Contract Report 650

Sangamon River Streamflow Assessment Model: 1999 Update to the Hydrologic Analysis

by
H. Vernon Knapp

Prepared for the
Illinois Department of Natural Resources
Office of Water Resources

August 1999

Illinois State Water Survey
Watershed Science Section
Champaign, Illinois

A Division of the Illinois Department of Natural Resources

Sangamon River Streamflow Assessment Model: 1999 Update to the Hydrologic Analysis

by

H. Vernon Knapp
Watershed Science Section
Illinois State Water Survey

Prepared for the
Illinois Department of Natural Resources
Office of Water Resources

August 1999

This report was printed on recycled and recyclable paper.

Contents

Introduction

The proper management of surface water resources in a watershed requires an understanding of both the expected streamflow characteristics within a river basin and the effects of various potential water-use practices on those flow characteristics. In many circumstances, potential conflicts exist between the uses of streams for domestic, industrial, and agricultural water supplies and the natural functions of the streams, which include providing habitat for aquatic and terrestrial biota. Sufficient information to evaluate these potential conflicts and other water resource questions is seldom available in a useful form.

The Illinois Streamflow Assessment Model (ILSAM) was developed to provide needed streamflow information to watershed managers and planners. This specialized software program was developed for use on a personal computer to provide estimates of the long-term expected magnitude of streamflow at various frequencies for any stream location along a major stream in a watershed. The effects of potential or hypothetical water resource projects on the quantity of water in streams also can be examined using options available in the model. For the purposes of this model, major streams are considered to be those having upstream contributing drainage areas that exceed 10 square miles in size.

To date, the sets of hydrologic data used by the model have been developed for four major watersheds in Illinois: the Sangamon, Fox, Kaskaskia, and Kankakee River basins. Hydrologic data sets currently are being developed for the Little Wabash and Rock River basins.

The purpose of this study was to update ILSAM for the Sangamon River basin, a model originally developed in 1985. Over time, climate variability and changes in human factors, such as land and water use and water resource projects, can greatly affect the quantity and distribution (both in space and time) of surface waters in a river basin. For this reason, the data sets used by ILSAM were designed to be updated periodically, perhaps every 5 to 15 years. The frequency of and need for updates are governed by the rate at which streamflow conditions in the watershed change over time. The model update for the Sangamon River basin addresses four areas that influence the flow frequencies and their estimation:

- Increases in population, overall water use, and the resulting effluent discharges.
- Increases in the water withdrawn from streams for water supply.
- General increases in streamflow magnitude caused by climatic variability and the overall increase in average precipitation.
- Adoption of improved regional equations from which to estimate flow at ungaged sites.

Background Information

There are more than 2,500 miles of rivers and major streams in the Sangamon River basin. Because it is not feasible to monitor the flows in all the streams in a basin, gaging stations have been established at selected locations to measure the amount and distribution of water passing the station. The data collected at these gaging stations often may be used to estimate flow at other parts of the watershed by applying hydrologic principles. The hydrologic principles often are in the form of regional regression equations, which are developed using a statistical analysis of streamgage records within a geographic region with watershed characteristics that are similar to the site of interest. However, numerous factors must be considered in such an analysis, including human alterations to streamflows and the period of record for which streamflow records are available at the various gages being evaluated.

For purposes of analysis, the flow in a stream can be separated into two components: unaltered or virgin flow conditions influenced primarily by weather and climate phenomena as well as the topography and hydrogeology, and modifications to the flow conditions by human activity. In the estimation of the virgin flows, there has been no attempt to represent the natural flow conditions that existed prior to European settlement and the development of the current drainage systems in the mid- and late-1800s. These drainage modifications and other extensive modifications to the natural landscape precede the establishment of streamflow gages in the state, for which measurements were begun in the early 1900s.

The human modifications to the flow conditions that are examined in the analysis include direct additions to or subtractions from the flow in the stream, such as from effluent discharges or water supply withdrawals, and changes in the temporal response of flow from the watershed, such as might be caused by a reservoir and other changes in the water stored within the watershed. Several different methodologies have been established in previous studies (Knapp et al., 1985; Knapp, 1988, 1990, 1992) to quantify the magnitude of the impact of these flow modifications on present and future flow conditions, as well as to evaluate the historical flow record to identify the expected character of the virgin flow condition. As mentioned previously, there has been no attempt to identify the human modification to flow caused by major land-use changes.

The climatic window during which streamflow records are available also influences the predicted long-term characteristics of streamflow. Streamflow varies considerably over time, not only displaying day-to-day fluctuations as influenced by weather phenomena, but also by climatic variations that may cause streamflows to remain above or below the long-term expected condition for several decades. Thus, to maintain consistency in the estimate of their long-term streamflow conditions, it is useful to compare and evaluate flows measured at different locations during a common period of record.

The ability to detect the impact of human modifications to the streamflow using gaging records also may be limited to some degree because there have been coincident trends in precipitation and other climate factors. In many cases, climate variability can mask all or part of the impacts of less obtrusive human modifications to river flows, especially if the magnitude of the modification is comparatively small.

Complete description of the methods used to determine the streamflow characteristics for ILSAM were presented in several earlier reports (Knapp, 1988, 1990, 1992). Knapp et al. (1985) describe the Sangamon River basin and the factors that influence its streamflow conditions. The current report focuses on changes in the data and model structure used in this update of the Sangamon River basin model, as compared to the 1985 study. These model and data changes are categorized as follows:

- Changes in database of flow modifications, which characterize the impacts of effluent discharges and surface water withdrawals in the basin.
- Changes in the way discharges from reservoirs are computed.
- Changes in the expected long-term frequency of flow for virgin conditions at gaging stations, as influenced by climate variability. For this study, differences in climate conditions have been assumed to be part of natural climatic variability.
- Improvements in the estimated streamflow conditions at gaging stations sites where previous data had been lacking.
- Additions to the network file.
- Changes in the structure of the virgin flow equations, and the estimation of watershed characteristics used in these equations.

Streamflow Information Produced by ILSAM

The ILSAM produces information on 154 selected streamflow parameters, including flow duration relationships (flow versus probability of exceedence) and low flows for various durations and expected recurrence intervals. All flows are given in units of cubic feet per second (cfs). The 154 flow parameters will be described in detail. For gaging locations, these flow parameters are computed using daily flow records, which are average flow rates estimated for each day within the gage's period of record.

Average Flow Values

Parameters: Average annual flow (Q_{mean}) and average monthly flows

Annual Flow-Duration Values

Description: The 2 percent flow (Q2), for example, is the daily streamflow rate that is exceeded on 2 percent of the days. The 1 percent flow (Q_1) is necessarily a higher flow rate because it is exceeded less frequently.

Parameters: Q_1, Q_2, Q_5, Q_{10}, Q_{15}, Q_{25}, Q_{40}, Q_{50}, Q_{60}, Q_{75}, Q_{85}, Q_{90}, Q_{95}, Q_{98}, and Q_{99}

Monthly Flow-Duration Values

Description: Monthly flow duration values are defined in the same manner as the annual flow-duration values, except they are determined using only those daily discharges that fall within a certain month of the year.

Parameters for Each Calendar Month: Q_2, Q_{10}, Q_{25}, Q_{50}, Q_{75}, Q_{90}, and Q_{98}

Low Flows

Description: Each low-flow parameter is defined by a duration in consecutive days and a recurrence interval in years. A 7-day low flow for a given year is the lowest average flow that occurred within a 7-consecutive-day period during that year. The 7-day, 10-year low flow is the 7-day low flow that is on average exceeded 9 years out of 10. Thus, the 7-day low flow is expected to be equal to or smaller than the $Q_{7,10}$ an average of once every 10 years. A 2-year low flow is the value expected to occur during an "average" year.

Low Flow Durations: 1,7, 15, 31, 61, and 91 days

Recurrence Intervals: 2, 10, 25, and 50 years

Drought Flows

Description: Drought flows are similar to low flows, except that the duration of the period is longer and is defined in months instead of days, and the average low flows are developed from monthly records. Drought durations are usually not defined on an annual basis, because a drought period typically encompasses multiple years.

Drought Flow Durations: 6, 9, 12, 18, 30, and 54 months

Recurrence Intervals: 10, 25, and 50 years

Database Used by ILSAM

The ILSAM uses four basic sets of data for computing streamflow characteristics in a watershed.

- Estimates of the 154 flow parameters at gaging stations within the watershed, as well as at other stream locations that have well-defined flow characteristics, such as downstream of reservoirs. Basic streamflow frequency data are listed in appendix A.
- A data set of all flow modifiers in the watershed (withdrawals, diversions, and effluent discharges), including the estimated impact of that modification on each of the 154 flow parameters produced by the model. Basic flow data for these modifications are listed in appendix B.
- A table of watershed characteristics for 609 locations in the basin, including stream mileage, drainage area, soils information, and the location of gaging stations, water-

use projects, reservoirs, and other points of interest in the basin. Stream network data are listed in appendix C.

- The set of regional regression equations used to estimate the virgin flow conditions for each of the 154 flow conditions for ungaged sites in the watershed. These equations are presented in appendix D.

In addition to these four basic sets of data, three supplemental data sets not included in this report provide stream codes that help to identify each stream in the watershed, an index of the stream network in the watershed (which helps the model identify all downstream locations impacted by a flow modification), and basic data on the size of each major reservoir in the watershed. All data sets have been imported into a Microsoft Access database, which will be accessed by a Windows version of ELSAM (currently under development).

Changes in Human Modifications to Streamflows

Effluent Discharges to Streams

Monthly discharge data were obtained from the Illinois Environmental Protection Agency (IEPA) for all sanitary effluents in the Sangamon River basin having an average discharge greater than 100,000 gallons per day. The frequency of daily discharges for these effluents was estimated using methods described by Knapp (1988, 1990, 1992). Estimates of low flow discharges were compared to the analytical results of Singh et al. (1988) to maintain consistency with that report.

Table 1 lists 41 of the largest sources of effluent discharge in the Sangamon River basin. Discharge frequency data for these 41 sources are used by the Sangamon River ILSAM. The full set of frequency data computed for these discharges and used by the model is listed in appendix B. Twenty-five of these discharge locations, identified in table 1 by italics, have been added since the 1985 version of the Sangamon River model. Most of these additional discharges are smaller treatment facilities that were not included in the

Table 1. Major Effluent Discharges in the Sangamon River Basin and Average Annual Discharge as Estimated for 1997 Conditions

Facility name	*Average annual discharge (cfs)*	*Facility name*	*Average annual discharge (cfs)*
Assumption	0.97	Lincoln	5.49
Athens	0.33	Mahomet	0.49
Atlanta	0.30	Maroa	0.47
Auburn	0.92	Monticello	0.93
Bloomington-Normal	25.92	*Morrisonville*	0.59
Blue Mound	0.14	*Moweaqua*	0.18
Borden Chemicals	1.00	Nestle Beich Inc.	0.41
Cerro Gordo	0.22	*Niantic*	0.05
Clinton	2.03	*Petersburg*	0.25
Danvers	0.25	*Pleasant Plains*	0.17
Decatur	55.88	*Riverton*	0.36
Divernon	0.12	*St. Francis Hospital*	0.12
Edinburg	0.29	*Sangamon Valley*	0.46
Farmer City	0.33	Springfield - SpringCreek	35.99
Fisher	0.28	Springfield - Sugar Creek	7.27
Gibson City	1.03	Taylorville - Northwest	2.76
Harristown	0.26	*Taylorville - South*	0.29
Heyworth	0.30	*Virden-East*	0.53
Illiopolis	0.18	*Virden-North*	0.31
Kinkaid	0.28	*Warrensburg*	0.24
Leroy	1.13		

Note: Locations added since the 1985 Sangamon River ILSAM appear in italic type.

1985 model version. Six discharge facilities in the basin have been discontinued over the last 15 years as a result of either closure of an industry or the transfer of wastewaters to a larger nearby facility. In addition to these 41 facilities, the Sangamon River basin contains a large number of smaller effluent discharges that are not considered in the model. Many of these other facilities use lagoon treatments that do not discharge to streams during dry periods.

Major Changes in Discharges Since the 1985 Study

Table 2 lists the amount of wastewater discharged by the five largest wastewater treatment facilities in the basin, as estimated for use in the 1985 and 1999 versions of the Sangamon River ILSAM, and represents 1983 and 1997 flow conditions, respectively. Also shown is an estimate of the total amount of wastewater discharges in the 41 largest facilities in the basin, as identified in table 1. The total amount of the wastewater discharges has increased approximately 11 percent in the past 14 years. Springfield and Bloomington-Normal have experienced slight increases in wastewater discharges of less than 10 percent.

The Decatur facility has experienced a 25 percent increase in its average discharge, from 44 to 56 cfs; however, this increase exceeds the associated increase in water use for the city during the same period of time. Table 3 provides the average water use for the three largest cities in the basin, and analysis of the data indicates that the increase in water use for Decatur over the last 15 years has been only 11 percent. The cause for the disparity between the water use and wastewater treatment increases is not known and was not further investigated. However, it is plausible that the difference could be explained by factors such as an increase in the treatment of storm sewer flows. Decatur has experienced only a 6 percent increase in discharges during dry periods, as represented by the 7-day, 10-year low flow discharges given in table 2.

Table 2. Wastewater Discharges for Springfield, Decatur, Bloomington-Normal, Lincoln, and Taylorville, and Total for 41 Facilities Listed in Table 1

Location	*Average discharge (cfs)*		*$Q_{7,10}$ discharge (cfs)*	
	1983	7997	7985	7997
Springfield	49.9	53.3	22.4	24.5
Decatur	44.4	55.9	32.4	34.7
Bloomington-Normal	23.7	25.9	11.0	14.2
Lincoln	6.7	5.5	4.1	2.4
Taylorville	2.6	3.0	1.1	1.5
Total for the 41 largest facilities	144	160	82	84

Table 3. Water Use for Springfield, Decatur, and Bloomington-Normal

Location	*Average water use (mgd)*		*Average water use (cfs)*	
	1980-1984	*1992-1996*	*1980-1984*	*1992-1996*
Springfield	19.8	21.3	30.7	33.1
Decatur	25.4	28.2	39.2	43.8
Bloomington-Normal	11.6	14.7	17.9	22.8

Surface Water Withdrawals

There are seven major surface water withdrawals in the Sangamon River basin, as identified by the Water-Use Inventory at the Illinois State Water Survey. Three of these withdrawals, from Clinton Lake, Lake Springfield, and Sangchris Lake, provide cooling water for electricity-generating facilities. The use of water for cooling purposes, such as at Clinton Lake, Lake Springfield, and Lake Sangchris, recirculates water, but it does not significantly impact the amount of outflow from those lakes.

There are six major withdrawals for public water supply (PWS), with intakes in Lake Decatur, Lake Taylorville, Lake Springfield, Lake Kinkaid, Sangchris Lake, and the South Fork Sangamon River near Rochester. The entire PWS for the cities of Decatur and Springfield is pumped directly from their respective lakes. The City of Taylorville obtains only about half of its water from its lake, with the remainder coming from local groundwater. The Kinkaid PWS receives about half of its water from Lake Kinkaid and the remainder from Sangchris Lake. The withdrawal from the South Fork Sangamon River provides a supplemental source of supply for the City of Springfield, and it is operated only to replenish the storage in Lake Springfield when that lake is experiencing drawdowns.

All of the reservoirs used for PWS produce zero outflow during periods of low flow and drought. The PWS withdrawals from reservoirs do not immediately reduce the flow in streams in the same manner as an instream pumping station. However, the withdrawals reduce water storage in the lake, which subsequently increases the duration of zero flow from the reservoirs during periods of drought when all inflows are retained to refill the reservoir.

The frequency and total amount of the withdrawal from the South Fork Sangamon River has increased significantly in the last 15 years, and this has produced a greater reduction in flow levels downstream during major dry periods. Originally, this source was used as a supplemental water supply for Springfield only during severe droughts. However, as water-use demands for Springfield have increased over time, so has the frequency at which the South Fork Sangamon River withdrawal is used to replenish storage in Lake Springfield; and pumping may occur as often as every other year, on average. Low flows at this location are significantly reduced, and zero flow is expected to occur roughly 5 percent of the time.

Reservoirs

Five major reservoirs are included in both the 1985 and 1999 versions of the Sangamon River ILSAM: Clinton Lake, Lake Springfield, Lake Decatur, Lake Taylorville, and Sangchris Lake. The Sangamon River basin has hundreds of smaller reservoirs on minor streams that have minimal impact on the flows in the major streams of the watershed and, therefore, are not included in the model. No new major reservoirs have been built in the watershed since 1978, when Clinton Lake was constructed.

The primary purpose for Lake Decatur, Lake Springfield, and Lake Taylorville is for PWS. Clinton Lake, Lake Springfield, and Sangchris Lake provide cooling water for electricity-generating facilities. Sangchris Lake also provides a small amount of water to supplement the Kinkaid PWS. For each of the lakes used for cooling, some additional evaporation is induced by the return of warmed water from the power-generating facilities, which causes a slight reduction in the average discharge from these lakes.

In the 1985 study, the impact of the major reservoirs on streamflows was estimated by simulating a series of inflows for each reservoir and using a reservoir routing model to estimate outflows. Because most of the reservoirs do not have streamgages located upstream to provide inflow data, it was necessary to make some assumptions on the character of inflow. In most cases it was assumed that the inflows were similar to that measured at gaging stations on other nearby streams.

Since the 1985 study, continuous streamflow data have been measured downstream of two major reservoirs: Lake Decatur and Clinton Lake. These records provide hard data on the impact of these reservoirs on flow conditions. Table 4 compares the simulated outflow from these two reservoirs, developed for the 1985 study, with the measured outflow.

Table 4. Comparison of Old and New Reservoir Outflow Estimates

	Flow frequency parameter							
Period of record	Q_{mean}	Q_1	Q_{10}	Q_{50}	Q_{75}	Q_{90}	Q_{98}	$Q_{7,10}$
Lake Decatur								
1985 model	635	5260	1570	256	47	4.8	1.6	0
1999 model	652	5615	1792	204	7	1.5	0	0
Clinton Lake								
1985 model	212	1782	540	82	16	0	0	0
1999 model	230	1866	574	105	25	6.7	5.2	5
Lake Taylorville								
1985 model	76	884	183	20	1.1	0	0	0
1999 model	99	1398	210	22	0	0	0	0
Sangchris Lake								
1985 model	44	430	124	11	0	0	0	0
1999 model	49	562	117	16	0	0	0	0
Lake Springfield								
1985 model	155	2161	388	0	0	0	0	0
1999 model	130	1588	382	1	0	0	0	0

Beginning with the 1988 ILSAM study on the Fox River basin (Knapp, 1988), algorithms were developed for use in the ILSAM model to estimate reservoir outflows for each of the 154 flow parameters produced by the model. Thus, with some basic information on the size of the reservoir and its outlet facilities, the model can take the regional estimates of virgin flow conditions upstream of the reservoir and simulate the changes to these flows downstream. The algorithms developed for estimating the impact of reservoirs were described by Knapp (1988, 1990). These algorithms were used to produce new estimates of flows downstream of Lake Taylorville and Sangchris Lake. Table 4 compares these new outflow estimates with those from the 1985 version of ILSAM.

Estimates of the inflow and outflow conditions for Lake Springfield were taken from a water budget model of the lake, developed by Knapp (1998). Table 4 compares the flow parameters used for the 1999 version of the Sangamon River ILSAM, and those developed in the 1985 model version.

For most cases, the 1999 estimates of reservoir outflow show higher average flow rates than that given by the 1985 model (table 4). These increases in average flows are generally associated with wetter climate conditions, as analyzed in the next section. The increase in low flows for Clinton Lake are associated with the 5 cfs minimum flow release from that lake, which was not accounted for in the 1985 model.

Updates to Flow Frequency Estimates at Gaged Sites

The analysis of streamgaging records attempts to separate the observed flow into two components: the unaltered or virgin flow conditions, and modifications to the flow conditions by human activity. Present flow conditions are defined as the virgin flow conditions as altered by the present-day level of flow modifications, which is often different than the level of modification displayed in the gaging record. Present flow conditions, and their associated flow modifications, normally are considered to be transitory in nature. For example, any time there is a change in the amount of an effluent discharge or surface water withdrawal, the estimated present flow condition will change.

In previous analyses, virgin flow conditions were assumed to be relatively stable over time. However, as will be demonstrated in the following comparisons, some of the estimated differences in flow frequencies in the Sangamon River basin since 1985 appear to be related to climatic variability. In many locations, the magnitude of these flow differences is considerably greater than that attributed to changes in the human impacts on streamflow. There is a heated debate within the scientific community as to whether observed changes in climatic conditions are a result of "real" climate changes or are part of the normal variability of climate. Until a quantifiable estimate of real climate change can be established, streamflow frequency estimates developed for ILSAM are based on the assumption that the observed differences in the climatic record are part of normal climate variability.

Over time, the estimated frequency of virgin flow conditions at a gaged site can change from two factors: climatic variability can change the expected long-term frequency of flow for virgin conditions at gaging stations, or new or additional streamflow data can improve the estimate of long-term flow conditions, in which the data were previously lacking.

Gaging Stations

The U.S. Geological Survey (USGS) has operated continuously recording streamgaging stations at 24 locations in the Sangamon River basin. These locations are listed in table 5. At the time of the analysis used in this report, only those streamgage records through 1997 were available from the USGS. Other gages currently being operated by the Illinois State Water Survey are located in the upper Sangamon River basin upstream of Decatur. In general these gaging records are not yet of sufficient length to be used in determining long-term flow frequencies.

Representative Period for Long-Term Conditions

The years included in a streamgage record have a significant impact on the estimation of flow frequency at that gage. A primary consideration in the development of flow estimates for ILSAM is that a consistent relationship be maintained between different locations. For this reason, it is necessary to define a base period, representative of long-term flow conditions, to which frequency estimates could be related. Considerations include both finding a period that includes a representative number of dry and wet

Table 5. USGS Continuous Discharge Records for the Sangamon River Basin

USGS ID	*Station name*	*Drainage area (mi²)*	*RL* (years)*	*Period of record*
	LONG-TERM GAGES (those with near 50 years of record)			
05572000	Sangamon River at Monticello	550	84	1914-present
05576000	South Fork near Rochester	867	49	1949-present
05576500	Sangamon River at Riverton	2618	54	1914-1956; 1986-present
05577500	Spring Creek at Springfield	107	50	1948-present
05578500	Salt Creek near Rowell	335	56	1942-present
05579500	Lake Fork near Cornland	214	50	1948-present
05580000	Kickapoo Creek at Waynesville	227	50	1948-present
05582000	Salt Creek near Greenview	1804	57	1941-present
05583000	Sangamon River near Oakford	5093	59	1939-present
	SHORT- TO MEDIUM-TERM GAGES			
05570910	Sangamon River at Fisher	240	21	1978-present
05571000	Sangamon River at Mahomet	362	30	1948-1978
05571500	Goose Creek near Deland	47.9	8	1951-1959
05572450	Friends Creek near Argenta	111	15	1967-1982
05572500	Sangamon River near Oakley**	774	26	1951-1977
05573540	Sangamon River at Route 45 at Decatur	938	17	1982-present
05574000	South Fork Sangamon River near Nokomis	11.0	24	1951-1975
05574500	Flat Branch near Taylorville	276	33	1949-1982
05575500	South Fork Sangamon River near Kinkaid	562.	33	1917-1934; 1945-1961
05575800	Horse Creek at Pawnee	52.2	17	1968-1985
05575830	Brush Creek near Divernon	32.4	8	1974-1982
05580500	Kickapoo Creek near Lincoln	306.	26	1945-1971
05580950	Sugar Creek near Bloomington	34.4	25	1974-present
05581500	Sugar Creek near Hartsburg	333.	26	1945-1971
05582500	Crane Creek near Easton	28.7	25	1950-1975

Notes: * RL = record length
** Following 1956 there were no discharge records for this gage during periods of low flow.

hydrologic conditions, and finding a period for which many stations have complete records.

Roughly half of the long-term gages listed in table 5 began operation in 1948 and 1949. Therefore, the period 1948-1997 was used as the basis for computing long-term flow conditions. This base period was chosen so that a relatively large number of stations could be used in determining these conditions, and consistency of the base period could be maintained in all portions of the basin.

Many streamgaging stations, particularly those on smaller streams, have periods of record that are shorter than the base period of 1948-1997. To provide consistency throughout the basin, it is necessary to adjust the flow frequencies observed at these gages to more accurately reflect the base period of long-term flow conditions. The procedure for making this adjustment was described by Knapp et al. (1985) and Knapp (1988).

Differences in the Long-Term Observed Flow Records

Seven of the nine long-term gages (table 5) were examined to estimate the changes in the long-term flow conditions in the Sangamon River basin since the original estimate associated with the 1985 model. The Sangamon River gage at Riverton was not used for this analysis because its period of record does not coincide with most of the other stations. The Salt Creek gage near Rowell also was not used for this analysis because Clinton Dam, located 13 miles upstream, now alters the flow of Salt Creek. Low flows at most of these long-term stations also are altered to some degree by upstream effluent discharges.

Average Flows

Table 6 shows the flow frequencies as computed with the long-term gaging records for two base periods of record, 1948-1983 and 1948-1997. The gaging records at two locations, the South Fork near Rochester and Spring Creek at Springfield, began in 1949. Flow frequencies computed for these two records are considered to be equivalent to the entire base periods beginning in 1948. During the period 1984-1997, a significant portion of the watershed experienced average flows that were above the long-term condition. The degree to which flows in this period are above the long-term average varies by location. For most of the gages in the Salt Creek watershed, the average flows in 1984-1997 were 16-20 percent above the long-term average, which previously was defined using the period 1948-1983. For the upper Sangamon River basin, such as at the Monticello gage, the average flows for 1984-1997 were approximately 12 percent above the previous long-term average. In contrast, the southwestern part of the watershed had flows that were very close to the long-term average and produced less than a 1 percent increase in the flow condition.

Table 6. Comparison of Flow Frequencies at Long-Term Stream Gages for Two Different Periods of Record

	Flow frequency parameter							
Period of record	Q_{mean}	Q_1	Q_{10}	Q_{50}	Q_{75}	Q_{90}	Q_{98}	$Q_{7,10}$
Sangamon River at Monticello								
1948-1983	408	3646	1080	153	33	12	4.1	1.9
1948-1997	434	3728	1130	170	37	12	3.7	1.9
South Fork Sangamon River near Rochester								
1949-1983	587	5998	1530	163	36	8.6	1.8	0.9
1949-1997	591	6003	1580	169	30	5.8	0.6	0.4
Spring Creek at Springfield								
1949-1983	65	760	148	18	2.0	0	0	0
1949-1997	68	750	156	22	2.7	0	0	0
Lake Fork near Cornland								
1948-1983	154	1501	377	53	14	6.5	3.1	2.5
1948-1997	165	1609	401	62	15	6.7	3.4	3.0
Kickapoo Creek at Waynesville								
1948-1983	160	1601	376	57	12	4.3	1.3	0.6
1948-1997	173	1730	400	64	14	4.4	1.2	0.8
Salt Creek near Greenview								
1948-1983	1261	10304	3050	565	196	115	78	69
1948-1997	1329	10300	3220	630	218	122	78	69
Sangamon River near Oakford								
1948-1983	3486	23805	9079	1640	571	321	220	193
1948-1997	3626	24200	9401	1760	609	345	226	193

Almost all of the increases in average flow can be directly associated with the impact of climate variability on the virgin flow condition in the streams. For the upper Sangamon River and Salt Creek portions of the basin, the 1984-1997 period of higher flows results in a corresponding 4-7 percent increase in the long-term, 1948-1997 average flow condition above that estimated in the 1985 study.

High Flows

An examination of table 6 indicates that, for most locations, there generally has been little change in the magnitude of moderate flooding conditions, as represented by Q_1, the 1 percent flow duration (the flow that has a 1 percent probability of being exceeded on any particular day). Lake Fork near Cornland and Kickapoo Creek at Waynesville are the exceptions, and show a 7-8 percent increase in the Q_1. The Monticello and Oakford records indicate a 2 percent increase in the Q_1, and all other stations indicate no change in this high flow. The changes in high flows are expected to be associated with climate variability.

Medium Flows

In general, the biggest change in the flow frequencies between 1983 and 1997 is for medium flows, as represented by the 50 and 75 percent flow duration. Six of the seven stations listed in table 6 show a noticeable increase in medium flows, generally ranging from a 7-12 percent increase. Most of the stations that have flow increases are located in the Salt Creek and upper Sangamon River watersheds. The flow record for the South Fork Sangamon River shows essentially no increase in medium flows. The changes in medium flow frequency within the basin are primarily associated with climate variability.

Low Flows

There is relatively little difference in the low flow frequency for the two base periods of record, 1948-1983 and 1948-1997. For several portions of the watershed, the drought of 1988-1989 produced some of the lowest flows on record. However, the frequency of occurrence of the 1988-1989 low flows within the 14 additional years of record (1984-1997) is generally consistent with the long-term frequency of low flows as predicted by frequency analysis for the 1948-1983 period. The decrease in low flows at the South Fork Sangamon River is caused by the withdrawal of water by the Springfield water supply.

Update to the Virgin and Present Flow Conditions

The flow frequencies at each short-term gage were estimated using the available flow record. These flow frequencies were adjusted using the procedures given by Knapp et al. (1985) and Knapp (1988) to reflect the long-term virgin conditions associated with the 1948-1997 base period. Present flow conditions were estimated either directly from the flow record, such as at the gage located immediately downstream of Lake Decatur, or indirectly through an analysis of upstream effluent discharges and withdrawals. The flow frequency results of these analyses are presented in appendix A.

Table 7 provides a comparison of the 1999 estimate of present flow conditions for several gages, as compared to the 1985 estimates. As mentioned earlier, there have been relatively few changes in the human modifications to flow conditions in the Sangamon River basin. For this reason, the most significant changes between the 1985 and 1999 estimates at most locations are associated with changes to the virgin conditions, as influenced by climate variability.

Three gages listed in table 5 did not have long enough records from which to accurately estimate long-term flow conditions: Goose Creek near Deland, Sangamon River near Oakley, and Brush Creek near Divernon. The ILSAM uses the regional flow equations, discussed in the following section, to estimate the long-term flow conditions at these gage locations.

Table 7. Comparison of the 1985 and 1999 Estimates of Present Flow Conditions

Model version	*Flow frequency parameter*							
	Q_{mean}	Q_1	Q_{10}	Q_{50}	Q_{75}	Q_{90}	Q_{98}	$Q_{7,10}$
Sangamon River at Mahomet								
1985 model	269	2800	650	84	16	5.4	0.9	0.25
1999 model	287	2830	700	98	19	5.9	0.9	0.20
Sangamon River at Monticello								
1985 model	406	3690	1052	146	32	11.7	4.3	2.0
1999 model	436	3732	1133	172	39	12.5	4.5	2.3
Friends Creek at Argenta								
1985 model	91	820	240	25	1.2	0	0	0
1999 model	96	910	245	36	5.5	0.25	0	0
Flat Branch at Taylorville								
1985 model	201	2350	455	51	9.0	1.9	0	0
1999 model	202	2352	457	52	9.9	2.4	0	0
South Fork Sangamon River near Rochester								
1985 model	570	6000	1520	159	37	9.7	0.8	0.8
1999 model	588	5910	1550	165	29	2.6	0	0
Sangamon River at Riverton								
1985 model	1750	15150	4520	689	179	83	57	49
1999 model	1835	13678	4509	599	119	80	60	49
Salt Creek near Rowell								
1985 model	246	2130	618	96	21	3.6	2.7	2.6
1999 model	264	2280	687	119	29	9.1	6.6	5.9
Sugar Creek near Bloomington								
1985 model	50	468	94	29	19	15.8	13.0	10.6
1999 model	54	434	96	31	23	19.6	16.1	14.2
Salt Creek near Greenview								
1985 model	1285	9900	3130	624	205	128	84	70
1999 model	1291	10305	3275	630	212	128	88	76
Sangamon River near Oakford								
1985 model	3342	22640	8510	1620	569	333	233	215
1999 model	3608	23950	9400	1760	609	347	245	221

Value of Gage Data in Updating and Defining Flow Conditions in the Watershed

Twelve streamgages were operated in the Sangamon River basin from 1985-1997. Seven of the nine long-term gages in the basin were instrumental in defining the regional changes in virgin flow conditions throughout the basin. For the future, it may be necessary to have another gage in the South Fork Sangamon River to determine regional trends, because the Rochester gage is becoming increasingly affected by water supply withdrawals during dry years. Most of the remaining gages in the watershed provide valuable data to help define the impact of various water uses and water-resource projects in the basin, including those gages located downstream of Lake Decatur, Clinton Lake, the Bloomington-Normal wastewater discharge, and the instream withdrawal on the South Fork Sangamon River near Rochester. Many of these gages also provide valuable data for use by other agencies for water-resource planning and operations.

Updates to Flow Frequency Estimates at Ungaged Sites

The ILSAM estimates flow conditions at ungaged sites through the use of two types of information: a set of regional equations to estimate virgin flow conditions at the ungaged site, and data on the magnitude of flow modifications located upstream of the site.

Regional equations used to estimate virgin flow conditions are based on a regression analysis of streamgage records within geographic regions that are expected to have similar streamflow characteristics. In the 1985 study, the Sangamon River basin was divided into four regions, and equations were developed for each region relating flow frequency to drainage area. Subsequent ELSAM studies (Knapp, 1988, 1990, 1992) have used a different approach, in which three watershed characteristics are used in the regional equations: drainage area, soil permeability, and average annual net precipitation (precipitation minus evapotranspiration). Only two regions are needed using this approach, and regional boundaries are based on the physiographic characteristics of the land. The equations used in the recent studies are more able to account for variation in the flow characteristics within the region based on individual watershed characteristics. Adoption of these equations for use in the 1999 Sangamon River model update also provides consistency in the methodology used in all other ILSAM basin studies.

To adopt the newer version of the regional flow equations, it was necessary to develop a database of watershed characteristics for the Sangamon River basin. An earlier database, the NETWORK data file, had been created for use in the 1985 model and included information on drainage areas for approximately 600 locations within the basin. The NETWORK database for the updated model was expanded to include 1079 locations within the watershed. Drainage areas were computed for all new locations. Data from county soil surveys and statewide soil association maps were used to estimate the average permeability of the soil substrate for the contributing drainage areas of all 1079 locations, and long-term precipitation and streamflow records were used to update the estimate of net precipitation within the watershed upstream of each location. The resulting database is included in the relational database developed for the Sangamon River ILSAM, and it is listed in appendix C.

Applicability of Existing Virgin Flow Equations

The two major physiographic regions of the Sangamon River basin are the Bloomington Ridged Till Plain, situated in the eastern portion of the basin, and the Sangamon Till Plain, which covers the western portion. Regional flow equations for these two regions previously were developed for use in the Kaskaskia River basin ILSAM (Knapp, 1990). Appendix D lists the equations developed by Knapp (1990) for each of the 154 flow parameters used in ILSAM. These flow equations were developed using long-term streamflow data from the 1948-1988 period.

Also shown in appendix D is a coefficient of error associated with the regional equations. The coefficient of error was computed as follows. For each gaging station, the equation error is computed as the difference between the observed flow parameter and the virgin flow estimate divided by the observed mean flow at the gage:

$$\text{Equation error at each station} = (Q_{est}-Q_{obs})/Q_{mean}$$

All values on the right-hand side of this equation are in cubic feet per second, and the defined equation error has no dimension. Division by the mean flow at the station provides for a better comparison of the errors between gages in small and large watersheds. The coefficient of error for a particular flow parameter, c_e, is then computed as the standard deviation of computed error values at all stations included in the development of the regional flow equations. To compute the expected error of a particular flow parameter at a selected station, in cubic feet per second, the coefficient of error should be multiplied by the mean flow rate in cubic feet per second at the location of interest. The standard error of estimate of the regional equations for most flow parameters is generally in the range of 5-10 percent.

Even though the regional flow equations in appendix D were created for use in the Kaskaskia River basin, streamflow data from the Sangamon River basin were used in their development. Therefore, their applicability to the Sangamon River basin was not a concern. It was necessary, however, to determine if these older equations needed to be updated using streamflow data from the 1948-1997 period. This concern is addressed in the following paragraphs.

Twenty of the 31 gaging stations used to develop the regional flow equations for the Bloomington Ridged Plain and the Springfield Till Plain are currently active. Flow duration values were developed for these gaging records for two periods, 1948-1988 and 1948-1997. Table 9 compares the flow frequencies for these two periods for 15 of the gaging records that have the most complete period of record. Table 10 lists the percentage change in flows between the 1948-1988 and 1948-1997 periods of record.

A comparison of the flow frequencies for these two periods indicate that most of the gaging stations located in the Springfield Till Plain area (Macoupin Creek, Indian Creek, Shoal Creek, Skillet Fork, North Fork Embarras River) have experienced little change in flow frequency. The average flow and high flows in this region generally indicate a 3 percent increase, and the increase in medium and low flows are about 5 percent. Streamgages in the Bloomington Ridged Plain have generally experienced a 5-6 percent increase in average flows, a slightly higher increase (8 percent) in medium flows, and slightly lower (3-5 percent) increase in high flows and low flows. There is, however, considerable variability in the flow frequency change for each gaging station in the regions.

As indicated by the equations in appendix D, the average flow for an ungaged watershed is computed from the net precipitation for that watershed, a parameter included in the NETWORK database. Over time, changes in the average streamflow over a region can be adjusted in the model by simply changing the estimated net precipitation given in the ILSAM database. The regional equations of the 154 flow parameters, also presented in appendix D, all use the average flow as the primary scaling factor in the equations. Thus, if the average flow is increased by 10 percent, the values of all flow parameters also are expected to increase by 10 percent.

Table 9. Comparison of Frequencies for Regional Equations: 1948-1988 and 1948-1997

Period of record	Flow frequency parameter							
	Q_{mean}	Q_1	Q_{10}	Q_{25}	Q_{50}	Q_{75}	Q_{90}	Q_{98}
South Branch Kishwaukee River near Fairdale								
1948-1988	280	2411	670	303	126	40	19	12
1948-1997	297	2540	692	320	136	47	21	12
Sugar Creek at Milford								
1948-1988	365	3420	985	361	115	26	10	5
1948-1997	380	3488	1000	385	127	29	11	5
Fox River at Wilmot, WI								
1948-1988	577	2881	1310	730	370	195	124	81
1948-1997	587	2930	1312	743	381	205	130	84
Poplar Creek at Elgin								
1951-1988	24.8	215	63	27	9.3	2.9	1	0.5
1951-1997	26.1	227	64	29	10	3.3	1.2	0.5
Vermilion River at Pontiac								
1948-1988	389	4152	1010	395	120	21	6.4	1.4
1948-1997	414	4280	1060	427	134	24	7	1.1
Mackinaw River near Congerville								
1948-1988	515	5233	1240	544	181	34	12	3
1948-1997	539	5640	1280	565	188	37	12	3.2
Sangamon River at Monticello								
1948-1988	408	3622	1070	446	159	33	12	3.7
1948-1997	432	3710	1120	480	170	37	13	3.8
Lake Fork near Cornland								
1949-1988	155	1480	379	160	56	14	6.6	3.1
1949-1997	167	1609	401	172	62	15	6.7	3.4
Kickapoo Creek at Waynesville								
1949-1988	162	1610	380	161	59	12	4.3	1.2
1949-1997	174	1729	400	180	64	14	4.6	1.3
Macoupin Creek near Kane								
1948-1988	480	6973	1031	310	85	21	7	2.6
1948-1997	496	7390	1050	318	91	22	7.6	2.8
Indian Creek at Wanda								
1948-1988	24.9	474	40	13	3	0.38	0	0
1948-1997	25.6	461	40	13	3.3	0.4	0	0
Shoal Creek near Breese								
1948-1988	520	6524	1281	398	97	29	12	3.5
1948-1997	530	6650	1310	393	100	29	12	3.8
Skillet Fork at Wayne City								
1948-1988	407	5042	1141	205	38	6.6	1.5	0.2
1948-1997	422	5410	1150	207	40	6.3	1.3	0.16
North Fork Embarras River near Oblong								
1948-1988	261	3502	592	154	44	11	2.8	0.2
1948-1997	272	3630	605	163	47	11	3	0.21
Iroquois River near Foresman, IN								
1949-1988	384	2570	1050	457	178	60	26	14
1949-1997	406	2701	1090	500	194	66	28	14

Table 10. Percentage Change in Flow Frequency and Estimation Bias Using Regional Equations listed in Appendix D

	Flow frequency parameter							
Change/Bias	Q_{mean}	Q_1	Q_{10}	Q_{25}	Q_{50}	Q_{75}	Q_{90}	Q_{98}
South Branch Kishwaukee River near Fairdale								
Change (%)	6.07	5.35	3.28	5.61	7.94	17.50	10.53	0.00
Bias(%)	0	0.68	2.63	0.43	-1.76	-10.77	-4.20	5.72
Sugar Creek at Milford								
Change (%)	4.11	1.99	1.52	6.65	10.43	11.54	10.00	0.00
Bias(%)	0	2.04	2.48	-2.44	-6.08	-7.14	-5.66	3.95
Fox River at Wilmot, WI								
Change (%)	1.73	1.70	0.15	1.78	2.97	5.13	4.84	3.70
Bias(%)	0	0.03	1.55	-0.05	-1.22	-3.34	-3.05	-1.94
Poplar Creek at Elgin								
Change (%)	5.24	5.58	1.59	7.41	7.53	13.79	20.00	0.00
Bias(%)	0	-0.32	3.47	-2.06	-2.17	-8.13	-14.02	4.98
Vermilion River at Pontiac								
Change (%)	6.43	3.08	4.95	8.10	11.67	14.29	9.37	-21.43
Bias(%)	0	3.14	1.39	-1.57	-4.92	-7.38	-2.77	26.17
Mackinaw River near Congerville								
Change (%)	4.66	7.78	3.23	3.86	3.87	8.82	0.00	6.67
Bias(%)	0	-2.98	1.37	0.76	0.76	-3.98	4.45	-1.92
Sangamon River at Monticello								
Change (%)	5.88	2.43	4.67	7.62	6.92	12.12	8.33	2.70
Bias(%)	0	3.26	1.14	-1.64	-0.98	-5.89	-2.31	3.00
Lake Fork near Cornland								
Change (%)	7.74	8.72	5.80	7.50	10.71	7.14	1.52	9.68
Bias(%)	0	-0.90	1.80	0.22	-2.76	0.56	5.78	-1.80
Kickapoo Creek at Waynesville								
Change (%)	7.41	7.39	5.26	11.80	8.47	16.67	6.98	8.33
Bias(%)	0	0.01	2.00	-4.09	-0.99	-8.62	0.40	-0.86
Macoupin Creek near Kane								
Change (%)	3.33	5.98	1.84	2.58	7.06	4.76	8.57	7.69
Bias(%)	0	-2.56	1.44	0.73	-3.61	-1.38	-5.07	-4.22
Indian Creek at Wanda								
Change (%)	2.81	-2.74	0.00	0.00	10.00	5.26	0	0
Bias(%)	0	5.40	2.73	2.73	-6.99	-2.38	2.73	2.73
Shoal Creek near Breese								
Change (%)	1.92	1.93	2.26	-1.26	3.09	0.00	0.00	8.57
Bias(%)	0	-0.01	-0.33	3.12	-1.15	1.89	1.89	-6.52
Skillet Fork at Wayne City								
Change (%)	3.69	7.30	0.79	0.98	5.26	-4.55	-13.33	-20.00
Bias(%)	0	-3.48	2.79	2.61	-1.52	7.94	16.41	22.84
North Fork Embarras River near Oblong								
Change (%)	4.21	3.66	2.20	5.84	6.82	0.00	7.14	5.00
Bias(%)	0	0.54	1.94	-1.56	-2.50	4.04	-2.81	-0.75
Iroquois River near Foresman, IN								
Change (%)	5.73	5.10	3.81	9.41	8.99	10.00	7.69	0.00
Bias(%)	0	0.60	1.82	-3.48	-3.08	-4.04	-1.86	5.42

The existing regional equations, developed using data through 1988, will be capable of estimating the 1997 flow frequencies at ungaged sites if the expected percentage change over time in each of the 154 flow parameters is roughly similar to the concurrent change in the average flow. If the expected percentage change in a parameter is considerably different than that for the average flow, then use of the existing equations will create a regional bias in the estimate of the flow condition. For example, if the average flow in the region has increased by 5 percent, but the Q_1 flow in the region has increased by 12 percent, then use of the existing regional equations would tend to underestimate the Q_1 value at any given ungaged site by roughly 7 percent.

Table 10 presents the bias that would exist in the estimation of seven flow parameters for each of the 16 gaging records being analyzed: Q_1, Q_{10}, Q_{25}, Q_{50}, Q_{75}, Q_{90}, and Q_{98}. Table 11 presents the average percentage change in these seven flow parameters for all 16 locations, as well as the expected regional bias in their estimation. A regional bias of -2 percent, for example, indicates that, on average, the existing regional equations would underestimate the flow parameter by 2 percent. Table 11 shows that, over the range of the flow conditions, the bias of the regional equations is generally less than 2 percent. However, the Q_{75} generally would be underestimated by 3.1 percent, and the Q_{98} generally would be overestimated by 2.68 percent.

The regional flow equations are developed with the intent toward reducing the mean squared error related to an estimate of the flow. The mean squared error is equal to the square of the bias plus the square of the variance in the equation. The variance in the equation is represented by the coefficient of error in the regional equations, presented in appendix D. The error in the regional equations is generally in the range of 5-10 percent, being the smallest in the medium flow range and the largest for low and high flows. Thus, the error caused by a 2 percent bias is small compared to that related to the error in the regional equations. The error also is small compared to the flow measurement error at individual stations, which is in the range of 5-15 percent. For this reason, a potential bias of 2 percent is not statistically significant nor is it likely to be significant when dealing with most operational issues in water resources. Therefore, it was not deemed necessary to update the equations given in appendix D at this time. A future update of the equations may be required if the long-term flow conditions in the basin continue to migrate from the relationship established in 1988.

Uncertainties of Flow Estimation

Every step in the computation of flow conditions includes some amount of uncertainty. Measurement error in streamgaging, and the resulting estimate of daily flows, generally is considered to be in the range of 5-15 percent, depending on the quality of the gaging location. Additional uncertainties are associated in the processing of hydrologic information for the model, including the flow frequency adjustments for period of record, errors in estimating infrequent events such as low flows, the separation of the gaging record into virgin flow conditions and the impact of flow modifications, and the algorithms that estimate downstream impacts of the various types of flow modifications. Only the error in the regional flow equations, given in appendix D, is readily quantifiable

Table 11. Average Percentage Change in Flow Frequency and Estimation Bias

	Q_{avg}	Q_1	Q_{10}	Q_{25}	Q_{50}	Q_{75}	Q_{90}	Q_{98}
Change (%)	4.76	4.83	2.94	5.47	7.03	8.00	5.24	1.95
Bias(%)	0	-0.07	1.73	-0.68	-2.17	-3.10	-0.46	2.68

and generally applicable to all locations within the basin. Because the estimated error in developing these regional equations also encompasses many of the other errors listed here, it is reasonable to accept them as a reasonable comprehensive error for the entire process of flow estimation.

Conclusions

The streamflow statistics presented in this report are updates of the statistics presented in the initial version of the Sangamon River Basin Streamflow Assessment Model (Knapp et al., 1985). As has been demonstrated, some of the flow statistics have changed moderately over time as a result of climate variability, new information from additional streamgaging, and the changes in the modifications to flows caused by water-use practices. The variability in climatic conditions appears to have caused a noticeable fluctuation in the expected unaltered, or virgin, flow condition primarily for medium flow conditions. Thus a previous assumption, that long-term virgin streamflow conditions in the future were expected to be similar to those of the past, has been demonstrated to be incorrect. Since the previous 1985 assessment, the magnitudes of virgin flow in the medium flow range have increased by roughly 7-12 percent for the Salt Creek and upper Sangamon River watersheds. The average annual flow for these watershed has increased by 4-7 percent. The magnitudes of high flows and low flows remain essentially unchanged throughout the basin, as have all flow conditions in the southern and western portion of the basin.

Human modifications have also altered the magnitude of streamflows at certain locations within the basin, particularly from the increase in water-use withdrawals from and discharges to the stream. The impacts of these water uses are most evident during low flow conditions on the South Fork Sangamon River downstream of the Springfield PWS withdrawal. Low flows have also increased moderately on Sugar Creek downstream of the Bloomington-Normal Sanitary District discharge.

The proper prediction of expected flow conditions in the future will need additional periodic review and updating, such as this report provides, and will depend upon the continued procurement of flow data from streamgaging, particularly from gages that are located to provide the most useful information on regional hydrology.

This study has produced data sets of hydrologic information, which were developed for use with a new Windows-based version of ILS AM that currently is being developed. The basic data used by ILSAM are included in the appendices.

Acknowledgments

This study was principally funded by a research contract from the Illinois Department of Natural Resources, Office of Water Resources (IDNR-OWR). Support also was provided by the Illinois State Water Survey, a Division of IDNR. Gary Clark of IDNR-OWR served as project liaison.

The study was conducted under the general supervision of Nani Bhowmik, head of the Watershed Science Section of the Water Survey. Other Water Survey staff also contributed to this project. Maitreyee Bera processed the data sets related to water use and wastewater effluents, and Michael W. Myers prepared the appendices. Eva C. Kingston and Agnes E. Dillon edited the report, and Cynthia Bauer assisted in typing and formatting. The Illinois Environmental Protection Agency and the U.S. Geological Survey provided wastewater effluent data and streamgaging records, respectively.

Any opinions, findings, and conclusion or recommendations expressed in this report are those of the author and do not necessarily reflect those of the Office of Water Resources or the Dlinois State Water Survey.

References

Knapp, H.V. 1988. *Fox River Basin Streamflow Assessment Model: Hydrologic Analysis.* Illinois State Water Survey Contract Report 454.

Knapp, H.V. 1990. *Kaskaskia River Basin Streamflow Assessment Model: Hydrologic Analysis.* Illinois State Water Survey Contract Report 499.

Knapp, H.V. 1992. *Kankakee River Basin Streamflow Assessment Model: Hydrologic Analysis.* Illinois State Water Survey Contract Report 541.

Knapp, H.V. 1998. *Operation Alternatives for the Springfield Water Supply System and Impacts on Drought Yield.* Illinois State Water Survey Contract Report 626.

Knapp, H.V., M.L. Terstriep, K.P. Singh, and D.C. Noel. 1985. *Sangamon River Basin Streamflow Assessment Model: Hydrologic Analysis.* Illinois State Water Survey Contract Report 368.

Singh, K.P., G.S. Ramamurthy, and I.W. Seo. 1988. *7-Day 10-Year Low Flows of Streams in the Kankakee, Sangamon, Embarras, Little Wabash, and Southern Regions.* Illinois State Water Survey Contract Report 441.

Appendix A. Control Points: Location and Estimated 1997 Flow Conditions

Control point location	Flow condition	Stream Code	Mile
1) Sangamon River near Oakford	Virgin	I	27.3
2) Sangamon River near Oakford	Present	I	27.3
3) Sangamon River above confluence with Salt Creek	Virgin	I	36.11
4) Sangamon River above confluence with Salt Creek	Present	I	36.11
5) Sangamon River at Riverton	Virgin	I	84.7
6) Sangamon River at Riverton	Present	I	84.7
7) Sangamon River at Stevens Creek (Decatur WTP)	Virgin	I	127.3
8) Sangamon River at Stevens Creek (Decatur WTP)	Present	I	127.3
9) Flat Branch near Taylorville	Virgin	IKR	1.6
10) Flat Branch near Taylorville	Present	IKR	1.6
11) Sangamon River at Lake Decatur Dam	Virgin	I	130.8
12) Sangamon River at Lake Decatur Dam	Present	I	130.8
13) Sugar Creek near Hartsburg	Virgin	IED	15.4
14) Sugar Creek near Hartsburg	Present	IED	15.4
15) Sangamon River at Monticello	Virgin	I	162.6
16) Sangamon River at Monticello	Present	I	162.6
17) Sangamon River at Mahomet	Virgin	I	186.1
18) Sangamon River at Mahomet	Present	I	186.1
19) Salt Creek near Greenview	Virgin	IE	4.9
20) Salt Creek near Greenview	Present	IE	4.9
21) Salt Creek at Sugar Creek	Virgin	IE	11.0
22) Salt Creek at Sugar Creek	Present	IE	11.0
23) Salt Creek at Lake Fork	Virgin	IE	32.6
24) Salt Creek at Lake Fork	Present	IE	32.6
25) Salt Creek near Rowell	Virgin	IE	63.5
26) Salt Creek near Rowell	Present	IE	63.5
27) Salt Creek at Clinton Dam	Virgin	IE	76.2
28) Salt Creek at Clinton Dam	Present	IE	76.2
29) Sugar Creek near Bloomington	Virgin	IED	48.8
30) Sugar Creek near Bloomington	Present	IED	48.8
31) Lake Fork near Cornland	Virgin/Present	IEI	12.9
32) Spring Creek at Springfield	Virgin/Present	IH	8.2
33) Sugar Creek at Lake Springfield (Spaulding Dam)	Virgin	IJ	8.4
34) Sugar Creek at Lake Springfield (Spaulding Dam)	Present	IJ	8.4
35) South Fork Sangamon River near Rochester	Virgin	IK	7.4
36) South Fork Sangamon River near Rochester	Present	IK	7.4
37) South Fork Sangamon River at Kinkaid	Virgin	IK	40.1
38) South Fork Sangamon River at Kinkaid	Present	IK	40.1
39) South Fork Sangamon River at Lake Taylorville	Virgin	IK	59.0
40) South Fork Sangamon River at Lake Taylorville	Present	IK	59.0
41) South Fork Sangamon River near Nokomis	Virgin/Present	IK	81.2
42) Clear Creek at Sangchris Lake	Virgin	IKH	1.0
43) Clear Creek at Sangchris Lake	Present	IKH	1.0
44) Kickapoo Creek near Lincoln	Virgin/Present	IEG	8.3
45) Friends Creek at Argenta	Virgin/Present	IQ	6.1
46) Sangamon River at Fisher	Virgin	I	201.1
47) Sangamon River at Fisher	Present	I	201.1
48) Kickapoo Creek at Waynesville	Virgin/Present	IEG	26.2

Notes:

Stream codes are as listed in appendix C
WTP - Wastewater Treatment Plant

Appendix A. Continued

Flow type	Location (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Q_{01}	24200	23950	18960	18700	14000	13678	6315	6305	2350	2352
Q_{02}	20200	20010	15160	14945	11200	10927	4695	4695	1710	1712
Q_{05}	13900	13890	9980	9920	7502	7392	2950	2960	890	892
Q_{10}	9350	9400	6340	6335	4560	4509	2065	2078	455	457
Q_{15}	6850	6930	4590	4610	3300	3278	1561	1572	308	309
Q_{25}	4270	4310	2780	2788	1900	1869	894	901	170	171
Q_{40}	2445	2480	1520	1512	990	946	450	452	82	83
Q_{50}	1725	1760	1055	1048	640	599	293	293	51	52
Q_{60}	1172	1220	674	683	368	344	181	179	30	31
Q_{75}	558	609	288	306	131	119	65	63	9.0	9.9
Q_{85}	338	410	159	201	73	87	35	54	3.4	4.0
Q_{90}	266	347	110	163	53	80	24.4	50	1.9	2.4
Q_{95}	198	286	71	132	33	70	14.1	45	0.36	0.72
Q_{98}	163	245	53	112	21	60	8.4	40	0.0	0.0
Q_{99}	143	218	49	103	17	54	6.2	37	0.0	0.0
Q_{mean}	3569	3608	2374	2375	1870	1835	781	785	200.9	202.1
Low Flows										
$Q_{1,2}$	242	298	88	123	46	65	19.1	37	1.6	1.8
$Q_{1,10}$	139	197	38	80	11	41	5.1	31	0.0	0.0
$Q_{1,25}$	112	167	30	70	6.0	35	2.3	28	0.0	0.0
$Q_{1,50}$	91	146	28	68	5.0	34	1.5	27	0.0	0.0
$Q_{7,2}$	258	340	95	149	50	79	22.8	45	2.2	2.7
$Q_{7,10}$	147	221	40	93	13	49	6.8	36	0.0	0.0
$Q_{7,25}$	118	190	32	85	8.0	44	2.9	32	0.0	0.0
$Q_{7,50}$	97	166	30	81	7.0	42	2.0	30	0.0	0.0
$Q_{15,2}$	280	361	105	158	55	82	25.4	48	2.5	3.0
$Q_{,5,10}$	155	234	42	99	16	54	8.6	39	0.0	0.0
$Q_{15,25}$	125	200	35	89	11	48	4.4	35	0.0	0.0
$Q_{15,50}$	103	177	32	87	9.0	47	2.7	34	0.0	0.0
$Q_{31,2}$	314	391	119	167	66	87	28.2	49	3.7	4.3
$Q_{31,10}$	164	248	46	105	19	58	9.2	40	0.01	0.14
$Q_{31,25}$	134	211	37	94	13	52	5.1	37	0.0	0.0
$Q_{31,50}$	112	191	35	93	11	52	1.8	36	0.0	0.0
$Q_{61,2}$	393	474	139	190	79	102	33	54	6.4	7.2
$Q_{61,10}$	178	267	54	117	25	66	11.2	43	0.4	0.7
$Q_{61,25}$	148	229	43	101	18	57	8.0	39	0.0	0.0
$Q_{61,50}$	126	203	40	96	14	52	5.4	37	0.0	0.0
$Q_{91,2}$	450	517	178	214	94	100	48	59	13.6	14.5
$Q_{91,10}$	196	287	59	122	32	71	15.6	45	0.9	1.3
$Q_{91,25}$	165	250	47	107	22	62	10.3	41	0.01	0.14
$Q_{91,50}$	140	222	44	103	18	57	7.7	40	0.0	0.0

Appendix A. Continued

Flow type	Location									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Drought Flows										
$Q_{6,10}$	276	371	83	147	77	113	32	66	5.0	5.8
$Q_{6,25}$	205	300	67	134	58	100	18.3	54	0.7	1.3
$Q_{6,50}$	162	258	52	121	42	87	13.6	50	0.1	0.46
$Q_{9,10}$	513	588	173	216	142	154	86	120	14	14.9
$Q_{9,25}$	330	422	106	168	80	113	42	79	4.3	5.1
$Q_{9,50}$	235	332	80	148	63	104	28	64	2.2	3.0
$Q_{12,10}$	980	999	455	440	360	312	233	228	55	56
$Q_{12,25}$	525	554	221	218	172	138	104	115	20	21
$Q_{12,50}$	337	399	145	176	112	114	83	94	4.5	5.4
$Q_{18,10}$	1300	1316	667	648	540	486	325	322	67	68
$Q_{18,25}$	662	644	280	229	217	134	159	143	32	33
$Q_{18,50}$	385	445	177	205	120	117	83	105	9.8	10.7
$Q_{30,10}$	2200	2216	1180	1160	950	894	470	469	105	106
$Q_{30,25}$	1150	1155	551	522	455	392	266	264	56	57
$Q_{30,50}$	610	618	404	379	300	243	186	190	25	26
$Q_{34,10}$	2950	2964	1620	1595	1330	1266	699	700	160	161
$Q_{54,25}$	1680	1665	997	947	850	765	431	428	74	75
$Q_{54,50}$	920	912	720	677	580	503	323	318	40	41
January										
Q02	21047	20406	18427	17749	11880	11144	4499	4508	1870	1872
Q10	8577	8565	6897	6839	5195	5092	2295	2304	450	452
Q_{25}	3663	3708	2333	2333	2200	2161	865	869	178	179
Q_{50}	1622	1665	1119	1121	780	748	318	317	48	49
Q_{75}	499	552	308	330	140	132	86	80	7.7	8.6
Q_{90}	255	324	156	198	50	66	29	48	2.1	2.5
Q_{98}	167	250	89	150	24	63	9.1	42	0.2	0.5
Q_{mean}	3327	3345	2435	2412	2072	2011	785	787	210.6	212
February										
Q_{02}	22222	21885	18152	17795	10680	10262	6289	6286	1950	1952
Q_{10}	11525	11389	7585	7401	5660	5429	2763	2775	810	812
Q_{25}	5947	5933	3557	3496	3035	2932	1109	1116	308	309
Q_{50}	2628	2637	1768	1734	1310	1240	435	436	103	104
Q_{75}	890	913	644	633	329	287	139	134	20	21
Q_{90}	319	366	169	186	75	64	45	57	4.4	5.2
Q_{98}	217	289	130	178	27	50	29	47	0.7	1.2
Q_{mean}	4560	4548	3126	3074	2467	2375	1031	1033	295	296
March										
Q_{02}	23254	22441	20294	19459	12180	11282	5513	5513	2050	2052
Q_{10}	14001	13794	10841	10583	6446	6138	2880	2894	820	822
Q_{25}	7465	7445	5805	5734	3220	3105	1628	1639	345	346
Q_{50}	3688	3677	2418	2360	1660	1563	802	807	170	171
Q_{75}	2009	2002	1284	1237	840	758	381	381	76	77
Q_{90}	977	1003	621	609	320	275	189	187	30	31
Q_{98}	404	446	271	281	39	21	87	78	2.1	2.9
Q_{mean}	5916	5823	4353	4219	2852	2677	1284	1281	347	348

Appendix A. Continued

Flow type	Location (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
April										
Q_{02}	24712	23856	16992	16114	16980	16039	6391	6390	2002	2409
Q_{10}	13760	13698	9610	9497	8670	8507	3319	3335	822	912
Q_{25}	8229	8297	5299	5313	3780	3749	1919	1931	370	518
Q_{50}	4570	4650	3070	3102	1660	1652	993	999	166	285
Q_{75}	2409	2466	1529	1543	870	848	456	457	76	147
Q_{90}	1595	1641	1182	1189	451	424	270	269	42	90
Q_{98}	668	684	453	437	113	68	122	115	8.0	32
Q_{mean}	6618	6607	4451	4398	3616	3522	1488	1488	356	466
May										
Q_{02}	28766	28344	18506	18062	15480	14973	6687	6687	2002	1964
Q_{10}	14438	14396	9188	9096	8145	8006	3745	3757	602	730
Q_{25}	7187	7250	4087	4097	3290	3259	1948	1957	231	388
Q_{50}	3406	3467	1746	1762	1330	1309	771	774	109	196
Q_{75}	1998	2042	990	993	706	674	394	393	60	111
Q_{90}	1496	1555	805	829	407	398	249	245	39	66
Q_{98}	764	809	213	228	113	100	127	119	5.4	34
Q_{mean}	6039	6052	3411	3383	3285	3217	1340	1338	269	360
June										
Q_{02}	19926	19682	17146	16880	10890	10561	5103	5103	2802	2006
Q_{10}	10790	10843	7110	7111	5630	5584	2601	2614	702	615
Q_{25}	5687	5755	2917	2933	2940	2915	1097	1105	267	291
Q_{50}	2569	2613	1239	1240	1160	1125	431	432	92	138
Q_{75}	1379	1403	595	584	488	443	237	226	37	71
Q_{90}	872	909	363	375	239	219	126	111	19.5	42
Q_{98}	522	563	120	137	96	85	54	55	5.0	15.7
Q_{mean}	4299	4320	2527	2510	2450	2397	948	944	337	301
July										
Q_{02}	15664	15663	10754	10720	6875	6788	4123	4127	1262	1177
Q_{10}	7604	7718	5234	5296	2740	2760	1504	1514	317	362
Q_{25}	3197	3256	1867	1879	1170	1145	587	591	116	165
Q_{50}	1480	1533	605	619	497	477	223	222	44	70
Q_{75}	696	744	178	195	199	185	98	83	14.3	32
Q_{90}	403	468	112	152	82	94	55	54	4.8	16.2
Q_{98}	251	335	104	166	46	84	19.4	46	0.0	4.6
Q_{mean}	2926	2974	1742	1754	1195	1174	604	602	143	168
August										
Q_{02}	12322	12350	10642	10639	3255	3202	3405	3412	922	738
Q_{10}	3484	3556	2334	2361	1259	1247	548	552	246	177
Q_{25}	1481	1531	875	883	486	460	177	177	64	58
Q_{50}	719	774	189	211	181	172	66	59	17.9	24.7
Q_{75}	412	497	81	137	81	109	37	52	6.1	12.2
Q_{90}	324	410	146	207	45	80	23.7	47	1.1	6.6
Q_{98}	211	290	109	164	20.0	55	13.1	40	0.0	2.6
Q_{mean}	1693	1754	1060	1086	604	599	307	312	104	117

Appendix A. Continued

Flow type	Location (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	**(10)**
September										
Q_{02}	10273	10237	8683	8602	7455	7329	2077	2084	422	827
Q_{10}	2101	2127	1511	1496	877	827	375	375	70	130
Q_{25}	703	748	251	260	280	258	94	89	13.3	32
Q_{50}	344	419	48	93	98	115	35	52	6.6	13.6
Q_{75}	272	364	86	150	60	98	22.6	48	2.1	5.9
Q_{90}	195	283	84	148	32	72	15.0	44	0.0	3.2
Q_{98}	139	216	82	138	16.0	55	5.2	37	0.0	1.4
Q_{mean}	1072	1133	701	729	651	649	203	212	41.7	84
October										
Q_{02}	12473	12422	8643	8544	7500	7354	2587	2598	442	694
Q_{10}	3235	3278	2115	2116	2215	2179	968	970	105	193
Q_{25}	1131	1180	578	588	407	384	168	166	41	53
Q_{50}	360	428	130	168	112	122	36	51	6.7	13.3
Q_{75}	274	361	121	180	55	88	22.2	47	1.9	6.0
Q_{90}	187	271	85	144	26.0	63	14.7	42	0.2	3.2
Q_{98}	132	206	93	147	13.0	51	4.0	35	0.0	0.9
Q_{mean}	1379	1433	883	904	905	896	296	307	65.7	82
November										
Q_{02}	11360	11031	6160	5790	7145	6726	4059	4069	462	973
Q_{10}	4110	4081	1730	1658	2850	2739	2127	2131	197	352
Q_{25}	1900	1930	1133	1124	950	906	589	587	62	116
Q_{50}	639	691	386	403	217	203	79	74	21.4	30
Q_{75}	277	352	121	167	75	94	33	51	3.6	10.7
Q_{90}	214	298	113	172	30	65	17.9	45	1.6	4.9
Q_{98}	142	214	82	134	15.0	50	8.7	37	0.0	2.2
Q_{mean}	1697	1724	915	905	1063	1019	458	461	68.6	119
December										
Q_{02}	18447	18625	16217	16358	7490	7574	4456	4471	1802	1370
Q_{10}	8605	8778	7575	7704	3370	3457	2334	2340	496	519
Q_{25}	3526	3620	2446	2499	1340	1357	1248	1249	124	204
Q_{50}	1113	1167	743	759	410	394	613	610	31	53
Q_{75}	348	397	200	219	74	65	54	52	6.0	11.9
Q_{90}	209	286	109	159	28	53	20.9	47	2.3	5.3
Q_{98}	145	226	89	148	19.0	58	9.2	41	0.0	2.0
Q_{mean}	2948	3046	2479	2538	1300	1321	724	728	190	206

Appendix A. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Q_{01}	5710	5615	2505	2549	3728	3732	2830	2833	10300	10305
Q_{02}	4260	4182	1728	1767	2722	2726	1935	1938	7690	7715
Q_{05}	2640	2581	980	1015	1781	1784	1155	1157	4880	4925
Q_{10}	1845	1792	593	625	1130	1133	700	702	3220	3275
Q_{15}	1402	1350	416	447	790	793	505	507	2420	2475
Q_{25}	794	742	246	274	481	484	301	303	1560	1610
Q_{40}	397	343	127	153	257	259	158	160	901	945
Q_{50}	259	204	78	104	170	172	98	100	590	630
Q_{60}	161	106	45	70	104	106	57	59	390	428
Q_{75}	58	6.7	16.3	39	37	39	19.1	20.5	180	212
Q_{85}	31	3.0	8.5	29.7	17.0	18.6	9.3	10.5	123	152
Q_{90}	21.2	1.5	6.0	25.9	11.0	12.5	5.9	7.0	101	128
Q_{95}	11.9	0.1	4.1	22.2	6.2	7.6	2.9	3.9	80	106
Q_{98}	7.0	0.0	2.7	17.6	3.5	4.5	0.9	1.5	66	88
Q_{99}	5.2	0.0	2.0	14.3	2.1	2.8	0.3	0.66	59	79
Q_{mean}	704	652	246	272	433.6	436	287	289	1254	1291
Low Flows										
$Q_{1,2}$	17.0	0.0	4.6	18.0	8.3	9.2	3.9	4.5	99.1	119
$Q_{1,10}$	4.2	0.0	1.4	10.6	1.0	1.3	0.1	0.15	54.5	70
$Q_{1,25}$	1.6	0.0	0.8	8.5	0.1	0.11	0.0	0.03	44.4	58
$Q_{1,50}$	0.9	0.0	0.25	7.2	0.0	0.0	0.0	0.03	39.9	53
$Q_{7,2}$	20.6	0.0	5.5	24.6	10.2	11.7	4.5	5.6	102	129
$Q_{7,10}$	5.8	0.0	1.8	14.2	1.6	2.3	0.2	0.56	56.6	76
$Q_{7,25}$	2.1	0.0	1.1	12.6	0.3	0.36	0.0	0.09	48	67
$Q_{7,50}$	1.2	0.0	0.45	10.3	0.1	0.1	0.0	0.09	42.6	59
$Q_{15,2}$	23.0	0.25	6.5	25.9	11.6	13.2	5.3	6.46	109	136
$Q_{15,10}$	7.4	0.01	2.3	15.7	2.2	3.0	0.6	1.03	57.2	78
$Q_{15,25}$	3.5	0.0	1.4	13.5	0.5	1.05	0.1	0.32	49.3	69
$Q_{15,50}$	1.9	0.0	0.8	11.7	0.12	0.12	0.0	0.1	45.4	63
$Q_{31,2}$	25.8	0.8	7.7	28.2	13.4	15.0	7.0	8.2	116	144
$Q_{31,10}$	8.0	0.2	3.0	18.9	3.0	4.2	1.4	2.2	62.5	86
$Q_{31,25}$	4.2	0.0	2.0	14.4	0.9	1.4	0.2	0.35	52.3	72
$Q_{31,50}$	0.95	0.0	1.3	13.4	0.3	0.5	0.0	0.14	48.3	68
$Q_{61,2}$	30	2.5	10.6	32.1	17.0	18.7	8.7	10.0	127	156
$Q_{61,10}$	9.7	0.4	3.7	20.6	4.3	6.5	2.4	4.2	68.7	94
$Q_{61,25}$	6.9	0.1	2.5	17.0	1.7	2.8	0.5	1.2	58.3	80
$Q_{61,50}$	4.4	0.0	1.8	14.6	0.7	1.2	0.1	0.23	53.5	74
$Q_{91,2}$	44	6.3	14.6	37	25.0	26.8	15.2	16.6	145	175
$Q_{91,10}$	13.6	0.6	4.4	22.9	5.8	7.2	3.2	4.2	71.7	99
$Q_{91,25}$	8.9	0.2	3.0	18.9	2.7	3.9	1.3	2.1	60.6	84
$Q_{91,50}$	6.5	0.0	2.3	16.8	1.3	2.4	0.5	1.2	56.6	79

Appendix A. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Drought Flows										
$Q_{6,10}$	28.0	15.0	7.8	28.9	24.0	25.6	12.6	13.8	123	153
$Q_{6,25}$	15.0	6.0	5.1	24.2	10.6	12.1	3.5	4.6	98	125
$Q_{6,50}$	11.0	4.7	4.0	22.1	8.2	9.6	2.0	3.0	78	104
$Q_{9,10}$	72	56	28	51	60	61	43	44	220	251
$Q_{9,25}$	37	26.0	13.0	35	31	33	13.0	14.4	135	164
$Q_{9,75}$	25.0	15.0	9.1	30	19.0	20.7	4.3	5.6	100	128
$Q_{12,10}$	210	152	66	91	150	152	83	85	360	393
$Q_{12,25}$	96	56	33	56	82	84	47	49	235	266
$Q_{12,50}$	80	43	22	44	68	70	16.0	17.4	160	190
$Q_{18,10}$	289	231	84	109	186	188	149	151	420	454
$Q_{18,25}$	143	75	43	68	112	114	60	62	270	302
$Q_{18,50}$	76	48	29	52	57	59	24.0	25.5	220	251
Q_{3010}	420	362	147	173	275	277	165	167	800	835
$Q_{30,10}$	231	175	80	105	162	164	84	86	380	413
$Q_{30,25}$	171	123	53	77	104	106	49	51	340	372
$Q_{54,10}$	635	577	202	230	370	373	258	260	1150	1188
$Q_{54,25}$	389	331	119	145	230	232	115	117	540	574
$Q_{54,50}$	296	238	84	109	150	152	101	103	380	414
January										
Q_{02}	3905	3835	1700	1741	3095	3099	1930	1933	7300	7336
Q_{10}	1992	1936	491	523	1172	1175	1001	1003	2500	2545
Q_{25}	726	671	192	220	411	414	333	335	1050	1094
Q_{50}	265	210	70	95	180	182	146	148	435	475
Q_{75}	76	20	15.6	36	60	62	56	58	140	170
Q_{90}	26.3	0.0	4.7	22.5	17.0	18.4	7.4	8.4	108	134
Q_{98}	7.4	0.0	2.1	15.3	3.0	3.7	0.31	0.64	65	86
Q_{mean}	677	621	207	235	438	441	341	343	1019	1059
February										
Q_{02}	5766	5681	1985	2028	3336	3340	2730	2733	9800	9819
Q_{10}	2434	2378	680	714	1344	1347	941	943	3550	3597
Q_{25}	947	892	301	331	624	627	430	432	1850	1896
Q_{50}	369	314	111	138	255	257	186	188	710	752
Q_{75}	116	60	35	59	90	92	83	85	240	273
Q_{90}	36	0.0	8.8	28.7	24.0	25.6	14.0	15.2	127	156
Q_{98}	25.5	0.0	3.8	19.6	15.0	16.1	6.2	6.9	76	99
Q_{mean}	909	851	290	318	569	572	404	406	1576	1615
March										
Q_{02}	5000	4915	2376	2420	2940	2944	1755	1758	9900	9921
Q_{10}	2621	2565	963	998	1551	1554	905	907	4700	4750
Q_{25}	1441	1387	496	528	841	844	497	499	2450	2500
Q_{50}	706	652	234	262	435	438	262	264	1230	1276
Q_{75}	325	270	107	133	220	222	129	131	590	629
Q_{90}	161	106	50	74	117	119	76	78	260	297
Q_{98}	76	20	14.4	34	54	56	32	33.4	96	127
Q_{mean}	1152	1090	439	469	691	694	388	390	2046	2086

Appendix A. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
April										
Q_{02}	5465	5380	2444	2488	3615	3619	2425	2428	12000	12021
Q_{10}	2870	2815	1055	1089	1690	1693	976	978	5150	5200
Q_{25}	1662	1609	576	607	1020	1023	588	590	3100	3153
Q_{50}	873	819	294	323	539	542	316	318	1740	1787
Q_{75}	404	349	145	171	280	282	163	165	1000	1042
Q_{90}	235	180	74	99	166	168	94	96	560	598
Q_{98}	109	53	24.5	46	73	75	53	55	106	137
Q_{mean}	1298	1237	490	520	825	828	528	530	2520	2561
May										
Q_{02}	6120	6035	2093	2136	3990	3994	2795	2798	9100	9121
Q_{10}	3385	3330	794	828	1573	1576	989	991	3800	3849
Q_{25}	1749	1697	389	418	717	720	427	429	1950	2002
Q_{50}	673	619	199	227	371	374	223	225	1020	1064
Q_{75}	340	285	105	130	229	231	137	139	580	620
Q_{90}	217	160	60	85	147	149	87	89	370	404
Q_{98}	115	59	24.8	44	80	82	55	57	100	129
Q_{mean}	1191	1129	375	404	715	718	447	449	1974	2014
June										
Q_{02}	4625	4540	2067	2111	3115	3119	2110	2113	9100	9121
Q_{10}	2310	2255	695	729	1220	1223	652	654	2850	2901
Q_{25}	944	892	306	336	579	582	345	347	1950	2001
Q_{50}	365	310	130	156	244	246	132	134	1000	1042
Q_{75}	203	138	61	84	133	135	73	75	580	614
Q_{90}	109	42	32	51	78	80	39	41	370	394
Q_{98}	47	0.0	13.8	30.7	34	36	14.7	16.0	103	126
Q_{mean}	843	782	316	343	530	532	360	362	1783	1820
July										
Q_{02}	3840	3770	1345	1383	2420	2424	1430	1433	7400	7432
Q_{10}	1349	1296	371	401	849	852	374	376	2600	2651
Q_{25}	510	457	152	179	343	346	172	174	1250	1296
Q_{50}	185	130	58	83	131	133	68	70	670	708
Q_{75}	82	17.0	24.5	44	55	57	27.0	28.5	315	345
Q_{90}	49	0.0	10.8	28.7	25.0	26.8	17.0	18.4	140	164
Q_{98}	16.2	0.0	4.9	18.7	5.2	6.6	1.8	2.8	88	109
Q_{mean}	547	492	177	202	346	348	225	227	1181	1216
August										
Q_{02}	3240	3177	984	1020	1870	1873	766	768	5170	5200
Q_{10}	497	442	206	235	332	335	117	119	1250	1294
Q_{25}	156	102	59	84	105	107	49	50.7	560	601
Q_{50}	57	0.0	19.3	42	42	44	20.0	21.5	235	267
Q_{75}	33	0.0	8.8	29.9	20.0	21.8	9.3	10.7	135	163
Q_{90}	21.2	0.0	5.2	22.0	11.0	12.5	4.6	5.7	115	139
Q_{98}	11.8	0.0	2.8	18.6	3.9	5.1	0.8	1.6	68	91
Q_{mean}	286	241	108	131	172	174	95	97	699	733

Appendix A. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
September										
Q_{02}	1910	1851	1017	1049	1116	1119	775	777	2600	2644
Q_{10}	332	277	182	208	216	218	108	110	790	830
Q_{25}	81	26.0	38	61	57	59	27.0	28.5	258	293
Q_{50}	31	0.0	13.8	35	22.0	23.8	11.0	12.4	140	169
Q_{75}	20.1	0.0	5.1	24.6	11.0	12.5	5.3	6.4	120	147
Q_{90}	13.5	0.0	2.8	18.0	5.2	6.3	2.1	2.8	96	119
Q_{98}	4.3	0.0	1.3	14.0	0.7	1.3	0.16	0.39	48	68
Q_{mean}	187	147	101	123	101	102	46	47	354	386
October										
Q02	2457	2401	836	869	1627	1630	974	976	4050	4097
Q_{10}	892	837	235	262	470	473	272	274	870	911
Q_{25}	148	93	70	94	91	93	42	44	430	468
Q_{50}	32	0.0	12.9	34	22.0	23.8	11.9	13.3	138	167
Q_{75}	19.7	0.0	5.4	24.7	10.0	11.5	4.6	5.7	114	141
Q_{90}	13.7	0.0	3.0	18.9	4.0	5.2	2.0	2.8	95	119
Q_{98}	3.5	0.0	1.6	13.4	1.0	1.2	0.0	0.09	49	68
Q_{mean}	278	240	101	123	167	169	85	86.58	453	485
November										
Q_{02}	3885	3826	900	933	2140	2143	1454	1456	3300	3340
Q_{10}	2032	1977	322	350	614	617	426	428	1100	1142
Q_{25}	557	501	113	139	205	207	112	114	490	528
Q_{50}	71	15.0	28.5	51	53	55	30	31.5	137	171
Q_{75}	28.2	0.0	7.9	28.3	18.0	19.6	11.9	13.1	117	145
Q_{90}	15.3	0.0	4.2	20.6	7.2	8.3	5.9	6.6	99	123
Q_{98}	7.2	0.0	2.1	14.5	3.6	4.1	1.4	1.6	60	79
Q_{mean}	426	375	117	142	256	258	127	129	413	449
December										
Q_{02}	4025	3962	1524	1564	2695	2699	1720	1723	3200	3236
Q_{10}	2203	2147	450	480	1022	1025	.735	737	1130	1173
Q_{25}	1198	1143	175	201	435	437	301	303	500	540
Q_{50}	596	541	53	77	130	132	78	80	142	179
Q_{75}	50	0.0	11.2	33	26.0	27.7	14.3	15.6	110	139
Q_{90}	17.8	0.0	4.4	23.2	8.39	9.8	4.7	5.7	100	126
Q_{98}	7.2	0.0	2.1	16.1	3.4	4.0	0.45	0.73	61	82
Qmean	671	617	188	216	403	406	295	297	761	799

Appendix A. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Q_{01}	9630	9635	4590	4485	2490	2280	2078	1866	391	434
Q_{02}	7310	7335	3365	3310	1881	1766	1500	1382	241	280
Q_{05}	4470	4515	2040	2034	1132	1118	899	882	116	150
Q_{10}	2920	2975	1280	1300	647	687	536	574	64	96
Q_{15}	2140	2195	921	947	449	498	379	425	42	72
Q_{25}	1405	1455	584	610	270	318	230	275	24.2	52
Q_{40}	811	855	330	349	143	175	124	154	12.1	38
Q_{50}	562	602	222	238	95	119	83	105	6.0	31
Q_{60}	371	409	142	156	59	79	52	70	3.0	27.0
Q_{75}	170	202	60	65.2	23.8	29.0	21.2	25	0.8	22.9
Q_{85}	116	145	40	41.4	13.7	15.1	12.3	12.2	0.2	21.1
Q_{90}	95	122	31.1	30.2	10.0	9.1	9.0	6.7	0.0	19.6
Q_{95}	75	101	24.1	25.0	6.7	7.6	6.1	5.8	0.0	18.3
Q_{98}	62	84	19.0	22.1	3.5	6.6	3.2	5.2	0.0	16.1
Q_{99}	55	75	15.4	19.4	2.0	6.0	1.8	5.0	0.0	14.2
Q_{mean}	1203	1240	536	543	257	264	225	230	28.48	54.4
Low Flows										
Q1.2	93.5	113	30.8	31.5	7.3	8.0	6.6	6.5	0.0	13.6
$Q_{1,10}$	51	66	12.4	16.8	0.7	5.1	0.6	4.5	0.0	10.8
$Q_{1,25}$	41.4	55	9.0	12.7	0.2	3.9	0.2	3.7	0.0	10.4
$Q_{1.50}$	37.2	50	7.4	10.9	0.0	3.5	0.0	3.2	0.0	10.4
$Q_{7.2}$	97	124	33.1	33.6	8.4	8.9	7.6	6.8	0.0	19.3
$Q_{7.10}$	53	73	14.3	18.4	1.8	5.9	1.7	5.0	0.0	14.2
$Q_{7,25}$	45	64	10.5	14.6	0.5	4.6	0.5	4.0	0.0	13.6
$Q_{7,50}$	39.6	56	8.2	12.2	0.1	4.1	0.1	3.5	0.0	13.6
$Q_{15,2}$	103	130	36	36.1	9.4	9.5	8.5	7.2	0.0	19.6
$Q_{15,10}$	53.6	75	15.2	20.1	2.2	7.1	2.0	6.0	0.0	15.2
$Q_{15,25}$	46.3	66	11.4	15.9	0.8	5.3	0.7	4.5	0.0	13.9
$Q_{15,50}$	42.4	60	9.2	13.5	0.3	4.6	0.3	4.0	0.0	13.9
$Q_{31,2}$	110	138	41	39.2	12.4	10.6	11.3	8.0	0.01	20.2
$Q_{31,10}$	58.3	82	17.3	22.7	2.9	8.3	2.7	7.0	0.0	16.1
$Q_{31,25}$	49	69	12.4	17.3	1.1	6.0	1.0	5.0	0.0	14.2
$Q_{31,50}$	45.1	64	10.3	15.1	0.4	5.2	0.4	4.5	0.0	13.9
$Q_{61,2}$	121	150	47	44.3	16.2	13.5	14.6	10.4	0.11	21.3
$Q_{61,10}$	66	91	20.8	25.3	5.0	9.5	4.6	8.0	0.0	17.1
$Q_{61,25}$	55	77	15.2	19.2	2.6	6.6	2.4	5.5	0.0	15.2
$Q_{61,50}$	50	70	12.6	17.0	1.5	5.9	1.4	5.0	0.0	14.6
$Q_{91,2}$	138	168	56	53.5	20.9	18.4	18.9	14.8	0.36	22.5
$Q_{91,10}$	68	95	22.7	28.2	6.3	11.8	5.7	10.0	0.01	18.3
$Q_{9,1,25}$	57	81	17.0	21.0	3.8	7.8	3.5	6.5	0.0	16.1
$Q_{91,50}$	53	75	14.1	18.3	2.3	6.5	2.1	5.3	0.0	15.8

Appendix A. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Drought Flows										
$Q_{6,10}$	117	147	39	44.4	12.5	17.9	11.1	15.0	0.06	20.9
$Q_{6,25}$	94	121	29.4	32.7	8.0	11.3	7.1	9.0	0.0	19.3
$Q_{6,50}$	73	99	23.4	24.9	6.4	7.9	5.7	6.0	0.0	18.3
$Q_{9,10}$	211	242	72	70	35	33	30.4	26.2	3.4	26.0
$Q_{9,25}$	128	157	49	46.4	22.0	19.4	19.5	15.3	0.3	21.8
$Q_{9,50}$	95	123	35	32.2	13.6	10.8	12.2	7.9	0.17	20.7
$Q_{12,10}$	345	378	143	141	74	72	65	61	8.3	32.6
$Q_{12,25}$	224	255	80	77	38	35	34	29.7	1.2	24.3
$Q_{12,50}$	152	182	58	55	27.0	24.0	24.0	19.7	0.5	22.3
$Q_{18,\|10}$	402	436	181	179	93	91	81	77	7.5	32.8
$Q_{18,25}$	258	290	94	92	52	50	46	42	3.8	27.5
$Q_{18,50}$	210	241	70	68	33	31	29.0	24.7	1.5	24.1
$Q_{30,10}$	767	802	334	332	157	155	137	133	15.8	42
$Q_{30,25}$	364	397	155	152	85	82	74	70	6.8	31.5
$Q_{30,50}$	324	356	121	119	54	52	48	44	3.0	26.7
$Q_{54,10}$	1100	1138	452	450	209	207	183	179	19.1	47
$Q_{54,25}$	518	552	234	231	131	128	115	111	9.0	34.3
$Q_{5,50}$	362	396	162	160	79	77	69	65	5.9	30.6
January										
Q_{02}	7030	7066	3400	3330	1775	1705	1544	1471	135	175
Q_{10}	2410	2455	1179	1188	635	644	540	547	30.3	62
Q_{25}	1010	1054	486	510	274	298	231	253	11.2	39
Q_{50}	417	457	187	211	97	121	82	104	2.0	27.0
Q_{75}	134	164	54	58.3	27.7	32	24	27.1	0.0	21.0
Q_{90}	101	127	29.9	31.4	10.0	11.5	8.9	9.0	0.0	18.0
Q_{98}	59	80	17.4	21.9	4.0	8.5	3.6	7.0	0.0	14.9
Q_{mean}	982	1022	474	484	258	268	222	230	12.2	39.4
February										
Q_{02}	9400	9419	4010	3863	1943	1796	1620	1470	260	302
Q_{10}	3400	3447	1530	1539	701	710	603	610	51	84
Q_{25}	1770	1816	806	830	375	399	321	343	19.7	49
Q_{50}	681	723	322	346	165	189	141	163	9.1	35
Q_{75}	231	264	106	110	54	58	46	48	0.9	24.0
Q_{90}	120	149	43	47.4	18.8	23.2	16.1	19.0	0.0	20.0
Q_{98}	70	93	26.4	27.1	8.6	9.3	7.6	7.0	0.0	17.0
Q_{mean}	1512	1551	693	695	335	337	290	290	27.6	55.8
March										
Q_{02}	9510	9531	4620	4472	2690	2542	2151	2000	411	454
Q_{10}	4500	4550	2190	2200	1140	1150	954	961	109	144
Q_{25}	2340	2390	1068	1100	512	544	435	465	49	80
Q_{50}	1175	1221	535	567	257	289	224	254	18.2	46
Q_{75}	549	588	244	259	121	136	105	118	8.7	34
Q_{90}	250	287	124	139	68	83	59	72	3.0	27.0
Q_{98}	90	121	59	71	40	52	35	46	0.0	19.9
Q_{mean}	1966	2006	894	895	455	456	399	397	54.6	83.6

Appendix A. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
April										
Q_{02}	11540	11561	5900	5753	2955	2808	2563	2413	247	290
Q_{10}	4940	4990	2230	2247	1128	1145	976	991	89	123
Q_{25}	2960	3013	1293	1334	616	657	533	571	43	74
Q_{50}	1660	1707	687	719	311	343	271	301	21.6	50
Q_{75}	954	996	385	409	171	195	150	172	10.1	36
Q_{90}	532	570	209	224	100	115	87	100	3.3	28.0
Q_{98}	101	132	72	76	45	49	39	42	0.5	22.0
Q_{mean}	2418	2459	982	988	552	558	480	483	41.9	70.9
May										
Q_{02}	8720	8741	4340	4193	2261	2114	1795	1645	341	384
Q_{10}	3650	3699	1730	1748	985	1003	772	787	108	141
Q_{25}	1870	1922	870	919	445	494	371	417	41	70
Q_{50}	980	1024	451	478	230	257	198	223	18.1	45
Q_{75}	556	596	258	278	131	151	113	132	4.7	30
Q_{90}	355	389	167	167	84	84	73	72	0.7	25.0
Q_{98}	96	125	47	55	35	43	30	36	0.0	18.8
Q_{mean}	1890	1930	874	880	443	449	384	388	47.1	75.2
June										
Q_{02}	8680	8701	3820	3674	1710	1564	1502	1352	169	212
Q_{10}	3690	3741	1730	1756	849	875	735	758	47	80
Q_{25}	1870	1921	817	865	374	422	322	368	22.2	51
Q_{50}	954	996	378	402	164	188	141	163	7.1	33
Q_{75}	552	586	205	214	81	90	70	77	0.0	23.0
Q_{90}	351	375	129	114	49	34	42	25.0	0.0	19.0
Q_{98}	98	121	51	42	20.4	11.4	17.5	7.0	0.0	17.0
Q_{mean}	1706	1743	745	750	332	337	290	293	24.8	51
July										
Q_{02}	7090	7122	3220	3150	1643	1573	1376	1303	234	271
Q_{10}	2470	2521	987	1027	409	449	.344	382	47	77
Q_{25}	1190	1236	465	505	185	225	159	197	13.6	40
Q_{50}	635	673	230	246	87	103	75	89	0.0	25.0
Q_{75}	299	329	108	114	41	47	35	40	0.0	20.0
Q_{90}	133	157	48	40.9	19.5	12.4	17.0	8.3	0.0	18.0
Q_{98}	81	102	28.3	29.3	6.5	7.5	5.7	5.5	0.0	14.0
Q_{mean}	1127	1162	470	477	196	203	171	177	20.6	44.9
August										
Q_{02}	4920	4950	2880	2812	1640	1572	1449	1378	173	208
Q_{10}	1190	1234	516	540	241	265	212	234	61	89
Q_{25}	530	571	188	217	66	95	58	85	11.5	36
Q_{50}	223	255	79	80	29.0	30	25.6	25.0	0.4	23.0
Q_{75}	128	156	45	41.4	15.9	12.3	14.1	9.0	0.0	21.2
Q_{90}	108	132	33	33.1	8.6	8.7	7.7	6.5	0.0	17.0
Q_{98}	62	85	20.8	22.7	4.5	6.4	4.1	5.0	0.0	16.1
Q_{mean}	669	703	284	293	136	145	120	127	22.0	44.8

Appendix A. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
September										
Q_{02}	2490	2534	902	910	394	402	630	636	248	279
Q_{10}	750	790	272	288	97	113	130	144	45	71
Q_{25}	245	280	82	96	35	49	31	43	7.2	30
Q_{50}	132	161	41	38.9	15.1	13.0	13.7	10.0	2.8	24.0
Q_{75}	113	140	33.5	34.3	9.0	9.8	8.1	7.5	0.0	19.6
Q_{90}	89	112	22.1	24.9	4.3	7.1	3.9	5.5	0.0	16.0
Q_{98}	43	63	10.5	15.1	0.8	5.4	0.7	4.5	0.0	14.2
Q_{mean}	342	374	124	128	46	50	45	48	22.4	44.4
October										
Q_{02}	3180	3227	1500	1510	563	573	1058	1065	124	157
Q_{10}	832	873	350	366	168	184	313	327	36	63
Q_{25}	407	445	146	164	53	71	80	96	12.1	36
Q_{50}	131	160	43	39.4	16.7	13.1	15.1	10.0	0.8	22.0
Q_{75}	107	134	32.1	32.2	8.8	8.9	8.0	6.8	0.0	19.4
Q_{90}	88	112	21.7	24.7	3.9	6.9	3.6	5.5	0.0	17.1
Q_{98}	44	63	11.2	15.6	1.0	5.4	0.9	4.5	0.0	13.6
Q_{mean}	431	463	181	187	74	80	89	94	15.6	37.6
November										
Q_{02}	3170	3210	1305	1284	723	702	1560	1536	161	194
Q_{10}	1060	1102	444	461	235	252	489	503	59	87
Q_{25}	469	507	190	202	93	105	129	139	18.7	44
Q_{50}	132	166	64	75	35	46	31	40	4.4	27.0
Q_{75}	111	139	38	36.6	14.4	13.0	12.9	10.0	0.0	20.6
Q_{90}	92	116	26.2	27.3	7.9	9.0	7.2	7.0	0.0	18.3
Q_{98}	55	74	16.0	18.9	3.3	6.2	3.0	5.0	0.0	14.2
Q_{mean}	397	433	169	176	94	101	114	119	22.7	47.6
December										
Q_{02}	3120	3156	1975	1909	1349	1283	1558	1488	269	308
Q_{10}	1100	1143	618	627	410	419	592	599	78	108
Q_{25}	483	523	255	273	148	166	305	321	28.2	54
Q_{50}	136	173	88	106	56	74	73	89	7.3	31
Q_{75}	111	140	41	40.5	16.7	16.2	15.0	13.0	0.8	22.0
Q_{50}	94	120	27.4	27.6	9.1	9.3	8.1	7.0	0.0	19.0
Q_{98}	56	77	13.8	16.8	3.8	6.8	3.4	5.5	0.0	15.8
Q_{mean}	730	768	341	345	174	178	230	232	30.4	57.6

Appendix A. Continued

Flow type	Location (31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Q_{01}	1609	750	1845	1588	6000	5910	5232	5081	1557	1398
Q_{02}	1161	504	1275	1051	4640	4560	3666	3583	955	865
Q_{05}	646	270	729	622	2770	2730	1996	1988	403	389
Q_{10}	401	156	440	382	1580	1550	1076	1090	201	210
Q_{15}	289	109	310	255	1080	1080	707	724	129	141
Q_{25}	172	63	168	113	581	577	383	400	68	80
Q_{40}	95	34	78	23.3	287	277	177	188	31	37
Q_{50}	62	22.0	54	1.0	171	165	110	117	18.6	21.5
Q_{60}	40	12.0	35	0.0	100	96	64	70	10.4	11.9
Q_{75}	15.0	2.7	15.0	0.0	39	29.0	23.1	23.5	3.0	0.0
Q_{85}	8.9	0.35	7.5	0.0	19.0	7.6	7.8	10.1	0.6	0.0
Q_{90}	6.7	0.0	3.6	0.0	10.0	2.6	4.3	6.8	0.1	0.0
Q_{95}	4.8	0.0	0.6	0.0	4.6	0.0	1.4	3.6	0.0	0.0
Q_{98}	3.4	0.0	0.1	0.0	2.3	0.0	0.8	2.4	0.0	0.0
Q_{99}	2.4	0.0	0.0	0.0	1.4	0.0	0.4	1.7	0.0	0.0
Q_{mean}	166.9	68.5	178	130	597	587.7	452	453	101.9	99
Low Flows										
$Q_{1,2}$	6.0	0.0	0.1	0.0	7.0	0.8	1.7	3.1	0.0	0.0
$Q_{1,10}$	2.5	0.0	0.0	0.0	0.75	0.0	0.0	0.7	0.0	0.0
$Q_{1,25}$	1.3	0.0	0.0	0.0	0.45	0.0	0.0	0.8	0.0	0.0
$Q_{1,50}$	0.8	0.0	0.0	0.0	0.36	0.0	0.0	0.8	0.0	0.0
$Q_{7,2}$	7.2	0.0	0.3	0.0	8.0	3.0	4.0	6.4	0.16	0.0
$Q_{7,10}$	3.0	0.0	0.0	0.0	0.9	0.0	0.4	1.7	0.0	0.0
$Q_{7,25}$	1-35	0.0	0.0	0.0	0.54	0.0	0.0	1.3	0.01	0.0
$Q_{7,50}$	0.9	0.0	0.0	0.0	0.45	0.0	0.0	1.3	0.0	0.0
$Q_{15,2}$	8.2	0.1	0.5	0.0	11.0	3.4	5.6	7.8	0.35	0.0
$Q_{15,10}$	3.8	0.0	0.0	0.0	1.2	0.0	0.6	2.0	0.0	0.0
$Q_{15,25}$	1.5	0.0	0.0	0.0	0.72	0.0	0.1	1.3	0.0	0.0
$Q_{15,50}$	1.1	0.0	0.0	0.0	0.6	0.0	0.0	1.2	0.0	0.0
$Q_{31,2}$	9.5	0.6	2.2	0.0	15.0	4.0	8.5	10.6	0.7	0.0
$Q_{31,10}$	4.0	0.0	0.0	0.0	1.7	0.9	0.8	2.5	0.0	0.0
$Q_{31,25}$	1.8	0.0	0.0	0.0	1.0	0.0	0.2	1.5	0.0	0.0
$Q_{31,50}$	1.4	0.0	0.0	0.0	0.8	0.0	0.0	1.3	0.0	0.0
$Q_{61,2}$	10.8	1.3	4.2	0.0	24.0	16.0	13.9	15.7	1.4	0.0
$Q_{61,10}$	4.6	0.2	0.0	0.0	3.0	2.1	1.2	3.2	0.0	0.0
$Q_{61,,25}$	2.4	0.0	0.0	0.0	2.0	1.6	0.4	1.8	0.0	0.0
$Q_{61,50}$	1.8	0.0	0.0	0.0	1.7	0.0	0.2	1.6	0.0	0.0
$Q_{91,2}$	13.0	3.9	5.3	0.0	39	24.0	26.3	26.3	3.4	0.0
$Q_{91,10}$	5.4	0.4	0.1	0.0	4.5	3.1	2.9	5.2	0.02	0.0
$Q_{91,25}$	2.8	0.0	0.0	0.0	2.7	2.2	1.2	2.9	0.0	0.0
$Q_{91,50}$	2.1	0.0	0.0	0.0	2.4	0.4	0.6	2.1	0.0	0.0

Appendix A. Continued

Flow type	Location (31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Drought Flows										
$Q_{6,10}$	8.6	1.9	7.8	0.0	14.0	10.0	7.4	9.8	0.75	0.0
$Q_{6,25}$	4.6	0.5	3.3	0.0	7.2	3.9	3.2	5.7	0.14	0.0
$Q_{6,50}$	3.6	0.1	1.4	0.0	5.0	3.3	2.0	4.2	0.03	0.0
$Q_{9,10}$	18.0	5.7	26.0	0.1	45	33	22.9	22.0	4.4	0.0
$Q_{9,25}$	8.2	2.0	14.0	0.0	22.0	17.0	13.6	14.2	2.7	0.0
$Q_{9.50}$	6.0	0.4	5.8	0.0	13.0	10.0	10.0	10.9	2.1	0.0
$Q_{12,10}$	41	14.0	56	15.0	126	107	84	82	17.1	11.2
$Q_{12,25}$	13.0	6.0	35	2.3	66	38	30	28.0	6.2	0.4
$Q_{12,50}$	8.0	2.0	7.7	0.0	34	18.0	15.5	15.2	3.7	0.0
$Q_{18,10}$	68	21.0	59	20.0	180	150	120	118	25.9	20.0
$Q_{18,25}$	19.0	9.0	36	1.6	91	42	49	47	10.5	4.6
$Q_{18,50}$	8.0	4.0	8.4	0.0	49	17.0	25.0	22.8	5.7	0.0
$Q_{30,10}$	96	33	109	70	285	250	218	216	48	42
$Q_{30,25}$	40	16.0	79	40	190	150	97	95	20.6	14.6
$Q_{30,50}$	26.0	8.0	32	9.0	120	65	45	43	9.6	3.7
$Q_{54,10}$	130	55	145	100	500	460	399	397	88	82
$Q_{54,25}$	67	31	100	55	310	255	154	152	33	27.0
$Q_{54,50}$	39	17.0	70	40	180	120	97	95	22.1	16.1
January										
Q_{02}	1135	449	1619	842	5090	5090	4149	4095	1145	1084
Q_{10}	381	131	446	310	1750	1750	1119	1121	200	197
Q_{25}	150	56	161	97	590	590	409	416	74	77
Q_{50}	66	23.0	58	11.5	200	197	142	149	25.6	28.5
Q_{75}	18	3.8	12.7	0.0	33	28.0	20.1	20.7	2.8	0.0
Q_{90}	5.3	0.0	3.9	0.0	12.0	0.0	5.0	7.2	0.35	0.0
Q_{98}	2.5	0.0	0.1	0.0	4.0	0.0	1.0	3.1	0.0	0.0
Q_{mean}	153	58	191	113	650	646	473	474	111	108
February										
Q_{02}	1350	594	1807	1359	5000	5000	4355	4244	1264	1145
Q_{10}	472	188	819	551	2490	2490	1661	1664	269	266
Q_{25}	239	92	391	260	1040	1040	722	730	129	132
Q_{50}	110	36	133	45	380	378	255	263	45	48
Q_{75}	38	9.5	32	0.0	76	55	48	47	8.1	3.5
Q_{90}	7.4	0.6	8.1	0.0	29	0.0	9.6	11.5	1.3	0.0
Q_{98}	4.4	0.0	0.3	0.0	7.0	0.0	2.3	4.6	0.05	0.0
Qmean	213	83	311	207	884	873	651	650	142	136
March										
Q_{02}	1255	639	2503	1571	5600	5600	4782	4671	1432	1313
Q_{10}	601	243	1016	667	2700	2700	1754	1757	309	306
Q_{25}	320	119	495	346	1230	1230	835	846	152	158
Q_{50}	161	58	232	109	544	544	382	392	71	77
Q_{75}	77	29	95	0.0	243	237	178	181	33	32
Q_{90}	40	15.0	33	0.0	102	75	58	61	10.4	9.8
Q_{98}	7.2	0.2	3.4	0.0	20.0	0.0	6.3	7.9	1.5	0.0
Q_{mean}	260	112	441	253	1056	1050	769	768	170	164

Appendix A. Continued

Flow type	Location									
	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
April										
Q_{02}	1535	794	2448	1473	5080	5080	4317	4205	1258	1139
Q_{10}	600	291	867	661	2590	2590	1798	1804	312	312
Q_{2S}	336	146	437	369	1270	1270	878	892	152	161
Q_{50}	173	67	187	151	527	527	376	387	68	74
Q_{75}	104	34	80	40	270	268	190	197	35	38
Q_{90}	57	18.0	34	0.0	132	123	86	90	14.5	13.9
Q_{98}	18.9	0.3	0.8	0.0	52	0.0	29.0	28.0	5.0	1.0
Q_{mean}	297	136	401	291	1044	1039	812	813	177	173
May										
Q_{02}	2060	824	1979	1437	4940	4940	4705	4594	1231	1112
Q_{10}	631	259	716	539	1840	1840	1855	1861	342	342
Q_{25}	290	121	321	262	830	828	685	702	124	136
Q_{50}	141	54	123	81	362	360	290	298	52	56
Q_{75}	78	27.0	59	13.0	186	183	137	143	25.2	27.0
Q_{90}	55	16.0	18.9	0.0	121	118	86	84	15.3	9.5
Q_{98}	10.9	0.4	0.0	0.0	28.0	9.2	9.9	11.8	1.2	0.0
Q_{mean}	300	130	313	229	796	793	713	715	153	150
June										
Q_{02}	1290	758	1343	980	5000	5000	4009	3898	1034	915
Q_{10}	477	167	420	336	1930	1930	1424	1433	258	261
Q_{25}	234	77	190	137	804	803	645	661	118	130
Q_{50}	110	34	82	29.0	304	303	251	258	47	50
Q_{75}	52	15.0	46	0.0	124	118	92	94	16.2	14.5
Q_{90}	34	6.7	18.1	0.0	72	69	50	44	8.7	0.0
Q_{98}	16.9	1.5	0.0	0.0	28	2.5	22.5	21.4	3.9	0.0
Q_{mean}	225	94	199	135	764	760	604	605	134	131
July										
Q_{02}	919	350	617	497	2950	2950	2266	2212	517	456
Q_{10}	270	88	153	141	1040	1040	681	695	102	111
Q_{25}	118	39	63	16.0	372	371	235	249	38	47
Q_{50}	52	14.0	35	0.0	141	139	92	96	15.5	15.4
Q_{75}	26.0	4.1	14.1	0.0	51	50	32	33	4.7	2.4
Q_{90}	13.0	0.7	0.0	0.0	15.0	14.0	5.6	8.3	0.05	0.0
Q_{98}	6.7	0.0	0.0	0.0	1.0	1.0	0.5	2.4	0.0	0.0
Q_{mean}	131	46	83	48	424	423	307	309	67	65
August										
Q_{02}	610	240	406	319	1890	1890	1343	1317	271	239
Q_{10}	128	47	78	42	670	670	454	461	97	100
Q_{25}	49	16.0	42	0.0	207	205	125	134	20.7	25.4
Q_{50}	18.0	3.8	17.3	0.0	52	52	31	32	4.1	1.3
Q_{75}	10.0	0.5	0.0	0.0	17.1	16.0	8.0	10.5	0.24	0.0
Q_{90}	7.4	0.0	0.0	0.0	6.0	5.4	1.9	4.4	0.0	0.0
Q_{98}	3.7	0.0	0.0	0.0	0.9	0.0	0.3	1.9	0.0	0.0
Q_{mean}	77	28.6	54	28.0	276	276	194	196	40	39

Appendix A. Continued

Flow type	Location									
	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
September										
Q_{02}	503	269	467	310	1970	1970	1251	1242	290	276
Q_{10}	94	32	69	1.0	302	302	139	143	20.3	20.3
Q_{25}	23.0	8.0	33	0.0	68	68	35	37	4.0	3.2
Q_{50}	11.0	1.0	13.5	0.0	22.0	21.0	11.4	13.5	0.9	0.0
Q_{75}	6.9	0.0	0.0	0.0	5.1	4.8	2.4	4.9	0.0	0.0
Q_{90}	4.5	0.0	0.0	0.0	1.1	1.0	0.4	2.3	0.0	0.0
Q_{98}	1.5	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
Q_{mean}	46	22.7	51	26.0	219	218	118	118	27.7	24.0
October										
Q_{02}	698	224	405	223	1990	1990	1033	1036	182	179
Q_{10}	135	58	78	21.0	437	437	239	243	40	40
Q_{25}	41	13.0	37	0.0	124	123	81	86	13.5	14.1
Q_{50}	12.0	1.7	16.4	0.0	24.0	21.0	13.6	15.2	1.5	0.0
Q_{75}	7.0	0.01	3.8	0.0	4.2	3.6	1.9	4.4	0.0	0.0
Q_{90}	4.5	0.0	0.0	0.0	1.6	1.2	0.7	2.5	0.0	0.0
Q_{98}	2.1	0.0	0.0	0.0	0.1	0.0	0.0	1.2	0.0	0.0
Q_{mean}	68	23.7	57	25.0	226	224	142	142	32	29.0
November										
Q_{02}	620	251	873	417	2430	2430	1579	1571	346	332
Q_{10}	180	73	211	75	862	862	489	493	86	86
Q_{25}	75	34	59	0.0	283	281	154	156	26.9	25.2
Q_{50}	22.0	7.0	19.1	0.0	63	57	37	38	4.9	3.2
Q_{75}	8.0	0.6	6.4	0.0	16.0	10.0	7.3	9.7	0.45	0.0
Q_{90}	4.8	0.0	0.2	0.0	4.2	1.0	1.0	3.3	0.0	0.0
Q_{98}	2.4	0.0	0.0	0.0	1.0	0.0	0.1	1.4	0.0	0.0
Q_{mean}	84	30.6	100	39	328	324	204	205	42.3	39
December										
Q_{02}	958	400	1200	1238	4850	4850	3902	3877	1000	968
Q_{10}	382	130	360	419	1690	1690	1130	1132	205	202
Q_{25}	155	55	112	110	602	602	368	373	65	66
Q_{50}	36	18.0	27.1	0.0	134	131	82	86	15.2	15.8
Q_{75}	11.0	1.0	8.6	0.0	33	20.0	17.3	18.4	2.1	0.0
Q_{90}	4.5	0.0	3.2	0.0	10.0	0.0	2.5	5.0	0.0	0.0
Q_{98}	2.5	0.0	0.0	0.0	2.1	0.0	0.3	1.9	0.0	0.0
Q_{mean}	153	59	149	150	610	606	438	438	102	97

Appendix A. Continued

Flow type	Location							
	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
Q_{01}	142	899	562	2275	910	1890	1892	1730
Q_{02}	80	535	348	1543	680	1290	1292	1160
Q_{05}	28	218	192	865	420	760	761	637
Q_{10}	9.7	92	117	542	245	454	455	400
Q_{15}	5.6	49	80	396	168	327	328	295
Q_{25}	2.8	21.1	52	241	103	193	194	180
Q_{40}	1.2	8.4	26.6	131	56	101	102	99
Q_{50}	0.6	4.7	16	84	36	62	63	64
Q_{60}	0.26	2.5	7.8	51	21	36	37	39
Q_{75}	0.0	0.65	0.0	18.2	5.5	11.6	12.4	13.7
Q_{85}	0.0	0.13	0.0	10	0.8	5.2	5.9	6.6
Q_{90}	0.0	0.01	0.0	7.4	0.25	3.0	3.7	4.4
Q_{95}	0.0	0.0	0.0	5.0	0.07	1.2	1.8	2.2
Q_{98}	0.0	0.0	0.0	3.2	0.0	0.25	0.58	1.2
Q_{99}	0.0	0.0	0.0	2.0	0.0	0.1	0.23	0.6
Q_{mean}	7.7	50.4	48.9	231	91.2	188	189	174
Low Flows								
$Q_{1,2}$	0.0	0.0	0.0	6.5	0.0	0.6	1.0	2.7
$Q_{1,10}$	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.7
$Q_{1,25}$	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.3
$Q_{1,50}$	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.15
$Q_{7,2}$	0.0	0.02	0.0	7.3	0.05	1.0	1.7	3.6
$Q_{7,10}$	0.0	0.0	0.0	3.0	0.0	0.01	0.14	0.8
$Q_{7,25}$	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.4
$Q_{7,50}$	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2
$Q_{15,2}$	0.0	0.05	0.0	8.1	0.1	1.6	2.3	4.6
$Q_{15,10}$	0.0	0.0	0.0	3.6	0.0	0.21	0.37	1.0
$Q_{15,25}$	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.55
$Q_{15,50}$	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.3
$Q_{31,2}$	0.03	0.21	0.0	9.1	0.18	2.5	3.2	5.0
$Q_{31,10}$	0.0	0.0	0.0	4.5	0.0	0.4	0.87	1.3
$Q_{31,25}$	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.75
$Q_{31,25}$	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.45
$Q_{31,50}$	0.13	0.82	0.0	12	0.75	5.1	5.9	7.0
$Q_{61,10}$	0.0	0.0	0.0	6.0	0.0	1.1	2.6	2.1
$Q_{61,25}$	0.0	0.0	0.0	2.4	0.0	0.01	0.43	1.3
$Q_{61,50}$	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.8
$Q_{91,2}$	0.2	2.0	0.0	16	2.2	9.6	10.4	9.8
$Q_{91,10}$	0.0	0.06	0.0	5.0	0.05	1.5	2.1	2.8
$Q_{91,25}$	0.0	0.0	0.0	2.8	0.0	0.3	0.77	1.7
$Q_{9,50}$	0.0	0.0	0.0	1.9	0.0	0.01	0.46	1.1

Appendix A. Continued

Flow type	Location							
	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
Drought Flows								
$Q_{6,10}$	0.06	0.98	0.0	16	0.37	7.2	7.9	8.2
$Q_{6,25}$	0.02	0.29	0.0	6.5	0.29	1.5	2.2	4.3
$Q_{6,50}$	0.0	0.08	0.0	3.5	0.26	0.6	1.2	2.2
$Q_{9,10}$	0.22	4.9	0.0	41	6.2	26	26.9	26
$Q_{9,25}$	0.09	2.2	0.0	18.6	2.1	7.8	8.6	15
$Q_{9,50}$	0.04	1.1	0.0	9.3	1.1	2.1	2.9	6.8
$Q_{12,10}$	1.0	10.2	4.5	80	18	53	54	46
$Q_{12,25}$	0.4	4.9	0.0	38	11	31	32	30
$Q_{12,50}$	0.2	2.9	0.0	24	7.0	10	10.8	14
$Q_{18,10}$	1.7	13.2	7.5	110	28	96	97	52
$Q_{18,25}$	0.6	6.5	0.8	56	13	39	40	31
$Q_{18,50}$	0.3	4.0	0.0	48	8.5	16.2	17.1	29
$Q_{30,10}$	3.7	22.4	16.6	146	53	108	109	100
$Q_{30,25}$	0.9	11.7	6.0	80	28	54	55	54
$Q_{30,50}$	0.6	7.7	2.0	60	16	33	34	46
$Q_{54,10}$	4.3	40	34	210	89	170	171	120
$Q_{54,25}$	1.4	22.5	16.74	120	41	75	76	74
$Q_{54,50}$	1.1	15.7	10	80	36	67	68	54
January								
Q_{02}	107	717	593	1689	780	1265	1267	1277
Q_{10}	15.2	136	136	487	250	618	619	356
Q_{25}	4.4	30	42	213	82	200	201	160
Q_{50}	1.0	6.9	18.9	90	30	87	88	70
Q_{75}	0.0	2.0	0.0	29.4	1.1	34	35	24.7
Q_{90}	0.0	0.1	0.0	7.3	0.07	3.8	4.4	5.8
Q_{98}	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.2
Q_{mean}	10	67	66	223	92.7	215	216	169
February								
Q_{02}	121	898	649	1926	840	1818	1820	1468
Q_{10}	19.4	189	189	636	290	598	599	452
Q_{25}	6.1	50	62	300	141	270	271	221
Q_{50}	2.3	15	27	129	41.5	115	116	100
Q_{75}	0.4	4.9	0.8	51	6.6	51	52	41
Q_{90}	0.0	1.3	0.0	12.3	0.42	6.7	7.4	9.3
Q_{98}	0.0	0.1	0.0	4.8	0.12	2.9	3.2	3.5
Q_{mean}	10.9	87	81	283	128.1	260	261	212
March								
Q_{02}	136	906	657	2192	720	1179	1181	1551
Q_{10}	27.6	231	230	824	390	603	604	601
Q_{25}	7.4	68	86	451	184	323	324	330
Q_{50}	3.3	25.9	44.2	220	86	169	170	161
Q_{75}	1.4	10.7	15.3	109	29	81	82	81
Q_{90}	0.5	5.1	9.7	57	14	47	48	43
Q_{98}	0.0	1.0	0.2	23	1.84	19	19.8	17.7
Q_{mean}	12.7	99	91	391	155.3	257	258	289

Appendix A. Continued

Flow type	Location							
	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
April								
Q_{02}	126	779	530	2409	900	1575	1577	1760
Q_{10}	18.4	179	185	912	400	628	629	650
Q_{25}	5.8	54	79	518	205	377	378	372
Q_{50}	2.2	19.3	37	285	112	205	206	204
Q_{75}	1.0	8.6	20.6	147	54	107	108	110
Q_{90}	0.4	4.1	8.6	90	28	60	61	70
Q_{98}	0.0	1.3	0.0	32	7.4	33	34	25.5
Q_{mean}	10.9	88	86	466	183.2	343	344	340
May								
Q_{02}	83	563	314	1964	720	1852	1854	1511
Q_{10}	8.2	81	87	730	275	628	629	541
Q_{25}	3.0	24	55	388	132	268	269	290
Q_{50}	0.16	9	23.5	196	70	141	142	145
Q_{75}	0.77	3.8	12.8	111	39	87	88	83
Q_{90}	0.15	1.7	0.0	66	23.3	55	56	49
Q_{98}	0.0	0.3	0.0	34	10	35	36	26.6
Q_{mean}	7.35	52.1	51.8	360	134.3	288	289	271
June								
Q_{02}	139	431	181	2006	800	1419	1421	1526
Q_{10}	11.3	56	68	615	290	421	422	440
Q_{25}	2.4	14.2	44.6	291	130	219	220	212
Q_{50}	0.65	4.3	11.3	138	50	84	85	104
Q_{75}	0.15	1.4	4.5	71	23.6	46	47	54
Q_{90}	0.0	0.4	0.0	42	12.1	24	24.9	32
Q_{98}	0.0	0.0	0.0	15.7	1.8	8.5	9.3	10.7
Q_{mean}	14.4	44.4	44	301	117.4	237	238	224
July								
Q_{02}	54	315	190	1177	560	962	964	894
Q_{20}	3.6	33	58	362	160	240	241	273
Q_{25}	0.9	6.2	27.3	165	63	108	109	126
Q_{50}	0.28	1.7	6.1	70	22	42	43	50
Q_{75}	0.0	0.4	2.3	32	6.6	15.6	16.5	21.7
Q_{90}	0.0	0.1	0.0	16.2	0.54	9.7	10.5	8.8
Q_{98}	0.0	0.0	0.0	4.6	0.0	0.5	1.1	2.0
Q_{mean}	4.8	29.3	31.5	168	69.7	148	149	127
August								
Q_{02}	42	133	70	738	550	521	522	450
Q_{10}	29	13.4	25.5	177	80	77	78	138
Q_{25}	0.6	2.7	14	58	18.7	31	32	42
Q_{50}	0.1	0.7	1.3	24.7	2.1	12	12.9	16.8
Q_{75}	0.0	0.1	0.0	12.2	0.19	5.2	6.0	7.8
Q_{90}	0.0	0.0	0.0	6.6	0.0	2.2	2.9	4.0
Q_{98}	0.0	0.0	0.0	2.6	0.0	0.1	0.6	1.0
Q_{mean}	3.7	15.9	18.7	117	42.3	64	65	79

Appendix A. Continued

Flow type	Location (41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)
September								
Q_{02}	20	104	79	827	160	526	527	633
Q_{10}	1.5	10.2	16	130	31	72	73	93
Q_{25}	0.2	2.0	6.1	32	6.2	16.7	17.6	19.7
Q_{50}	0.0	0.3	0.0	13.6	0.48	6.6	7.4	8.5
Q_{75}	0.0	0.0	0.0	5.9	0.04	2.8	3.5	3.1
Q_{90}	0.0	0.0	0.0	3.2	0.0	1.0	1.3	1.4
Q_{98}	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.4
Q_{mean}	2.1	10.4	8.1	84	14.7	31	31.8	64
October								
Q_{02}	8.5	116	116	694	290	665	666	516
Q_{10}	1-3	11.4	17.2	193	74	178	179	139
Q_{25}	0.3	2.8	6.2	53	19	27	27.9	36
Q_{50}	0.0	0.5	0.0	13.3	0.9	7.3	8.1	8.8
Q_{75}	0.0	0.0	0.0	6.0	0.07	2.3	3.0	3.3
Q_{90}	**0.0**	0.0	0.0	3.2	0.0	0.9	1.4	1.45
Q_{98}	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.3
Q_{mean}	2.9	13.6	12.5	82	30	58	59	60
November								
Q_{02}	26	317	292	973	160	982	983	744
Q_{10}	4.6	45	51	352	70	281	282	238
Q_{25}	1.4	9.7	11.8	116	28	74	75	89
Q_{50}	0.2	2.3	1.5	30	7.0	19	19.9	16.8
Q_{75}	0.0	0.3	0.0	10.7	0.14	6.5	7.2	5.6
Q_{90}	0.0	0.0	0.0	4.9	0.0	3.0	3.3	3.2
Q_{98}	0.0	0.0	0.0	2.2	0.0	0.0	0.0	1.2
Q_{mean}	2.4	28.7	26.4	119	25.8	84	85	94
December								
Q_{02}	94	531	468	1370	610	1135	1137	1043
Q_{10}	10.8	129	128	519	170	485	.486	421
Q_{25}	2.5	25.8	32.8	204	61	199	200	165
Q_{50}	0.76	7.3	14.3	53	13.5	52	52.9	40
Q_{75}	0.0	1.6	0.0	11.9	0.18	8.6	9.4	8.8
Q_{90}	0.0	0.2	0.0	5.3	0.0	2.0	2.6	3.3
Q_{98}	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.2
Q_{mean}	9.6	58	53	206	67.7	195	196	165

Note: Streamflow values published by the U.S. Geological Survey ordinarily have 3 significant digits for values greater than or equal to 100 cfs, and 2 significant digits for values less than 100 cfs. Additional significant digits have been added to some streamflow frequency estimates in this appendix when used by ILSAM to estimate relative differences in flow values, either between virgin and present flow conditions, or between flows at two different locations. The additional digits do not indicate an improvement in the accuracy of the streamflow estimates.

Appendix B. Withdrawals and Effluent Discharges: Location and Estimated 1997 Flow

Facility	Stream name	Code	Mile
1) Assumption STP	Big George Branch	IKRN	6.3
2) Athens STP	Tributary of Kickapoo Creek	IEGH	2.8
3) Atlanta STP	Town Branch	IF7	2.6
4) Auburn STP	Sugar Creek	IJ	29.4
5) Bloomington-Normal SD	Sugar Creek	IED	49.0
6) Blue Mound STP	Tributary of Mosquito Creek	IMQ	1.4
7) Borden Chemicals and Plastics	Tributary of Long Point Slough	IM2D	3.0
8) Cerro Gordo STP	Tributary of Sangamon River	IP9	3.6
9) Clinton SD STP	Coon Creek	IEQ	4.6
10)Danvers STP	West Fork Sugar Creek	IEDK	26.7
11) Decatur SD Main STP	Stevens Creek	IO	0.1
12) Divernon STP	Brush Creek	IKCF	11.7
13) Edinburg WTP	Tributary of South Fork Sangamon	IKI	2.5
14) Farmer City STP	Salt Creek	IE	96.7
15) Fisher STP	Owl Creek	IW	0.6
16) Gibson City STP	Drummer Creek	IX	7.9
17) Harristown STP	Tributary of Sangamon River	IM7	4.6
18) Heyworth STP	Kickpoo Creek	IEG	37.5
19) Hospital Sisters St. Francis	Sangamon River	I	82.8
20) Illiopolis WTP	Tributary of Long Point Slough	IM2D	1.3
21) Kincaid STP	South Fork Sangamon River	IK	38.4
22)Leroy STP	North Fork Salt Creek	IES	19.4
23) Lincoln STP	Salt Creek	IE	28.2
24) Mahomet STP	Sangamon River	I	185.2
25) Maroa STP	North Fork Lake Fork	IEI	44.6
26) Monticello WTP	Sangamon River	I	162.5
27) Morrisonville STP	Tributary of Bear Creek	IKNM	2.2
28) Moweaqua STP	Flat Branch	IKR	18.8
29) Nestle Beich, Inc, -Bloomington	Tributary of Sugar Creek	IEDT	3.7
30) Niantic STP	Tributary of South Fork Sangamon	IM2J	1.6
31) Petersburg STP	Sangamon River	I	45.5
32) Pleasant Plaines WTP	Richland Creek	IG	14.2
33) Riverton STP	Sangamon River	I	82.8
34) Sangamon Valley STP	Tributary of Sangamon River	IU	2.4
35) Springfield SD Spring Creek	Spring Creek	IH	2.2
36) Springfield SD Sugar Creek	Sugar Creek	IJ	8.3
37) Taylorville SD STP	Panther Creek	IKM8	2.6
38) Taylorville WTP	South Fork Sangamon River	IK	55.1
39) Virden East STP	Brush Creek	IKCF	19.0
40) Virden North STP	Sugar Creek	IJ	38.6
41) Warrensburg STP	Tributary of South Fork Lake Fork	IEILK	4.4
42) Decatur PWS withdrawal	Sangamon River	I	130.9
43) Taylorville PWS withdrawal	South Fork Sangamon River	IK	59.1
44) Springfield PWS net withdrawal	Sugar Creek	IJ	8.5

Notes:

Stream codes are as listed in appendix C
PWS - Public Water Supply
SD - Sanitary District
STP - Sanitary Treatment Plant
WTP - Wastewater Treatment Plant

Appendix B. Continued

Flow type	Location									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Q_{01}	2.04	0.57	0.41	1.96	42.67	0.27	1.50	0.37	3.75	0.56
Q_{02}	1.80	0.51	0.38	1.72	38.87	0.24	1.39	0.33	3.36	0.49
Q_{05}	1.52	0.45	0.36	1.45	34.45	0.20	1.26	0.29	2.91	0.41
Q_{10}	1.34	0.41	0.34	1.27	31.61	0.18	1.17	0.27	2.61	0.35
Q_{15}	1.21	0.38	0.33	1.16	29.71	0.17	1.11	0.25	2.42	0.32
Q_{25}	1.09	0.36	0.31	1.04	27.82	0.15	1.06	0.24	2.23	0.29
Q_{40}	0.97	0.33	0.30	0.92	25.92	0.14	1.00	0.22	2.03	0.25
Q_{50}	0.91	0.32	0.29	0.86	24.97	0.13	0.97	0.21	1.93	0.23
Q_{60}	0.85	0.30	0.29	0.80	24.02	0.13	0.94	0.20	1.84	0.22
Q_{75}	0.73	0.28	0.28	0.69	22.13	0.11	0.89	0.19	1.64	0.18
Q_{85}	0.65	0.26	0.27	0.61	20.87	0.10	0.85	0.18	1.51	0.16
Q_{90}	0.57	0.24	0.26	0.53	19.60	0.09	0.81	0.17	1.38	0.14
Q_{95}	0.48	0.22	0.25	0.45	18.34	0.08	0.77	0.15	1.25	0.11
Q_{98}	0.34	0.19	0.24	0.31	16.13	0.07	0.71	0.14	1.03	0.07
Q_{99}	0.22	0.16	0.22	0.19	14.23	0.05	0.65	0.12	0.83	0.04
Q_{mean}	0.97	0.33	0.30	0.92	25.92	0.14	1.00	0.22	2.03	0.25
Low Flows										
$Q_{1,2}$	0.18	0.16	0.22	0.16	13.60	0.05	0.63	0.11	0.77	0.03
$Q_{1,10}$	0.00	0.12	0.20	0.00	10.76	0.03	0.55	0.09	0.47	0.00
$Q_{1,25}$	0.00	0.11	0.20	0.00	10.44	0.02	0.54	0.09	0.44	0.00
$Q_{1,50}$	0.00	0.11	0.20	0.00	10.44	0.02	0.54	0.09	0.44	0.00
$Q_{7,2}$	0.54	0.24	0.26	0.51	19.29	0.09	0.80	0.16	1.35	0.13
$Q_{7,10}$	0.22	0.16	0.22	0.19	14.23	0.05	0.65	0.12	0.83	0.04
$Q_{7,25}$	0.18	0.16	0.22	0.16	13.60	0.05	0.63	0.11	0.77	0.03
$Q_{7,50}$	0.18	0.16	0.22	0.16	13.60	0.05	0.63	0.11	0.77	0.03
$Q_{15,2}$	0.57	0.24	0.26	0.53	19.60	0.09	0.81	0.17	1.38	0.14
$Q_{15,10}$	0.28	0.18	0.23	0.25	15.18	0.06	0.68	0.13	0.93	0.06
$Q_{15,25}$	0.20	0.16	0.22	0.18	13.91	0.05	0.64	0.12	0.80	0.03
$Q_{15,50}$	0.20	0.16	0.22	0.18	13.91	0.05	0.64	0.12	0.80	0.03
$Q_{31,2}$	0.61	0.25	0.26	0.57	20.23	0.10	0.83	0.17	1.45	0.15
$Q_{31,10}$	0.34	0.19	0.24	0.31	16.13	0.07	0.71	0.14	1.03	0.07
$Q_{3,25}$	0.22	0.16	0.22	0.19	14.23	0.05	0.65	0.12	0.83	0.04
$Q_{31,50}$	0.20	0.16	0.22	0.18	13.91	0.05	0.64	0.12	0.80	0.03
$Q_{61,2}$	0.67	0.26	0.27	0.63	21.18	0.10	0.86	0.18	1.54	0.16
$Q_{61,10}$	0.40	0.21	0.24	0.37	17.07	0.07	0.74	0.14	1.12	0.09
$Q_{61,25}$	0.28	0.18	0.23	0.25	15.18	0.06	0.68	0.13	0.93	0.06
$Q_{61,50}$	0.24	0.17	0.23	0.21	14.55	0.05	0.66	0.12	0.86	0.04
$Q_{91,2}$	0.73	0.28	0.28	0.69	22.13	0.11	0.89	0.19	1.64	0.18
$Q_{91,10}$	0.48	0.22	0.25	0.45	18.34	0.08	0.77	0.15	1.25	0.11
$Q_{91.25}$	0.34	0.19	0.24	0.31	16.13	0.07	0.71	0.14	1.03	0.07
$Q_{91,50}$	0.32	0.19	0.23	0.29	15.81	0.06	0.70	0.13	0.99	0.07

Appendix B. Continued

Flow type	Location									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	**(10)**
Drought Flows										
$Q_{6,10}$	0.65	0.26	0.27	0.61	20.87	0.10	0.85	0.18	1.51	0.16
$Q_{6,25}$	0.54	0.24	0.26	0.51	19.29	0.09	0.80	0.16	1.35	0.13
$Q_{6,50}$	0.48	0.22	0.25	0.45	18.34	0.08	0.77	0.15	1.25	0.11
$Q_{9,10}$	0.76	0.28	0.28	0.71	22.60	0.12	0.90	0.19	1.69	0.19
$Q_{9,25}$	0.69	0.27	0.27	0.65	21.50	0.11	0.87	0.18	1.58	0.17
$Q_{9,50}$	0.63	0.25	0.27	0.59	20.55	0.10	0.84	0.17	1.48	0.15
$Q_{12,10}$	0.87	0.31	0.29	0.82	24.34	0.13	0.95	0.21	1.87	0.22
$Q_{12,25}$	0.79	0.29.	0.28	0.74	23.08	0.12	0.92	0.20	1.74	0.20
$Q_{12,50}$	0.71	0.27	0.27	0.67	21.81	0.11	0.88	0.18	1.61	0.18
$Q_{18,10}$	0.93	0.32	0.30	0.88	25.29	0.14	0.98	0.21	1.97	0.24
$Q_{18,25}$	0.83	0.30	0.29	0.78	23.71	0.12	0.93	0.20	1.80	0.21
$Q_{18,50}$	0.76	0.28	0.28	0.71	22.60	0.12	0.90	0.19	1.69	0.19
$Q_{30,10}$	0.99	0.33	0.30	0.94	26.24	0.14	1.01	0.22	2.06	0.26
$Q_{30,25}$	0.89	0.31	0.29	0.84	24.66	0.13	0.96	0.21	1.90	0.23
$Q_{30,50}$	0.83	0.30	0.29	0.78	23.71	0.12	0.93	0.20	1.80	0.21
$Q_{54,10}$	1-07	0.35	0.31	1.02	27.50	0.15	1.05	0.23	2.19	0.28
$Q_{54,25}$	0.93	0.32	0.30	0.88	25.29	0.14	0.98	0.21	1.97	0.24
$Q_{54,50}$	0.89	0.31	0.29	0.84	24.66	0.13	0.96	0.21	1.90	0.23
January										
Q_{02}	1.86	0.53	0.39	1.78	39.82	0.25	1.42	0.34	3.46	0.50
Q_{10}	1.34	0.41	0.34	1.27	31.61	0.18	1.17	0.27	2.61	0.35
Q_{25}	1.09	0.36	0.31	1.04	27.82	0.15	1.06	0.24	2.23	0.29
Q_{50}	0.91	0.32	0.29	0.86	24.97	0.13	0.97	0.21	1.93	0.23
Q_{75}	0.73	0.28	0.28	0.69	21.00	0.11	0.89	0.19	1.64	0.18
Q_{90}	0.56	0.24	0.26	0.52	18.00	0.09	0.81	0.16	1.37	0.13
Q_{98}	0.40	0.21	0.24	0.37	14.90	0.07	0.74	0.14	1.12	0.09
Q_{mean}	1.05	0.35	0.31	1.00	27.18	0.15	1.04	0.23	2.16	0.27
February										
Q_{02}	1.96	0.55	0.40	1.88	41.40	0.26	1.46	0.36	3.62	0.53
Q_{10}	1.42	0.43	0.35	1.35	32.87	0.19	1.21	0.28	2.74	0.38
Q_{25}	1.19	0.38	0.32	1.14	29.40	0.17	1.10	0.25	2.39	0.31
Q_{50}	0.97	0.33	0.30	0.92	25.92	0.14	1.00	0.22	2.03	0.25
Q_{75}	0.79	0.29	0.28	0.74	23.08	0.12	0.92	0.20	1.74	0.20
Q_{90}	0.67	0.26	0.27	0.63	20.00	0.10	0.86	0.18	1.54	0.16
Q_{98}	0.52	0.23	0.26	0.49	17.00	0.09	0.79	0.16	1.32	0.12
Q_{mean}	1.12	0.36	0.32	1.06	28.20	0.16	1.07	0.24	2.26	0.29
March										
Q_{02}	2.04	0.57	0.41	1.96	42.67	0.27	1.50	0.37	3.75	0.56
Q_{10}	1.52	0.45	0.36	1.45	34.45	0.20	1.26	0.29	2.91	0.41
Q_{25}	1.27	0.40	0.33	1.21	30.66	0.18	1.14	0.26	2.52	0.34
Q_{50}	1-09	0.36	0.31	1.04	27.82	0.15	1.06	0.24	2.23	0.29
Q_{75}	0.93	0.32	0.30	0.88	25.29	0.14	0.98	0.21	1.97	0.24
Q_{90}	0.85	0.30	0.29	0.80	24.02	0.13	0.94	0.20	1.84	0.22
Q_{98}	0.65	0.26	0.27	0.61	19.90	0.10	0.85	0.18	1.51	0.16
Q_{mean}	1.17	0.37	0.32	1.11	29.02	0.16	1.09	0.25	2.35	0.31

Appendix B. Continued

Flow type	Location (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
April										
Q_{02}	2.04	0.57	0.41	1.96	42.67	0.27	1.50	0.37	3.75	0.56
Q_{10}	1.52	0.45	0.36	1.45	34.45	0.20	1.26	0.29	2.91	0.41
Q_{25}	1.32	0.41	0.34	1.25	31.29	0.18	1.16	0.27	2.58	0.35
Q_{50}	1.13	0.37	0.32	1.08	28.45	0.16	1.08	0.24	2.29	0.30
Q_{75}	0.97	0.33	0.30	0.92	25.92	0.14	1.00	0.22	2.03	0.25
Q_{90}	0.89	0.31	0.29	0.84	24.66	0.13	0.96	0.21	1.90	0.23
Q_{98}	0.69	0.27	0.27	0.65	21.50	0.11	0.87	0.18	1.58	0.17
Q_{mean}	1.17	0.37	0.32	1.11	29.05	0.16	1.09	0.25	2.35	0.31
May										
Q_{02}	2.04	0.57	0.41	1.96	42.67	0.27	1.50	0.37	3.75	0.56
Q_{10}	1.42	0.43	0.35	1.35	32.87	0.19	1.21	0.28	2.74	0.38
Q_{25}	1.17	0.37	0.32	1.11	28.99	0.16	1.09	0.25	2.35	0.31
Q_{50}	1.03	0.34	0.31	0.98	26.87	0.15	1.03	0.23	2.13	0.27
Q_{75}	0.93	0.32	0.30	0.88	25.29	0.14	0.98	0.21	1.97	0.24
Q_{90}	0.87	0.31	0.29	0.82	24.34	0.13	0.95	0.21	1.87	0.22
Q_{98}	0.67	0.26	0.27	0.63	18.80	0.10	0.86	0.18	1.54	0.16
Q_{mean}	1.11	0.36	0.31	1.06	28.13	0.16	1.07	0.24	2.26	0.29
June										
Q_{02}	2.04	0.57	0.41	1.96	42.67	0.27	1.50	0.37	3.75	0.56
Q_{10}	1.42	0.43	0.35	1.35	32.87	0.19	1.21	0.28	2.74	0.38
Q_{25}	1.15	0.37	0.32	1.10	28.76	0.16	1.09	0.25	2.32	0.30
Q_{50}	0.97	0.33	0.30	0.92	25.92	0.14	1.00	0.22	2.03	0.25
Q_{75}	0.89	0.31	0.29	0.84	23.00	0.13	0.96	0.21	1.90	0.23
Q_{90}	0.81	0.29	0.28	0.76	23.39	0.12	0.92	0.20	1.77	0.20
Q_{98}	0.65	0.26	0.27	0.61	17.00	0.10	0.85	0.18	1.51	0.16
Q_{mean}	0.99	0.33	0.30	0.94	26.20	0.14	1.01	0.22	2.06	0.26
July										
Q_{02}	1.66	0.48	0.37	1.59	36.66	0.22	1.32	0.31	3.13	0.45
Q_{10}	1.21	0.38	0.33	1.16	29.71	0.17	1.11	0.25	2.42	0.32
Q_{25}	1.01	0.34	0.30	0.96	26.55	0.15	1.02	0.23	2.10	0.26
Q_{50}	0.91	0.32	0.29	0.86	24.97	0.13	0.97	0.21	1.93	0.23
Q_{75}	0.77	0.29	0.28	0.72	20.00	0.12	0.91	0.19	1.71	0.19
Q_{90}	0.67	0.26	0.27	0.63	18.00	0.10	0.86	0.18	1.54	0.16
Q_{98}	0.48	0.22	0.25	0.45	14.00	0.08	0.77	0.15	1.25	0.11
Q_{mean}	0.87	0.31	0.29	0.82	24.34	0.13	0.95	0.21	1.87	0.22
August										
Q_{02}	1.52	0.45	0.36	1.45	34.45	0.20	1.26	0.29	2.91	0.41
Q_{10}	1.07	0.35	0.31	1.02	27.50	0.15	1.05	0.23	2.19	0.28
Q_{25}	0.89	0.31	0.29	0.84	24.66	0.13	0.96	0.21	1.90	0.23
Q_{50}	0.76	0.28	0.28	0.71	22.60	0.12	0.90	0.19	1.69	0.19
Q_{75}	0.67	0.26	0.27	0.63	21.18	0.10	0.86	0.18	1.54	0.16
Q_{90}	0.56	0.24	0.26	0.52	17.00	0.09	0.81	0.16	1.37	0.13
Q_{98}	0.34	0.19	0.24	0.31	16.13	0.07	0.71	0.14	1.03	0.07
Q_{mean}	0.77	0.29	0.28	0.72	22.76	0.12	0.91	0.19	1.71	0.19

Appendix B. Continued

Flow type	Location									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	**(10)**
September										
Q_{02}	1.34	0.41	0.34	1.27	31.61	0.18	1.17	0.27	2.61	0.35
Q_{10}	0.95	0.33	0.30	0.90	25.60	0.14	0.99	0.22	2.00	0.24
Q_{25}	0.77	0.29	0.28	0.72	22.76	0.12	0.91	0.19	1.71	0.19
Q_{50}	0.67	0.26	0.27	0.63	21.18	0.10	0.86	0.18	1.54	0.16
Q_{75}	0.57	0.24	0.26	0.53	19.60	0.09	0.81	0.17	1.38	0.14
Q_{90}	0.48	0.22	0.25	0.45	16.00	0.08	0.77	0.15	1.25	0.11
Q_{98}	0.22	0.16	0.22	0.19	14.23	0.05	0.65	0.12	0.83	0.04
Q_{mean}	0.72	0.28	0.28	0.68	22.07	0.11	0.89	0.19	1.63	0.18
October										
Q_{02}	1.40	0.42	0.34	1.33	32.56	0.19	1.20	0.28	2.71	0.37
Q_{10}	1.03	0.34	0.31	0.98	26.87	0.15	1.03	0.23	2.13	0.27
Q_{25}	0.85	0.30	0.29	0.80	24.02	0.13	0.94	0.20	1.84	0.22
Q_{50}	0.67	0.26	0.27	0.63	21.18	0.10	0.86	0.18	1.54	0.16
Q_{75}	0.56	0.24	0.26	0.52	19.44	0.09	0.81	0.16	1.37	0.13
Q_{90}	0.40	0.21	0.24	0.37	17.07	0.07	0.74	0.14	1.12	0.09
Q_{98}	0.18	0.16	0.22	0.16	13.60	0.05	0.63	0.11	0.77	0.03
Q_{mean}	0.72	0.27	0.27	0.68	22.00	0.11	0.88	0.19	1.63	0.18
November										
Q_{02}	1.48	0.44	0.35	1.41	33.82	0.20	1.24	0.29	2.84	0.39
Q_{10}	1.09	0.36	0.31	1.04	27.82	0.15	1.06	0.24	2.23	0.29
Q_{25}	0.93	0.32	0.30	0.88	25.29	0.14	0.98	0.21	1.97	0.24
Q_{50}	0.76	0.28	0.28	0.71	22.60	0.12	0.90	0.19	1.69	0.19
Q_{75}	0.63	0.25	0.27	0.59	20.55	0.10	0.84	0.17	1.48	0.15
Q_{90}	0.48	0.22	0.25	0.45	18.34	0.08	0.77	0.15	1.25	0.11
Q_{98}	0.22	0.16	0.22	0.19	14.23	0.05	0.65	0.12	0.83	0.04
Q_{mean}	0.91	0.32	0.29	0.86	24.97	0.13	0.97	0.21	1.93	0.23
December										
Q_{02}	1.80	0.51	0.38	1.72	38.87	0.24	1.39	0.33	3.36	0.49
Q_{10}	1.21	0.38	0.33	1.16	29.71	0.17	1.11	0.25	2.42	0.32
Q_{25}	0.97	0.33	0.30	0.92	25.92	0.14	1.00	0.22	2.03	0.25
Q_{50}	0.83	0.30	0.29	0.78	23.71	0.12	0.93	0.20	1.80	0.21
Q_{75}	0.67	0.26	0.27	0.63	21.18	0.10	0.86	0.18	1.54	0.16
Q_{90}	0.52	0.23	0.26	0.49	18.97	0.09	0.79	0.16	1.32	0.12
Q_{98}	0.32	0.19	0.23	0.29	15.81	0.06	0.70	0.13	0.99	0.07
Q_{mean}	1.05	0.35	0.31	1.00	27.12	0.15	1.04	0.23	2.15	0.27

Appendix B. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Q_{01}	84.62	0.16	0.64	0.53	0.53	1.87	0.55	0.58	0.21	0.36
Q_{02}	78.11	0.15	0.56	0.48	0.47	1.68	0.49	0.51	0.19	0.32
Q_{05}	70.52	0.14	0.47	0.43	0.41	1.46	0.41	0.44	0.17	0.27
Q_{10}	65.64	0.13	0.41	0.40	0.37	1.32	0.36	0.39	0.15	0.24
Q_{15}	62.39	0.13	0.37	0.38	0.34	1.22	0.33	0.36	0.14	0.22
Q_{25}	59.13	0.12	0.33	0.35	0.31	1.13	0.29	0.33	0.13	0.20
Q_{40}	55.88	0.12	0.29	0.33	0.28	1.03	0.26	0.30	0.12	0.18
Q_{50}	54.25	0.12	0.27	0.32	0.27	0.98	0.24	0.28	0.12	0.17
Q_{60}	52.63	0.12	0.25	0.31	0.25	0.94	0.23	0.27	0.11	0.16
Q_{75}	49.37	0.11	0.21	0.29	0.22	0.84	0.19	0.24	0.10	0.14
Q_{85}	47.21	0.11	0.18	0.27	0.21	0.78	0.17	0.22	0.09	0.13
Q_{90}	45.04	0.11	0.16	0.26	0.19	0.71	0.15	0.20	0.09	0.11
Q_{95}	42.87	0.10	0.13	0.24	0.17	0.65	0.13	0.18	0.08	0.10
Q_{98}	39.07	0.10	0.08	0.22	0.13	0.54	0.09	0.14	0.07	0.08
Q_{99}	35.82	0.10	0.04	0.19	0.11	0.45	0.06	0.11	0.06	0.06
Q_{mean}	55.88	0.12	0.29	0.33	0.28	1.03	0.26	0.30	0.12	0.18
Low Flows										
$Q_{1,2}$	34.74	0.09	0.03	0.19	0.10	0.41	0.04	0.10	0.05	0.05
$Q_{1,10}$	29.86	0.09	0.00	0.15	0.05	0.27	0.00	0.05	0.04	0.02
$Q_{1,25}$	27.70	0.09	0.00	0.15	0.05	0.26	0.00	0.04	0.03	0.02
$Q_{1,50}$	26.62	0.09	0.00	0.15	0.05	0.26	0.00	0.04	0.03	0.02
$Q_{7,2}$	42.32	0.11	0.15	0.25	0.18	0.70	0.14	0.19	0.08	0.11
$Q_{7,10}$	34.74	0.10	0.04	0.19	0.11	0.45	0.06	0.11	0.06	0.06
$Q_{7,25}$	31.50	0.09	0.03	0.19	0.10	0.41	0.04	0.10	0.05	0.05
$Q_{7,50}$	29.42	0.09	0.03	0.19	0.10	0.41	0.04	0.10	0.05	0.05
$Q_{15,2}$	45.04	0.11	0.16	0.26	0.19	0.71	0.15	0.20	0.09	0.11
$Q_{15,10}$	37.45	0.10	0.06	0.20	0.12	0.49	0.07	0.12	0.06	0.07
$Q_{15,25}$	34.21	0.09	0.04	0.19	0.10	0.43	0.05	0.10	0.05	0.05
$Q_{15,50}$	33.13	0.09	0.04	0.19	0.10	0.43	0.05	0.10	0.05	0.05
$Q_{31,2}$	46.12	0.11	0.17	0.26	0.20	0.75	0.16	0.21	0.09	0.12
$Q_{31,10}$	39.07	0.10	0.08	0.22	0.13	0.54	0.09	0.14	0.07	0.08
$Q_{31,25}$	35.82	0.10	0.04	0.19	0.11	0.45	0.06	0.11	0.06	0.06
$Q_{31,50}$	34.74	0.09	0.04	0.19	0.10	0.43	0.05	0.10	0.05	0.05
$Q_{61,2}$	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
$Q_{61,10}$	40.70	0.10	0.10	0.23	0.15	0.59	0.11	0.15	0.07	0.09
$Q_{61,25}$	37.45	0.10	0.06	0.20	0.12	0.49	0.07	0.12	0.06	0.07
$Q_{61,50}$	36.36	0.10	0.05	0.20	0.11	0.46	0.06	0.11	0.06	0.06
$Q_{91,2}$	49.37	0.11	0.21	0.29	0.22	0.84	0.19	0.24	0.10	0.14
$Q_{91,10}$	42.87	0.10	0.13	0.24	0.17	0.65	0.13	0.18	0.08	0.10
$Q_{91,25}$	39.07	0.10	0.08	0.22	0.13	0.54	0.09	0.14	0.07	0.08
$Q_{91,50}$	38.53	0.10	0.08	0.21	0.13	0.52	0.08	0.13	0.06	0.07

Appendix B. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Drought Flows										
$Q_{6,10}$	47.21	0.11	0.18	0.27	0.21	0.78	0.17	0.22	0.09	0.13
$Q_{6,25}$	44.49	0.11	0.15	0.25	0.18	0.70	0.14	0.19	0.08	0.11
$Q_{6,50}$	42.87	0.10	0.13	0.24	0.17	0.65	0.13	0.18	0.08	0.10
$Q_{9,10}$	50.19	0.11	0.22	0.29	0.23	0.86	0.20	0.25	0.10	0.15
$Q_{9,25}$	48.29	0.11	0.20	0.28	0.21	0.81	0.18	0.23	0.10	0.13
$Q_{9,50}$	46.66	0.11	0.18	0.27	0.20	0.76	0.17	0.21	0.09	0.12
$Q_{12,10}$	53.17	0.12	0.26	0.31	0.26	0.95	0.23	0.27	0.11	0.16
$Q_{12,25}$	51.00	0.11	0.23	0.30	0.24	0.89	0.21	0.25	0.10	0.15
$Q_{12,50}$	48.83	0.11	0.20	0.28	0.22	0.82	0.19	0.23	0.10	0.14
$Q_{18,10}$	54.80	0.12	0.28	0.32	0.27	1.00	0.25	0.29	0.12	0.17
$Q_{18,25}$	52.09	0.12	0.24	0.30	0.25	0.92	0.22	0.26	0.11	0.16
$Q_{18,50}$	50.19	0.11	0.22	0.29	0.23	0.86	0.20	0.25	0.10	0.15
$Q_{30,10}$	56.42	0.12	0.30	0.33	0.29	1.05	0.27	0.31	0.12	0.18
$Q_{30,25}$	53.71	0.12	0.26	0.32	0.26	0.97	0.24	0.28	0.11	0.17
$Q_{30,50}$	52.09	0.12	0.24	0.30	0.25	0.92	0.22	0.26	0.11	0.16
$Q_{54,10}$	58.59	0.12	0.32	0.35	0.30	1.11	0.29	0.33	0.13	0.20
$Q_{54,25}$	54.80	0.12	0.28	0.32	0.27	1.00	0.25	0.29	0.12	0.17
$Q_{54,50}$	53.71	0.12	0.26	0.32	0.26	0.97	0.24	0.28	0.11	0.17
January										
Q_{02}	79.74	0.15	0.58	0.49	0.49	1.73	0.50	0.53	0.20	0.33
Q_{10}	65.64	0.13	0.41	0.40	0.37	1.32	0.36	0.39	0.15	0.24
Q_{25}	59.13	0.12	0.33	0.35	0.31	1.13	0.29	0.33	0.13	0.20
Q_{50}	54.25	0.12	0.27	0.32	0.27	0.98	0.24	0.28	0.12	0.17
Q_{75}	49.37	0.11	0.21	0.29	0.22	0.84	0.19	0.24	0.10	0.14
Q_{90}	44.77	0.11	0.15	0.25	0.18	0.71	0.15	0.19	0.08	0.11
Q_{98}	40.70	0.10	0.10	0.23	0.15	0.59	0.11	0.15	0.07	0.09
Q_{mean}	58.05	0.12	0.32	0.35	0.30	1.09	0.28	0.32	0.13	0.19
February										
Q_{02}	82.45	0.15	0.62	0.51	0.51	1.81	0.53	0.56	0.21	0.35
Q_{10}	67.81	0.14	0.44	0.41	0.38	1.38	0.38	0.42	0.16	0.25
Q_{25}	61.84	0.13	0.36	0.37	0.33	1.20	0.32	0.36	0.14	0.22
Q_{50}	55.88	0.12	0.29	0.33	0.28	1.03	0.26	0.30	0.12	0.18
Q_{75}	51.00	0.11	0.23	0.30	0.24	0.89	0.21	0.25	0.10	0.15
Q_{90}	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
Q_{98}	43.95	0.11	0.14	0.25	0.18	0.68	0.14	0.19	0.08	0.11
Q_{mean}	59.78	0.13	0.34	0.36	0.31	1.14	0.30	0.34	0.13	0.20
March										
Q_{02}	84.62	0.16	0.64	0.53	0.53	1.87	0.55	0.58	0.21	0.36
Q_{10}	70.52	0.14	0.47	0.43	0.41	1.46	0.41	0.44	0.17	0.27
Q_{25}	64.01	0.13	0.39	0.39	0.35	1.27	0.34	0.38	0.15	0.23
Q_{50}	59.13	0.12	0.33	0.35	0.31	1.13	0.29	0.33	0.13	0.20
Q_{75}	54.80	0.12	0.28	0.32	0.27	1.00	0.25	0.29	0.12	0.17
Q_{90}	52.63	0.12	0.25	0.31	0.25	0.94	0.23	0.27	0.11	0.16
Q_{98}	47.21	0.11	0.18	0.27	0.21	0.78	0.17	0.22	0.09	0.13
Q_{mean}	61.19	0.13	0.36	0.37	0.33	1.19	0.31	0.35	0.14	0.21

Appendix B. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
April										
Q_{02}	84.62	0.16	0.64	0.53	0.53	1.87	0.55	0.58	0.21	0.36
Q_{10}	70.52	0.14	0.47	0.43	0.41	1.46	0.41	0.44	0.17	0.27
Q_{25}	65.10	0.13	0.40	0.39	0.36	1.30	0.35	0.39	0.15	0.24
Q_{50}	60.22	0.13	0.34	0.36	0.32	1.16	0.30	0.34	0.13	0.21
Q_{75}	55.88	0.12	0.29	0.33	0.28	1.03	0.26	0.30	0.12	0.18
Q_{90}	53.71	0.12	0.26	0.32	0.26	0.97	0.24	0.28	0.11	0.17
Q_{98}	48.29	0.11	0.20	0.28	0.21	0.81	0.18	0.23	0.10	0.13
Q_{mean}	61.25	0.13	0.36	0.37	0.33	1.19	0.32	0.35	0.14	0.21
May										
Q_{02}	84.62	0.16	0.64	0.53	0.53	1.87	0.55	0.58	0.21	0.36
Q_{10}	67.81	0.14	0.44	0.41	0.38	1.38	0.38	0.42	0.16	0.25
Q_{25}	61.14	0.13	0.36	0.37	0.33	1.18	0.31	0.35	0.14	0.21
Q_{50}	57.51	0.12	0.31	0.34	0.29	1.08	0.28	0.32	0.13	0.19
Q_{75}	54.80	0.12	0.28	0.32	0.27	1.00	0.25	0.29	0.12	0.17
Q_{90}	53.17	0.12	0.26	0.31	0.26	0.95	0.23	0.27	0.11	0.16
Q_{98}	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
Q_{mean}	59.68	0.13	0.34	0.36	0.31	1.14	0.30	0.34	0.13	0.20
June										
Q_{02}	84.62	0.16	0.64	0.53	0.53	1.87	0.55	0.58	0.21	0.36
Q_{10}	67.81	0.14	0.44	0.41	0.38	1.38	0.38	0.42	0.16	0.25
Q_{25}	60.76	0.13	0.35	0.36	0.32	1.17	0.31	0.35	0.14	0.21
Q_{50}	55.88	0.12	0.29	0.33	0.28	1.03	0.26	0.30	0.12	0.18
Q_{75}	53.71	0.12	0.26	0.32	0.26	0.97	0.24	0.28	0.11	0.17
Q_{90}	51.54	0.12	0.24	0.30	0.24	0.90	0.22	0.26	0.11	0.15
Q_{98}	47.21	0.11	0.18	0.27	0.21	0.78	0.17	0.22	0.09	0.13
Q_{mean}	56.37	0.12	0.30	0.33	0.28	1.04	0.27	0.31	0.12	0.18
July										
Q_{02}	74.31	0.14	0.52	0.46	0.44	1.57	0.45	0.48	0.18	0.29
Q_{10}	62.39	0.13	0.37	0.38	0.34	1.22	0.33	0.36	0.14	0.22
Q_{25}	56.96	0.12	0.30	0.34	0.29	1.06	0.27	0.31	0.12	0.19
Q_{50}	54.25	0.12	0.27	0.32	0.27	0.98	0.24	0.28	0.12	0.17
Q_{75}	50.46	0.11	0.22	0.29	0.23	0.87	0.21	0.25	0.10	0.15
Q_{90}	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
Q_{98}	42.87	0.10	0.13	0.24	0.17	0.65	0.13	0.18	0.08	0.10
Q_{mean}	53.17	0.12	0.26	0.31	0.26	0.95	0.23	0.27	0.11	0.16
August										
Q_{02}	70.52	0.14	0.47	0.43	0.41	1.46	0.41	0.44	0.17	0.27
Q_{10}	58.59	0.12	0.32	0.35	0.30	1.11	0.29	0.33	0.13	0.20
Q_{25}	53.71	0.12	0.26	0.32	0.26	0.97	0.24	0.28	0.11	0.17
Q_{50}	50.19	0.11	0.22	0.29	0.23	0.86	0.20	0.25	0.10	0.15
Q_{75}	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
Q_{90}	44.77	0.11	0.15	0.25	0.18	0.71	0.15	0.19	0.08	0.11
Q_{98}	39.07	0.10	0.08	0.22	0.13	0.54	0.09	0.14	0.07	0.08
Q_{mean}	50.46	0.11	0.22	0.29	0.23	0.87	0.21	0.25	0.10	0.15

Appendix B. Continued

Flow type	Location									
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
September										
Q_{02}	65.64	0.13	0.41	0.40	0.37	1.32	0.36	0.39	0.15	0.24
Q_{10}	55.34	0.12	0.28	0.33	0.28	1.01	0.25	0.30	0.12	0.18
Q_{25}	50.46	0.11	0.22	0.29	0.23	0.87	0.21	0.25	0.10	0.15
Q_{50}	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
Q_{75}	45.04	0.11	0.16	0.26	0.19	0.71	0.15	0.20	0.09	0.11
Q_{90}	42.87	0.10	0.13	0.24	0.17	0.65	0.13	0.18	0.08	0.10
Q_{98}	35.82	0.10	0.04	0.19	0.11	0.45	0.06	0.11	0.06	0.06
Q_{mean}	49.27	0.11	0.21	0.29	0.22	0.84	0.19	0.24	0.10	0.14
October										
Q_{02}	67.27	0.13	0.43	0.41	0.38	1.36	0.38	0.41	0.16	0.25
Q_{10}	57.51	0.12	0.31	0.34	0.29	1.08	0.28	0.32	0.13	0.19
Q_{25}	52.63	0.12	0.25	0.31	0.25	0.94	0.23	0.27	0.11	0.16
Q_{50}	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
Q_{75}	44.77	0.11	0.15	0.25	0.18	0.71	0.15	0.19	0.08	0.11
Q_{90}	40.70	0.10	0.10	0.23	0.15	0.59	0.11	0.15	0.07	0.09
Q_{98}	34.74	0.09	0.03	0.19	0.10	0.41	0.04	0.10	0.05	0.05
Q_{mean}	49.16	0.11	0.21	0.28	0.22	0.83	0.19	0.24	0.10	0.14
November										
Q_{02}	69.44	0.14	0.46	0.42	0.40	1.43	0.40	0.43	0.16	0.26
Q_{10}	59.13	0.12	0.33	0.35	0.31	1.13	0.29	0.33	0.13	0.20
Q_{25}	54.80	0.12	0.28	0.32	0.27	1.00	0.25	0.29	0.12	0.17
Q_{50}	50.19	0.11	0.22	0.29	0.23	0.86	0.20	0.25	0.10	0.15
Q_{75}	46.66	0.11	0.18	0.27	0.20	0.76	0.17	0.21	0.09	0.12
Q_{90}	42.87	0.10	0.13	0.24	0.17	0.65	0.13	0.18	0.08	0.10
Q_{98}	35.82	0.10	0.04	0.19	0.11	0.45	0.06	0.11	0.06	0.06
Q_{mean}	54.25	0.12	0.27	0.32	0.27	0.98	0.24	0.28	0.12	0.17
December										
Q_{02}	78.11	0.15	0.56	0.48	0.47	1.68	0.49	0.51	0.19	0.32
Q_{10}	62.39	0.13	0.37	0.38	0.34	1.22	0.33	0.36	0.14	0.22
Q_{25}	55.88	0.12	0.29	0.33	0.28	1.03	0.26	0.30	0.12	0.18
Q_{50}	52.09	0.12	0.24	0.30	0.25	0.92	0.22	0.26	0.11	0.16
Q_{75}	47.75	0.11	0.19	0.27	0.21	0.79	0.18	0.22	0.09	0.13
Q_{90}	43.95	0.11	0.14	0.25	0.18	0.68	0.14	0.19	0.08	0.11
Q_{98}	38.53	0.10	0.08	0.21	0.13	0.52	0.08	0.13	0.06	0.07
Q_{mean}	57.94	0.12	0.32	0.34	0.30	1.09	0.28	0.32	0.13	0.19

Appendix B. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Q_{01}	0.61	2.16	9.90	0.71	0.94	1.47	1.34	0.30	0.97	0.08
Q_{02}	0.54	1.93	8.90	0.66	0.83	1.35	1.17	0.28	0.84	0.07
Q_{05}	0.45	1.66	7.74	0.60	0.71	1.20	0.97	0.24	0.70	0.06
Q_{10}	0.39	1.48	6.99	0.56	0.63	1.11	0.84	0.22	0.60	0.06
Q_{15}	0.36	1.36	6.49	0.54	0.58	1.05	0.76	0.21	0.54	0.06
Q_{25}	0.32	1.25	5.99	0.52	0.52	0.99	0.67	0.19	0.47	0.05
Q_{40}	0.28	1.13	5.49	0.49	0.47	0.93	0.59	0.18	0.41	0.05
Q_{50}	0.26	1.07	5.24	0.48	0.44	0.90	0.55	0.17	0.38	0.05
Q_{60}	0.24	1.01	4.99	0.47	0.42	0.87	0.51	0.17	0.35	0.05
Q_{75}	0.21	0.90	4.49	0.44	0.36	0.81	0.42	0.15	0.28	0.04
Q_{85}	0.18	0.82	4.16	0.42	0.33	0.77	0.37	0.14	0.24	0.04
Q_{90}	0.16	0.74	3.83	0.41	0.29	0.73	0.31	0.13	0.20	0.04
Q_{95}	0.13	0.66	3.49	0.39	0.26	0.69	0.25	0.12	0.16	0.04
Q_{98}	0.09	0.53	2.91	0.36	0.20	0.62	0.16	0.11	0.08	0.03
Q_{99}	0.05	0.41	2.41	0.34	0.14	0.55	0.07	0.09	0.02	0.03
Q_{mean}	0.28	1.13	5.49	0.49	0.47	0.93	0.59	0.18	0.41	0.05
Low Flows										
$Q_{1,2}$	0.04	0.37	2.24	0.33	0.13	0.53	0.04	0.09	0.00	0.03
$Q_{1,10}$	0.00	0.19	1.49	0.29	0.05	0.44	0.00	0.07	0.00	0.03
$Q_{1,25}$	0.00	0.17	1.41	0.29	0.04	0.43	0.00	0.07	0.00	0.02
$Q_{1,50}$	0.00	0.17	1.41	0.29	0.04	0.43	0.00	0.07	0.00	0.02
$Q_{7,2}$	0.15	0.72	3.74	0.40	0.28	0.72	0.30	0.13	0.19	0.04
$Q_{7,10}$	0.05	0.41	2.41	0.34	0.14	0.55	0.07	0.09	0.02	0.03
$Q_{7,25}$	0.04	0.37	2.24	0.33	0.13	0.53	0.04	0.09	0.00	0.03
$Q_{7,50}$	0.04	0.37	2.24	0.33	0.13	0.53	0.04	0.09	0.00	0.03
$Q_{15,2}$	0.16	0.74	3.83	0.41	0.29	0.73	0.31	0.13	0.20	0.04
$Q_{15,10}$	0.07	0.47	2.66	0.35	0.17	0.59	0.11	0.10	0.05	0.03
$Q_{15,25}$	0.04	0.39	2.33	0.33	0.13	0.54	0.06	0.09	0.01	0.03
$Q_{15,50}$	0.04	0.39	2.33	0.33	0.13	0.54	0.06	0.09	0.01	0.03
$Q_{31,2}$	0.17	0.78	3.99	0.42	0.31	0.75	0.34	0.14	0.22	0.04
$Q_{31,10}$	0.09	0.53	2.91	0.36	0.20	0.62	0.16	0.11	0.08	0.03
$Q_{31,25}$	0.05	0.41	2.41	0.34	0.14	0.55	0.07	0.09	0.02	0.03
$Q_{31,50}$	0.04	0.39	2.33	0.33	0.13	0.54	0.06	0.09	0.01	0.03
$Q_{61,2}$	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
$Q_{61,10}$	0.11	0.58	3.16	0.38	0.22	0.65	0.20	0.12	0.12	0.04
$Q_{61,25}$	0.07	0.47	2.66	0.35	0.17	0.59	0.11	0.10	0.05	0.03
$Q_{61,50}$	0.05	0.43	2.49	0.34	0.15	0.56	0.08	0.10	0.03	0.03
$Q_{91,2}$	0.21	0.90	4.49	0.44	0.36	0.81	0.42	0.15	0.28	0.04
$Q_{91,10}$	0.13	0.66	3.49	0.39	0.26	0.69	0.25	0.12	0.16	0.04
$Q_{91,25}$	0.09	0.53	2.91	0.36	0.20	0.62	0.16	0.11	0.08	0.03
$Q_{91,50}$	0.08	0.51	2.83	0.36	0.19	0.61	0.14	0.11	0.07	0.03

Appendix B. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
Drought Flows										
$Q_{6,10}$	0.18	0.82	4.16	0.42	0.33	0.77	0.37	0.14	0.24	0.04
$Q_{6,25}$	0.15	0.72	3.74	0.40	0.28	0.72	0.30	0.13	0.19	0.04
$Q_{6,50}$	0.13	0.66	3.49	0.39	0.26	0.69	0.25	0.12	0.16	0.04
$Q_{9,10}$	0.21	0.93	4.62	0.45	0.38	0.82	0.44	0.16	0.30	0.04
$Q_{9,25}$	0.19	0.86	4.33	0.43	0.35	0.79	0.39	0.15	0.26	0.04
$Q_{9,50}$	0.17	0.80	4.08	0.42	0.32	0.76	0.35	0.14	0.23	0.04
$Q_{12,10}$	0.25	1.03	5.07	0.47	0.43	0.88	0.52	0.17	0.36	0.05
$Q_{12,25}$	0.22	0.95	4.74	0.45	0.39	0.84	0.46	0.16	0.32	0.05
$Q_{12,50}$	0.20	0.88	4.41	0.44	0.36	0.80	0.41	0.15	0.27	0.04
$Q_{18,10}$	0.27	1.09	5.32	0.48	0.45	0.91	0.56	0.18	0.39	0.05
$Q_{18,25}$	0.24	0.99	4.91	0.46	0.41	0.86	0.49	0.16	0.34	0.05
$Q_{18,50}$	0.21	0.93	4.62	0.45	0.38	0.82	0.44	0.16	0.30	0.04
$Q_{30,10}$	0.29	1.15	5.57	0.49	0.48	0.94	0.60	0.18	0.42	0.05
$Q_{30,25}$	0.26	1.05	5.16	0.47	0.44	0.89	0.53	0.17	0.37	0.05
$Q_{30,50}$	0.24	0.99	4.91	0.46	0.41	0.86	0.49	0.16	0.34	0.05
$Q_{54,10}$	0.31	1.23	5.91	0.51	0.51	0.98	0.66	0.19	0.46	0.05
$Q_{54,25}$	0.27	1.09	5.32	0.48	0.45	0.91	0.56	0.18	0.39	0.05
$Q_{54,50}$	0.26	1.05	5.16	0.47	0.44	0.89	0.53	0.17	0.37	0.05
January										
Q_{02}	0.56	1.99	9.15	0.67	0.86	1.38	1.21	0.28	0.87	0.07
Q_{10}	0.39	1.48	6.99	0.56	0.63	1.11	0.84	0.22	0.60	0.06
Q_{25}	0.32	1.25	5.99	0.52	0.52	0.99	0.67	0.19	0.47	0.05
Q_{50}	0.26	1.07	5.24	0.48	0.44	0.90	0.55	0.17	0.38	0.05
Q_{75}	0.21	0.90	4.49	0.44	0.36	0.81	0.42	0.15	0.28	0.04
Q_{90}	0.15	0.73	3.78	0.41	0.29	0.72	0.30	0.13	0.19	0.04
Q_{98}	0.11	0.58	3.16	0.38	0.22	0.65	0.20	0.12	0.12	0.04
Q_{mean}	0.31	1.21	5.82	0.51	0.51	0.97	0.65	0.19	0.45	0.05
February										
Q_{02}	0.59	2.09	9.57	0.69	0.90	1.43	1.28	0.29	0.93	0.08
Q_{10}	0.42	1.56	7.32	0.58	0.67	1.15	0.90	0.23	0.64	0.06
Q_{25}	0.35	1.35	6.41	0.54	0.57	1.04	0.75	0.21	0.53	0.06
Q_{50}	0.28	1.13	5.49	0.49	0.47	0.93	0.59	0.18	0.41	0.05
Q_{75}	0.22	0.95	4.74	0.45	0.39	0.84	0.46	0.16	0.32	0.05
Q_{90}	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
Q_{98}	0.14	0.70	3.66	0.40	0.28	0.71	0.28	0.13	0.18	0.04
Q_{mean}	0.33	1.27	6.09	0.52	0.53	1.00	0.69	0.20	0.49	0.05
March										
Q_{02}	0.61	2.16	9.90	0.71	0.94	1.47	1.34	0.30	0.97	0.08
Q_{10}	0.45	1.66	7.74	0.60	0.71	1.20	0.97	0.24	0.70	0.06
Q_{25}	0.37	1.42	6.74	0.55	0.60	1.08	0.80	0.22	0.57	0.06
Q_{50}	0.32	1.25	5.99	0.52	0.52	0.99	0.67	0.19	0.47	0.05
Q_{75}	0.27	1.09	5.32	0.48	0.45	0.91	0.56	0.18	0.39	0.05
Q90	0.24	1.01	4.99	0.47	0.42	0.87	0.51	0.17	0.35	0.05
Q_{98}	0.18	0.82	4.16	0.42	0.33	0.77	0.37	0.14	0.24	0.04
Q_{mean}	0.34	1.32	6.31	0.53	0.56	1.03	0.73	0.20	0.51	0.06

Appendix B. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
April										
Q_{02}	0.61	2.16	9.90	0.71	0.94	1.47	1.34	0.30	0.97	0.08
Q_{10}	0.45	1.66	7.74	0.60	0.71	1.20	0.97	0.24	0.70	0.06
Q_{25}	0.39	1.46	6.91	0.56	0.62	1.10	0.83	0.22	0.59	0.06
Q_{50}	0.33	1.29	6.16	0.52	0.54	1.01	0.70	0.20	0.49	0.05
Q_{75}	0.28	1.13	5.49	0.49	0.47	0.93	0.59	0.18	0.41	0.05
Q_{90}	0.26	1.05	5.16	0.47	0.44	0.89	0.53	0.17	0.37	0.05
Q_{98}	0.19	0.86	4.33	0.43	0.35	0.79	0.39	0.15	0.26	0.04
Q_{mean}	0.34	1.32	6.31	0.53	0.56	1.03	0.73	0.20	0.51	0.06
May										
Q_{02}	0.61	2.16	9.90	0.71	0.94	1.47	1.34	0.30	0.97	0.08
Q_{10}	0.42	1.56	7.32	0.58	0.67	1.15	0.90	0.23	0.64	0.06
Q_{25}	0.34	1.32	6.30	0.53	0.56	1.03	0.73	0.20	0.51	0.06
Q_{50}	0.30	1.19	5.74	0.50	0.50	0.96	0.63	0.19	0.44	0.05
Q_{75}	0.27	1.09	5.32	0.48	0.45	0.91	0.56	0.18	0.39	0.05
Q_{90}	0.25	1.03	5.07	0.47	0.43	0.88	0.52	0.17	0.36	0.05
Q_{98}	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
Q_{mean}	0.32	1.27	6.07	0.52	0.53	1.00	0.69	0.20	0.48	0.05
June										
Q_{02}	0.61	2.16	9.90	0.71	0.94	1.47	1.34	0.30	0.97	0.08
Q_{10}	0.42	1.56	7.32	0.58	0.67	1.15	0.90	0.23	0.64	0.06
Q_{25}	0.34	1.31	6.24	0.53	0.55	1.02	0.72	0.20	0.51	0.06
Q_{50}	0.28	1.13	5.49	0.49	0.47	0.93	0.59	0.18	0.41	0.05
Q_{75}	0.26	1.05	5.16	0.47	0.44	0.89	0.53	0.17	0.37	0.05
Q_{90}	0.23	0.97	4.82	0.46	0.40	0.85	0.48	0.16	0.33	0.05
Q_{98}	0.18	0.82	4.16	0.42	0.33	0.77	0.37	0.14	0.24	0.04
Q_{mean}	0.29	1.15	5.57	0.49	0.48	0.94	0.60	0.18	0.42	0.05
July										
Q_{02}	0.49	1.79	8.32	0.63	0.77	1.28	1.07	0.26	0.77	0.07
Q_{10}	0.36	1.36	6.49	0.54	0.58	1.05	0.76	0.21	0.54	0.06
Q_{25}	0.29	1.17	5.66	0.50	0.49	0.95	0.62	0.19	0.43	0.05
Q_{50}	0.26	1.07	5.24	0.48	0.44	0.90	0.55	0.17	0.38	0.05
Q_{75}	0.22	0.94	4.66	0.45	0.38	0.83	0.45	0.16	0.31	0.05
Q_{90}	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
Q_{98}	0.13	0.66	3.49	0.39	0.26	0.69	0.25	0.12	0.16	0.04
Q_{mean}	0.25	1.03	5.07	0.47	0.43	0.88	0.52	0.17	0.36	0.05
August										
Q_{02}	0.45	1.66	7.74	0.60	0.71	1.20	0.97	0.24	0.70	0.06
Q_{10}	0.31	1.23	5.91	0.51	0.51	0.98	0.66	0.19	0.46	0.05
Q_{25}	0.26	1.05	5.16	0.47	0.44	0.89	0.53	0.17	0.37	0.05
Q_{50}	0.21	0.93	4.62	0.45	0.38	0.82	0.44	0.16	0.30	0.04
Q_{75}	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
Q_{90}	0.15	0.73	3.78	0.41	0.29	0.72	0.30	0.13	0.19	0.04
Q_{98}	0.09	0.53	2.91	0.36	0.20	0.62	0.16	0.11	0.08	0.03
Q_{mean}	0.22	0.94	4.66	0.45	0.38	0.83	0.45	0.16	0.31	0.05

Appendix B. Continued

Flow type	Location									
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
September										
Q_{02}	0.39	1.48	6.99	0.56	0.63	1.11	0.84	0.22	0.60	0.06
Q_{10}	0.27	1.11	5.41	0.49	0.46	0.92	0.58	0.18	0.40	0.05
Q_{25}	0.22	0.94	4.66	0.45	0.38	0.83	0.45	0.16	0.31	0.05
Q_{50}	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
Q_{75}	0.16	0.74	3.83	0.41	0.29	0.73	0.31	0.13	0.20	0.04
Q_{90}	0.13	0.66	3.49	0.39	0.26	0.69	0.25	0.12	0.16	**0.04**
Q_{98}	0.05	0.41	2.41	0.34	0.14	0.55	0.07	0.09	0.02	0.03
Q_{mean}	0.20	0.89	4.47	0.44	0.36	0.81	0.42	0.15	0.28	0.04
October										
Q_{02}	0.41	1.54	7.24	0.58	0.66	1.14	0.89	0.23	0.63	0.06
Q_{10}	0.30	1.19	5.74	0.50	0.50	0.96	0.63	0.19	0.44	0.05
Q_{25}	0.24	1.01	4.99	0.47	0.42	0.87	0.51	0.17	0.35	0.05
Q_{50}	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
Q_{75}	0.15	0.73	3.78	0.41	0.29	0.72	0.30	0.13	0.19	0.04
Q_{90}	0.11	0.58	3.16	0.38	0.22	0.65	0.20	0.12	0.12	0.04
Q_{98}	0.04	0.37	2.24	0.33	0.13	0.53	0.04	0.09	0.00	0.03
Q_{mean}	0.20	0.89	4.46	0.44	0.36	0.80	0.42	0.15	0.28	0.04
November										
Q_{02}	0.44	1.62	7.57	0.59	0.69	1.18	0.94	0.24	0.67	0.06
Q_{10}	0.32	1.25	5.99	0.52	0.52	0.99	0.67	0.19	0.47	0.05
Q_{25}	0.27	1.09	5.32	0.48	0.45	0.91	0.56	0.18	0.39	0.05
Q_{50}	0.21	0.93	4.62	0.45	0.38	0.82	0.44	0.16	0.30	0.04
Q_{75}	0.17	0.80	4.08	0.42	0.32	0.76	0.35	0.14	0.23	0.04
Q_{90}	0.13	0.66	3.49	0.39	0.26	0.69	0.25	0.12	0.16	0.04
Q_{98}	0.05	0.41	2.41	0.34	0.14	0.55	0.07	0.09	0.02	0.03
Q_{mean}	0.26	1.07	5.24	0.48	0.44	0.90	0.55	0.17	0.38	0.05
December										
Q_{02}	0.54	1.93	8.90	0.66	0.83	1.35	1.17	0.28	0.84	0.07
Q_{10}	0.36	1.36	6.49	0.54	0.58	1.05	0.76	0.21	0.54	0.06
Q_{25}	0.28	1.13	5.49	0.49	0.47	0.93	0.59	0.18	0.41	0.05
Q_{50}	0.24	0.99	4.91	0.46	0.41	0.86	0.49	0.16	0.34	0.05
Q_{75}	0.19	0.84	4.24	0.43	0.34	0.78	0.38	0.15	0.25	0.04
Q_{90}	0.14	0.70	3.66	0.40	0.28	0.71	0.28	0.13	0.18	0.04
Q_{98}	0.08	0.51	2.83	0.36	0.19	0.61	0.14	0.11	0.07	0.03
Q_{mean}	0.30	1.20	5.81	0.51	0.50	0.97	0.64	.0.19	0.45	0.05

Appendix B. Continued

Flow type	Location									
	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Q_{01}	0.40	0.22	0.62	0.87	62.54	32.01	4.81	0.52	1.24	0.60
Q_{02}	0.37	0.21	0.56	0.78	56.53	28.68	4.34	0.47	1.08	0.54
Q_{05}	0.33	0.20	0.49	0.67	49.52	24.78	3.80	0.41	0.89	0.46
Q_{10}	0.30	0.19	0.45	0.60	45.01	22.28	3.46	0.37	0.77	**0.41**
Q_{15}	0.28	0.18	0.42	0.55	42.00	20.61	3.22	0.34	0.69	0.38
Q_{25}	0.27	0.18	0.39	0.51	39.00	18.94	2.99	0.32	0.61	0.34
Q_{40}	0.25	0.17	0.36	0.46	35.99	17.27	2.76	0.29	0.53	0.31
Q_{50}	0.24	0.17	0.35	0.44	34.49	16.44	2.64	0.28	0.49	0.29
Q_{60}	0.23	0.16	0.33	0.41	32.98	15.60	2.53	0.26	0.45	0.28
Q_{75}	0.22	0.16	0.30	0.37	29.98	13.93	2.30	0.24	0.37	0.24
Q_{85}	0.21	0.16	0.28	0.34	27.98	12.82	2.14	0.22	0.31	0.22
Q_{90}	0.19	0.15	0.26	0.31	25.97	11.71	1.99	0.20	0.26	0.20
Q_{95}	0.18	0.15	0.24	0.27	23.97	10.59	1.83	0.18	0.21	0.18
Q_{98}	0.16	0.14	0.21	0.22	20.46	8.65	1.56	0.15	0.11	0.14
Q_{99}	0.15	0.14	0.18	0.17	17.46	6.98	1.33	0.13	0.03	0.11
Q_{mean}	0.25	0.17	0.36	0.46	35.99	17.27	2.76	0.29	0.53	0.31
Low Flows										
Q_{12}	0.14	0.13	0.17	0.16	16.45	6.42	1.25	0.12	0.00	0.10
$Q_{1,10}$	0.11	0.13	0.13	0.09	11.95	3.92	0.91	0.08	0.00	0.05
$Q_{1,25}$	0.11	0.13	0.12	0.08	11.44	3.64	0.87	0.07	0.00	0.04
$Q_{1,50}$	0.11	0.13	0.12	0.08	11.44	3.64	0.87	0.07	0.00	0.04
$Q_{7,2}$	0.19	0.15	0.26	0.30	25.47	11.43	1.95	0.20	0.25	0.20
$Q_{7,10}$	0.15	0.14	0.18	0.17	17.46	6.98	1.33	0.13	0.03	0.11
$Q_{7,25}$	0.14	0.13	0.17	0.16	16.45	6.42	1.25	0.12	0.00	0.10
$Q_{7,50}$	0.14	0.13	0.17	0.16	16.45	6.42	1.25	0.12	0.00	0.10
$Q_{15,2}$	0.19	0.15	0.26	0.31	25.97	11.71	1.99	0.20	0.26	0.20
$Q_{15,10}$	0.15	0.14	0.20	0.20	18.96	7.81	1.45	0.14	0.07	0.12
$Q_{15,25}$	0.14	0.14	0.18	0.17	16.95	6.70	1.29	0.12	0.02	0.10
$Q_{15,50}$	0.14	0.14	0.18	0.17	16.95	6.70	1.29	0.12	0.02	0.10
$Q_{31,2}$	0.20	0.15	0.27	0.32	26.97	12.26	2.06	0.21	0.29	0.21
$Q_{31,10}$	0.16	0.14	0.21	0.22	20.46	8.65	1.56	0.15	0.11	0.14
$Q_{31,25}$	0.15	0.14	0.18	0.17	17.46	6.98	1.3.3	0.13	0.03	0.11
$Q_{31,50}$	0.14	0.14	0.18	0.17	16.95	6.70	1.29	0.12	0.02	0.10
$Q_{61,2}$	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
$Q_{61,10}$	0.17	0.14	0.22	0.24	21.96	9.48	1.68	0.17	0.15	0.16
$Q_{61,25}$	0.15	0.14	0.20	0.20	18.96	7.81	1.45	0.14	0.07	0.12
$Q_{61,50}$	0.15	0.14	0.19	0.18	17.96	7.26	1.37	0.13	0.05	0.11
$Q_{91,2}$	0.22	0.16	0.30	0.37	29.98	13.93	2.30	0.24	0.37	0.24
$Q_{91,10}$	0.18	0.15	0.24	0.27	23.97	10.59	1.83	0.18	0.21	0.18
$Q_{91,25}$	0.16	0.14	0.21	0.22	20.46	8.65	1.56	0.15	0.11	0.14
$Q_{91,50}$	0.16	0.14	0.21	0.21	19.96	8.37	1.52	0.15	0.10	0.13

Appendix B. Continued

Flow type	Location (31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
Drought Flows										
$Q_{6,10}$	0.21	0.16	0.28	0.34	27.98	12.82	2.14	0.22	0.31	0.22
$Q_{6,25}$	0.19	0.15	0.26	0.30	25.47	11.43	1.95	0.20	0.25	0.20
$Q_{6,50}$	0.18	0.15	0.24	0.27	23.97	10.59	1.83	0.18	0.21	0.18
$Q_{9,10}$	0.22	0.16	0.31	0.38	30.73	14.35	2.35	0.24	0.39	0.25
$Q_{9,25}$	0.21	0.16	0.29	0.35	28.98	13.38	2.22	0.23	0.34	0.23
$Q_{9,50}$	0.20	0.15	0.28	0.33	27.47	12.54	2.10	0.22	0.30	0.22
$Q_{12,10}$	0.24	0.17	0.34	0.42	33.49	15.88	2.57	0.27	0.46	0.28
$Q_{12,25}$	0.23	0.16	0.32	0.39	31.48	14.77	2.41	0.25	0.41	0.26
$Q_{12,50}$	0.21	0.16	0.30	0.36	29.48	13.65	2.26	0.23	0.36	0.24
$Q_{18,10}$	0.24	0.17	0.35	0.44	34.99	16.71	2.68	0.28	0.50	0.30
$Q_{18,25}$	0.23	0.16	0.33	0.41	32.48	15.32	2.49	0.26	0.44	0.27
$Q_{18,50}$	0.22	0.16	0.31	0.38	30.73	14.35	2.35	0.24	0.39	0.25
$Q_{30,10}$	0.25	0.17	0.37	0.47	36.49	17.55	2.80	0.29	0.54	0.32
$Q_{30,25}$	0.24	0.17	0.34	0.43	33.99	16.16	2.61	0.27	0.48	0.29
$Q_{30,50}$	0.23	0.16	0.33	0.41	32.48	15.32	2.49	0.26	0.44	0.27
$Q_{54,10}$	0.26	0.18	0.38	0.50	38.50	18.66	2.95	0.31	0.60	0.34
$Q_{54,25}$	0.24	0.17	0.35	0.44	34.99	16.71	2.68	0.28	0.50	0.30
$Q_{54,50}$	0.24	0.17	0.34	0.43	33.99	16.16	2.61	0.27	0.48	0.29
January										
Q_{02}	0.37	0.21	0.57	0.80	58.03	29.51	4.46	0.49	1.12	0.55
Q_{10}	0.30	0.19	0.45	0.60	45.01	22.28	3.46	0.37	0.77	0.41
Q_{25}	0.27	0.18	0.39	0.51	39.00	18.94	2.99	0.32	0.61	0.34
Q_{50}	0.24	0.17	0.35	0.44	34.49	16.44	2.64	0.28	0.49	0.29
Q_{75}	0.22	0.16	0.30	0.37	29.98	13.93	2.30	0.24	0.37	0.24
Q_{90}	0.19	0.15	0.26	0.30	25.72	11.57	1.97	0.20	0.25	0.20
Q_{98}	0.17	0.14	0.22	0.24	21.96	9.48	1.68	0.17	0.15	0.16
Q_{mean}	0.26	0.17	0.38	0.49	37.99	18.38	2.92	0.31	0.58	0.33
February										
Q02	0.39	0.22	0.60	0.84	60.54	30.90	4.65	0.51	1.19	0.58
Q_{10}	0.31	0.19	0.47	0.63	47.01	23.39	3.61	0.39	0.83	0.43
Q_{25}	0.28	0.18	0.41	0.55	41.50	20.33	3.19	0.34	0.68	0.37
Q_{50}	0.25	0.17	0.36	0.46	35.99	17.27	2.76	0.29	0.53	0.31
Q_{75}	0.23	0.16	0.32	0.39	31.48	14.77	2.41	0.25	0.41	0.26
Q_{90}	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
Q_{98}	0.19	0.15	0.25	0.29	24.97	11.15	1.91	0.19	0.23	0.19
Q_{mean}	0.27	0.18	0.40	0.52	39.60	19.27	3.04	0.32	0.63	0.35
March										
Q_{02}	0.40	0.22	0.62	0.87	62.54	32.01	4.81	0.52'	1.24	0.60
Q_{10}	0.33	0.20	0.49	0.67	49.52	24.78	3.80	0.41	0.89	0.46
Q_{25}	0.29	0.18	0.43	0.58	43.50	21.44	3.34	0.36	0.73	0.39
Q_{50}	0.27	0.18	0.39	0.51	39.00	18.94	2.99	0.32	0.61	0.34
Q_{75}	0.24	0.17	0.35	0.44	34.99	16.71	2.68	0.28	0.50	0.30
Q_{90}	0.23	0.16	0.33	0.41	32.98	15.60	2.53	0.26	0.45	0.28
Q_{98}	0.21	0.16	0.28	0.34	27.98	12.82	2.14	0.22	0.31	0.22
Q_{mean}	0.28	0.18	0.41	0.54	40.90	20.00	3.14	0.33	0.66	0.36

Appendix B. Continued

Flow type	Location									
	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
April										
Q_{02}	0.40	0.22	0.62	0.87	62.54	32.01	4.81	0.52	1.24	0.60
Q_{10}	0.33	0.20	0.49	0.67	49.52	24.78	3.80	0.41	0.89	0.46
Q_{25}	0.30	0.19	0.44	0.59	44.51	22.00	3.42	0.37	0.76	0.40
Q_{50}	0.27	0.18	0.40	0.52	40.00	19.50	3.07	0.33	0.64	0.35
Q_{75}	0.25	0.17	0.36	0.46	35.99	17.27	2.76	0.29	0.53	0.31
Q_{90}	0.24	0.17	0.34	0.43	33.99	16.16	2.61	0.27	0.48	0.29
Q_{98}	0.21	0.16	0.29	0.35	28.98	13.38	2.22	0.23	0.34	0.23
Q_{mean}	0.28	0.18	0.41	0.54	40.95	20.02	3.14	0.33	0.66	0.36
May										
Q_{02}	0.40	0.22	0.62	0.87	62.54	32.01	4.81	0.52	1.24	0.60
Q_{10}	0.31	0.19	0.47	0.63	47.01	23.39	3.61	0.39	0.83	0.43
Q_{25}	0.28	0.18	0.41	0.54	40.85	19.97	3.14	0.33	0.66	0.36
Q_{50}	0.26	0.17	0.38	0.48	37.49	18.11	2.88	0.30	0.57	0.33
Q_{75}	0.24	0.17	0.35	0.44	34.99	16.71	2.68	0.28	0.50	0.30
Q_{90}	0.24	0.17	0.34	0.42	33.49	15.88	2.57	0.27	0.46	0.28
Q_{98}	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
Q_{mean}	0.27	0.18	0.39	0.51	39.50	19.22	3.03	0.32	0.62	0.35
June										
Q_{02}	0.40	0.22	0.62	0.87	62.54	32.01	4.81	0.52	1.24	0.60
Q_{10}	0.31	0.19	0.47	0.63	47.01	23.39	3.61	0.39	0.83	0.43
Q_{25}	0.28	0.18	0.40	0.53	40.50	19.77	3.11	0.33	0.65	0.36
Q_{50}	0.25	0.17	0.36	0.46	35.99	17.27	2.76	0.29	0.53	0.31
Q_{75}	0.24	0.17	0.34	0.43	33.99	16.16	2.61	0.27	0.48	0.29
Q_{90}	0.23	0.16	0.32	0.40	31.98	15.05	2.45	0.26	0.42	0.27
Q_{98}	0.21	0.16	0.28	0.34	27.98	12.82	2.14	0.22	0.31	0.22
Q_{mean}	0.25	0.17	0.36	0.47	36.44	17.52	2.80	0.29	0.54	0.32
July										
Q_{02}	0.35	0.20	0.53	0.72	53.02	26.73	4.07	0.44	0.99	0.50
Q_{10}	0.28	0.18	0.42	0.55	42.00	20.61	3.22	0.34	0.69	0.38
Q_{25}	0.26	0.17	0.37	0.48	36.99	17.83	2.84	0.30	0.56	0.32
Q_{50}	0.24	0.17	0.35	0.44	34.49	16.44	2.64	0.28	0.49	0.29
Q_{75}	0.22	0.16	0.31	0.38	30.98	14.49	2.37	0.25	0.40	0.26
Q_{90}	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
Q_{98}	0.18	0.15	0.24	0.27	23.97	10.59	1.83	0.18	0.21	0.18
Q_{mean}	0.24	0.17	0.34	0.42	33.49	15.88	2.57	0.27	0.46	0.28
August										
Q_{02}	0.33	0.20	0.49	0.67	49.52	24.78	3.80	0.41	0.89	0.46
Q_{10}	0.26	0.18	0.38	0.50	38.50	18.66	2.95	0.31	0.60	0.34
Q_{25}	0.24	0.17	0.34	0.43	33.99	16.16	2.61	0.27	0.48	0.29
Q_{50}	0.22	0.16	0.31	0.38	30.73	14.35	2.35	0.24	0.39	0.25
Q_{75}	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
Q_{90}	0.19	0.15	0.26	0.30	25.72	11.57	1.97	0.20	0.25	0.20
Q_{98}	0.16	0.14	0.21	0.22	20.46	8.65	1.56	0.15	0.11	0.14
Q_{mean}	0.22	0.16	0.31	0.38	30.98	14.49	2.37	0.25	0.40	0.26

Appendix B. Continued

Flow type	Location									
	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
September										
Q_{02}	0.30	0.19	0.45	0.60	45.01	22.28	3.46	0.37	0.77	**0.41**
Q_{10}	0.25	0.17	0.36	0.45	35.49	16.99	2.72	0.29	0.52	**0.31**
Q_{25}	0.22	0.16	0.31	0.38	30.98	14.49	2.37	0.25	0.40	0.26
Q_{50}	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
Q_{75}	0.19	0.15	0.26	0.31	25.97	11.71	1.99	0.20	0.26	0.20
Q_{90}	0.18	0.15	0.24	0.27	23.97	10.59	1.83	0.18	0.21	**0.18**
Q_{98}	0.15	0.14	0.18	0.17	17.46	6.98	1.33	0.13	0.03	**0.11**
Q_{mean}	0.22	0.16	0.30	0.37	29.88	13.88	2.29	0.24	0.37	0.24
October										
Q_{02}	0.31	0.19	0.46	0.62	46.51	23.11	3.57	0.38	0.81	0.43
Q_{10}	0.26	0.17	0.38	0.48	37.49	18.11	2.88	0.30	0.57	0.33
Q_{25}	0.23	0.16	0.33	0.41	32.98	15.60	2.53	0.26	0.45	0.28
Q_{50}	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
Q_{75}	0.19	0.15	0.26	0.30	25.72	11.57	1.97	0.20	0.25	0.20
Q_{90}	0.17	0.14	0.22	0.24	21.96	9.48	1.68	0.17	0.15	0.16
Q_{98}	0.14	0.13	0.17	0.16	16.45	6.42	1.25	0.12	0.00	0.10
Q_{mean}	0.22	0.16	0.30	0.36	29.78	13.82	2.28	0.24	0.36	0.24
November										
Q_{02}	0.32	0.19	0.48	0.65	48.51	24.23	3.73	0.40	0.87	0.45
Q_{10}	0.27	0.18	0.39	0.51	39.00	18.94	2.99	0.32	0.61	0.34
Q_{25}	0.24	0.17	0.35	0.44	34.99	16.71	2.68	0.28	0.50	0.30
Q_{50}	0.22	0.16	0.31	0.38	30.73	14.35	2.35	0.24	0.39	0.25
Q_{75}	0.20	0.15	0.28	0.33	27.47	12.54	2.10	0.22	0.30	0.22
Q_{90}	0.18	0.15	0.24	0.27	23.97	10.59	1.83	0.18	0.21	0.18
Q_{98}	0.15	0.14	0.18	0.17	17.46	6.98	1.33	0.13	0.03	0.11
Q_{mean}	0.24	0.17	0.35	0.44	34.49	16.44	2.64	0.28	0.49	0.29
December										
Q_{02}	0.37	0.21	0.56	0.78	56.53	28.68	4.34	0.47	1.08	0.54
Q_{10}	0.28	0.18	0.42	0.55	42.00	20.61	3.22	0.34	0.69	0.38
Q_{25}	0.25	0.17	0.36	0.46	35.99	17.27	2.76	0.29	0.53	0.31
Q_{50}	0.23	0.16	0.33	0.41	32.48	15.32	2.49	0.26	0.44	0.27
Q_{75}	0.21	0.16	0.29	0.34	28.48	13.10	2.18	0.22	0.33	0.23
Q_{90}	0.19	0.15	0.25	0.29	24.97	11.15	1.91	0.19	0.23	0.19
Q_{98}	0.16	0.14	0.21	0.21	19.96	8.37	1.52	0.15	0.10	0.13
Q_{mean}	0.26	0.17	0.38	0.49	37.89	18.33	2.91	0.31	0.58	0.33

Appendix B. Continued

Flow type	Location			
	(41)	(42)	(43)	(44)
Q_{01}	0.48	-56	-1	-48
Q_{02}	0.42	-56	-1	-46
Q_{05}	0.36	-56	-1	-46
Q_{10}	0.32	-56	-1	-46
Q_{15}	0.29	-56	-1	-46
Q_{25}	0.27	-56	-1	-46
Q_{40}	0.24	-56	-1	-46
Q_{50}	0.23	-56	-1	-46
Q_{60}	0.21	-56	-1	-46
Q_{75}	0.19	-56	-1	-46
Q_{85}	0.17	-56	-1	-46
Q_{go}	0.15	-56	-1	-46
Q_{95}	0.13	-56	-1	-46
Q_{98}	0.10	-56	-1	-46
Q_{99}	0.08	-56	-1	-46
Q_{mean}	0.24	-56	-1	-46
Low Flows				
Q_{12}	0.07	-56	-1	-46
$Q_{1,10}$	0.03	-56	-1	-46
$Q_{1,25}$	0.02	-56	-1	-46
$Q_{1,50}$	0.02	-56	-1	-46
$Q_{7,2}$	0.15	-56	-1	-46
$Q_{7,10}$	0.08	-56	-1	-46
$Q_{7,25}$	0.07	-56	-1	-46
$Q_{7,50}$	0.07	-56	-1	-46
$Q_{15,2}$	0.15	-56	-1	-46
$Q_{15,10}$	0.09	-56	-1	-46
$Q_{15,25}$	0.07	-56	-1	-46
$Q_{15,50}$	0.07	-56	-1	-46
$Q_{31,2}$	0.16	-56	-1	-46
$Q_{31,10}$	0.10	-56	-1	-46
$Q_{31,25}$	0.08	-56	-1	-46
$Q_{31,50}$	0.07	-56	-1	-46
$Q_{61,2}$	0.17	-56	-1	-46
$Q_{61,10}$	0.12	-56	-1	-46
$Q_{61,25}$	0.09	-56	-1	-46
$Q_{61,50}$	0.08	-56	-1	-46
$Q_{91,2}$	0.19	-56	-1	-46
$Q_{91,10}$	0.13	-56	-1	-46
$Q_{91.25}$	0.10	-56	-1	-46
$Q_{91,50}$	0.10	-56	-1	-46

Appendix B. Continued

Flow type	Location			
	(41)	(42)	(43)	(44)
Drought Flows				
$Q_{6,10}$	0.17	-56	**-1**	-46
$Q_{6,25}$	0.15	-56	-1	-46
$Q_{6,50}$	0.13	-56	-1	-46
$Q_{9,10}$	0.19	-56	-1	-46
$Q_{9,25}$	0.18	-56	-1	-46
$Q_{9,50}$	0.17	-56	-1	-46
$Q_{12,10}$	0.22	-56	-1	-46
$Q_{12,25}$	0.20	-56	-1	-46
$Q_{12,50}$	0.18	-56	-1	-46
$Q_{18,10}$	0.23	-56	-1	-46
$Q_{18,25}$	0.21	-56	-1	-46
$Q_{18,50}$	0.19	-56	-1	-46
$Q_{30,10}$	0.24	-56	-1	-46
$Q_{30,25}$	0.22	-56	-1	-46
$Q_{30,50}$	0.21	-56	-1	-46
$Q_{54,10}$	0.26	-56	-1	-46
$Q_{54,25}$	0.23	-56	-1	-46
$Q_{54,50}$	0.22	-56	-1	-46
January				
Q_{02}	0.44	-56	-1	-46
Q_{10}	0.32	-56	-1	-46
Q_{25}	0.27	-56	-1	-46
Q_{50}	0.23	-56	-1	-46
Q_{75}	0.19	-56	-1	-46
Q_{90}	0.15	-56	-1	-46
Q_{98}	0.12	-56	-1	-46
Q_{mean}	0.26	-56	-1	-46
February				
Q_{02}	0.46	-56	-1	-46
Q_{10}	0.34	-56	-1	-46
$\mathbf{Q_{25}}$	0.29	-56	-1	-46
Q_{50}	0.24	-56	-1	-46
$\mathbf{Q_{75}}$	0.20	-56	-1	-46
Q_{90}	0.17	-56	**-1**	-46
Q_{98}	0.14	-56	-1	-46
Q_{mean}	0.27	-56	-1	-46
March				
Q_{02}	0.48	-56	-1	-46
Q_{10}	0.36	-56	-1	-46
Q_{25}	0.31	-56	-1	-46
Q_{50}	0.27	-56	-1	-46
Q_{75}	0.23	-56	-1	-46
Q_{90}	0.21	-56	-1	-46
Q_{98}	0.17	-56	-1	-46
Q_{mean}	0.28	-56	-1	-46

Appendix B. Continued

Flow type	Location			
	(41)	(42)	(43)	(44)
April				
Q_{02}	0.48	-56	-1	-46
Q_{10}	0.36	-56	-1	-46
Q_{25}	0.32	-56	-1	-46
Q_{50}	0.28	-56	-1	-46
Q_{75}	0.24	-56	-1	-46
Q_{90}	0.22	-56	-1	-46
Q_{g8}	0.18	-56	-1	-46
Qmean	0.28	-56	-1	-46
May				
Q_{02}	0.48	-56	-1	-46
Q_{10}	0.34	-56	-1	-46
Q_{25}	0.28	-56	-1	-46
Q_{50}	0.25	-56	-1	-46
Q_{75}	0.23	-56	-1	-46
Q_{90}	0.22	-56	-1	-46
Q_{98}	0.17	-56	-1	-46
Q_{mean}	0.27	-56	-1	-46
June				
Q_{02}	0.48	-56	-1	-46
Q_{10}	0.34	-56	-1	-46
Q_{25}	0.28	-56	-1	-46
Q_{50}	0.24	-56	-1	-46
Q_{75}	0.22	-56	-1	-46
Q_{90}	0.21	-56	-1	-46
Q_{98}	0.17	-56	-1	-46
Q_{mean}	0.24	-56	-1	-46
July				
Q_{02}	0.39	-56	-1	-46
Q_{10}	0.29	-56	-1	-46
Q_{25}	0.25	-56	-1	-46
Q_{50}	0.23	-56	-1	-46
Q_{75}	0.20	-56	-1	-46
Q_{90}	0.17	-56	-1	-46
Q_{98}	0.13	-56	-1	-46
Q_{mean}	0.22	-56	-1	-46
August				
Q_{02}	0.36	-56	-1	-46
Q_{10}	0.26	-56	-1	-46
Q_{25}	0.22	-56	-1	-46
Q_{50}	0.19	-56	-1	-46
Q_{75}	0.17	-56	-1	-46
Q_{90}	0.15	-56	-1	-46
Q_{98}	0.10	-56	-1	-46
Q_{mean}	0.20	-56	-1	-46

Appendix B. Concluded

Flow type	Location (41)	(42)	(43)	(44)
September				
Q_{02}	0.32	-56	-1	-46
Q_{10}	0.24	-56	-1	-46
Q_{25}	0.20	-56	-1	-46
Q_{50}	0.17	-56	-1	-46
Q_{75}	0.15	-56	-1	-46
Q_{90}	0.13	-56	-1	-46
Q_{98}	0.08	-56	-1	-46
Q_{mean}	0.19	-56	-1	-46
October				
Q_{02}	0.33	-56	-1	-46
Q_{10}	0.25	-56	-1	-46
Q_{25}	0.21	-56	-1	-46
Q_{50}	0.17	-56	-1	-46
Q_{75}	0.15	-56	-1	-46
Q_{90}	0.12	-56	-1	-46
Q_{98}	0.07	-56	-1	-46
Q_{mean}	0.19	-56	-1	-46
November				
Q_{02}	0.35	-56	-1	-46
Q_{10}	0.27	-56	-1	-46
Q_{25}	0.23	-56	-1	-46
Q_{50}	0.19	-56	-1	-46
Q_{75}	0.17	-56	-1	-46
Q_{90}	0.13	-56	-1	-46
Q_{98}	0.08	-56	-1	-46
Q_{mean}	0.23	-56	-1	-46
December				
Q_{02}	0.42	-56	-1	-46
Q_{10}	0.29	-56	-1	-46
Q_{25}	0.24	-56	-1	-46
Q_{50}	0.21	-56	-1	-46
Q_{75}	0.17	-56	-1	-46
Q_{90}	0.14	-56	-1	-46
Q_{98}	0.10	-56	-1	-46
Q_{mean}	0.26	-56	**-1**	-46

Appendix C. NETWORK File Describing the Location of Streams, Control Points, Withdrawals, and Discharges in the Sangamon River Basin

List of Stream Names and Associated Codes

Stream name	Code	Stream name	Code
Archer Creek	IHL	Friends Creek	IQ
Bear Creek	IKN	Friends Creek Ditch	IQK
Bear Creek tributary	IKNM	Furrer Ditch	IDV
Bear Creek tributary	IKNQ	Goose Creek	IT
Big Creek	IPD	Goose Creek tributary	ITL
Big Ditch	IT4	Griffith Creek	IK5G
Big Ditch	IV	Grove Creek	IEAE
Big George Branch	IKRN	Herget Drainage Ditch	IDD
Black Branch	IKB	Hillsbury Slough	IW5
Brush Creek	IKCF	Horse Creek	IKC
Brush Creek	IKP	Hunter Slough	IEII
Brushy Branch	IKRI	Indian Creek	IF
Buckhart Creek	IL	Jacksonville Branch	IHG
Buckhart Creek tributary	ILE	Jobs Creek	IA8
Buckhart Creek tributary	ILL	Johns Creek	IJHOG
Cabiness Creek	IEA	Kickapoo Creek	IEG
Camp Creek	IS	Kickapoo Creek	IQGC
Camp Creek tributary	ISK	Kickapoo Creek tributary	IEGH
Cantrall Creek	IG3	Kickapoo Creek tributary	IEGW
Clary Creek	IC	Kings Mill Creek	IEDKDS
Clear Creek	IEGK	Lake Fork	IEI
Clear Creek	IK5	Lake Fork	IKRU
Clear Creek	IKH	North Fork tributary	IEIH
Clear Creek tributary	IKHE	Lake Fork tributary	IKRUO
Clear Creek West	IKHC	Lick Creek	IJH
Clear Creek West tributary	IKHCF	Little Grove Creek	ICE
Concord Creek	IE6	Little Kickapoo Creek	IEGR
Coon Creek	IEQ	Little Kickapoo Creek	IEGT
Cotton Creek	IKW	Little Spring Creek	IHN
Cox Creek	IBH	Locust Creek	IKT
Crane Creek	ID	Lonetree Creek	IY
Deer Creek	IEH	Lonetree Creek tributary	IYI
Dickerson Slough	IW7	Long Creek	IPDE
Drummer Creek	IX	Long Grove Creek	IKRMF
Drummer Creek tributary	IXI	Long Point Creek	IEGN
Dry Branch	IKRMJ	Long Point Slough	IM2
Elkhart Slough	IEIC	Long Point Slough tributary	IM2D
Fancy Creek	IH7	Long Point Slough tributary	IM2H
Fancy Creek tributary	IH7J	Lost Creek	IA
Finley Creek	IP	Madden Creek	IT4
Flat Branch	IKR	Middle Creek	IB5
Flat Branch tributary	IKRQ	Middle Fork Sugar Creek	IEDKD

Appendix C. Continued

Stream Names and Associated Codes Continued

Stream name	Code
Middle Fork Sugar Creek tributary	IEDKDC
Middle Fork Sugar Creek tributary	IEDKDO
Mosquito Creek	IM
Mosquito Creek tributary	IMQ
Niantic Creek	IM2J
North Fork Lake Fork	IEI
North Fork Clear Creek	IK5H
North Fork Salt Creek	IES
North Fork Salt Creek	IESO
North Fork Salt Creek tributary	IESU
North Fork Salt Creek tributary	IESV
North Fork tributary	IEIQ
Oak Branch	IKRK
Owl Creek	IW
Panther Creek	IB
Panther Creek	UK
Panther Creek	IKM8
Pike Creek	IEC
Prairie Creek	IEDB
Prairie Creek	IEGM
Prairie Creek	IGG
Prairie Creek Ditch	IEDBJ
Prairie Creek tributary	IEDBH
Prairie Creek tributary	IEDBP
Prairie Fork	IKNH
Richland Creek	IG
Rock Creek	IEGL
Rock Creek	IF8
Salt Creek	IE
Salt Creek tributary	IEA4
Salt Creek tributary	IEB3
Salt Creek tributary	IEF
Salt Creek tributary	IEJ
Salt Creek tributary	IEN
Salt Creek tributary	IEV6
Salt Creek tributary	IEX
Salt Creek tributary	IEY
Salt Spring Creek	IEHC
Sand Creek	109
Sangamon River	I
Sangamon River tributary	IM7
Sangamon River tributary	IP9
Sangamon River tributary	IU
Sangamon River tributary	IV4
Sleepy Hollow Ditch	IEB
South Fork Lake Fork	IEIL
South Fork Lake Fork tributary	IEILK
South Fork Lake Fork tributary	IEILL
South Fork Lick Creek	IJHO
South Fork Sangamon River	IK
South Fork Sangamon River tributary	IKF
South Fork Sangamon River tributary	IKI
South Fork Sangamon River tributary	IKK
Spring Creek	IH
Spring Creek	IMP
Spring Creek	IOE
Stevens Creek	IO
Sugar Creek	IED
Sugar Creek	IJ
Sugar Creek tributary	IEDT
Tar Creek	IC3
Tenmile Creek	IEP
Timber Creek	IEDP
Town Branch	IF7
Trenkle Slough	IEW
West Branch Drummer Creek	IXJ
West Branch Friends Creek	IQG
West Branch Horse Creek	IKCQ
West Fork Brushy Branch	IKRIL
West Fork North Fork Salt Creek	IESQ
West Fork Sugar Creek	IEDK
West Fork Sugar Creek tributary	IEDKF
West Fork Sugar Creek tributary	IEDKK
Wildcat Slough	IV7
Willow Branch	IKRM
Willow Branch	IR
Wolf Creek	II
Wolf Creek tributary	ME
Wolf Run Ditch	IQ8

Note: Each stream has a unique code. Along the course of a stream it is possible for the stream name to change, but the stream code will not change. To differentiate between two streams that share the same name, use the location descriptions presented in the remainder of this appendix.

Appendix C. Continued

Watershed Characteristics at Locations of Interest in the Sangamon River Basin

DA(u) = Drainage area upstream of location (sq mi)
DA(d) = Drainage area downstream of location (sq mi)
K - Average subsoil permeability (inches/hr)
P-ET = Net excess precipitation for the watershed (inches), defined as average annual precipitation (P) minus evapotranspiration (ET)

ID = 0 Basic watershed information
= 1 Tributary inflow
= 2 Effluent discharge
= 3 Water supply withdrawal
= 6 Control point (full set of flow information)
= 9 Reservoir

Region = 1 Bloomington Ridged Plain
= 2 Springfield Plain

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Sangamon River	241.40	0.0	0.0	1.13	10.40	0	1	topographic divide
(I)	237.40	5.6	5.6	1.03	10.40	0	1	Northwestern RR
	234.70	13.2	13.2	0.96	10.40	0	1	Chicago and Northwestern RR
	230.90	20.2	20.2	0.90	10.42	0	1	4 miles west of Saybrook
	225.80	33.6	33.6	0.77	10.45	0	1	0.5 miles west of Saybrook
	225.50	33.6	41.9	0.73	10.47	0	1	at Saybrook
	224.50	45.1	45.1	0.73	10.48	0	1	0.5 miles south of Saybrook
	220.00	53.3	53.3	0.75	10.49	0	1	IL Rte. 54
	216.90	60.1	60.1	0.75	10.51	0	1	Chicago and Northwestern RR
	213.61	66.8	66.8	0.75	10.52	0	1	
	213.60	66.8	114.1	0.77	10.55	1	1	at Lone Tree Creek (IY)
	212.90	115.0	115.0	0.77	10.55	0	1	IL Rte. 47
	211.21	116.0	116.0	0.77	10.55	0	1	
	211.20	116.0	174.0	0.73	10.57	1	1	at Drummer Creek (IX)
	208.01	182.0	182.0	0.73	10.57	0	1	
	208.00	182.0	212.5	0.65	10.59	1	1	at Dickerson Slough (IW7)
	205.51	214.7	214.7	0.65	10.59	0	1	
	205.50	214.7	234.1	0.65	10.59	1	1	at Hillsbury Slough (IW5)
	201.10	239.0	239.0	0.64	10.59	6	1	USGS Gage 05570910 at Fisher
	200.11	239.8	239.8	0.64	10.59	0	1	
	200.10	239.8	252.5	0.64	10.60	1	1	at Owl Creek (IW)
	197.71	254.5	254.5	0.63	10.60	0	1	
	197.70	254.5	272.4	0.63	10.60	1	1	at Wildcat Slough (IV7)
	195.51	275.4	275.4	0.63	10.60	0	1	
	195.50	275.4	289.6	0.63	10.60	1	1	at Sangamon River tributary (IV4)
	191.91	292.2	292.2	0.63	10.60	0	1	
	191.90	292.2	345.0	0.63	10.61	1	1	at Big Ditch (IV)
	189.61	352.2	352.2	0.63	10.61	0	1	
	189.60	352.2	356.1	0.63	10.61	1	1	at Sangamon tributary (IU)
	186.10	361.7	361.7	0.63	10.61	6	1	USGS Gage 05571000 at Mahomet
	185.20	362.6	362.6	0.63	10.61	2	1	Mahomet STP
	181.00	372.0	372.0	0.64	10.61	0	1	ISWS Gage-Sec.30,T20N,R 7E
	171.00	392.9	392.9	0.66	10.61	0	1	IL Rte. 10
	169.81	398.0	398.0	0.68	10.61	0	1	
	169.80	398.0	425.3	0.68	10.60	1	1	at Madden Creek (IT4)
	164.41	435.0	435.0	0.70	10.60	0	1	
	164.40	435.0	493.9	0.70	10.58	1	1	at Goose Creek (IT)

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Sangamon River	163.81	494.2	494.2	0.70	10.58	0	1	
(I)	163.80	494.2	549.2	0.70	10.58	1	1	at Camp Creek (IS)
	162.60	550.4	550.4	0.70	10.58	6	1	USGS Gage 05572000 at Monticello
	162.50	552.8	552.8	0.70	10.58	2	1	Monticello WTP
	158.50	564.0	572.6	0.71	10.57	0	1	at Wildcat Creek
	155.61	575.7	575.7	0.71	10.57	0	1	
	155.60	575.7	597.3	0.72	10.57	1	1	at Willow Branch (IR)
	155.01	597.9	597.9	0.73	10.57	0	1	
	155.00	597.9	610.9	0.73	10.56	1	1	at Wolf Run Ditch (IQ8)
	146.71	632.0	632.0	0.76	10.55	0	1	
	146.70	632.0	761.0	0.76	10.51	1	1	at Friends Creek (IQ)
	145.11	764.4	764.4	0.77	10.50	0	1	
	145.00	764.4	774.4	0.77	10.50	1	1	at Sangamon River tributary (IP9)
	144.30	774.6	774.6	0.77	10.50	0	1	USGS Gage 05572500 near Oakley
	144.20	774.6	783.2	0.78	10.50	0	1	
	132.31	822.7	822.7	0.78	10.48	0	1	
	132.30	822.7	907.2	0.78	10.46	1	1	at Finley Creek (IP)
	132.21	907.2	907.2	0.78	10.46	0	1	
	132.20	907.2	923.2	0.78	10.45	1	1	at Sand Creek (I09)
	130.90	925.0	925.0	0.78	10.45	3	1	Decatur PWS withdrawal
	130.80	925.0	925.0	0.78	10.45	6	1	Lake Decatur Dam
	129.70	927.2	937.2	0.78	10.45	0	1	
	127.31	941.4	941.4	0.78	10.44	0	1	above Stevens Creek
	127.30	941.4	1028.4	0.78	10.41	1	1	at Stevens Creek (IO)
	117.80	1053.9	1053.9	0.78	10.40	0	2	Lincoln Trail bridge
	114.41	1074.0	1074.0	0.78	10.40	0	2	
	114.40	1074.0	1083.7	0.78	10.40	1	2	at Sangamon River tributary (IM7)
	110.40	1088.2	1088.2	0.78	10.38	0	2	Sangamon-Macon County Line
	108.91	1088.2	1088.2	0.78	10.38	0	2	
	108.90	1088.2	1152.6	0.77	10.34	1	2	at Long Point Slough (IM2)
	107.71	1152.9	1152.9	0.77	10.34	0	2	
	107.70	1152.9	1230.0	0.76	10.30	1	2	at Mosquito Creek (IM)
	99.60	1261.7	1261.7	0.76	10.28	0	2	USGS Gage 05573800 at Roby
	93.51	1267.7	1267.7	0.76	10.27	0	2	
	93.50	1267.7	1372.5	0.75	10.21	1	2	at Buckhart Creek (IL)
	91.21	1380.0	1380.0	0.75	10.20	0	2	
	91.20	1380.0	1435.8	0.75	10.17	1	2	at Clear Creek (IK5)
	86.92	1444.7	1444.7	0.75	10.16	1	2	upstream of South Fork Sangamon River
	86.91	1444.7	2327.7	0.67	9.97	1	2	at South Fork Sangamon River (IK)
	86.90	2610.7	2610.7	0.66	9.85	1	2	at Sugar Creek (IJ)
	84.70	2618.0	2618.0	0.66	9.84	6	2	USGS Gage 05576500 at Riverton
	82.80	2619.0	2619.0	0.66	9.84	2	2	St.Francis Hospital/Riverton STP
	81.21	2624.8	2624.8	0.79	9.84	0	2	
	81.20	2624.8	2686.5	0.79	9.82	1	2	at Wolf Creek (II)
	79.51	2688.0	2688.0	0.79	9.82	0	2	
	79.50	2688.0	2727.1	0.79	9.81	1	2	at Fancy Creek (IH7)
	75.01	2736.2	2736.2	0.79	9.81	0	2	above Spring Creek
	75.00	2736.2	2861.2	0.80	9.76	1	2	at Spring Creek (IH)
	63.21	2883.8	2883.8	0.81	9.75	0	2	
	63.20	2883.8	2904.6	0.81	9.74	1	2	at Cantrall Creek (IG3)
	59.21	2911.7	2911.7	0.81	9.74	0	2	
	59.20	2911.7	3001.4	0.82	9.71	1	2	at Richland Creek (IG)
	54.91	3006.6	3006.6	0.82	9.70	0	2	
	54.90	3006.6	3024.1	0.83	9.70	1	2	at Rock Creek (IF8)
	54.61	3024.3	3024.3	0.83	9.70	0	2	
	54.60	3024.3	3032.0	0.83	9.70	1	2	at Town Branch (IF7)
	45.50	3063.2	3063.2	0.83	9.70	2	2	Petersburg STP
	44.51	3066.4	3066.4	0.85	9.68	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Sangamon River	44.50	3066.4	3085.3	0.85	9.68	1	2	at Indian Creek (IF)
(I)	41.61	3093.4	3093.4	0.87	9.68	0	2	
	41.60	3093.4	3107.0	0.88	9.67	1	2	at Concord Creek (IE6)
	36.11	3114.4	3114.4	0.89	9.67	6	2	above Salt Creek
	36.10	3114.4	4970.8	1.21	9.74	1	1	at Salt Creek (IE)
	28.21	4982.6	4982.6	1.22	9.73	0	1	
	28.20	4982.6	5080.0	1.33	9.71	0	1	at Crane Creek (ID)
	27.30	5080.4	5080.4	1.34	9.71	6	1	USGS Gage 05583000 near Oakford
	26.21	5080.8	5080.8	1.34	9.71	0	1	
	26.20	5080.8	5095.6	1.35	9.70	0	1	at Tar Creek (IC3)
	25.11	5099.6	5099.6	1.35	9.70	0	1	
	25.10	5099.6	5154.4	1.35	9.69	0	1	at Clary Creek (IC)
	20.81	5166.2	5166.2	1.36	9.69	0	1	
	20.80	5166.2	5193.5	1.36	9.68	0	1	at Middle Creek (IB5)
	16.11	5204.3	5204.3	1.36	9.68	0	1	
	16.10	5204.3	5257.0	1.36	9.67	0	1	at Panther Creek (IB)
	12.81	5267.8	5267.8	1.36	9.66	0	1	
	12.80	5267.8	5302.1	1.36	9.66	0	1	at Jobs Creek (IA8)
	0.21	5343.5	5343.5	1.37	9.65	0	1	
	0.20	5343.5	5369.5	1.38	9.64	0	1	at Lost Creek (IA)
	0.00	5370.0	5370.0	1.38	9.64	0	1	at mouth at Beardstown
Lost Creek	17.60	0.0	0.0	2.67	8.40	0	3	
(IA)	7.00	9.3	9.3	2.67	8.40	0	3	IL Rte. 125
	4.01	12.9	12.9	2.67	8.40	0	3	
	4.00	12.9	25.6	2.67	8.40	1	3	at Califs Ditch
	0.00	26.0	26.0	2.67	8.40	0	3	
Jobs Creek	15.00	0.0	0.0	1.05	8.40	0	1	
(IA8)	9.50	8.4	8.4	1.05	8.40	0	1	Road@Sec.35 18N 10W
	5.51	14.5	14.5	1.05	8.40	0	1	
	5.50	14.5	24.0	1.05	8.40	1	1	at Little Jobs Creek
	0.00	34.3	34.3	1.05	8.40	0	1	
Panther Creek	14.90	0.0	0.0	1.07	8.40	0	1	
(IB)	10.30	7.9	7.9	1.07	8.40	0	1	Road@Sec.2 17N 9W
	8.30	11.5	11.5	1.07	8.40	0	1	Road@Sec.27 18N 9W
	4.41	18.1	18.1	1.07	8.40	0	1	
	4.40	18.1	42.2	1.11	8.40	1	1	at Cox Creek (IBH)
	1.50	52.5	52.5	1.40	8.40	0	1	IL Rte. 78
	0.00	52.7	52.7	1.40	8.40	0	1	
Cox Creek	11.70	0.0	0.0	1.12	8.40	0	1	
(IBH)	7.50	8.7	8.7	1.12	8.40	0	1	Road@Sec.32 18N 8W
	3.20	19.0	19.0	1.12	8.40	0	1	Road@Sec.13 18N 9W
	0.00	26.1	26.1	1.12	8.40	0	1	
Middle Creek	12.20	0.0	0.0	1.84	8.40	0	1	
(IB5)	4.51	8.6	8.6	1.84	8.40	0	1	
	4.50	8.6	12.7	1.84	8.40	1	1	at Fancher Creek
	1.51	15.9	15.9	1.84	8.40	0	1	
	1.50	15.9	19.1	1.84	8.40	1	1	at Miller Creek
	0.00	27.3	27.3	1.84	8.40	0	1	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Clary Creek	20.40	0.0	0.0	1.37	8.40	0	1	
(IC)	17.00	4.0	4.0	1.37	8.40	0	1	Road@Sec.2 17N 7W
	13.10	9.8	9.8	1.37	8.40	0	1	Road@Sec. 31 18N 7W
	11.50	22.3	22.3	1.37	8.40	0	1	Road@Sec. 30 18N 7W
	8.00	32.1	32.1	1.37	8.40	0	1	Road@Sec. 13 18N 8W
	3.01	38.4	38.4	1.37	8.40	0	1	
	3.00	38.4	50.6	1.52	8.40	1	1	At Little Grove Creek (ICE)
	0.00	54.8	54.8	1.51	8.40	0	1	
Little Grove	8.90	0.0	0.0	1.98	8.40	0	1	
Creek	3.70	8.4	8.4	1.98	8.40	0	1	Road@Sec. 1 18N 8W
(ICE)	0.00	12.2	12.2	1.98	8.40	0	1	
Tar Creek	9.90	0.0	0.0	5.37	8.40	0	3	
(IC3)	4.80	5.9	5.9	5.37	8.40	0	3	Road@Sec. 17 19N 7W
	0.00	14.8	14.8	5.37	8.40	0	3	
Crane Creek	14.60	0.0	0.0	4.57	8.40	0	3	
(ID)	12.51	8.0	8.0	4.57	8.40	0	3	
	12.50	8.0	27.0	5.50	8.40	1	3	at Furrer Ditch (IDV)
	10.60	28.7	28.7	5.50	8.40	5	3	USGS Gage # 05582500 near Easton
	9.41	35.0	35.0	6.07	8.40	0	3	
	9.40	35.0	43.0	6.42	8.40	1	3	at Samual Ditch
	7.81	50.0	50.0	6.66	8.40	0	3	
	7.80	50.0	55.4	6.79	8.40	1	3	at Hall Ditch
	5.41	68.2	68.2	7.02	8.40	0	3	
	5.40	68.2	76.4	7.13	8.40	1	3	at Hurd Lake Ditch
	1.91	86.3	86.3	7.23	8.40	0	3	
	1.90	86.3	97.4	7.40	8.40	1	3	at Herget Drainage Ditch (IDD)
	0.00	97.4	97.4	7.40	8.40	0	3	
Herget Drainage	9.40	0.0	0.0	8.71	8.40	0	3	
Ditch	5.80	5.8	5.8	8.71	8.40	0	3	Road@Sec.35 20N 7W
(IDD)	0.00	11.1	11.1	8.71	8.40	0	3	
Furrer Ditch	6.90	0.0	0.0	5.89	8.40	0	3	
(IDV)	4.30	1.2	1.2	5.89	8.40	0	3	
	3.30	4.0	4.0	5.89	8.40	0	3	Road@Sec. 29 21N 6W
	0.00	19.0	19.0	5.89	8.40	0	3	
Salt Creek	116.00	0.0	0.0	0.88	10.50	0	1	topographic divide
(IE)	111.10	8.2	16.1	0.88	10.50	0	1	
	108.60	26.2	26.2	0.88	10.50	0	1	Illinois Central RR
	103.01	37.3	37.3	0.88	10.50	0	1	
	103.00	37.3	48.1	0.90	10.50	1	1	at Salt Creek tributary (IEY)
	98.81	56.6	56.6	0.95	10.50	0	1	
	98.80	56.6	74.1	0.96	10.50	1	1	at Salt Creek tributary (IEX)
	96.70	75.3	75.3	0.97	10.50	2	1	Farmer City discharge
	96.21	75.5	75.5	0.97	10.50	0	1	
	96.20	75.5	111.4	0.94	10.50	1	1	at Trenkle Slough (IEW)
	94.41	113.3	113.3	0.94	10.50	0	1	
	94.40	113.3	125.5	0.93	10.49	1	1	at Salt Creek tributary (IEV6)
	89.10	132.2	141.3	0.90	10.47	0	1	IL Rte. 48
	82.00	150.5	155.6	0.87	10.45	0	1	
	76.71	165.1	165.1	0.86	10.43	0	1	
	76.70	165.1	291.6	0.91	10.42	1	1	at North Fork Salt Creek (IES)
	76.20	292.0	292.0	0.91	10.42	9	1	Clinton Dam

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Salt Creek	69.40	305.0	305.0	0.90	10.40	0	1	US Hwy. 51
(IE)	65.91	312.5	331.7	0.89	10.38	0	1	
	65.90	331.7	331.7	0.89	10.38	1	1	at Coon Creek (IEQ)
	63.50	335.0	335.0	0.89	10.38	6	1	USGS Gage 05578500 near Rowell
	62.71	335.3	335.3	0.89	10.38	0	1	
	62.70	335.3	379.3	0.88	10.34	1	1	at Tenmile Creek (IEP)
	55.90	390.3	390.3	0.88	10.33	0	1	Logan-DeWitt County Line
	55.71	390.3	390.3	0.88	10.33	0	1	
	55.70	390.3	401.3	0.88	10.33	1	1	at Salt Creek tributary (IEN)
	51.40	416.4	416.4	0.93	10.31	0	1	
	47.90	427.6	427.6	0.97	10.30	0	1	
	42.00	442.4	442.4	1.01	10.28	0	1	Illinois Central RR
	37.21	447.8	447.8	1.02	10.27	0	1	
	37.20	447.8	463.7	1.15	10.25	1	1	at Salt Creek tributary (IEJ)
	32.61	470.2	470.2	1.20	10.25	0	1	above Lake Fork
	32.60	470.2	747.6	1.22	10.06	6	1	at Lake Fork (IEI)
	29.31	751.5	751.5	1.23	10.06	0	1	
	29.30	751.5	832.4	1.50	10.03	1	1	at Deer Creek (IEH)
	28.20	835.5	835.5	1.50	10.03	2	1	Lincoln Treatment Plant
	27.50	840.3	840.3	1.50	10.03	0	1	Interstate 55
	24.51	844.7	844.7	1.51	10.03	0	1	
	24.50	844.7	1176.2	1.37	10.03	1	1	at Kickapoo Creek (IEG)
	19.71	1186.2	1186.2	1.38	10.03	0	1	
	19.70	1186.2	1200.6	1.39	10.02	1	1	at Salt Creek tributary (IEF)
	13.90	1203.0	1203.0	1.39	10.02	0	1	Mason-Logan County line
	11.01	1224.1	1224.1	1.45	10.00	0	1	above Sugar Creek
	11.00	1224.1	1717.5	1.61	9.92	6	1	at Sugar Creek (IED)
	10.30	1718.1	1718.1	1.61	9.92	0	1	Chicago and Northwestern RR
	8.21	1725.1	1725.1	1.61	9.92	0	1	
	8.20	1725.1	1760.7	1.65	9.90	1	1	at Pike Creek (I EC)
	6.41	1765.9	1765.9	1.65	9.90	0	1	
	6.40	1765.9	1778.6	1.66	9.89	1	1	at Salt Creek tributary (IEB3)
	5.71	1779.1	1779.1	1.66	9.89	0	1	
	5.70	1779.1	1791.8	1.69	9.88	1	1	at Sleepy Hollow Ditch (IEB)
	4.90	1792.6	1792.6	1.69	9.88	6	1	USGS Gage 05582000 near Greenview
	2.11	1798.7	1798.7	1.69	9.88	0	1	
	2.10	1798.7	1808.7	1.69	9.87	1	1	at Salt Creek tributary (IEA4)
	0.11	1809.9	1809.9	1.69	9.87	0	1	
	0.10	1809.9	1856.3	1.75	9.85	1	1	at Cabiness Creek (IEA)
	0.00	1856.4	1856.4	1.75	9.85	0	1	at Mouth near Curtis
Cabiness Creek	11.00	0.0	0.0	4.12	8.90	0	2	topographic divide
(IEA)	1.61	15.4	15.4	3.80	8.90	0	2	
	1.60	15.4	44.9	3.80	8.90	1	2	at Grove Creek (IEAE)
	0.00	46.4	46.4	3.81	8.90	0	2	
Grove Creek	13.30	0.0	0.0	3.80	8.90	0	2	topographic divide
(IEAE)	10.10	5.0	5.0	3.80	8.90	0	2	Chicago and Northwestern RR
	0.00	29.5	29.5	3.80	8.90	0	2	
Salt Creek	10.90	0.0	0.0	2.38	8.90	0	2	topographic divide
tributary	7.45	3.0	3.0	2.38	8.90	0	2	Road@Sec.17 19N 6W
(IEA4)	0.00	10.0	10.0	2.38	8.90	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Sleepy Hollow	8.40	0.0	0.0	5.37	8.90	0	3	topographic divide
Ditch	5.40	5.4	5.4	5.37	8.90	0	3	Road® Sec. 21 20N 6W
(IEB)	0.00	12.7	12.7	5.37	8.90	0	3	
Salt Creek	7.20	0.0	0.0	2.34	8.90	0	3	topographic divide
tributary	4.50	5.6	5.6	2.34	8.90	0	3	IL Rte. 29
(IEB3)	1.50	9.3	9.3	2.34	8.90	0	3	Mason City STP
	0.00	15.1	15.1	2.34	8.90	0	3	
Pike Creek	16.70	0.0	0.0	3.55	9.10	0	3	topographic divide
(IEC)	10.30	11.3	11.3	3.55	9.10	0	3	Menard-Logan County Line
	0.00	35.6	35.6	3.55	9.10	0	3	
Sugar Creek	58.60	0.0	0.0	0.60	10.00	0	1	topographic divide
(IED)	55.60	9.1	9.1	0.60	10.00	0	1	Illinois Central RR
	49.90	21.6	21.6	0.60	10.00	0	1	IL Rte. 9
	49.40	32.0	32.0	0.60	10.00	0	1	
	49.00	32.2	32.2	0.60	10.00	2	1	Bloomington Treatment Plant
	48.80	34.4	34.4	0.60	10.00	6	1	USGS Gage 05580950 near Bloomington
	43.41	43.2	43.2	0.60	10.00	0	1	
	43.40	43.2	48.3	0.60	10.01	1	1	at Sugar Creek tributary (IEDT)
	35.60	67.3	67.3	0.60	9.99	0	1	
	35.51	67.3	67.3	0.60	9.99	0	1	
	35.50	67.3	103.5	0.70	10.03	1	1	at Timber Creek (IEDP)
	32.70	110.2	110.2	0.71	10.03	0	1	McLean STP
	22.91	126.0	126.0	0.73	9.99	0	1	
	22.90	126.0	312.2	0.79	9.89	1	1	at West Fork Sugar Creek (IEDK)
	15.40	333.0	333.0	0.81	9.87	6	1	USGS Gage 05581000 near Hartsburg
	7.20	364.5	364.5	0.84	9.85	0	1	IL Rte. 10
	1.90	383.2	383.2	0.86	9.83	0	1	Mason-Logan County Line
	1.21	383.2	383.2	0.86	9.83	0	1	
	1.20	383.2	493.7	1.50	9.71	1	1	at Prairie Creek (IEDB)
	0.00	493.9	493.9	1.50	9.71	0	1	at mouth near New Holland
Prairie Creek	20.60	0.0	0.0	3.80	9.60	0	3	topographic divide
(IEDB)	16.30	6.8	15.0	3.80	9.50	0	3	at tributary just north of US Hwy 136
	12.61	22.9	22.9	3.80	9.50	0	3	
	12.60	22.9	35.7	3.21	9.50	1	3	at Prairie Creek tributary (IEDBP)
	7.31	45.6	45.6	3.76	9.45	0	3	
	7.30	45.6	70.5	4.36	9.39	1	3	at Prairie Creek Ditch (IEDBJ)
	6.21	71.4	71.4	4.32	9.39	0	3	
	6.20	71.4	85.0	3.82	9.38	1	3	at Prairie Creek tributary (IEDBH)
	4.40	88.7	97.1	3.76	9.36	0	3	
	0.00	110.5	110.5	3.72	9.33	0	3	
Prairie Creek	5.40	0.0	0.0	1.18	9.30	0	2	topographic divide
tributary	5.80	3.0	3.0	1.18	9.30	0	2	Road@Sec.34 21N 4W
(IEDBH)	0.00	13.6	13.6	1.18	9.30	0	2	
Prairie Creek	10.90	0.0	0.0	5.46	9.30	0	2	topographic divide
Ditch	5.80	10.6	10.6	5.46	9.30	0	2	US Hwy. 136
(IEDBJ)	2.80	19.3	19.3	5.46	9.30	0	2	Road@Sec.18 12N 4W
	0.00	24.9	24.9	5.46	9.30	0	2	
Prairie Creek	7.00	0.0	0.0	2.16	9.50	0	2	topographic divide
tributary	3.30	4.5	4.5	2.16	9.50	0	2	US Hwy. 121
(IEDBP)	0.00	12.8	12.8	2.16	9.50	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
West Fork	29.80	0.0	0.0	0.70	9.85	0	1	topographic divide
Sugar Creek	26.70	4.0	4.0	0.70	9.85	2	1	Danvers STP
(IEDK)	23.10	8.4	8.4	0.70	9.80	0	1	
	17.80	18.5	18.5	0.80	9.78	0	1	McLean-Tazwell County Line
	15.50	24.1	24.1	0.82	9.77	0	1	IL Rte. 122
	13.10	27.1	27.1	0.83	9.77	0	1	Minier STP
	12.81	31.6	31.6	0.84	9.76	0	1	
	12.80	31.6	45.3	0.85	9.77	1	1	at West Fork Sugar Creek trib. (IEDKK)
	6.51	60.7	60.7	0.85	9.78	0	1	
	6.50	60.7	76.5	0.86	9.79	1	1	at West Fork Sugar Creek trib. (IEDKF)
	3.81	78.8	78.8	0.86	9.79	0	1	
	3.80	78.8	172.6	0.83	9.82	1	1	at Middle Fork Sugar Creek (IEDKD)
	0.00	186.2	186.2	0.83	9.81	0	1	at mouth near Armington
Middle Fork	24.60	0.0	0.0	0.60	9.95	0	1	topographic divide
Sugar Creek	17.31	10.2	10.2	0.60	9.85	0	1	
(IEDKD)	17.30	10.2	33.5	0.60	9.89	1	1	at Kings Mill Creek (IEDKDS)
	13.61	38.3	38.3	0.60	9.88	0	1	
	13.60	38.3	49.0	0.67	9.87	1	1	at Middle Fork tributary (IEDKDO)
	7.20	61.1	61.1	0.75	9.86	0	1	At Tazewell-McLean County Line
	2.61	64.7	64.7	0.76	9.86	0	1	
	2.60	64.7	86.6	0.80	9.84	1	1	at Middle Fork tributary (IEDKDC)
	0.00	93.8	93.8	0.80	9.84	0	1	at mouth near Armington
Middle Fork	9.00	0.0	0.0	0.90	9.80	0	1	topographic divide
Sugar Creek	3.75	10.8	10.8	0.90	9.80	0	1	Road@Sec.17 22N 1W
tributary	1.60	20.9	20.9	0.90	9.80	0	1	Illinois Terminal RR
(IEDKDC)	0.00	21.9	21.9	0.90	9.80	0	1	
Middle Fork	7.60	0.0	0.0	0.95	9.85	0	1	topographic divide
Sugar Creek	3.10	7.4	7.4	0.95	9.85	0	1	3rd Principal Meridian
trib. (IEDKDO)	0.00	10.7	10.7	0.95	9.85	0	1	
Kings Mill Creek	12.60	0.0	0.0	0.60	9.90	0	1	topographic divide
(IEDKDS)	8.90	5.4	5.4	0.60	9.90	0	1	Road@Sec.22 24N 1E
	5.50	18.7	18.7	0.60	9.90	0	1	US Hwy. 9
	0.00	23.3	23.3	0.60	9.90	0	1	
West Fork Sugar	9.90	0.0	0.0	0.90	9.80	0	1	topographic divide
Creek tributary	5.80	6.1	6.1	0.90	9.80	0	1	Road@Sec.1 22N 3W
(IEDKF)	3.00	11.3	11.3	0.90	9.80	0	1	Road@Sec. 18 22N 2W
	0.00	15.8	15.8	0.90	9.80	0	1	
West Fork Sugar	11.40	0.0	0.0	0.90	9.80	0	1	topographic divide
Creek tributary	4.00	10.9	10.9	0.90	9.80	0	1	Tazewell-McLean County Line
(IEDKK)	0.00	13.7	13.7	0.90	9.80	0	1	
Timber Creek	15.60	0.0	0.0	0.90	10.10	0	1	topographic divide
(IEDP)	12.10	7.9	7.9	0.90	10.10	0	1	Road@Sec.31 23N 2E
	8.70	14.6	14.6	0.90	10.10	0	1	Road@Sec. 11 22N 1E
	6.00	27.4	27.4	0.90	10.10	0	1	Interstate 55
	0.00	36.2	36.2	0.90	10.10	0	1	
Sugar Creek	5.20	0.0	0.0	0.60	10.10	0	1	topographic divide
tributary	3.70	0.8	0.8	0.60	10.10	2	1	Beich Company discharge
(IEDT)	0.00	5.1	5.1	0.60	10.10	0	1	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Salt Creek	5.80	0.0	0.0	2.33	9.30	0	2	topographic divide
tributary	2.90	3.4	3.4	2.33	9.30	0	2	Road@Sec. 28 19N 4W
(IEF)	0.00	14.4	14.4	2.33	9.30	0	2	
Kickapoo Creek	61.80	0.0	0.0	0.70	10.35	0	1	topographic divide
(IEG)	55.80	5.5	5.5	0.70	10.30	0	1	
	53.10	8.6	8.6	0.70	10.30	0	1	Road@Sec.16 23N 3E
	51.91	17.0	17.0	0.70	10.30	0	1	
	51.90	17.0	35.1	0.61	10.30	1	1	at Kickapoo Creek tributary (IEGW)
	48.60	44.0	44.0	0.69	10.29	0	1	US Hwy. 150
	44.81	49.7	49.7	0.73	10.29	0	1	
	44.80	49.7	61.8	0.79	10.29	1	1	at Little Kickapoo Creek (IEGT)
	42.00	70.9	70.9	0.82	10.28	0	1	USGS Gage 0579700 near Heyworth
	39.41	74.5	74.5	0.83	10.27	0	1	
	39.40	74.5	104.2	0.79	10.25	1	1	at Little Kickapoo Creek (IEGR)
	37.50	112.4	112.4	0.78	10.25	2	1	Heyworth STP
	34.70	122.8	130.3	0.76	10.22	0	1	
	30.71	138.6	138.6	0.75	10.21	0	1	
	30.70	138.6	190.7	0.78	10.20	1	1	at Long Point Creek (IEGN)
	27.61	201.1	201.1	0.78	11.38	0	1	
	27.60	201.1	215.7	0.77	10.18	1	1	at Prairie Creek (IEGM)
	26.81	216.3	216.3	0.77	10.18	0	1	
	26.80	216.3	227.0	0.77	10.17	1	1	at Rock Creek (IEGL)
	26.20	227.3	227.3	0.77	10.17	5	1	USGS Gage 05580000 at Waynesville
	24.00	236.5	236.5	0.77	10.17	0	1	Logan-Dewitt Country Line
	23.31	247.5	247.5	0.77	10.16	0	1	
	23.30	247.5	261.3	0.77	10.15	1	1	at Clear Creek (IEGK)
	19.10	270.2	270.2	0.77	10.14	0	1	
	17.21	275.3	275.3	0.77	10.14	0	1	
	17.20	275.3	278.6	0.77	10.14	1	1	at Kickapoo Creek tributary (IEGH)
	14.50	280.3	280.3	0.77	10.13	0	1	Interstate 55
	11.30	298.1	298.1	0.79	10.11	0	1	
	8.30	305.9	305.9	0.80	10.10	0	1	USGS Gage 05580500 near Lincoln
	6.10	311.4	318.2	0.81	10.08	0	1	IL Rte. 121
	0.00	332.1	332.1	0.82	10.06	0	1	at mouth near Lincoln
Kickapoo Creek	3.30	0.0	0.0	1.02	10.06	0	1	
tributary	2.80	3.0	3.0	1.02	10.06	2	1	Athens STP
(IEGH)	0.00	3.1	3.1	1.02	10.06	0	1	
Clear Creek	8.30	0.0	0.0	0.75	9.95	0	1	topographic divide
(IEGK)	4.50	6.9	6.9	0.75	9.95	0	1	Interstate 55
	0.00	13.8	13.8	0.75	9.95	0	1	
Rock Creek	7.60	0.0	0.0	0.83	10.05	0	1	topographic divide
(IEGL)	3.30	6.2	6.2	0.83	10.05	0	1	
	0.00	10.4	10.4	0.83	10.05	0	1	
Prairie Creek	9.90	0.0	0.0	0.75	10.05	0	1	topographic divide
(IEGM)	6.00	4.5	4.5	0.75	10.05	0	1	
	3.60	11.2	11.2	0.75	10.05	0	1	IL Rte. 119
	0.00	14.6	14.6	0.75	10.05	0	1	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Long Point	17.40	0.0	0.0	0.85	10.15	0	1	topographic divide
Creek	9.91	7.6	7.6	0.85	10.15	0	1	
(IEGN)	9.90	7.6	16.0	0.85	10.15	0	1	
	8.40	16.8	24.4	0.85	10.15	0	1	
	7.10	24.8	44.9	0.85	10.15	0	1	
	0.00	51.3	51.3	0.85	10.15	0	1	
Little Kickapoo	15.90	0.0	0.0	0.68	10.20	0	1	topographic divide
Creek	12.80	5.5	5.5	0.68	10.20	0	1	
(IEGR)	7.80	15.1	15.1	0.68	10.20	0	1	
	4.80	21.6	21.6	0.68	10.20	0	1	
	0.00	29.7	29.7	0.68	10.20	0	1	
Little Kickapoo	9.60	0.0	0.0	1.02	10.30	0	1	topographic divide
Creek	8.00	0.7	0.7	1.02	10.30	0	1	
(IEGT)	0.00	12.1	12.1	1.02	10.30	0	1	
Kickapoo Creek	9.90	0.0	0.0	0.53	10.30	0	1	topographic divide
tributary	4.50	10.1	10.1	0.53	10.30	0	1	
(IEGW)	0.00	18.1	18.1	0.53	10.30	0	1	
Deer Creek	19.50	0.0	0.0	4.44	10.00	0	3	topographic divide
(IEH)	15.70	8.0	8.0	4.44	9.90	0	3	
	11.90	14.5	23.4	4.44	9.87	0	3	
	11.30	28.1	28.1	4.44	9.85	0	3	Road@Sec.20 20N 1W
	6.70	41.7	49.0	4.44	9.83	0	3	
	1.21	65.5	65.5	4.44	9.80	0	3	
	1.20	65.5	76.0	3.99	9.80	1	3	at Salt Springs Branch (IEHC)
	0.00	80.9	80.9	3.97	9.79	0	3	
Salt Spring	6.20	0.0	0.0	1.20	9.80	0	2	topographic divide
Branch	2.40	6.9	6.9	1.20	9.80	0	2	Illinois Central Gulf RR
(IEHC)	0.00	10.5	10.5	1.20	9.80	0	2	
North Fork Lake	49.60	0.0	0.0	0.94	10.20	0	2	topographic divide
Fork(IEI)	44.60	9.5	9.5	0.94	10.15	2	2	Maroa STP
	39.60	19.7	19.7	0.94	10.12	0	2	
	32.61	25.8	25.8	0.94	10.09	0	2	
	32.60	25.8	44.3	0.94	9.97	1	2	at North Fork Lake Fork tributary (IEIQ)
	31.20	48.2	48.2	0.96	9.98	0	2	Logan-Macon County Line
	30.70	52.7	52.7	0.98	9.98	0	2	
	28.30	60.1	60.1	1.00	9.97	0	2	
	25.20	74.6	74.6	1.03	9.93	0	2	IL Rte. 121
	21.61	85.9	85.9	1.05	9.91	0	2	
Lake Fork	21.60	85.9	151.1	1.10	9.91	1	2	at South Fork Lake Fork (IEIL)
(IEI)	19.50	159.5	159.5	1.18	9.90	0	2	
	16.41	167.4	167.4	1.24	9.88	0	2	
	16.40	167.4	186.3	1.24	9.86	1	2	at Hunter Slough (IEH)
	13.70	192.6	200.6	1.23	9.83	0	2	
	13.61	200.6	200.6	1.23	9.83	0	2	
	13.60	200.6	210.5	1.22	9.82	1	2	at North Fork tributary (IEIH)
	12.90	214.1	214.1	1.22	9.81	5	2	USGS Gage 05579500 near Cornland
	9.50	224.3	224.3	1.22	9.80	0	2	
	4.20	243.8	249.8	1.21	9.77	0	2	
	3.11	250.7	250.7	1.21	9.77	0	2	
	3.10	250.7	263.1	1.21	9.75	1	2	at Elkhart Slough (IEIC)
	1.50	265.7	274.5	1.24	9.74	0	2	
	0.00	277.4	277.4	1.25	9.74	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Elkhart Slough	7.20	0.0	0.0	1.18	9.40	0	2	topographic divide
(IEIC)	4.10	6.3	6.3	1.18	9.40	0	2	Interstate 55
	0.00	12.8	12.8	1.18	9.40	0	2	
North Fork	5.30	0.0	0.0	1.03	9.55	0	2	topographic divide
tributary	3.10	1.9	1.9	1.03	9.55	0	2	Logan-Sangamon County Line
(IEIH)	0.00	9.9	9.9	1.03	9.55	0	2	
Hunter Slough	7.60	0.0	0.0	1.23	9.60	0	2	topographic divide
(IEII)	4.30	10.1	10.1	1.23	9.60	0	2	Road@Sec.28 17N 2W
	0.00	19.9	19.9	1.23	9.60	0	2	
South Fork	16.40	0.0	0.0	1.45	9.90	0	2	topographic divide
Lake Fork	11.01	6.6	6.6	0.79	9.90	0	2	
(IEIL)	11.00	6.6	12.1	1.45	9.90	0	2	
	9.60	12.9	18.4	1.45	9.90	0	2	
	6.91	26.1	26.1	1.36	9.90	1	2	
	6.90	26.1	37.2	1.25	9.90	1	2	at South Fork tributary (IEILL)
	6.01	38.2	38.2	1.25	9.90	0	2	
	6.00	38.2	41.9	1.25	9.90	1	2	at South Fork tributary (IEILK)
	3.20	50.2	59.6	1.18	9.90	0	2	
	0.00	65.9	65.9	1.16	9.90	0	2	
South Fork Lake	5.40	0.0	0.0	1.25	9.90	0	2	
Fork tributary	4.40	0.8	0.8	1.25	9.90	2	2	Warrensburg STP
(IEILK)	0.00	3.7	3.7	1.25	9.90	0	2	
South Fork Lake	4.20	0.0	0.0	1.06	9.90	0	2	topographic divide
Fork tributary	1.70	3.0	3.0	1.06	9.90	0	2	Road@Sec.30 18N 1W
(IEILL)	0.00	11.3	11.3	1.06	9.90	0	2	
North Fork Lake	7.10	0.0	0.0	0.94	9.80	0	2	topographic divide
Fork tributary	5.40	9.6	9.6	0.94	9.80	0	2	
(IEIQ)	0.00	18.5	18.5	0.94	9.80	0	2	
Salt Creek	7.90	0.0	0.0	4.75	9.75	0	3	topographic divide
tributary	4.50	5.1	5.1	4.75	9.75	0	3	Mt. Pulaski STP
(IEJ)	0.00	14.9	14.9	4.75	9.75	0	3	
Salt Creek	8.30	0.0	0.0	0.91	10.00	0	2	topographic divide
tributary	3.50	3.9	3.9	0.91	10.00	0	2	Illinois Central Gulf RR
(IEN)	0.00	11.1	11.1	0.91	10.00	0	2	
Tenmile Creek	19.40	0.0	0.0	0.82	10.10	0	1	topographic divide
(IEP)	13.80	9.3	9.3	0.82	10.10	0	1	
	11.70	11.7	11.7	0.82	10.10	0	1	IL Rte.51
	8.00	23.6	23.6	0.82	10.10	0	1	
	3.70	30.9	30.9	0.82	10.10	0	1	Road@Sec. 31 20N 2E
	0.00	41.9	41.9	0.82	10.10	0	1	
Coon Creek	13.70	0.0	0.0	0.82	10.20	0	1	topographic divide
(IEQ)	7.60	6.4	6.4	0.82	10.20	0	1	
	5.80	12.2	12.2	0.82	10.20	0	1	US Hwy. 54
	4.60	14.4	14.4	0.82	10.20	2	1	Clinton Treatment Plant
	0.00	18.9	18.9	0.82	10.20	0	1	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
North Fork	31.60	0.0	0.0	0.90	10.40	0	1	topographic divide
Salt Creek	27.30	4.5	4.5	0.90	10.35	0	1	
(IES)	23.71	7.0	7.0	0.90	10.37	0	1	
	23.70	7.0	21.2	0.98	10.39	1	1	at North Fork Salt Creek trib. (IESV)
	23.11	21.7	21.7	0.99	10.39	0	1	
	23.10	21.7	32.9	1.02	10.38	1	1	at North Fork Salt Creek trib. (IESU)
	19.40	35.9	35.9	1.03	10.37	2	1	LeRoy treatment plant
	18.61	39.5	39.5	1.05	10.37	0	1	
	18.60	39.5	62.1	1.10	10.36	1	1	at West Fork North Fork Salt Cr. (IESQ)
	16.51	65.8	65.8	1.11	10.36	0	1	
	16.50	65.8	75.9	1.08	10.36	1	1	at North Fork tributary (IESO)
	15.00	79.6	79.6	1.06	10.35	0	1	De Witt-McLean County Line
	11.91	95.9	95.9	1.04	10.34	0	1	
	11.90	95.9	103.2	1.02	10.34	0	1	
	6.10	117.0	117.0	0.99	10.34	0	1	
	0.00	126.5	126.5	0.98	10.34	0	1	
North Fork Salt	6.70	0.0	0.0	0.91	10.35	0	2	topographic divide
Fork tributary	3.10	5.3	5.3	0.91	10.35	0	2	ConRail RR
(IESO)	0.00	10.1	10.1	0.91	10.35	0	2	
West Fork North	9.50	0.0	0.0	1.20	10.35	0	1	topographic divide
Fork Salt Creek	4.90	11.5	11.5	1.20	10.35	0	1	
(IESQ)	0.00	22.6	22.6	1.20	10.35	0	1	
North Fork Salt	6.40	0.0	0.0	1.08	10.35	0	1	topographic divide
Creek tributary	5.00	3.2	3.2	1.08	10.35	0	1	Road@Sec.9 22N 4E
(IESU)	0.00	11.2	11.2	1.08	10.35	0	1	
North Fork Salt	6.70	0.0	0.0	1.02	10.40	0	1	topographic divide
Creek tributary	4.90	0.9	0.9	1.02	10.40	0	1	
(IESV)	2.90	6.1	6.1	1.02	10.40	0	1	
	0.00	14.2	14.2	1.02	10.40	0	1	
Salt Creek	6.10	0.0	0.0	0.87	10.40	0	1	topographic divide
tributary	2.10	5.7	5.7	0.87	10.40	0	1	Illinois Central Gulf RR
(IEV6)	0.00	11.3	11.3	0.87	10.40	0	1	
Trenkle Slough	8.90	0.0	0.0	0.87	10.50	0	1	topographic divide
(IEW)	4.51	9.7	9.7	0.87	10.50	0	1	
	4.50	9.7	16.2	0.87	10.50	0	1	
	2.70	22.1	22.1	0.87	10.50	0	1	US Hwy. 150
	0.00	35.9	35.9	0.87	10.50	0	1	
Salt Creek	7.10	0.0	0.0	0.99	10.50	0	1	topographic divide
tributary	3.60	6.4	6.4	0.99	10.50	0	1	DeWitt-McLean County Line
(IEX)	0.00	17.5	17.5	0.99	10.50	0	1	
Salt Creek	7.40	0.0	0.0	0.98	10.50	0	1	topographic divide
tributary	2.40	5.8	5.8	0.98	10.50	0	1	Road@Sec.34 22N 5E
(IEY)	0.00	10.8	10.8	0.98	10.50	0	1	
Concord Creek	9.50	0.0	0.0	3.07	8.60	0	2	topographic divide
(IE6)	2.70	10.1	10.1	3.07	8.60	0	2	Road® Sec.2219N 7W
	0.00	13.6	13.6	3.07	8.60	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Indian Creek	9.20	0.0	0.0	2.25	8.70	0	2	topographic divide
(IF)	6.20	6.4	6.4	2.25	8.70	0	2	US Hwy. 29
	3.60	15.7	15.7	2.25	8.70	0	2	US Hwy. 123
	0.00	18.9	18.9	2.25	8.70	0	2	
Town Branch	4.60	0.0	0.0	0.78	10.40	0	2	
(IF7)	2.60	3.0	3.0	0.78	10.40	2	2	Atlanta STP
	0.00	7.7	7.7	0.78	10.40	0	2	
Rock Creek	12.50	0.0	0.0	1.24	8.65	0	2	topographic divide
(IF8)	5.40	9.3	9.3	1.24	8.65	0	2	IL Rte. 97
	0.00	17.5	17.5	1.24	8.65	0	2	
Richland Creek	18.70	0.0	0.0	0.98	8.50	0	2	topographic divide
(IG)	14.21	7.8	7.8	0.98	8.50	0	2	
	14.20	7.8	17.2	0.98	8.50	2	2	Pleasant Plains WTP
	13.80	17.5	26.8	0.98	8.50	0	2	
	10.30	33.2	33.2	0.98	8.51	0	2	Road@Sec.35 17N 7W
	5.80	42.9	42.9	0.98	8.52	0	2	IL Rte. 97
	4.41	44.3	44.3	0.98	8.52	0	2	
	4.40	44.3	85.0	0.98	8.57	1	2	at Prairie Creek (IGG)
	0.00	89.7	89.7	0.98	8.58	0	2	at mouth near Salisbury
Prairie Creek	16.90	0.0	0.0	0.82	8.50	0	2	topographic divide
(IGG)	12.70	5.0	5.0	0.82	8.55	0	2	
	11.11	9.2	9.2	0.82	8.58	0	2	
	11.10	9.2	14.0	0.82	8.58	0	2	
	7.30	22.8	22.8	0.82	8.59	0	2	railroad grade west of Farmington
	4.80	28.7	28.7	0.82	8.60	0	2	IL Rte. 125
	3.90	30.9	36.7	0.82	8.62	0	2	
	0.00	40.7	40.7	0.82	8.63	0	2	
Cantrall Creek	13.10	0.0	0.0	0.94	8.85	0	2	topographic divide
(IG3)	9.00	5.1	5.1	0.94	8.85	0	2	0.5 miles east of Cantrall
	5.60	14.5	14.5	0.94	8.85	0	2	IL Rte. 29
	0.00	20.8	20.8	0.94	8.85	0	2	
Spring Creek	37.80	0.0	0.0	0.90	8.50	0	2	topographic divide
(IH)	34.00	7.7	7.7	0.90	8.50	0	2	US Hwy. 36
	29.60	19.2	19.2	0.90	8.50	0	2	Road@Sec.12 15N 8W
	26.91	22.9	22.9	0.90	8.55	0	2	
	26.90	22.9	31.3	0.90	8.55	0	2	
	19.41	43.9	43.9	0.90	8.55	0	2	
	19.40	43.9	61.0	0.91	8.59	1	2	at Little Spring Creek (IHN)
	16.21	64.3	64.3	0.91	8.60	0	2	
	16.20	64.3	84.4	0.91	8.63	1	2	at Archer Creek (IHL)
	8.31	96.4	96.4	0.92	8.64	0	2	
	8.30	96.4	107.8	0.92	8.67	1	2	at Jacksonville Branch (IHG)
	8.20	107.8	107.8	0.92	8.67	5	2	USGS Gage 05577500 at Springfield
	2.20	119.8	119.8	0.93	8.67	2	2	Springfield STP
	0.00	125.0	125.0	0.93	8.67	0	2	
Jacksonville	6.80	0.0	0.0	0.85	8.90	0	2	topographic divide
Branch	3.80	4.3	4.3	0.85	8.90	0	2	IL Rte. 4
(IHG)	0.00	11.4	11.4	0.85	8.90	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Archer Creek	10.90	0.0	0.0	0.89	8.75	0	2	topographic divide
(IHL)	9.50	5.4	5.4	0.89	8.75	0	2	US Hwy. 36
	3.00	10.4	10.4	0.89	8.75	0	2	Road@Sec.4 15N 6W
	0.00	20.1	20.1	0.89	8.75	0	2	
Little Spring	10.30	0.0	0.0	0.92	8.70	0	2	topographic divide
Creek	5.90	6.7	6.7	0.92	8.70	0	2	Road@Sec. 16 15N 7W
(IHN)	3.60	14.2	14.2	0.92	8.70	0	2	Road@Sec.11 15N 7W
	0.00	17.1	17.1	0.92	8.70	0	2	
Fancy Creek	15.80	0.0	0.0	0.85	8.95	0	2	topographic divide
(IH7)	11.50	4.9	4.9	0.85	8.95	0	2	Sangamon-Menard County Line
	9.00	14.7	14.7	0.85	8.95	0	2	IL Rte. 124
	5.61	20.7	20.7	0.85	8.95	0	2	
	5.60	20.7	34.2	0.85	8.95	1	2	at Fancy Creek tributary (IH7J)
	0.00	39.1	39.1	0.85	8.95	0	2	
Fancy Creek	6.70	0.0	0.0	0.85	8.95	0	2	topographic divide
tributary	4.20	3.1	3.1	0.85	8.95	0	2	Sangamon-Logan County Line
(IH7J)	0.00	13.5	13.5	0.85	8.95	0	2	
Wolf Creek	16.50	0.0	0.0	0.80	9.05	0	2	topographic divide
(II)	11.50	5.8	5.8	0.80	9.05	0	2	Sangamon-Logan County Line
	10.20	11.3	11.3	0.80	9.05	0	2	Road@Sec.2 17N 4W
	9.30	18.5	18.5	0.80	9.05	0	2	Williamsville STP
	8.40	19.7	19.7	0.80	9.05	0	2	Road@Sec.10 17N 4W
	5.90	26.3	26.3	0.80	9.05	0	2	
	2.51	39.2	39.2	0.80	9.05	0	2	
	2.50	39.2	53.8	0.80	9.05	1	2	at Wolf Creek tributary (IIE)
	0.00	61.7	61.7	0.80	9.05	0	2	
Wolf Creek	7.50	0.0	0.0	0.80	9.00	0	2	
tributary	2.70	8.2	8.2	0.80	9.00	0	2 .	Illinois Central Gulf RR
(ME)	0.00	14.6	14.6	0.80	9.00	0	2	
Sugar Creek	51.10	0.0	0.0	0.40	8.94	0	2	topographic divide
(IJ)	46.20	10.1	10.1	0.40	8.94	0	2	Macoupin-Sangamon County Line
	41.90	20.4	20.4	0.41	8.94	0	2	2 miles West of Virden
	39.80	29.4	29.4	0.43	8.94	0	2	Chicago and Northwest RR
	38.60	32.5	32.5	0.43	8.94	2	2	Virden North STP
	36.90	34.8	34.8	0.44	8.94	0	2	IL Rte. 4
	30.30	49.1	49.1	0.46	8.94	5	2	IDOT Gage/IL Rte. 104 near Auburn
	29.40	50.5	50.5	0.46	8.94	2	2	Auburn STP
	20.40	63.9	63.9	0.46	8.94	0	2	
	19.61	67.6	67.6	0.46	8.94	0	2	
	19.60	67.6	90.3	0.47	8.92	1	2	at Panther Creek (UK)
	14.91	100.2	100.2	0.48	8.92	0	2	
	14.90	100.2	245.0	0.55	8.80	1	2	at Lick Creek (IJH)
	8.50	263.0	263.0	0.55	8.81	3	2	Springfield PWS Withdrawal
	8.40	263.0	263.0	0.55	8.81	6	2	Spaulding Dam (Lake Springfield)
	8.30	263.0	263.0	0.55	8.81	2	2	Springfield STP
	0.00	283.0	283.0	0.55	8.81	0	2	at mouth near Springfield

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Lick Creek	30.40	0.0	0.0	0.40	8.60	0	2	topographic divide
(IJH)	26.90	4.5	4.5	0.40	8.60	0	2	Sangamon-Morgan County Line
	23.71	9.5	9.5	0.42	8.60	0	2	
	23.70	9.5	17.7	0.42	8.60	0	2	
	22.90	22.0	22.0	0.45	8.60	0	2	
	18.90	28.8	28.8	0.49	8.61	0	2	1 mile South of Loami
	16.91	32.4	32.4	0.51	8.61	0	2	
	16.90	32.4	82.5	0.53	8.68	1	2	at South Fork Lick Creek (IJHO)
	10.50	97.3	97.3	0.57	8.68	0	2	3 miles South of Curran
	9.80	97.6	104.4	0.58	8.68	0	2	
	4.10	127.0	127.0	0.59	8.68	0	2	IL Rte. 4
	2.60	128.1	137.7	0.59	8.68	0	2	at Polecat Creek
	0.00	144.8	144.8	0.59	8.68	0	2	
South Fork	14.50	0.0	0.0	0.40	8.70	0	2	topographic divide
Lick Creek	12.10	4.2	4.2	0.40	8.70	0	2	Sangamon-Morgan County Line
(IJHO)	9.30	13.6	13.6	0.40	8.70	0	2	
	6.50	21.4	21.4	0.41	8.70	0	2	
	3.61	28.2	28.2	0.42	8.70	0	2	upstream of Johns Creek
	3.60	28.2	42.7	0.43	8.72	1	2	at Johns Creek (IJHOG)
	0.00	50.1	50.1	0.46	8.72	0	2	
Johns Creek	7.10	0.0	0.0	0.40	8.70	0	2	topographic divide
(IJHOG)	3.50	5.9	5.9	0.40	8.75	0	2	IL Rte. 4
	0.00	14.5	14.5	0.40	8.75	0	2	
Panther Creek	14.50	0.0	0.0	0.40	8.83	0	2	topographic divide
(UK)	7.21	8.8	8.8	0.41	8.87	0	2	
	7.20	8.8	14.2	0.41	8.87	0	2	IL Rte. 4
	0.00	22.7	22.7	0.49	8.87	0	2	
South Fork	86.80	0.0	0.0	0.40	9.63	1	2	topographic divide
Sangamon River	81.20	11.0	11.0	0.40	9.63	5	2	USGS Gage 05574000 near Nokomis
(IK)	78.80	25.9	25.9	0.42	9.63	0	2	Road@Sec.2 17N 4W
	75.80	36.2	36.2	0.44	9.63	0	2	Road@Sec.10 17N 4W
	71.21	45.4	45.4	0.47	9.63	0	2	
	71.20	45.4	56.1	0.47	9.68	1	2	at Cotton Creek (IKW)
	67.50	70.9	70.9	0.47	9.71	0	2	Road@Sec.2712N 2W
	63.80	77.7	86.1	0.48	9.75	0	2	
	63.11	87.3	87.3	0.49	9.75	0	2	
	63.10	87.3	118.6	0.49	9.79	1	2	at Locust Creek (IKT)
	59.01	125.0	125.0	0.50	9.80	3	2	Taylorville PWS Withdrawal
	59.00	125.0	125.0	0.50	9.80	9	2	Lake Taylorville Dam
	57.31	131.8	131.8	0.51	9.80	0	2	above Fiat Branch (IKR)
	57.30	131.8	409.3	0.56	9.74	1	2	at Flat Branch
	57.10	409.5	409.5	0.56	9.74	0	2	Georgia-Pacific discharge
	55.10	411.5	411.5	0.56	9.74	2	2	Taylorville (south) WTP
	51.61	420.8	420.8	0.56	9.75	0	2	
	51.60	420.8	435.1	0.56	9.74	1	2	at Brush Creek (IKP)
	46.01	440.0	440.0	0.56	9.74	0	2	
	46.00	440.0	539.7	0.56	9.72	1	2	at Bear Creek (IKN)
	45.51	540.3	540.3	0.56	9.72	0	2	
	45.40	540.3	547.7	0.56	9.72	1	2	at Panther Creek (IKM8)
	40.10	553.0	553.0	0.56	9.72	6	2	USGS Gage 05575500 at Kinkaid
	38.40	563.1	563.1	0.56	9.72	2	2	Kinkaid STP
	37.11	564.3	564.3	0.56	9.72	0	2	
	37.10	564.3	601.7	0.55	9.71	1	2	at South Fork Sangamon River trib. (IKK)

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
South Fork	27.60	611.2	620.7	0.55	9.71	0	2	
Sangamon River	27.01	621.3	621.3	0.55	9.71	0	2	
(IK)	27.00	621.3	631.1	0.55	9.71	1	2	at South Fork Sangmon River trib. (IKI)
	23.81	626.6	626.6	0.55	9.71	0	2	
	23.80	626.6	700.2	0.54	9.67	1	2	at Clear Creek (IKH)
	18.71	707.4	707.4	0.54	9.68	0	2	
	18.70	707.4	719.1	0.54	9.67	1	2	at South Fork Sangamon River (IKF)
	7.41	733.9	733.9	0.54	9.66	0	2	above Horse Creek (IKC)
	7.40	733.9	865.0	0.54	9.66	6	2	USGS Gage 05576000 near Rochester
	3.01	870.6	870.6	0.54	9.66	0	2	
	3.00	870.6	880.2	0.54	9.66	1	2	at Black Branch (IKB)
	0.00	883.0	883.0	0.54	9.66	0	2	
Black Branch	6.20	0.0	0.0	0.40	9.05	0	2	topographic divide
(IKB)	3.00	5.5	5.5	0.50	9.05	0	2	
	0.00	9.6	9.6	0.56	9.05	0	2	
Horse Creek	36.00	0.0	0.0	0.40	9.30	0	2	topographic divide
(IKC)	29.70	7.6	7.6	0.40	9.30	0	2	Road@Sec.18 12N 4W
	27.00	15.3	15.3	0.40	9.30	0	2	Road@Sec.512N 4W
	22.51	29.8	29.8	0.40	9.30	0	2	
	22.50	29.8	50.8	0.44	9.26	1	2	at West Branch Horse Creek (IKCQ)
	21.00	52.2	52.2	0.44	9.26	0	2	USGS Gage 05575800 Pawnee
	20.30	53.4	60.6	0.44	9.26	0	2	at Henkle Branch confluence
	20.20	60.7	60.7	0.44	9.26	0	2	
	19.80	61.0	61.0	0.44	9.26	0	2	IL Rte. 104
	6.61	78.4	78.4	0.45	9.25	0	2	
	6.60	78.4	127.4	0.52	9.19	1	2	at Brush Creek (IKCF)
	4.20	129.8	129.8	0.52	9.19	0	2	Site of proposed Hunter Lake
	0.00	131.1	131.1	0.52	9.19	0	2	At mouth near Rochester
Brush Creek	24.10	0.0	0.0	0.40	9.10	0	2	topographic divide
(IKCF)	19.00	4.9	4.9	0.40	9.10	2	2	Virden East STP
	16.70	9.5	9.5	0.40	9.10	0	2	Road@Sec.31 13N 5W
	15.00	19.7	19.7	0.40	9.10	0	2	
	11.70	26.3	26.3	0.40	9.10	2	2	Divernon STP
	9.10	32.4	32.4	0.43	9.10	0	2	USGS Gage Divernon
	4.30	41.3	41.3	0.42	9.10	0	2	Road@Sec.24 14N 5W
	0.00	49.0	49.0	0.40	9.10	0	2	
West Branch	13.00	0.0	0.0	0.40	9.20	0	2	topographic divide
Horse Creek	7.70	4.9	4.9	0.40	9.20	0	2	Interstate 55
(IKCQ)	4.60	12.9	12.9	0.40	9.20	0	2	Sangamon-Montgomery County Line
	0.00	21.0	21.0	0.40	9.20	0	2	
South Fork	6.90	0.0	0.0	0.40	9.25	0	2	topographic divide
Sangamon River	3.10	6.2	6.2	0.40	9.25	0	2	Sangamon-Christian County Line
tributary (IKF)	0.00	11.7	11.7	0.40	9.25	0	2	
Clear Creek	19.70	0.0	0.0	0.40	9.45	0	2	topographic divide
(IKH)	12.50	8.2	8.2	0.40	9.45	0	2	Road@Sec.8 12N 4W
	9.10	15.4	15.4	0.40	9.45	0	2	
	3.21	26.5	26.5	0.40	9.44	0	2	
	3.20	26.5	36.3	0.45	9.43	1	2	at Clear Creek tributary (IKHE)
	1.11	38.0	38.0	0.45	9.43	0	2	
	1.10	38.0	72.9	0.45	9.38	1	2	at Clear Creek (West) (IKHC)
	1.00	72.9	72.9	0.45	9.38	0	2	Sangchris Dam
	0.00	73.6	73.6	0.45	9.38	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Clear Creek	19.20	0.0	0.0	0.40	9.30	0	2	topographic divide
West(IKHC)	14.20	5.2	5.2	0.40	9.30	0	2	Road@Sec. 15 12N 4W
	8.60	12.9	12.9	0.40	9.30	0	2	
	4.91	20.3	20.3	0.40	9.32	0	2	
	4.90	20.3	30.4	0.43	9.32	1	2	at Clear Creek West Tributary (IKHCF)
	0.00	34.9	34.9	0.44	9.32	0	2	
Clear Creek	8.50	0.0	0.0	0.40	9.35	0	2	topographic divide
West tributary	3.40	6.0	6.0	0.40	9.35	0	2	Road® Sec.23 13N 4W
(IKHCF)	0.00	10.1	10.1	0.40	9.35	0	2	
Clear Creek	9.40	0.0	0.0	0.40	9.40	0	2	topographic divide
tributary	4.70	4.2	4.2	0.42	9.40	0	2	Road@Sec.13 13N 4W
(IKHE)	0.00	9.8	9.8	0.43	9.40	0	2	
South Fork	4.50	0.0	0.0	0.59	9.71	0	2	
Sangamon River	2.50	6.4	6.4	0.59	9.71	2	2	Edinburg STP
tributary (IKI)	0.00	9.8	9.8	0.59	9.71	0	2	
South Fork	13.10	0.0	0.0	0.40	9.50	0	2	topographic divide
Sangamon	9.40	6.3	6.3	0.40	9.50	0	2	Road@Sec.35 14N 2W
River tributary	6.50	11.0	19.8	0.40	9.50	0	2	
(IKK)	0.00	37.4	37.4	0.43	9.50	0	2	
Panther Creek	5.40	0.0	0.0	0.40	9.60	0	2	topographic divide
(IKM8)	2.60	5.2	5.2	0.54	9.60	2	2	Taylorville (north) SD STP
	0.00	7.4	7.4	0.60	9.60	0	2	
Bear Creek	21.60	0.0	0.0	0.40	9.60	0	2	topographic divide
(IKN)	17.10	9.8	9.8	0.41	9.60	0	2	Road@Sec.30 11N 3W
	13.01	20.0	20.0	0.42	9.60	0	2	
	13.00	20.0	35.8	0.42	9.64	1	2	at Bear Creek tributary (IKNQ)
	10.40	45.7	45.7	0.43	9.64	0	2	IL Rte. 48
	10.21	46.2	46.2	0.43	9.64	0	2	
	10.20	46.2	52.9	0.43	9.64	1	2	at Bear Creek tributary (IKNM)
	5.91	58.6	58.6	0.43	9.64	0	2	
	5.90	58.6	88.4	0.43	9.61	1	2	at Prairie Fork (IKNH)
	0.00	99.7	99.7	0.44	9.61	0	2	
Prairie Fork	13.80	0.0	0.0	0.40	9.55	0	2	topographic divide
(IKNH)	6.61	9.3	9.3	0.40	9.55	0	2	
	6.60	9.3	18.6	0.40	9.55	1	2	
	0.00	29.8	29.8	0.43	9.55	0	2	
Bear Creek	5.60	0.0	0.0	0.43	9.64	0	2	
tributary	2.20	3.8	3.8	0.43	9.64	2	2	Morrisonville STP
(IKNM)	0.00	6.7	6.7	0.43	9.64	0	2	
Bear Creek	7.00	0.0	0.0	0.40	9.70	0	2	topographic divide
tributary	2.60	5.2	5.2	0.40	9.70	0	2	Road@Sec.21 11N 3W
(IKNQ)	1.50	13.0	13.0	0.40	9.70	0	2	Road® Sec 16 11N 3W
	0.00	15.8	15.8	0.42	9.70	0	2	
Brush Creek	7.40	0.0	0.0	0.40	9.70	0	2	topographic divide
(IKP)	4.20	5.2	5.2	0.40	9.70	0	2	Road® Sec 30 12N 2W
	0.00	14.3	14.3	0.40	9.70	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Flat Branch	36.80	0.0	0.0	0.70	10.10	0	2	topographic divide
(IKR)	29.51	12.1	12.1	0.70	10.10	0	2	
	29.50	12.1	57.9	0.48	10.10	1	2	at Lake Fork (IKRV)
	28.20	59.3	68.6	0.51	10.10	0	2	
	23.81	87.3	87.3	0.58	10.10	0	2	
	23.80	87.3	94.3	0.60	10.10	0	2	at Sorghum Branch confluence
	22.61	95.9	95.9	0.60	10.10	0	2	
	22.60	95.9	106.3	0.60	10.10	1	2	at Flat Branch tributary (IKRQ)
	18.80	112.3	112.3	0.60	10.10	2	2	Moweaqua STP
	18.31	112.7	112.7	0.60	10.09	0	2	
	18.30	112.7	139.8	0.60	10.08	1	2	at Big George Branch (IKRN)
	17.61	140.1	140.1	0.60	10.08	0	2	
	17.60	140.1	186.6	0.60	10.06	1	2	at Willow Branch (IKRM)
	14.71	193.6	193.6	0.60	10.06	0	2	
	14.70	193.6	207.1	0.60	10.05	1	2	at Oak Branch (IKRK)
	13.10	208.8	218.5	0.60	10.05	0	2	
	12.11	220.9	220.9	0.60	10.05	0	2	
	12.10	220.9	251.3	0.58	10.03	1	2	at Brushy Branch (IKRI)
	1.60	276.0	276.0	0.58	10.00	5	2	USGS Gage 05574500 near Taylorville
	0.00	277.5	277.5	0.58	10.00	0	2	at mouth near Taylorville
Brushy Branch	11.90	0.0	0.0	0.40	9.90	0	2	topographic divide
(IKRI)	7.50	5.9	5.9	0.40	9.90	0	2	Road@Sec.6 12N 1E
	4.11	12.3	12.3	0.40	9.90	0	2	
	4.10	12.3	23.5	0.40	9.90	1	2	at West Fork Brushy Branch (IKRIL)
	0.00	30.4	30.4	0.45	9.90	0	2	
West Fork	6.80	0.0	0.0	0.40	9.90	0	2	topographic divide
Brushy Branch	2.00	6.4	6.4	0.40	9.90	0	2	Road® Sec 36 13N1W
(IKRIL)	0.00	11.2	11.2	0.40	9.90	0	2	
Oak Branch	9.20	0.0	0.0	0.40	10.00	0	2	topographic divide
(IKRK)	3.80	6.8	6.8	0.40	10.00	0	2	Road® Sec22 13N1E
	0.00	13.5	13.5	0.44	10.00	0	2	
Willow Branch	12.00	0.0	0.0	0.70	10.00	0	2	topographic divide
(IKRM)	4.21	11.0	11.0	0.70	10.00	0	2	
	4.20	11.0	23.8	0.70	10.00	1	2	at Dry Branch (IKRMJ)
	2.21	27.5	27.5	0.70	10.00	0	2	
	2.20	27.5	44.4	0.76	10.00	1	2	at Long Grove Creek (IKRMF)
	0.00	46.5	46.5	0.78	10.00	0	2	
Long Grove	10.40	0.0	0.0	0.70	10.00	0	2	topographic divide
Creek	3.00	5.7	5.7	0.70	10.00	0	2	Shelby-Macon County Line
(IKRMF)	0.00	16.9	16.9	0.75	10.00	0	2	
Dry Branch	6.80	0.0	0.0	0.70	10.00	0	2	topographic divide
(IKRMJ)	2.40	8.1	8.1	0.70	10.00	0	2	Macon SD STP
	0.00	12.8	12.8	0.70	10.00	0	2	
Big George	14.30	0.0	0.0	0.40	10.00	0	2	topographic divide
Branch	12.10	4.8	4.8	0.40	10.00	0	2	Road@Sec. 21 12N 1E
(IKRN)	6.30	14.1	14.1	0.40	10.00	2	2	Assumption STP
	2.40	21.4	21.4	0.42	10.00	0	2	Road@Sec.11 13N 1E
	0.00	27.1	27.1	0.44	10.00	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Flat Branch	6.50	0.0	0.0	0.70	10.10	0	2	topographic divide
tributary	2.50	2.9	2.9	0.70	10.10	0	2	Road® Sec. 27 14N 2E
(IKRQ)	0.00	10.4	10.4	0.70	10.10	0	2	
Lake Fork	18.20	0.0	0.0	0.40	10.10	0	2	topographic divide
(IKRU)	13.10	7.6	7.6	0.40	10.10	0	2	Road@Sec.5 11N 1E
	9.81	13.7	13.7	0.40	10.10	0	2	
	9.80	13.7	26.6	0.40	10.10	1	2	at Lake Fork tributary (IKRUO)
	3.00	33.7	33.7	0.40	10.10	0	2	Road@Sec.412N 2E
	0.00	45.8	45.8	0.43	10.10	0	2	
Lake Fork	6.60	0.0	0.0	0.40	10.10	0	2	topographic divide
tributary	2.80	4.4	4.4	0.40	10.10	0	2	Road® Sec2 11N 1E
(IKRUO)	0.00	12.9	12.9	0.40	10.10	0	2	
Locust Creek	12.30	0.0	0.0	0.57	9.90	0	2	topographic divide
(IKT)	7.20	5.8	5.8	0.57	9.90	0	2	Road@Sec.35 12N 1W
	4.50	15.8	15.8	0.57	9.90	0	2	Road@Sec.28 12N 1W
	1.70	21.7	30.1	0.57	9.90	0	2	
	0.00	31.3	31.3	0.57	9.90	0	2	
Cotton Creek	10.60	0.0	0.0	0.57	9.90	0	2	topographic divide
(IKW)	4.00	6.0	6.0	0.57	9.90	0	2	Road@Sec1311N 2W
	0.00	10.7	10.7	0.57	9.90	0	2	
Clear Creek	13.80	0.0	0.0	0.90	9.40	0	2	topographic divide
(IK5)	8.00	7.3	7.3	0.90	9.40	0	2	Road@Sec.24 16N 2W
	6.90	20.6	20.6	0.90	9.40	0	2	Road@Sec.23 16N 3W
	3.91	24.0	24.0	0.90	9.35	0	2	
	3.90	24.0	36.9	0.90	9.33	1	2	at North Fork Clear Creek (IK5H)
	3.61	37.0	37.0	0.90	9.33	0	2	
	3.60	37.0	51.2	0.90	9.34	1	2	at Griffith Creek (IK5G)
	0.00	55.8	55.8	1.54	9.33	0	2	
Griffith Creek	7.90	0.0	0.0	0.88	9.35	0	2	topographic divide
(IK5G)	2.60	7.6	7.6	0.88	9.35	0	2	Road@ Sec26 16N 3W
	0.00	14.2	14.2	0.88	9.35	0	2	
North Fork	8.50	0.0	0.0	0.89	9.30	0	2	topographic divide
Clear Creek	2.80	6.8	6.8	0.89	9.30	0	2	Interstate 72
(IK5H)	1.70	10.7	10.7	0.89	9.30	0	2	Buffalo, Dawson, Mechanicsburg STP
	0.00	12.9	12.9	0.89	9.30	0	2	
Buckhart Creek	25.70	0.0	0.0	0.80	9.70	0	2	topographic divide
(IL)	21.70	7.2	7.2	0.80	9.60	0	2	Road@Sec.21 14N 1W
	21.40	8.1	8.1	0.80	9.60	0	2	Stonington STP
	19.60	22.1	22.1	0.80	9.60	0	2	
	16.00	31.6	31.6	0.80	9.60	0	2	Road@Sec.15 14N 2W
	12.11	41.5	41.5	0.80	9.51	0	2	
	12.10	41.5	70.5	0.80	9.50	1	2	at Buckhart Creek tributary (ILL)
	4.01	86.3	86.3	0.80	9.46	0	2	
	4.00	86.3	97.8	0.80	9.44	1	2	at Buckhart Creek tributary (ILE)
	0.00	104.8	104.8	0.80	9.42	0	2	
Buckhart Creek	7.40	0.0	0.0	0.80	9.30	0	2	topographic divide
tributary	2.70	9.3	9.3	0.80	9.30	0	2	Sangamon-Christian County Line
(ILE)	0.00	11.5	11.5	0.80	9.30	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Buckhart Creek	10.70	0.0	0.0	0.80	9.50	0	2	topographic divide
tributary	4.80	7.6	7.6	0.80	9.50	0	2	Road® Sec.25 15N 2W
(ILL)	2.00	17.8	17.8	0.80	9.50	0	2	tributary North of Grove City
	0.00	29.0	29.0	0.80	9.50	0	2	
Mosquito Creek	21.70	0.0	0.0	0.72	9.95	0	2	topographic divide
(IM)	14.60	4.5	4.5	0.72	9.95	0	2	Road@Sec.21 15N 1E
	13.51	13.7	13.7	0.72	9.90	0	2	
	13.50	13.7	22.0	0.74	9.90	1	2	at Mosquito Creek tributary(IMQ)
	12.41	25.3	25.3	0.74	9.89	0	2	
	12.40	25.3	35.7	0.74	9.88	1	2	at Spring Creek (IMP)
	11.60	36.2	44.2	0.74	9.84	0	2	
	6.30	62.8	62.8	0.75	9.79	0	2	Road@Sec.10 15N 1W
	0.00	77.1	77.1	0.76	9.74	0	2	
Spring Creek	8.00	0.0	0.0	0.72	9.85	0	2	topographic divide
(IMP)	3.10	4.5	4.5	0.72	9.85	0	2	Baltimore and Ohio RR
	0.00	10.4	10.4	0.72	9.85	0	2	
Mosquito Creek	3.80	0.0	0.0	0.78	9.85	0	2	
tributary	1.40	3.4	3.4	0.78	9.85	2	2	Blue Mound STP
(IMQ)	0.00	8.3	8.3	0.78	9.85	0	2	
Long Point	17.50	0.0	0.0	0.86	9.95	0	2	topographic divide
Slough	12.60	10.6	10.6	0.86	9.87	0	2	Road@Sec.33 17N 1E
(IM2)	6.41	14.7	14.7	0.86	9.80	0	2	
	6.40	14.7	25.0	0.86	9.80	1	2	at Long Point Slough tributary (IM2J)
	5.01	30.2	30.2	0.86	9.78	0	2	
	5.00	30.2	46.1	0.84	9.75	1	2	at Long Point Slough tributary (IM2H)
	2.41	52.8	52.8	0.84	9.66	0	2	
	2.40	52.8	60.7	0.83	9.66	1	2	at Long Point Slough tributary (IM2D)
	0.00	64.4	64.4	0.83	9.65	0	2	
Long Point	4.40	0.0	0.0	0.80	9.65	0	2	topographic divide
Slough tributary	3.00	1.1	1.1	0.80	9.65	2	2	Borden Chemical Co. discharge
(IM2D)	1.30	3.0	3.0	0.80	9.65	2	2	Illiopolis STP
	0.00	7.9	7.9	0.80	9.65	0	2	
Long Point	6.30	0.0	0.0	0.80	9.70	0	2	topographic divide
Slough tributary	2.20	4.3	4.3	0.80	9.70	0	2	Macon-Sangamon County Line
(IM2H)	0.00	15.9	15.9	0.80	9.70	0	2	
Niantic Creek	4.80	0.0	0.0	0.86	9.80	0	2	topographic divide
(IM2J)	2.60	3.4	3.4	0.86	9.80	0	2	Third Principle Meridian
	1.60	4.2	4.2	0.86	9.80	2	2	Niantic STP
	0.00	10.3	10.3	0.86	9.80	0	2	
Sangamon River	7.20	0.0	0.0	0.80	9.80	0	2	
tributary	4.60	9.5	9.5	0.80	9.80	2	2	Harristown STP
(IM7)	0.00	9.7	9.7	0.80	9.80	0	2	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Stevens Creek	23.30	0.0	0.0	0.95	10.10	0	1	topographic divide
(IO)	18.31	8.9	8.9	0.95	10.10	0	1	
	18.30	8.9	17.8	0.94	10.10	0	1	Illinois Central RR
	13.21	31.0	31.0	0.93	10.10	0	1	
	13.20	31.0	37.8	0.92	10.10	0	1	400' south of Oceana Road (at Forsyth)
	4.81	50.1	50.1	0.88	10.10	0	1	
	4.80	50.1	76.2	0.82	10.10	1	1	at Spring Creek (IOE)
	4.79	76.2	83.4	0.82	10.10	0	1	
	0.10	87.0	87.0	0.82	10.10	2	1	Decatur Treatment Plant
	0.00	87.0	87.0	0.82	10.10	0	1	
Spring Creek	13.50	0.0	0.0	0.95	10.10	0	1	topographic divide
(IOE)	7.81	6.3	6.3	0.91	10.10	0	1	
	7.80	6.3	11.7	0.91	10.10	0	1	
	5.20	18.4	18.4	0.84	10.10	0	1	Mound Road in Decatur
	0.00	26.1	26.1	0.79	10.10	0	1	
Sand Creek	9.40	0.0	0.0	0.63	10.10	0	1	topographic divide
(I09)	3.90	7.7	7.7	0.63	10.10	0	1	
	0.00	16.0	16.0	0.68	10.10	0	1	
Finley Creek	18.50	0.0	0.0	0.71	10.20	0	1	topographic divide
(IP)	12.90	7.3	7.3	0.71	10.20	0	1	
	10.40	17.0	17.0	0.69	10.20	0	1	
	4.10	24.4	24.4	0.68	10.20	0	1	
	1.91	30.7	30.7	0.68	10.20	0	1	
	1.90	30.7	82.1	0.73	10.20	1	1	at Big Creek (IPD)
	0.00	84.5	84.5	0.73	10.20	0	1	
Big Creek	11.40	0.0	0.0	0.63	10.30	0	1	topographic divide
(IPD)	8.00	7.8	7.8	0.63	10.30	0	1	near Hervey City
	5.71	14.9	14.9	0.67	10.30	0	1	
	5.70	14.9	25.1	0.67	10.30	0	1	
	1.81	29.1	29.1	0.67	10.30	0	1	
	1.80	29.1	46.7	0.78	10.20	1	1	at Long Creek (IPDE)
	1.30	47.0	47.0	0.78	10.20	0	1	IL Rte. 121
	0.00	51.4	51.4	0.76	10.20	0	1	
Long Creek	11.20	0.0	0.0	1.30	10.20	0	1	topographic divide
(IPDE)	6.50	4.3	4.3	1.30	10.20	0	1	IL Rte. 105
	5.70	7.8	7.8	1.30	10.20	0	1	
	2.50	13.7	13.7	1.09	10.20	0	1	US Hwy. 36
	0.00	17.6	17.6	0.97	10.20	0	1	
Sangamon River	7.50	0.0	0.0	1.19	10.30	0	1	topographic divide
tributary	3.80	4.9	4.9	1.19	10.30	0	1	Macon-Piatt County Line
(IP9)	3.60	6.2	6.2	1.19	10.30	2	1	Cerro Gordo STP
	0.00	10.0	10.0	1.19	10.30	0	1	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Friends Creek	22.20	0.0	0.0	0.94	10.30	0	1	topographic divide
(IQ)	19.20	7.4	7.4	0.94	10.30	0	1	
	14.20	15.0	15.0	0.96	10.30	0	1	Macon-DeWitt County Line
	12.80	17.4	17.4	0.96	10.30	0	1	
	10.41	18.6	18.6	0.96	10.30	0	1	
	10.40	18.6	63.9	0.94	10.30	1	1	at Friends Creek Ditch (IQK)
	6.41	68.8	68.8	0.94	10.30	1	1	
	6.40	68.8	111.0	0.93	10.30	1	1	at Friends Creek tributary (IQG)
	6.10	111.2	111.2	0.93	10.30	5	1	USGS Gage 05572450 at Argenta
	0.00	128.8	128.8	0.91	10.30	0	1	
West Branch	12.80	0.0	0.0	0.94	10.20	0	1	topographic divide
Friends Creek	10.10	9.4	9.4	0.94	10.20	0	1	
(IQG)	9.30	13.8	13.8	0.95	10.20	0	1	Road@Sec.33 19N 3E
	6.40	21.4	21.4	0.95	10.20	0	1	
	0.91	31.2	31.2	0.92	10.20	0	1	
	0.90	31.2	41.9	0.91	10.20	1	1	at Kickapoo Creek (IQGC)
	0.00	42.2	42.2	0.91	10.20	0	1	
Kickapoo Creek	7.00	0.0	0.0	0.89	10.20	0	1	topographic divide
(IQGC)	3.75	4.5	4.5	0.89	10.20	0	1	Road@28 18N3E
	0.00	10.7	10.7	0.89	10.20	0	1	
Friends Creek	16.70	0.0	0.0	0.94	10.30	0	1	topographic divide
Ditch (IQK)	11.60	11.3	11.3	0.94	10.30	0	1	IL Rte. 10
	7.40	18.5	24.7	0.94	10.30	0	1	
	4.70	27.6	27.6	0.94	10.30	0	1	Macon-DeWitt County Line
	4.20	27.7	38.7	0.94	10.30	0	1	
	0.00	45.3	45.3	0.93	10.30	0	1	
Wolf Run Ditch	9.40	0.0	0.0	0.92	10.40	0	1	topographic divide
(IQ8)	3.90	6.0	6.0	0.92	10.40	0	1	Interstate 72
	0.00	13.0	13.0	0.92	10.40	0	1	
Willow Branch	9.30	0.0	0.0	1.19	10.40	0	1	topographic divide
(IR)	4.70	6.6	6.6	1.19	10.40	0	1	
	2.60	12.6	12.6	1.16	10.40	0	1	Road@Sec.33 18N 5E
	0.00	21.6	21.6	1.14	10.40	0	1	
Camp Creek	18.20	0.0	0.0	0.60	10.60	0	1	topographic divide
(IS)	13.40	10.9	10.9	0.60	10.60	0	1	Interstate 72
	12.30	18.1	18.1	0.60	10.60	0	1	IL Rte. 47
	7.01	32.6	32.6	0.60	10.60	0	1	
	7.00	32.6	44.7	0.60	10.60	1	1	at Camp Creek tributary (ISK)
	4.40	48.2	48.2	0.60	10.60	0	1	ISWS Gage
	0.00	55.0	55.0	0.60	10.60	0	1	
Camp Creek	7.20	0.0	0.0	0.60	10.60	0	1	topographic divide
tributary	4.40	2.8	2.8	0.60	10.60	0	1	Road@Sec.21 21N 7E
(ISK)	0.00	12.1	12.1	0.60	10.60	0	1	

Appendix C. Continued

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Goose Creek	19.50	0.0	0.0	0.60	10.50	0	1	topographic divide
(IT)	14.30	5.7	5.7	0.60	10.50	0	1	
	10.40	10.2	10.2	0.60	10.40	0	1	IL Rte. 10
	9.30	11.2	11.2	0.60	10.40	0	1	Illinois Central Gulf RR
	8.21	27.7	27.7	0.60	10.40	0	1	
	8.20	27.7	42.2	0.60	10.40	1	1	at Goose Creek tributary (ITL)
	5.80	47.9	47.9	0.60	10.40	0	1	USGS Gage 05571500 near Deland
	0.00	58.9	58.9	0.60	10.40	0	1	
Goose Creek	7.40	0.0	0.0	0.92	10.40	0	1	topographic divide
tributary	1.40	1.8	1.8	0.92	10.40	0	1	IL Rte. 10
(ITL)	0.00	14.5	14.5	0.92	10.40	0	1	
Big Ditch	15.50	0.0	0.0	0.71	10.50	0	1	topographic divide
(IT4)	11.30	5.6	5.6	0.71	10.50	0	1	
	10.40	7.0	9.6	0.71	10.50	0	1	US Hwy. 150
	6.50	14.0	14.0	0.79	10.50	0	1	
	3.60	18.4	18.4	0.83	10.50	0	1	
	0.00	27.3	27.3	0.87	10.50	0	1	
Sangamon River	3.90	0.0	0.0	0.63	10.61	0	1	
tributary	2.40	3.4	3.4	0.63	10.61	2	1	Sangamon Valley PWD STP
(IU)	0.00	4.9	4.9	0.63	10.61	0	1	
Big Ditch	18.20	0.0	0.0	0.58	10.70	0	1	topographic divide
(IV)	14.60	3.6	3.6	0.58	10.70	0	1	
	12.30	13.4	13.4	0.68	10.70	0	1	
	10.50	19.4	19.4	0.67	10.70	0	1	US Hwy. 136
	9.10	25.0	25.0	0.66	10.70	0	1	
	7.00	29.4	29.4	0.64	10.70	0	1	2 miles south of Dewey
	3.80	41.4	41.4	0.60	10.70	0	1	ISWS Streamgage
	1.40	45.7	45.7	0.59	10.70	0	1	
	0.00	52.8	52.8	0.59	10.70	0	1	
Sangamon River	7.40	0.0	0.0	0.61	10.60	0	1	topographic divide
tributary	3.70	7.5	7.5	0.61	10.60	0	1	
(IV4)	1.30	13.0	13.0	0.61	10.60	0	1	IL Rte. 47
	0.00	14.2	14.2	0.61	10.60	0	1	
Wildcat Slough	14.10	0.0	0.0	0.44	10.70	0	1	topographic divide
(IV7)	9.90	4.5	4.5	0.44	10.70	0	1	
	7.50	9.3	9.3	0.54	10.70	0	1	
	3.70	15.1	15.1	0.52	10.70	0	1	US Hwy. 136 near Dewey
	0.00	17.9	17.9	0.52	10.70	0	1	
Owl Creek	8.40	0.0	0.0	0.66	10.70	0	1	topographic divide
(IW)	0.60	7.9	7.9	0.66	10.70	2	1	Fisher discharge
	0.00	12.7	12.7	0.66	10.70	0	1	
Hillsbury Slough	8.60	0.0	0.0	0.16	10.70	0	1	topographic divide
(IW5)	5.50	3.9	3.9	0.16	10.70	0	1	
	1.90	6.8	14.8	0.54	10.70	0	1	
	0.00	19.4	19.4	0.56	10.70	0	1	

Appendix C. Concluded

Stream (code)	Mileage	DA(u)	DA(d)	K	P-ET	ID	Region	Location description
Dickerson	14.50	0.0	0.0	0.10	10.70	0	1	topographic divide
Slough	9.00	8.4	8.4	0.10	10.70	0	1	IL Rte. 9
(IW7)	6.30	10.7	10.7	0.10	10.70	0	1	
	4.40	12.4	20.3	0.21	10.70	0	1	
	2.50	23.3	28.3	0.30	10.70	0	1	at Blackford Slough
	0.00	30.5	30.5	0.30	10.70	0	1	
Drummer Creek	18.10	0.0	0.0	0.27	10.60	0	1	topographic divide
(IX)	15.00	4.5	4.5	0.27	10.60	0	1	IL Rte. 47
	11.90	11.6	11.6	0.33	10.60	0	1	
	8.60	19.6	19.6	0.37	10.60	0	1	IL Rte. 9
	7.90	19.9	19.9	0.37	10.60	2	1	Gibson City discharge
	6.21	23.4	23.4	0.53	10.60	0	1	
	6.20	23.4	39.9	0.53	10.60	1	1	at West Branch Drummer Creek (IXJ)
	5.91	40.0	40.0	0.60	10.60	0	1	
	5.90	40.0	51.2	0.60	10.60	1	1	at Drummer Creek tributary (IXI)
	0.00	58.0	58.0	0.60	10.60	0	1	
Drummer Creek	6.50	0.0	0.0	0.76	10.60	0	1	topographic divide
tributary	2.20	5.4	5.4	0.76	10.60	0	1	
(IXI)	0.00	11.2	11.2	0.83	10.60	0	1	
West Branch	10.00	0.0	0.0	0.50	10.60	0	1	topographic divide
Drummer Creek	7.50	2.7	2.7	0.50	10.60	0	1	Ford-McLean County Line
(IXJ)	2.60	10.2	10.2	0.54	10.60	0	1	IL Rte. 9
	0.00	16.5	16.5	0.63	10.60	0	1	
Lonetree Creek	15.10	0.0	0.0	0.73	10.60	0	1	topographic divide
(IY)	9.20	9.6	9.6	0.73	10.60	0	1	US Hwy. 136
	8.30	9.9	14.4	0.75	10.60	0	1	
	6.50	24.6	24.6	0.87	10.60	0	1	
	4.71	25.2	25.2	0.89	10.60	0	1	
	4.70	25.2	37.3	0.89	10.60	1	1	at Lonetree Creek tributary (I YI)
	3.40	43.0	43.0	0.85	10.60	0	1	at Foosland
	0.00	47.3	47.3	0.83	10.60	0	1	
Lonetree Creek	6.20	0.0	0.0	0.96	10.60	0	1	topographic divide
tributary	1.80	5.2	5.2	0.96	10.60	0	1	
(IYI)	0.00	12.1	12.1	0.96	10.60	0	1	near Foosland

Notes:

Cr. - Creek
PWS - Public Water Supply
Sec. - Section
STP - Sanitary Treatment Plant
Trib. - Tributary
WTP - Wastewater Treatment Plant

Appendix D. Coefficients for Virgin Flow Equations

The mean flow for a stream location (Q_{mean}) is computed as: Q_{mean} = 0.0738 DA (P-ET), where the drainage area (DA) and net excess precipitation (P-ET) are included in the NETWORK file, listed in appendix C.

The flow values for the remaining flow parameters, designated by Q_x, are computed using the following equation:

$$Q_x = \min \{ Q_{mean} [a + b\,DA + c\,K] - 0.05, 0 \}$$

where K is the average soil permeability for the watershed, also included in the NETWORK file (see appendix C), and the coefficients a, b, and c are defined in the following table.

Flow type	Region 1 (Bloomington Ridged Plain)				Region 2 (Springfield Plain)			
	(a)	(b)	(c)	Error(c_e)	(a)	(b)	(c)	Error(c_e)
Q_{01}	11.373080	-0.00118000	-1.445050	0.8389	18.422430	-0.00949000	0.171951	2.0539
Q_{02}	7.788779	-0.00074000	-0.804580	0.4752	11.038620	-0.00311000	-0.444800	0.7633
Q_{05}	4.217719	0.00002460	-0.297770	0.2523	4.448777	0.00133700	-0.519090	0.5315
Q_{10}	2.408664	0.00026600	-0.085570	0.1349	1.803110	0.00101100	-0.105370	0.3623
Q_{15}	1.635997	0.00021800	0.008032	0.0927	0.876903	0.00069900	0.098388	0.2258
Q_{25}	0.906904	0.00017900	0.057598	0.0645	0.298858	0.00038100	0.204075	0.1096
Q_{40}	0.423646	0.00010200	0.078911	0.0577	0.089304	0.00018200	0.143338	0.0508
Q_{50}	0.230940	0.00007310	0.090849	0.0495	0.039943	0.00012400	0.099612	0.0357
Q_{60}	0.099315	0.00004370	0.095504	0.0398	0.017739	0.00008330	0.059911	0.0235
Q_{75}	-0.006340	0.00001140	0.088305	0.0224	0.002269	0.00004890	0.018021	0.0102
Q_{85}	-0.025320	0.00001120	0.071292	0.0140	-0.001280	0.00002910	0.006121	0.0055
Q_{90}	-0.027050	0.00001040	0.061116	0.0118	-0.001800	0.00002110	0.003375	0.0046
Q_{95}	-0.026610	0.00000753	0.050945	0.0092	-0.001790	0.00001270	0.002405	0.0029
Q_{98}	-0.024100	0.00000460	0.041830	0.0074	-0.001740	0.00000677	0.001900	0.0013
Q_{99}	-0.022820	0.00000372	0.036853	0.0065	-0.001670	0.00000421	0.001295	0.0012
Low Flows								
$Q_{1,2}$	-0.024230	0.00000548	0.052233	0.0110	-0.00.1200	0.00001610	0.002333	0.0034
$Q_{1,10}$	-0.019930	0.00000425	0.030450	0.0056	-0.000600	0.00000227	0.000400	0.0008
$Q_{1,25}$	-0.017740	0.00000341	0.024968	0.0045	-0.000600	0.00000070	0.000080	0.0008
$Q_{1,5o}$	-0.015690	0.00000440	0.019100	0.0038	-0.000600	0.00000070	0.000060	0.0007
$Q_{7,2}$	-0.025110	0.00000393	0.058737	0.0121	-0.001100	0.00001800	0.002800	0.0037
$Q_{7,10}$	-0.022630	0.00000420	0.035682	0.0065	-0.000600	0.00000333	0.000500	0.0007
$Q_{7,25}$	-0.019670	0.00000440	0.028100	0.0048	-0.000600	0.00000100	0.000099	0.0007
$Q_{7,50}$	-0.017120	0.00000515	0.021500	0.0038	-0.000600	0.00000090	0.000080	0.0007
$Q_{15,2}$	-0.026190	0.00000337	0.065619	0.0128	-0.001100	0.00002180	0.003531	0.0043
$Q_{15,10}$	-0.024160	0.00000392	0.040200	0.0078	-0.000600	0.00000352	0.000637	0.0007
$Q_{15,25}$	-0.020500	0.00000380	0.031000	0.0058	-0.000500	0.00000124	0.000200	0.0008
$Q_{15,50}$	-0.018200	0.00000440	0.025000	0.0042	-0.000600	0.00000110	0.000160	0.0005
$Q_{31,2}$	-0.025650	0.00000007	0.073262	0.0142	-0.000210	0.00003000	0.006881	0.0058
$Q_{31,10}$	-0.024200	0.00000250	0.044337	0.0087	-0.000750	0.00000534	0.001335	0.0009
$Q_{31,25}$	-0.020700	0.00000260	0.035063	0.0067	-0.000490	0.00000314	0.000384	0.0007
$Q_{31,50}$	-0.018400	0.00000350	0.028000	0.0047	-0.000620	0.00000159	0.000313	0.0004
$Q_{61,2}$	-0.022730	0.00000024	0.085028	0.0175	0.005456	0.00004190	0.019468	0.0085
$Q_{61,10}$	-0.024360	0.00000297	0.048514	0.0090	-0.000900	0.00001020	0.002479	0.0020
$Q_{61,25}$	-0.021570	0.00000269	0.038344	0.0072	-0.000700	0.00000556	0.001526	0.0015
$Q_{61,50}$	-0.018520	0.00000351	0.030719	0.0054	-0.000770	0.00000331	0.001085	0.0011
$Q_{91,2}$	-0.012240	-0.00000640	0.095759	0.0202	0.012613	0.00005480	0.052354	0.0132
$Q_{91,10}$	-0.026870	0.00000539	0.054067	0.0102	-0.000230	0.00001550	0.003025	0.0039
$Q_{91.25}$	-0.023090	0.00000434	0.042206	0.0077	-0.000570	0.00000827	0.001735	0.0024
$Q_{91,50}$	-0.018360	0.00000426	0.032794	0.0060	-0.000840	0.00000525	0.001672	0.0018

Appendix D. Continued

Flow type	Region 1				Region 2			
	(a)	(b)	(c)	Error (c_e)	(a)	(b)	(c)	Error (c_e)
Drought Flows								
$Q_{6,10}$	-0.020250	0.00001260	0.061397	0.0269	0.006901	0.00001870	0.026859	0.0150
$Q_{6,25}$	-0.025780	0.00001340	0.053184	0.0199	0.000133	0.00001290	0.012416	0.0057
$Q_{6,50}$	-0.027080	0.00001120	0.049294	0.0170	-0.001230	0.00000896	0.007127	0.0036
$Q_{9,10}$	0.056450	0.00004300	0.049126	0.0692	0.073849	0.00000786	0.052622	0.0390
$Q_{9,25}$	0.010527	0.00000419	0.055739	0.0392	0.033460	0.00000408	0.022622	0.0247
$Q_{9,50}$	-0.002770	-0.00000130	0.052993	0.0280	0.019570	-0.00000120	0.005456	0.0167
$Q_{l2,10}$	0.214412	0.00002330	0.051174	0.1559	0.199032	0.00004370	0.000882	0.0533
$Q_{12,25}$	0.098817	-0.00002100	0.064969	0.0945	0.086789	0.00000929	0.022193	0.0366
$Q_{12,50}$	0.058534	-0.00003700	0.062428	0.0674	0.048991	-0.00001100	0.023742	0.0315
$Q_{18,10}$	0.302353	0.00007730	0.023239	0.1973	0.253393	0.00002110	0.015732	0.0686
$Q_{18,25}$	0.136027	0.00001990	0.047060	0.1129	0.124239	0.00001010	0.011729	0.0469
$Q_{18,50}$	0.085953	-0.00001800	0.056233	0.0858	0.072835	-0.00000680	0.016464	0.0385
$Q_{30,10}$	0.577792	0.00003120	0.016966	0.3370	0.424079	0.00003230	0.039105	0.0456
$Q_{30,25}$	0.288214	0.00007400	0.023831	0.1933	0.235844	0.00002060	-0.009890	0.0529
$Q_{30,50}$	0.204693	-0.00002000	0.040279	0.1382	0.151654	0.00001140	0.002945	0.0504
$Q_{54,10}$	0.821054	-0.00000350	0.027199	0.4707	0.709745	-0.00005300	0.198612	0.0931
$Q_{54,25}$	0.465373	0.00002710	0.038042	0.2908	0.398772	-0.00001400	0.109295	0.1092
$Q_{54,50}$	0.324378	-0.00000610	0.046099	0.2116	0.244633	-0.00005300	0.160434	0.1145
January								
Q_{02}	8.256238	0.00028200	-1.381390	1.2030	14.178860	-0.00525000	0.937568	1.6474
Q_{10}	2.064314	0.00111000	-0.420500	0.3917	2.550000	0.00140000	0.100000	0.9891
Q_{25}	0.728722	0.00059700	-0.140090	0.1719	0.510889	0.00044100	0.120790	0.1628
Q_{50}	0.220107	0.00023200	0.006675	0.0760	0.093797	0.00013300	0.074685	0.0536
Q_{75}	0.005306	0.00004190	0.061177	0.0191	0.020845	0.00003310	0.038346	0.0254
Q_{90}	-0.027210	0.00001280	0.052691	0.0106	0.001409	0.00001940	0.000593	0.0071
Q_{98}	-0.028040	0.00000830	0.042319	0.0085	-0.001250	0.00000743	0.002217	0.0032
Q_{mean}	0.888421	0.00031000	-0.126030	0.1175	1.300805	-0.00008600	0.073500	0.1487
February								
Q_{02}	9.284479	-0.00074000	-1.280140	1.0674	17.752540	-0.00708000	1.253863	3.9959
Q_{10}	2.989105	0.00084100	-0.482250	0.4091	3.543303	0.00281100	0.004052	0.8385
Q_{25}	1.279789	0.00050000	-0.203440	0.2485	0.895200	0.00080600	0.093441	0.2400
Q_{50}	0.399664	0.00023900	-0.020310	0.1236	0.214802	0.00027900	0.138682	0.0761
Q_{75}	0.093291	0.00009070	0.037001	0.0479	0.069171	0.00005700	0.055407	0.0474
Q_{90}	-0.025330	0.00004890	0.057587	0.0139	0.015865	0.00001780	0.021190	0.0209
Q_{98}	-0.029870	0.00001560	0.049982	0.0098	0.000820	0.00001060	0.004807	0.0047
Q_{mean}	1.258718	0.00022900	-0.162870	0.1879	1.697000	0.00013900	0.051620	0.2286
March								
Q_{02}	10.194180	-0.00148000	-0.719630	1.3390	20.000000	-0.00800000	-3.236280	2.9717
Q_{10}	3.940799	-0.00034000	0.137838	0.5570	4.700000	0.00260000	-0.700000	1.2785
Q_{25}	1.792988	0.00024400	0.212393	0.2611	1.200000	0.00082600	0.200000	0.4104
Q_{50}	0.803663	0.00016200	0.156120	0.1055	0.427166	0.00031800	0.143179	0.1460
Q_{75}	0.316486	0.00017300	0.086546	0.0721	0.165359	0.00013600	0.084383	0.0576
Q_{90}	0.122431	0.00009550	0.070082	0.0501	0.080000	0.00005600	0.040000	0.0366
Q_{98}	-0.009690	0.00004680	0.070258	0.0270	0.017001	-0.00000590	0.009158	0.0232
Q_{mean}	1.722511	-0.00003000	0.070402	0.1702	1.962000	0.00009630	-0.022630	0.3110

Appendix D. Continued

Flow type	Region 1				Region 2			
	(a)	(b)	(c)	Error (c_e)	(a)	(b)	(c)	Error (c_e)
April								
Q_{02}	11.217380	0.00114200	-1.823100	1.2877	17.500000	-0.00601000	-3.600000	2.5266
Q_{10}	4.575437	0.00085300	-0.530060	0.6603	3.749570	0.00257000	-0.849950	1.0453
Q_{25}	2.352647	0.00054800	-0.122270	0.2950	0.848822	0.00100200	0.344947	0.3515
Q_{50}	1.121761	0.00019100	0.076074	0.1683	0.267101	0.00032900	0.202915	0.1354
Q_{75}	0.515019	0.00003970	0.107929	0.0849	0.102738	0.00013800	0.128697	0.0599
Q_{90}	0.230835	0.00008140	0.078383	0.0613	0.037149	0.00009580	0.082897	0.0307
Q_{98}	0.033722	0.00004060	0.074163	0.0402	0.015314	0.00002440	0.021206	0.0273
Q_{mean}	2.075321	0.00024800	-0.122090	0.2123	1.722324	0.00008820	0.055534	0.2468
May								
Q_{02}	9.592962	-0.00047000	-1.623350	1.4765	13.277310	-0.00387000	-4.081670	3.9642
Q_{10}	3.183883	0.00092800	-0.438810	0.3242	1.637472	0.00167400	-0.329060	0.4785
Q_{25}	1.475056	0.00061000	-0.118080	0.1741	0.327836	0.00060700	0.233389	0.1576
Q_{50}	0.739528	0.00027100	-0.006600	0.1025	0.093787	0.00021600	0.156207	0.0753
Q_{75}	0.386462	0.00014800	0.022807	0.0633	0.034251	0.00010700	0.074896	0.0343
Q_{90}	0.222348	0.00008580	0.025465	0.0384	0.012186	0.00007580	0.037940	0.0217
Q_{98}	0.078393	0.00002910	0.030314	0.0375	0.002766	0.00002300	0.007298	0.0098
Q_{mean}	1.556877	0.00026100	-0.169390	0.0986	0.990000	0.00009000	0.083239	0.2776
June								
Q_{02}	10.915300	-0.00161000	-1.895610	1.7579	8.000000	-0.00247000	1.600000	1.7679
Q_{10}	3.167954	0.00048500	-0.432610	0.4487	0.800000	0.00136300	0.450000	0.5061
Q_{25}	1.251336	0.00041600	-0.114550	0.1973	0.150000	0.00051900	0.210000	0.1509
Q_{50}	0.497747	0.00018300	-0.000250	0.0986	0.011407	0.00015600	0.138949	0.0503
Q_{75}	0.222524	0.00010100	0.024847	0.0590	0.001078	0.00008260	0.046810.	0.0232
Q_{90}	0.102360	0.00004820	0.035293	0.0420	0.000817	0.00004570	0.011833	0.0117
Q_{g8}	0.018023	0.00002200	0.045060	0.0275	-0.002160	0.00002240	0.004441	0.0057
Q_{mean}	1.476773	0.00001470	-0.167980	0.2120	0.790000	0.00009080	0.187000	0.1687
July								
Q_{02}	5.959371	-0.00090000	-0.614200	0.9058	5.554171	-0.00014000	1.571211	2.2013
Q_{10}	1.419172	0.00032700	-0.059250	0.2643	0.353169	0.00116600	0.494727	0.2092
Q_{25}	0.532244	0.00023000	0.024553	0.1362	0.019083	0.00030500	0.182931	0.0459
Q_{50}	0.185234	0.00013800	0.037420	0.0683	0.002339	0.00010500	0.054007	0.0200
Q_{75}	0.052863	0.00005880	0.045725	0.0368	-0.003040	0.00005560	0.017546	0.0088
Q_{90}	0.004029	0.00002240	0.044747	0.0205	-0.003150	0.00002940	0.006508	0.0059
Q_{98}	-0.008580	0.00001320	0.031476	0.0106	-0.001950	0.00000585	0.002703	0.0027
Q_{mean}	0.731141	0.00001160	-0.019210	0.0948	0.472049	0.00000551	0.240776	0.1528
August								
Q_{02}	4.395971	-0.00099000	-0.355850	0.9775	2.496213	0.00131200	0.085676	0.7351
Q_{10}	0.515885	0.00000556	0.180363	0.1606	0.089393	0.00053700	0.308231	0.0692
Q_{25}	0.085608	0.00004010	0.142585	0.0642	0.015824	0.00016200	0.060251	0.0246
Q_{50}	0.003665	0.00002340	0.089638	0.0340	0.000526	0.00007100	0.020504	0.0102
Q_{75}	-0.012620	0.00001090	0.058857	0.0180	-0.003580	0.00003830	0.008097	0.0046
Q_{90}	-0.015160	0.00000688	0.043720	0.0115	-0.002920	0.00001970	0.004368	0.0038
Q_{98}	-0.014440	0.00000399	0.030773	0.0068	-0.001500	0.00000510	0.001300	0.0020
Q_{mean}	0.371711	-0.00007400	0.062424	0.0830	0.254374	0.00007710	0.122401	0.1308

Appendix D. Concluded

Flow type	Region 1				Region 2			
	(a)	(b)	(c)	Error (c_e)	(a)	(b)	(c)	Error (c_e)
September								
Q_{02}	4.060000	-0.00085000	-0.245000	1.5610	2.155580	-0.00024000	-0.163640	0.5518
Q_{10}	0.445846	-0.00003700	0.236173	0.3236	0.128548	0.00026900	0.121347	0.1121
Q_{25}	0.010761	0.00001950	0.149305	0.0712	0.012000	0.00008770	0.050000	0.0307
Q_{50}	-0.035390	0.00000338	0.101760	0.0247	0.001196	0.00004260	0.007462	0.0072
Q_{75}	-0.030590	0.00000787	0.061490	0.0127	-0.001760	0.00002150	0.002974	0.0047
Q_{90}	-0.024850	0.00000548	0.042832	0.0084	-0.001300	0.00000925	0.001589	0.0019
Q_{98}	-0.019450	0.00000395	0.029154	0.0061	-0.000950	0.00000182	0.000559	0.0004
Q_{mean}	0.330553	-0.00009400	0.077429	0.1099	0.195371	-0.00003600	0.031428	0.0576
October								
Q_{02}	3.749512	-0.00098000	-0.134930	0.8482	2.386303	0.00134500	-0.390680	1.2584
Q_{10}	0.766785	0.00005120	0.156244	0.2924	0.055233	0.00025300	0.340837	0.0744
Q_{25}	0.112101	0.00000285	0.182602	0.1447	0.009607	0.00009040	0.089628	0.0407
Q_{50}	-0.032320	-0.00000210	0.106540	0.0267	0.001649	0.00003590	0.015400	0.0078
Q_{75}	-0.034640	0.00000655	0.068646	0.0124	-0.000750	0.00001820	0.002015	0.0042
Q_{90}	-0.029570	0.00000139	0.051620	0.0087	-0.001350	0.00000937	0.001881	0.0020
Q_{98}	-0.024610	0.00000092	0.038254	0.0069	-0.001000	0.00000193	0.000636	0.0002
Q_{mean}	0.360370	-0.00009400	0.081682	0.1237	0.257045	-0.00000780	0.030862	0.0984
November								
Q_{02}	3.912397	-0.00071000	-0.300110	0.6226	5.778984	0.00007670	1.125926	3.3941
Q_{10}	1.097621	0.00001940	0.125676	0.3098	0.625124	0.00048600	0.535047	0.4354
Q_{25}	0.276369	-0.00000700	0.193159	0.1791	0.100520	0.00015300	0.182357	0.0585
Q_{50}	-0.018760	0.00000419	0.153421	0.0523	0.008365	0.00007140	0.071101	0.0216
Q_{75}	-0.047060	0.00001750	0.092118	0.0175	-0.000640	0.00002790	0.012181	0.0072
Q_{90}	-0.042390	0.00001110	0.069137	0.0130	-0.001830	0.00001470	0.003664	0.0041
Q_{9S}	-0.034620	0.00000729	0.050684	0.0104	-0.001430	0.00000381	0.002128	0.0008
Q_{mean}	0.350713	-0.00000480	0.101021	0.1065	0.478191	0.00004130	0.197340	0.2463
December								
Q_{02}	6.806380	-0.00014000	-1.168730	1.1576	10.242620	-0.00300000	1.100000	4.5048
Q_{10}	1.794654	-0.00000510	-0.098070	0.3902	2.337093	0.00116400	0.293572	1.1662
Q_{25}	0.629568	-0.00001500	0.060414	0.1730	0.386146	0.00036300	0.220000	0.2372
Q_{50}	0.123610	0.00000551	0.103285	0.0990	0.079048	0.00004610	0.139510	0.0736
Q_{75}	-0.021920	0.00000811	0.080068	0.0199	0.006640	0.00003210	0.052905	0.0296
Q_{90}	-0.032410	0.00001410	0.056926	0.0106	0.001241	0.00001930	0.004180	0.0056
Q_{98}	-0.030510	0.00001110	0.044116	0.0085	-0.001630	0.00000783	0.002883	0.0026
Q_{mean}	0.742898	-0.00002300	-0.009110	0.1270	1.093988	-0.00006200	0.153800	0.3614

ILLINOIS
DEPARTMENT OF
NATURAL
RESOURCES