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THE ILLINOIS STREAMFLOW ASSESSMENT MODEL

Version 3.0

User's Guide

by
Evan P. Mills and H. Vernon Knapp

Prepared for the
Illinois Department of Transportation
Division of Water Resources

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ILSAM User's Guide

Contents

System Requirements

This is what you need to run ILSAM Version 3.0:

1) An IBM PC/XT/AT personal computer or compatible.
2) DOS 3.0 or above.
3) A CGA, EGA, or VGA graphics adapter. (Hercules graphics cards are not supported, although many come with CGA emulation programs that may allow ILSAM to be run.)
4) 640K of RAM.
5) A hard drive, two floppy drives, or one high-density drive (720 Kilobyte [Kb], 1.2 Megabyte [Mb], or 1.44 Mb).

Installing ILSAM

To install ILSAM to run from diskette

If your system does not contain a hard drive, then you must run ILSAM from diskette.

If ILSAM is on one high-density 5.25" (1.2 Mb) diskette or one 3.5" (720 Kb or 1.44 Mb) diskette, then you can run the model entirely from one diskette, although there may be limited space for the output files. This disk is called the Distribution Disk.

ILSAM can also be run from two low-density (360 Kb) diskettes. One is the Program Disk and the other is the Data Disk.

No installation is required; however, please make backup copies of the original distribution diskettes.

To install ILSAM to run from a hard drive

To run ILSAM from a hard drive it is necessary to copy the files from the distribution diskettes to the hard drive. To create a working copy of ILSAM on the hard drive, for instance drive C, do the following:

1) Make sure the DOS prompt (C>) is visible on the screen. If it is not, then consult your DOS manual to see how to get DOS up and running.
2) Make the hard drive the default drive by typing:
   ```
   C:
   ```
3) Make a directory to hold the model by typing:
   ```
   MD C:\ILSAM
   ```
4) Move into mat directory by typing:
   ```
   CD C:\ILSAM
   ```
5) For each distribution disk (either one or two) place the disk in drive A and type:
   ```
   COPY A:*.*
   ```

Starting ILSAM

Using one high-density diskette

If you wish to run ILSAM from one high-density disk, complete the following steps:

1) Make sure the DOS prompt is visible on the screen.
2) Place the Distribution Disk in the drive from which you want to run the Model, for instance drive A.
3) Make that drive the default drive by typing:
   ```
   A:
   ```
4) To start the model, type:
   ```
   ILSAM
   ```

Using two diskettes

To start ILSAM using two diskettes:

1) Make sure the DOS prompt is showing on the screen.
2) Place the Program Disk in drive A.
3) Place the Data Disk in drive B.
4) Make drive A the default drive by typing:
   A:
5) To start the model, type:
   ILSAM

Using a hard drive system

Complete the following steps to start ILSAM on a system with a hard drive:

1) Make sure that the DOS prompt is visible.
2) Make the hard drive the default drive by typing:
   C:
3) Move into the directory containing the model by typing:
   CD C:\ILSAM
4) To start the model, type:
   ILSAM

Flow of Execution

The steps involved in completing one "session" of ILSAM are listed below. A session consists of the one or more "runs" completed between the time you start the model (by typing ILSAM) and the time the you exit. A run is the analysis of a particular stretch of stream, referred to as a "reach." Each of the different parameters referred to below is explained in more detail in the next section.

1) Start ILSAM from DOS.
2) Enter some basic parameters, listed here:
   A) The basin name
   B) The run description
   C) The dataset directory
   D) The output directory
   E) The output destination
   F) The output type
3) Enter the stream reach information.
   A) The stream name
   B) The starting point of the reach
   C) The ending point of the reach
   D) If necessary, select a coverage.
4) Select the streamflow parameters to be analyzed.
   There are four categories of streamflow parameters:
   A) Annual flow-duration parameters
   B) Low-flow parameters
   C) Drought-flow parameters
   D) Monthly flow-duration parameters
5) You may add a hypothetical flow modification to the system.
6) Using the values specified in steps 2 through 5, an analysis is performed along the selected reach on the points specified by the coverage.
7) Make any changes to the parameters listed in steps 2 through 5.
8) Repeat steps 2 through 7 until all runs for the current session are completed.
9) ILSAM exits. If any of the runs specify that tables should be sent to the printer, they are output at this time.

Entering the Basic Parameters

After ILSAM's opening screen, you are presented with a list of the basic parameters shown below in figure 1. All of the parameters have defaults, so you only have to change those fields that require different values.

The up and down arrow keys are used to scroll through the fields.

Once the values are correct, the Esc key can be used to accept them. Alternatively, you can press Alt-S to save the given values as defaults for subsequent sessions.

The basin name

The basin name indicates which river basin is to be analyzed. Use the left and right arrow keys to scroll among the legal basins. Please note, however, that this is the list of basins for which ILSAM has been designed, not necessarily the list of basins that are available. For a particular basin to be available, all of the input data files for that basin must be present in the dataset directory.

The run description

The run description is an arbitrary phrase whose function is to help identify output from different runs. It is placed at the top of the output for all runs that will be sent to the printer. The description may contain one or more of the provided "macros." A macro is acombination of characters thatrepresents one or more words. In the case of ILSAM, a macro is represented by a dollar sign followed by an additional character. The list of provided macros is given below:

$b	*The current basin name*
$d	*The date the run xvas completed*
$p	*The dataset directory (path) used in the run*
$r	*The run number of the current session*
$t	*The time of day the run was completed*
$$	*The dollar sign itself*

As an example, a run description of "Run $r at $d $t" would be transformed into something similar to "Run 2 at 06-11-89 10:23:00," meaning that this was the second run of the session, completed at 10:23 a.m. on June 11, 1989. This list of available macros can be displayed on the screen by pressing the Fl key when the run description field is the current one.

The dataset directory

This field contains the directory that holds the input data files. Normally this will be the same directory that contains the ILSAM program. If you are using two diskettes, please note that initially the dataset directory will be "A:." Change this to "B:" since the Data Disk is in drive B.

The output directory

This field contains the directory in which you wish to place output files. Raw output for each run is placed in a file called "SETn.DAT," where "n" is the current run number. See the section on Analysis and Output for a complete description of the output

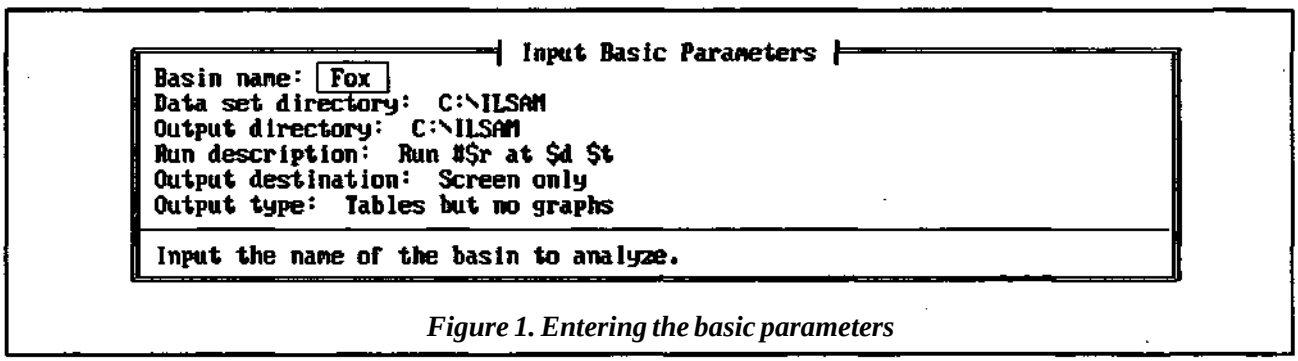

Figure 1. Entering the basic parameters

The output destination

In addition to the raw output file, formatted tables of the output may be produced for each run. The output destination indicates where you wish these tables to be sent. They may be displayed on the screen, sent to the printer, or both.

The output type

This field specifies what kind of formatted output you wish to have produced. The choices are tables, graphs, or both; however, at this time *only tables are available.*

Entering the Streamflow Parameters

The next set of parameters to be input are the streamflow parameters, which are divided into four categories: annual flow durations, low flows, drought flows, and monthly flow durations. Together there are 154 parameters. See the section on Hydrological Concepts for a detailed discussion of the categories.

The main streamflow parameters menu is displayed in figure 2. The arrow keys are used to scroll through the list of parameter categories, and the Enter key is used to select one. The methods for selecting parameters for the different categories are described below. Once you have finished with a category, press the Esc key to accept your choices.

Choosing the "Save" option from the main streamflow parameters menu saves the set of parameters selected in the four categories as the default values for subsequent sessions.

Use the "Continue" option to move on to the next step.

Annual flow duration

The flow duration input menu is displayed in figure 3.

Use the arrow keys to move among the available exceedance probabilities.

Pressing Enter once selects the parameter; pressing Enter again deselects it. The Enter key is said to "toggle" the parameter. Pressing the letter "A" toggles all of the parameters at once.

Low flows

Figure 4 shows the input menu for low flows.

Low-flow parameters are specified by a duration and a recurrence period. They are arranged in a 6 x 4 matrix. Each row represents a duration in days; each column, a recurrence in years.

Like the annual flow-duration parameters, the Enter key is used to toggle a single parameter, and the letter "A" is used to toggle all of the parameters. Two additional toggle keys are provided:

- Pressing "R" toggles the current row (duration).
- Pressing "C" toggles the current column (recurrence).

Drought flows

The method used to select drought flows is identical to that for low flows, and the menu has the same format. The parameters are set up in a 6 x 3 matrix, each row being a duration in months and each column a recurrence in years.

Monthly flow duration

The menu for selecting monthly flow duration parameters is shown in figure 5.

The monthly flow durations are arranged in a 12 x 8 matrix. Each row represents a month of the year, and each column represents an exceedance probability. The matrix elements are selected in the same manner as low flows and drought flows .

Figure 2. Choosing a stream/low parameter category

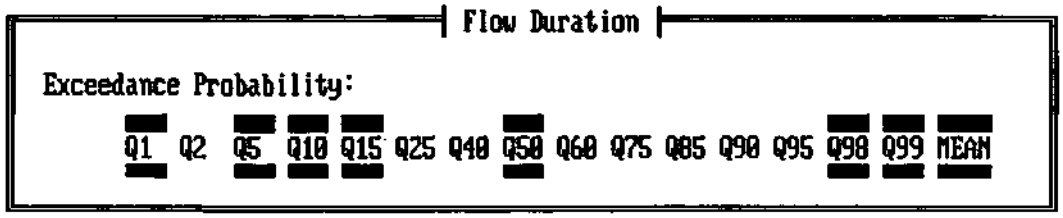

Figure 3. Selecting flow-duration parameters

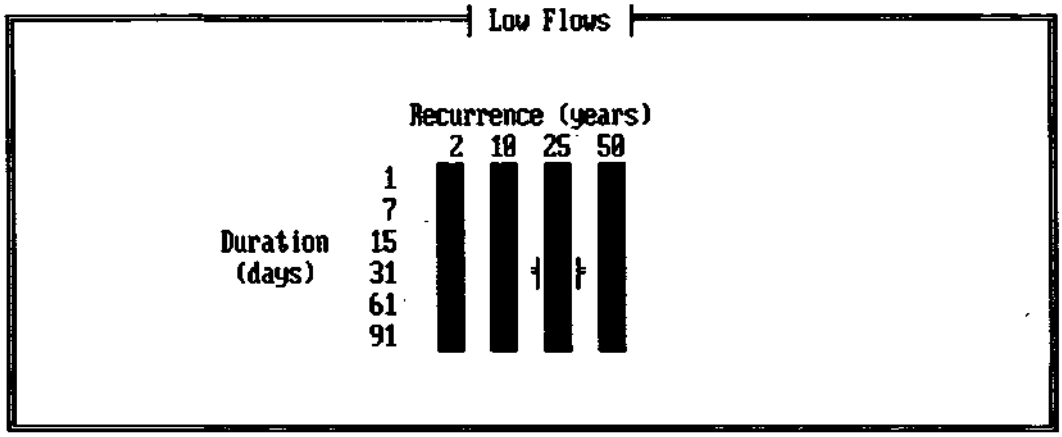

Figure 4. Selecting low-flow parameters

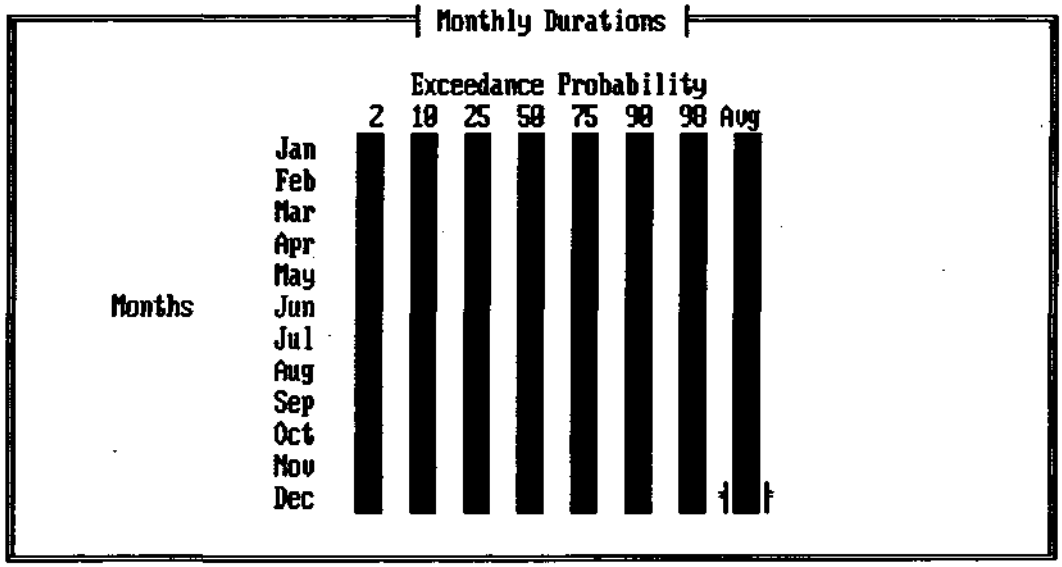

Figure 5. Selecting monthly flow-duration parameters

Entering the Stream Reach Information

The next set of parameters to be entered are those that describe the reach to be analyzed. First, a stream must be chosen. Then a starting point for the reach must be selected from that stream. Next, an ending point for the reach must be entered. Finally, if the reach consists of more than a single pointon the stream, then a coverage must be selected as well.

The stream name

The menu used to enter the stream name is shown in figure 6.

ILSAM needs a stream code to identify the stream containing the starting point. The code can be provided in three ways:

— Type in the code directly.
— Type the name of the stream.
— Press "?" to get a list of streams from which to choose.

Typing the code directly is the quickest method, but you must have either memorized the code associated with a particular stream or have looked it up in the supplemental information provided for each river basin. Entering the stream name can be efficient if the name is short and you know how it is spelled in the alias file. But the easiest method is to type "?." A menu like that shown in figure 7 will appear, containing all streams listed in the alias file along with their associated codes. Use the arrow keys to move among the listed streams and press Enter to choose one. A few streams are not listed in the alias file (they are unnamed or have the same name as another stream). These few streams must be identified by their code only.

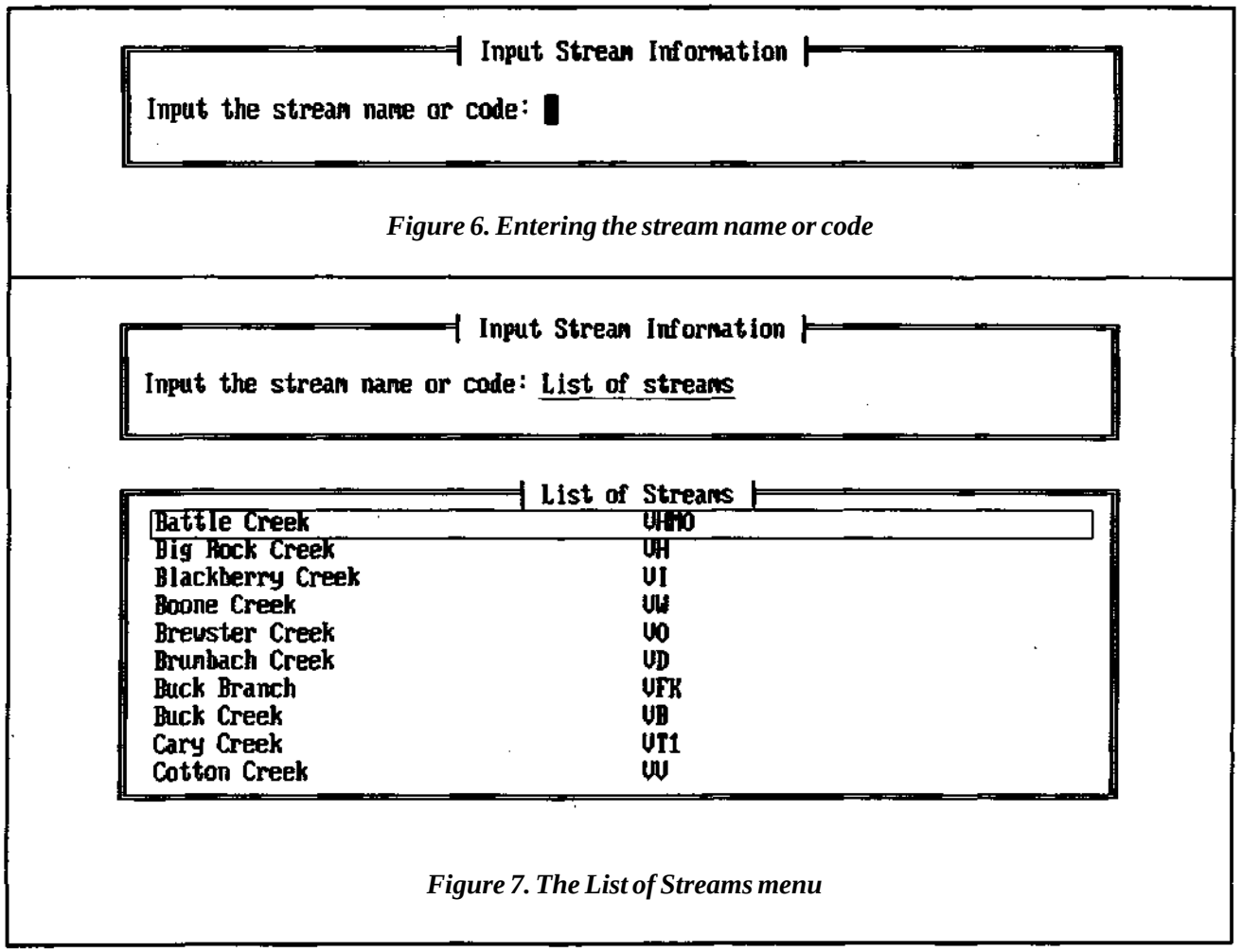

Figure 6. Entering the stream name or code

Figure 7. The List of Streams menu

The starting point

You will now be presented with a list of points along the stream just chosen, as shown in figure 8. Each entry in the menu contains the stream code, the mileage along that stream, and possibly a description of mat point. The arrow keys are used to scroll through the list of points; press the Enter key to choose one. Alternatively, you may press the Insert key to enter a starting point that is not among those listed.

The ending point

Finally, you will be asked to enter an ending point. The menu has the same format as the starting point menu and consists of all points between the starting point and the mouth of the major river of the basin. The point is selected in the same manner as the starting point, except that you may not enter an unlisted mileage.

The coverage

If the reach consists of more than one point, you will be asked which kind of coverage you want. This is displayed in figure 9. The coverage describes the points along the reach that will have their flow values output. There are three types of coverage:

— Minimal coverage: Streamflow gages, reservoirs
— Intermediate coverage: Streamflow gages, reservoirs, plus points of withdrawal and discharge, and confluences of streams along the reach
— Full coverage: All points

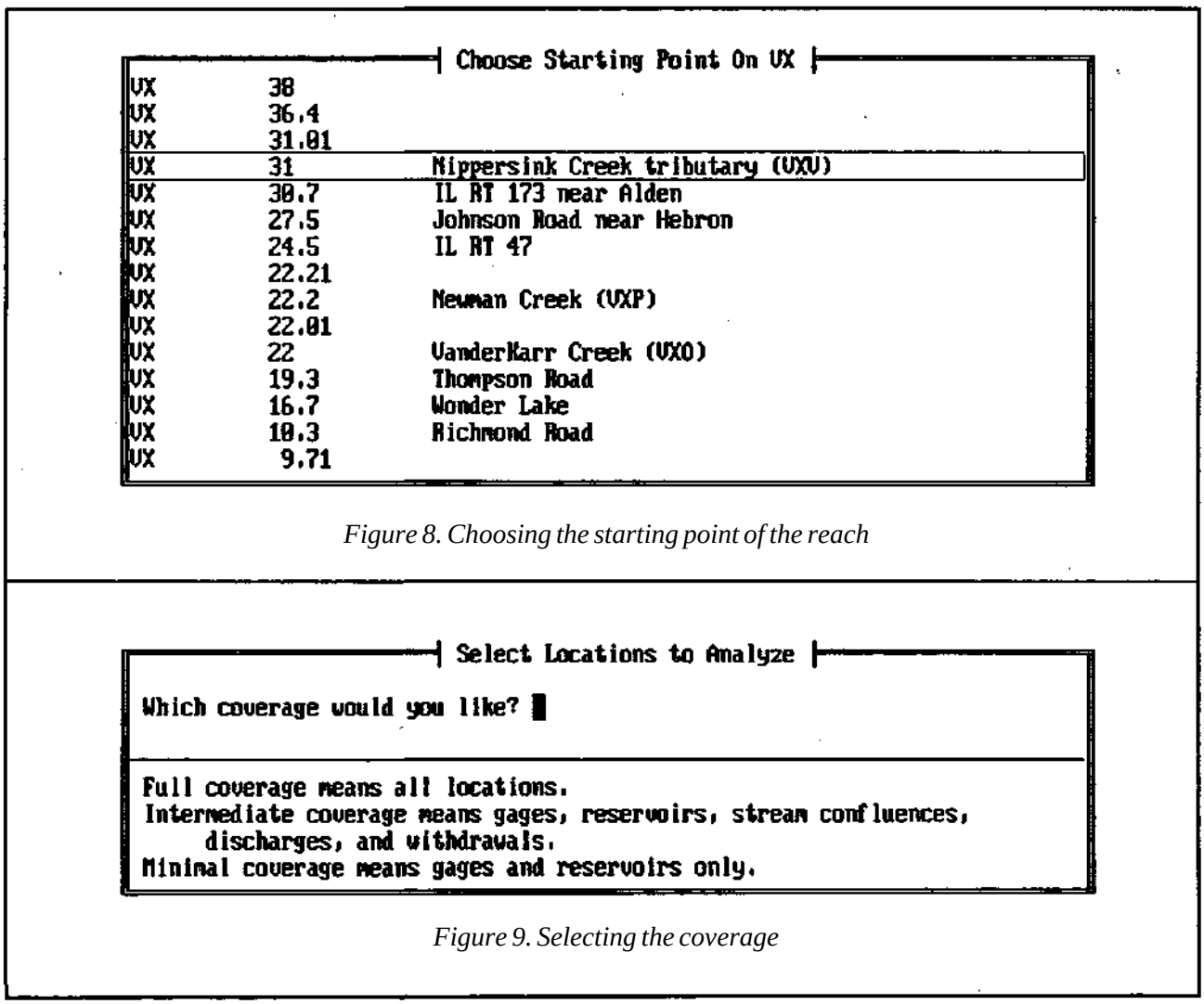

Figure 8. Choosing the starting point of the reach

Figure 9. Selecting the coverage

Entering a Flow Modification

The last type of information to be entered before the analysis can begin is an optional hypothetical flow modification. Hypothetical withdrawals and discharges are represented by the construction of an annual flow-duration curve of the modification. The effect of the modification on all remaining flow parameters is estimated by a transformation of the annual flow-duration curve. This process is discussed in the section on Hydrological Concepts.

The modification can be a withdrawal or a discharge, and it is applied at the starting point of the reach. You may enter the entire flow-duration curve if the flow values for all exceedance probabilities are known. If they are not, then you can enter minimal information, and ILS AM will compute the entire flow-duration curve. The main flow-modification menu is shown in figure 10.

Entering the entire flow-duration curve

The table used to enter the entire flow-duration curve is displayed in figure 11.

To create the entire flow-duration curve, simply enter the exceedance probabilities Q_1 through Q_{99} plus Q_{MEAN}. In addition, you must specify a value for the withdrawal or discharge coinciding with a day of extremely low streamflow.

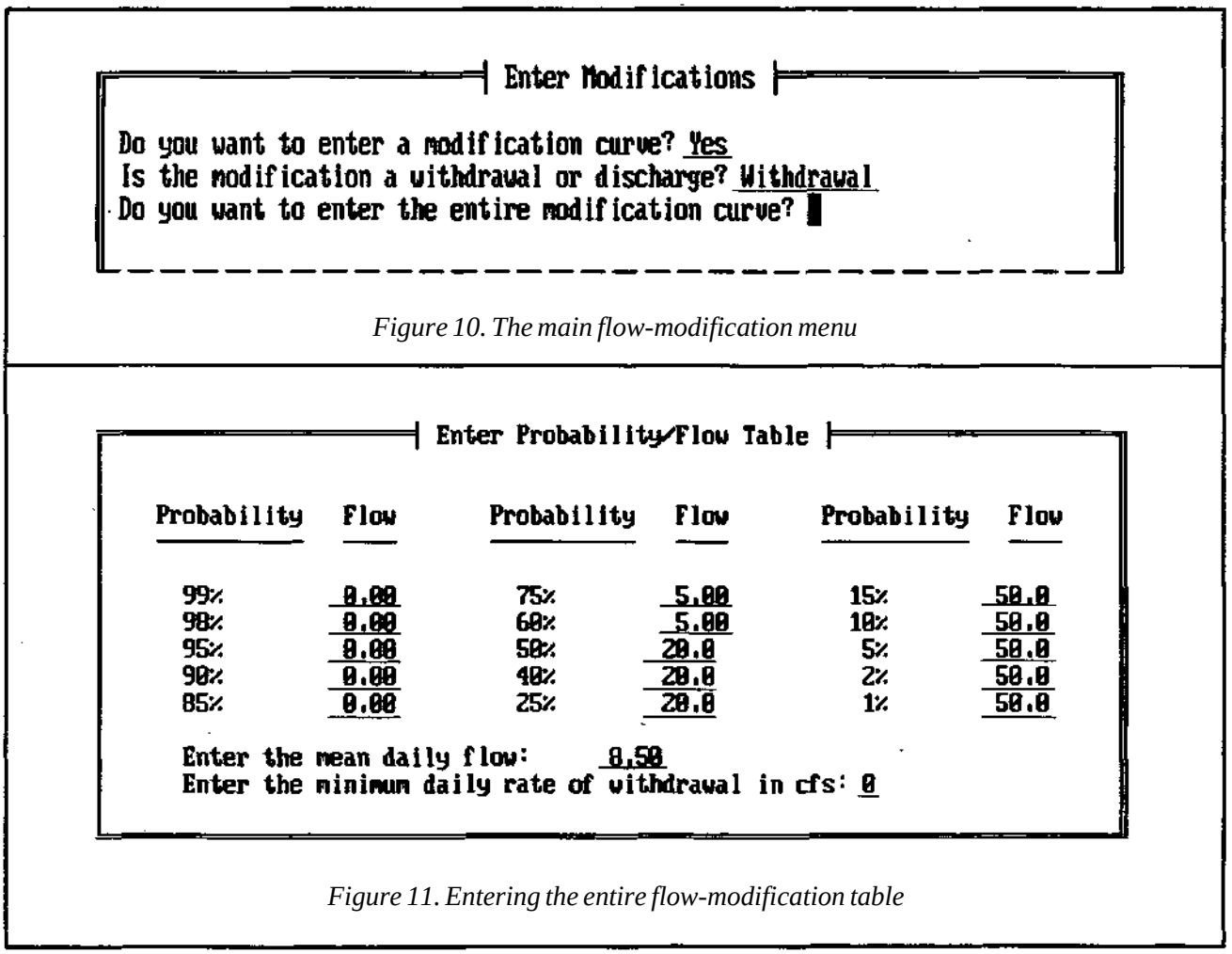

Figure 10. The main flow-modification menu

Figure 11. Entering the entire flow-modification table

Entering only minimal information

The minimal-information menu is depicted in figure 12.

To create the flow-duration curve from minimal information, enter four pieces of information:

- The value of the average daily withdrawal or discharge.
- The expected *minimum* monthly flow.
- The expected *maximum* monthly flow.
- The value of the withdrawal or discharge coinciding with a day of extremely low streamflow.

From those values ILSAM constructs the flow-duration curve as shown in figure 13. A detailed explanation of the method involved in deriving this curve is provided in the Hydrological Concepts section at the end of this guide.

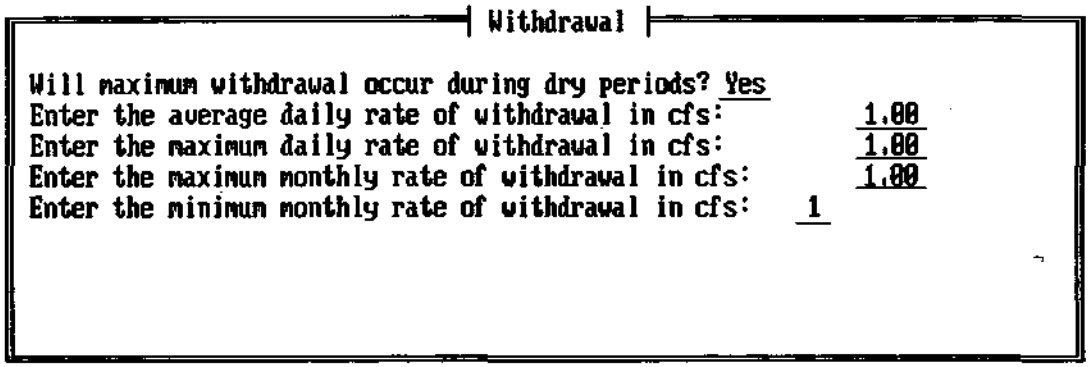

Figure 12. Entering only minimal flow-modification information

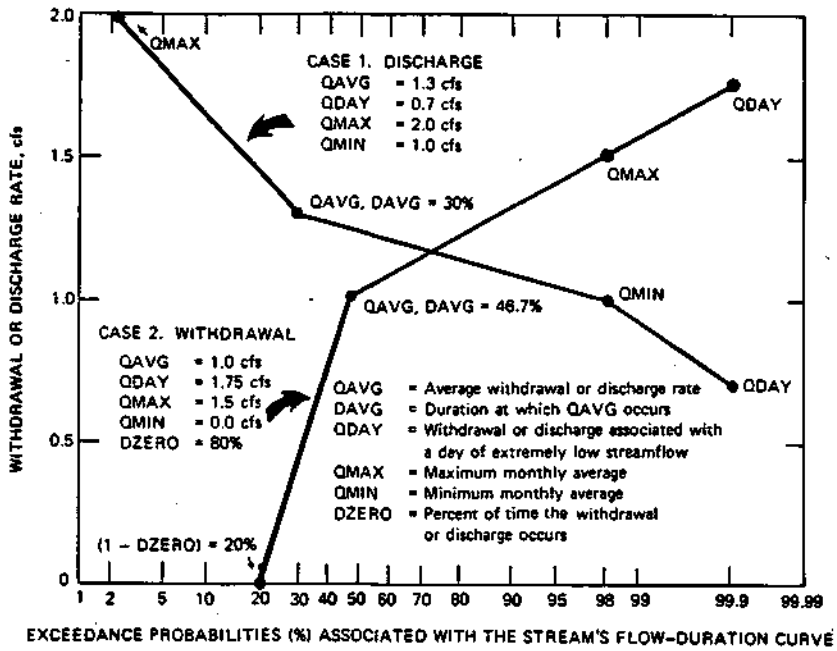

Figure 13. The use of minimal data in describing a modification's flow-duration curve (from Knapp et al., 1985, **Streamflow Assessment Model for the Sangamon River Basin in Illinois,** *ISWS Contract Report 358, Champaign: Illinois State Water Survey)*

The Analysis and Output

Once all of the input parameters have been entered, the analysis of the reach begins. ELSAM steps through the points of the reach specified by the coverage, producing flow output for each one.

There are three types of flow output values:

— Virgin flow: The flow at the point as it would be if the basin had not been affected by humans.

— Present flow: The flow as it currently exists.

— Altered flow: If the user entered a flow modification, men this value indicates the flow as it would exist if the modification were implemented.

There are two kinds of output: raw (unformatted) output, which is placed in a file called "SETn.DAT" (where "n" is the run number); and formatted output, which consists of tables displayed on the screen or sent to the printer.

There are 154 streamflow parameters. See Appendix B for a list of the parameters and their associated indexes.

Raw Output (disk file)

Here is the structure of the raw output file:

Line 1:	The run description
Line 2:	The output destinations (S=screen, P=printer, SP=both, N=neither)
Line 3:	The output types (T=tables, G=graphs, GT=both)
Lines 4-157:	The output for point #1
Lines 158-311:	The output for point #2
...	...
Lines [154(n-1)+4] - [154n - 1]:	The output for point #n

The output for each point is shown in the following form:

The stream code for the current point, the mileage of the point on the current stream, the mileage left to be analyzed this run, the drainage area of current point	one line		
Virgin flow for parameter 1	Present flow 1	[Altered flow 1]	
Virgin flow for parameter 2	Present flow 2	[Altered flow 2]	
...	...	...	
Virgin flow for parameter 154	Present flow 154	[Altered flow 154]	

Here is a piece of sample output:

```
Run #1 at 06-11-89 08:23:11
SP
T
VX, 32.7, 53.8, 125.0
        395             407             -1
        390             403             -1
        -1              -1              -1
        ...             ...             ...
        0.95            0.75            -1
```

This output is from the first run of the session, completed at 8:23 a.m. on June 11, 1989. Tables from this run were sent to the screen and the printer.

The first point on the reach is mile 32.7 of stream VX. There are 53.8 miles left to be analyzed after this point The drainage area of the first point is 125 square miles.

The virgin flow for parameter 1 (Q_1) is 395 cubic feet per second (cfs); the present flow is 407 cfs. The negative values in the altered flow column indicate that no flow modification was in effect for this run. The negative values for parameter 3 (Q_5) mean that it was not among the parameters selected for output. The last value is parameter 154 (December Q_{MEAN}). The virgin flow is 0.95 cfs, and the present flow is 0.75 cfs.

Formatted output (screen and printer)

The formatted output is arranged by the type of streamflow parameter. If any of the annual flow-duration parameters were selected, then a table is output containing the virgin, present, and perhaps the altered flow for those flow durations at that point along the reach. The same applies to low flows and drought flows. Monthly flow durations are output by month; that is, if any of the parameters for a particular month were selected, then the table for that month is displayed.

Sample output for annual flow durations is shown in figure 14.

Flow Duration Output for V, Mile 96.91

Exceedance Probability	Virgin Flow	Present Flow	Altered Flow
Q1	3602	3988	3991
Q2	2952	3223	3226
Q5	2207	2421	2424
Q10	1721	1814	1817
Q15	1455	1513	1516
Q25	980	971	974
Q40	647	634	637
Q50	489	459	462
Q60	370	369	372
Q75	254	248	251
Q85	193	176	179
Q90	163	151	154
Q95	128	122	125
Q98	105	102	105
Q99	91.3	98.3	101
MEAN	748	797	800

Press Enter to continue

Figure 14. Annual flow-duration output

Output similar to that produced for low flows and drought flows is displayed in figure 15. Monthly flow-duration output appears as shown in figure 16.

Screen output is displayed immediately after each point is analyzed. If selected in the basic parameters menu, printed output is produced at the end of the session.

This process continues for each point to be analyzed.

Low-Flow Output for V, Mile 96.91

		Recurrence (years) 2	10	25	50	
	1	136	86.6	63.4	47.2	<— Virgin Q
		137	90.6	88.4	86.2	<— Present Q
		140	93.6	91.4	89.2	<— Altered Q
	7	142	89.0	65.6	49.4	
		142	96.0	89.6	86.4	
		145	99.0	92.6	89.4	
Duration (days)	15	155	94.2	70.7	53.5	
		158	98.2	90.7	87.5	
		161	101	93.7	90.5	
	31	169	103	76.0	58.7	
		175	102	92.0	88.7	
		178	105	95.0	91.7	
	61	187	113	85.2	65.9	
		213	109	96.2	89.9	
		216	112	99.2	92.9	
	91	229	126	94.5	74.3	
		257	119	108	92.3	
		260	122	111	95.3	

Press Enter to continue

Figure 15. Low-flow output

Monthly Duration Output for V, Mile 96.91

		Virgin	Present	Altered	Virgin	Present	Altered
		Jan			Feb		
	2	2211	2796	2797	2372	3242	3243
E	10	1165	1235	1236	1353	1523	1524
x	25	592	629	630	734	737	738
c	50	364	352	353	410	383	384
e	75	214	210	211	242	257	258
e	90	151	145	146	168	149	150
d	98	109	132	133	141	134	135
e	Avg	624	667	668	669	749	750
n		Mar			Apr		
c	2	4289	4699	4700	4362	4632	4633
e	10	3006	3081	3082	2804	2799	2800
	25	2043	1993	1994	1993	1873	1874
P	50	1062	1052	1053	1326	1139	1140
r	75	570	472	473	753	591	592
o	90	336	285	286	482	287	288
b	98	202	152	153	335	174	175
	Avg	1481	1517	1518	1577	1541	1542

PgUp/PgDn goto previous/next group of months Esc when done

Figure 16. Monthly flow-duration output

Making Parameter Changes for a New Run

At this point an entire run has been completed. Now is the time to make changes to any of the parameters and then to make a new run. The menu is shown in figure 17.

Select the category of parameter you wish to change.

When all parameters are correct, chose the "Run" option from the menu to start a new run.

When all runs for the session have been completed, select the "Exit" option. At this time you will receive formatted output from any of the runs for which you selected the printer as an output destination.

Finally, ILSAM will exit to DOS.

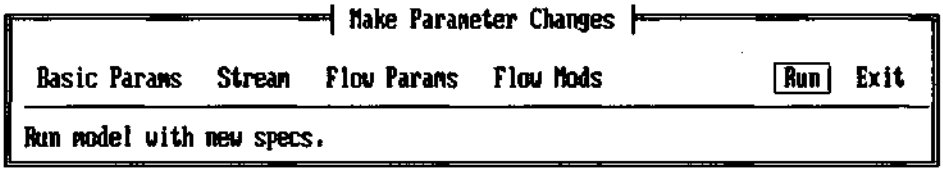

Figure 17. Changing ILSAM's parameters and making another run

Hydrological Concepts: Additional Definitions and Descriptions

This section provides more detailed explanations of the streamflow parameters and flow modifications, as well as instructions on how to identify stream mibles.

Streamflow parameters

ILSAM produces information for 154 selected streamflow parameters, including flow-duration (flow versus percentage of duration) relationships, low flows for various durations, and expected return intervals. The 154 flow parameters are described in detail in the following paragraphs.

Annual Flow-Duration Values (percent probability of exceedance)

For a gaging station with a record of continuous daily discharge, the 2 percent flow (Q_2) is the streamflow volume that is exceeded exactly 2 percent of the days during that period of record. The 1 percent flow (Q_1) is necessarily a larger value because it is exceeded less often. A graph of some typical flow.-duration values is shown in figure 18.

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

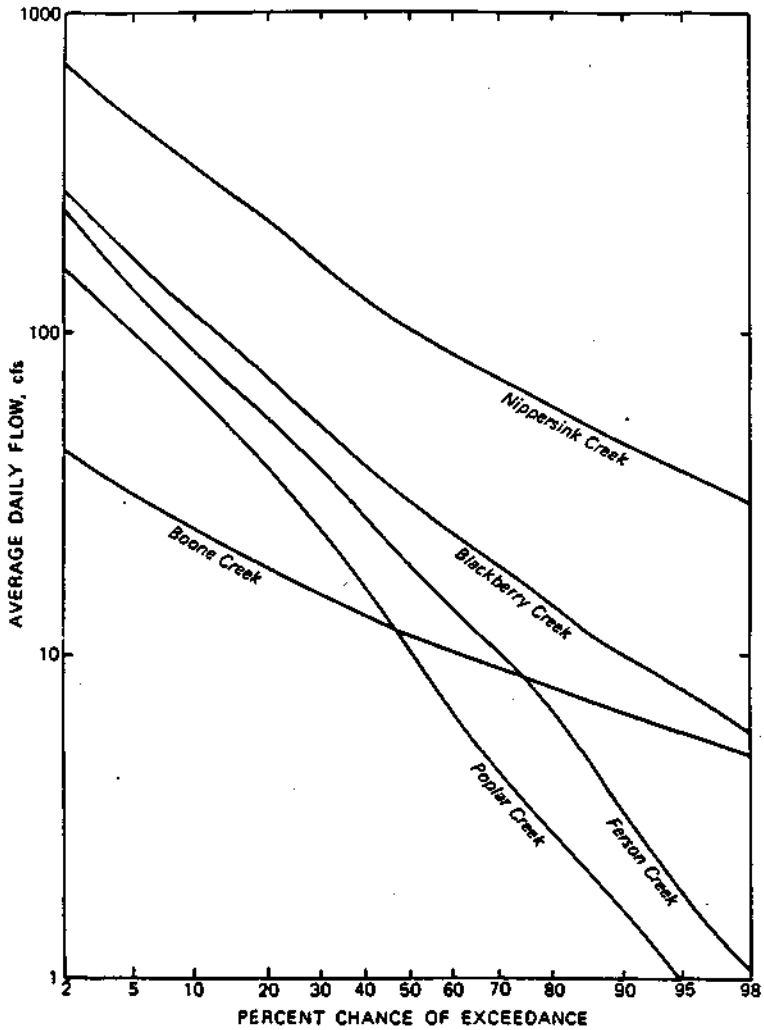

Figure 18. Some sample annual flow-duration curves.
***(from Knapp et ah, 1988,* Fox River Basin Streamflow Assessment Model: Hydrological Analysis,**
ISWS Contract Report 454, Champaign: Illinois State Water Survey)

***Monthly flow durations (probability of exceedance for each month** of **the** year)*
The monthly flow-duration values are just like annual flow durations, except that the values are determined using only those daily discharges that fall within a certain month of the year. For example, in a 30-year streamflow record, there are exactly 900 daily values for the month of April. The value for Q_{10} is the flow that is exceeded exactly 10 percent of the time, or on 90 days.

Parameters: Q_{98}, Q_{90}, Q_{75}, Q_{50}, Q_{25}, Q_{10}, Q_2, and Q_{MEAN}

Low flows
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 for any 7 consecutive days within that year. Figure 19 (shown on page 17) illustrates a daily hydrograph and both the 7-day and 31 - day low flows that occur during this period. The 7-day, 10-year low flow is the 7-day low flow that occured *on average* only once in 10 years. Low flows with a recurrence interval of more than ten years will be lower in magnitude than the 10-year low flow. The 2-year low flow is the value expected to occur during an "average" year.

Durations: 1-day, 7-day, 15-day, 31-day, 61-day, and 91-day
Recurrence intervals: 2 years, 10 years, 25 years, and 50 years

Drought flows
These flows are similar to low flows, except that the duration of the period is defined in months instead of days. The values are average low flows developed from monthly records (as opposed to daily records). These values are useful in determining reservoir yields for which drought severity over a lengthy period is a critical parameter.

Durations: 6-month, 9-month, 12-month, 18-month, 30-month, and 54-month
Recurrence intervals: 10 years, 25 years, and 50 years

Estimates of these flow parameters are presented for both present and virgin (natural or unaffected) flow conditions. In addition, you may introduce a hypothetical (or potential) withdrawal or discharge and estimate its effect on the specified flow parameters; the resulting flow is called the altered flow. Flow conditions may be estimated for any gaged or ungaged site in the watershed with a drainage area of at least 10 square miles.

Entering flow modifications

Hypothetical modifications to the streamflow may be represented as withdrawals from or discharges into the stream.

The program assumes that the period of maximum withdrawal or discharge coincides with the period of either maximum or minimum flow in the stream. Modifications with seasonal variations, such as irrigation (which occurs in mid-summer and not necessarily at the period of lowest streamflow), are not presendy accounted for in the model. For the current version of ILSAM, maximum irrigation withdrawals should be assumed to occur during the period of lowest streamflow.

Developing an annual flow-duration curve for the modification

The first step in representing the withdrawal or discharge is to develop the annual flow-duration curve for the modification. You may enter either all fifteen values associated with the flow duration or only four selected values, from which the other values of the curve are calculated.

For the latter method, the four values to be supplied are: 1) the average daily rate of withdrawal or discharge, 2) the maximum mondily rate, 3) the minimum monthly rate, and 4) the daily rate associated with the period when streamflow is lowest. If the minimum monthly rate is zero, then the user will be asked to enter the percentage of time for which the modification is not zero.

Figure 13 (shown on page 9) illustrates two examples of the flow-duration curve that might be approximated from the four values described above. Case 1 illustrates a fairly standard flow-duration curve for a municipal treatment plant discharge. The percent exceedance at which the average flow of the discharge occurs, D_{AVG}, is placed so that the computed area beneath the curve is equal to the average discharge. In this case, the average discharge of 1.3 cfs is associated with a duration (D_{AVG}) of 30 percent.

The second case is an example of a withdrawal during the dry season of the year. Since the average monthly minimum is zero, the user is asked to supply the percentage of time (D_{ZERO} for which the wididrawal is not zero. Again, the average wididrawal rate (D_{ZERO} = 80 percent) is situated so that the area under the flow-duration curve is equal to the average rate for the period of pumping.

Defining the remaining flow values for the modification

The effect of the wididrawal or disharge on the flow parameters, other than those of the annual flow-duration curve, is estimated by a direct transformation of the annual curve. As shown in figure 19, the effect of the discharge on the $Q_{7,10}$ (7-day, 10-year low flow) is estimated to have the same effect that occurs on the annual curve with a frequency of 99.1 percent. Similarly, the frequencies associated with the $Q_{7,2}$ and $Q_{91,10}$ flows are 84 and 92 percent, respectively.

Identifying stream miles

The network file for each basin (given in the Supplement to the User's Guide) lists the river mileage, upstream and downstream drainage area, and site description for selected locations along each stream. The river mile information, which specifically identifies the site, is taken from the larger listing given in Healy (Healy, R.W., 1979, *River Mileages and Drainage Area for Illinois Streams*, U.S. Geological Survey Water Resources Investigation 79-111).

Although the above publication is out of print, copies of the complete listing for a particular basin may be obtained from the Water Survey.

If the location of interest is not supplied in the network file (and therefore is not among those listed on the screen), you may choose a nearby point or insert your own. The new river mile is best estimated by examining a detailed map of the area (such as a U.S. Geological Survey topographic map) and comparing distances along the stream with the upstream and downstream entries in the network listing. In some cases, the more detailed Healy listing will be preferable to the network listing.

Values for the watershed characteristics (such as drainage area) are interpolated for locations between points listed in the network file. Streamflow values estimated by the model are sensitive to changes in drainage area. On small streams, for which percentage changes in drainage area may be large, the choice of river mile is especially important. The user may want to edit the network file listing to insert a new river mile for which specific information is available.

Use of the model is not recommended for streams whose drainage areas are less than 10 square miles.

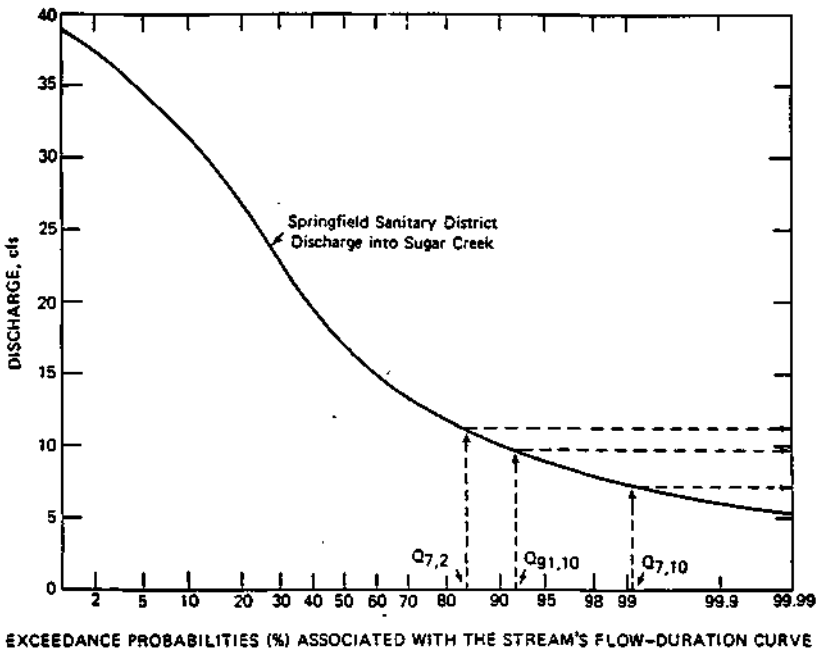

Figure 19: The transformation of the annual flow-duration curve to other parameters (from Knapp et al, 1985,* Streamflow Assessment Model for the Sangamon River Basin in Illinois, *ISWS Contract Report 358, Champaign: Illinois State Water Survey)

Appendix A: ILSAM Messages

Can't find datafile: *filename*
One of ILSAM's datafiles was not present in the current dataset directory.

Can't find dataset directory: *path*
The dataset directory does not exist.

Can't find output directory: *path*
The output directory does not exist.

Computing final flows...
ILSAM is computing the virgin, present, and altered flows (if a flow modification was entered) for the current point

Computing upstream dataset...
ILSAM is analyzing the points upstream to see what effect they will have on the current point

Couldn't find stream name or code.
The stream name or code does not exist as typed. If you entered a stream name, then check your spelling or use "?" to get a list of streams. If you entered a code, check your spelling and then check the appendix to make sure the code exists.

Doing calculations. Please wait..
There will be a slight delay before the next message or menu appears.

Done outputting data.
The output for the current point has been written to disk.

***filename* already exists!**
This occurs if you are about to overwrite an output file. Since all the output files are named SET*.DAT, the output from one session will overwrite that of a previous one. Therefore, it is necessary to rename any output files thatyou wish to keep permanently.

Locating starting point of desired reach...
The current point is the confluence of a new stream.

Locating stream in *filename...*
ILSAM is searching for stream information in filename.

Mileage remaining on current stream: x
There are x miles left to be analyzed on the current stream.

***name* is not a legal basin.**
The basin entered is not one for which ILSAM has information.

Please advance printer paper to the top of form.
ILSAM is ready to output tables/graphs to the printer. This message gives you the chance to prepare the printer.

Printing flow flow-param table/graph...
ILSAM is currently printing the table or graph for the flow parameter of type flow-param.

Printing requested tables/graphs...
ILSAM has begun sending the tables and graphs to the printer.

Reading in virgin flow parameters...
ILSAM is reading in virgin flow parameters for the current basin.

Reading mileage data from *filename...*
The mileage data used to determine the starting and ending points of the analysis are being read in from disk.

Sorting mileage data...
The mileage data just read in from disk is being sorted.

Stream to be analyzed next: *name*
The next point to be analyzed is located on stream name.

The Caps/Num lock key(s) is/are on...
TheCAPSLOCKorNUMLOCK keywasfoundtobe on. For ILSAM to work correctly, these keys will be turned off by ILSAM.

The starting point must lie on the stream.
You have entered a starting point that is is not on the stream. Check to make sure that the point is between the stream's highest mileage and zero.

Total mileage remaining to be analyzed: *X*
There are x miles left to be analyzed this run.

Writing/appending output to *file filename*
The output for the current point is being placed in the output file for the current run.

Appendix B: Streamflow Parameters and Associated Indexes

Index	*Parameter*
	Annual flow durations
1	Q_1
2	Q_2
3	Q_5
4	Q_{10}
5	Q_{15}
6	Q_{25}
7	Q_{40}
8	Q_{50}
9	
10	Q_{75}
11	Q_{85}
12	Q_{90}
13	Q_{95}
14	Q_{98}
15	Q_{99}
16	Q_{MEAN}
	Low flows
17	1-day, 2-year
18	1-day, 10-year
19	1-day, 25-year
20	1-day, 50-year
21	7-day, 2-year
22	7-day, 10-year
23	7-day, 25-year
24	15-day, 50-year
25	15-day, 2-year
26	15-day, 10-year
27	15-day, 25-year
28	15-day, 50-year
29	31-day, 2-year
30	31-day, 10-year
31	31-day, 25-year
32	31-day, 50-year
33	61-day, 2-year
34	61-day, 10-year
35	61-day, 25-year
36	61-day, 50-year
37	91-day, 2-year
38	91-day, 10-year
39	91-day, 25-year
40	91-day, 50-year

Index	*Parameter*
	Drought flows
41	6-month, 10-year
42	6-month, 25-year
43	6-month, 50-year
44	9-month, 10-year
45	9-month, 25-year
46	9-month, 50-year
47	12-month, 10-year
48	12-month, 25-year
49	12-month, 50-year
50	18-month, 10-year
51	18-month, 25-year
52	18-month, 50-year
53	30-month, 10-year
54	30-month, 25-year
55	30-month, 50-year
56	54-month, 10-year
57	54-month, 25-year
58	54-month, 50-year
	Monthly flow durations
59	January, Q_2
60	January, Q_{10}
61	January, Q_{25}
62	January, Q_{50}
63	January, Q_{75}
64	January, Q_{90}
65	January, Q_{98}
66	January, Q_{AVG}
67	February, Q_2
68	February, Q_{10}
69	February, Q_{25}
70	February, Q_{50}
71	February, Q_{75}
72	February, Q_{90}
73	February, Q_{98}
74	February, Q_{AVG}
75	March, Q_2
76	March, Q_{10}
77	March, Q_{25}
78	March, Q_{50}
79	March, Q_{75}
80	March, Q_{90}

Index	*Parameter*	*Index*	*Parameter*
	Monthly flow-durations (cont.)		*Monthly flow-durations (cont.)*
81	March, Q_{98}	118	August, Q_{50}
82	March, Q_{AVG}	119	August, Q_{75}
83	April, Q_2	120	August, Q_{90}
84	April, Q_{10}	121	August, Q_{98}
85	April, Q_{25}	122	August, Q_{AVG}
86	April, Q_{50}	123	September, Q_2
87	April, Q_{75}	124	September, Q_{10}
88	April, Q_{90}	125	September, Q_{25}
89	April, Q_{98}	126	Sptermber, Q_{30}
90	April, Q_{AVG}	127	September, Q_{75}
91	May,Q_2	128	September, Q_{90}
92	May,Q_{10}	129	September, Q_{98}
93	May,Q_{25}	130	September, Q_{AVG}
94	May, Q_{50}	131	October, Q_2
95	May, Q_{75}	132	October, Q_{10}
96	May,Q_{90}	133	October, Q_{25}
97	May, Q_{98}	134	October, Q_{50}
98	May, Q_{AVG}	135	October, Q_{75}
99	June, Q_2	136	October, Q_{90}
100	June, Q_{10}	137	October, Q_{98}
101	June, Q_{25}	138	October, Q_{AVG}
102	June, Q_{50}	139	November, Q_2
103	June, Q_{75}	140	November, Q_{10}
104	June, Q_{90}	141	November, Q_{25}
105	June, Q_{98}	142	November, Q_{50}
106	June, Q_{AVG}	143	November, Q_{75}
107	July, Q_2	144	November, Q_{90}
108	July, Q_{10}	145	November, Q_{98}
109	July, Q_{25}	146	November, Q_{AVG}
110	July,Q_{50}	147	December; Q_2
111	July, Q_{75}	148	December, Q_{10}
112	July,Q_{90}	149	December, Q_{25}
113	July,Q_{98}	150	December, Q_{50}
114	July, Q_{AVG}	151	December, Q_{75}
115	August, Q_2	152	December, Q_{90}
116	August, Q_{10}	153	December, Q_{98}
117	August, Q_{25}	154	December, Q_{AVG}

THE ILLINOIS STREAMFLOW ASSESSMENT MODEL

Supplement to the User's Guide:
The Fox River Basin

List of Streams

By Name

Battle Creek	VHMO
Big Rock Creek	VH
Blackberry Creek	VI
Boone Creek	VW
Brewster Creek	VO
Brumbach Creek	VD
Buck Branch	VFK
Buck Creek	VB
Cary Creek	VT1
Cotton Creek	VV
Crooked Leg Creek	VCB
Crystal Creek	VS
De Young Creek	VXHV
Dutch Creek	VW4
Eagle Creek	VYE
East Branch Big Rock Creek	VH
East Branch Poplar Creek	VPQ
Elizabeth Lake Drain	VXHG
Ferson Creek	VN
Flint Creek	VU
Fox River	V
Hollenback Creek	VG7
Jelkes Creek	VQ5
Lake Run	VIN
Little Indian Creek	VCF
Little Rock Creek	VHA
Mill Creek	VL
Mission Creek	VE
Morgan Creek	VI3
Mutton Creek	VV
Newman Creek	VXP
Nippersink Creek	VX
North Branch Nippersink Creek	VXH
Norton Creek	VN3
Otter Creek	VNL
Paw Paw Run	VCN
Pingree Creek	VQR
Poplar Creek	VP
Rob Roy Creek	VH2
Roods Creek	VF1
Sequoit Creek	VZ
Silver Creek	VXP
Sleepy Hollow Creek	W4
Slocum Lake Outlet	VU3
Slough Creek	VXPD
Somonauk Creek	VF
Spring Creek	VT
Squaw Creek	VY
Stony Creek	VNLK
Sutphens Run	VCL
Tyler Creek	VQ
Vanderkaar Creek	VXO
Waubansee Creek	VJ
Welch Creek	VHJ
West Branch Big Rock Creek	VHM
Woods Creek	VSE
Youngs Creek	VHT

By Code

V	Fox River
VB	Buck Creek
VCB	Crooked Leg Creek
VCF	Little Indian Creek
VCL	Sutphens Run
VCN	Paw Paw Run
VD	Brumbach Creek
VE	Mission Creek
VF	Somonauk Creek
VF1	Roods Creek
VFK	Buck Branch
VG7	Hollenback Creek
VH	Big Rock Creek
VH	East Branch Big Rock Creek
VH2	Rob Roy Creek
VHA	Little Rock Creek
VHJ	Welch Creek
VHM	West Branch Big Rock Creek
VHMO	Battle Creek
VHT	Youngs Creek
VI	Blackberry Creek
VI3	Morgan Creek
VIN	Lake Run
VJ	Waubansee Creek
VL	Mill Creek
VN	Ferson Creek
VN3	Norton Creek
VNL	Otter Creek
VNLK	Stony Creek
VO	Brewster Creek
VP	Poplar Creek
VPQ	East Branch Poplar Creek
VQ	Tyler Creek
VQ5	Jelkes Creek
VQR	Pingree Creek
VS	Crystal Creek
VSE	Woods Creek
VT	Spring Creek
VT1	Cary Creek
VU	Flint Creek
VU3	Slocum Lake Outlet
VV	Cotton Creek
VV	Mutton Creek
W4	Sleepy Hollow Creek
VW	Boone Creek
VW4	Dutch Creek
VX	Nippersink Creek
VXH	North Branch Nippersink Creek
VXHG	Elizabeth Lake Drain
VXHV	De Young Creek
VXO	Vanderkaar Creek
VXP	Newman Creek
VXP	Silver Creek
VXPD	Slough Creek
VY	Squaw Creek
VYE	Eagle Creek
VZ	Sequoit Creek

Network

Stream	Mileage	DA_{US}[1]	DA_{DS}[2]	Description
V	116.60	868.0	868.0	USGS gage #05546500 at Wilmot
	109.50	894.0	894.0	Sequoit Creek (VZ)
	107.51	931.5	931.5	
	107.50	931.5	978.0	Squaw Creek (VY)
	106.31	981.1	981.1	
	106.30	981.1	1184.6	Nippersink Creek (VX)
	104.51	1201.0	1201.0	Fox River Regional sanitary discharge
	104.50	1201.0	1201.0	Chain of Lakes outlet (near Johnsburg)
	103.00	1204.0	1204.0	
	102.51	1204.1	1204.1	
	102.50	1204.1	1216.8	Dutch Creek (VW4)
	100.31	1219.4	1219.4	
	100.30	1219.4	1242.7	Boone Creek (VW)
	100.10	1242.8	1242.8	McHenry sanitary treatment plant
	97.80	1249.0	1249.0	DOWR Gage at McHenry Dam
	96.91	1254.0	1254.0	
	96.90	1254.0	1269.0	Sleepy Hollow Creek (VV4)
	94.31	1276.7	1276.7	
	94.30	1276.7	1289.1	Mutton Creek (VV)
	90.81	1302.7	1302.7	
	90.80	1302.7	1313.2	Slocum Lake outlet (VU3)
	89.41	1320.0	1320.0	
	89.40	1320.0	1356.8	Hint Creek (VU)
	85.50	1362.7	1366.0	Cary Creek (VT1)
	85.31	1366.0	1366.0	
	85.30	1366.0	1391.8	Spring Creek (VT)
	8.1.60	1399.0	1399.0	USGS gage #05550000 at Algonquin
	81.59	1399.0	1427.2	Crystal Creek (VS)
	80.60	1431.5	1431.5	Algonquin sanitary treatment plant
	76.60	1444.7	1444.7	Carpentersville sanitary treatment plant
	74.90	1451.0	1451.0	East Dundee sanitary treatment plant
	74.80	1451.1	1451.1	West Dundee sanitary treatment plant
	74.61	1451.6	1451.6	
	74.60	1451.6	1458.4	Jelkes Creek (VQ5)
	72.21	1464.0	1464.0	
	72.20	1464.0	1504.0	Tyler Creek (VQ)
	72.10	1504.0	1504.0	Elgin (north) sanitary treatment plant
	70.70	1507.2	1507.2	Elgin water supply withdrawal
	69.10	1507.7	1507.7	Elgin (South & West) treatment plants
	68.81	1507.8	1507.8	
	68.80	1507.8	1552.1	Poplar Creek (VP)
	67.30	1555.0	1555.0	DOWR Gage at South Elgin
	65.91	1557.5	1557.5	
	65.90	1557.5	1573.0	Brewster Creek (VO)
	62.41	1577.5	1577.5	
	62.40	1577.5	1589.6	Norton Creek (VN3)
	60.91	1590.5	1590.5	
	60.90	1590.5	1644.6	Ferson Creek (VN)
	59.90	1646.0	1646.0	St. Charles Dam
	58.70	1646.8	1650.5	St. Charles sanitary treatment plant
	57.90	1652.0	1652.0	DOWR gage at Geneva
	57.30	1652.5	1652.5	Geneva sanitary treatment plant
	54.80	1657.9	1657.9	Batavia sanitary treatment plant

[1] Upstream drainage area
[2] Downstream drainage area

Stream	Mileage	DA_{US}	DA_{DS}	Description
V(cont.)	53.00	1662.7	1693.6	Mill Creek (VL)
	49.30	1701.6	1701.6	Aurora, Illinois Avenue bridge
	49.00	1701.8.	1716.5	Indian Creek (VK)
	45.90	1726.5	1726.5	Montgomery
	44.80	1726.0	1729.0	Fox River tributary (VJ3)
	44.50	1729.0	1729.0	Aurora sanitary treatment plant
	44.49	1729.0	1729.0	
	42.71	1733.7	1733.7	
	42.70	1733.7	1763.1	Waubansee Creek (VJ)
	42.40	1763.1	1763.1	Oswego sanitary treatment plant
	37.81	1766.0	1766.0	
	37.80	1766.0	1783.0	Morgan Creek (VI3)
	35.90	1788.7	1788.7	Yorkville, IL RT 47 bridge
	35.61	1789.0	1789.0	Yorkville-Bristol treatment plant
	35.60	1789.0	1864.0	Blackberry Creek (VI)
	31.31	1873.0	1873.0	
	31.30	1873.0	1892.6	Rob Roy Creek (VH2)
	31.01	1900.3	1900.3	
	31.00	1900.3	2092.7	Big Rock Creek (VH)
	29.51	2094.3	2094.3	
	29.50	2094.3	2109.6	Hollenback Creek (VG7)
	25.41	2126.5	2126.5	
	25.40	2126.5	2132.0	
	21.01	2134.0	2134.0	
	21.00	2134.0	2150.0	Roods Creek (VF1)
	20.11	2160.9	2160.9	
	20.10	2160.9	2243.9	Somonauk Creek (VF)
	19.00	2247.4	2250.1	Sheridan
	15.81	2257.2	2257.2	
	15.80	2257.2	2272.4	Mission Creek (VE)
	13.01	2285.1	2285.1	
	13.00	2285.1	2296.8	Brumbach Creek (VD)
	9.41	2304.4	2304.4	
	9.40	2304.4	2568.8	Indian Creek (VC)
	8.51	2572.0	2572.0	
	8.50	2572.0	2612.9	Buck Creek (VB)
	5.40	2630.8	2630.8	USGS gage #05552500 at Dayton
	0.00	2647.7	2647.7	At mouth at Ottawa
VB	16.40	0.0	0.0	
	11.90	6.5	6.5	
	10.40	11.7	11.7	
	9.10	16.3	16.3	
	8.61	17.3	17.3	
	8.60	17.3	29.7	Buck Creek tributary (VBP)
	5.90	30.2	30.2	ILRT23
	4.52	36.3	36.3	
	4.10	38.0	38.0	
	2.90	40.1	40.1	
	0.00	40.9	40.9	
VBP	14.00	0.0	0.0	
	6.90	2.7	2.7	
	5.78	5.6	5.6	
	3.84	8.5	8.5	
	1.52	12.1	12.1	
	.63	13.1	13.1	
	0.00	13.4	13.4	
VC	53.19	0.0	0.0	
	52.70	2.1	2.1	
	46.10	7.6	7.6	
	44.00	11.8	13.7	

Stream	Mileage	DA_{US}	DA_{DS}	Description
VC (cont.)	41.20	18.8	18.8	Lake Shabbona
	36.00	31.8	31.8	Chicago Road
	32.90	36.6	36.6	Suydam Road
	26.81	47.6	47.6	
	26.80	47.6	59.8	Paw Paw Run (VCN)
	24.21	68.1	68.1	
	24.20	68.1	86.0	Indian Creek tributary (VCM)
	22.61	87.9	87.9	Earlville sanitary treatment plant
	22.60	87.9	115.6	Sutphens Run (VCL)
	15.70	125.6	125.6	
	9.41	138.1	138.1	
	9.40	138.1	225.3	Little Indian Creek (VCF)
	4.40	231.5	231.5	
	1.51	234.1	234.1	
	1.50	234.1	263.3	Crooked Leg Creek (VCB)
	0.00	264.4	264.4	At mouth near Wedron
VCB	18.81	0.0	0.0	
	16.50	5.7	5.7	
	13.00	8.9	8.9	
	12.24	10.6	10.6	
	9.90	15.8	15.8	US HWY 23
	7.50	17.8	17.8	
	6.50	18.7	18.7	
	5.20	21.0	21.0	US HWY 52
	3.10	24.8	24.8	
	0.00	28.7	28.7	
VCF	34.70	0.0	0.0	
	32.30	3.4	3.4	Duffy Road
	28.90	8.1	8.1	Leland Road
	27.44	10.8	10.8	
	24.30	16.6	16.6	
	20.70	25.3	25.3	Suydam Road
	18.70	37.9	37.9	Sanderson Road
	17.00	40.6	40.6	Dekalb-LaSalle county line
	15.60	42.8	42.8	LelandRoad
	14.03	43.7	43.7	
	14.02	43.7	51.2	
	12.10	55.0	55.0	
	8.81	64.7	64.7	
	8.80	64.7	73.6	
	6.40	79.8	79.8	
	4.10	82.6	82.6	
	0.00	87.3	87.3	At mouth near Sheridan
VCL	15.30	0.0	0.0	
	12.50	3.8	3.8	
	10.90	7.1	7.1	Lee-LaSalle county line
	9.57	9.2	9.2	
	7.30	12.8	18.1	
	5.40	19.1	19.1	Burlington Northern RR
	1.90	26.6	26.6	Chicago and Northwestern RR
	0.00	27.7	27.7	
VCM	8.40	0.0	0.0	
	5.60	2.9	2.9	
	3.30	4.8	4.8	Lee-DeKalb county line
	.81	10.2	10.2	
	.80	10.2	17.7	Earlville Road
	0.00	18.0	18.0	
VCN	11.10	0.0	0.0	
	8.70	2.4	2.4	Paw Paw sanitary treatment plant
	5.70	4.5	4.5	Lee-DeKalb county line

Stream	Mileage	DA_{US}	DA_{DS}	Description
VCN(cont.)	3.00	9.2	9.2	Chicago and Northwestern RR
	1.00	10.9	10.9	DeKalb-LaSalle county line
	0.00	12.2	12.2	
VD	9.00	0.0	0.0	
	8.81	.2	.2	
	6.34	4.2	4.2	
	3.60	6.6	6.6	ILRT 71
	1.70	9.4	9.4	
	.60	10.2	10.2	
	0.00	11.7	11.7	
VE	8.70	0.0	0.0	
	6.60	2.2	2.2	US HWY 52
	3.70	5.7	5.7	
	1.10	8.7	8.7	IL RT 71
	0.00	15.2	15.2	
VF	35.00	0.0	0.0	
	30.20	8.9	8.9	Crego Road
	29.10	12.5	14.1	Somonauk Creek tributary (VFU)
	25.30	21.7	21.7	
	20.40	26.4	26.4	Somonauk Road
	14.01	43.3	43.3	
	14.00	43.3	55.8	Buck Branch (VFK)
	10.50	59.8	62.8	Somonauk Creek tributary (VFH)
	9.30	64.0	64.0	Lake Holiday
	5.30	64.9	64.9	
	4.71	73.1	73.1	
	0.00	83.0	83.0	At mouth near Sheridan
VFH	1.40	1.9	1.9	Somonauk sanitary treatment plant
	0.00	3.0	3.0	
VFK	6.10	0.0	0.0	
	3.70	6.7	6.7	Pine Road
	2.50	9.0	9.0	Suydam Road
	.90	12.1	12.1	Somonauk Road
	0.00	12.5	12.5	
VFU	1.80	0.9	0.9	Waterman sanitary treatment plant
	0.00	1.6	1.6	
VF1	12.30	0.0	0.0	
	9.80	1.4	1.4	Roods Road
	7.40	5.7	5.7	US HWY 52
	4.40	11.9	11.9	IL RT 71
	.90	14.8	14.8	Burlington Northern RR
	0.00	15.9	15.9	
VG7	8.20	0.0	0.0	
	5.00	5.7	5.7	Walker Road
	4.20	8.0	8.0	IL RT 71
	3.00	11.3	11.3	
	1.70	13.5	13.5	Fox River Road
	0.00	15.3	15.3	
VH	30.20	0.0	0.0	
	26.90	5.7	5.7	Harter Road
	25.70	6.9	6.9	Perry Road
	24.10	9.1	9.1	Owens Road
	21.71	11.2	11.2	
	21.70	11.4	22.9	Youngs Creek (VHT)
	19.80	26.9	26.9	Kane-DeKalb county line
	15.70	32.6	32.6	US HWY 630
	13.81	33.1	33.1	
	13.80	33.1	60.9	West Branch Big Rock Creek (VHM)
	12.90	62.0	62.0	Price Road
	10.31	64.4	64.4	

Stream	Mileage	DA_{US}	DA_{DS}	Description
VH(cont.)	10.30	64.4	102.7	Welch Creek (VHJ)
	8.00	108.2	108.2	Kendall-Kane county line
	7.40	109.6	109.6	
	3.00	114.9	114.9	Main Street
	1.20	115.7	115.7	Piano sanitary treatment plant
	.11	117.9	117.9	
	.10	117.9	192.4	Little Rock Creek (VHA)
	0.00	192.4	192.4	At mouth near Piano
VHA	30.80	0.0	0.0	
	27.10	5.6	5.6	McGirr Road
	24.00	7.6	14.4	
	23.40	14.5	18.9	
	18.00	24.6	24.6	
	13.40	29.2	40.1	Little Rock Creek tributary (VHAL)
	9.50	51.2	51.2	Miller Road
	4.10	58.6	66.2	
	3.20	66.5	71.4	Little Rock Creek tributary (VHAD)
	.0.00	74.5	74.5	
VHAD	1.60	3.0	3.0	Sandwich sanitary treatment plant
	0.00	4.9	4.9	
VHAL	6.60	0.0	0.0	
	3.30	6.3	6.3	Somonauk Road
	1.00	10.5	10.5	East Sandwich Road
	0.00	10.9	10.9	
VHJ	17.40	0.0	0.0	
	16.00	2.1	2.1	Elbum sanitary treatment plant
	14.50	3.8	3.8	
	12.00	10.0	10.0	Dauberman Road at Kaneville
	10.90	12.0	12.0	
	7.10	15.6	15.6	Scott Road
	4.90	19.3	19.3	Dauberman Road
	3.20	22.1	22.1	Grannart Road near Big Rock
	2.21	22.4	22.4	
	2.20	22.4	36.8	Unnamed tributary (VHJD)
	0.00	38.3	38.3	At mouth near Piano
VHJD	7.10	0.0	0.0	
	4.20	5.5	5.5	Scott Road
	2.90	7.7	7.7	Wheeler Road
	1.50	10.2	10.2	Grannart Road
	0.00	14.4	14.4	
VHM	13.90	0.0	0.0	
	10.90	3.9	3.9	McGirrRoad
	7.51	8.4	8.4	
	7.50	8.4	23.2	Battle Creek (VHMO)
	7.00	23.6	23.6	Phillips Road
	5.60	24.8	24.8	Pritchard Road at Hinckley
	4.10	25.4	25.4	Kane-DeKalb county line
	2.60	25.8	25.8	US HWY 30 (west of Big Rock)
	.80	26.6	26.6	
	0.00	27.8	27.8	At mouth near Big Rock
VHMO	10.00	0.0	0.0	
	7.40	3.4	3.4	Harter Road
	5.90	9.9	9.9	
	3.30	12.6	12.6	McGirrRoad
	0.00	14.8	14.8	
VHT	8.30	0.0	0.0	
	6.70	2.6	2.6	
	4.40	4.5	4.5	DeKalb-Kane county line
	2.20	8.3	8.3	Owens Road (county line)
	.40	11.0	11.0	

Stream	Mileage	DA_{US}	DA_{DS}	Description
VHT (cont.)	0.00	19.8	19.8	At mouth near Kaneville
VH2	10.30	0.0	0.0	
	7.80	7.2	7.2	Galena Road
	5.40	13.1	13.1	CB.&Q.RR
	5.00	14.1	14.1	Faxon Road
	3.00	17.0	17.0	Schaefer Road
	0.00	19.6	19.6	
VI	34.60	0.0	0.0	
	31.90	3.5	3.5	Pouley Road
	27.90	6.0	6.0	
	25.40	9.2	9.2	Main Street
	22.60	18.7	18.7	Scott Road
	21.90	21.1	21.1	IL RT 47
	19.80	25.2	25.2	Ka-De-Ka Road
	17.01	30.7	30.7	
	17.00	30.7	44.3	- Lake Run (VIN)
	14.30	48.1	48.1	Prairie Street
	11.30	52.7	52.7	Kendall-Kane county line
	7.40	57.0	57.0	
	3.30	70.2	70.2	USGS gage #05551700 near Yorkville
	1.80	71.7	71.7	US HWY 34
	0.00	72.9	72.9	At mouth near Bristol
VIN	7.30	0.0	0.0	
	6.00	2.1	2.1	Bliss Road (west of Batavia)
	3.98	8.8	8.8	
	3.30	11.0	11.0	Tanner Road
	2.00	12.5	12.5	East-West Tollway
	0.00	13.6	13.6	At mouth near Sugar Grove
VI3	8.60	0.0	0.0	
	6.70	1.2	1.2	
	4.60	4.2	4.2	
	2.90	9.3	15.7	
	1.00	17.4	17.4	IL RT 71
	0.00	17.7	17.7	
VJ	12.60	0.0	0.0	
	10.50	1.8	1.8	IL RT 65
	9.30	3.9	3.9	E.J.&E.RR
	7.20	14.3	14.3	Kane-DuPage county line
	5.50	17.2	17.2	EJ.&E.RR
	3.40	20.3	20.3	
	1.20	28.8	28.8	IL RT 71 near Oswego
	.30	28.9	28.9	IL RT 25
	0.00	29.4	29.4	At mouth at Oswego
VJ3	1.40	2.3	2.3	Armour Dial industrial discharge
	0.00	2.8	2.8	
VK	9.10	0.0	0.0	
	5.70	3.1	3.1	
	2.90	8.9	8.9	Reckinger Road
	1.10	14.2	14.2	Ohio Street in Aurora
	.50	14.5	14.5	High Sreet in Aurora
	0.00	14.7	14.7	
VL	16.30	0.0	0.0	
	13.20	3.6	3.6	Brown Road
	10.20	8.0	8.0	US Alt HWY 30 near Wasco
	7.20	14.7	14.7	Keslinger Road
	5.40	19.8	19.8	Kaneville Road
	4.10	23.5	23.5	Wenmoth Road
	1.00	30.4	30.4	At Mooseheart Lake
	.20	30.8	30.8	IL RT 31
	0.00	30.9	30.9	At mouth near Mooseheart

Stream	Mileage	DA_{US}	DA_{DS}	Description
VN	15.20	0.0	0.0	
	12.10	4.8	4.8	
	10.40	6.1	6.1	Burlington Road at Wasco
	8.74	8.4	8.4	
	6.51	11.4	11.4	
	6.50	11.4	45.5	Otter Creek (VNL)
	4.40	47.9	47.9	
	2.20	53.1	53.1	USGS Gage #05551200 near St. Charles
	.20	54.1	54.1	IL RT 31
	0.00	54.1	54.1	At mouth at St. Charles
VNL	7.20	0.0	0.0	
	4.38	2.5	2.5	
	3.80	4.7	11.9	Fitchie Creek confluence
	2.71	13.9	13.9	
	2.70	13.9	25,4	Stony Creek (VNLK)
	1.00	28.9	28.9	Silver Glen Road
	0.00	34.1	34.1	
VNLK	6.00	0.0	0.0	
	3.40	5.0	5.0	
	1.20	10.8	11.1	Bowes Creek confluence
	.60	11.6	11.6	Stevens Road
	0.00	11.7	11.7	
VN3	5.30	0.0	0.0	
	2.60	7.4	7.4	Dunham Road near Wayne
	.50	11.5	11.5	IL RT 25
	0.00	12.1	12.1	At mouth near St. Charles
VO	6.80	0.0	0.0	
	4.20	4.9	4.9	Illinois Central RR
	2.00	7.0	7.0	Kane-DuPage county line
	.80	12.0	12.0	IL RT 25
	0.00	15.5	15.5	At mouth near South Elgin
VP	17.70	0.0	0.0	
	14.80	3.3	3.3	1L RT 62 near Barrington
	11.80	7.8	7.8	IL RT 72 near Bartlett
	10.71	8.2	8.2	
	10.70	8.2	13.3	East Branch Poplar Creek (VPQ)
	10.10	16.6	16.6	IL RT 58
	7.50	21.8	21.8	IL RT 58
	4.91	26.1	26.1	
	4.90	26.1	33.2	Poplar Creek tributary (VPH)
	4.40	34.4	34.4	
	2.30	35.5	35.5	USGS gage #05550500 at Elgin
	1.00	43.4	43.4	Kane-Cook county line
	0.00	44.3	44.3	At mouth at Elgin
VPH	6.48	0.0	0.0	
	1.30	6.0	6.0	
	0.00	7.2	7.2	
VPQ	5.07	0.0	0.0	
	2.70	3.7	3.7	
	0.00	5.1	5.1	
VQ	17.70	0.0	0.0	
	15.50	5.2	5.2	IL RT 72 at Starks
	11.61	10.1	10.1	
	11.60	10.1	21.5	Pingree Creek (VQR)
	9.00	28.0	28.0	C.& N.W.RR
	7.90	30.7	30.7	Big Timber Road
	6.80	32.2	32.2	
	5.60	33.8	33.8	Randall Road
	3.00	36.9	36.9	
	1.60	38.4	38.4	Big Timber Road at Elgin

Stream	Mileage	DA_{US}	DA_{DS}	Description
VQ(cont.)	0.00	40.0	40.0	At mouth at Elgin
VQR	9.00	0.0	0.0	
	6.40	1.9	1.9	Illinois Central RR
	2.70	8.4	8.4	US HWY 20
	1.40	10.0	10.0	Highland Avenue
	0.00	11.4	11.4	
VQ5	1.50	0.0	0.0	
	.50	6.5	6.5	
	0.00	6.8	6.8	At mouthnear West Dundee
VS	8.85	0.0	0.0	
	7.50	5.8	5.8	Crystal Lake
	6.10	8.4	8.4	Crystal Lake sanitary treatment plant
	2.50	9.5	9.5	Lake in the Hills treatment plant
	2.10	10.4	10.4	Cedar Street
	1.40	11.4	11.4	Algonquin Road
	1.30	11.4	20.4	Woods Creek (VSE)
	0.00	27.2	27.2	At mouth near Algonquin
VSE	3.68	0.0	0.0	
	3.30	3.4	3.4	
	1.70	8.3	8.3	
	.40	8.9	8.9	
	0.00	9.0	9.0	
VT	12.90	0.0	0.0	
	10.10	5.2	5.2	Penny Road
	9.30	5.3	5.3	
	8.00	8.2	8.2	IL RT 62
	5.70	17.7	17.7	Donlea Road
	4.60	20.7	20.7	McHenry-Cook county line
	.60	24.8	24.8	Fox River Grove treatment plant
	0.00	25.8	25.8	At mouth near Fox River Grove
VT1	0.90	3.0	3.0	Cary sanitary treatment plant
	0.00	3.3	3.3	
VU	15.58	0.0	0.0	
	15.00	.7	.7	
	12.10	3.4	3.4	IL RT 59
	9.90	4.4	4.4	Lake-Cook county line
	9.30	5.6	13.3	Hint Creek tributary (VUP)
	5.10	19.8	19.8	Cuba Road (at Cuba)
	4.70	20.4	20.4	US HWY 14
	2.30	23.9	35.3	Hint Creek tributary (VUE)
	1.10	36.0	36.0	Kelsey Road
	0.00	36.8	36.8	At mouth near Fox River Grove
VUE	6.50	0.0	0.0	
	4.10	5.6	5.6	Lake Zurich treatment plant
	1.50	8.3	8.3	IL RT 59
	1.32	8.6	8.6	
	.30	10.8	10.8	Barrington Road
	0.00	11.4	11.4	At mouth near North Barrington
VUP	2.00	5.7	5.7	
	0.50	7.5	7.5	Barrington sanitary treatment plant
	0.00	7.7	7.7	
VU3	9.20	0.0	0.0	
	4.80	4.9	4.9	Wauconda sanitary treatment plant
	2.00	8.8	8.8	
	0.00	11.5	11.5	
VV	7.85	0.0	0.0	
	6.50	3.9	3.9	Garland Road
	3.50	9.0	9.0	Darrell Road at Island Lake
	2.79	10.4	10.4	
	2.60	10.9	10.9	

Stream	Mileage	DA_{US}	DA_{DS}	Description
VV (cont.)	1.70	11.3	11.3	Island Lake sanitary treatment plant
	0.00	12.4	12.4	
W 4	8.00	0.0	0.0	
	5.20	8.6	8.6	Pleasant Hill Road
	1.70	11.4	11.4	
	0.00	15.0	15.0	At mouth near Burtons Grove
VW	12.40	0.0	0.0	
	9.70	4.5	4.5	
	9.00	5.8	5.8	Valley Hill Road
	7.30	8.9	8.9	
	6.89	9.9	9.9	
	5.42	13.4	13.4	
	4.80	14.9	14.9	USGS gage #05549000 near McHenry
	3.38	17.9	17.9	
	1.30	22.3	22.3	IL RT 120 at McHenry
	0.00	23.3	23.3	At mouth at McHenry
VW4	4.80	0.0	0.0	
	1.80	3.5	6.4	Dutch Creek tributary (VW4J)
	.80	7.9	7.9	
	0.00	12.7	12.7	
VW4J	1.80	0.6	0.6	Morton Chemical industrial discharge
	0.00	2.9	2.9	
VX	38.00	0.0	0.0	
	36.40	2.5	2.5	
	31.01	8.0	8.0	
	31.00	8.0	18.4	Nippersink Creek tributary (VXV)
	30.70	19.3	19.3	IL RT 173 near Alden
	27.50	21.7	21.7	Johnson Road near Hebron
	24.50	24.7	24.7	IL RT 47
	22.21	28.3	28.3	
	22.20	28.3	65.1	Newman Creek (VXP)
	22.01	65.1	65.1	
	22.00	65.1	79.9	VanderKarr Creek (VXO)
	19.30	84.1	84.1	Thompson Road
	16.70	95.7	95.7	Wonder Lake
	10.30	115.7	115.7	Richmond Road
	9.71	116.3	116.3	
	9.70	116.3	184.6	North Branch Nippersink Creek (VXH)
	7.00	191.3	191.3	USGS gage #05548280 near Spring Grove
	2.70	201.8	201.8	
	0.00	203.5	203.5	At mouth at Fox Lake
VXH	20.10	0.0	0.0	
	16.50	6.1	11.7	DeYoung Creek (VXHV)
	14.70	13.6	13.6	Wisconsin County Road B
	10.50	42.7	42.7	
	9.00	43.9	43.9	Genoa City
	8.60	44.3	44.3	Illinois-Wisconsin state line
	5.70	51.7	51.7	Richmond sanitary treatment plant
	5.01	51.8	51.8	
	5.00	51.8	64.6	Elizabeth Lake Drain (VXHG)
	4.30	65.8	65.8	Hill Road
	2.40	67.3	67.3	US HWY 12
	0.00	68.3	68.3	At mouth near Solon Mills
VXHG	5.40	0.0	0.0	
	2.30	8.5	8.5	Illinois-Wisconsin state line
	1.90	9.7	9.7	Elizabeth Lake
	.90	12.4	12.4	IL RT 173
	0.00	12.8	12.8	At mouth near Richmond
VXHV	3.30	0.0	0.0	
	1.70	1.5	1.5	IL RT 170 at Hebron

Stream	Mileage	DA_{US}	DA_{DS}	Description
VXHV (cont.)	.50	5.5	5.5	Hebron sanitary treatment plant
	0.00	5.6	5.6	
VXO	6.20	0.0	0.0	
	3.70	4.0	4.0	Stewart Street
	2.85	9.3	9.3	
	2.50	11.4	11.4	Vander Karr Road
	.20	14.8	14.8	Allendale Road
	0.00	14.8	14.8	
VXP	9.80 -	0.0	0.0	
	7.30	2.7	5.4	Woodstock Die Casting industrial discharge
	5.80	9.0	9.0	Woodstock (East) treatment plant
	5.00	9.3	12.2	Silver Creek tributary (VXPL)
	4.00	15.4	15.4	Alden Road
	1.21	18.0	18.0	
	1.20	18.0	36.4	Slough Creek (VXPD)
	0.00	36.8	36.8	At mouth near Greenwood
VXPD	8.20	0.0	0.0	
	6.20	3.6	3.6	Nelson Road
	5.10	7.6	7.6	Rose Farm Road
	3.60	8.4	8.4	AldenRoad
	2.86	11.0	11.0	
	.90	17.8	17.8	IL RT 47
	0.00	18.4	18.4	
VXPL	2.20	0.2	0.2	Woodstock (West) treatment plant
	0.00	2.9	2.9	
VXV	6.90	0.0	0.0	
	5.50	3.7	3.7	Ferris Road
	2.80	3.1	3.1	Alden Road at Alden
	0.00	10.6	10.6	At mouth at Alden
VY	15.30	0.0	0.0	
	11.40	7.5	7.5	IL RT 60 at Fremont Center
	9.50	12.6	12.6	
	8.20	16.1	16.1	IL RT 120 at Round Lake Park
	4.50	18.5	21.7	Squaw Creek tributary (VYH)
	3.20	23.7	30.9	Squaw Creek tributary (VYF)
	2.70	31.5	35.6	Eagle Creek (VYE)
	1.40	37.8	37.8	Rollins Road at Fox Lake
	1.20	38.0	45.7	Fish Lake Drain confluence
	0.00	46.5	46.5	At mouth at Fox Lake
VYE	4.80	0.0	0.0	
	3.30	1.3	1.3	Lake Villa sanitary treatment plant
	0.00	4.1	4.1	At mouth at Long Lake
VYF	4.60	0.0	0.0	
	2.70	4.5	4.5	
	1.50	5.2	5.2	
	0.00	7.2	7.2	
VYH	2.20	1.5	1.5	Travenol Industries discharge
	0.00	3.2	3.2	
VZ	7.50	0.0	0.0	
	5.00	5.2	5.2	Grass Lake Road
	3.10	10.4	10.4	
	1.40	12.8	12.8	Antioch sanitary treatment plant
	.90	13.4	13.4	Tiffany Road
	0.00	13.7	13.7	At mouth at IL RT 173