, T6N, R14W, Jasper County, at highway bridge at St. Marie

DRAINAGE AREA
1540 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1909 to Dec 1912, Aug 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station
Note: Some regulation by Lake Charleston, 1947-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.90 inch per month

---

Daft-Storage-Recurrence Data for Embarrass River at St. Marie

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Gran discharge (inches per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>5</td>
<td>0.1</td>
</tr>
<tr>
<td>10</td>
<td>0.1</td>
</tr>
<tr>
<td>20</td>
<td>0.1</td>
</tr>
<tr>
<td>50</td>
<td>0.1</td>
</tr>
<tr>
<td>100</td>
<td>0.1</td>
</tr>
</tbody>
</table>

---

EMBARRASS RIVER AT ST. MARIE

LOCATION
In NW ¼ NW ¼ sec 30, T6N, R14W, Jasper County, at highway bridge at St. Marie

DRAINAGE AREA
1540 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1909 to Dec 1912, Aug 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station
Note: Some regulation by Lake Charleston, 1947-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.90 inch per month

---

Daft-Storage-Recurrence Data for Embarrass River at St. Marie

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Gran discharge (inches per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.1</td>
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<tr>
<td>5</td>
<td>0.1</td>
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<tr>
<td>10</td>
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</tr>
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<td>50</td>
<td>0.1</td>
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<tr>
<td>100</td>
<td>0.1</td>
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</table>

---

EMBARRASS RIVER AT ST. MARIE

LOCATION
In NW ¼ NW ¼ sec 30, T6N, R14W, Jasper County, at highway bridge at St. Marie

DRAINAGE AREA
1540 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1909 to Dec 1912, Aug 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station
Note: Some regulation by Lake Charleston, 1947-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.90 inch per month

---

Daft-Storage-Recurrence Data for Embarrass River at St. Marie

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Gran discharge (inches per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
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<tr>
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<td>0.1</td>
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<td>0.1</td>
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<tr>
<td>100</td>
<td>0.1</td>
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---

EMBARRASS RIVER AT ST. MARIE

LOCATION
In NW ¼ NW ¼ sec 30, T6N, R14W, Jasper County, at highway bridge at St. Marie

DRAINAGE AREA
1540 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1909 to Dec 1912, Aug 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station
Note: Some regulation by Lake Charleston, 1947-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.90 inch per month
NORTH FORK, EMBARRASS RIVER NEAR OBLONG

LOCATION
At NW corner of sec 35, T7N, R14W, on the Jasper-Crawford County line at bridge on Ill. 33, 2.0 miles west of Oblong

DRAINAGE AREA
304 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 26 years; water years 1915-40
INDEX STATION: Embarrass River at St. Marie
COINCIDENT RECORD: 19 years; water years 1941-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.93 inch per month

Draft-Storage-Recurrence Data for North Fork, Embarrass River near Oblong

<table>
<thead>
<tr>
<th>Recurrence Interval, years</th>
<th>Great flood rate in percent of mean flow</th>
</tr>
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<tbody>
<tr>
<td>10</td>
<td>5.5</td>
</tr>
<tr>
<td>20</td>
<td>2.8</td>
</tr>
<tr>
<td>30</td>
<td>2.0</td>
</tr>
<tr>
<td>40</td>
<td>1.5</td>
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<td>50</td>
<td>1.2</td>
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<tr>
<td>60</td>
<td>1.0</td>
</tr>
<tr>
<td>70</td>
<td>0.9</td>
</tr>
<tr>
<td>80</td>
<td>0.8</td>
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<tr>
<td>90</td>
<td>0.7</td>
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<tr>
<td>100</td>
<td>0.6</td>
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Notes:
- (Draft-Storage-Recurrence Data for North Fork, Embarrass River near Oblong)
- The flow rate is in inches per month.
LITTLE WABASH RIVER BELOW CLAY CITY

STATION 11

LOCATION

In SE ¼ sec 3, T2N, R8E, on the Clay-Richland County line, 300 feet downstream from township road bridge at Wilcox, about 5.0 miles southeast of Clay City

DRAINAGE AREA

1130 square miles, approximately

ACTUAL FLOW DATA

PERIOD: Aug 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA

None; this station utilized as an index station

TOTAL DATA ANALYZED

PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.90 inch per month

Draft-Storage-Recurrence Data for Little Wabash River below Clay City

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical draught period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>Capacity in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
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<td>90</td>
<td>0.00</td>
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<tr>
<td>100</td>
<td>0.00</td>
</tr>
</tbody>
</table>

MEAN DISCHARGE: 0.90 inch per month
DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
LITTLE WABASH RIVER BELOW CLAY CITY

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECORUENCE INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES

100
90
80
70
60
55
50
45
40
35
30
25
20
15
10
5

0.1

0.01
RANGE CREEK NEAR CASEY

LOCATION
In NE ¼ SE ¼ sec 12, T10N, R10E, Cumberland County, at highway bridge 0.5 mile west of Yanaway School and 3.0 miles northwest of Casey

DRAINAGE AREA
7.60 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1950 thru Sept 1959
CONTINUOUS RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1915-50
INDEX STATION: Embarrass River at St. Marie
COINCIDENT RECORD: 9 years; water years 1951-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.83 inch per month

Draft-Storage-Recurrence Data for Range Creek near Casey

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Great draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1</td>
</tr>
<tr>
<td>2</td>
<td>5.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1</td>
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<tr>
<td>8</td>
<td>5.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1 6.1</td>
</tr>
</tbody>
</table>

(Explanation of critical flood period in months shown below each capacity water)

134
STATION 46

LOCATION
In N ½ NW ¼ sec 8, T2N, R8W, St. Clair County, at highway bridge at Caseyville, 100 feet upstream from Pennsylvania Railroad bridge and 400 feet upstream from Ill. 157 bridge

DRAINAGE AREA
22.5 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Kaskaskia River at New Athens
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.84 inch per month

---

**Draft-Storage-Recurrence Data for Cane Creek at Caseyville**

<table>
<thead>
<tr>
<th>Recurrence Interval (years)</th>
<th>Gross Cv in percent of mean flow</th>
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<td>2</td>
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<td>3</td>
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<tr>
<td>4</td>
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<tr>
<td>5</td>
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</table>

**Low Flow Recurrence Curves**

- Duration of critical drought period in months shown below each recurrence interval value.
DRAFT- STORAGE- RECURRENCE CURVES
BASED ON
CANTEEN CREEK AT CASEYVILLE

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECIWRENCE INTERVAL IN YEARS

RESEVOIR STORAGE CAPACITY IN INCHES

0.01  0.1  1  10  100

0  2  3  4  5  6  7  8  9  10  20  30  40  50  60  70  80  100
CRANE CREEK NEAR EASTON

LOCATION
In NE ¼ NW ¼ sec 26, T21N, R7W, Mason County, at highway bridge 1.25 miles northwest of Easton

DRAINAGE AREA
28.7 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1915-49
INDEX STATION: Sangamon River at Riverton
COINCIDENT RECORD: 7 years; water years 1950-56

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.67 inch per month

### Draft-Storage-Recurrence Data for Crane Creek near Easton

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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<th>50</th>
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<th>80</th>
<th>90</th>
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<td>Low Flow Recurrence Curves</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
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<td>6</td>
<td>9</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>24</td>
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</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Denoted by critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Capacity (inches)</th>
<th>7.5</th>
<th>11.1</th>
<th>14.4</th>
<th>16.4</th>
<th>17.1</th>
<th>18.9</th>
<th>20.0</th>
<th>20.2</th>
<th>21.0</th>
<th>23.0</th>
<th>25.0</th>
<th>27.0</th>
<th>28.2</th>
<th>30.0</th>
<th>31.4</th>
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</thead>
<tbody>
<tr>
<td>Capacity (months)</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>9</td>
<td>11</td>
<td>14</td>
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<td>15</td>
<td>18</td>
<td>20</td>
<td>22</td>
<td>25</td>
<td>28</td>
<td>30</td>
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</tbody>
</table>

### Table

<table>
<thead>
<tr>
<th>Year</th>
<th>Discharge (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1915</td>
<td>0.67</td>
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<tr>
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</tr>
<tr>
<td>1917</td>
<td>0.67</td>
</tr>
<tr>
<td>1918</td>
<td>0.67</td>
</tr>
<tr>
<td>1919</td>
<td>0.67</td>
</tr>
<tr>
<td>1920</td>
<td>0.67</td>
</tr>
<tr>
<td>1921</td>
<td>0.67</td>
</tr>
<tr>
<td>1922</td>
<td>0.67</td>
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138
DRAFT- STORAGE- RECURRENT CURVES
BASED ON
CRANE CREEK NEAR EASTON

RECURRANCE INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

5% DRAFT RATE NEEDS ZERO STORAGE
**FLAT BRANCH NEAR TAYLORVILLE**

**LOCATION**
In SE ¼ SE ¼ sec 24, T13N, R2W, Christian County, at bridge on Ill. 29, 1.4 miles east of Taylorville

**DRAINAGE AREA**
276 square miles

**ACTUAL FLOW DATA**
PERIOD: Oct 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

**SYNTHETIC FLOW DATA**
PERIOD: 35 years; water years 1915-49
INDEX STATION: South Fork of Sangamon River near Kincaid

**TOTAL DATA ANALYZED**
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.75 inch per month

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<table>
<thead>
<tr>
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<th>Actual Flow Data</th>
<th>Synthetic Flow Data</th>
<th>Total Data Analyzed</th>
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Draft-Storage-Recurrence Data for Flat Branch near Taylorville

Recurrence storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
**HURRICANE CREEK NEAR ROODHOUSE**

**STATION 77**

**LOCATION**
In NE ¼ sec 15, T12N, R12W, Greene County, 150 feet downstream from bridge on Ill. 106, 2.0 miles west of Roodhouse

**DRAINAGE AREA**
2.33 square miles

**ACTUAL FLOW DATA**
- **PERIOD:** Aug 1950 thru Sept 1959
- **CONTINUOUS RECORD:** 9 years; water years 1951-59

**SYNTHETIC FLOW DATA**
- **PERIOD:** 36 years; water years 1915-50
- **INDEX STATION:** Macoupin Creek near Kane
- **COINCIDENT RECORD:** 9 years; water years 1951-59

**TOTAL DATA ANALYZED**
- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.85 inch per month

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### Draft-Storage-Recurrence Data for Hurricane Creek near Roodhouse

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<th>Recurrence interval years</th>
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<th>15</th>
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<th>70</th>
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<tr>
<td>Mean discharge</td>
<td>0.85 inch per month</td>
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<th>Recurrence interval in years</th>
<th>100</th>
<th>90</th>
<th>80</th>
<th>70</th>
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<th>20</th>
<th>15</th>
<th>10</th>
<th>5</th>
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<tbody>
<tr>
<td>Mean discharge</td>
<td>0.56 inch per month</td>
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</table>

**Recurrence storage capacity in inches required to ensure draft rate at various recurrence intervals**

(Duration at critical drought period in months shown below each capacity value)

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### Recurrence storage capacity

- **5 years:** 0.53 inches
- **10 years:** 0.55 inches
- **15 years:** 0.57 inches
- **20 years:** 0.60 inches
- **25 years:** 0.63 inches
- **30 years:** 0.66 inches
- **40 years:** 0.71 inches
- **50 years:** 0.79 inches
- **60 years:** 0.85 inches
- **70 years:** 0.93 inches
- **80 years:** 1.04 inches
- **90 years:** 1.23 inches
- **100 years:** 1.65 inches

---

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DRAFT STORAGE RECURRENCE CURVES
BASED ON
HURRICANE CREEK NEAR ROODHOUSE

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS
### Indian Creek at Wanda

**Station 81**

**Location:**
In SE ¼ NW ¼ sec 31, T5N, R8W, Madison County, at bridge on Ill. 159, .75 mile northeast of Wanda, and 5.0 miles west of Edwardsville

**Drainage Area:**
37.0 square miles

**Actual Flow Data**

**Period:** Apr 1940 thru Sept 1959

**Continuous Record:** 19 years; water years 1941-59

**Synthetic Flow Data**

**Period:** 26 years; water years 1915-40

**Index Station:** Macoupin Creek near Kane

**Coincident Record:** 19 years; water years 1941-59

**Total Data Analyzed**

**Period:** 45 years; water years 1915-59

**Mean Discharge:** 0.71 inch per month

---

**Draft-Storage-Recurrence Data for Indian Creek at Wanda**

| Recurrence Interval (Years) | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|-----------------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Low Runoff in Inches       |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Duration of Low Flow in Months |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Recurrence Interval in Years |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**Low Flow Recurrence Curves**

- Mean discharge: 0.71 inch per month
- Drainage area: 37.0 square miles
- Actual flow data period: Apr 1940 thru Sept 1959
- Continuous record: 19 years; water years 1941-59
- Synthetic flow data period: 26 years; water years 1915-40
- Index station: Macoupin Creek near Kane
- Coincident record: 19 years; water years 1941-59
- Total data analyzed period: 45 years; water years 1915-59

---

**2:**

- Low runoff in inches: 6.5, 1.8, 1.7, 1.6, 1.5, 1.4, 1.3, 1.2, 1.1, 1.0, 0.9, 0.8, 0.7, 0.6, 0.5, 0.4, 0.3, 0.2, 0.1
- Duration of low flow in months: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, 126, 135, 144, 153, 162, 171, 180

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**2.1:**

- Recurrence interval in years: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100
- Low runoff in inches: 6.5, 1.8, 1.7, 1.6, 1.5, 1.4, 1.3, 1.2, 1.1, 1.0, 0.9, 0.8, 0.7, 0.6, 0.5, 0.4, 0.3, 0.2, 0.1
- Duration of low flow in months: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, 126, 135, 144, 153, 162, 171, 180

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**2.2:**

- Recurrence interval in years: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100
- Low runoff in inches: 6.5, 1.8, 1.7, 1.6, 1.5, 1.4, 1.3, 1.2, 1.1, 1.0, 0.9, 0.8, 0.7, 0.6, 0.5, 0.4, 0.3, 0.2, 0.1
- Duration of low flow in months: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, 126, 135, 144, 153, 162, 171, 180

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**2.3:**

- Recurrence interval in years: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100
- Low runoff in inches: 6.5, 1.8, 1.7, 1.6, 1.5, 1.4, 1.3, 1.2, 1.1, 1.0, 0.9, 0.8, 0.7, 0.6, 0.5, 0.4, 0.3, 0.2, 0.1
- Duration of low flow in months: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, 126, 135, 144, 153, 162, 171, 180

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**2.4:**

- Recurrence interval in years: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100
- Low runoff in inches: 6.5, 1.8, 1.7, 1.6, 1.5, 1.4, 1.3, 1.2, 1.1, 1.0, 0.9, 0.8, 0.7, 0.6, 0.5, 0.4, 0.3, 0.2, 0.1
- Duration of low flow in months: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108, 117, 126, 135, 144, 153, 162, 171, 180
KASKASKIA RIVER AT CARLYLE

LOCATION
In SE ¼ sec 18, T2N, R2W, Clinton County, at bridge on U. S. 50 at Carlyle

DRAINAGE AREA
2680 square miles

ACTUAL FLOW DATA

CONTINUOUS RECORD: 21 years; water years 1939-59

SYNTHETIC FLOW DATA
PERIOD: 23 years; water years 1916-38

INDEX STATION: Kaskaskia River at Vandalia

COINCIDENT RECORD: 16 years; water years 1915, 1939-53

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59

MEAN DISCHARGE: 0.84 inch per month

Draft-Storage-Recurrence Data for Kaskaskia River at Carlyle

Regressive storage capacity in index required to meet draft rates at various recurrence intervals

(Duration of critical drawdown period in months below each capacity value)

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<th>Mean Discharge (inches per month)</th>
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KASKASKIA RIVER AT NEW ATHENS

LOCATION
In SW ¼ sec 28, T2S, R7W, St. Clair County, 0.5 mile downstream from the Ill. 13 bridge at New Athens

DRAINAGE AREA
5220 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1909 to Dec 1912, June 1914 to Sept 1921, Oct 1934 thru Sept 1959
CONTINUOUS RECORD: 32 years; water years 1915-21, 1935-59

SYNTHETIC FLOW DATA
PERIOD: 13 years; water years 1922-34
INDEX STATION: Kaskaskia River at Vandalia
COINCIDENT RECORD: 19 years; water years 1935-53

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.82 inch per month

Draft-Storage-Recurrence Data for Kaskaskia River at New Athens

<table>
<thead>
<tr>
<th>Recurrence Interval (in Years)</th>
<th>5</th>
<th>10</th>
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<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
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<tbody>
<tr>
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<td>0.82</td>
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</tr>
</tbody>
</table>

STATION 89

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.82 inch per month
**KASKASKIA RIVER AT VANDALIA**

**STATION 91**

**LOCATION**
In SE ¼ sec 16, T6N, R1E, Fayette County, at Gallatin Street bridge in Vandalia

**DRAINAGE AREA**
1980 square miles, approximately

**ACTUAL FLOW DATA**
PERIOD: Feb 1908 thru Dec 1912, Aug 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

**SYNTHETIC FLOW DATA**
None; this station utilized as an index station
REGULATION: For the water years 1954-59 some regulation is present due to ground-water pumpage and side channel storage at Ficklin

**TOTAL DATA ANALYZED**
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.82 inch per month

---

**Draft-Storage-Recurrence Data for Kaskaskia River at Vandalia**

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross drainage in percent of mean flow</td>
<td>3.2</td>
<td>5.9</td>
<td>8.9</td>
<td>12.5</td>
<td>16.2</td>
<td>20.4</td>
<td>23.7</td>
<td>27.5</td>
<td>30.4</td>
<td>33.7</td>
<td>37.3</td>
<td>40.5</td>
<td>43.4</td>
<td>46.2</td>
<td>48.9</td>
</tr>
</tbody>
</table>

**Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals**
(Duration of critical drawdown period in months shown below each capacity value)
DRAFT- STORAGE- RECURRENCE CURVES
BASED ON
KASKASKIA RIVER AT VANDALIA

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRANCE INTERVAL IN YEARS

RESEVOIR STORAGE CAPACITY IN INCHES

0.01  0.1  1  10

100  95  90  85  80  75  70  65  60  55  50  45  40  35  30  25  20  15  10  5

151
LAKE FORK NEAR CORNLAND

LOCATION
In SW ¼ sec 1, T17N, R3W, Logan County, at bridge on U. S. 54, 2.0 miles northeast of Cornland

DRAINAGE AREA
207 square miles

ACTUAL FLOW DATA
PERIOD: Jan 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 34 years; water years 1915-48
INDEX STATION: Sangamon River at Riverton
COINCIDENT RECORD: 8 years; water years 1949-56

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.76 inch per month

Draft-Storage-Recurrence Data for Lake Fork near Cornland

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Great draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>20</td>
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<tr>
<td>25</td>
<td>30</td>
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<td>50</td>
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<tr>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

| STATION 100 |

| LOCATION |
| In SW ¼ sec 1, T17N, R3W, Logan County, at bridge on U. S. 54, 2.0 miles northeast of Cornland |
| DRAINAGE AREA |
| 207 square miles |
| ACTUAL FLOW DATA |
| PERIOD: Jan 1948 thru Sept 1959 |
| CONTINUOUS RECORD: 11 years; water years 1949-59 |
| SYNTHETIC FLOW DATA |
| PERIOD: 34 years; water years 1915-48 |
| INDEX STATION: Sangamon River at Riverton |
| COINCIDENT RECORD: 8 years; water years 1949-56 |
| TOTAL DATA ANALYZED |
| PERIOD: 45 years; water years 1915-59 |
| MEAN DISCHARGE: 0.76 inch per month |
Macoupin Creek near Kane

Mean discharge: 0.65 inch per month

Period: 45 years; water years 1915-59

TOTAL DATA ANALYZED

This station utilized as an index station

1941-53
Concurrent record: 6 years; water years 1941-46
Index station: Kaskaskia River at Vandalia

PERIOD: 4 years; water years 1945-49

SYNTHETIC FLOW DATA

PERIOD: 14 years; water years 1915-30

INDEX STATION: Kaskaskia River at Vandalia

PERIOD: 26 years; water years 1921-46

ACTUAL FLOW DATA

PERIOD: May 1921 thru Nov 1933

Flows are in 10-ft. units

Drainage area

83 square miles

LOCATION

Station 105

Macoupin Creek near Kane

Draft-Storage-Recurrence data for Macoupin Creek near Kane

Recurrence Interval in Years

DURATION OF LOW FLOW IN MONTHS

LOW RUNOFF IN INCHES

Recurrence Curves

Low Flow in inches
DRAFT STORAGE RECURRENCE CURVES
BASED ON
MACOUPIN CREEK NEAR KANE
NORTH FORK, MAUVAISE TERRE CREEK NEAR JACKSONVILLE

LOCATION
In SE ¼ NW ¼ sec 8, T15N, R9W, Morgan County, at bridge 2.5 miles north of Arnold and 6.0 miles east of Jacksonville

DRAINAGE AREA
30.0 square miles

ACTUAL FLOW DATA
PERIOD: Dec 1949 thru Sept 1959
CONTINUOUS RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1915-50
INDEX STATION: Macoupin Creek near Kane
COINCIDENT RECORD: 9 years; water years 1951-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.87 inch per month

Draft-Storage-Recurrence Data for North Fork, Mauvaise Terre Creek near Jacksonville

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>Mean discharge in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>15.1</td>
</tr>
<tr>
<td>10</td>
<td>30.2</td>
</tr>
<tr>
<td>15</td>
<td>45.3</td>
</tr>
<tr>
<td>25</td>
<td>60.4</td>
</tr>
<tr>
<td>35</td>
<td>75.6</td>
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<tr>
<td>50</td>
<td>90.7</td>
</tr>
<tr>
<td>65</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.
(Duration of critical draftsperiod in months shown below each capacity value.)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>Mean discharge in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>15.1</td>
</tr>
<tr>
<td>10</td>
<td>30.2</td>
</tr>
<tr>
<td>15</td>
<td>45.3</td>
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<tr>
<td>25</td>
<td>60.4</td>
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</tr>
<tr>
<td>65</td>
<td>100.0</td>
</tr>
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</table>

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<tr>
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</tr>
<tr>
<td>65</td>
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</tr>
</tbody>
</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.
(Duration of critical draftsperiod in months shown below each capacity value.)

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<thead>
<tr>
<th>Recurrence interval in years</th>
<th>Mean discharge in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>15.1</td>
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<tr>
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<td>30.2</td>
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</tr>
<tr>
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</tr>
</tbody>
</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.
(Duration of critical draftsperiod in months shown below each capacity value.)

<table>
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<tr>
<th>Recurrence interval in years</th>
<th>Mean discharge in percent of mean flow</th>
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</thead>
<tbody>
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<tr>
<td>35</td>
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<tr>
<td>50</td>
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</tr>
<tr>
<td>65</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.
(Duration of critical draftsperiod in months shown below each capacity value.)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>Mean discharge in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>15.1</td>
</tr>
<tr>
<td>10</td>
<td>30.2</td>
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<td>45.3</td>
</tr>
<tr>
<td>25</td>
<td>60.4</td>
</tr>
<tr>
<td>35</td>
<td>75.6</td>
</tr>
<tr>
<td>50</td>
<td>90.7</td>
</tr>
<tr>
<td>65</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.
(Duration of critical draftsperiod in months shown below each capacity value.)
SALT CREEK NEAR GREENVIEW

LOCATION
In NE ¼ NE ¼ sec 2, T19N, R6W, on the Mason-Menard County line at bridge on Ill. 29, about 3.5 miles north of Greenview

DRAINAGE AREA
1800 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1941 thru Sept 1959
CONTINUOUS RECORD: 18 years; water years 1942-59

SYNTHETIC FLOW DATA
PERIOD: 27 years; water years 1915-41
INDEX STATION: Sangamon River at Riverton
COINCIDENT RECORD: 15 years; water years 1942-56

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.74 inch per month

Draft-Storage-Recurrence Data for Salt Creek near Greenview

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drought period in months shown below each recurrence value)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>CROSS DRAINAGE CURVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Draft-Storage-Recurrence Data for Salt Creek Near Greenview

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drought period in months shown below each recurrence value)
SANGAMON RIVER NEAR OAKFORD

LOCATION
In NW ¼ SE ¼ sec 3, T19N, R8W, on the Menard-Mason County line, at the bridge on Ill. 97, about 2 miles northwest of Petersburg and 1.75 miles northwest of Oakford

DRAINAGE AREA
5120 square miles

ACTUAL FLOW DATA
PERIOD: 1910-11, 1915-18, 1922, 1929-33, 1940-59
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 15 years; water years 1919-21, 1923-28, 1934-39
INDEX STATION: Sangamon River at Riverton
COINCIDENT RECORD: 28 years; water years 1910-11, 1915-18, 1922, 1929-33, 1940-56

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-1959
MEAN DISCHARGE: 0.71 inch per month

Draft-Storage-Recurrence Data for Sangamon River near Oakford

<table>
<thead>
<tr>
<th>Recurrence Interval (Years)</th>
<th>Gross Discharge Rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100</td>
<td>0.54, 0.51, 0.50, 0.49, 0.48, 0.47, 0.46, 0.45, 0.44, 0.43, 0.42, 0.41, 0.40, 0.39, 0.38, 0.37, 0.36, 0.35, 0.34, 0.33, 0.32, 0.31, 0.30, 0.29, 0.28, 0.27, 0.26, 0.25, 0.24, 0.23, 0.22, 0.21, 0.20, 0.19, 0.18, 0.17, 0.16, 0.15, 0.14, 0.13, 0.12, 0.11, 0.10, 0.09, 0.08, 0.07, 0.06, 0.05, 0.04, 0.03, 0.02, 0.01, 0.00</td>
</tr>
</tbody>
</table>

<INSERT GRAPHICAL DATA HERE>
SHOAL CREEK NEAR BRESE

LOCATION
In SW ¼ SW ¼ sec 13, T2N, R4W, Clinton County, at bridge on U. S. 50, about 1.7 miles east of Breese

DRAINAGE AREA
760 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Nov 1909 thru Dec 1912, Aug thru Dec 1914, Oct 1945 thru Sept 1959
CONTINUOUS RECORD: 14 years; water years 1946-59

SYNTHETIC FLOW DATA
PERIOD: 31 years; water years 1915-45
INDEX STATION: Kaskaskia River at Vandalia
COINCIDENT RECORD: 8 years; water years 1946-53

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.73 inch per month

Draft-Storage-Recurrence Data for Shoal Creek near Breese

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Portion of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
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<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
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</thead>
<tbody>
<tr>
<td>Capacity (inches)</td>
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</tbody>
</table>

Mean discharge: 0.73 inch per month
SOUTH FORK, SANGAMON RIVER AT KINCAID

LOCATION
In SW 1/4 NE 1/4 sec 14, T13N, R3W, Christian County, about 300 feet upstream from bridge on Ill. 104, 1.0 mile southeast of Kincaid

DRAINAGE AREA
510 square miles

ACTUAL FLOW DATA

SYNTHETIC FLOW DATA
PERIOD: 16 years; water years 1915-17, 1928,1931, 1934-44

INDEX STATION: Kaskaskia River at Vandalia

COINCIDENT RECORD: 23 years; water years 1918-27, 1929-30, 1932-33, 1945-53

This station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59

MEAN DISCHARGE: 0.85 inch per month

---

Draft-Storage-Recurrence Data for South Fork, Sangamon River at Kincaid

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Gross draft in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td></td>
</tr>
<tr>
<td>90</td>
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<tr>
<td>85</td>
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<td>75</td>
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<td>70</td>
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<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

(Duration of critical flood period in months shown above each capacity value)
DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
SOUTH FORK SANGAMON RIVER AT KINCAID

RECURRENT STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS
SOUTH FORK, SANGAMON RIVER NEAR NOKOMIS

STATION 141

LOCATION
In NE ¼ SE ¼ sec 36, T11N, R2W, Montgomery County, at the highway bridge on Ill. 16, 4.0 miles northeast of Nokomis.

DRAINAGE AREA
10.8 square miles

TOTAL DATA ANALYZED
PERIOD: 45 years, water years 1915-59
MEAN DISCHARGE: 0.84 inch per month

ACTUAL FLOW DATA
PERIOD: Oct 1951 thru Sept 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1915-51
INDEX STATION: South Fork, Sangamon River near Kincaid
CONCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 45 years, water years 1915-59
MEAN DISCHARGE: 0.84 inch per month

LOW RUNOFF IN INCHES

LOW FLOW CURVES

DURATION OF LOW FLOW IN MONTHS

100
50
10
5
1

0.0
0.2
0.4
0.6
0.8
1.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0

10.8
5.0
1.0
0.2
0.0
LOCATION
In N ½ SE ¼ sec 8, T15N, R4W, Sangamon County, at bridge on Ill. 29, about 1.1 miles northwest of Rochester

DRAINAGE AREA
809 square miles

ACTUAL FLOW DATA
PERIOD: July 1949 thru Sept 1959

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1915-49
INDEX STATION: South Fork, Sangamon River at Kincaid

COINCIDENT RECORD: 10 years; water years 1950-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.68 inch per month

Draft-Storage-Recurrence Data for South Fork, Sangamon River near Rochester

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Gross flow in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.19</td>
</tr>
<tr>
<td>20</td>
<td>0.39</td>
</tr>
<tr>
<td>30</td>
<td>0.59</td>
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<tr>
<td>40</td>
<td>0.79</td>
</tr>
<tr>
<td>50</td>
<td>0.99</td>
</tr>
<tr>
<td>60</td>
<td>1.19</td>
</tr>
<tr>
<td>70</td>
<td>1.39</td>
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<td>80</td>
<td>1.59</td>
</tr>
<tr>
<td>90</td>
<td>1.79</td>
</tr>
<tr>
<td>100</td>
<td>1.99</td>
</tr>
</tbody>
</table>

The draft-storage curves are used to estimate the frequency of occurrence of various recurrence intervals.
SPRING CREEK NEAR SPRINGFIELD

LOCATION
In NW ¼ NE ¼ sec 30, T16N, R5W, Sangamon County, at bridge on Ill. 125, about 19 miles west of the intersection of Jefferson Street and MacArthur Boulevard in Springfield.

DRAINAGE AREA
107 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1949 thru Sept 1959; Jan 1948 thru Sept 1949; partial record
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1915-49
INDEX STATION: Sangamon River at Riverton
COINCIDENT RECORD: 7 years; water years 1950-56

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.58 inch per month

Draft-Storage-Recurrence Data for Spring Creek near Springfield

Reservoir average capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity interval)

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>45.0</th>
<th>50.0</th>
<th>55.0</th>
<th>60.0</th>
<th>65.0</th>
<th>70.0</th>
<th>75.0</th>
<th>80.0</th>
<th>85.0</th>
<th>90.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft storage in percent of mean flow</td>
<td>2.62</td>
<td>2.25</td>
<td>1.93</td>
<td>1.67</td>
<td>1.46</td>
<td>1.28</td>
<td>1.13</td>
<td>0.99</td>
<td>0.87</td>
<td>0.77</td>
</tr>
</tbody>
</table>

170
Station 159

Location
In NE ¼ SW ½ sec 5, T3N, R11W, Lawrence County, at bridge on U. S. 50, 1.0 mile east of Lawrenceville

Drainage Area
2260 square miles, approximately

Actual Flow Data
Period: Apr 1930 thru Oct 1933; gaging discontinued Nov 1, 1933
Continuous Record: 3 years; water years 1931-33

Synthetic Flow Data
Period: 42 years; water years 1915-30, 1934-59
Index Station: Embarrass River at St. Marie
Coincident Record: 3 years; water years 1931-33

Total Data Analyzed
Period: 45 years; water years 1915-59
Mean Discharge: 105 inches per month

---

### Draft-Storage-Recurrence Data for Embarrass River at Lawrenceville

#### Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>Gross Draft Rate in Percent of Mean Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.05</td>
</tr>
<tr>
<td>2</td>
<td>1.00</td>
</tr>
<tr>
<td>5</td>
<td>0.80</td>
</tr>
<tr>
<td>10</td>
<td>0.60</td>
</tr>
<tr>
<td>30</td>
<td>0.43</td>
</tr>
<tr>
<td>50</td>
<td>0.35</td>
</tr>
<tr>
<td>100</td>
<td>0.30</td>
</tr>
</tbody>
</table>

---

### Low Flow Recurrence Curves

- Low flow recurrence curves are shown for various return periods.
- The curves indicate the frequency of occurrence of low flows at different durations.

---

### EMBARRASS RIVER AT LAWRENCEVILLE

- Location: NE ¼ SW ½ sec 5, T3N, R11W, Lawrence County, at bridge on U. S. 50, 1.0 mile east of Lawrenceville
- Drainage Area: 2260 square miles, approximately
- Actual Flow Data: Period: Apr 1930 thru Oct 1933; gaging discontinued Nov 1, 1933
- Continuous Record: 3 years; water years 1931-33
- Synthetic Flow Data: Period: 42 years; water years 1915-30, 1934-59
- Index Station: Embarrass River at St. Marie
- Coincident Record: 3 years; water years 1931-33
- Total Data Analyzed: Period: 45 years; water years 1915-59
- Mean Discharge: 105 inches per month

---

### Draft-Storage-Recurrence Data for Embarrass River at Lawrenceville

- Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

<table>
<thead>
<tr>
<th>Duration of Critical Exceedance (in months)</th>
<th>Gross Draft Rate in Percent of Mean Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 months</td>
<td>1.05</td>
</tr>
<tr>
<td>24 months</td>
<td>0.80</td>
</tr>
<tr>
<td>36 months</td>
<td>0.60</td>
</tr>
<tr>
<td>48 months</td>
<td>0.43</td>
</tr>
<tr>
<td>60 months</td>
<td>0.35</td>
</tr>
<tr>
<td>72 months</td>
<td>0.30</td>
</tr>
</tbody>
</table>

---

### Low Flow Recurrence Curves

- Low flow recurrence curves are shown for various return periods.
- The curves indicate the frequency of occurrence of low flows at different durations.
SANGAMON RIVER AT RIVERTON

LOCATION
In NE ¼ sec 16, T16N, R3W, Sangamon County, at bridge on U. S. 36 at Riverton

DRAINAGE AREA
2560 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Mar 1908 thru Dec 1913, Sept 1914 thru Sept 1956; gaging discontinued Sept 30, 1956
CONTINUOUS RECORD: 42 years; water years 1915-56

SYNTHETIC FLOW DATA
PERIOD: 3 years; water years 1957-59
INDEX STATION: Sangamon River near Oakford
COINCIDENT RECORD: 28 years; water years 1910-11, 1915-18, 1922, 1929-33, 1940-56
This station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.75 inch per month

Draft-Storage-Recurrence Data for Sangamon River at Riverton

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>Mean annual flow, inches per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td>10</td>
<td>0.3</td>
</tr>
<tr>
<td>15</td>
<td>0.5</td>
</tr>
<tr>
<td>20</td>
<td>0.6</td>
</tr>
<tr>
<td>25</td>
<td>0.7</td>
</tr>
<tr>
<td>30</td>
<td>0.8</td>
</tr>
<tr>
<td>40</td>
<td>1.0</td>
</tr>
<tr>
<td>50</td>
<td>1.2</td>
</tr>
<tr>
<td>60</td>
<td>1.5</td>
</tr>
<tr>
<td>80</td>
<td>2.0</td>
</tr>
<tr>
<td>100</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Recurrence data in inches required to meet draft rate at various recurrence intervals
(Duration of optical dredging period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>Mean annual flow, inches per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td>10</td>
<td>0.3</td>
</tr>
<tr>
<td>15</td>
<td>0.5</td>
</tr>
<tr>
<td>20</td>
<td>0.6</td>
</tr>
<tr>
<td>25</td>
<td>0.7</td>
</tr>
<tr>
<td>30</td>
<td>0.8</td>
</tr>
<tr>
<td>40</td>
<td>1.0</td>
</tr>
<tr>
<td>50</td>
<td>1.2</td>
</tr>
<tr>
<td>60</td>
<td>1.5</td>
</tr>
<tr>
<td>80</td>
<td>2.0</td>
</tr>
<tr>
<td>100</td>
<td>2.5</td>
</tr>
</tbody>
</table>

This station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.75 inch per month

Draft-Storage-Recurrence Data for Sangamon River at Riverton

Recurrence data in inches required to meet draft rate at various recurrence intervals
(Duration of optical dredging period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>Mean annual flow, inches per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td>10</td>
<td>0.3</td>
</tr>
<tr>
<td>15</td>
<td>0.5</td>
</tr>
<tr>
<td>20</td>
<td>0.6</td>
</tr>
<tr>
<td>25</td>
<td>0.7</td>
</tr>
<tr>
<td>30</td>
<td>0.8</td>
</tr>
<tr>
<td>40</td>
<td>1.0</td>
</tr>
<tr>
<td>50</td>
<td>1.2</td>
</tr>
<tr>
<td>60</td>
<td>1.5</td>
</tr>
<tr>
<td>80</td>
<td>2.0</td>
</tr>
<tr>
<td>100</td>
<td>2.5</td>
</tr>
</tbody>
</table>

This station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.75 inch per month
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
SANGAMON RIVER AT RIVERTON

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS

RESEVOIR STORAGE CAPACITY IN INCHES
LICK CREEK NEAR CURRAN

STATION 211

LOCATION
In N ½ sec 4, T14N, R6W, Sangamon County, about 3 miles upstream from Lake Springfield and 3.25 miles south of Curran

DRAINAGE AREA
97.0 square miles

ACTUAL FLOW DATA
PERIOD: May 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 34 years; water years 1915-48
INDEX STATION: Sangamon River at Riverton
COINCIDENT RECORD: 8 years; water years 1949-56

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.57 inch per month

Draft-Storage-Recurrence Data for Lick Creek near Curran

Reservoir storage capacity in inches required to control draft rates at various recurrence intervals
(Duration of critical draught period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>60</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in.</td>
<td>2</td>
<td>2.5</td>
<td>3.4</td>
<td>4.2</td>
<td>5.1</td>
<td>6.1</td>
<td>7.6</td>
<td>9.4</td>
<td>14.1</td>
</tr>
<tr>
<td>2 in.</td>
<td>3</td>
<td>3.6</td>
<td>4.7</td>
<td>5.5</td>
<td>6.6</td>
<td>7.8</td>
<td>9.3</td>
<td>11.4</td>
<td>17.2</td>
</tr>
<tr>
<td>4 in.</td>
<td>4</td>
<td>5.1</td>
<td>6.5</td>
<td>7.8</td>
<td>9.2</td>
<td>11.0</td>
<td>13.5</td>
<td>17.8</td>
<td>27.1</td>
</tr>
<tr>
<td>8 in.</td>
<td>7</td>
<td>8.4</td>
<td>10.6</td>
<td>12.8</td>
<td>15.3</td>
<td>18.4</td>
<td>22.7</td>
<td>29.9</td>
<td>49.4</td>
</tr>
<tr>
<td>16 in.</td>
<td>11</td>
<td>13.1</td>
<td>16.4</td>
<td>20.1</td>
<td>24.2</td>
<td>30.0</td>
<td>38.2</td>
<td>51.5</td>
<td>90.9</td>
</tr>
<tr>
<td>32 in.</td>
<td>20</td>
<td>24.6</td>
<td>31.3</td>
<td>38.9</td>
<td>48.7</td>
<td>60.6</td>
<td>77.0</td>
<td>102.8</td>
<td>188.0</td>
</tr>
</tbody>
</table>

Mean discharge: 0.57 inch per month
SUGAR CREEK AT AUBURN

STATION 212

LOCATION

In NW ¼ sec 12, T13N, R6W, Sangamon County, at Ill. 104 bridge, 1.25 miles east of Auburn

DRAINAGE AREA

51.5 square miles

ACTUAL FLOW DATA

PERIOD: Apr 1948 thru Sept 1959

CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA

PERIOD: 34 years; water years 1915-48

INDEX STATION: Sangamon River at Riverton

COINCIDENT RECORD: 8 years; water years 1949-56

TOTAL DATA ANALYZED

PERIOD: 45 years; water years 1915-59

MEAN DISCHARGE: 0.52 inch per month

Draft-Storage-Recurrence Data for Sugar Creek at Auburn

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft rate in percent of mean flow</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>2.5</td>
<td>3.0</td>
<td>3.5</td>
<td>4.0</td>
<td>4.5</td>
<td>5.0</td>
<td>5.5</td>
<td>6.0</td>
<td>7.0</td>
<td>8.0</td>
<td>9.0</td>
<td>100</td>
</tr>
<tr>
<td>Mean discharge: 0.52 inch per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

178
Gaging Stations in Mt. Vernon Hills

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Bonpas Creek at Browns</td>
<td>182</td>
</tr>
<tr>
<td>10</td>
<td>Little Wabash River at Carmi</td>
<td>184</td>
</tr>
<tr>
<td>14</td>
<td>Saline River near Junction</td>
<td>186</td>
</tr>
<tr>
<td>15</td>
<td>Skillet Fork at Wayne City</td>
<td>188</td>
</tr>
<tr>
<td>35</td>
<td>Beaucoup Creek near Matthews</td>
<td>190</td>
</tr>
<tr>
<td>37</td>
<td>Big Muddy River near Benton</td>
<td>192</td>
</tr>
<tr>
<td>38</td>
<td>Big Muddy River at Murphysboro</td>
<td>194</td>
</tr>
<tr>
<td>39</td>
<td>Big Muddy River at Plumfield</td>
<td>196</td>
</tr>
<tr>
<td>49</td>
<td>Crab Orchard Creek near Marion</td>
<td>198</td>
</tr>
<tr>
<td>107</td>
<td>Mary's River near Sparta</td>
<td>200</td>
</tr>
<tr>
<td>162</td>
<td>Middle Fork, Saline River near Harrisburg</td>
<td>202</td>
</tr>
<tr>
<td>164</td>
<td>Beaucoup Creek near Pinckneyville</td>
<td>204</td>
</tr>
</tbody>
</table>

STATIONS OMITTED

<table>
<thead>
<tr>
<th>REASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>165 Big Muddy River near Cambon</td>
</tr>
<tr>
<td>Combined with record for Station 39</td>
</tr>
<tr>
<td>184 Tilley Creek at West Frankfort</td>
</tr>
<tr>
<td>Regulation</td>
</tr>
<tr>
<td>202 Horse Creek near Keenes</td>
</tr>
<tr>
<td>Record too short</td>
</tr>
<tr>
<td>207 Sevenmile Creek near Mt. Vernon</td>
</tr>
<tr>
<td>Record too short</td>
</tr>
</tbody>
</table>
STATION 3

LOCATION
In SW ¼ SE ¼ sec 33, T1S, R14W, the creek being the Edwards-Wabash County line, 300 feet upstream from Ill. 15 bridge at Browns

DRAINAGE AREA
235 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 12 years; water years 1929-40
INDEX STATION: Skillet Fork at Wayne City
COINCIDENT RECORD: 19 years; water years 1941-59

TOTAL DATA ANALYZED
PERIOD: 31 years; water years 1929-59
MEAN DISCHARGE: 1.04 inches per month
**LITTLE WABASH RIVER AT CARMI**

**LOCATION**
Near center of E ½ sec 25, T5S, R9E, White County, at Possum Bridge, 2.5 miles downstream from Carmi

**DRAINAGE AREA**
3090 square miles

**ACTUAL FLOW DATA**
- **PERIOD:** Oct 1939 thru Sept 1959
- **CONTINUOUS RECORD:** 20 years; water years 1940-59

**SYNTHETIC FLOW DATA**
- **PERIOD:** 25 years; water years 1915-39
  - **INDEX STATION:** Little Wabash at Wilcox
  - **COINCIDENT RECORD:** 20 years; water years 1940-59

**TOTAL DATA ANALYZED**
- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.93 inch per month

---

**Draft-Storage-Recurrence Data for Little Wabash River at Carmi**

<table>
<thead>
<tr>
<th>Recurrence interval,</th>
<th>Goon draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>years</td>
<td></td>
</tr>
<tr>
<td>45.0</td>
<td>.54 .78 1.50 2.54 3.18 4.61 4.85 5.69 6.20 6.53 9.59 11.10 12.76 16.39 18.59 21.62 24.32 27.08 29.75 32.41</td>
</tr>
<tr>
<td>8</td>
<td>.14 .18 .16 .18 .18 .18 .18 .20 .20 .20 .34 .34 .36 .36 .36 .36 .36 .36</td>
</tr>
<tr>
<td>22.5</td>
<td>.15 .18 .25 1.39 2.11 2.85 3.60 4.34 5.09 5.63 7.12 8.54 9.34 11.35 12.13 14.12 15.92 17.15 19.75 22.94</td>
</tr>
<tr>
<td>5</td>
<td>.10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10</td>
</tr>
<tr>
<td>5</td>
<td>.10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10 .10</td>
</tr>
<tr>
<td>11.3</td>
<td>.14 .15 .16 .17 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18</td>
</tr>
<tr>
<td>9.0</td>
<td>.14 .15 .16 .17 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18 .18</td>
</tr>
</tbody>
</table>

**Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals**

(Duration of critical drought period in months shown below each capacity value)

---

184
DRAFT- STORAGE- RECURRENCE CURVES
BASED ON
LITTLE WABASH RIVER AT CARMI
STATION 14

LOCATION
In NE ¼ sec 36, T9S, R8E, Gallatin County, at Old Island Ripple Bridge site, 2.5 miles southwest of Junction

DRAINAGE AREA
1040 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 1.13 inches per month

---

Draft-Storage-Recurrence Data for Saline River near Junction

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown periods in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>75</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean discharge:</td>
<td>1.13 inches per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

STATION 14

LOCATION
In NE ¼ sec 36, T9S, R8E, Gallatin County, at Old Island Ripple Bridge site, 2.5 miles southwest of Junction

DRAINAGE AREA
1040 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 1.13 inches per month

---

Draft-Storage-Recurrence Data for Saline River near Junction

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown periods in months shown below each capacity value)
DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
SALINE RIVER NEAR JUNCTION

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS

187
LOCATION

In SW ¼ sec 7, T2S, R6E, Wayne County, 0.5 mile downstream from Ill. 15 bridge, 1.0 mile north of Wayne City

DRAINAGE AREA

475 square miles

ACTUAL FLOW DATA

PERIOD: Aug 1908 thru Dec 1912, June 1914 thru Sept 1921, June 1928 thru Sept 1959

CONTINUOUS RECORD: 31 years; water years 1929-59

SYNTHETIC FLOW DATA

None; this station utilized as an index station

TOTAL DATA ANALYZED

PERIOD: 31 years; water years 1929-59

MEAN DISCHARGE: 0.92 inch per month

Draft-Storage-Recurrence Data for Skillet Fork at Wayne City

| Recurrence interval in years | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|-----------------------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                            |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

| Rainfall rate in inches per month | 2 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|-----------------------------------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                                  |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

188
DRAFT-STORAGE-RECURRENT CURVES
BASED ON
SKILLET FORK AT WAYNE CITY
BEAUCOUP CREEK NEAR MATTHEWS

LOCATION
In SW ¼ sec 29, T6S, R2W, Perry County, at bridge on Ill. 13, 1.25 miles east of Matthews and 7 miles southwest of DuQuoin

DRAINAGE AREA
291 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1945 thru Sept 1959
CONTINUOUS RECORD: 14 years; water years 1946-59

SYNTHETIC FLOW DATA
PERIOD: 31 years; water years 1915-45
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 14 years; water years 1946-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.90 inch per month

Draft-Storage-Recurrence Data for Beaucoup Creek near Matthews

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drainage period in months shown below each capacity value)

<table>
<thead>
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<th>Recurrence Interval in Years</th>
<th>Capacity (inches)</th>
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Mean discharge: 0.90 inch per month
DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
BEAUCOUP CREEK NEAR MATTHEWS

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS

191
STATION 37

LOCATION
In NE ¼ NW ¼ sec 22, T6S, R2E, Franklin County, at bridge on Ill. 14, 3.0 miles west of Benton

DRAINAGE AREA
498 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1945 thru Sept 1959
CONTINUOUS RECORD: 14 years; water years 1946-59

SYNTHETIC FLOW DATA
PERIOD: 31 years; water years 1915-45
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 14 years; water years 1946-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 1.05 inches per month

### Draft-Storage-Recurrence Data for Big Muddy River near Benton

<table>
<thead>
<tr>
<th>Recurrence Interval (years)</th>
<th>Cross section in percent of mean flow</th>
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Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals (Number of critical drawdown periods in months shown below each capacity value)

![LOW FLOW RECURRENCE CURVES](image)

### Diagram

- **LOW FLOW RECURRENCE CURVES**
- **DURATION**
- **LOW RUNOFF IN INCHES**
- **RECURRENT INTERVAL IN YEARS**

### Table

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Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals (Number of critical drawdown periods in months shown below each capacity value)
LOCALIZATION
In SE ¼ sec 8, T9S, R2W, in Jackson County, 0.1 miles upstream from Gulf, Mobile and Ohio Railroad bridge at Murphysboro

DRAINAGE AREA
2170 square miles

ACTUAL FLOW DATA
PERIOD: Dec 1916 thru Sept 1959; fragmentary prior to 1931
CONTINUOUS RECORD: 29 years; water years 1931-59

SYNTHETIC FLOW DATA
PERIOD: 16 years; water years 1915-30
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 29 years; water years 1931-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 1.04 inches per month

Draft-Storage-Recurrence Data for Big Muddy River at Murphysboro

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

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Mean draft rate in percent of mean flow

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**BIG MUDDY RIVER AT PLUMFIELD**

**STATION 39**

**LOCATION**
In NW ¼ sec 20, T7S, R2E, Franklin County, 0.75 mile upstream from bridge on Ill. 149 at Plumfield

**DRAINAGE AREA**
753 square miles

**ACTUAL FLOW DATA**
**PERIOD:** June 1908 thru Dec 1912, Aug 1914 thru Sept 1959

**CONTINUOUS RECORD:** 45 years; water years 1915-59

**SYNTHETIC FLOW DATA**
None; this station utilized as an index station

**TOTAL DATA ANALYZED**
**PERIOD:** 45 years; water years 1915-59

**MEAN DISCHARGE:** 1.06 inches per month

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**Draft-Storage-Recurrence Data for Big Muddy River at Plumfield**

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<th>Great Rate of Increase (percent of mean flow)</th>
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(Duration of critical recurrence period in months shown below each recurrence value)

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LOCATION
In SW 1/4 NW 1/4 sec 21, T9S, R3E, Williamson County, at Ill. 13 bridge, 2.0 miles east of Marion

DRAINAGE AREA
31.9 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1951 thru Sept 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1915-51
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.73 inch per month

Draft-Storage-Recurrence Data for Crab Orchard Creek near Marion

- Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
- Duration of critical drought period in months shown below each capacity value

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<thead>
<tr>
<th>Recurrence Interval (Years)</th>
<th>5</th>
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TOTAL DATA ANALYZED PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.73 inch per month
MARY'S RIVER NEAR SPARTA

LOCATION
In NE ¼ SE ¼ sec 9, T5S, R5W, Randolph County, at Ill. 154 bridge, 3.2 miles southeast of Sparta

DRAINAGE AREA
17.8 square miles

ACTUAL FLOW DATA
PERIOD: May 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1915-49
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 10 years; water years 1950-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.98 inch per month

Draft-Storage-Recurrence Data for Mary's River near Sparta

Reservoir storage capacity in inches required to meet draft needs at various recurrence intervals

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<th>Recurrence Interval (years)</th>
<th>Mean Discharge (inches per month)</th>
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Low Flow Recurrence Curves

Station 107

Location
In NE ¼ SE ¼ sec 9, T5S, R5W, Randolph County, at Ill. 154 bridge, 3.2 miles southeast of Sparta

Drainage Area
17.8 square miles

Actual Flow Data
Period: May 1949 thru Sept 1959
Continuous Record: 10 years; water years 1950-59

Synthetic Flow Data
Period: 35 years; water years 1915-49
Index Station: Big Muddy River at Plumfield
Coincident Record: 10 years; water years 1950-59

Total Data Analyzed
Period: 45 years; water years 1915-59
Mean Discharge: 0.98 inch per month
STATION 162

LOCATION
In NW 1/4 SW 1/4 sec 13, T9S, R6E, Saline County, at highway bridge 2 miles east of Harrisburg

DRAINAGE AREA
198 square miles

ACTUAL FLOW DATA
PERIOD: Intermittent Oct 1922 thru Sept 1932; gaging discontinued Sept 30, 1932
INTERMITTENT RECORD: 10 years; water years 1923-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1915-22, 1933-32
INDEX STATION: Big Muddy River at Plumfield
COINCIDENT RECORD: 10 years; water years 1923-32

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 1.37 inches per month

Draft-Storage-Recurrence Data for Middle Fork, Saline River near Harrisburg

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<td>0.79</td>
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Note: Storage capacity in inches required to meet draft rates at various recurrence intervals. (Duration of critical drought period in months shown below each capacity value.)
DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
MIDDLE FORK, SALINE RIVER NEAR HARRISBURG
BEAUCOUP CREEK NEAR PINCKNEYVILLE

LOCATION
Near center sec 30, T5S, R2W, Perry County, at Illinois Central Railroad bridge, 1.5 miles southeast of Pinckneyville

DRAINAGE AREA
227 square miles

ACTUAL FLOW DATA
PERIOD: Jan 1909 thru Oct 1914; gaging discontinued Oct 1, 1914
CONTINUOUS RECORD: 4 years; water years 1909-12

SYNTHETIC FLOW DATA
PERIOD: 45 years; water years 1915-59
INDEX STATION: Big Muddy River at Plumfield CONCIDENT RECORD: 4 years; water years 1909-12

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.79 inch per month

Draft-Storage-Recurrence Data for Beaucoup Creek near Pinckneyville

Reservoir storage capacity in inches required to meet draft rate at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

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<tr>
<th>Recurrence Interval in Years</th>
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<td>Low Flow Recurrence Curves</td>
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| Mean storage in inches:  | 0.79 |

204
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
BEAUCOUP CREEK NEAR PINCKNEYVILLE

RESEVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS
Gaging Stations in Shawnee Hills

<table>
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<th>NAME OF STATION</th>
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STATION OMITTED

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<th>NUMBER</th>
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<tr>
<td>9</td>
<td>Lake Glendale Outlet near Dixon Springs</td>
<td>Regulation</td>
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Station 4

Location
In NE ¼ NW ¼ sec 6, T14S, R3E, Johnson County, at highway bridge, 1.25 miles southwest of Forman

Drainage Area
243 square miles

Actual Flow Data
Period: Oct 1922 thru July 1924, Sept 1924 thru Sept 1959
Continuous Record: 35 years; water years 1925-59

Synthetic Flow Data
None; this station utilized as an index station

Total Data Analyzed
Period: 35 years; water years 1925-59
Mean Discharge: 1.43 inches per month

Draft-Storage-Recurrence Data for Cache River at Forman

<table>
<thead>
<tr>
<th>Recurrence Interval</th>
<th>5</th>
<th>10</th>
<th>15</th>
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<td>Gross draft rate as percent of mean flow</td>
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Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals (Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Duration of Critical Drawdown Period</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
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208
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
CACHE RIVER AT FORMAN

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS

209
STATION 7

LOCATION
In SW ¼ SW ¼ sec 21, T12S, R5E, Pope County, at bridge on Ill. 145 at Glendale

DRAINAGE AREA
18.9 square miles

ACTUAL FLOW DATA
PERIOD: May 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1925-49
INDEX STATION: Cache River at Forman
COINCIDENT RECORD: 10 years; water years 1925-59

TOTAL DATA ANALYZED
PERIOD: 35 years; water years 1925-59
MEAN DISCHARGE: 1.59 inches per month

Draft-Storage-Recurrence Data for Hayes Creek at Glendale

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Gross draft rate in percent of mean flow</th>
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</thead>
<tbody>
<tr>
<td>10</td>
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Recurrence storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
LAKE GLENDALE INLET NEAR DIXON SPRINGS

STATION 8

LOCATION
In NE ¼ SW ¼ sec 3, T13S, R5E, Pope County, 0.9 mile upstream from Lake Glendale dam and 2.5 miles north of Dixon Springs

DRAINAGE AREA
1.04 square miles

ACTUAL FLOW DATA
PERIOD: Aug 1954 thru Sept 1959
CONTINUOUS RECORD: 5 years; water years 1955-59

SYNTHETIC FLOW DATA
PERIOD: 30 years; water years 1925-54
INDEX STATION: Cache River at Forman
COINCIDENT RECORD: 5 years; water years 1955-59

TOTAL DATA ANALYZED
PERIOD: 35 years; water years 1925-59
MEAN DISCHARGE: 1.50 inches per month

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
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Draft-Storage-Recurrence Data for Lake Glendale Inlet near Dixon Springs

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical droughts period in months shown below each capacity value)

212
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
LAKE GLENDALE INLET NEAR DIXON SPRINGS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES
SUGAR CREEK NEAR DIXON SPRINGS

LOCATION
In NE ¼ SE ¼ sec 5, T13S, R5E, Pope County, at abandoned highway bridge 2.0 miles north of Dixon Springs

DRAINAGE AREA
9.70 square miles

ACTUAL FLOW DATA
PERIOD: Apr 1950 thru Sept 1959
CONTINUOUS RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA
PERIOD: 26 years; water years 1925-50
INDEX STATION: Cache River at Forman
COINCIDENT RECORD: 9 years; water years 1951-59

TOTAL DATA ANALYZED
PERIOD: 35 years; water years 1925-59
MEAN DISCHARGE: 1.43 inches per month

Draft-Storage-Recurrence Data for Sugar Creek near Dixon Springs

<table>
<thead>
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<th>5</th>
<th>10</th>
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</table>

Gross draft in percent of mean flow (Duration of critical draft times period in months shown below each recurrence interval)

214
BIG CREEK NEAR WETAUG

LOCATION
In SW ¼ sec 5, T14S, R1E, Pulaski County, 2.0 miles southeast of Wetaug

DRAINAGE AREA
32.2 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 16 years; water years 1925-40
INDEX STATION: Cache River at Forman
COINCIDENT RECORD: 19 years; water years 1941-59

TOTAL DATA ANALYZED
PERIOD: 35 years; water years 1925-59
MEAN DISCHARGE: 1.42 inches per month

Draft-Storage-Recurrence Data for Big Creek near Wetaug

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
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(Percent of critical flow during period in months shown below each capacity value)
### Gaging Stations in Lincoln Hills

<table>
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<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>PAGE</th>
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<tbody>
<tr>
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<td>Bay Creek at Nebo</td>
<td>220</td>
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<tr>
<td>33</td>
<td>Bay Creek at Pittsfield</td>
<td>222</td>
</tr>
<tr>
<td>71</td>
<td>Hadley Creek near Barry</td>
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<tr>
<td>72</td>
<td>Hadley Creek at Kinderhook</td>
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<td>182</td>
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**STATION OMITTED**

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<th>REASON</th>
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<td>Hadley Creek near Shinn</td>
<td>Used Station 72 instead</td>
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---

**Period of Record, Water Years**

- NEBO
- PITTSFIELD
- BARRY
- KINDERHOOK
- ATLAS

**Legend**

- Synthetic
- Actual
BAY CREEK AT NEBO

LOCATION
In NW ¼ sec 19, T7S, R3W, Pike County, 40 feet downstream from highway bridge, 500 feet upstream from Spring Creek, 0.25 mile west of Nebo; records include flow of Spring Creek

DRAINAGE AREA
162 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Macoupin Creek near Kane
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.61 inch per month

Draft-Storage-Recurrence Data for Bay Creek at Nebo

Reservoir storage capacity in inches required to meet draft rate at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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<td>3.40</td>
<td>3.87</td>
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<td>4.81</td>
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</tbody>
</table>

| MEAN DISCHARGE | 0.61 inch per month |

Draft-Storage-Recurrence Data for Bay Creek at Nebo

Reservoir storage capacity in inches required to meet draft rate at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval (years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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| MEAN DISCHARGE | 0.61 inch per month |
DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
BAY CREEK AT NEBO

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS

221
STATION 33

LOCATION
In NE ¼ SW ¼ sec 18, T5S, R3W, Pike County, at abandoned highway bridge, 0.1 mile downstream from bridge on Ill. 107, 14 miles northeast of Pittsfield

DRAINAGE AREA
39.6 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Macoupin Creek near Kane
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.66 inch per month

---

### Draft-Storage-Recurrence Data for Bay Creek at Pittsfield

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

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<thead>
<tr>
<th>Recurrence Interval (years)</th>
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Draft-Storage-Recurrence Curves

LOW FLOW RECURRENCE CURVES

LOW RUNOFF IN INCHES

LOW FLOW IN MONTHS

DURATION OF LOW FLOW IN YEARS

RECURRENT INTERVAL IN YEARS

MEAN DISCHARGE: 0.66 inch per month
HADLEY CREEK NEAR BARRY

LOCATION
In SW ¼ SW ¼ sec 14, T4S, R6W, Pike County, at U. S. 36 highway bridge, 1.8 miles northwest of Barry

DRAINAGE AREA
40.6 square miles

ACTUAL FLOW DATA
PERIOD: Sept 1955 thru Sept 1959
Data at this station are provisional

SYNTHETIC FLOW DATA
PERIOD: 34 years; water years 1922-55
INDEX STATION: La Moine River at Ripley

CONTINUOUS RECORD:
4 years; water years 1956-59

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 1.14 inches per month

Draft-Storage-Recurrence Data for Hadley Creek near Barry

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<tr>
<th>Recurrence interval in years</th>
<th>Gross mean rate in percent of mean flow</th>
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Low Flow Recurrence Curves
HADLEY CREEK AT KINDERHOOK

LOCATION
In SE ¼ NE ¼ sec 25, T4S, R7W, Pike County, at bridge on Ill. 96, 0.8 mile southeast of Kinderhook

DRAINAGE AREA
72.7 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 18 years; water years 1922-39
INDEX STATION: La Moine River at Ripley
COINCIDENT RECORD: 19 years; water years 1940-58

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.73 inch per month

Draft-Storage-Recurrence Data for Hadley Creek at Kinderhook

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals:
(Duration of critical drought period in months shown below each capacity value)

Recurrence interval, years

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<tr>
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<th>10</th>
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Draft-Storage-Recurrence Data for Hadley Creek at Kinderhook

Mean discharge:
0.73 inch per month

226
LOCATION
In NE ¼ NW ¼ sec. 33, T6S, R5W, Pike County, at bridge on U. S. 54, 1 mile west of Atlas.

DRAINAGE AREA
451 square miles

SYNTHETIC FLOW DATA
PERIOD: 42 years; water years 1915-39, 1943-59
INDEX STATION: Macoupin Creek near Kane
CONTINENTAL RECORD: 3 years; water years 1940-42
MEAN DISCHARGE: 199 inches per month

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
CONCISE RECORD: 2 years; water years 1941-42
MEAN DISCHARGE: 199 inches per month
### Gaging Stations in Galesburg Plain

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<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>PAGE</th>
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<tr>
<td>34</td>
<td>Bear Creek near Marcelline</td>
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<tr>
<td>47</td>
<td>Cedar Creek at Little York</td>
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<td>Edwards River near New Boston</td>
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<td>Edwards River near Orion</td>
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<td>73</td>
<td>Henderson Creek near Little York</td>
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<td>Henderson Creek near Oquawka</td>
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<td>La Moine River at Colmar</td>
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<td>La Moine River at Ripley</td>
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<td>Mill Creek at Milan</td>
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<td>Pope Creek near Keithsburg</td>
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<td>Spoon River at London Mills</td>
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<td>Spoon River at Seville</td>
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<td>North Henderson Creek near Seaton</td>
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**STATIONS OMITTED**

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<td>Brush Creek at Lake Bracken near Galesburg</td>
<td>Regulation</td>
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<td>Indian Creek near Wyoming</td>
<td>Record too short</td>
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<td>206</td>
<td>Drowning Fork at Bushnell</td>
<td>Record too short</td>
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BEAR CREEK NEAR MARCELLINE

STATION 34

LOCATION
Between secs 20 and 21, T2N, R8W, Adams County, at highway bridge 2.25 miles northeast of Marcelline and 4.5 miles northwest of Mendon

DRAINAGE AREA
348 square miles

ACTUAL FLOW DATA
PERIOD: Mar 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 23 years; water years 1922-44
INDEX STATION: La Moine River at Ripley
COINCIDENT RECORD: 15 years; water years 1945-59

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE : 0.54 inch per month

Draft-Storage-Recurrence Data for Bear Creek near Marcelline

<table>
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<th>Recurrence Interval (years)</th>
<th>Gross draft max in percent of mean flow</th>
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(Recurrence interval in years is shown below each capacity value)

Draft-Storage-Recurrence Curves for Bear Creek near Marcelline

(Draft-Storage-Recurrence Data for Bear Creek near Marcelline)

(Below table of critical drawdown period in months shown below each capacity value)

---

232
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
BEAR CREEK NEAR MARCELLINE

RECURRENT INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

233
CEDAR CREEK AT LITTLE YORK

LOCATION
Between secs 20 and 21, T12N, R3W, Warren County, at bridge on Ill. 135 at north edge of Little York

DRAINAGE AREA
128 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 26 years; water years 1915-40
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 19 years; water years 1941-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.71 inch per month

Draft-Storage-Recurrence Data for Cedar Creek at Little York

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Mean flow rate (inches per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
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<tr>
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Reservoir storage capacity in inches required to meet draft rates at random recurrence intervals

<table>
<thead>
<tr>
<th>Draft-Storage-Recurrence Data for Cedar Creek at Little York</th>
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</thead>
<tbody>
<tr>
<td>Recurrence Interval (in years)</td>
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</tr>
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<tr>
<td>10</td>
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<td>80</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>90</td>
</tr>
</tbody>
</table>

Continuous record: 19 years; water years 1941-59

Synthetic flow data: 26 years; water years 1915-40

Index station: Spoon River at Seville
Coincident record: 19 years; water years 1941-59

Total data analyzed: 45 years; water years 1915-59

Mean discharge: 0.71 inch per month

234
EDWARDS RIVER NEAR NEW BOSTON

STATION 57

LOCATION
At quarter corner between secs 21 and 28, T14N, R5W, Mercer County, at bridge on Ill. 17, 1.5 miles northeast of New Boston

DRAINAGE AREA
434 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1934 thru Sept 1959

SYNTHETIC FLOW DATA
PERIOD: 20 years; water years 1915-34
INDEX STATION: Spoon River at Seville

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.66 inch per month

Draft-Storage-Recurrence Data for Edwards River near New Boston

<table>
<thead>
<tr>
<th>Recurrence Interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
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<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Flow Recurrence Curves</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

(GLASS draft curve in percent of mean flow)

| Duration of critical flow-down period in months shown below each capacity value |

[Graph showing recurrence intervals and low flow recurrence curves]
EDWARDS RIVER NEAR ORION

LOCATION
In NE ¼ SE ¼ sec 21, T15N, R1E, Henry County, at bridge on U. S. 150, 1.5 miles north of Opheim and 5.5 miles south of Orion

DRAINAGE AREA
163 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 26 years; water years 1915-40
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 19 years; water years 1941-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.65 inch per month
STATION 73

LOCATION
Between secs 8 and 9, T12N, R3W, Warren County, at bridge on Ill. 94 and Ill. 135, 2.2 miles north of Little York

DRAINAGE AREA
151 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1958; gaging discontinued Oct 1, 1958
CONTINUOUS RECORD: 18 years; water years 1941-58

SYNTHETIC FLOW DATA
PERIOD: 27 years; water years 1915-40, 1959
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 18 years; water years 1941-58

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.65 inch per month

Draft-Storage-Recurrence Data for Henderson Creek near Little York

Reservoir storage in inches required to meet draft rates at various recurrence intervals
(Duration of critical flow period in months above each recurrence interval)

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Great rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.01</td>
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<td>10</td>
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<td>15</td>
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<tr>
<td>60</td>
<td>0.50</td>
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<tr>
<td>100</td>
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</table>

Mean discharge: 0.65 inch per month
STATION 74

LOCATION
In NE ¼ SW ¼ sec 28, T12N, R4W, Henderson County, at bridge on Ill. 94, 10 mile south of Bald Bluff and 6.5 miles northeast of Oquawka

DRAINAGE AREA
428 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1934 thru Sept 1959
CONTINUOUS RECORD: 25 years; water years 1935-59

SYNTHETIC FLOW DATA
PERIOD: 20 years; water years 1915-34
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 25 years; water years 1935-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.69 inch per month

Draft-Storage-Recurrence Data for Henderson Creek near Oquawka

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Whereas of effective drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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<td>9.65</td>
<td>11.12</td>
<td>12.57</td>
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</tr>
</tbody>
</table>

Draft-Storage-Recurrence Data for Henderson Creek near Oquawka

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Whereas of effective drawdown period in months shown below each capacity value)
LA MOINE RIVER AT COLMAR

STATION 101

LOCATION
In SE ¼ SW ¼ sec 18, T4N, R4W, McDonough County, at bridge on Ill. 61, 1.0 mile southwest of Colmar and 4.0 miles northeast of Plymouth

DRAINAGE AREA
655 square miles

ACTUAL FLOW DATA

PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA

PERIOD: 23 years; water years 1922-44
INDEX STATION: La Moine River at Ripley
COINCIDENT RECORD: 15 years; water years 1945-59

TOTAL DATA ANALYZED

PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.62 inch per month

Draft-Storage-Recurrence Data for La Moine River at Colmar

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross draft rate in percent of mean flow</td>
<td>5.7</td>
<td>2.6</td>
<td>1.6</td>
<td>1.1</td>
<td>0.9</td>
<td>0.7</td>
<td>0.6</td>
<td>0.5</td>
<td>0.4</td>
<td>0.3</td>
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<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Notes:
- The table provides the gross draft rate in percent of the mean flow at various recurrence intervals.
- The duration of critical drawdown periods is shown for each capacity value.
- The data is based on a 38-year period, with water years from 1922 to 1959.

Mean Discharge:
- 0.62 inch per month

Draft-Storage-Recurrence Data for La Moine River at Colmar

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)
LA MOINE RIVER AT RIPLEY

LOCATION
In NE ¼ sec. 33, T1N, R2W, Brown County, at bridge on
U. S. 24, 0.25 mile east of Ripley

DRAINAGE AREA
1310 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Mar 1921 thru Sept 1959
CONTINUOUS RECORD: 38 years; water years 1922-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 38 years; water years 1922-59
MEAN DISCHARGE: 0.62 inch per month

Draft-Storage-Recurrence Data for La Moine River at Ripley

Note: this station utilized as an index station
MILL CREEK AT MILAN

LOCATION
In SW ¼ SE ¼ sec 24, T17N, R2W, Rock Island County, at bridge on Knoxville Road, 1.0 mile southeast of Milan

DRAINAGE AREA
62.5 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru May 1940, July 1941 thru Sept 1959
CONTINUOUS RECORD: 18 years; water years 1942-59

SYNTHETIC FLOW DATA
PERIOD: 27 years; water years 1915-41
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 18 years; water years 1942-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.62 inch per month

---

**Draft-Storage-Recurrence Data for Mill Creek at Milan**

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean discharge (in inches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

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STATION 111

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**LOW FLOW RECURRENCE CURVES**

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<th>TIME INTERVAL IN YEARS</th>
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<th>2</th>
<th>5</th>
<th>10</th>
<th>15</th>
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<th>25</th>
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<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW FLOW INTERVAL IN TIMES OF MEAN</td>
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<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
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**DRAFT-STORAGE-RECURRENCE DATA FOR MILL CREEK AT MILAN**

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drought period in months shown below each capacity value)

---

**TOTAL DATA ANALYZED**

PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.62 inch per month
**POPE CREEK NEAR KEITHSBURG**

**LOCATION**
In SE ¼ sec 11, T13N, R5W, Mercer County, at highway bridge 2.0 miles northeast of Keithsburg

**DRAINAGE AREA**
171 square miles

**ACTUAL FLOW DATA**

- **PERIOD:** Oct 1934 thru Sept 1959
- **CONTINUOUS RECORD:** 25 years; water years 1935-59

**SYNTHETIC FLOW DATA**

- **PERIOD:** 20 years; water years 1915-34
- **INDEX STATION:** Spoon River at Seville
- **COINCIDENT RECORD:** 25 years; water years 1935-59

**TOTAL DATA ANALYZED**

- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.64 inch per month

**Draft-Storage-Recurrence Data for Pope Creek near Keithsburg**

Reservoir average capacity in inches required to meet draft rates at various recurrence intervals

<table>
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<tr>
<th>Recurrence Interval, years</th>
<th>Cross draft rate in percent of mean flow</th>
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**Draft-Storage-Recurrence Data for Pope Creek near Keithsburg**

- Draft Storage Recurrence Data
- Location
- DRAINAGE AREA
- ACTUAL FLOW DATA
- SYNTHETIC FLOW DATA
- TOTAL DATA ANALYZED

**Draft-Storage-Recurrence Data for Pope Creek near Keithsburg**

Draft Storage Recurrence Data

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<tr>
<th>Recurrence Interval, years</th>
<th>Cross draft rate in percent of mean flow</th>
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</table>
SOUTH HENDERSON CREEK AT BIGGSVILLE

LOCATION
Between secs 16 and 17, T10N, R4W, Henderson County, at bridge on Ill. 94 at north edge of Biggsville

DRAINAGE AREA
81.4 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.66 inch per month
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
SOUTH HENDERSON CREEK AT BIGGSVILLE

RECURRENCE INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

100
90
80
70
60
55
50
45
40
35
30
25
20
15
10
5

0.1
0.01

2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 100
STATION 143

LOCATION
In NW ¼ sec 3, T8N, R2E, Fulton County, at highway bridge in London Mills

DRAINAGE AREA
1070 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1942 thru Sept 1959
CONTINUOUS RECORD: 17 years; water years 1943-59

SYNTHETIC FLOW DATA
PERIOD: 28 years; water years 1915-42
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 17 years; water years 1943-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.67 inch per month

Draft-Storage-Recurrence Data for Spoon River at London Mills

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Numbers of critical drought period in months shown below each capacity value)

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<th>Recurrence interval, years</th>
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Mean discharge: 0.67 inch per month
SPOON RIVER AT SEVILLE

LOCATION
In SW ¼ sec 24, T6N, R1E, Fulton County, at highway bridge in Seville

DRAINAGE AREA
1600 square miles, approximately

ACTUAL FLOW DATA
PERIOD: July 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.68 inch per month

Draft-Storage-Recurrence Data for Spoon River at Seville

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought periods in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval (years)</th>
<th>Capacity in Inches</th>
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<td>1</td>
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<td>2</td>
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Mean draft rate in percent of mean flow

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<th>Recurrence Interval (years)</th>
<th>Mean Draft Rate (percent)</th>
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Draft Storage-Recurrence Data for Spoon River at Seville

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought periods in months shown below each capacity value)
NORTH HENDERSON CREEK NEAR SEATON

LOCATION
Near center of sec 30, T13N, R3W, Warren County, at county road bridge 16 miles southeast of Seaton

DRAINAGE AREA
66.4 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1951; gaging discontinued Oct 1, 1951
CONTINUOUS RECORD: 11 years; water years 1941-51

SYNTHETIC FLOW DATA
PERIOD: 34 years; water years 1915-40, 1952-59
INDEX STATION: Spoon River at Seville
COINCIDENT RECORD: 11 years; water years 1941-51

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.61 inch per month

Draft-Storage-Recurrence Data for North Henderson Creek near Seaton

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drawdown period in months shown below each capacity value)

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<th>Recurrence interval, years</th>
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<tbody>
<tr>
<td>Draft-rate in percent of mean flow</td>
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3.0 | 0.10 | 0.10 | 0.10 | 0.10 |
3.5 | 0.15 | 0.15 | 0.15 | 0.15 |
4.0 | 0.20 | 0.20 | 0.20 | 0.20 |
4.5 | 0.25 | 0.25 | 0.25 | 0.25 |
5.0 | 0.30 | 0.30 | 0.30 | 0.30 |
5.5 | 0.35 | 0.35 | 0.35 | 0.35 |
6.0 | 0.40 | 0.40 | 0.40 | 0.40 |
6.5 | 0.45 | 0.45 | 0.45 | 0.45 |
7.0 | 0.50 | 0.50 | 0.50 | 0.50 |
7.5 | 0.55 | 0.55 | 0.55 | 0.55 |
8.0 | 0.60 | 0.60 | 0.60 | 0.60 |
8.5 | 0.65 | 0.65 | 0.65 | 0.65 |
9.0 | 0.70 | 0.70 | 0.70 | 0.70 |
9.5 | 0.75 | 0.75 | 0.75 | 0.75 |
10.0| 0.80 | 0.80 | 0.80 | 0.80 |
10.5| 0.85 | 0.85 | 0.85 | 0.85 |
11.0| 0.90 | 0.90 | 0.90 | 0.90 |
11.5| 0.95 | 0.95 | 0.95 | 0.95 |
12.0| 1.00 | 1.00 | 1.00 | 1.00 |
12.5| 1.05 | 1.05 | 1.05 | 1.05 |
13.0| 1.10 | 1.10 | 1.10 | 1.10 |
13.5| 1.15 | 1.15 | 1.15 | 1.15 |
14.0| 1.20 | 1.20 | 1.20 | 1.20 |
14.5| 1.25 | 1.25 | 1.25 | 1.25 |
15.0| 1.30 | 1.30 | 1.30 | 1.30 |
15.5| 1.35 | 1.35 | 1.35 | 1.35 |
16.0| 1.40 | 1.40 | 1.40 | 1.40 |
16.5| 1.45 | 1.45 | 1.45 | 1.45 |
17.0| 1.50 | 1.50 | 1.50 | 1.50 |
17.5| 1.55 | 1.55 | 1.55 | 1.55 |
18.0| 1.60 | 1.60 | 1.60 | 1.60 |
18.5| 1.65 | 1.65 | 1.65 | 1.65 |
19.0| 1.70 | 1.70 | 1.70 | 1.70 |
19.5| 1.75 | 1.75 | 1.75 | 1.75 |
20.0| 1.80 | 1.80 | 1.80 | 1.80 |
Gaging Stations in Kankakee Plain

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>Iroquois River near Chebanse</td>
<td>262</td>
</tr>
<tr>
<td>83</td>
<td>Iroquois River at Iroquois</td>
<td>264</td>
</tr>
<tr>
<td>84</td>
<td>Kankakee River at Momence</td>
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</tr>
<tr>
<td>85</td>
<td>Kankakee River near Wilmington</td>
<td>268</td>
</tr>
<tr>
<td>109</td>
<td>Mazon River near Coal City</td>
<td>270</td>
</tr>
<tr>
<td>147</td>
<td>Sugar Creek at Milford</td>
<td>272</td>
</tr>
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<td>148</td>
<td>Terry Creek near Custer Park</td>
<td>274</td>
</tr>
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<td>150</td>
<td>North Fork, Vermilion River near Charlotte</td>
<td>276</td>
</tr>
<tr>
<td>151</td>
<td>Vermilion River at Lowell</td>
<td>278</td>
</tr>
<tr>
<td>152</td>
<td>Vermilion River at Pontiac</td>
<td>280</td>
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<td>156</td>
<td>Singleton Ditch at Illinoi</td>
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STATIONS OMITTED

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<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>REASON</th>
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<tbody>
<tr>
<td>173</td>
<td>Kankakee River at Custer Park</td>
<td>Combined with the record for Station 85</td>
</tr>
<tr>
<td>185</td>
<td>Vermilion River at Streator</td>
<td>Combined with the record for Station 151</td>
</tr>
</tbody>
</table>
STATION 82

LOCATION
In SW ¼ sec 10, T29N, R13W, Kankakee County, at highway bridge, 4.5 miles east of Chebanse

DRAINAGE AREA
2120 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Apr 1923 thru Sept 1959
CONTINUOUS RECORD: 36 years; water years 1924-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 36 years; water years 1924-59
MEAN DISCHARGE: 0.83 inch per month

Draft-Storage-Recurrence Data for Iroquois River near Chebanse

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
IROQUOIS RIVER, NEAR CHEBANSE

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS

0.01  0.1  1  10  100

2  3  4  5  6  7  8  9  10  20  30  40  50  60  70  80  100
LOCATION
In SE ¼ sec 15, T27N, R11W, Iroquois County, at bridge on U. S. 52 at Iroquois, 8.0 miles northeast of Watseka

DRAINAGE AREA
682 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 21 years; water years 1924-44
INDEX STATION: Iroquois River near Chebanse
COINCIDENT RECORD: 15 years; water years 1945-59

TOTAL DATA ANALYZED
PERIOD: 36 years; water years 1924-59
MEAN DISCHARGE: 0.85 inch per month

Draft-Storage-Recurrence Data for Iroquois River at Iroquois

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)
KANKAKEE RIVER AT MOMENCE

LOCATION
In NE ¼ sec 24, T31N, R13E, Kankakee County, 0.25 mile downstream from highway bridge in Momence

DRAINAGE AREA
2340 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Feb to Dec 1905, Feb to July 1906, Dec 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.88 inch per month

Draft-Storage-Recurrence Data for Kankakee River at Momence

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

| Recurrence Interval in Years | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|-----------------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Draft Rate in Percent of Mean Flow |

266
DRAFT STORAGE RECURRENCE CURVES
BASED ON
KANKAKEE RIVER AT MOMENCE

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS
KANKAKEE RIVER NEAR WILMINGTON

LOCATION
In NW ¼ sec 15, T33N, R9E, Will County, 0.4 mile downstream from Prairie Creek and 5.0 miles downstream from Wilmington

DRAINAGE AREA
5250 square miles, approximately

ACTUAL FLOW DATA

PERIOD: Oct 1933 thru Sept 1959
CONTINUOUS RECORD: 26 years; water years 1934-59
ADDITIONAL RECORD: Kankakee River at Custer Park, Station 173

CONTINUOUS RECORD: 18 years; water years 1916-33

SYNTHETIC FLOW DATA

None; the records from Station 173 were combined with the records from Station 85. The combined record was utilized as an index station record. The difference in drainage area between the two stations is 7 percent.

TOTAL DATA ANALYZED

PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.83 inch per month

Draft-Storage-Recurrence Data for Kankakee River near Wilmington

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical droughts period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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<td>1.83</td>
<td>2.17</td>
<td>2.89</td>
<td>3.51</td>
<td>4.26</td>
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<td>6.78</td>
<td>7.68</td>
<td>9.13</td>
<td>10.69</td>
</tr>
</tbody>
</table>

268
MAZON RIVER NEAR COAL CITY

LOCATION
In SW ¼ SW ¼ sec 31, T33N, R8E, Grundy County, at bridge on Ill. 113 S, 4.0 miles west of Coal City and 6.0 miles southeast of Morris

_DRAINAGE AREA_
470 square miles

_ACTUAL FLOW DATA_
_PERIOD: Oct 1939 thru Sept 1959
_CONTINUOUS RECORD: 20 years; water years 1940-59

_SYNTHESETIC FLOW DATA_
_PERIOD: 24 years; water years 1916-39
_INDEX STATION: Kankakee River near Wilmington
_COINCIDENT RECORD: 20 years; water years 1940-59

_TOTAL DATA ANALYZED_
_PERIOD: 44 years; water years 1916-59
_MEAN DISCHARGE: 1.18 inch per month

**Draft-Storage-Recurrence Data for Mazon River near Coal City**

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>Mean Discharge: 1.18 inch per month</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>1.18</td>
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<tr>
<td>10</td>
<td>2.17</td>
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<td>20</td>
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<td>30</td>
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<td>7.74</td>
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<tr>
<td>90</td>
<td>8.52</td>
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<td>9.30</td>
</tr>
</tbody>
</table>

(Extraction data in inches required to even draft every year at various recurrence intervals)

(Duration of actual discharge period in months shown below each capacity value)
LOCATION
In N ½ sec 16, T25N, R12W, Iroquois County, at highway bridge 1.5 miles west of Milford

DRAINAGE AREA
430 square miles

ACTUAL FLOW DATA
PERIOD: July 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1924-48
INDEX STATION: Iroquois River near Chebanse
COINCIDENT RECORD: 11 years; water years 1949-59

TOTAL DATA ANALYZED
PERIOD: 36 years; water years 1924-59
MEAN DISCHARGE: 0.84 inch per month

Draft-Storage-Recurrence Data for Sugar Creek at Milford

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>Grain draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6.0 0.07 0.23 0.46 0.71 1.00 1.25 1.59</td>
</tr>
<tr>
<td>10</td>
<td>3.5 0.33 0.34 0.35 0.36 0.37 0.38 0.39</td>
</tr>
<tr>
<td>20</td>
<td>5.0 0.38 0.46 0.55 0.65 0.74 0.83 0.93</td>
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<tr>
<td>50</td>
<td>10.0 0.63 0.74 0.86 1.00 1.14 1.29 1.45</td>
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<td>100</td>
<td>20.0 0.90 1.05 1.22 1.40 1.59 1.80 2.03</td>
</tr>
</tbody>
</table>

Reservoir storage capacity in inches required to meet draft runs at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
TERRY CREEK NEAR CUSTER PARK

STATION 148

LOCATION
Near southwest corner of SE ¼ sec 20, T32N, R10E, Will County, at bridge on Ill. 113 S, about 1.5 miles southeast of Custer Park

DRAINAGE AREA
12.0 square miles

ACTUAL FLOW DATA
PERIOD: July 1949 thru Sept 1959
CONTINUOUS RECORD: 10 years; water years 1950-59

SYNTHETIC FLOW DATA
PERIOD: 34 years; water years 1916-49
INDEX STATION: Kankakee River near Wilmington
COINCIDENT RECORD: 10 years; water years 1950-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.70 inch per month

Draft-Storage-Recurrence Data for Terry Creek near Custer Park

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Gross draft in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.02</td>
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<tr>
<td>15</td>
<td>0.06</td>
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<tr>
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<td>0.13</td>
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<td>2.51</td>
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<tr>
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<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Gross draft in percent of mean flow</th>
</tr>
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<tbody>
<tr>
<td>10</td>
<td>0.02</td>
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</table>
DRAFT STORAGE - RECURRENCE CURVES
BASED ON
TERRY CREEK NEAR CUSTER PARK

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS

2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 100

0.01 0.1 1 10 100
LOCATION
In SE ¼ SE ¼ sec 4, T27N, R8E, Livingston County, at Foreman highway bridge 1.25 miles northwest of Charlotte and 5.5 miles north of Chatsworth

DRAINAGE AREA
184 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1942 thru Sept 1959
CONTINUOUS RECORD: 17 years; water years 1943-59

SYNTHETIC FLOW DATA
PERIOD: 19 years; water years 1924-42
INDEX STATION: Iroquois River near Chebanse
COINCIDENT RECORD: 17 years; water years 1943-59

TOTAL DATA ANALYZED
PERIOD: 36 years; water years 1924-59
MEAN DISCHARGE: 0.72 inch per month
STATION 151
LOCATION
In NE ¼ SE ¼ sec 8, T32N, R2E, LaSalle County, at bridge on Ill. 178, 0.25 mile north of Lowell, and 7 miles southeast of LaSalle
DRAINAGE AREA
1230 square miles, approximately
ACTUAL FLOW DATA
PERIOD: May 1931 thru Sept 1959
CONTINUOUS RECORD: 28 years; water years 1932-59
ADDITIONAL RECORD: Station No. 185
CONTINUOUS RECORD: 16 years; water years 1915-30
SYNTHETIC FLOW DATA
PERIOD: 1 year; water year 1931
INDEX STATION: Kankakee River near Wilmington
COINCIDENT RECORD: 26 years; water years 1934-59
Note: The records from Station 185 were combined with the records from Station 151; the difference in drainage areas is 12 percent
TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.66 inch per month
VERMILION RIVER AT PONTIAC

STATION 152

LOCATION
In SW ¼ sec 22, T28N, R5E, Livingston County, at Vermilion Street bridge in Pontiac, 0.1 mile upstream from railroad bridge and Ill. 116 bridge

DRAINAGE AREA
568 square miles

ACTUAL FLOW DATA

PERIOD: Oct 1942 thru Sept 1959

CONTINUOUS RECORD: 17 years; water years 1943-59

SYNTHETIC FLOW DATA

PERIOD: 19 years; water years 1924-42

INDEX STATION: Iroquois River near Chebanse

COINCIDENT RECORD: 17 years; water years 1943-59

TOTAL DATA ANALYZED

PERIOD: 36 years; water years 1924-59

MEAN DISCHARGE: 0.69 inch per month

Draft-Storage-Recurrence Data for Vermilion River at Pontiac

<table>
<thead>
<tr>
<th>Recurrence Interval, years</th>
<th>Mean discharge in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>10</td>
<td>0.07</td>
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<tr>
<td>20</td>
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<tr>
<td>30</td>
<td>0.09</td>
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<tr>
<td>40</td>
<td>0.10</td>
</tr>
<tr>
<td>50</td>
<td>0.11</td>
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<tr>
<td>60</td>
<td>0.12</td>
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<tr>
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<td>0.15</td>
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<tr>
<td>100</td>
<td>0.16</td>
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</table>
SINGLETON DITCH AT ILLINOI

LOCATION
In SW ¼ NW ¼ sec 8, T31N, R15E, Kankakee County, at county highway bridge at Illinoi, at Illinois-Indiana State line, 7.0 miles east of Momence

DRAINAGE AREA
219 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 29 years; water years 1916-44
INDEX STATION: Kankakee River at Momence
COINCIDENT RECORD: 15 years; water years 1945-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.79 inch per month

Draft-Storage-Recurrence Data for Singleton Ditch at Illinoi

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>75</th>
<th>90</th>
<th>100</th>
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<tr>
<td>Low flow return period, years</td>
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<tr>
<td>Mean discharge, inch per month</td>
<td>0.79</td>
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Reservoir storage capacity in inches required in most draft years at various recurrence intervals

(Design of critical drainage period in months above each capacity value)

<table>
<thead>
<tr>
<th>Capacity, inches</th>
<th>44</th>
<th>40</th>
<th>30</th>
<th>25</th>
<th>20</th>
<th>15</th>
<th>10</th>
<th>5</th>
<th>2</th>
<th>1</th>
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<tr>
<td>Draft rate, in.</td>
<td>0.79</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
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(188x433)
### Gaging Stations in Rock River Hills

<table>
<thead>
<tr>
<th>Number</th>
<th>Name of Station</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>Cedar Creek near Winslow</td>
<td>286</td>
</tr>
<tr>
<td>59</td>
<td>Elkhorn Creek near Penrose</td>
<td>288</td>
</tr>
<tr>
<td>96</td>
<td>Killbuck Creek near Monroe Center</td>
<td>290</td>
</tr>
<tr>
<td>97</td>
<td>Kishwaukee River at Belvidere</td>
<td>292</td>
</tr>
<tr>
<td>98</td>
<td>Kishwaukee River near Perryville</td>
<td>294</td>
</tr>
<tr>
<td>99</td>
<td>South Branch, Kishwaukee River near Fairdale</td>
<td>296</td>
</tr>
<tr>
<td>103</td>
<td>Leaf River at Leaf River</td>
<td>298</td>
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<tr>
<td>120</td>
<td>Pecatonica River at Freeport</td>
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<tr>
<td>121</td>
<td>Pecatonica River at Shirland</td>
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<td>125</td>
<td>Rock Creek near Morrison</td>
<td>304</td>
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<tr>
<td>126</td>
<td>Rock River at Como</td>
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<tr>
<td>128</td>
<td>Rock River at Rockton</td>
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#### Stations Omitted

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<th>Number</th>
<th>Reason</th>
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<tr>
<td>176</td>
<td>Record too short</td>
</tr>
<tr>
<td>178</td>
<td>Used Station 125 instead</td>
</tr>
<tr>
<td>179</td>
<td>Used Station 128 instead</td>
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<tr>
<td>218</td>
<td>Record too short</td>
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</table>

#### Diagram

- **WINSLOW**
- **PENROSE**
- **MONROE CENTER**
- **BELVIDERE**
- **PERRYVILLE**
- **FAIRDALE**
- **LEAF RIVER**
- **FREEPORT**
- **SHIRLAND**
- **MORRISON**
- **COMO**
- **ROCKTON**

**Legend:**
- Synthetic
- Actual
CEDAR CREEK NEAR WINSLOW

STATION 48

LOCATION
In SE ¼ NE ¼ sec 32, T29N, R6E, Stephenson County, at highway bridge 3.0 miles southwest of Winslow

DRAINAGE AREA
1.29 square miles

ACTUAL FLOW DATA
PERIOD: Mar 1951 thru Sept 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1915-51
INDEX STATION: Pecatonica River at Freeport
COINCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1952-59
MEAN DISCHARGE: 0.49 inch per month

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Draft-Storage-Recurrence Data for Cedar Creek near Winslow

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value

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<th>Required storage capacity (inches)</th>
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286
ELKHORN CREEK NEAR PENROSE

LOCATION
In SW ¼ SE ¼ sec 9, T22N, R7E, Whiteside County, 50 feet upstream from highway bridge, 2.0 miles northwest of Penrose and 8 miles north of Sterling

DRAINAGE AREA
153 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Rock River at Como
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.68 inch per month

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### Draft-Storage-Recurrence Data for Elkhorn Creek near Penrose

Reservoir storage capacity in inches required to meet flood rates at various recurrence intervals

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<th>Gross Storage in Percent of Mean Flow</th>
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</tbody>
</table>

---

### Low Flow Recurrence Curves

- Chart showing low flow recurrence curves.

---

### Data Analysis

- Mean discharge: 0.68 inch per month.
**KILLBUCK CREEK NEAR MONROE CENTER**

**LOCATION**
In NW ¼ SW ¼ sec 19, T42N, R2E, Ogle County, 800 feet downstream from railroad bridge and 800 feet upstream from bridge on Ill. 72, 3.0 miles west of Monroe Center

**DRAINAGE AREA**
114 square miles

**ACTUAL FLOW DATA**

- **PERIOD:** Oct 1939 thru Sept 1959
- **CONTINUOUS RECORD:** 20 years; water years 1940-59

**SYNTHETIC FLOW DATA**

- **PERIOD:** 25 years; water years 1915-39
- **INDEX STATION:** Rock River at Como
- **COINCIDENT RECORD:** 20 years; water years 1940-59

**TOTAL DATA ANALYZED**

- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.67 inch per month

---

### Draft-Storage-Recurrence Data for Killbuck Creek near Monroe Center

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>Low Flow Recurrence Curves</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
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<tr>
<td>30</td>
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</table>

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>Mean Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.67 inch/month</td>
</tr>
</tbody>
</table>

---

**STATION 96**

**LOCATION**
In NW ¼ SW ¼ sec 19, T42N, R2E, Ogle County, 800 feet downstream from railroad bridge and 800 feet upstream from bridge on Ill. 72, 3.0 miles west of Monroe Center

**DRAINAGE AREA**
114 square miles

**ACTUAL FLOW DATA**

- **PERIOD:** Oct 1939 thru Sept 1959
- **CONTINUOUS RECORD:** 20 years; water years 1940-59

**SYNTHETIC FLOW DATA**

- **PERIOD:** 25 years; water years 1915-39
- **INDEX STATION:** Rock River at Como
- **COINCIDENT RECORD:** 20 years; water years 1940-59

**TOTAL DATA ANALYZED**

- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.67 inch per month
KISHWAUKEE RIVER AT BELVIDERE

STATION 97

LOCATION
Near southeast corner of sec 27, T44N, R3E, Boone County, at Belvidere sewage treatment plant, 1.25 miles downstream from State Street Bridge in Belvidere

DRAINAGE AREA
525 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Rock River at Como
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.68 inch per month

Draft-Storage-Recurrence Data for Kishwaukee River at Belvidere

<table>
<thead>
<tr>
<th>Recurrence interval (YEARS)</th>
<th>Cross draft rate in percent of mean flow</th>
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<tbody>
<tr>
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<td>2</td>
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</table>

Draft-Storage-Recurrence Data for Kishwaukee River at Belvidere

(Remove storage capacity in inches required to meet draft rate at various recurrence intervals)

(Duration of critical drought period in months shown below each capacity value)
KISHWAUKEE RIVER NEAR PERRYVILLE

LOCATION
In northeast corner of sec 21, T43N, R2E. Winnebago County, at Forest Preserve Road bridge, 2.0 miles southwest of Perryville and 7.0 miles southeast of Rockford

DRAINAGE AREA
1090 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Rock River at Como
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.68 inch per month

Draft-Storage-Recurrence Data for Kishwaukee River near Perryville

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>Gross draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>8</td>
<td>23.8</td>
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<tr>
<td>9</td>
<td>26.8</td>
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</tbody>
</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals (Duration of critical drought period in months shown below each capacity value)

- Mean discharge: 0.68 inch per month
**SOUTH BRANCH, KISHWAUKEE RIVER NEAR FAIRDALE**

**LOCATION**
On line between and near south boundary of sec 16 and 17, T42N, R3E, DeKalb County, at highway bridge 1.75 miles northeast of Fairdale and 3.0 miles northwest of Kirkland.

**DRAINAGE AREA**
386 square miles

**ACTUAL FLOW DATA**

<table>
<thead>
<tr>
<th>PERIOD:</th>
<th>Oct 1939 thru Sept 1959</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTINUOUS RECORD:</td>
<td>20 years; water years 1940-59</td>
</tr>
</tbody>
</table>

**SYNTHETIC FLOW DATA**

<table>
<thead>
<tr>
<th>PERIOD:</th>
<th>25 years; water years 1915-39</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDEX STATION:</td>
<td>Rock River at Como</td>
</tr>
<tr>
<td>CONCORDANT RECORD:</td>
<td>20 years; water years 1940-59</td>
</tr>
</tbody>
</table>

**TOTAL DATA ANALYZED**

<table>
<thead>
<tr>
<th>PERIOD:</th>
<th>45 years; water years 1915-59</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN DISCHARGE:</td>
<td>0.69 inch per month</td>
</tr>
</tbody>
</table>

### Draft-Storage-Recurrence Data for South Branch, Kishwaukee River near Fairdale

<table>
<thead>
<tr>
<th>Recurrence Interval</th>
<th>Gross runoff rate in percent of mean flow</th>
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<tbody>
<tr>
<td>10</td>
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<td>90</td>
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<tr>
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</tr>
</tbody>
</table>

| Duration of critical drawdown period in months shown below each capacity value |

<table>
<thead>
<tr>
<th>Recurrence Interval</th>
<th>Duration of critical drawdown period in months</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
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<tr>
<td>100</td>
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</tr>
</tbody>
</table>

**Mean discharge:** 0.69 inch per month
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
S. BR., KISHWAWEKE RIVER NEAR FAIRDALE

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES
**LEAF RIVER AT LEAF RIVER**

**LOCATION**
In NW ¼ sec 31, T25N, R10E, Ogle County, at bridge on Ill. 72, 0.5 mile east of the town of Leaf River and 7.0 miles west of Byron

**DRAINAGE AREA**
102 square miles

**ACTUAL FLOW DATA**
CONTINUOUS RECORD: 19 years; water years 1940-58

**SYNTHETIC FLOW DATA**
PERIOD: 25 years; water years 1915-39
INDEX STATION: Rock River at Como
COINCIDENT RECORD: 19 years; water years 1940-58

**TOTAL DATA ANALYZED**
PERIOD: 44 years; water years 1915-58
MEAN DISCHARGE: 0.66 inch per month

---

**Draft-Storage-Recurrence Data for Leaf River at Leaf River**

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.
(Duration of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
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<th>55</th>
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</thead>
<tbody>
<tr>
<td>Capacity in inches</td>
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<tr>
<td>Draft Rate in percent of mean flow</td>
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</tbody>
</table>

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**Statistical Data**

- **Mean Discharge:** 0.66 inch per month
PECATONICA RIVER AT FREEPORT

LOCATION
In SE ¼ sec 30, T27N, R8E, Stephenson County, on property of Public Service Co. of Northern Illinois at Freeport, 0.3 mile upstream from Stephenson Street Bridge

DRAINAGE AREA
1330 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Sept 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.74 inch per month
PECATONICA RIVER AT SHIRLAND

LOCATION
In SW ¼ sec 11, T28N, R11E, Winnebago County, at mouth of Sugar River, 0.5 mile south of Shirland and 6.0 miles southwest of Rockton

DRAINAGE AREA
2540 square miles, approximately

ACTUAL FLOW DATA

CONTINUOUS RECORD: 19 years; water years 1940-58

SYNTHETIC FLOW DATA
PERIOD: 26 years; water years 1915-39, 1959
INDEX STATION: Pecatonica River at Freeport
COINCIDENT RECORD: 19 years; water years 1940-58

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.74 inch per month

Draft-Storage-Recurrence Data for Pecatonica River at Shirland

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>Gross draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.00 0.00 0.00 0.01 0.06 0.13 0.26 0.52 0.83 1.36 2.37 3.98 5.40 7.23 8.86 10.49 12.13 13.84 15.29 17.18</td>
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</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)
**LOCATION**
In SW ¼ SE ¼ sec 6, T21N, R5E, Whiteside County, 1.5 miles north of Morrison

**DRAINAGE AREA**
143 square miles

**ACTUAL FLOW DATA**
**PERIOD:** Oct 1942 thru Sept 1958; gaging discontinued Oct 1, 1958
**CONTINUOUS RECORD:** 16 years; water years 1943-58

**SYNTHETIC FLOW DATA**
**PERIOD:** 37 years; water years 1915-50, 1959
**INDEX STATION:** Rock River at Como
**COINCIDENT RECORD:** 16 years; water years 1943-58

**TOTAL DATA ANALYZED**
**PERIOD:** 45 years; water years 1915-59
**MEAN DISCHARGE:** 0.66 inch per month

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**Draft-Storage-Recurrence Data for Rock Creek near Morrison**

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Duration of critical drought period in months shown below each capacity value)

| Recurrence interval (years) | 5  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|-----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Gross draft rate in percent of mean flow |

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**LOW FLOW RECURRENT CURVES**

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DRAFT STORAGE RECURRENCE CURVES
BASED ON
ROCK CREEK NEAR MORRISON

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES
ROCK RIVER AT COMO

STATION 126

LOCATION
In NE ¼ sec 25, T21N, R6E, Whiteside County, 10 mile upstream from Como and 3.0 miles downstream from Rock Falls

DRAINAGE AREA
8700 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Mar thru Dec 1905, Oct 1914 thru Sept 1959
CONTINUOUS RECORD: 45 years; water years 1915-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.80 inch per month

Draft-Storage-Recurrence Data for Rock River at Como
Reservoir storage capacity in inches required to meet dry years at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity curve)

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<th>Recurrence interval, years</th>
<th>Mean dry year in percent of mean flow</th>
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ROCK RIVER AT ROCKTON

STATION 128

LOCATION

In SE ¼ NW ¼ sec 24, T46N, R1E, Winnebago County, at bridge on Ill. 2 in Rockton

DRAINAGE AREA

6290 square miles, approximately

ACTUAL FLOW DATA

PERIOD: June 1903 thru July 1906; Oct 1906 thru Mar 1909, July 1914 thru Sept 1919, Oct 1939 thru Sept 1959

CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA

PERIOD: 25 years; water years 1915-39

INDEX STATION: Pecatonica River at Freeport

COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED

PERIOD: 45 years; water years 1915-59

MEAN DISCHARGE: 0.65 inch per month

Draft-Storage-Recurrence Data for Rock River at Rockton

Reservoir storage capacity in inches required to meet flood rates at various recurrence intervals

(Duration of critical discharges period in months shown below each capacity value)

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<th>Recurrence Interval in Years</th>
<th>Mean Flood Rate in percent of mean flow</th>
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<th>Recurrence Interval in Years</th>
<th>Mean Flood Rate in percent of mean flow</th>
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308
Gaging Stations in Green River Lowland

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<th>NUMBER</th>
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<td>Green River at Amboy</td>
<td>312</td>
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<tr>
<td>70</td>
<td>Green River near Geneseo</td>
<td>314</td>
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</tbody>
</table>

![Diagram showing gaging stations AMBOY and GENESEO with period of record from 1910 to 1960.](image)
Green River at Amboy

Station 69

Location:
In SE ¼ NE ¼ sec 22, T20N, R10E, Lee County, at bridge on U.S. 52, at southeast edge of Amboy

Drainage Area:
199 square miles

Actual Flow Data:
Continuous Record: 19 years; water years 1940-58

Synthetic Flow Data:
Period: 25 years; water years 1915-39
Index Station: Rock River at Como
Coincident Record: 19 years; water years 1940-58

Total Data Analyzed:
Period: 44 years; water years 1915-58
Mean Discharge: 0.62 inch per month

Draft-Storage-Recurrence Data for Green River at Amboy

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

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Mean Discharge: 0.62 inch per month
DRAFT- STORAGE- RECURRENCE CURVES
BASED ON
GREEN RIVER AT AMBOY

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS

5% DRAFT RATE NEEDS ZERO STORAGE
GREEN RIVER NEAR GENESEO

LOCATION
In NE ¼ SW ¼ sec 4, T17N, R3E, Henry County, at bridge on Ill. 82, 2.5 miles north of Geneseo

DRAINAGE AREA
958 square miles

ACTUAL FLOW DATA
PERIOD: Mar 1936 thru Sept 1959
CONTINUOUS RECORD: 23 years; water years 1937-59

SYNTHETIC FLOW DATA
PERIOD: 22 years; water years 1915-36
INDEX STATION: Rock River at Como
COINCIDENT RECORD: 23 years; water years 1937-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.63 inch per month

Draft-Storage-Recurrence Data for Green River near Geneseo

Reservoir storage capacity in inches required to meet draf rates at various recurrence intervals
(Duration of selected drought period in months shown below each capacity value)

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Draft-Storage-Recurrence Data for Green River near Geneseo

STATION 70
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<td>Apple River near Hanover</td>
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<td>Plum River below Carroll Creek, near Savanna</td>
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<td>Galena River at Galena</td>
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<td>Galena River at Buncombe, Wisconsin</td>
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<td>East Fork, Galena River at Council Hill</td>
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![Gaging Stations in Wisconsin Driftless Region](image)
APPLE RIVER NEAR HANOVER

LOCATION
In NE ¼ NW ¼ sec 16, T26N, R2E, JoDaviess County, 0.3 mile southwest of Hanover

DRAINAGE AREA
244 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1934 thru Sept 1959
CONTINUOUS RECORD: 25 years; water years 1935-59

SYNTHETIC FLOW DATA
PERIOD: 20 years; water years 1915-34
INDEX STATION: Pecatonica River at Freeport
COINCIDENT RECORD: 25 years; water years 1935-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.72 inch per month

Draft-Storage-Recurrence Data for Apple River near Hanover

Recharge storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

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<th>Mean Discharge (inches)</th>
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Draft-Storage-Recurrence Data for Apple River near Hanover

Recharge storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)
PLUM RIVER BELOW CARROLL CREEK, NEAR SAVANNA

LOCATION
In NE ¼ SW ¼ sec 31, T25N, R4E, Carroll County, 0.7 mile upstream from Camp Creek, 2.6 miles downstream from Carroll Creek and 3.5 miles northeast of Savanna

DRAINAGE AREA
231 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 26 years; water years 1915-40
INDEX STATION: Pecatonica River at Freeport
COINCIDENT RECORD: 19 years; water years 1941-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.64 inch per month

Draft-Storage-Recurrence Data for Plum River below Carroll Creek, near Savanna

Reservoir storage capacity to inches required to meet draft rates at various recurrence intervals

<table>
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<tr>
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Green draft rate in percent of mean flow

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STATION 171

LOCATION
In NE ¼ NE ¼ sec 24, T28N, R1W, JoDaviess County, at Green Street Bridge in Galena

DRAINAGE AREA
200 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1934 thru Sept 1938
CONTINUOUS RECORD: 4 years; water years 1935-38

SYNTHETIC FLOW DATA
PERIOD: 41 years; water years 1915, 1939-59
INDEX STATION: Pecatonica River at Freeport
COINCIDENT RECORD: 4 years; water years 1935-38

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.74 inch per month

Draft-Storage-Recurrence Data for Galena River at Galena

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months below each capacity value)

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<tr>
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Mean discharge: 0.74 inch per month
DRAFT- STORAGE- RECURRENCE CURVES
BASED ON
GALENA RIVER AT GALENA

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES
PLUM RIVER ABOVE CARROLL CREEK, NEAR SAVANNA

STATION 175

LOCATION
In SW ¼ NW ¼ sec 33, T25N, R4E, Carroll County, 0.9 mile upstream from Carroll Creek and 5.0 miles northeast of Savanna

DRAINAGE AREA
164 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1934 thru Sept 1941; gaging discontinued Oct 1, 1941
CONTINUOUS RECORD: 7 years; water years 1935-41

SYNTHETIC FLOW DATA
PERIOD: 38 years; water years 1942-59, 1915-34
INDEX STATION: Pecatonica River at Freeport
COINCIDENT RECORD: 7 years; water years 1935-41

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.81 inch per month

---

### Draft-Storage-Recurrence Data for Plum River above Carroll Creek, near Savanna

Reservoir average capacity in billions required to meet draft rate at various recurrence intervals

(Duration of critical drought period in months shown below each capacity value)

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<th>Recurrence Interval (months)</th>
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<th>15</th>
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<th>70</th>
<th>80</th>
<th>90</th>
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<tr>
<td>Cross draft rate in percent of mean flow</td>
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### Draft-Storage-Recurrence Curves

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</table>
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
PLUM RIVER
ABOVE CARROLL CREEK NEAR SAVANNA

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS

0.01  0.1  1  10  100

0  2  4  6  8  10  20  30  40  50  60  70  80  100
**GALENA RIVER AT BUNCOMBE, WISCONSIN**

**LOCATION**
Near center of sec 33, T1N, R1E, LaFayette County, Wisconsin, 2.0 miles upstream from the Wisconsin-Illinois state line, at Buncombe

**DRAINAGE AREA**
128 square miles

**ACTUAL FLOW DATA**
- **PERIOD:** Sept 1939 thru Sept 1959
- **CONTINUOUS RECORD:** 20 years; water years 1940-59

**SYNTHETIC FLOW DATA**
- **PERIOD:** 25 years; water years 1915-39
- **INDEX STATION:** Pecatonica River at Freeport
- **COINCIDENT RECORD:** 20 years; water years 1940-59

**TOTAL DATA ANALYZED**
- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.69 inch per month

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**Draft-Storage-Recurrence Data for Galena River at Buncombe, Wisconsin**

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<tr>
<td>Low discharge (cfs)</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
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<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>

(Duration of critical drawdown period in months shown below each capacity value)
DRAFT STORAGE-RECURRENT CURVES
BASED ON
GALENA RIVER AT BUNCOMBE, WISCONSIN

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES

2  3  4  5  6  7  8  9  10  20  30  40  50  60  70  80  100

20

0,01  0,1  1  10  100

327
EAST FORK, GALENA RIVER AT COUNCIL HILL

STATION 221

LOCATION
In W ½ sec 31, T29N, R2E, JoDaviess County, at Council Hill and 6.0 miles northeast of Galena

DRAINAGE AREA
20.1 square miles

ACTUAL FLOW DATA
PERIOD: Sept 1939 thru Sept 1959
CONTINUOUS RECORD: 20 years; water years 1940-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1915-39
INDEX STATION: Pecatonica River at Freeport
COINCIDENT RECORD: 20 years; water years 1940-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.69 inch per month

Draft-Storage-Recurrence Data for East Fork, Galena River at Council Hill

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross draft rate in percent of mean flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 0.5 | 0.00 | 0.03 | 0.05 | 0.08 | 0.11 | 0.14 | 0.17 | 0.20 | 0.23 | 0.26 | 0.29 | 0.32 | 0.35 | 0.38 | 0.41 | 0.44 | 0.47 | 0.50 |
| 0.6 | 0.00 | 0.02 | 0.04 | 0.06 | 0.08 | 0.10 | 0.12 | 0.14 | 0.16 | 0.18 | 0.20 | 0.22 | 0.24 | 0.26 | 0.28 | 0.31 | 0.33 | 0.35 |
| 0.7 | 0.00 | 0.01 | 0.03 | 0.04 | 0.05 | 0.07 | 0.08 | 0.10 | 0.11 | 0.13 | 0.14 | 0.16 | 0.17 | 0.19 | 0.20 | 0.22 | 0.24 | 0.25 |
| 0.8 | 0.00 | 0.00 | 0.02 | 0.03 | 0.05 | 0.06 | 0.07 | 0.08 | 0.10 | 0.11 | 0.13 | 0.14 | 0.15 | 0.17 | 0.18 | 0.19 | 0.20 | 0.21 |
| 0.9 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 | 0.14 | 0.15 | 0.16 | 0.17 |
| 1.0 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.05 | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.12 | 0.13 | 0.14 | 0.15 |

328
DRAFT-STORAGE-RECURRENT CURVES

BASED ON

EAST FORK GALENA RIVER AT COUNCIL HILL

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS
Gaging Stations in Wheaton Morainai Region

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Butterfield Creek at Flossmoor</td>
<td>332</td>
</tr>
<tr>
<td>21</td>
<td>Deer Creek near Chicago Heights</td>
<td>334</td>
</tr>
<tr>
<td>22</td>
<td>Lansing Ditch near Lansing</td>
<td>336</td>
</tr>
<tr>
<td>24</td>
<td>Midlothian Creek at Oak Forest</td>
<td>338</td>
</tr>
<tr>
<td>25</td>
<td>North Creek near Lansing</td>
<td>340</td>
</tr>
<tr>
<td>27</td>
<td>Thorn Creek at Thornton</td>
<td>342</td>
</tr>
<tr>
<td>29</td>
<td>Addison Creek at Bellwood</td>
<td>344</td>
</tr>
<tr>
<td>40</td>
<td>Boone Creek near McHenry</td>
<td>346</td>
</tr>
<tr>
<td>42</td>
<td>Buffalo Creek near Wheeling</td>
<td>348</td>
</tr>
<tr>
<td>53</td>
<td>DesPlaines River near DesPlaines</td>
<td>350</td>
</tr>
<tr>
<td>54</td>
<td>DesPlaines River near Gurnee</td>
<td>352</td>
</tr>
<tr>
<td>55</td>
<td>DesPlaines River at Riverside</td>
<td>354</td>
</tr>
<tr>
<td>56</td>
<td>DuPage River at Troy</td>
<td>356</td>
</tr>
<tr>
<td>62</td>
<td>Flag Creek near Willow Springs</td>
<td>358</td>
</tr>
<tr>
<td>65</td>
<td>Fox River at Algonquin</td>
<td>360</td>
</tr>
<tr>
<td>75</td>
<td>Hickory Creek at Joliet</td>
<td>362</td>
</tr>
<tr>
<td>104</td>
<td>Long Run near Lemont</td>
<td>364</td>
</tr>
<tr>
<td>110</td>
<td>McDonald Creek near Mount Prospect</td>
<td>366</td>
</tr>
<tr>
<td>115</td>
<td>North Branch, Chicago River at Deerfield</td>
<td>368</td>
</tr>
<tr>
<td>116</td>
<td>North Branch, Chicago River at Niles</td>
<td>370</td>
</tr>
<tr>
<td>124</td>
<td>Poplar Creek at Elgin</td>
<td>372</td>
</tr>
<tr>
<td>129</td>
<td>Salt Creek near Arlington Heights</td>
<td>374</td>
</tr>
<tr>
<td>132</td>
<td>Salt Creek at Western Springs</td>
<td>376</td>
</tr>
<tr>
<td>138</td>
<td>Skokie River at Lake Forest</td>
<td>378</td>
</tr>
<tr>
<td>149</td>
<td>Tinley Creek near Palos Park</td>
<td>380</td>
</tr>
<tr>
<td>153</td>
<td>Weller Creek at DesPlaines</td>
<td>382</td>
</tr>
<tr>
<td>154</td>
<td>West Fork, North Branch, Chicago River</td>
<td>384</td>
</tr>
<tr>
<td>155</td>
<td>Willow Creek near Park Ridge</td>
<td>386</td>
</tr>
<tr>
<td>163</td>
<td>Little Calumet River at Harvey</td>
<td>388</td>
</tr>
<tr>
<td>183</td>
<td>Spring Creek at Joliet</td>
<td>390</td>
</tr>
</tbody>
</table>

**STATIONS OMITTED**

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>NAME OF STATION</th>
<th>REASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Little Calumet River at South Holland</td>
<td>Diversion</td>
</tr>
<tr>
<td>26</td>
<td>Thorn Creek at Glenwood</td>
<td>Diversion</td>
</tr>
<tr>
<td>157</td>
<td>Chicago Sanitary and Ship Canal at Lockport</td>
<td>Regulated</td>
</tr>
<tr>
<td>168</td>
<td>DesPlaines River above Jackson Creek at Channahan</td>
<td>Same information as Station 189</td>
</tr>
<tr>
<td>169</td>
<td>DesPlaines River at Joliet</td>
<td>Regulated, diversion</td>
</tr>
<tr>
<td>189</td>
<td>DesPlaines River at Lemont</td>
<td>Combined with record for Station 55</td>
</tr>
<tr>
<td>210</td>
<td>Ferson Creek near St. Charles</td>
<td>Record too short</td>
</tr>
<tr>
<td>215</td>
<td>East Branch, DuPage River at Lisle</td>
<td>Record too short</td>
</tr>
<tr>
<td>216</td>
<td>East Branch, DuPage River near Naperville</td>
<td>Record too short</td>
</tr>
<tr>
<td>217</td>
<td>West Branch, DuPage River near Naperville</td>
<td>Record too short</td>
</tr>
<tr>
<td>219</td>
<td>West Branch, DuPage River near West Chicago</td>
<td>Record too short</td>
</tr>
</tbody>
</table>
BUTTERFIELD CREEK AT FLOSSMOOR

LOCATION
In NE 1/4 NW 1/4 sec 8, T35N, R14E, Cook County, at Reigle Road Bridge at Homewood city limits, 0.75 mile east of Flossmoor

DRAINAGE AREA
22.9 square miles

ACTUAL FLOW DATA
PERIOD: June 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 33 years; water years 1916-48
INDEX STATION: Kankakee River at Momence
COINCIDENT RECORD: 11 years; water years 1949-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-1959
MEAN DISCHARGE: 0.67 inch per month

---

Draft-Storage-Recurrence Data for Butterfield Creek at Flossmoor

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low flow recurrence curves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

---

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
### Draft-Storage-Recurrence Data for Deer Creek near Chicago Heights

**Reservoir storage capacity in inches required to meet draft rate at various recurrence intervals**

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Gross draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.50</td>
</tr>
<tr>
<td>3</td>
<td>0.60</td>
</tr>
<tr>
<td>5</td>
<td>0.80</td>
</tr>
<tr>
<td>10</td>
<td>1.50</td>
</tr>
<tr>
<td>20</td>
<td>2.00</td>
</tr>
<tr>
<td>30</td>
<td>2.50</td>
</tr>
<tr>
<td>50</td>
<td>3.00</td>
</tr>
<tr>
<td>100</td>
<td>4.00</td>
</tr>
</tbody>
</table>

---

### STATION 21

**LOCATION**

Near center of sec 14, T35N, R14E, Cook County, at bridge on Joe Orr road, 1.5 miles northeast of Chicago Heights

**DRAINAGE AREA**

24.4 square miles

**ACTUAL FLOW DATA**

**PERIOD:** June 1948 thru Sept 1959

**CONTINUOUS RECORD:** 11 years; water years 1949-59

**SYNTHETIC FLOW DATA**

**PERIOD:** 33 years; water years 1916-48

**INDEX STATION:** Kankakee River at Momence

**COINCIDENT RECORD:** 11 years; water years 1949-59

**TOTAL DATA ANALYZED**

**PERIOD:** 44 years; water years 1916-59

**MEAN DISCHARGE:** 0.57 inch per month
**Station 22**

**Location**
At north boundary of sec 17, T35N, R15E, Cook County, at bridge on farm road, 0.5 mile east of Burnham Avenue and 2.0 miles south of Lansing.

**Drainage Area**
8.3 square miles

**Actual Flow Data**
- **Period:** June 1948 thru Sept 1959
- **Continuous Record:** 11 years; water years 1949-59

**Synthetic Flow Data**
- **Period:** 33 years; water years 1916-48
- **Index Station:** Kankakee River at Momence
- **Coincident Record:** 11 years; water years 1949-59

**Total Data Analyzed**
- **Period:** 44 years; water years 1916-59
- **Mean Discharge:** 0.92 inch per month

---

**Draft-Storage-Recurrence Data for Lansing Ditch near Lansing**

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.

(Duration of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval (years)</th>
<th>Mean draft in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.12</td>
</tr>
<tr>
<td>15</td>
<td>0.21</td>
</tr>
<tr>
<td>20</td>
<td>0.30</td>
</tr>
<tr>
<td>25</td>
<td>0.40</td>
</tr>
<tr>
<td>30</td>
<td>0.50</td>
</tr>
<tr>
<td>35</td>
<td>0.60</td>
</tr>
<tr>
<td>40</td>
<td>0.70</td>
</tr>
<tr>
<td>45</td>
<td>0.80</td>
</tr>
<tr>
<td>50</td>
<td>0.90</td>
</tr>
<tr>
<td>55</td>
<td>1.00</td>
</tr>
<tr>
<td>60</td>
<td>1.10</td>
</tr>
<tr>
<td>65</td>
<td>1.20</td>
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<tr>
<td>70</td>
<td>1.30</td>
</tr>
<tr>
<td>75</td>
<td>1.40</td>
</tr>
<tr>
<td>80</td>
<td>1.50</td>
</tr>
<tr>
<td>85</td>
<td>1.60</td>
</tr>
<tr>
<td>90</td>
<td>1.70</td>
</tr>
<tr>
<td>95</td>
<td>1.80</td>
</tr>
<tr>
<td>100</td>
<td>1.90</td>
</tr>
</tbody>
</table>

**Legend:**
- **LOW FLOW**
- **RECURRENT INTERVALS IN YEARS**
- **DATA ANALYZED PERIOD:**
  - June 1916 to Sept 1959
  - Continuous record: 11 years; water years 1949-59
  - Synthetic flow data: 33 years; water years 1916-48
  - Coincident record: 11 years; water years 1949-59
  - Total data analyzed: 44 years; water years 1916-59
- **MEAN DISCHARGE:** 0.92 inch per month
DRAFT-STORAGE-RECURRENCE CURVES
BASED ON
LANSING DITCH NEAR LANSING

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENCE INTERVAL IN YEARS
**MIDLOTHIAN CREEK AT OAK FOREST**

**LOCATION**
In SE ¼ NW ¼ sec 15, T36N, R13E, Cook County, at Kilbourn Avenue Bridge in Oak Forest

**DRAINAGE AREA**
12.7 square miles

**ACTUAL FLOW DATA**
**PERIOD:** Oct 1950 thru Sept 1959
**CONTINUOUS RECORD:** 9 years; water years 1951-59

**SYNTHETIC FLOW DATA**
**PERIOD:** 35 years; water years 1916-50
**INDEX STATION:** Kankakee River at Momence
**COINCIDENT RECORD:** 9 years; water years 1951-59

**TOTAL DATA ANALYZED**
**PERIOD:** 44 years; water years 1916-59
**MEAN DISCHARGE:** 0.83 inch per month

---

### Draft-Storage-Recurrence Data for Midlothian Creek at Oak Forest

<table>
<thead>
<tr>
<th>Recurrence Interval</th>
<th>Cross Draft Rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>3</td>
<td>4.0</td>
</tr>
<tr>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>5</td>
<td>3.0</td>
</tr>
<tr>
<td>6</td>
<td>2.5</td>
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<tr>
<td>7</td>
<td>2.0</td>
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<tr>
<td>8</td>
<td>1.5</td>
</tr>
<tr>
<td>9</td>
<td>1.0</td>
</tr>
<tr>
<td>10</td>
<td>0.5</td>
</tr>
<tr>
<td>15</td>
<td>0.2</td>
</tr>
<tr>
<td>20</td>
<td>0.1</td>
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<tr>
<td>25</td>
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<tr>
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<tr>
<td>50</td>
<td>0.005</td>
</tr>
<tr>
<td>60</td>
<td>0.0025</td>
</tr>
<tr>
<td>75</td>
<td>0.001</td>
</tr>
<tr>
<td>100</td>
<td>0.0005</td>
</tr>
</tbody>
</table>

Reservoir storage capacity in feet required to meet draft cases at various recurrence intervals (Duration of critical drawdown period in months shown below each capacity value)
### Draft-Storage-Recurrence Data for North Creek near Lansing

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>Mean discharge in inches per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.41</td>
</tr>
<tr>
<td>10</td>
<td>0.41</td>
</tr>
<tr>
<td>15</td>
<td>0.41</td>
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<tr>
<td>20</td>
<td>0.41</td>
</tr>
<tr>
<td>25</td>
<td>0.41</td>
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<tr>
<td>30</td>
<td>0.41</td>
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<tr>
<td>35</td>
<td>0.41</td>
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<td>40</td>
<td>0.41</td>
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<td>45</td>
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<tr>
<td>65</td>
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<td>70</td>
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<td>80</td>
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<tr>
<td>85</td>
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<tr>
<td>90</td>
<td>0.41</td>
</tr>
<tr>
<td>95</td>
<td>0.41</td>
</tr>
<tr>
<td>100</td>
<td>0.41</td>
</tr>
</tbody>
</table>

### DRAINAGE AREA

18.2 square miles

### ACTUAL FLOW DATA

#### PERIOD:
June 1948 thru Sept 1959

#### CONTINUOUS RECORD:
11 years; water years 1949-59

### SYNTHETIC FLOW DATA

#### PERIOD:
33 years; water years 1916-48

#### INDEX STATION:
Kankakee River at Momence

#### COINCIDENT RECORD:
11 years; water years 1949-59

#### TOTAL DATA ANALYZED

#### PERIOD:
44 years; water years 1916-59

#### MEAN DISCHARGE:
0.76 inch per month

---

**STATION 25**

**LOCATION**
In SE ¼ SE ¼ sec 1, T35N, R14E, Cook County, at Torrence Avenue Bridge, 1.1 miles south of Lansing and 2.7 miles north of U. S. 30

**DRAINAGE AREA**
18.2 square miles

---

**Draft-Storage-Recurrence Data for North Creek near Lansing**

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

*(Duration of critical drawdown period in months shown below each capacity value)*
THORN CREEK AT THORNTON

LOCATION
Near center of N½ sec 34, T36N, R14E, Cook County, at Ridge Road Bridge in Thornton

DRAINAGE AREA
106 square miles

ACTUAL FLOW DATA
PERIOD: June 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 33 years; water years 1916-48
INDEX STATION: Kankakee River at Momence
COINCIDENT RECORD: 11 years; water years 1949-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.83 inch per month

Draft-Storage-Recurrence Data for Thorn Creek at Thornton

Recurrence interval in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence Interval (in years)</th>
<th>Gross draft rate in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>40,0.04</td>
<td>0.09</td>
</tr>
<tr>
<td>40,0.02</td>
<td>0.07</td>
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342
ADDISON CREEK AT BELLWOOD

LOCATION
In SE ¼ sec 9, T39N, R12E, Cook County, at bridge on Washington Boulevard in Bellwood

DRAINAGE AREA
18.2 square miles

ACTUAL FLOW DATA
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1915-1951
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.66 inch per month

Draft-Storage-Recurrence Data for Addison Creek at Bellwood

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of ordinates drawn down period in months shown below; capacity values)

<table>
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<tr>
<th>Recurrence Interval,</th>
<th>Gross draft rate as percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
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344
STATION 40

LOCATION
In W ½ sec 4, T44N, R8E, McHenry County, at county highway bridge, 0.5 mile west of Clemens School, 2.5 miles southwest of McHenry and 6.5 miles east of Woodstock

DRAINAGE AREA
15.6 square miles

ACTUAL FLOW DATA
PERIOD: July 1948 thru Sept 1959
CONTINUOUS RECORD: 11 years; water years 1949-59

SYNTHETIC FLOW DATA
PERIOD: 33 years; water years 1916-48
INDEX STATION: Fox River at Algonquin
COINCIDENT RECORD: 11 years; water years 1949-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.81 inch per month
BUFFALO CREEK NEAR WHEELING

STATION 42

LOCATION
In NE ¼ NW ¼ sec 4, T42N, R11E, Cook County, at highway bridge 2.5 miles west of Wheeling

DRAINAGE AREA
19.4 square miles

ACTUAL FLOW DATA
PERIOD: Aug 1952 thru Sept 1959
CONTINUOUS RECORD: 7 years; water years 1953-59

SYNTHETIC FLOW DATA
PERIOD: 38 years; water years 1915-52
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 7 years; water years 1953-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.68 inch per month

Draft-Storage-Recurrence Data for Buffalo Creek near Wheeling

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

(Deviations of actual observed period from those shown below each capacity value)

Recurrence
interval
(per 100 year)

Cross draft rate in percent of mean flow

<table>
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<tr>
<th>Cross draft rate</th>
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<th>10</th>
<th>15</th>
<th>20</th>
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</table>

Drought-Storage-Recurrence curves for Buffalo Creek near Wheeling.
### Location

In SE ¼ SE ¼ sec 25, T42N, R11E, Cook County, 50 feet upstream from dam No. 2 of Cook County Forest Preserve, 2.5 miles north of DesPlaines.

### Drainage Area

359 square miles

### Actual Flow Data

**Period:** Oct 1940 thru Sept 1959

**Continuous Record:** 19 years; water years 1941-59

### Synthetic Flow Data

**Period:** 25 years; water years 1916-40

**Index Station:** DesPlaines River at Riverside

**Coincident Record:** 19 years; water years 1941-59

### Total Data Analyzed

**Period:** 44 years; water years 1916-59

**Mean Discharge:** 0.64 inch per month

---

### Draft-Storage-Recurrence Data for DesPlaines River near DesPlaines

Reservoir storage capacity to inhibit required to meet draft rates at various recurrence intervals

<table>
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<tr>
<th>Recurrence Interval (years)</th>
<th>Gran Discharge (inches)</th>
<th>Total (inches)</th>
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350
DESPLAINES RIVER NEAR GURNEE

LOCATION
In SW ¼ sec 27, T45N, R11E, Lake County, at bridge on Ill. 120, 2.5 miles southwest of Gurnee and 5.5 miles west of Waukegan

DRAINAGE AREA
215 square miles

ACTUAL FLOW DATA
CONTINUOUS RECORD: 13 years; water years 1946-58

SYNTHETIC FLOW DATA
PERIOD: 31 years; water years 1916-45, 1959
INDEX STATION: Fox River at Algonquin
COINCIDENT RECORD: 13 years; water years 1946-58

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.69 inch per month

Draft-Storage-Recurrence Data for DesPlaines River near Gurnee

<table>
<thead>
<tr>
<th>Recurrence Interval in Years</th>
<th>5</th>
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<th>15</th>
<th>20</th>
<th>25</th>
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Station 54

Draft-Storage-Recurrence Data for DesPlaines River near Gurnee

<table>
<thead>
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<th>Recurrence Interval in Months</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
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<th>85</th>
<th>90</th>
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<tbody>
<tr>
<td>Mean Discharge (inches)</td>
<td>0.69</td>
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</tr>
</tbody>
</table>

352
DRAFT STORAGE RECURRENCE CURVES
BASED ON DES PLAINES RIVER NEAR GURNEE

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES
DESPLAINES RIVER AT RIVERSIDE

LOCATION
In SW ¼ SW ¼ sec 36, T39N, R12E, Cook County, 300 feet downstream from Barry Point Road Bridge in Riverside.

DRAINAGE AREA
635 square miles

ACTUAL FLOW DATA
PERIOD: Fragmentary May 1886 thru Dec 1890; complete for May 1892 thru Sept 1936, and Oct 1943 thru Sept 1959.
CONTINUOUS RECORD: 44 years; water years 1893-36, 16 years; water years 1944-59.

SYNTHETIC FLOW DATA
PERIOD: 7 years; water years 1937-43.
INDEX STATION: DesPlaines River at Lemont.
COINCIDENT RECORD: 21 years; water years 1916-36.
Note: The 45 year composite record was used as an index station record. The 23 years of data for water years 1893-1915 were omitted.

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59.
MEAN DISCHARGE: 0.65 inch per month.

Draft-Storage-Recurrence Data for DesPlains River at Riverside

Station 55

Note: The 45 year composite record was used as an index station record. The 23 years of data for water years 1893-1915 were omitted.
DUPAGE RIVER AT TROY

LOCATION
In SE ¼ SW ¼ sec 10, T35N, R9E, Will County, 400 feet upstream from U. S. 52 at Troy, 6.0 miles west of Joliet

DRAINAGE AREA
325 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1940 thru Sept 1959
CONTINUOUS RECORD: 19 years; water years 1941-59

SYNTHETIC FLOW DATA
PERIOD: 25 years; water years 1916-40
INDEX STATION: Fox River at Dayton
COINCIDENT RECORD: 19 years; water years 1941-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.73 inch per month

Draft-Storage-Recurrence Data for DuPage River at Troy

Recurrence storage capacity in inches required to meet draft rates at various recurrence intervals

(Draft rate in percent of mean flow)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
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Draft-Storage-Recurrence Curves for DuPage River at Troy

Recurrence storage capacity in inches required to meet draft rates at various recurrence intervals

(Draft rate in percent of mean flow)
FLAG CREEK NEAR WILLOW SPRINGS

LOCATION
In SE ¼ NE ¼ sec 31, T38N, R12E, Cook County, at bridge on German Church Road. 1.1 miles northwest of Willow Springs

DRAINAGE AREA
16.2 square miles

ACTUAL FLOW DATA
PERIOD: July 1951 thru Sept 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1915-51
INDEX STATION: Des Plaines River at Riverside
COINCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 1.01 inches per month
STATION 65

LOCATION
In NW ¼ sec 34, T43N, R8E, McHenry County, at Chicago Street Bridge at Algonquin, 5.0 miles north of Dundee

DRAINAGE AREA
1364 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1915 thru Sept 1959
CONTINUOUS RECORD: 44 years; water years 1916-59

SYNTHETIC FLOW DATA
None; this station utilized as an index station

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.62 inch per month
DRAFT-STORAGE-RECURRENT CURVES
BASED ON
FOX RIVER AT ALGONQUIN

RESERVOIR STORAGE CAPACITY IN INCHES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

5% draft rate needs zero storage

RECURRENCE INTERVAL IN YEARS

0.01 0.1 1 10 100

2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 100
HICKORY CREEK AT JOLIET

LOCATION
In SW ¼ NE ¼ sec 15, T35N, R10E, Will County, at bridge on Third Avenue in Joliet

DRAINAGE AREA
107 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1944 thru Sept 1959
CONTINUOUS RECORD: 15 years; water years 1945-59

SYNTHETIC FLOW DATA
PERIOD: 29 years; water years 1916-44
INDEX STATION: Kankakee River at Momence
COINCIDENT RECORD: 15 years; water years 1945-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.73 inch per month

Draft-Storage-Recurrence Data for Hickory Creek at Joliet

Reservoir average capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
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<tbody>
<tr>
<td>Cross draft rate in percent of mean flow</td>
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<td>2.4</td>
<td>0.01 0.07</td>
<td>0.19</td>
<td>0.35</td>
<td>0.56</td>
<td>0.75</td>
<td>0.94</td>
<td>1.13</td>
<td>1.32</td>
<td>1.51</td>
<td>1.70</td>
<td>1.89</td>
<td>2.08</td>
<td>2.27</td>
<td>2.46</td>
<td>2.65</td>
<td>2.84</td>
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<td>3.22</td>
<td>3.41</td>
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<tr>
<td>4.4</td>
<td>0.20 0.31 0.50 0.69 0.88 1.07 1.26 1.45 1.64 1.83 2.02 2.21 2.40 2.59 2.78 2.97 3.16 3.35 3.54 3.73</td>
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<tr>
<td>6.4</td>
<td>0.40 0.53 0.66 0.79 0.92 1.05 1.18 1.31 1.44 1.57 1.70 1.83 1.96 2.09 2.22 2.35 2.48 2.61 2.74 2.87</td>
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<td>8.4</td>
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STATION 75

Draft-Storage-Recurrence Data for Hickory Creek at Joliet

Reservoir average capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
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<th>85</th>
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<tr>
<td>Cross draft rate in percent of mean flow</td>
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<tr>
<td>2.4</td>
<td>0.01 0.07</td>
<td>0.19</td>
<td>0.35</td>
<td>0.56</td>
<td>0.75</td>
<td>0.94</td>
<td>1.13</td>
<td>1.32</td>
<td>1.51</td>
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<td>2.46</td>
<td>2.65</td>
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<td>3.22</td>
<td>3.41</td>
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<tr>
<td>4.4</td>
<td>0.20 0.31 0.50 0.69 0.88 1.07 1.26 1.45 1.64 1.83 2.02 2.21 2.40 2.59 2.78 2.97 3.16 3.35 3.54 3.73</td>
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<tr>
<td>6.4</td>
<td>0.40 0.53 0.66 0.79 0.92 1.05 1.18 1.31 1.44 1.57 1.70 1.83 1.96 2.09 2.22 2.35 2.48 2.61 2.74 2.87</td>
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<td>8.4</td>
<td>0.60 0.70 0.80 0.90 1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50</td>
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</tr>
</tbody>
</table>

362
LONG RUN NEAR LEMONT

LOCATION
In SW ¼ SE ¼ sec 32, T37N, R11E, Cook County, at highway bridge 2.0 miles south of Lemont

DRAINAGE AREA
20.8 square miles

ACTUAL FLOW DATA
PERIOD: July 1951 thru Sept 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1916-51
INDEX STATION: Kankakee River near Wilmington
COINCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.85 inch per month

Draft-Storage-Recurrence Data for Long Run near Lemont

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals

| Recurrence intervals | 1 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 |
|----------------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 44.0                 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 32.5                 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 30.0                 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 25.0                 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 20.0                 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 15.0                 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 10.0                 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 5.0                  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |

Note: The table above shows the recurrence intervals in years and the corresponding storage capacities in inches required to meet draft rates. The data is for the Long Run near Lemont station, covering the period from July 1951 to September 1959.
MCDONALD CREEK NEAR MOUNT PROSPECT

STATION 110

LOCATION
In NW ¼ NE ¼ sec 26, T42N, R11E, Cook County, at bridge on McDonald Road, 2.5 miles northeast of Mount Prospect

DRAINAGE AREA
7.52 square miles

ACTUAL FLOW DATA
PERIOD: Aug 1952 thru Sept 1959
CONTINUOUS RECORD: 7 years; water years 1953-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1916-52
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 7 years; water years 1953-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.75 inch per month

Draft-Storage-Recurrence Data for McDonald Creek near Mount Prospect

<table>
<thead>
<tr>
<th>Recurrence period</th>
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<th>10</th>
<th>20</th>
<th>40</th>
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</tr>
</tbody>
</table>

MEAN DISCHARGE: 0.75 inch per month

366
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
McDONALD CREEK NEAR MOUNT PROSPECT

RECURRANCE INTERVAL IN YEARS

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESEVOIR STORAGE CAPACITY IN INCHES
STATION 115

LOCATION
In NW ¼ NE ¼ sec 3, T42N, R12E, Cook County, at bridge on county line road, 1.7 miles southeast of Deerfield

DRAINAGE AREA
20.7 square miles

ACTUAL FLOW DATA
PERIOD: Aug 1952 thru Sept 1959
CONTINUOUS RECORD: 7 years; water years 1953-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1916-52
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 7 years; water years 1953-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.61 inch per month

Draft-Storage-Recurrence Data for North Branch, Chicago River at Deerfield

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>Cross drainage in percent of mean flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
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<tr>
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Draft-Storage-Recurrence Data for North Branch, Chicago River at Deerfield

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

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<thead>
<tr>
<th>Recurrence interval, years</th>
<th>Cross drainage in percent of mean flow</th>
</tr>
</thead>
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Draft-Storage-Recurrence Data for North Branch, Chicago River at Deerfield

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)
NORTH BRANCH, CHICAGO RIVER AT NILES

STATION 116

LOCATION
In SW ¼ SE ¼ sec 30, T41N, R13E, Cook County, at bridge on Touhy Avenue in Niles

DRAINAGE AREA
102 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1950 thru Sept 1959
CONTINUOUS RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1916-50
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 9 years; water years 1951-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.78 inch per month

Draft-Storage-Recurrence Data for North Branch, Chicago River at Niles

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval (in years)</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
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Gross draft rates in percent of mean flow

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<td>10.0</td>
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370
POPLAR CREEK AT ELGIN

STATION 124

LOCATION
In SE ¼ NW ¼ sec 19, T41N, R9E, Cook County, just upstream from bridge on U. S. 20 in Elgin

DRAINAGE AREA
35.8 square miles

ACTUAL FLOW DATA
PERIOD: Aug 1951 thru Sept 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 37 years; water years 1915-51
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.60 inch per month
DRAFT- STORAGE-RECURRENCE CURVES
BASED ON
POPLAR CREEK AT ELGIN

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS

373
SALT CREEK NEAR ARLINGTON HEIGHTS

LOCATION

On north boundary of sec 17, T41N, R11E, Cook County, at bridge on Ill. 58, Golf Road, 2.75 miles southwest of Arlington Heights

DRAINAGE AREA

33.7 square miles

ACTUAL FLOW DATA

PERIOD: Aug 1950 thru Sept 1959
CONTINUOUS RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA

PERIOD: 36 years; water years 1915-1950
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 9 years; water years 1951-59

TOTAL DATA ANALYZED

PERIOD: 45 years; water years 1915-59
MEAN DISCHARGE: 0.79 inch per month

Draft-Storage-Recurrence Data for Salt Creek near Arlington Heights

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<td>.02</td>
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</tr>
</tbody>
</table>

| Gamma draft rate in percent of mean flow | | | | | | | |
|------------------------------------------|---|---|---|---|---|---|---|---|
| 45.0 | .95 | .57 | .13 | .02 | .00 | .00 | .00 | .00 |
| 22.5 | .94 | .36 | .13 | .02 | .00 | .00 | .00 | .00 |
| 15.0 | .92 | .35 | .13 | .02 | .00 | .00 | .00 | .00 |
| 11.3 | .91 | .36 | .13 | .03 | .00 | .00 | .00 | .00 |
| 9.0  | .9 |   | .13 | .02 | .00 | .00 | .00 | .00 |
| 7.7  | .9 |   | .13 | .02 | .00 | .00 | .00 | .00 |
| 7.0  | .9 |   | .13 | .02 | .00 | .00 | .00 | .00 |
| 6.5  | .9 |   | .13 | .02 | .00 | .00 | .00 | .00 |
| 6.0  | .9 |   | .13 | .02 | .00 | .00 | .00 | .00 |
| 5.5  | .9 |   | .13 | .02 | .00 | .00 | .00 | .00 |
| 5.0  | .9 |   | .13 | .02 | .00 | .00 | .00 | .00 |

374
**SALT CREEK AT WESTERN SPRINGS**

**LOCATION**
On boundary between secs 31 and 32, T39N, R12E, Cook County, at bridge on Wolf Road, 0.5 mile north of Western Springs

**DRAINAGE AREA**
122 square miles

**ACTUAL FLOW DATA**
- **PERIOD:** Oct 1945 thru Sept 1959
- **CONTINUOUS RECORD:** 14 years; water years 1946-59

**SYNTHETIC FLOW DATA**
- **PERIOD:** 31 years; water years 1915-45
- **INDEX STATION:** DesPlaines River at Riverside
- **COINCIDENT RECORD:** 4 years; water years 1956-59

**TOTAL DATA ANALYZED**
- **PERIOD:** 45 years; water years 1915-59
- **MEAN DISCHARGE:** 0.82 inch per month

---

### Draft-Storage-Recurrence Data for Salt Creek at Western Springs

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals (Duration of critical dry-down period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval</th>
<th>Capacity (inches)</th>
<th>Duration of dry-down period (months)</th>
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376
SKOKIE RIVER AT LAKE FOREST

LOCATION
In NW ¼ SW ¼ sec 4, T43N, R12E, Lake County, at bridge on Ill. 59A at Lake Forest

DRAINAGE AREA
12.8 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1951 thru Sept 1959
CONTINUOUS RECORD: 8 years; water years 1952-59

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1916-1951
INDEX STATION: DesPlaines River at Riverside
RECORD: 8 years; water years 1952-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.92 inch per month

Draft-Storage-Recurrence Data for Skokie River at Lake Forest

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Decade of critical drought period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval, years</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
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</table>

Mean discharge: 0.92 inch per month
**TINLEY CREEK NEAR PALOS PARK**

**STATION 149**

**LOCATION**

In SW ¼ SE ¼ sec 32, T37N, R13E, Cook County, at bridge on 135th Street, 1.5 miles west of Ill. 50 and 3.0 miles southeast of Palos Park

**DRAINAGE AREA**

11.3 square miles

**ACTUAL FLOW DATA**

**PERIOD:** July 1951 thru Sept 1959

**CONTINUOUS RECORD:** 8 years; water years 1952-59

**SYNTHETIC FLOW DATA**

**PERIOD:** 36 years; water years 1916-51

**INDEX STATION:** Kankakee River at Momence

**COINCIDENT RECORD:** 8 years; water years 1952-59

**TOTAL DATA ANALYZED**

**PERIOD:** 44 years; water years 1916-59

**MEAN DISCHARGE:** 0.83 inch per month

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### Draft-Storage-Recurrence Data for Tinley Creek near Palos Park

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>2</th>
<th>10</th>
<th>15</th>
<th>20</th>
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</tbody>
</table>

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### Low Flow Recurrence Curves

**Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals**

(Duration of critical droughts period in months shown below each capacity value)

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>2</th>
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**Draft-Storage-Recurrence Data for Tinley Creek near Palos Park**

- **Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals.**
- **Duration of critical droughts period in months shown below each capacity value.**

---

**380**
WELLER CREEK AT DESPLAINES

LOCATION
In NW ¼ NW ¼ sec 18, T41N, R12E, Cook County, at bridge on Ill. 58 in DesPlaines, 2.0 miles west of U. S. 45

DRAINAGE AREA
13.1 square miles

ACTUAL FLOW DATA
PERIOD: Oct 1950 thru Sept 1959
CONTINUOUS RECORD: 9 years; water years 1951-59

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1916-50
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 9 years; water years 1951-59

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.95 inch per month

---

### Draft-Storage-Recurrence Data for Weller Creek at DesPlaines

<table>
<thead>
<tr>
<th>Recurrence interval in years</th>
<th>Cross drainage in percent of mean flow</th>
</tr>
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### Chart and Diagram

The chart contains recurrence interval curves, with data points indicating cross drainage in percent of mean flow. The graph shows the relationship between recurrence intervals and cross drainage, useful for understanding the frequency and magnitude of flow events at Weller Creek at DesPlaines.
DRAFT STORAGE - RECURRENCE CURVES
BASED ON
WELLER CREEK AT DES PLAINES

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECURRENT STORAGE CAPACITY IN INCHES

RECURRENT INTERVAL IN YEARS

383
### Location

In SW 1/4 SE 1/4 sec 4, T42N, R12E, Cook County, at bridge on Ill. 68, 2.0 miles northwest of Northbrook

### Drainage Area

11.5 square miles

### Actual Flow Data

- **Period:** Aug 1952 thru Sept 1959
- **Continuous Record:** 7 years; water years 1953-59

### Synthetic Flow Data

- **Period:** 37 years; water years 1916-52
- **Index Station:** DesPlaines River at Riverside
- **Coincident Record:** 7 years; water years 1953-59

### Total Data Analyzed

- **Period:** 44 years; water years 1916-59
- **Mean Discharge:** 0.84 inch per month

---

### Draft-Storage-Recurrence Data for West Fork, North Branch, Chicago River at Northbrook

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<th>Recurrence Interval (years)</th>
<th>Mean Discharge (inch per month)</th>
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#### Draft-Storage-Recurrence Curves

Reservoir storage capacity in millions required to meet draft rates at various recurrence intervals

(Duration of critical drought period in months shown below each capacity value)
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
WEST FORK, NORTH BRANCH,
CHICAGO RIVER AT NORTHBROOK

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RECYCERCE INTERVAL IN YEARS

RESERVOIR STORAGE CAPACITY IN INCHES

0.01
0.1
1
10
100

5
25
50
70
80
90
100
WILLOW CREEK NEAR PARK RIDGE

LOCATION
In SW ¼ NE ¼ sec 4, T40N, R12E, Cook County, at bridge on Byron Street, 0.4 mile south of Ill. 72, 2.5 miles southwest of Park Ridge

DRAINAGE AREA
19.6 square miles

ACTUAL FLOW DATA
PERIOD: Aug 1950 thru Sept 1958; gaging discontinued
Oct 1, 1958
CONTINUOUS RECORD: 8 years; water years 1951-58

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1916-50, 1959
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 8 years; water years 1951-58

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.76 inch per month

Draft-Storage-Recurrence Data for Willow Creek near Park Ridge

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drought period in months shown below each capacity value)

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Draft-Storage-Recurrence Data for Willow Creek near Park River
LITTLE CALUMET RIVER AT HARVEY

LOCATION
In W 1/2 NW 1/4 sec 9, T36N, R14E, Cook County, at Illinois Central Railroad bridge, 800 feet north of 147th Street in Harvey

DRAINAGE AREA
570 square miles, approximately

ACTUAL FLOW DATA
PERIOD: Oct 1916 thru Sept 1925
CONTINUOUS RECORD: 9 years; water years 1917-25

SYNTHETIC FLOW DATA
PERIOD: 35 years; water years 1916, 1926-59
INDEX STATION: DesPlaines River at Riverside
COINCIDENT RECORD: 9 years; water years 1917-25

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.73 inch per month

### Draft-Storage-Recurrence Data for Little Calumet River at Harvey

<table>
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<th>Recurrence interval (years)</th>
<th>Cross draft rate in percent of mean flow</th>
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Draft-Storage-Recurrence Data (Duration of critical drought period in months shown below each capacity value)

- Duration of critical drought period in months shown below each capacity value.

388
DRAFT - STORAGE - RECURRENCE CURVES
BASED ON
LITTLE CALUMET RIVER AT HARVEY

GROSS DRAFT RATE IN PERCENT OF MEAN FLOW

RESERVOIR STORAGE CAPACITY IN INCHES

RECURRENCE INTERVAL IN YEARS

0.01 0.1 1 10 100

2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 100
LOCATION
In NE ¼ SE ¼ sec 10, T35N, R10E, Will County, at Benton Street Bridge in Joliet

DRAINAGE AREA
19.7 square miles

ACTUAL FLOW DATA
PERIOD: Aug 1925 thru Oct 1933; gaging discontinued Nov 1, 1933
CONTINUOUS RECORD: 8 years; water years 1926-33

SYNTHETIC FLOW DATA
PERIOD: 36 years; water years 1916-25, 1934-59
INDEX STATION: Kankakee River at Momence
COINCIDENT RECORD: 8 years; water years 1926-33

TOTAL DATA ANALYZED
PERIOD: 44 years; water years 1916-59
MEAN DISCHARGE: 0.86 inch per month

Draft-Storage-Recurrence Data for Spring Creek at Joliet

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<th>Cross drain rate in percent of mean flow</th>
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<tr>
<td>90</td>
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</table>

Reservoir storage capacity in inches required to meet draft rates at various recurrence intervals
(Duration of critical drawdown period in months shown below each capacity value)

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<th>Recurrence Interval</th>
<th>Storage Capacity (inches)</th>
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