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Water Resources Series No. 73

COMPUTER OUTPUT PROGRAMS
IN THE
WATER RESOURCES DATA SYSTEM

Vicki C. Pelton

March 1979

ABSTRACT

The Water Resources Data System (WRDS) is a computerized system for storage, retrieval and analysis of surface water, water quality, water well levels, climatic and snow course data. This report describes the kinds of data stored, methods of retrieval, kinds of analyses, how users may obtain data and user costs on the current system.

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INTRODUCTION

The Water Resources Data System (WRDS) is a computerized storage, retrieval and analysis system for water resources data. The system includes surface water, water quality, water well levels, climatic and snow course data.

The computerization process, which was begun over ten years ago, is continually being revised and updated by the Wyoming Water Resources Research Institute (WRI) to incorporate new data and technology into the system. This report describes WRDS as it is today so that potential users may make use of it. Previous publications describe the past systems at WRI (Embree and Cole, 1970; Embree and Larson, 1970; Smith, 1974; Smith, Pelton and Bender, 1976; Pelton and Smith, 1977). Verne Smith and Sally Bender, in addition to the current author, have done a large part of the work in writing the programs and past reports for WRDS.

The current system contains a vast and growing amount of data. It is a fast, effective and easy way to obtain large or small amounts of information, eliminating considerable time tabulating and calculating by hand. Persons interested in requesting data or having questions regarding the system may write to the Water Resources Research Institute, Box 3067, University Station, Laramie, Wyoming 82071. A more expedient approach is to telephone Vicki Pelton at (307) 766-2143.

INTRODUCTION

(continued)

User requests are normally submitted to the computer the same day that they are received. Results for small requests are in the mail the following day. Large requests may require a week for processing. Charges for services are given in the appendix.

SUMMARY OF PROGRAMS

Surface Water Data

CREST	prints peak flows for crest gage and S-R recorder stations
DAYAVE	prints mean daily flows averaged over several years
DAYFLOW	prints mean daily flow data
DURCUR	prints and plots duration curves for mean daily flow data
FLOWDATES	prints location information and years available for all mean daily flow stations
GUMBEL	prints and plots the Gumbel Method analysis of peak flows
HAZEN	prints and plots the Hazen Method analysis of peak flows
HYGRAPH	prints tables for hydrograph separation using mean daily flow data
LACOR	prints correlations using Langbein's method for two monthly flow stations
LOGPT3	prints and plots the Log-Pearson Type III analysis of peak flows
MADIS	prints monthly and annual flow data along with statistics
MCOR	prints and plots regression analysis for two monthly flow stations
MONMAX	prints maximum daily flow for each month
MONMIN	prints minimum daily flow for each month
PEAKDATES	prints years of data available for all crest-gage and S-R recorder stations
PERMAX	prints maximum mean daily flows for specified time periods
PERMIN	prints minimum mean daily flows for specified time periods
PLQFLOW	plots mean daily flow data

Surface Water Data

(continued)

PLRUNOFF	plots monthly flows and monthly precipitation data (described under Daily Climatic Data)
Q7,10	prints and plots a Q7,10 analysis of low flow frequency using mean daily flow data
RESERV	prints end-of-month reservoir contents
RESTNS	prints headers of all reservoir contents stations
SORT	prints table of mean daily flow and date, sorted by flow
UNITPEAK	plots four months of mean daily flow data unitized to annual instantaneous peak

Water Quality Data

LPARAM	prints list of chemical parameters available
QDDATA	prints daily sample data
QDPLQT	plots daily sample data versus time
QGCQMSTAT	prints statistics of grab sample data for several stations
QGDATA	prints tabulation of grab sample data
QGDATSTAT	prints tabulation of data and statistics of grab sample data
QGPLQT	plots grab sample data versus time
QGSTAT	prints statistics of grab sample data
QHEAD	prints listing of headers
QHEAD1	prints listing of headers with dates of grab sample data
QHEAD2	prints listing of headers with years of daily sample data
QHEAD3	prints listing of headers with dates of grab and daily sample data
REGDAY	prints and plots regression analysis for two daily sample parameters
REGGRAB	prints and plots regression analysis for two grab sample parameters
REGMQN	prints and plots regression analysis for two daily sample parameters by month
REGSTA	prints and plots regression analysis for one parameter at two stations
RUNAVE	prints and plots running averages for daily sample conductivity
SEDDUBMASS	plots doublemass curve for two stations for daily sediment data (tons/day)
SEDDURCUR	plots sediment duration curve for daily values

Water Quality Data

(continued)

SEDMASS	plots cumulative daily sediment versus time
SEDSIZE	plots sediment particle size distribution for grab samples

Well Level Data

DAILYWELL	prints daily well level data
GRABWELL	prints grab well level data
PLØTLEVELD	plots daily well level data
PLØTLEVELG	plots grab well level data
WELLDATES	prints dates of grab samples for well level data
WELLHEAD	prints headers for well level data
WELLSAMP	prints number and date range of samples for grab well level data

Climatic Data

ANTEPREC	prints and plots 5-day antecedent precipitation from daily climatic data
AVEPREC	prints average daily precipitation for given year range and also prints number of days to get specific percentages
CUM	plots cumulative total for daily precipitation data
DAILYPRINTH	prints daily climatic values (precipitation excluded) calculated from hourly climatic values
DAILYPRINTP	prints daily precipitation values calculated from hourly precipitation values
DEGREE	prints daily degree day temperatures
DOUBLEMASS	prints and plots doublemass curve for annual precipitation using daily climatic values to compute annual value
DRDUGHT	prints and plots mean precipitation for all years, total precipitation for each year and running average for daily precipitation data
FREZTAB	prints number of freeze-free days per week for daily climatic data
LISTDATAD	prints daily climatic data
LISTDATAH	prints hourly climatic data (precipitation excluded)
LISTDATAP	prints hourly precipitation data
LISTDATESD	prints dates for daily climatic data
LISTDATESP	prints headers and optionally year ranges for hourly precipitation data
MONTHLYD	prints monthly and annual summaries of daily climatic data
MONTHLYP	prints monthly and annual summaries of hourly precipitation data
NORMALTEMP	prints normal temperatures for 1941 to 1970 for daily climatic data
OCCUR	prints and plots number of occurrences of daily precipitation in each of 18 class sizes

Climatic Data

(continued)

PARCREATER	prints number of days a type of daily climatic data was greater than or less than specified values
PLQTDAYD	plots daily climatic data
PLQTDAYP	plots daily precipitation data calculated from hourly precipitation values
PLQTHQURP	plots hourly precipitation data
PLQTMQNTH	plots monthly summaries from daily climatic data
PLQTYEAR	plots yearly summaries from daily climatic data
PLRUNQFF	plots monthly streamflow and monthly precipitation calculated from daily climatic data
PRQBTEMP	prints probability of specific temperatures occurring for daily climatic data
RUN	prints and plots running average for annual precipitation calculated from daily climatic data
SNQWCREATER	prints summary values for snowfall and snowdepth for daily climatic data
STQRM	prints storm data calculated from hourly precipitation data
TEMPBELQW	prints summary values of daily minimum temperature data for specific categories
WINDRQSE	prints and plots a windrose from hourly wind data

Snow Course Data

SNOWCOURSE	prints snow course data and/or statistics
SNOWDATES	prints headers and years of data available for snow course data

SURFACE WATER DATA

There are four types of surface water data stored in WRDS. These are mean daily flows, annual instantaneous peaks, monthly runoff volumes and reservoir contents. For each surface water station the elevation, latitude, longitude, township and drainage area (if known) are stored on the system. All surface water data are stored by water year. Water year 1978 includes data from 1 October 1977 through 30 September 1978.

The majority of the mean daily flow data are collected by the U.S. Geological Survey. Essentially all streams in or adjacent to Wyoming with five or more years of records are included. Mean daily flow data for diversion records from the annual Water Commissioners' reports, the Bureau of Reclamation reports, the U.S. Forest Service and WRRI are also stored on the system.

Annual instantaneous peaks are stored for continuous record, crest-gage and S-R (stage-rainfall) recorder stations. Peaks for continuous record stations are stored with the daily flow data while the other peaks are stored in a separate file. All of these sources may be used in flood frequency analyses.

Monthly runoff volumes are accumulations of daily flows by month in units of acre-feet. In some instances monthly runoff volumes are stored for which no daily flows are readily available.

End of the month reservoir content data are stored for those stations whose data are published by the U.S. Geological Survey.

SURFACE WATER DATA

(continued)

A description of the kinds of analyses available is presented on the following pages. Note that monthly runoff values can be plotted using the PLRUNOFF program as described in the Daily Climatic Data section.

CREST

This program lists data from crest-gage and S-R recorder stations. For each year on file the date and amount of the peak flow, the peak stage and the day number of peak flow (1 for October 1) are printed. The peak flows can be used in flood frequency analyses described under the GUMBEL, HAZEN and LOGPT3 programs.

Caution should be exercised in using the stage data. The datum of a gage is sometimes changed, significantly affecting the stage. If stage data are to be used, the original records should be checked for datum changes.

Example of CREST

WAGON GULCH NEAR DUBOIS, WYOMING STATION NO 062187.00
LATITUDE 43-34-42 LONGITUDE 109-44-13 SECTION 30 TOWNSHIP 42 N RANGE 107 W
DRAINAGE AREA 4.89 SQUARE MILES

YEAR	DATE	DISCHARGE VALLE	STAGE	DAY NUMBER
1961	JUNE 4	360.00	7.67	247
1962		80.00	-1.00	-1
1963		80.00	-1.00	-1
1964	JULY 13	220.00	6.24	287
1965		134.00	5.29	-1
1966		80.00	-1.00	-1
1967	JUNE 14	120.00	5.15	257
1968	JUNE 10	95.00	4.74	254
1969	SEP. 20	47.00	3.90	355
1970	MAY 23	25.00	3.27	235
1971	MAY 4	115.00	15.54	216
1972	APR.	110.00	15.56	-1
1973	AUG. 4	82.00	15.26	309
1974	JULY 19	520.00	17.91	292

-1 DENCIES MISSING VALLES

DAYAVE

This program prints the mean daily flow for each day of the year averaged over a specified number of years. The standard deviation for each day for the year range is also printed. For example, for the specified years the mean and standard deviation for the October 1st's are computed and printed, then the October 2nd s, 3rd's, etc. This can serve as the basis for stochastic analyses. The values are calculated and printed in two ways: (1) all years included and (2) years containing missing data excluded. The first example shows the means with partial years excluded. The second example shows the standard deviations using all years'.

For each station the user should specify the year range unless all years are to be printed.

GREEN RIVER AT WARREN BRIDGE, NEAR DANIEL, WYOMING STATIC NC 091885.00
 LATITUDE 43-01-08 LONGITUDE 110-07-03 SECTION 8 TOWNSHIP 35 N RANGE 111 W
 ELEVATION 7468.09 FEET MSL DRAINAGE AREA 468. SQUARE MILES

*** AVERAGE DAILY STREAMFLOW IN CFS FOR 1932 - 1974 ***

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	229.9	163.9	129.3	108.4	110.4	117.1	169.0	539.4	1669.7	1665.8	815.9	370.0
2	226.5	158.4	129.6	107.3	109.5	116.4	169.7	557.7	1648.4	1614.0	807.0	361.1
3	222.8	156.8	129.6	107.6	111.0	115.6	170.8	561.0	1640.5	1611.6	787.9	358.7
4	220.3	159.1	127.7	107.9	111.4	115.3	171.0	629.2	1639.2	1626.4	764.0	351.0
5	217.4	153.2	126.9	107.7	111.0	115.3	172.3	677.6	1647.3	1616.2	731.3	342.1
6	216.6	156.2	126.5	108.0	111.1	114.9	178.9	715.6	1692.8	1590.3	707.8	338.3
7	212.2	159.3	125.8	109.0	110.7	115.1	183.7	761.3	1734.7	1572.5	679.7	346.6
8	207.8	155.1	125.0	109.1	110.1	115.2	191.9	810.1	1774.4	1557.1	651.0	350.4
9	206.5	152.3	126.8	109.1	110.9	115.6	197.8	829.3	1793.2	1529.7	632.7	341.1
10	205.5	151.7	125.9	109.7	111.2	115.5	206.0	855.0	1789.6	1502.5	615.7	329.8
11	204.0	151.8	126.1	110.2	110.6	115.5	227.7	885.6	1773.7	1485.7	603.1	323.5
12	201.3	148.7	124.6	109.7	110.3	116.7	239.9	916.2	1761.8	1471.8	592.7	319.6
13	200.3	148.7	124.2	110.2	110.3	117.7	247.9	934.9	1789.4	1456.2	578.0	314.4
14	198.0	147.1	124.5	112.0	110.5	117.4	259.2	951.1	1842.0	1419.0	561.2	306.5
15	198.8	144.0	125.0	112.3	109.0	117.6	269.7	975.7	1898.5	1376.2	540.2	302.0
16	198.7	142.7	123.5	111.2	109.8	118.5	277.7	1010.8	1945.6	1333.7	517.1	297.7
17	198.8	142.3	122.2	110.4	110.8	119.1	286.3	1054.5	1973.8	1284.0	497.9	292.3
18	197.0	139.8	122.6	110.6	111.2	119.1	293.6	1100.0	1966.5	1240.3	483.9	288.9
19	195.6	137.0	122.7	110.6	110.1	119.4	306.0	1139.4	1942.4	1192.9	478.5	291.5
20	193.0	137.3	124.4	111.9	111.1	119.4	320.8	1187.4	1951.6	1158.5	476.9	292.4
21	190.9	136.6	124.0	112.9	110.6	120.0	347.4	1222.0	1987.0	1140.3	478.0	289.8
22	189.1	134.0	123.1	112.0	110.6	122.8	368.6	1268.9	2022.8	1108.8	475.7	285.0
23	187.1	132.3	121.9	110.9	111.4	126.0	392.9	1295.4	2034.1	1059.3	466.2	275.0
24	185.7	132.6	120.6	111.0	110.8	127.8	406.7	1334.6	2045.5	1007.4	453.4	267.4
25	182.9	133.0	118.8	109.9	110.6	128.5	404.1	1385.0	2049.3	964.2	435.6	260.3
26	181.4	132.4	118.0	110.1	110.7	131.0	400.4	1457.2	2007.1	939.1	417.9	252.5
27	179.8	130.7	116.0	110.6	110.3	133.7	394.5	1527.8	1948.0	917.7	403.3	245.3
28	175.9	129.0	114.7	110.3	111.1	136.3	414.2	1609.6	1900.3	891.3	390.0	240.0
29	173.6	129.8	114.6	110.3		140.0	439.4	1676.5	1829.5	862.9	380.9	237.3
30	167.5	130.6	114.0	110.9		141.2	464.3	1731.4	1746.3	842.9	376.1	236.7
31	164.6		114.3	110.4		144.3		1731.2		830.8	372.8	
TOTALS	6128.5	4326.1	3813.9	3412.1	3097.2	3788.0	8572.4	33351.4	55448.0	39873.0	17172.4	9107.2
MEAN	197.7	144.2	123.0	110.1	110.6	122.2	285.7	1075.9	1848.3	1286.2	553.9	303.6
ACRE FEET	12159.7	8593.5	7567.4	6770.1	6145.2	7515.8	17008.7	66173.3	110015.8	79112.1	34072.2	18069.7

TOTAL OF DAILY AVERAGES IN ACRE FEET 373194.4

Example of DAYAVE

GREEN RIVER AT WARREN BRIDGE, NEAR DANIEL, WYOMING STATION NO 091885.00
 LATITUDE 43-01-08 LONGITUDE 110-07-03 SECTION 8 TOWNSHIP 35 N RANGE 111 W
 ELEVATION 7466.09 FEET MSL DRAINAGE AREA 468. SCLARE PILES

*** STANDARD DEVIATION OF DAILY STREAMFLOW FOR 1932 - 1974 ***

YEARS WITH MISSING DATA INCLUDED, BUT MISSING VALUES EXCLUDED

CAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	73.9	43.1	33.1	22.6	25.1	27.1	76.2	325.6	671.5	666.7	278.6	150.1
2	71.0	45.8	32.9	21.6	23.6	26.6	74.1	336.5	657.8	700.6	277.7	128.8
3	68.4	45.8	32.2	22.7	25.1	26.4	72.9	358.4	729.0	708.9	273.3	123.4
4	69.2	46.1	33.3	23.0	25.4	27.1	72.0	399.2	735.4	682.5	280.6	118.3
5	68.6	42.9	33.7	23.4	24.3	27.6	71.1	415.1	740.6	625.2	276.8	110.3
6	65.3	40.7	33.0	23.3	23.1	28.2	70.3	420.5	763.4	614.6	275.0	106.1
7	65.9	40.8	31.7	23.9	21.9	28.2	71.8	451.2	791.1	594.3	261.7	146.2
8	61.2	39.4	31.6	23.2	21.6	27.3	78.0	496.7	802.0	577.6	240.7	174.0
9	97.2	40.5	31.2	22.3	22.2	27.3	77.3	524.4	814.9	576.6	234.5	157.6
10	96.9	40.5	30.1	23.3	22.2	27.2	79.9	525.6	802.2	574.6	234.3	127.6
11	59.3	37.3	30.9	24.6	21.9	27.9	99.9	498.4	799.1	566.1	238.6	119.4
12	58.3	35.6	30.9	26.1	22.0	28.4	113.4	473.8	789.0	553.1	238.2	114.8
13	97.9	34.9	31.4	25.4	22.1	29.1	119.6	453.6	798.4	545.7	216.6	111.5
14	96.8	34.9	31.5	27.4	23.6	29.1	133.3	445.5	789.5	524.7	195.7	99.5
15	60.0	35.4	29.2	27.2	22.0	28.5	143.7	468.6	799.5	508.7	179.9	96.8
16	62.1	36.4	28.0	26.7	22.2	28.7	142.5	488.2	847.9	486.6	162.2	100.2
17	65.4	33.8	26.9	25.7	22.3	29.4	150.3	498.6	874.3	476.7	148.9	110.4
18	63.5	32.9	28.2	26.1	22.8	29.2	148.8	518.6	882.6	475.1	142.3	123.1
19	61.1	32.4	27.3	26.0	23.1	29.5	149.8	535.9	877.3	461.0	143.7	152.0
20	58.8	34.0	25.5	28.0	23.5	29.6	162.8	565.3	867.1	450.9	151.3	169.1
21	57.7	35.4	25.1	29.0	23.0	29.0	180.8	603.7	840.4	447.3	170.1	172.7
22	55.1	34.8	24.9	28.5	22.1	29.9	207.0	633.5	801.1	447.4	199.0	156.2
23	52.0	34.6	25.0	28.2	22.3	31.7	240.7	645.4	795.4	426.2	217.3	129.1
24	49.1	34.5	24.2	27.5	21.4	34.1	265.0	633.4	821.6	382.7	208.9	113.7
25	45.4	35.9	24.2	27.3	20.7	37.1	257.7	645.8	851.8	352.6	184.1	95.3
26	48.7	36.2	23.2	28.7	20.5	40.0	249.8	668.7	851.5	322.2	151.7	86.1
27	47.2	36.8	22.6	28.9	19.9	43.8	227.1	657.3	846.1	321.7	135.4	77.5
28	46.6	37.7	23.1	29.5	19.4	47.9	241.1	677.6	838.9	315.8	131.0	71.9
29	44.8	37.6	23.5	28.8		57.6	259.9	712.6	754.9	310.2	128.6	67.5
30	45.8	35.9	23.7	30.5		58.3	275.4	750.1	715.5	304.5	132.6	72.2
31	42.1		23.1	29.3		59.8		723.6		294.8	143.7	

Example of DAYAVE

DAYFLOW

In some instances there is no substitute for perusing the original data that may form the basis for further analyses. DAYFLOW prints a table of mean daily flows in cubic feet per second by water year. Included are total monthly flow in second-foot-days, average daily flow in cubic feet per second for each month, monthly volume in acre-feet, total annual volume in acre-feet, and the amount and date of the annual instantaneous peak. Missing data are indicated by -1.0. The format is similar to that of surface water data in the USGS water-supply papers.

For each station the user should specify the year range unless all years are to be printed.

SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA + 135. SQUARE MILES

DAILY FLOWS IN CFS BY WATERYEAR

1971

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	80.0	35.0	26.0	19.0	34.0	22.0	34.0	75.0	614.0	366.0	293.0	148.0
2	75.0	40.0	24.0	16.0	32.0	23.0	32.0	123.0	578.0	420.0	297.0	133.0
3	70.0	41.0	25.0	15.0	33.0	25.0	23.0	164.0	602.0	465.0	301.0	175.0
4	80.0	46.0	27.0	14.0	31.0	23.0	26.0	169.0	626.0	451.0	289.0	164.0
5	75.0	40.0	28.0	15.0	30.0	21.0	27.0	175.0	596.0	420.0	281.0	150.0
6	70.0	40.0	29.0	16.0	26.0	20.0	34.0	169.0	566.0	446.0	281.0	146.0
7	65.0	38.0	30.0	17.0	26.0	21.0	37.0	189.0	608.0	465.0	265.0	138.0
8	65.0	38.0	28.0	20.0	27.0	23.0	37.0	231.0	782.0	433.0	261.0	146.0
9	65.0	38.0	25.0	19.0	31.0	26.0	44.0	231.0	964.0	495.0	231.0	128.0
10	70.0	35.0	23.0	18.0	31.0	27.0	50.0	207.0	1030.0	590.0	220.0	116.0
11	70.0	38.0	21.0	16.0	32.0	28.0	42.0	242.0	1020.0	608.0	210.0	107.0
12	67.0	37.0	20.0	17.0	33.0	29.0	33.0	317.0	1010.0	560.0	207.0	103.0
13	61.0	25.0	20.0	16.0	34.0	29.0	35.0	420.0	1080.0	540.0	201.0	99.0
14	55.0	30.0	22.0	16.0	32.0	29.0	44.0	388.0	1080.0	602.0	198.0	97.0
15	52.0	39.0	22.0	20.0	33.0	24.0	68.0	348.0	1140.0	632.0	198.0	95.0
16	50.0	38.0	23.0	24.0	31.0	22.0	54.0	397.0	1150.0	596.0	195.0	91.0
17	50.0	35.0	22.0	26.0	30.0	22.0	46.0	309.0	1300.0	572.0	192.0	87.0
18	50.0	33.0	20.0	26.0	29.0	19.0	47.0	224.0	1310.0	555.0	183.0	87.0
19	50.0	32.0	17.0	27.0	28.0	20.0	39.0	189.0	1190.0	545.0	175.0	83.0
20	49.0	26.0	18.0	28.0	27.0	21.0	36.0	175.0	1110.0	525.0	166.0	82.0
21	49.0	24.0	19.0	30.0	28.0	20.0	34.0	164.0	1350.0	493.0	161.0	78.0
22	48.0	22.0	15.0	29.0	29.0	19.0	37.0	156.0	1480.0	402.0	158.0	76.0
23	46.0	18.0	17.0	27.0	29.0	19.0	43.0	148.0	1490.0	392.0	158.0	73.0
24	44.0	19.0	16.0	26.0	32.0	21.0	58.0	177.0	1230.0	392.0	153.0	70.0
25	43.0	20.0	17.0	27.0	31.0	24.0	54.0	234.0	999.0	388.0	146.0	68.0
26	43.0	23.0	19.0	29.0	30.0	25.0	47.0	392.0	894.0	366.0	143.0	68.0
27	39.0	23.0	20.0	30.0	27.0	23.0	42.0	602.0	740.0	352.0	138.0	68.0
28	52.0	23.0	21.0	32.0	24.0	22.0	44.0	768.0	560.0	348.0	138.0	65.0
29	41.0	25.0	22.0	34.0		27.0	52.0	775.0	415.0	325.0	136.0	65.0
30	40.0	27.0	23.0	34.0		47.0	57.0	680.0	348.0	313.0	189.0	67.0
31	40.0		22.0	35.0		29.0		680.0		305.0	164.0	
TOTALS	1754.0	948.0	681.0	718.0	840.0	750.0	1256.0	9518.0	27862.0	14362.0	6328.0	3073.0
MEAN	56.6	31.6	22.0	23.2	30.0	24.2	41.9	307.0	928.7	463.3	204.1	102.4
ACRE FEET	3479.0	1880.3	1350.7	1424.1	1666.1	1487.6	2491.2	18878.7	55263.4	28486.6	12551.4	6095.2

TOTAL FLOW IN ACRE FEET= 135054.4

INSTANTANEOUS PEAK 1840. CFS JUN 23

-1.0 INDICATES MISSING DATA

Example of DAYFLOW

DURCUR

This program provides duration curves and tables for a cumulative distribution of flow. The curves and tables are often used for water supply or low-flow analyses. One can ascertain information such as: 10 percent of the time the flow is greater than 600 cfs, 50 percent of the time the flow is greater than 50 cfs, or 90 percent of the time the flow is greater than 25 cfs. Specifying a portion of the year can sometimes be helpful. For example, using only April through September may be useful in irrigation studies.

DURCUR provides tables and plots for a station based on the specified period of time, i.e., the range of years to be included and the portion of each year to be considered. Up to 32 class sizes of streamflow may be used in an analysis.

The tables include total second-foot-days and number of occurrences in each class for each year, total second-foot-days for the entire period, mean annual second-foot-days, mean daily discharge in cfs, total number of occurrences in each class, cumulative totals, percent of total accumulated occurrences in each class, class size divided by the drainage area (square miles) and class size divided by the mean daily discharge. If there are missing values within a particular year (or rather the portion of the year that is being analyzed), that year is not included in the analysis computations.

Three plots are produced, either on the line printer or on the X-Y plotter. These are for flows in units of: CSM (cubic feet per second per square mile), CMD (cubic feet per second values divided by the mean daily flow), and CFS (cubic feet per second). When the

DURCUR (continued)

entire year is specified for line printer plots, a fourth plot is made which contains all three curves on one plot. All graphs are semi-logarithmic plots with discharge as the log ordinate value.

In addition to daily data input, the program also provides for input of monthly or annual data to obtain duration tables and curves. For these cases, the user may supply the data cards if desired. For annual data, a Chi Square goodness of fit test to the normal distribution is also made.

Two examples are presented on the following pages. The first is for a station using an entire year's worth of data and plotted on the line printer. The second is for April through July data, plotted on the X-Y plotter.

For each station the user should specify the year range (unless all years are to be used), the portion of the water year to be used (unless the entire water year is to be used) and whether X-Y plotter or line printer plots are desired. Unless there is a great rush, X-Y plotter plots are recommended. WRRRI personnel routinely select class sizes, but the user may specify these if desired. The user may also request monthly or annual volume analyses.

Example of DURCUR Using Entire Year

SUNLIGHT CREEK NEAR PAINTER, WYOMING
LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
ELEVATION 6700. FEET MSL DRAINAGE AREA 4 135. SQUARE MILES

STATION NO 062065.00

DAILY FLOW IN CFS

DURATION TABLE OF DISCHARGE

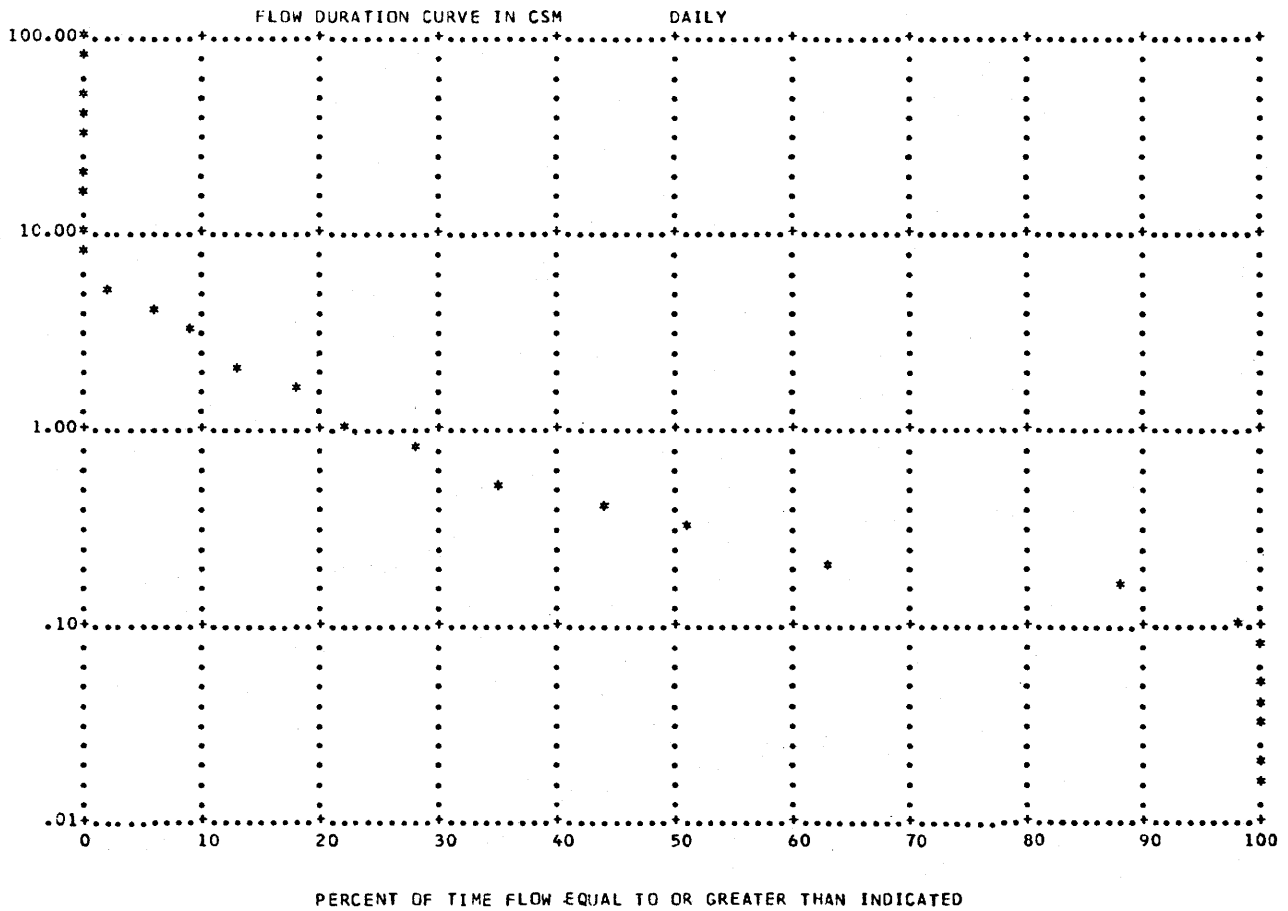
CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL FLOW IN SFD	
YEAR	NUMBER OF DAYS IN CLASS																																
1929	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1.0		
1930	0	0	0	0	0	0	0	0	0	53	64	25	64	37	33	22	26	19	11	7	4	0	0	0	0	0	0	0	0	0	0	44190.0	
1931	0	0	0	0	0	0	0	0	0	0121	39	25	54	58	17	10	20	5	5	8	3	0	0	0	0	0	0	0	0	0	0	33246.0	
1932	0	0	0	0	0	0	0	0	0	0140	57	26	32	15	12	11	20	22	9	8	6	7	1	0	0	0	0	0	0	0	0	49105.0	
1946	0	0	0	0	0	0	0	0	0	59	62	19	52	38	27	31	19	21	19	8	10	0	0	0	0	0	0	0	0	0	0	37878.0	
1947	0	0	0	0	0	0	0	28	31	76	34	37	10	16	33	17	36	24	12	10	1	0	0	0	0	0	0	0	0	0	0	43488.0	
1948	0	0	0	0	0	0	0	0	60	99	35	22	44	17	18	7	10	17	9	14	13	1	0	0	0	0	0	0	0	0	0	45142.0	
1949	0	0	0	0	0	0	0	0	0	28120	27	56	19	17	19	7	24	20	16	10	2	0	0	0	0	0	0	0	0	0	0	0	39527.0
1950	0	0	0	0	0	0	0	0	0	0125	63	27	10	19	28	16	21	14	7	14	20	1	0	0	0	0	0	0	0	0	0	0	53016.0
1951	0	0	0	0	0	0	0	18	38	64	32	18	27	29	33	18	16	24	22	16	10	0	0	0	0	0	0	0	0	0	0	0	55069.0
1952	0	0	0	0	0	0	0	0	42	91	32	27	40	17	12	26	38	16	12	6	6	1	0	0	0	0	0	0	0	0	0	0	44090.0
1953	0	0	0	0	0	0	0	1	37105	69	29	20	23	13	10	18	10	13	10	7	0	0	0	0	0	0	0	0	0	0	0	0	37977.0
1954	0	0	0	0	0	0	0	0	28113	68	21	27	16	10	16	17	15	22	5	7	0	0	0	0	0	0	0	0	0	0	0	0	40610.0
1955	0	0	0	0	0	0	0	0	32172	20	18	14	22	21	11	29	7	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	32602.0
1956	0	0	0	0	0	0	0	0	0173	25	7	32	17	25	7	18	11	10	16	21	4	0	0	0	0	0	0	0	0	0	0	0	58851.0
1957	0	0	0	0	0	0	0	0	90	52	53	14	16	21	21	12	25	9	16	14	9	13	0	0	0	0	0	0	0	0	0	0	60148.0
1958	0	0	0	0	0	0	0	1	38108	29	29	40	12	25	18	20	13	11	14	7	0	0	0	0	0	0	0	0	0	0	0	0	42077.0
1959	0	0	0	0	0	0	0	28	75	73	33	8	35	16	23	12	9	24	7	6	15	1	0	0	0	0	0	0	0	0	0	0	44465.0
1960	0	0	0	0	0	0	0	0	60	68	73	19	45	25	22	9	10	8	10	16	1	0	0	0	0	0	0	0	0	0	0	0	34321.0
1961	0	0	0	0	0	0	0	48	87	44	51	1	30	20	27	11	11	6	11	9	9	0	0	0	0	0	0	0	0	0	0	0	36010.0
1962	0	0	0	0	0	0	0	0	8	54	34	16	54	37	54	30	32	10	8	21	7	0	0	0	0	0	0	0	0	0	0	0	54369.0
1963	0	0	0	0	0	0	0	0	24	71	56	37	58	27	10	16	7	5	24	17	11	2	0	0	0	0	0	0	0	0	0	0	50591.0
1964	0	0	0	0	0	0	0	0	78	79	40	37	28	13	9	5	22	17	8	22	8	0	0	0	0	0	0	0	0	0	0	0	45659.0
1965	0	0	0	0	0	0	0	1	48	74	68	8	17	20	31	13	24	9	13	21	12	6	0	0	0	0	0	0	0	0	0	0	57795.0
1966	0	0	0	0	0	0	0	0	4	97	7	81	41	34	30	11	27	21	6	5	1	0	0	0	0	0	0	0	0	0	0	0	37294.0
1967	0	0	0	0	0	0	0	10	76	81	28	26	28	18	13	10	12	5	4	23	25	6	0	0	0	0	0	0	0	0	0	0	58934.0
1968	0	0	0	0	0	0	0	0	14	99	59	24	30	35	31	12	19	14	14	11	4	0	0	0	0	0	0	0	0	0	0	0	41764.0
1969	0	0	0	0	0	0	0	0	37	74	39	38	51	27	14	10	47	18	10	0	0	0	0	0	0	0	0	0	0	0	0	0	35972.0
1970	0	0	0	0	0	0	0	0	23	73	71	22	16	22	37	16	9	11	8	10	23	20	4	0	0	0	0	0	0	0	0	0	56133.0
1971	0	0	0	0	0	0	0	0	1	25	85	49	25	25	21	16	26	18	18	12	22	7	15	0	0	0	0	0	0	0	0	0	68090.0
SUM IN SFD																															1338413.0		
PERIOD MEAN IN SFD																															46152.2		
PERIOD MEAN IN CFS																															126.4		

-1 INDICATES MISSING DATA

CLASS	SIZE	TOTAL	ACCUM	PERCT	SIZE/DA	SIZE/MEAN
0	.0	0	10592	100.0	.0	.0
1	1.0	0	10592	100.0	.0	.0
2	2.0	0	10592	100.0	.0	.0
3	3.0	0	10592	100.0	.0	.0
4	4.0	0	10592	100.0	.0	.0
5	5.0	0	10592	100.0	.0	.0
6	7.0	0	10592	100.0	.1	.1
7	10.0	159	10592	100.0	.1	.1
8	15.0	1092	10433	98.5	.1	.1
9	20.0	2644	9341	88.2	.1	.2
10	30.0	1225	6697	63.2	.2	.2
11	40.0	769	5472	51.7	.3	.3
12	50.0	951	4703	44.4	.4	.4
13	70.0	693	3752	35.4	.5	.6
14	100.0	647	3059	28.9	.7	.8
15	150.0	401	2412	22.8	1.1	1.2
16	200.0	608	2011	19.0	1.5	1.6
17	300.0	408	1403	13.2	2.2	2.4
18	400.0	329	995	9.4	3.0	3.2
19	500.0	368	666	6.3	3.7	4.0
20	700.0	236	298	2.8	5.2	5.5
21	1000.0	61	62	.6	7.4	7.9
22	1500.0	1	1	.0	11.1	11.9
23	2000.0	0	0	.0	14.8	15.8
24	3000.0	0	0	.0	22.2	23.7
25	4000.0	0	0	.0	29.6	31.7
26	5000.0	0	0	.0	37.0	39.6
27	7000.0	0	0	.0	51.9	55.4
28	10000.0	0	0	.0	74.1	79.1
29	15000.0	0	0	.0	111.1	118.7
30	20000.0	0	0	.0	148.1	158.3

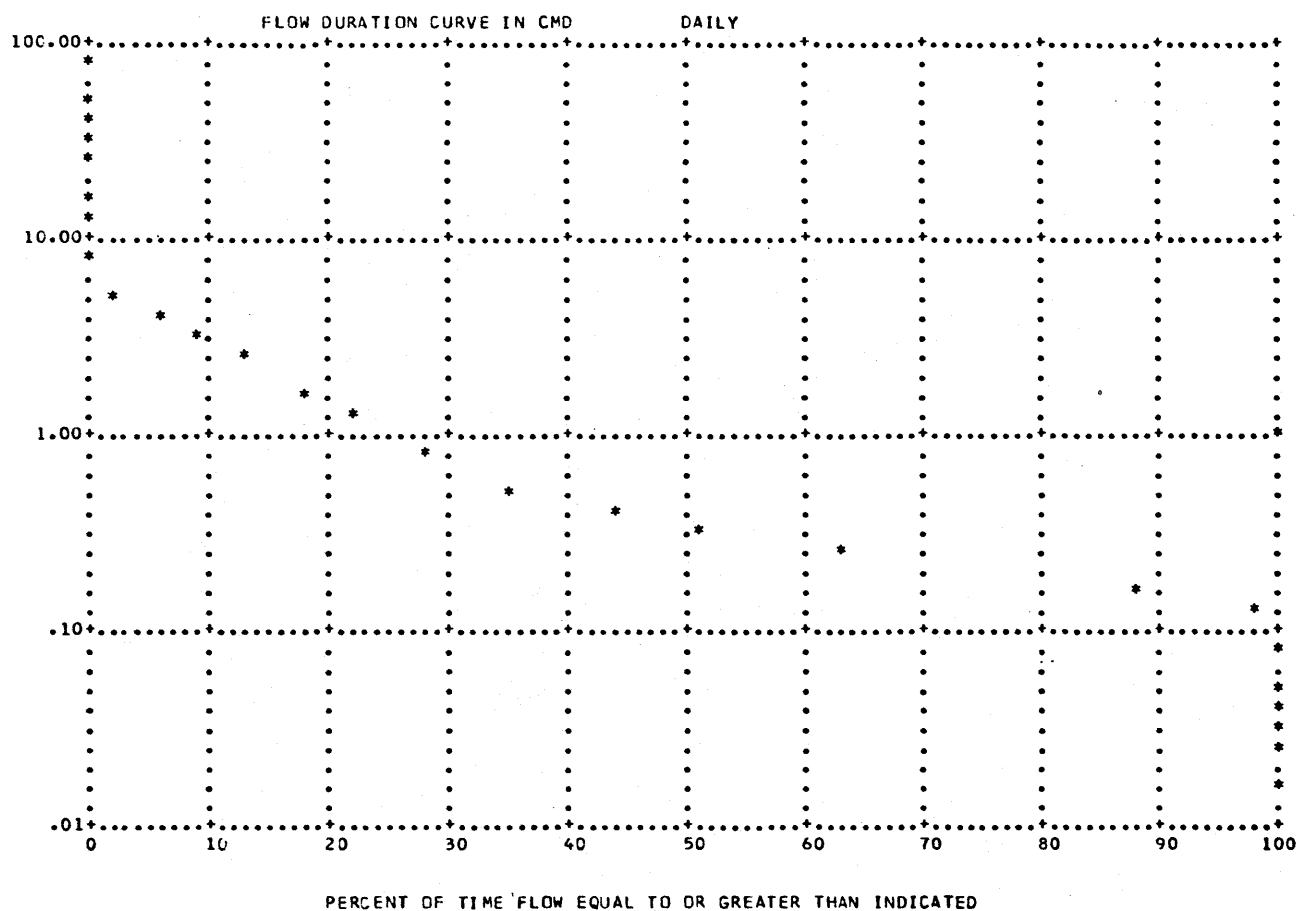
Example of DURCUR
Using Entire Year

SUNLIGHT CREEK NEAR PAINTER, WYOMING . STATION NO 062065.00
LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
ELEVATION 6700. FEET MSL DRAINAGE AREA + 135. SQUARE MILES



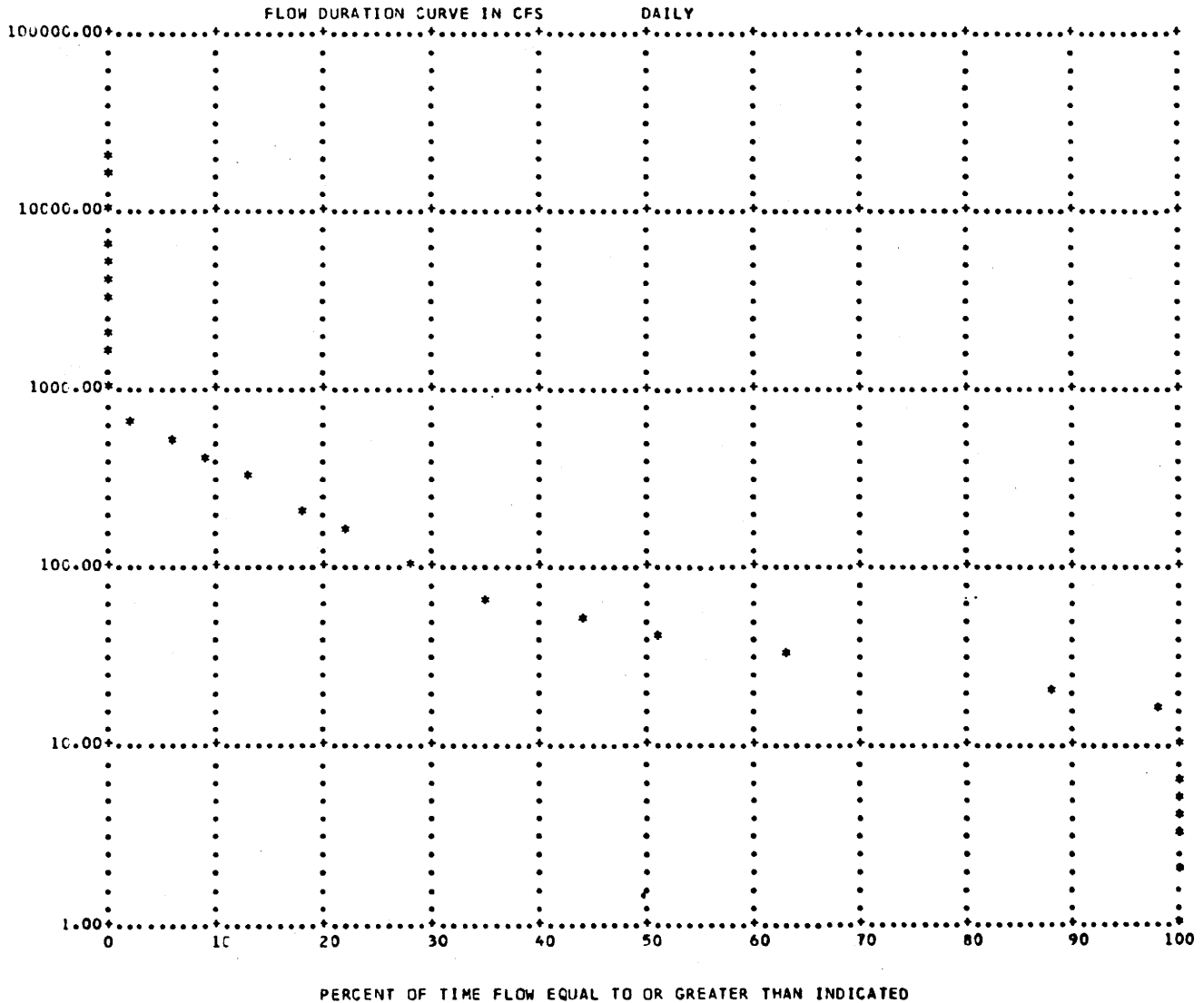
Example of DURCUR
Using Entire Year

SUNLIGHT CREEK NEAR PAINTER, WYOMING . STATION NO 062065.00
LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
ELEVATION 6700. FEET MSL DRAINAGE AREA # 135. SQUARE MILES



Example of DURCUR
Using Entire Year

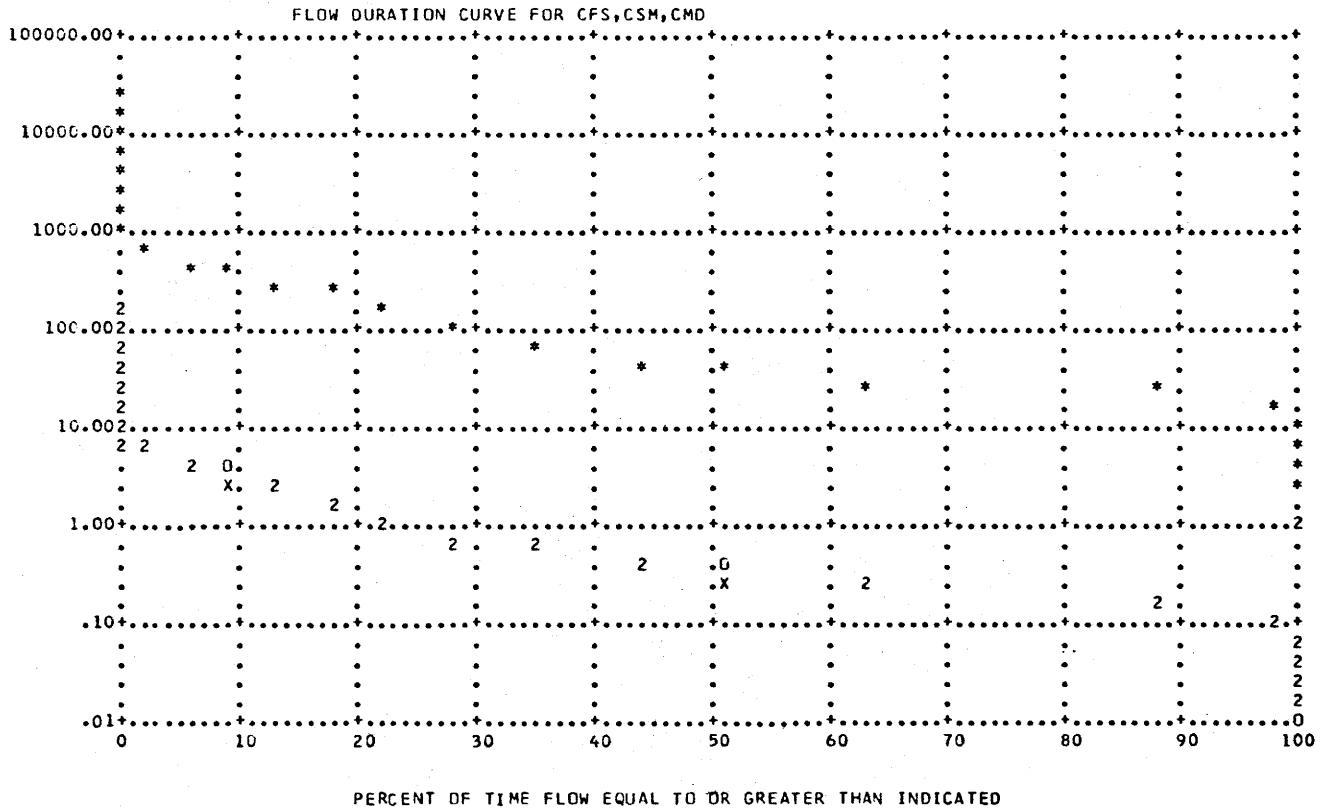
SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
ELEVATION 6700. FEET MSL DRAINAGE AREA # 135. SQUARE MILES



Example of DURCUR
Using Entire Year

SUNLIGHT CREEK NEAR PAINTER, WYOMING
LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
ELEVATION 6700. FEET MSL DRAINAGE AREA 135. SQUARE MILES

STATION NO 062065.00



*=SIZE
O=SIZE/MEAN
X=SIZE/DA
2=TWO OR MORE POINTS

SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA 135. SQUARE MILES

DAILY FLOW IN CFS
 APRIL THROUGH JULY

DURATION TABLE OF DISCHARGE

CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL FLOW IN SFD		
YEAR	NUMBER OF DAYS IN CLASS																																	
1929	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1.0		
1930	0	0	0	0	0	0	0	0	0	3	1	2	4	3	6	7	8	5	4	3	11	12	14	18	10	7	4	0	0	0	0	0	27927.0	
1931	0	0	0	0	0	0	0	0	0	0	16	13	2	1	9	2	9	6	4	5	6	19	5	5	8	3	0	0	0	0	0	0	21680.0	
1932	0	0	0	0	0	0	0	0	0	8	9	9	6	1	2	3	0	0	1	0	0	10	20	22	9	8	6	7	1	0	0	0	37377.0	
1946	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	14	10	17	21	19	8	10	0	0	0	0	0	27937.0	
1947	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	1	0	1	1	20	12	30	24	12	10	1	0	0	0	0	0	32917.0	
1948	0	0	0	0	0	0	0	0	0	31	1	2	5	3	2	2	0	0	0	1	6	5	10	17	9	14	13	1	0	0	0	0	35332.0	
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	1	3	2	7	7	24	20	16	10	2	0	0	0	0	0	31009.0	
1950	0	0	0	0	0	0	0	0	0	7	5	30	0	0	1	0	1	0	2	3	1	4	13	13	7	14	20	1	0	0	0	0	0	38692.0
1951	0	0	0	0	0	0	0	0	6	4	4	5	4	4	4	1	1	1	1	2	2	8	11	19	12	16	10	0	0	0	0	0	0	38855.0
1952	0	0	0	0	0	0	0	0	5	5	3	0	2	3	0	2	1	1	2	1	2	16	33	16	12	6	5	1	0	0	0	0	0	33309.0
1953	0	0	0	0	0	0	0	0	10	12	3	8	3	4	8	2	3	2	1	0	1	7	18	10	13	10	7	0	0	0	0	0	0	28694.0
1954	0	0	0	0	0	0	0	0	7	13	1	4	3	3	4	2	0	1	0	2	16	17	15	22	5	7	0	0	0	0	0	0	0	32351.0
1955	0	0	0	0	0	0	0	1	23	1	3	0	2	0	1	4	3	2	2	4	7	9	29	7	9	10	0	0	0	0	0	0	0	24314.0
1956	0	0	0	0	0	0	0	0	0	7	1	2	4	0	1	11	2	3	0	4	5	4	16	11	10	16	21	4	0	0	0	0	0	49042.0
1957	0	0	0	0	0	0	0	0	13	0	9	4	1	1	0	1	0	1	1	1	0	5	24	9	16	14	9	13	0	0	0	0	0	49465.0
1958	0	0	0	0	0	0	0	0	13	7	5	1	2	3	1	1	0	1	0	2	6	15	20	13	11	14	7	0	0	0	0	0	0	32231.0
1959	0	0	0	0	0	0	0	0	5	10	10	2	2	0	3	3	1	1	1	7	7	8	2	24	7	6	15	1	0	0	0	0	0	35892.0
1960	0	0	0	0	0	0	0	0	14	6	6	6	3	1	2	1	0	5	4	12	8	9	10	8	10	16	1	0	0	0	0	0	0	25720.0
1961	0	0	0	0	0	2	25	11	3	2	5	1	0	0	0	4	3	5	2	4	2	9	9	6	11	9	9	0	0	0	0	0	0	26332.0
1962	0	0	0	0	0	0	0	0	7	2	0	0	1	0	0	0	1	0	4	7	7	21	26	10	8	21	7	0	0	0	0	0	0	37937.0
1963	0	0	0	0	0	0	0	0	0	0	13	11	2	1	3	4	0	1	2	3	16	7	5	24	17	11	2	0	0	0	0	0	0	40523.0
1964	0	0	0	0	0	0	0	20	8	5	2	4	0	1	2	1	0	1	0	1	1	1	17	8	22	8	0	0	0	0	0	0	0	36319.0
1965	0	0	0	0	0	0	0	0	0	15	2	2	0	0	5	5	3	2	0	4	4	7	12	9	13	21	12	6	0	0	0	0	0	44784.0
1966	0	0	0	0	0	0	0	0	0	0	3	12	11	6	1	1	0	3	8	6	11	27	21	6	5	1	0	0	0	0	0	0	0	25907.0
1967	0	0	0	0	0	0	14	22	1	0	0	1	0	0	3	1	2	2	1	0	3	9	5	4	23	25	6	0	0	0	0	0	0	48331.0
1968	0	0	0	0	0	0	0	24	4	1	2	2	1	6	5	3	2	4	4	0	8	14	13	14	11	4	0	0	0	0	0	0	0	29316.0
1969	0	0	0	0	0	0	0	0	0	0	2	4	7	11	3	3	2	1	2	3	9	47	18	10	0	0	0	0	0	0	0	0	0	26284.0
1970	0	0	0	0	0	0	11	20	1	0	1	0	1	1	2	3	2	0	2	1	11	8	10	23	20	4	0	0	0	0	0	0	0	45617.0
1971	0	0	0	0	0	0	1	2	5	5	5	3	5	1	1	0	0	1	1	10	6	17	12	22	7	15	0	0	0	0	0	0	0	52998.0
SUM IN SFD																																1018173.0		
PERIOD MEAN IN SFD																																35109.4		
PERIOD MEAN IN CFS																																297.8		

-1 INDICATES MISSING DATA

Example of DURCUR
 Using April through July

Example of DURCUR
Using April through July

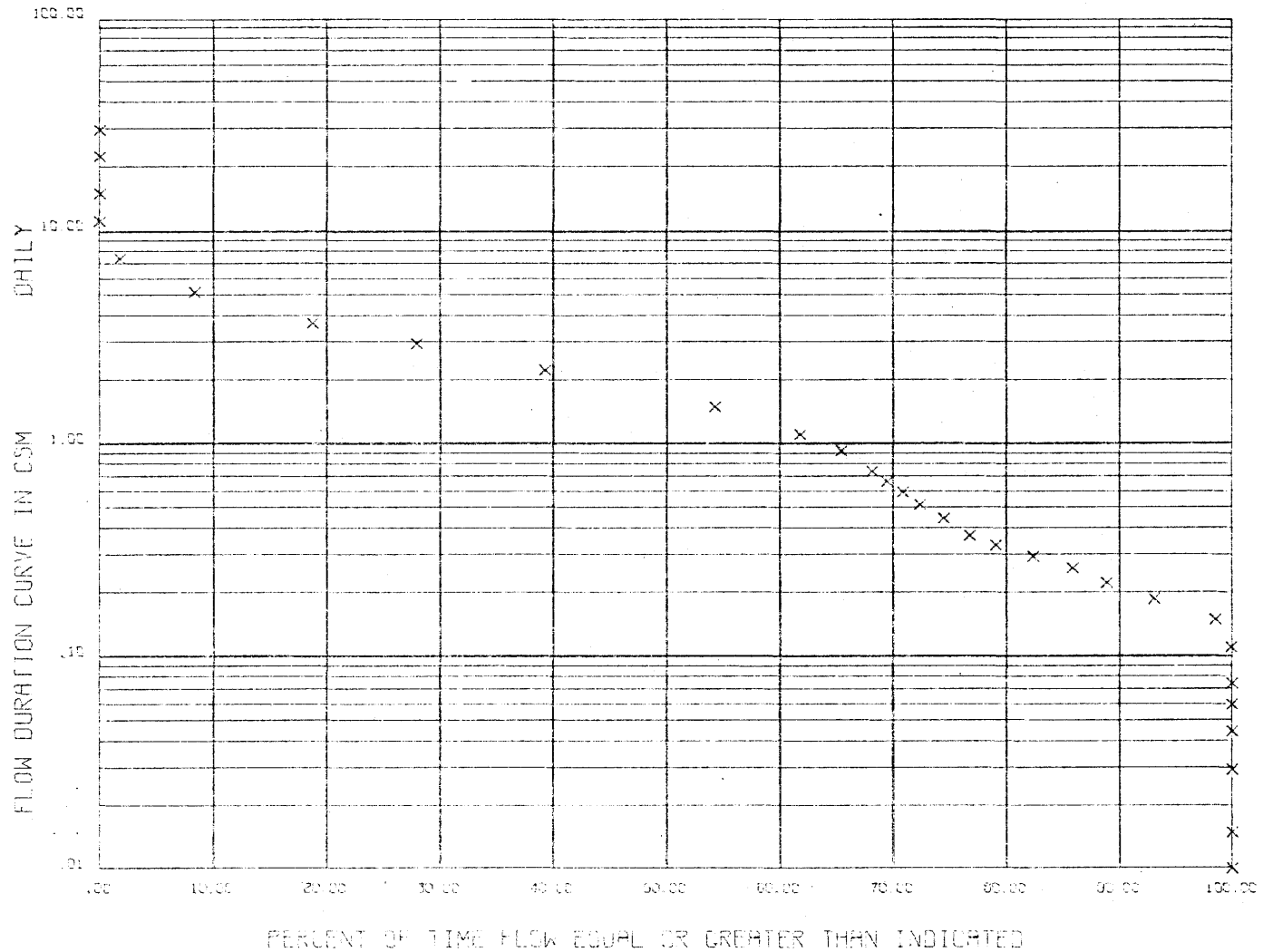
SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
ELEVATION 6700. FEET MSL DRAINAGE AREA 135. SQUARE MILES

APRIL THROUGH JULY

CLASS	SIZE	TOTAL	ACCUM	PERCT	SIZE/DA	SIZE/MEAN
0	.0	0	3538	100.0	.0	.0
1	2.0	0	3538	100.0	.0	.0
2	4.0	0	3538	100.0	.0	.0
3	6.0	0	3538	100.0	.0	.0
4	8.0	0	3538	100.0	.1	.0
5	10.0	2	3538	100.0	.1	.0
6	15.0	51	3536	99.9	.1	.1
7	20.0	192	3485	98.5	.1	.1
8	25.0	149	3293	93.1	.2	.1
9	30.0	106	3144	88.9	.2	.1
10	35.0	121	3038	85.9	.3	.1
11	40.0	118	2917	82.4	.3	.1
12	45.0	83	2799	79.1	.3	.2
13	50.0	80	2716	76.8	.4	.2
14	60.0	73	2636	74.5	.4	.2
15	70.0	56	2563	72.4	.5	.2
16	80.0	47	2507	70.9	.5	.3
17	90.0	48	2460	69.5	.7	.3
18	100.0	96	2412	68.2	.7	.3
19	125.0	123	2316	65.5	.9	.4
20	150.0	266	2198	61.8	1.1	.5
21	200.0	532	1922	54.3	1.5	.7
22	300.0	399	1390	39.3	2.2	1.0
23	400.0	325	991	28.0	3.0	1.4
24	500.0	368	666	18.8	3.7	1.7
25	700.0	236	298	8.4	5.2	2.4
26	1000.0	61	62	1.8	7.4	3.5
27	1500.0	1	1	.0	11.1	5.2
28	2000.0	0	0	.0	14.8	6.9
29	3000.0	0	0	.0	22.2	10.4
30	4000.0	0	0	.0	29.6	13.9

SUNLIGHT CREEK NEAR PRINTER, WYOMING STATION NO 062065.00
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA = 135. SQUARE MILES

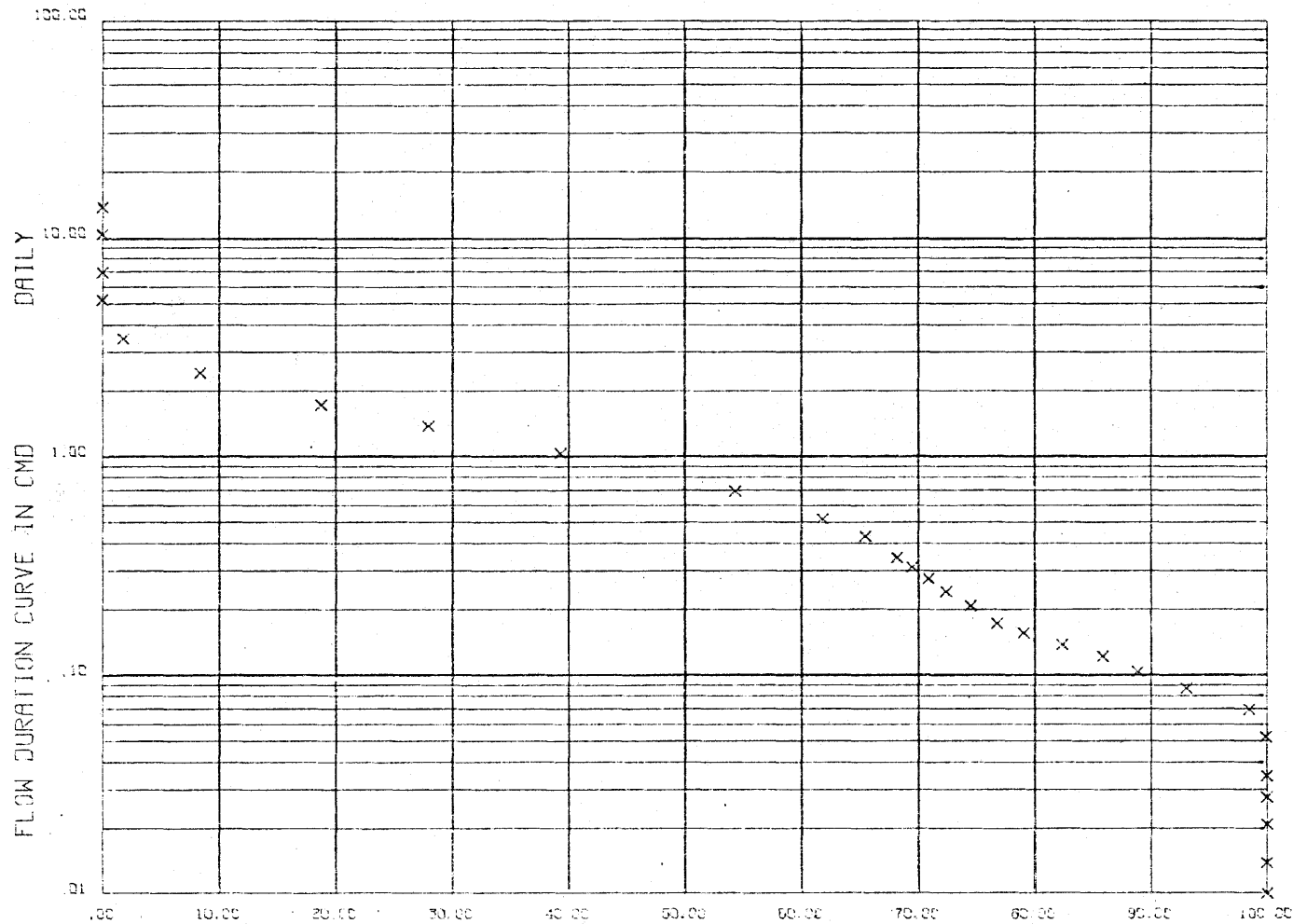
APRIL THROUGH JULY



Example of DURCUR
 Using April through July

SUNLIGHT CREEK NEAR PAINTER, WYOMING
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA = 135. SQUARE MILES
 APRIL THROUGH JULY

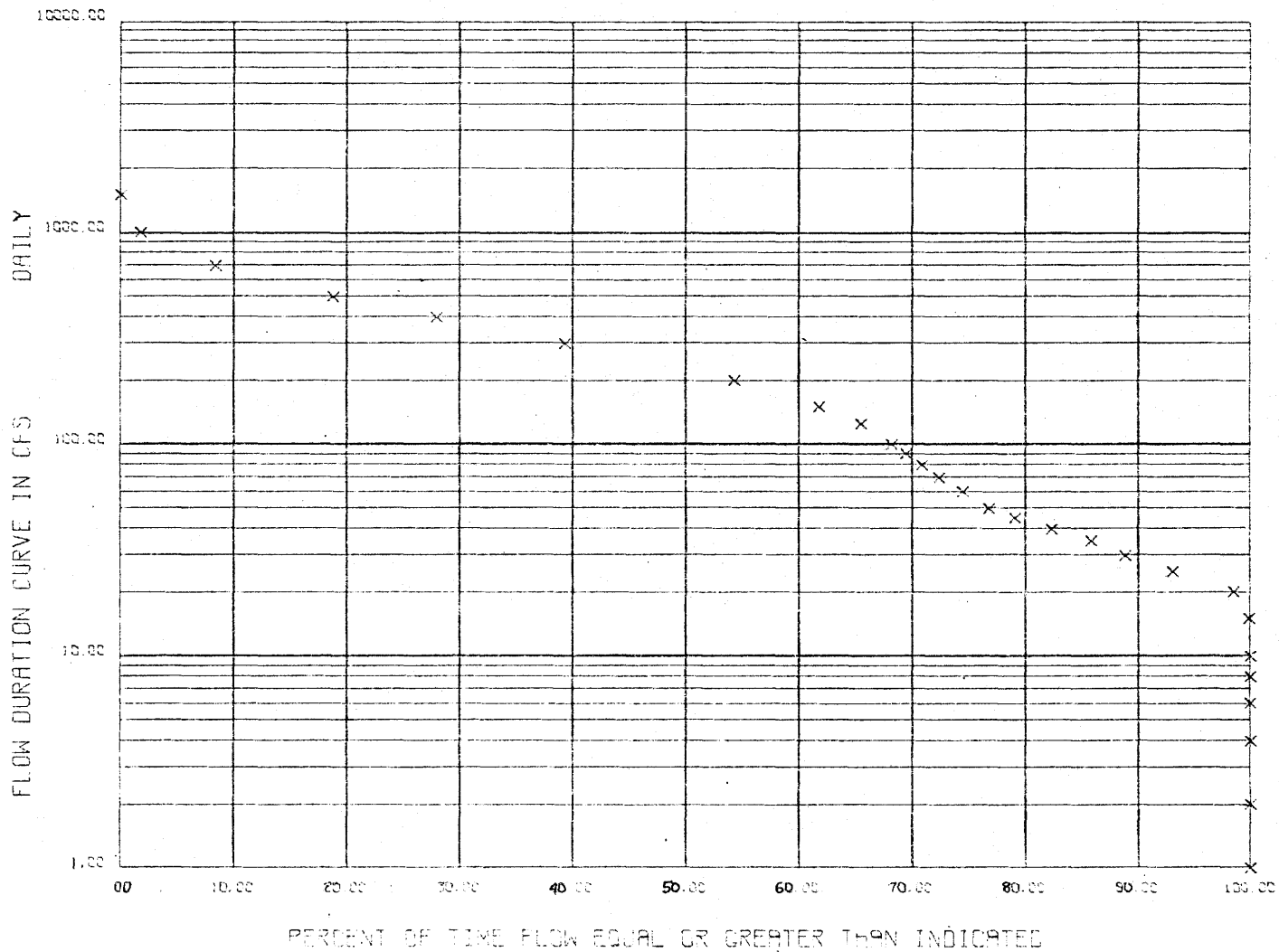
STATION NO 062065.00



Example of DURCUR
 Using April through July

SUNLIGHT CREEK NEAR PRINTER, WYOMING STATION NO 062065.00
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA = 135. SQUARE MILES

APRIL THROUGH JULY



FLOWDATES

For each mean daily flow station on WRDS, this program prints a station description, which includes location information, and the years of data available for that station. The list is extensive so the following example shows only a small portion of the stations. No list is available for monthly flow stations; however, they are generally the same as the daily flow stations.

Example of FLOWDATES

LISTING FOR MEAN DAILY FLOW SURFACE WATER STATICS

STATION =	6206500	SUNLIGHT CREEK NEAR PAINTER, WYOMING LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 35 N RANGE 105 W ELEVATION 6700. FEET MSL DRAINAGE AREA 135. SQUARE MILES	STATION NO 062065.CO
		1929 TO 1932 1946 TO 1971	
STATION =	6207000	CLARKS FORK YELLOWSTONE RIVER NEAR CLARK, WYOMING LATITUDE 45-00-45 LONGITUDE 109-03-40 SECTION 32 TOWNSHIP 9 S RANGE 22 E ELEVATION 4220. FEET MSL DRAINAGE AREA 912. SQUARE MILES	STATION NO 062070.CO
		1919 TO 1925	
STATION =	6207500	CLARKS FORK YELLOWSTONE RIVER AT CHANCE, MONTANA LATITUDE 45-00-40 LONGITUDE 109-04-00 SECTION 31 TOWNSHIP 9 S RANGE 22 E ELEVATION 3980. FEET MSL DRAINAGE AREA 1154. SQUARE MILES	STATION NO 062075.CO
		1921 TO 1974	
STATION =	6207507	BIG SAND COULEE AB STATE DITCH NR BADGER BASIN WY LATITUDE 44-55-30 LONGITUDE 109-00-38 SECTION 14 TOWNSHIP 57 N RANGE 131 W ELEVATION 4150. FEET DRAINAGE AREA 98.3 SQUARE MILES	STATION NO 062075.07
		1973 TO 1974	
STATION =	6207510	BIG SAND COULEE AT WYO-MONT STATE LINE LATITUDE 45-00-17 LONGITUDE 109-03-20 SECTION 32 TOWNSHIP 9 S RANGE 22 E ELEVATION 4000. FEET DRAINAGE AREA 134. SQUARE MILES	STATION NO 062075.10
		1973 TO 1974	
STATION =	6207540	SILVER TIP CREEK NEAR BELFRY, MONT. LATITUDE 45-09-32 LONGITUDE 108-58-31 SECT 1. TOWN 8 S RANGE 22 E ELEVATION 3830. DRAINAGE AREA 88. SQUARE MILES	STATION NO 062075.40
		1969 TO 1972	
STATION =	6208500	CLARKS FORK YELLOWSTONE RIV CLARKS FORK AT EGGAR, MONT. LATITUDE 45-27-58N LONGITUDE 108-50-35W SECTION 23 TOWNSHIP 4 S RANGE 23 E ELEVATION 3440 FEET DRAINAGE AREA 2032. SQUARE MILES	STATION NO 062085.CO
		1921 TO 1969	

GUMBEL

This program uses the Gumbel Method (Linsley, Kohler and Paulhus, 1958) for flood frequency analyses. The date, flow value and flow value squared for the peak occurrence for each year are printed. Also included are statistics of the peak flows and peak flows squared, the peak flows sorted by magnitude, Gumbel computed factors, return period and computed flows. A plot of the data and computed line are provided as an option. Annual flow values, instead of peak flow values, may optionally be used in this program.

For other types of flood analyses, see the HAZEN and LOGPT3 programs.

For each station the user should specify the year range (unless all years are desired), peak or annual flows and whether or not a plot is to be made.

```

*****
*
*      FLCCD-FREQUENCY ANALYSIS
*
*      GUMBEL METHOD
*
*****

```

WAGBN GULCH NEAR DUBCIS, WYOMING STATION NC 062187.00
 LATITUDE 43-34-42 LONGITUDE 109-44-13 SECTION 30 TOWNSHIP 42 N RANGE 107 W
 DRAINAGE AREA 4.89 SQUARE MILES

ANNUAL INSTANTANEOUS PEAK DISCHARGE IN CFS

PERIOD 1961 - 1974 14 YEARS OF DATA

INPUT DATA

DATE	FLCW, X	X SQUARED
JUNE 4 1961	360.	129600.
1962	80.	6400.
1962	80.	6400.
JULY 13 1964	220.	48400.
1965	134.	17956.
1966	80.	6400.
JUNE 14 1967	120.	14400.
JUNE 10 1968	95.	9025.
SEP. 20 1969	47.	2209.
MAY 23 1970	25.	625.
MAY 4 1971	115.	13225.
APR. 1972	116.	13456.
AUG. 4 1973	82.	6724.
JULY 19 1974	520.	270400.
SUMMATION X 2074.	MEAN OF X	148.
SUMMATION X SQUARED 545220.	MEAN OF X SQUARED	38944.

Example of GUMBEL

WAGON GULCH NEAR DUBOIS, WYOMING STATION AC 662187.00
 LATITUDE 43-34-42 LONGITUDE 109-44-13 SECTION 30 TOWNSHIP 42 N RANGE 107 W
 DRAINAGE AREA 4.89 SQUARE MILES

ANNUAL INSTANTANEOUS PEAK DISCHARGE IN CFS

SCRTED DATA

DATE	FLOW, X	ORDER NO. M	N/ N-M
MAY 23 1970	25.	1	1.07692
SEP. 20 1969	47.	2	1.16667
1963	80.	3	1.27273
1966	80.	4	1.40000
1962	80.	5	1.55556
AUG. 4 1973	82.	6	1.75000
JUNE 10 1968	95.	7	2.00000
MAY 4 1971	115.	8	2.33333
APR. 1972	116.	9	2.80000
JUNE 14 1967	120.	10	3.50000
1965	134.	11	4.66667
JULY 13 1964	220.	12	7.00000
JUNE 4 1961	360.	13	14.00000
JULY 19 1974	520.	14	

S 134.65206

1/ALPHA 104.98822

U 87.54942

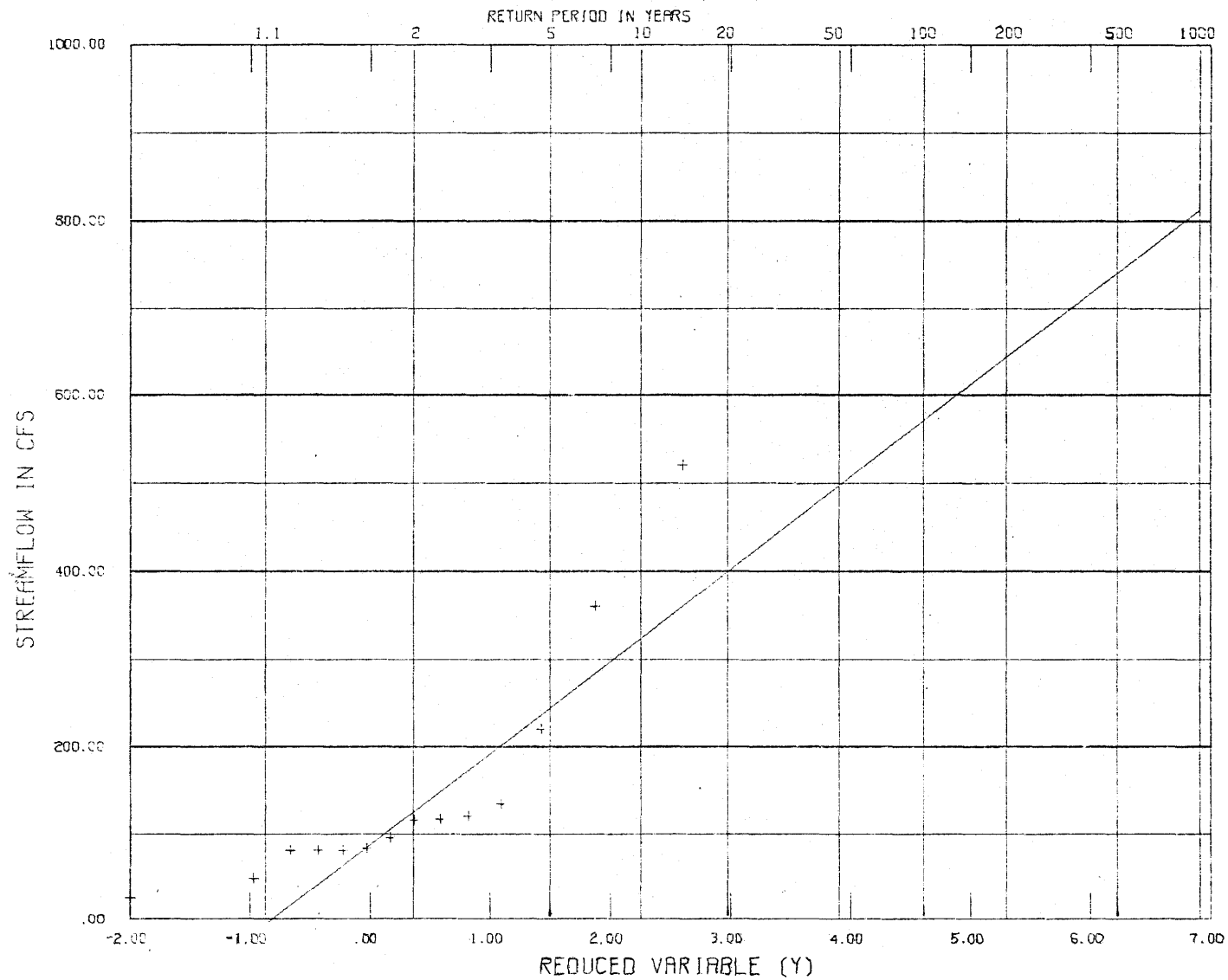
RETURN PERIOD	Y	ESTIMATED FLOW
---------------	---	----------------

2	.3665	126.
5	1.5000	245.
10	2.2504	324.
20	2.9702	399.
25	3.1985	423.
50	3.9019	497.
100	4.6001	571.
200	5.2958	644.
500	6.2126	740.
1000	6.9073	813.

Example of GUMBEL

FLOOD FREQUENCY---GUMBEL METHOD
 WAGON GULCH NEAR DUBOIS, WYOMING
 PERIOD 1961 - 1974 14 YEARS

STATION NO 062187.00



Example of GUMBEL

HAZEN

The Hazen method of flood frequency analysis (Linsley, Kohler and Paulhus, 1958) is provided by this program. For each year the following are printed: date of peak, peak flow, deviation of the peak from the mean, the deviations squared and deviations cubed. Also included are statistics of the peaks, percent chance, recurrence intervals, factors from the Hazen frequency table, and computed flows. A plot of the data and the computed curve are provided as an option. Annual flow values, instead of peak flow values, may optionally be used in this program.

For other types of flood analyses, see the GUMBEL and LOGPT3 programs.

For each station the user should specify the year range (unless all years are to be used), peak or annual flows and whether or not a plot is to be produced.

```

*****
*
*   FLOOD FLOW FREQUENCY ANALYSIS - HAZEN METHOD
*
*   ANNUAL INSTANTANEOUS PEAK DISCHARGE IN CFS
*
*****

```

WAGON GULCH NEAR DUBOIS, WYOMING STATION NO 062187.00
 LATITUDE 43-34-42 LONGITUDE 109-44-13 SECTION 30 TOWNSHIP 42 N RANGE 107 W
 DRAINAGE AREA 4.89 SQUARE MILES

PERIOD 1961- 1974 14 YEARS OF DATA

DATE	FLOW	DEVIATION	DEVIATION SQUARED	DEVIATION CUBED PER 1000
JUNE 4 1961	360.	212.	44883.	9508.9
1962	80.	-68.	4643.	-316.4
1963	80.	-68.	4643.	-316.4
JULY 13 1964	220.	72.	5163.	371.0
1965	134.	-14.	200.	-2.8
1966	80.	-68.	4643.	-316.4
JUNE 14 1967	120.	-28.	792.	-22.3
JUNE 10 1968	95.	-53.	2824.	-150.1
SEP. 20 1969	47.	-101.	10201.	-1034.7
MAY 23 1970	25.	-123.	15164.	-1867.4
MAY 4 1971	115.	-33.	1089.	-36.4
APR. 4 1972	116.	-32.	1024.	-32.2
AUG. 4 1973	82.	-66.	4356.	-289.4
JULY 19 1974	520.	372.	138278.	51419.6
TOTALS	2074.	0.	237972.	56914.0
MEAN	148.			
STANDARD DEVIATION		135.		
COEFFICIENT OF SKEW FOR HAZEN METHOD			2.84	

Example of HAZEN

```

*****
*
*      FLOOD FLOW FREQUENCY ANALYSIS - HAZEN METHOD
*
*      ANNUAL INSTANTANEOUS PEAK DISCHARGE IN CFS
*
*****

```

WAGON GULCH NEAR DUBOIS, WYOMING STATION NO 062187.00
 LATITUDE 43-34-42 LONGITUDE 109-44-13 SECTION 30 TOWNSHIP 42 N RANGE 107 W
 DRAINAGE AREA 4.89 SQUARE MILES

PERIOD 1961- 1974 14 YEARS OF DATA

INTERPOLATED FACTORS FROM HAZEN FREQUENCY TABLE
 AND COMPLETED FLOWS

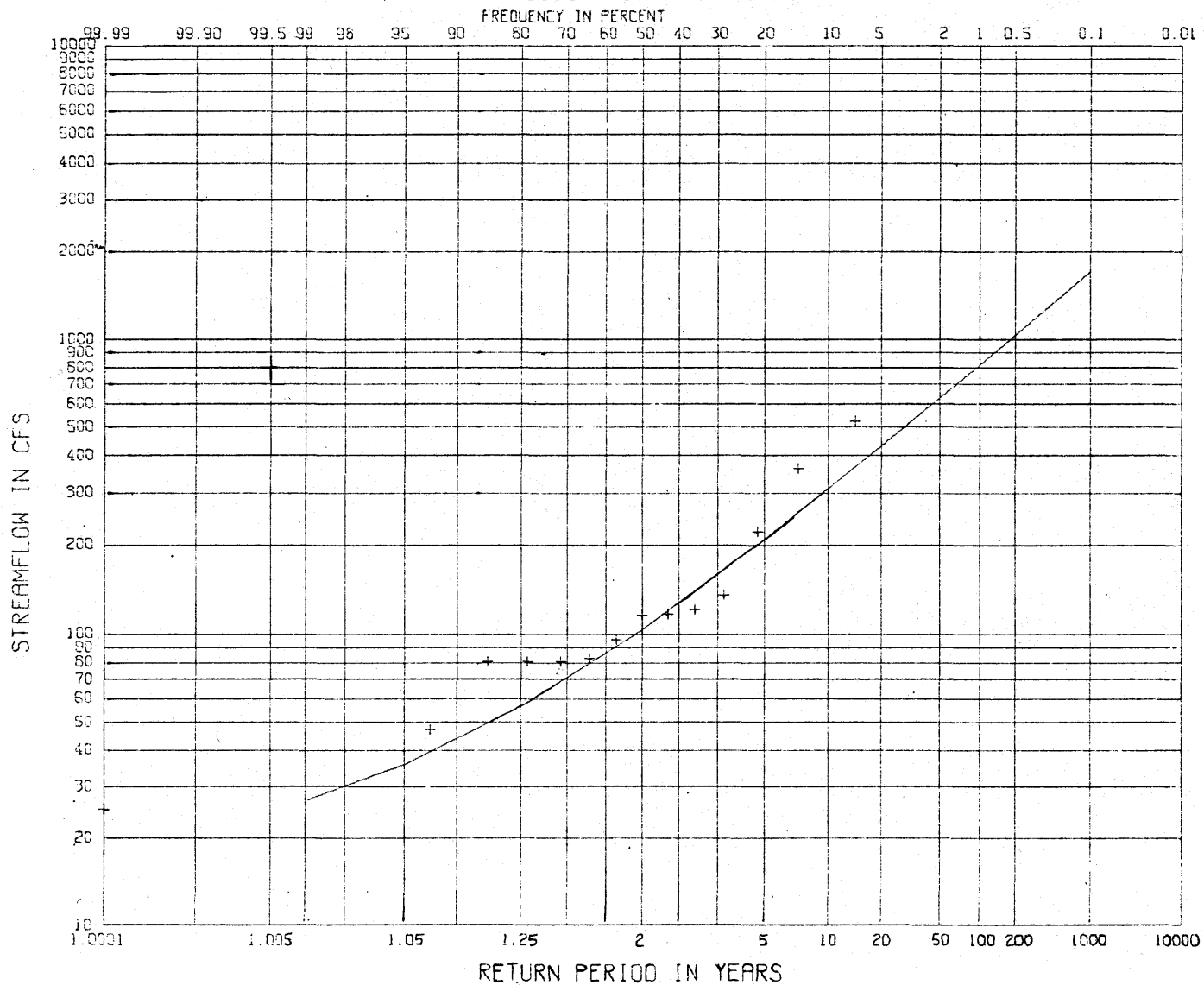
PERCENT CHANCE	RECUURRENCE INTERVAL	FACTOR	COMPLETED FLOW
99.00	1.01	-.90	27.
95.00	1.05	-.83	36.
80.00	1.25	-.68	57.
50.00	2.00	-.33	102.
20.00	5.00	.44	208.
5.00	20.00	2.09	431.
1.00	100.00	4.94	816.
.10	1000.00	11.43	1694.
.01	10000.00	**	**

** INDICATES TABLE FACTOR AND THUS FLOW NOT DEFINED

Example of HAZEN

FLOOD-FREQUENCY--HAZEN METHOD
 WAGON GULCH NEAR DUBOIS, WYOMING
 PERIOD 1961 - 1974 14 YEARS

STATION NO 062187.00



Example of HAZEN

HYGRAPH

This program performs a hydrograph separation analysis of component flows of a storm event. The analysis basically follows the description in Bethlahmy (1972). Hydrograph separation is a time consuming task if performed by hand. Thus, the hydrologist normally analyzes only a small number of the many hydrographs available. The availability of this HYGRAPH program will allow the hydrologist to perform a separation analysis on a larger number of hydrographs. It should be noted that in this program a precipitation event that occurs before the current stormflow runoff has ended is not considered to be another event.

Input into the program may be from WRDS or by cards sent by the user in the following format:

1st Card (values placed anywhere on card, separated by commas or blanks):

Item Number -----	Item ----
1	Station number (e.g., 13432814)
2	Beginning water year of data (e.g., 1979)
3	Contributing drainage area in square miles (e.g., 197.43)
4	Number of years of data to be used for the current analysis (e.g., 2)
5	1, indicating cards are being used as input
6	0 to not print Table 1 1 to print Table 1
7	0 to not print Tables 2-5 1 to print Tables 2-5

The rest of the cards occur in sets, each set containing mean daily flow measurements in cfs for one water year. Each card is read by the Fortran format statement (2X,12F5.0). The first card in each set contains the firsts of all the months (October first, November first,

HYGRAPH (continued)

etc.). The second card contains the seconds of all the months, etc. If a month does not contain 31 days, fill out the end of the month with blanks. For missing values throughout the year, use zero.

If input is from WRDS (only daily data may be used), missing values are converted to zeros. Zero values are later converted by the program to .10 so logarithms can be used.

For each station the user should specify the year range (unless all years are to be used) and whether or not Tables 1 and/or Tables 2-5 are to be printed. If the table print options are not specified, all tables will be printed. The user may optionally supply data cards as described above.

The examples shown have been shortened from the original printouts. The following is a definition of terms and a description of the variables used in the tables.

HYGRAPH (continued)

Definitions

Streamflow - total flow in stream, comprised of baseflow, interflow and rapidflow.

Baseflow - contribution to flow from groundwater.

Interflow - water that percolates through the upper portion of the soil mantle and, after some delay, enters the stream.

Rapidflow - water that enters the stream channel with a minimum of delay, never entering the soil pores.

Stormflow - interflow plus rapidflow.

Beginning of event - first day of four consecutive days of increasing mean daily flow during a non-event period.

End of event - the time when baseflow is equal to the mean daily flow after the beginning of an event.

Interstorm period - time between end of one event and beginning of the next event, or between beginning of year and beginning of first event.

AC-FT - acre-feet.

CFS - cubic feet per second.

CFSM - cubic feet per second per square mile.

HYGRAPH (continued)

Table 1

The beginning of Table 1 indicates the beginning of an event.

EVENT NUMBER

= number of the event in the current water year, numbered sequentially.

EVENT BEGINS AT

= day of water year during which current event begins;
1 = 1 Oct.

INITIAL RUNOFF RATE IS

= runoff on beginning day of event (cfs).

TIME

= day of water year.

Q

= mean daily flow for current day (from input data) (cfs).

Q BASE

= baseflow for day (as calculated in Bethlahmy) (cfs).

Q INT

= interflow for day (as calculated in Bethlahmy) (cfs).

TOTAL VOL

= cumulative total volume from beginning of current event (ac-ft).

$$TV(i) = TV(i-1) + [(V(i) + V(i-1))/2] * \text{portion of day in event}$$

where: $TV(i)$ = cumulative total volume to day i

$V(i)$ = volume of flow on day i

BASEFLOW

= cumulative baseflow volume from beginning of current event (ac-ft).

$$BF(i) = BF(i-1) + [(BV(i) + BV(i-1))/2] * \text{portion of day in event}$$

where: $BF(i)$ = cumulative baseflow volume to day i

$BV(i)$ = baseflow on day i

STORMFLOW

= cumulative stormflow volume (ac-ft).

$$= TV(i) - BF(i)$$

HYGRAPH (continued)

Table 1
(continued)

PCNT BFLO
= baseflow volume as percentage of total volume.

PCNT ST FLO
= stormflow volume as percentage of total volume.

INTERFLOW
= cumulative volume of interflow (ac-ft).

RAPIDFLOW
= cumulative volume of rapidflow (ac-ft).

The break in Table 1 indicates the end of the current event. For the second part of Table 1, QBASE = Q.

RSSN CONST
= daily interstorm recession constant

$$RC(i) = \frac{Q(i+1)}{Q(i)}$$

where: RC(i) = recession constant

Q(i) = mean daily discharge for day i.

CUM AVG
= cumulative average of recession constant
for recession constants ≤ 1 .

Table 1 is repeated for each event. The program can handle up to 25 events per year.

HYGRAPH (continued)

Tables 2 through 5 provide summaries of each event appearing in Table 1.

Table 2

EVENT NO
= corresponds to EVENT NUMBER in Table 1.

Q START
= flow at beginning of event (cfs).

Q PEAK
= peak flow during event (cfs).

Q END
= flow at end of event (cfs).

TOTAL VOLUME
= total volume of flow during event (ac-ft).

BASEFLOW VOLUME
= volume of baseflow during event (ac-ft).

STORMFLOW VOLUME
= volume of stormflow during event (ac-ft).

INTERFLOW
VOL
= volume of interflow during event (ac-ft).
PCNT
= interflow volume as percentage of stormflow volume.

RAPIDFLOW
VOL
= volume of rapidflow during event (ac-ft).
PCNT
= rapidflow volume as percentage of stormflow volume.

Q AT RSSN END
= flow at end of interstorm period (cfs).

HYGRAPH (continued)

Table 3

EVENT NO
= corresponds to EVENT NUMBER in Table 1.

TIME AT START
= day number of water year at start of event.

TIME AT PEAK
= day number of water year at peak of event.

TIME AT END
= day number of water year at end of event.

EVENT DURATION
= length of event in days; note that the interstorm period is not included in this number.

TIME TO PEAK
= number of days from beginning of event to peak flow.

RECESSION TIME
= number of days from peak flow to end of event.

BLACK'S DECAY T
= number of days from peak flow until flow $\leq$ (peak flow in cfs/2.71828).

PCNT TIME PRE-PEAK
= time of the event that occurred before the peak as percentage of total time of event.

PCNT TIME POST-PEAK
= time of the event that occurred after the peak as percentage of total time of event

TIME AT RSSN END
= day number at the end of the interstorm period.

INTERSTORM DURATION
= number of days between end of event and beginning of next event or end of data.

VOLUMETRIC MIDPOINT
= day number on which one-half of the volume of the event has been discharged.

HYGRAPH (continued)

Table 4

EVENT NO

= corresponds to EVENT NUMBER in Table 1.

STORMFLOW BASELINE

= length of line connecting initial and final points of the storm hydrograph.

PERIMETER

= sum of lines connecting the initial point, the peak, the final point and back to the initial point on the storm hydrograph.

PERIMETER/LN(1+STORMFLO)

= PERIMETER/LN(1+STORMFLOW VOLUME)

where: LN = natural logarithm
STORMFLOW VOLUME is from Table 2.

STORMFLOW VOLUME

= volume of stormflow during event (ac-ft).

BASELINE ANGLE

= acute angle formed by intersection of horizontal line and line connecting initial and final points of event (radians).

RISING LIMB ANGLE

= acute angle formed by intersection of horizontal line and line connecting initial and peak points of event (radians).

TOP ANGLE

= angle of less than 180 degrees formed by intersection of line connecting initial and peak points with line connecting peak and final points of event (radians).

FALLING LIMB ANGLE

= acute angle formed by intersection of a vertical line and line connecting peak and final points of event (radians).

BASEFLOW RSSN

ANGLE

= angle formed by intersection of a vertical line and a line connecting the final point of the event and the beginning of the next event (radians); this is the counter-clockwise angle of less than 180 degrees moving from the vertical line.

K

= recession constant for baseflow
= [(flow at end of interstorm period) divided by (flow at end of event)] to the (one divided by the number of days of interstorm period) power.

HYGRAPH (continued)

Table 5

EVENT NO
= corresponds to EVENT NUMBER in Table 1.

TOTAL RUNOFF
= total runoff (inches) (from TOTAL VOL, Table 1).

BASEFLOW
= total baseflow (inches) (from BASEFLOW, Table 1).

STORMFLOW
= total stormflow of event (inches) (from STORMFLOW, Table 1).

INTERFLOW
= total interflow of event (inches) (from INTERFLOW, Table 1).

RAPIDFLOW
= total rapidflow of event (inches) (from RAPIDFLOW, Table 1).

STORMFLOW TO PK
IN
= stormflow through peak (inches) (from STORMFLOW through peak day, Table 1).
PCNT
= stormflow through peak as percentage of total stormflow.

STORMFLOW AFTER PK
IN
= stormflow after peak (inches) (from STORMFLOW, Table 1, last value in column minus STORMFLOW TO PK).
PCNT
= stormflow after peak as percentage of total stormflow.

HYGRAPH (continued)

Annual Summary

TOTAL VOLUME RUNOFF

= volume of runoff for entire year (ac-ft).

TOTAL AREAL YIELD

= volume of runoff for entire year (inches).

INTER-STORM BASEFLOW YIELD

= volume of runoff for all interstorm periods (inches).

TOTAL STORMFLOW YIELD

= volume of runoff for all stormflows (inches).

TOTAL BASEFLOW YIELD

= volume of runoff for all baseflows (event and interstorm)
(inches).

MINIMUM 10-DAY FLOW VOLUME, AVE DAILY FLOW

= mean flow of the ten days whose total is the lowest for the
given time period. The value given is the daily average
of these 10 values (cfs and cfsm).

LAST DAY OF ABOVE EVENT

= self explanatory.

OF

= number of days considered.

MINIMUM 30-DAY FLOW VOLUME, AVG DAILY FLOW

= same as above except with 30 days.

LAST DAY OF ABOVE EVENT

= self explanatory.

MEDIAN FLOW OF RECESSION PERIOD

= median flow for the period July through September (cfs and
cfsm).

SUM OF ALL YEARS

= total volume of runoff for all years analyzed (inches).

AVERAGE ANNUAL YIELD

= average volume of runoff for all years analyzed (inches).

FOR ____ YEARS

= number of years analyzed.

HYDROGRAPH SEPARATION AND ANALYSIS

STATION= 67125000 AREA= 336. SQ MI
PERIOD OF ANALYSIS= WATER YEAR 1966

TABLE 1
EVENT HYDROGRAPH

EVENT NUMBER 3									
EVENT BEGINS AT 157.00		INITIAL RUNOFF RATE IS 3.500000							
TIME	Q	Q BASE	Q INT	TOTAL VOL = (BASEFLOW + STORMFLOW)			PCNT BFLO	PCNT ST FLO	STORMFLOW= (INTERFLOW + RAPIDFLOW)
158.00	4.20	3.53349	3.77563	7.64	6.97536	.66100	91.	9.	.24014 .42086
159.00	4.80	3.59841	4.13566	16.56	14.04837	2.51365	85.	15.	1.01308 1.50056
160.00	5.40	3.68867	4.56088	26.68	21.27516	5.40250	80.	20.	2.41090 2.99160
161.00	8.80	3.89028	5.90687	40.76	28.79147	11.96883	71.	29.	5.27582 6.69301
162.00	7.00	4.03143	6.28531	56.43	36.64777	19.78201	65.	35.	9.51099 10.27102
163.00	7.00	4.16765	6.56471	70.31	44.77907	25.53500	64.	36.	14.12349 11.41151
164.00	10.00	4.38785	7.65185	87.17	53.26377	33.90973	61.	39.	19.73776 14.17197
165.00	10.00	4.60250	8.39683	107.01	62.17587	44.82838	58.	42.	26.73775 18.09064
166.00	8.80	4.77841	8.59357	125.65	71.48320	54.16962	57.	43.	34.28435 19.88527
167.00	7.00	4.88643	7.00000	141.32	81.06815	60.25409	57.	43.	40.16408 20.09001
167.96	4.89	4.88741	4.88741	152.64	90.37607	62.26691	59.	41.	42.17690 20.09001
RSSN CONST					CUM AVG				
168.00	4.80	4.80000	.77083	.771					
169.00	3.70	3.70000	1.45946	.771					
170.00	5.40	5.40000	.40741	.589					
171.00	2.20	2.20000	21.81818	.589					
172.00	48.00	48.00000	.06667	.415					
173.00	3.20	3.20000	1.50000	.415					

Example of HYGRAPH

SUMMARY OF EVENT DATA

TABLE 2 FLOW COMPONENTS												
EVENT NO	Q START	Q PEAK	Q END	TOTAL VOLUME	BASEFLOW VOLUME	STORMFLOW VOLUME	INTERFLOW VCL	PCNT	RAPIDFLOW VCL	PCNT	Q AT RSSN END	
1	2.20	5.40	2.81	63.	40.	23.	13.	58.	10.	42.	.20	
2	.20	15.00	4.43	321.	120.	200.	147.	73.	54.	27.	3.50	
3	3.50	10.00	4.89	153.	91.	62.	42.	68.	20.	32.	3.20	
4	3.20	15.00	5.09	159.	101.	98.	66.	67.	33.	33.	.10	

TABLE 3 TIME COMPONENTS													
EVENT NO	TIME AT START	TIME AT PEAK	TIME AT END	EVENT DURATION	TIME TO PEAK	RECESSION TIME	BLACK'S DECAY T	PCNT TIME PRE-PEAK	PCNT TIME POST-PEAK	TIME AT RSSN END	INTERSTORM DURATION	VOLUMETRIC MIDPOINT	
1	51.00	54.00	58.22	7.22	3.00	4.22	5.00	42.	58.	115.00	56.78	55.00	
2	115.00	145.00	150.86	35.86	30.00	5.86	6.00	84.	16.	157.00	6.14	143.00	
3	157.00	164.00	167.96	10.96	7.00	3.96	7.00	64.	36.	173.00	5.04	163.00	
4	173.00	177.00	184.08	11.08	4.00	7.08	6.00	36.	64.	365.00	180.92	178.00	

SUMMARY OF EVENT DATA

TABLE 4 HYDROGRAPH CHARACTERISTICS											
EVENT NO	STORMFLOW BASELINE	PERIMETER	PERIMETER/ LN(1+STORMFLOW)	STORMFLOW VOLUME	BASELINE ANGLE	RISING LIMB ANGLE	TOP ANGLE	FALLING LIMB ANGLE	BASEFLOW RSSN ANGLE	RSSN K	
1	7.2440	16.5824	5.2206	22.9588	.08383	.81764	1.77274	1.01958	1.52492	.955	
2	36.1058	81.6456	15.3910	200.2565	.11732	.45830	1.61838	.50589	1.42113	.962	
3	11.0477	27.0672	6.5264	62.2665	.12592	.74838	1.48148	.65907	1.24771	.919	
4	11.2435	35.8816	7.8076	98.0616	.16017	1.24397	.94751	.62069	1.54320	.979	

TABLE 5 AREAL YIELD COMPONENTS										
EVENT NO	TOTAL RUNOFF	BASEFLOW	STORMFLOW	INTERFLOW	RAPIDFLOW	STORMFLOW IN	TC PK PCNT	STORMFLOW AFTER PK IN	PCNT	
1	.0035	.0022	.0013	.0007	.0005	.0005	41.	.0008	59.	
2	.0179	.0067	.0112	.0082	.0030	.0079	71.	.0033	29.	
3	.0085	.0051	.0035	.0024	.0011	.0019	54.	.0016	46.	
4	.0111	.0056	.0055	.0037	.0018	.0023	41.	.0032	59.	

Example of HYGRAPH

ANNUAL SUMMARY

TOTAL VOLUME RUNOFF= 2127. ACRE-FEET
 TOTAL AREAL YIELD= .1 INCHES
 INTER-STORM BASEFLOW YIELD= .1 INCHES
 TOTAL STORMFLOW YIELD= .0 INCHES
 TOTAL BASEFLOW YIELD= .1 INCHES
 MINIMUM 10-DAY FLOW VOLUME, AVG DAILY FLOW= 0. CFS (.0003 CFSM)
 LAST DAY OF ABOVE EVENT= 364 CF 365 DAYS
 MINIMUM 30-DAY FLOW VOLUME, AVG DAILY FLOW= 0. CFS (.0003 CFSM)
 LAST DAY OF ABOVE EVENT= 364
 MEDIAN FLOW OF RECESSION PERIOD= 0. CFS (.0003 CFSM)

 SUM OF ALL YEARS= .12 INCHES
 AVERAGE ANNUAL YIELD= .12 INCHES FOR 1 YEARS

Example of HYGRAPH

LACOR

Streamflow data are correlated in this program by utilizing Langbein's method (Lyons, 1965) in which correlations are made in terms of deviations in log units (base 10) from the geometric mean of each month's discharges. Correlations are made only for matching months of record, using monthly discharge. The printout lists the deviations from the mean logs for each month of matching record. Also printed are the slope and Y-axis intercept of the regression line, coefficient of correlation, standard error of estimate, standard deviation of the dependent variable and other correlation information.

Missing values of the dependent station for which corresponding independent values exist are optionally extrapolated. The annual volume is computed using the observed values and the extrapolated values where needed.

For each correlation the user should specify the independent station and the dependent station to be used. If certain years are to be excluded from a correlation, those years should be noted. Extrapolations are included unless the user specifies otherwise.

STREAMFLOW CORRELATION DATA

TONGUE RIVER AT STATE LINE, NEAR DECKER, MONTANA STATION NO 063063.00
 LATITUDE 45-00-32 LONGITUDE 106-50-08 SECTION 33 TOWNSHIP 9 S RANGE 43 E
 ELEVATION 3430. FEET DRAINAGE AREA = 1477. SQUARE MILES

DEVIATIONS FROM MTH MEAN LOGS, INDEPENDENT STATION

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1965	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000
1966	.020	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000
1967	-.224	-.171	-.167	-.103	-.136	-.256	-.192	-.006	.226	.240	.031	.177
1968	.005	-.013	-.045	.074	.189	-.025	-.152	-.133	.248	.120	.437	.428
1969	.139	.070	.068	-.014	-.178	.227	.158	.026	-.242	.131	-.197	-.351
1970	-.073	-.019	.041	-.084	.033	-.031	.120	.214	.215	.084	-.033	.017
1971	-.026	-.023	.054	.059	.397	.051	.162	.001	.038	-.163	-.236	-.102
1972	.026	.033	-.005	-.008	.032	.315	-.021	-.059	-.123	-.099	.157	.069
1973	.039	-.005	-.030	-.040	-.085	-.220	.031	.151	.047	-.018	-.029	.297
1974	.118	.080	.044	.189	-.001	-.238	.060	-.035	-.062	-.119	.033	-.009
1975	-.023	.048	.041	-.074	-.183	.176	.013	.038	.284	.530	.284	-.083

PRAIRIE DOG CREEK NEAR ACME, WYOMING STATION NO 063062.50
 LAT 44-59-02 LONG 106-50-21 SECT 23 TOWN 58 N R 33 W ELEV 3450. FEET
 CA 358. SQ MI (NOTE---YEARS 1965-1970 FROM STATE ENC. RECORDS.)

DEVIATIONS FROM MTH MEAN LOGS, DEPENDENT STATION

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1965	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000
1966	-.080	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000	9.000
1967	-.051	-.009	-.124	-.076	-.149	-.091	-.228	.109	.638	.117	.051	.081
1968	.121	.040	.039	.106	.429	-.005	-.190	-.259	.144	-.113	.452	.408
1969	.129	-.005	-.034	.151	-.343	.324	.116	-.001	.063	.217	-.438	-.584
1970	-.240	-.162	-.077	-.108	-.074	-.385	.081	.468	.176	-.157	-.367	.112
1971	.037	.013	.024	.035	.141	.034	.233	-.122	.018	-.159	-.222	-.056
1972	.067	.034	.064	-.021	-.175	.322	-.062	.027	-.019	.106	.214	.130
1973	.036	.007	.104	.010	.043	-.190	.195	.549	-.016	.151	.278	.440
1974	.165	.110	.073	.101	.317	-.202	-.012	-.311	-.111	-.222	.155	.020
1975	-.184	.002	-.008	-.197	-.189	.193	.042	.134	.326	.415	.346	-.206

CORRELATION CONSTANTS

PRAIRIE DOG CREEK NEAR ACME, WYOMING STATION NO 063062.50
 TONGUE RIVER AT STATE LINE, NEAR DECKER, MONTANA STATION NO 063063.00
 SLOPE# .9693 INTERCEPT# -.0000 R= .777 SE= .151 COR 3062/3063

MEAN MTHLY LOGS, OCT - SEP, STA 3062
 3.399 3.305 3.175 3.114 3.345 3.690 3.545 3.529 3.225 3.027 3.021 3.252

MEAN MTHLY LOGS, OCT - SEP, STA 3063
 4.254 4.205 4.118 4.119 4.175 4.406 4.377 4.668 5.027 4.483 4.028 4.135

TOTX= .000 TOTY= .000 DTXX= 514.784 DTYY= 800.555 DTXY= 498.944

-.9.999 INDICATES NO CORRELATION FOR THAT MONTH
 9.999 INDICATES NO DATA AT ONE OR BOTH STATIONS FOR THAT PARTICULAR MONTH

Example of LACOR

EXTRAPOLATED STREAMFLOWS IN ACRE-FEET

PRAIRIE DOG CREEK NEAR ACME, WYOMING STATION NO 963062.50
 LAT 44-59-02 LONG 106-50-21 SECT 23 TOWN 58 N R 83 W ELEV 3450. FEET
 CA 358. SQ MI (NOTE---YEARS 1964-1970 FROM STATE ENG. RECORDS.)

DEPENDENT STATION 3062 INDEPENDENT STATION 3063

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	ANNUAL
1961	1026	1142	1029	821	1310	1585	1120	1446	577	198	1 5	784	11151
1962	2318	1679	1341	1162	2440	3155	4550	2856	1555	993	1126	1973	25054
1963	2173	1572	997	1046	2645	2463	3213	4520	2672	786	517	917	23525
1964	1142	1477	1061	942	1352	2192	1997	3625	2610	1728	922	1774	21829
1965	1961	1695	1589	1395	2263	4360	4911	3103	-2	-2	-2	-2	26755
1966	-2	1664	1067	671	1304	2908	-2	-2	-2	-2	-2	-2	14505

-1 DENOTES INSUFFICIENT DATA TO COMPUTE
 -2 DENOTES OBSERVED VALUE EXISTS

Example of IACOR

LOGPT3

The Log-Pearson Type III method of analysis can be used for flood frequency studies by utilizing this program. The printout includes a listing of the peak flows, dates of peak flows, logarithms of the peak flows, statistics of the log values, tabular values (Water Resources Council, 1967), percent chance, recurrence interval and computed flows. A plot of the data and the computed curve are provided as an option. Annual flow values, instead of peak flow values, may optionally be used in this program.

For other types of flood analyses, see the GUMBEL and HAZEN programs. For a low flow Log-Pearson Type III analysis, see the Q7,10 program.

For each station the user should specify the year range (unless all years are desired), peak or annual flows and whether or not a plot is to be made.

```

*****
*
*   FLOOD FLOW FREQUENCY ANALYSIS   LCG-PEARSON TYPE III METHOD
*
*   ANNUAL INSTANTANEOUS PEAK DISCHARGE IN CFS
*
*****

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WAGON GULCH NEAR DUBOIS, WYOMING          STATION NO 062187.00
LATITUDE 43-34-42 LONGITUDE 109-44-13    SECTION 30 TOWNSHIP 42 N RANGE 107 W
DRAINAGE AREA 4.89 SQUARE MILES

```

PERIOD 1961 - 1974 14 YEARS OF DATA

YEAR	DATE	FLOW VALUE Y	LCG Y X
1961	JUNE 4	260	2.556302
1962		80	1.903090
1963		80	1.903090
1964	JULY 13	220	2.342422
1965		134	2.127104
1966		80	1.903090
1967	JUNE 14	120	2.079181
1968	JUNE 10	95	1.977723
1969	SEP. 20	47	1.672697
1970	MAY 23	25	1.397940
1971	MAY 4	115	2.060698
1972	APR.	116	2.064457
1973	AUG. 4	82	1.913814
1974	JULY 19	520	2.716002
SUMMATION X		28.617020	
SUMMATION X SQUARED		59.943802	
SUMMATION X CUBED		128.584213	
MEAN OF X		2.044072	
STANDARD DEVIATION		.333807	
SKEW COEFFICIENT		.320479	

STANDARD DEVIATION AND SKEW COEFFICIENT AS DEFINED FOR LCG PEARSON TYPE III METHOD

Example of LOGPT3

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*****
*
*   FLOOD FLOW FREQUENCY ANALYSIS   LOG-PEARSON TYPE III METHOD
*
*   ANNUAL INSTANTANECUS PEAK DISCHARGE IN CFS
*
*****

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WAGON GULCH NEAR DUBOIS, WYOMING STATION NO 062187.00
 LATITUDE 43-34-42 LONGITUDE 109-44-13 SECTION 30 TOWNSHIP 42 N RANGE 107 W
 DRAINAGE AREA 4.89 SQUARE MILES

PERIOD 1961 - 1974 14 YEARS OF DATA

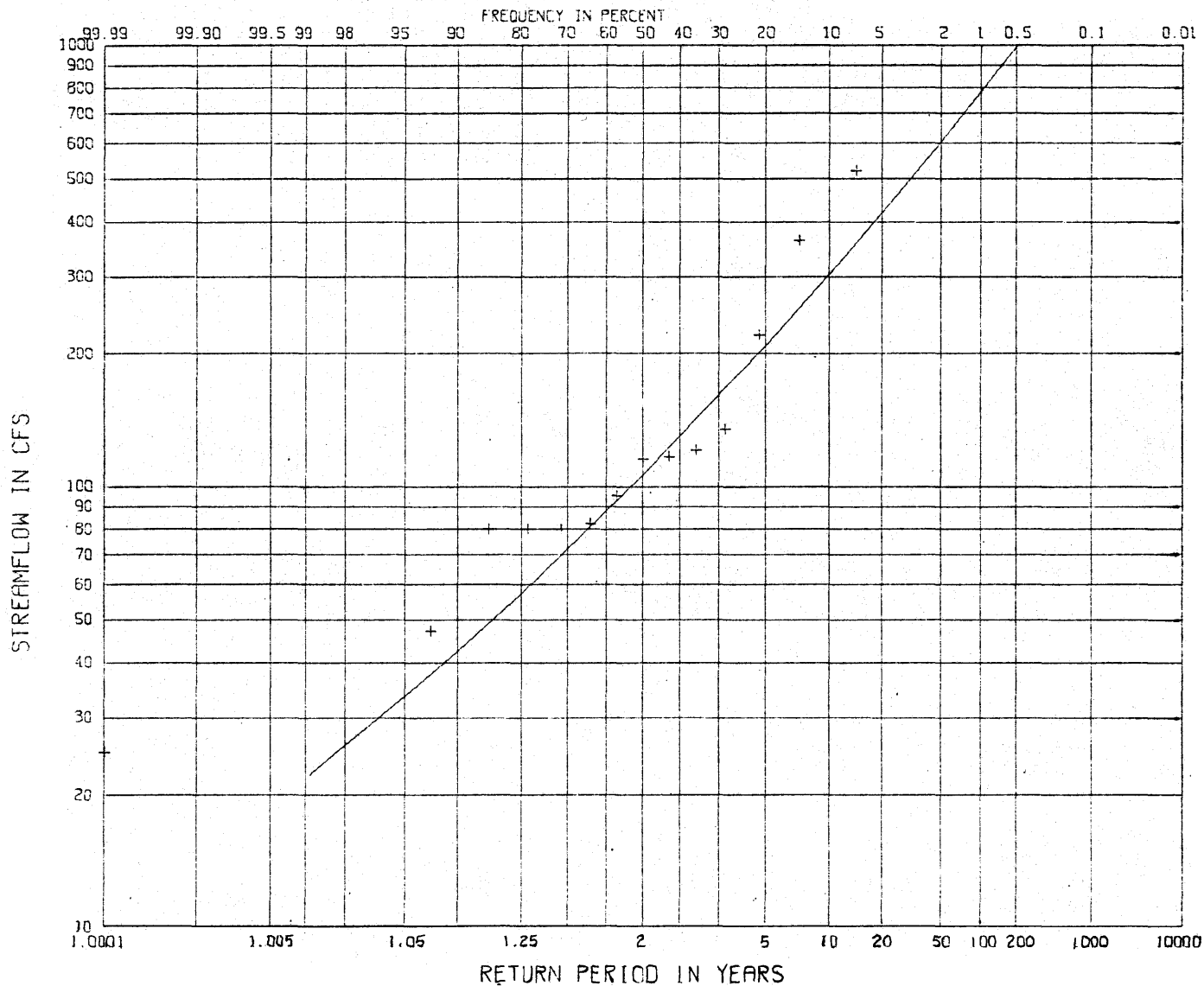
K VALUES- PEARSON TYPE III COORDINATES EXPRESSED IN
 NUMBER OF STANDARD DEVIATIONS FROM THE MEAN FOR
 VARIOUS RECURRENCE INTERVALS OR PERCENT CHANCE.
 FROM WATER RESOURCES COUNCIL BULLETIN NO. 15
 L IS COLUMN NO., J IS ROW NO. IN TABLE

K	L	J
-2.1040	1	28
-1.5550	2	28
-1.2450	3	28
-.8530	4	28
-.0500	5	28
.8240	6	28
1.3090	7	28
1.8490	8	28
2.2110	9	28
2.5440	10	28
2.8560	11	28

PERCENT CHANCE	RECURRENCE INTERVAL	COMPLETED FLOW
99.0	1.0101	21.97
95.0	1.0526	33.50
90.0	1.1111	42.51
80.0	1.2500	57.46
50.0	2.0000	106.51
20.0	5.0000	208.51
10.0	10.0000	307.71
4.0	25.0000	458.44
2.0	50.0000	605.51
1.0	100.0000	782.12
.5	200.0000	994.09

Example of LOGPT3

FLOOD FREQUENCY--LOG-PEARSON TYPE III METHOD
 WAGON CULCH NEAR DUBOIS, WYOMING
 PERIOD 1961 - 1974 14 YEARS
 STATION NO 062187.00



Example of LOGPT3

MADIS

This program prints a table of monthly and annual discharges in acre-feet. Included in the table are total and mean monthly and annual flows for the period, and percent of mean annual flow by month and by year. If a year's data are incomplete the data for that year are excluded in further computations. Missing data are indicated by a -1. Every year of partial or complete record is indicated.

Additional statistics for the monthly and annual flow are also produced. Moving average statistics of annual flows for any specified number of years, such as the ten years used in the example, is optional. Statistics can also be obtained for annual flows in specified yearly increments forwards or backwards as illustrated for five-year increments. There is also an option to print, in addition to the above items, the annual discharge using only a specified range of months for each year of record. The month range must be within one water year.

For each station the user should specify the year range (unless all years are desired), number of years in the moving average (if this option is desired), number of years for forward and/or backward increments (if desired) and month range (if desired).

Example of MADIS

LARAMIE RIVER AND PIONEER CANAL NEAR WOODS, WYOMING STATION NO 066595.00
 LATITUDE 41-08-17 LONGITUDE 105-58-49 SECTION 36 TOWNSHIP 14N RANGE 77W
 ELEVATION 7389 FEET MSL DRAINAGE AREA = 434. SQUARE MILES

MONTHLY AND ANNUAL FLOWS IN ACRE FEET

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANNUAL	PCT MN
1913	6400	4160	2310	2650	2350	3300	12700	38300	26600	6830	3130	3020	111750	83.6
1914	3800	3680	3250	2840	2610	3360	7740	64400	79200	13700	4050	2170	190800	142.7
1915	4660	2990	1860	1520	1810	2180	7860	20400	32100	8610	3970	3750	91710	68.6
1916	4000	3060	2980	3300	3160	4560	8870	42500	47700	13800	7690	5660	147280	110.1
1917	6460	5160	4360	3650	3030	2790	7500	37900	141000	54900	11200	4150	282100	211.0
1918	3070	3000	2000	3000	3000	6200	6310	52300	82700	15100	4800	4330	185810	139.0
1919	3360	2500	2460	2000	1800	2460	7970	28500	17400	4670	3520	2280	78920	59.0
1920	1010	1490	2000	2490	2500	3070	8030	62100	94600	20200	8500	4640	210630	157.5
1921	3750	4680	2950	2770	2500	3690	6010	54200	94600	19200	9470	3340	207160	154.9
1922	3810	3070	2280	1540	1390	4160	7860	30100	39100	7510	3980	2080	106380	79.6
1923	1700	1790	1840	1840	1670	1840	5060	32200	103000	26900	8420	4810	191070	142.9
1924	6150	3450	3070	3070	2580	3070	10600	49300	72600	12700	3660	2650	172900	129.3
1925	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	.0
1926	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	.0
1927	4610	3270	2340	2090	2500	4060	5350	47500	45600	15600	4770	4190	141880	106.1
1928	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	.0
1929	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	.0
1930	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	.0
1931	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	.0
1932	3690	3090	2340	2090	1900	2770	9700	53600	51600	11300	4060	1710	147850	110.6
1933	2700	2430	2150	2150	2110	3380	5560	26100	78000	9900	3240	2740	140460	105.0
1934	2270	1900	1840	2090	2220	3080	8420	17670	3740	1240	1600	897	46967	35.1
1935	2080	1080	615	615	830	1230	3830	18920	72440	12560	3700	2300	120200	89.9
1936	2620	3490	2150	2150	2010	2460	15410	48770	27280	6640	5280	2880	121140	90.6
1937	2400	3210	1540	1540	1390	2210	8110	35610	29480	9840	3310	2070	100710	75.3
1938	2910	2400	1840	1840	1670	3110	9040	55260	71380	13200	4150	6650	173450	129.7
1939	4090	3250	2450	2150	1940	5500	9570	34520	18740	3250	2500	1820	89790	67.1
1940	2280	2110	1840	1540	1440	2340	5180	24560	28050	13450	3680	2990	89460	66.9
1941	3680	2450	2150	1840	2220	3070	5260	29970	27970	12870	5290	2560	99530	74.4
1942	4630	4050	2770	1840	1670	2460	9760	39340	65860	9360	2960	1980	146680	109.7
1943	3250	2410	2460	1840	1670	2460	16230	33390	52150	8610	3370	1920	129760	97.0
1944	2160	2380	1840	1230	1150	1840	4180	23750	30430	9680	4070	1620	84330	63.1
1945	2830	1550	920	1540	1940	2770	6000	41880	44080	19650	12170	4020	139350	104.2
1946	3540	3450	2460	2460	2220	3690	14280	28720	37040	13340	5680	3110	119990	89.7
1947	2590	2380	2150	920	1110	1840	7660	49760	55370	24100	8770	4540	161190	120.5
1948	4680	4200	3690	3070	2590	3070	10100	49500	29000	8330	4960	1650	124840	93.4
1949	3070	2680	2150	3570	4880	3690	10600	45720	69090	10980	4060	2950	163440	122.2
1950	4130	2980	1840	1540	2220	3690	6460	28170	43940	10290	4490	4380	114130	85.4
1951	3180	2670	2650	2230	2350	2650	7130	56250	62570	13060	7560	3430	161740	121.0
1952	4900	3000	2520	2600	2380	3190	11730	56600	61170	9700	3420	1840	163050	121.9
1953	2070	2530	2470	2710	2230	3230	4680	14340	22410	4550	6220	1710	69150	51.7
1954	2130	2610	2360	1930	1730	2480	7330	17700	6960	3110	1530	1030	50900	38.1
1955	3040	2290	2180	1530	1370	1810	3990	14840	16760	8240	7810	2110	65970	49.3
1956	2260	2560	2540	2320	1990	3090	6430	48340	40510	7930	6170	1950	126090	94.3
1957	2170	2620	2110	1740	2080	2940	4960	34080	122100	44630	7700	3810	230920	172.7
1958	4030	3770	3350	2840	2390	2650	5230	51860	32110	5160	3860	2740	119990	89.7
1959	3120	2560	2000	1970	1790	2210	5800	29850	46850	7610	5240	3450	112450	84.1
1960	5610	3840	3390	2730	2240	2600	11440	27290	36930	8830	6020	2910	113830	85.1
1961	2480	1980	1740	1500	1520	2650	4540	33050	55560	8430	4800	7630	125880	94.1
1962	9860	5650	3580	3300	4140	4300	21150	65020	46500	19080	4620	2710	189910	142.0
1963	3630	3040	2570	2130	2400	2980	5890	24880	13910	3690	5530	3670	74320	55.6
1964	2200	2290	2060	1750	1490	1710	5550	30950	27390	11160	7130	3370	97050	72.6
1965	2590	2700	2360	2820	2640	3070	8040	33890	73550	16810	7130	7510	163110	122.0
1966	8200	5180	4760	3510	2430	5220	7150	21090	11320	3580	2860	1740	77040	57.6
1967	3020	2250	2000	1800	2260	3780	4900	20200	47890	20930	3900	3570	116500	87.1
1968	3230	2900	2350	2880	2520	3260	5310	21080	69290	11220	7360	4510	135910	101.6
1969	4260	2940	3090	2410	1920	2470	9700	37480	27450	7860	4550	3240	107370	80.3
1970	4610	4120	3040	2450	2700	3110	6050	53290	69180	14750	5110	3600	172010	128.6
1971	5010	4010	2430	2250	2030	3660	9430	43450	85770	14790	4990	4380	182200	136.3
N YEAR														
SUM	194180	159300	128455	118175	114360	162460	423640	1976750	2688020	672930	278010	170767		
N	53	53	53	53	53	53	53	53	53	53	53	53		
N YEAR														
MEAN	3664	3006	2424	2230	2158	3065	7993	37297	50717	12697	5245	3222		
COMPLETE YEARS														
SUM	194180	159300	128455	118175	114360	162460	423640	1976750	2688020	672930	278010	170767	7087047	
COMPLETE YEARS														
MEAN	3664	3006	2424	2230	2158	3065	7993	37297	50717	12697	5245	3222	133718	
PER CENT														
ANNUAL	2.7	2.2	1.8	1.7	1.6	2.3	6.0	27.9	37.9	9.5	3.9	2.4		

-1 INDICATES MISSING OR INCOMPLETE DATA

Example of MADIS

LARAMIE RIVER AND PIONEER CANAL NEAR WOODS, WYOMING STATION NO 066595.00
 LATITUDE 41-08-17 LONGITUDE 105-58-49 SECTION 36 TOWNSHIP 14N RANGE 77W
 ELEVATION 7389 FEET MSL DRAINAGE AREA = 434. SQUARE MILES

STATISTICS OF ANNUAL FLOW

FOR PERIOD OF RECORD, 53 YEARS

ANNUAL MEAN 133718 ACRE-FT 5.777 INCHES STANDARD DEVIATION 47218.4 ACRE-FT
 LOG 5.07838 OF ANNUAL FLOW LOGS .161204

COEFFICIENT OF VARIATION 35.31 SKEW COEFFICIENT .498008
 (PERCENT) OF LOGS -.029351

FIRST-ORDER SERIAL CORRELATION COEFFICIENT OF ANNUAL FLOW SERIES .076926
 OF LOGS .104626

RANGE OF VALUES- 282100 MAXIMUM 46967 MINIMUM 125880 MEDIAN

STATISTICS OF MONTHLY FLOW

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	3664	3006	2424	2230	2158	3065	7993	37297	50717	12697	5245	3222
STD DEV	1612	937	724	672	687	943	3383	13695	29174	9237	2251	1456
COEF. OF VARIATION (PER CENT)	44.02	31.20	29.87	30.14	31.85	30.79	42.32	36.72	57.52	72.75	42.91	45.21
MAX POSITIVE DEVIATION	6195	2643	2335	1419	2721	3134	13156	27722	90282	42202	6924	4407
MAX NEGATIVE DEVIATION	2654	1926	1809	1615	1328	1835	4163	22957	46977	11457	3715	2325
95 PER CENT C.I. UPPER VALUE	4098	3258	2619	2411	2343	3319	8904	40984	58572	15184	5852	3614
95 PER CENT C.I. LOWER VALUE	3230	2753	2229	2049	1973	2811	7082	33610	42863	10210	4639	2830

Example of MADIS

LARAMIE RIVER AND PIONEER CANAL NEAR WOODS, WYOMING STATION NO 066595.00
 LATITUDE 41-08-17 LONGITUDE 105-58-49 SECTION 36 TOWNSHIP 14N RANGE 77W
 ELEVATION 7389 FEET MSL DRAINAGE AREA = 434. SQUARE MILES

STATISTICS OF ANNUAL FLOW

10 YEAR MOVING AVERAGE AND STATISTICS

BEGINNING YEAR	MEAN	STD DEV	C V (PCT)	FIRST ORDER CORRELATION OF MEANS	SERIAL COEFFICIENT OF LOGS
1913	161254	64890	40.2414	-.226843	-.286833
1914	169185	62987	37.2296	-.228918	-.290822
1915	167396	62557	37.3711	-.191498	-.224253
1932	112955	35787	31.6825	-.242638	-.258508
1933	112838	35662	31.6046	-.402581	-.380958
1934	111768	34893	31.2195	-.185527	-.145869
1935	115505	28620	24.7784	-.264758	-.228163
1936	117420	29593	25.2031	-.339256	-.330867
1937	117305	29579	25.2160	-.316897	-.286406
1938	123353	31901	25.8619	-.202857	-.168822
1939	118492	26698	22.5323	.077019	.107009
1940	125857	28026	22.2689	-.079251	-.049097
1941	128324	25432	19.8193	-.419471	-.376201
1942	134545	25214	18.7407	-.428739	-.370336
1943	136182	26584	19.5211	-.226033	-.208752
1944	130121	34067	26.1812	-.486972	-.446136
1945	126778	40156	31.6743	.212670	.434627
1946	119440	44113	36.9333	.428776	.572382
1947	120050	44163	36.7878	.386913	.478371
1948	127023	55444	43.6496	.346141	.466421
1949	126538	55487	43.8504	.242984	.418175
1950	121439	54043	44.5027	.263471	.426756
1951	121409	54048	44.5174	.288445	.438689
1952	117823	52234	44.3327	.223258	.380920
1953	120509	55412	45.9818	.358744	.569731
1954	121026	54901	45.3634	.035166	.218228
1955	125641	50079	39.8594	-.117129	-.088040
1956	135355	46513	34.3640	-.202620	-.168044
1957	130450	50050	38.3677	-.301082	-.307403
1958	119008	35491	29.8228	-.390174	-.401452
1959	120600	35895	29.7639	-.389855	-.389093
1960	120092	36058	30.0261	-.407983	-.397729
1961	125910	39468	31.3468	-.420848	-.397969
1962	131542	43296	32.9147	-.205520	-.233359

Example of MADIS

LARAMIE RIVER AND PIONEER CANAL NEAR WOODS, WYOMING STATION NO 066595.00
 LATITUDE 41-08-17 LONGITUDE 105-58-49 SECTION 36 TOWNSHIP 14N RANGE 77W
 ELEVATION 7389 FEET MSL DRAINAGE AREA = 434. SQUARE MILES

STATISTICS OF ANNUAL FLOW

PARTIAL STATISTICS FOR 5-YEAR INCREASING PERIODS OF RECORD

YRS IN PERIOD	MEAN	STD DEV	S OVER SQRT N FOR T-TEST
5	164728	75661	33836
10	161254	64890	20520

MISSING VALUES PRECLUDE FURTHER COMPUTATION

LARAMIE RIVER AND PIONEER CANAL NEAR WOODS, WYOMING STATION NO 066595.00
 LATITUDE 41-08-17 LONGITUDE 105-58-49 SECTION 36 TOWNSHIP 14N RANGE 77W
 ELEVATION 7389 FEET MSL DRAINAGE AREA = 434. SQUARE MILES

STATISTICS OF ANNUAL FLOW

PARTIAL STATISTICS FOR 5-YEAR INCREASING PERIODS OF RECORD FROM LATEST YEAR SELECTED

YRS IN PERIOD	MEAN	STD DEV	S OVER SQRT N FOR T-TEST
5	142798	33166	14832
10	131542	43296	13691
15	134566	44283	11433
20	124682	47221	10559
25	128759	43909	8781
30	127970	40995	7484
35	125486	40250	6803
40	124216	39857	6302

MISSING VALUES PRECLUDE FURTHER COMPUTATION

TONGUE RIVER AT STATE LINE, NEAR DECKER, MONTANA
 LATITUDE 45-00-32 LONGITUDE 106-50-08 SECTION 33 TOWNSHIP 9 S RANGE 20 E
 ELEVATION 3430. FEET DRAINAGE AREA = 1477. SQUARE MILES

COMBINED MONTHLY RUNOFF APR. THROUGH AUG.

YEAR	ACRE-FEET
1961	79260
1962	231290
1963	320510
1964	326660
1965	277840
1966	91990
1967	331380
1968	328880
1969	218770
1970	373390
1971	251790
1972	206740
1973	287760
1974	222460
1975	433000
TOTAL	3982320
MEAN	265488
STD DEV	95947
COEF. OF VARIATION	36.14
1 ST SERIAL COR. COEF.	-.1756
SKEW COEFFICIENT	-.4156

Example of MADIS

MOCOR

This program computes two linear least squares fits between two stations for monthly runoff in acre-feet. One fit is for the data as stored and the second is for the logarithmic (base 10) transformation of the data. For each fit, the number of data points, the regression constant, regression slope, coefficient of determination and coefficient of correlation for each month are printed.

Missing monthly values of the dependent station for which corresponding independent station values exist are extrapolated. The monthly extrapolated values (and recorded values where available) are combined to obtain the annual runoff.

Twelve plots, one for each month, may optionally be printed. The plot for each month contains the runoff of one station versus the other station, the regression line, regression formula and coefficient of determination. The example plot shows the results for July only.

For each correlation the user should specify the independent and the dependent station to be used and whether or not plots should be made. If certain years are to be excluded from a correlation, those years should be noted. Normally extrapolations are included. If they are not desired, the user should so specify.

STREAMFLOW CORRELATION DATA

INDEPENDENT STATION

CLARKS FORK YELLOWSTONE RIVER NEAR BELFRY, MONTANA STATION NO 062075.00
 LATITUDE 45-00-40 LONGITUDE 109-04-00 SECTION 31 TOWNSHIP 9 S RANGE 22 E
 ELEVATION 3980. FEET DRAINAGE AREA 1154. SQUARE MILES

DEPENDENT STATION

SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
 LATITUDE 44-45-00 LONGITUDE 109-30-20 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET DRAINAGE AREA 135. SQUARE MILES

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
NO OF POINTS	29	29	27	27	27	27	28	29	29	29	31	31
CONSTANT	1184.9	1018.5	1222.8	1342.0	1294.9	1663.8	396.9	-1563.1	-4362.6	4608.4	2082.6	1212.0
SLOPE	.1156	.0609	.0219	-.0025	-.0133	-.0268	.0915	.1313	.1478	.1153	.1352	.1335
R	.93578	.52753	.14785	-.01886	-.12567	-.25808	.76163	.88854	.93831	.95402	.95251	.76272
R SQUARED	.87569	.28040	.02245	.00036	.01579	.06661	.58008	.78950	.88043	.91015	.90727	.58174

LOGARITHMIC TRANSFORMATION

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
NO OF POINTS	29	29	27	27	27	27	28	29	29	29	31	31
CONSTANT	1.309	1.241	2.467	3.376	3.822	4.149	-.347	-1.549	-1.403	.384	.759	1.322
SLOPE	.5199	.4887	.1717	-.0651	-.1897	-.2526	.8557	1.1205	1.0954	.7657	.6792	.5241
R	.89120	.56079	.12787	-.04991	-.16389	-.26368	.81670	.92612	.94082	.96974	.94785	.45737
R SQUARED	.79424	.31448	.01635	.00249	.02686	.06952	.66701	.85770	.88515	.94039	.89843	.20919

Example of MOCOR

EXTRAPOLATED STREAMFLOWS IN ACRE-FEET BY LINEAR REGRESSION

SUNLIGHT CREEK NEAR PAINTER, WYOMING
 LATITUDE 44-45-00 LONGITUDE 109-30-20 SECTION 16 TOWNSHIP 55 N RANGE 105W
 ELEVATION 6700. FEET DRAINAGE AREA 135. SQUARE MILES

STATION NO 062065.00

DEPENDENT STATION 2065

INDEPENDENT STATION 2075

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	ANNUAL
1921	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	7303	3971	-1
1922	2537	1559	1371	1325	1221	1505	1367	9259	36886	16540	7519	3707	84796
1923	2280	1774	1425	1319	1199	1329	1824	11518	28902	22911	7032	4844	86357
1924	5207	2213	1561	1311	1165	1425	2611	18269	24171	19088	6302	4359	97581
1925	5392	2475	1587	1311	1162	1396	5209	27200	37625	31483	11563	5274	131676
1926	4028	2286	1626	1311	1162	1399	4935	23654	23136	17467	6762	4193	91957
1927	4167	2231	1558	1314	1170	1435	3023	15511	54035	29166	13726	7173	134509
1928	3959	3370	1629	1295	1104	1265	2456	44405	27867	32410	11563	5080	136401
1929	3404	1926	1455	1320	1184	1367	1705	11571	30676	21753	-2	-2	87501
1933	2560	1865	1424	1316	1184	1334	1879	5766	39103	10539	4868	3693	75532
1934	2961	1853	1493	1314	1166	1361	5068	23142	17252	11043	4744	2702	74098
1935	2860	2032	1537	1303	1138	1352	2190	6332	34446	22424	6342	3508	95564
1936	2774	2050	1532	1307	1157	1306	4788	28934	30277	11815	6622	3766	96327
1937	3047	1991	1465	1316	1149	1311	1764	16351	25221	15381	4373	2706	76076
1938	2730	1833	1573	1307	1152	1359	2580	10379	38778	18625	5596	3596	93509
1939	3209	2191	1557	1309	1171	1257	3265	19306	17548	15897	5177	2593	74479
1940	2621	1563	1441	1315	1146	1344	2213	17757	22914	10788	3260	2817	69180
1941	3343	1764	1506	1313	1158	1365	1901	14434	19144	12607	7082	8092	73709
1942	6206	2645	1673	1302	1115	1292	3379	8730	22767	22031	5722	3161	30020
1943	2971	2397	1645	1304	1120	1271	6747	13882	43805	38341	12800	5711	131794
1944	3395	2143	1583	1312	1140	1315	1782	11728	26300	20212	6152	4032	81094
1945	3272	2041	1563	1302	1119	1320	1732	7631	28651	30858	-2	-2	94759
1951	-2	-2	1734	1299	1069	1263	2848	-2	-2	-2	-2	-2	110202
1952	-2	-2	1672	1289	1073	1259	-2	-2	-2	-2	-2	-2	97352
1972	4281	2515	1659	1293	1070	1064	2517	14040	49600	22112	11938	6792	118881
1973	4807	2453	1650	1299	1108	1271	1757	10431	25738	15438	5707	5026	76686
1974	3085	2518	1607	1302	1113	1225	3102	11279	53976	28147	8723	3759	119335

-1 DENOTES INSUFFICIENT DATA TO COMPUTE
 -2 DENOTES OBSERVED VALUE EXISTS

Example of MOCOR

EXTRAPOLATED STREAMFLOWS IN ACRE-FEET BY LOG LINEAR REGRESSION

SUNLIGHT CREEK NEAR PAINTER, WYOMING
 LATITUDE 44-45-00 LONGITUDE 109-30-20 SECTION 16 TOWNSHIP 55 N RANGE 105W
 ELEVATION 6700. FEET DRAINAGE AREA 135. SQUARE MILES

STATION NO 062065.00

DEPENDENT STATION 2065

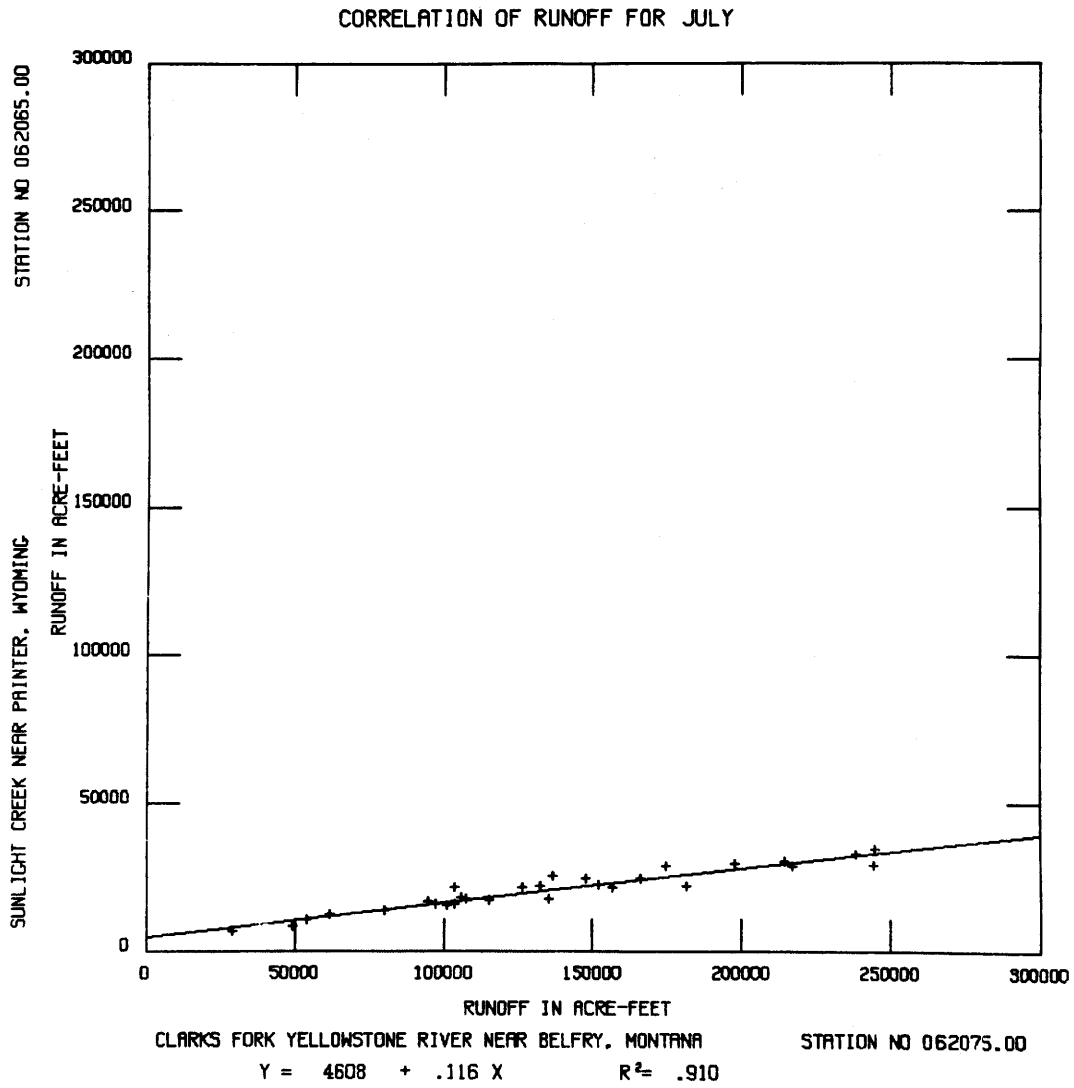
INDEPENDENT STATION 2075

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	ANNUAL
1921	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	7412	3764	-1
1922	2658	1480	1332	1337	1292	1570	1253	9116	36469	16683	7619	3571	84379
1923	2381	1744	1405	1310	1229	1300	1744	11273	28813	23151	7149	4347	85845
1924	4684	2181	1534	1286	1160	1415	2539	17969	24356	19349	6416	4032	35921
1925	4795	2403	1554	1286	1155	1375	4934	27256	37186	31067	11109	4510	128729
1926	3911	2245	1582	1286	1155	1379	4692	23519	23390	17667	6832	3919	91627
1927	4009	2197	1532	1294	1168	1431	2938	15194	53374	28995	12772	5636	130540
1928	3861	3037	1583	1252	1078	1243	2386	46091	27833	31884	11109	4493	135350
1929	3438	1907	1439	1316	1196	1339	1619	11324	30501	22020	-2	-2	87238
1933	2681	1844	1403	1299	1196	1305	1801	5890	38623	9769	4842	3560	74212
1934	3063	1830	1476	1294	1162	1333	4810	22985	17967	10398	4694	2725	73737
1935	2970	2012	1515	1266	1120	1323	2120	6402	34113	22678	6458	3495	80473
1936	2890	2030	1511	1275	1147	1278	4562	29103	30120	11340	6743	3614	95613
1937	3138	1973	1449	1299	1134	1283	1681	16034	25339	15428	4240	2729	75728
1938	2849	1809	1544	1276	1140	1331	2509	10179	38306	18873	5667	3487	88967
1939	3277	2161	1531	1280	1170	1238	3169	19026	18237	15990	5199	2519	74927
1940	2741	1486	1423	1296	1131	1315	2143	17450	23183	10081	2700	2834	67784
1941	3389	1732	1488	1291	1149	1338	1824	14124	19698	12283	7198	6076	71569
1942	5256	2536	1612	1265	1090	1266	3276	8618	23046	22293	5803	3137	79197
1943	3071	2339	1594	1270	1097	1248	6256	13579	43221	36972	12073	4863	127584
1944	3431	2118	1551	1288	1123	1286	1700	11476	26354	20488	6260	3807	80882
1945	3331	2022	1536	1265	1095	1292	1647	7593	28575	30512	-2	-2	94136
1951	-2	-2	1647	1259	1044	1242	2770	-2	-2	-2	-2	-2	109952
1952	-2	-2	1611	1241	1048	1239	-2	-2	-2	-2	-2	-2	37198
1972	4088	2435	1603	1248	1046	1122	2446	13735	48950	22372	11406	5444	115895
1973	4436	2385	1598	1259	1083	1248	1674	10228	25825	15490	5787	4460	75473
1974	3172	2438	1569	1263	1088	1214	3014	11042	53315	28069	8725	3509	118519

-1 DENOTES INSUFFICIENT DATA TO COMPUTE
 -2 DENOTES OBSERVED VALUE EXISTS

Example of MOCOR

Example of MOCOR



MQNMAX

For each year this program prints the maximum daily flow by month. The maximum daily flow for each year and the month in which it occurred are also printed. The maximum daily flow of record and its date of occurrence are included on the printout. If two or more days have the maximum flow of record, only the first date is printed.

For each station the user should specify the year range unless all years are to be printed.

SUNLIGHT CREEK NEAR PAINTER, WYOMING
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA 135. SQUARE MILES

STATION NO 062065.00

MAXIMUM DAILY FLOW IN CFS BY MONTHS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	MAX	MONTH
1929	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	112.0	113.0	-1.0	SEPT
1930	67.0	72.0	45.0	30.0	30.0	35.0	90.0	703.0	787.0	912.0	410.0	117.0	912.0	JULY
1931	226.0	54.0	27.0	25.0	25.0	27.0	44.0	334.0	920.0	188.0	143.0	78.0	920.0	JUNE
1932	52.0	49.0	26.0	26.0	24.0	27.0	47.0	652.0	1570.0	926.0	150.0	67.0	1570.0	JUNE
1946	79.0	45.0	24.0	16.0	18.0	23.0	207.0	290.0	664.0	413.0	174.0	68.0	664.0	JUNE
1947	45.0	41.0	30.0	19.0	14.0	21.0	130.0	397.0	819.0	616.0	236.0	87.0	819.0	JUNE
1948	76.0	36.0	34.0	23.0	16.0	18.0	714.0	28.0	1020.0	586.0	154.0	92.0	1020.0	JUNE
1949	41.0	31.0	21.0	20.0	19.0	20.0	45.0	680.0	900.0	550.0	130.0	63.0	900.0	JUNE
1950	59.0	46.0	39.0	24.0	26.0	24.0	35.0	316.0	895.0	1010.0	339.0	221.0	1010.0	JULY
1951	136.0	71.0	36.0	27.0	30.0	27.0	79.0	986.0	965.0	739.0	435.0	112.0	986.0	MAY
1952	61.0	50.0	32.0	35.0	22.0	21.0	250.0	460.0	1000.0	456.0	198.0	74.0	1000.0	JUNE
1953	45.0	36.0	25.0	23.0	19.0	25.0	60.0	314.0	944.0	538.0	177.0	105.0	944.0	JUNE
1954	43.0	36.0	27.0	20.0	20.0	25.0	60.0	764.0	902.0	497.0	128.0	62.0	902.0	JUNE
1955	32.0	28.0	21.0	19.0	21.0	20.0	33.0	259.0	675.0	570.0	162.0	58.0	675.0	JUNE
1956	34.0	28.0	24.0	22.0	21.0	30.0	129.0	985.0	1080.0	502.0	228.0	74.0	1080.0	JUNE
1957	53.0	34.0	26.0	16.0	16.0	19.0	90.0	884.0	1330.0	1080.0	204.0	110.0	1330.0	JUNE
1958	58.0	45.0	25.0	25.0	20.0	25.0	50.0	800.0	620.0	257.0	184.0	68.0	800.0	MAY
1959	39.0	30.0	28.0	15.0	14.0	18.0	61.0	271.0	1010.0	466.0	195.0	60.0	1010.0	JUNE
1960	71.0	52.0	35.0	18.0	20.0	25.0	52.0	316.0	806.0	336.0	198.0	46.0	806.0	JUNE
1961	36.0	33.0	26.0	17.0	22.0	21.0	22.0	844.0	823.0	289.0	128.0	240.0	844.0	MAY
1962	128.0	73.0	66.0	50.0	36.0	30.0	187.0	275.0	802.0	700.0	244.0	131.0	802.0	JUNE
1963	68.0	45.0	34.0	30.0	24.0	34.0	77.0	724.0	1120.0	565.0	117.0	89.0	1120.0	JUNE
1964	54.0	34.0	29.0	20.0	21.0	23.0	66.0	374.0	963.0	838.0	210.0	62.0	963.0	JUNE
1965	44.0	38.0	60.0	30.0	24.0	35.0	125.0	448.0	1100.0	685.0	275.0	152.0	1100.0	JUNE
1966	105.0	49.0	50.0	28.0	25.0	25.0	50.0	55.0	798.0	363.0	139.0	128.0	798.0	JUNE
1967	58.0	40.0	27.0	32.0	19.0	19.0	26.0	884.0	1110.0	902.0	239.0	78.0	1110.0	JUNE
1968	76.0	45.0	35.0	36.0	22.0	29.0	42.0	338.0	985.0	420.0	325.0	130.0	985.0	JUNE
1969	87.0	48.0	30.0	22.0	20.0	20.0	123.0	415.0	475.0	334.0	130.0	150.0	475.0	JUNE
1970	58.0	39.0	27.0	22.0	20.0	19.0	25.0	760.0	1150.0	720.0	180.0	130.0	1150.0	JUNE
1971	80.0	46.0	30.0	35.0	34.0	47.0	68.0	775.0	1490.0	632.0	301.0	175.0	1490.0	JUNE

MAXIMUM OF RECORD 1570.0 FOR JUNE 27 1932

-1.0 INDICATES MISSING DATA

Example of MONMAX

MQNMIN

For each year MQNMIN prints the minimum daily flow by month. The minimum daily flow for each year and the month in which it occurred are also printed. The minimum daily flow of record and its date of occurrence are included on the printout. If two or more days have this minimum flow only the date for the first one is printed.

For each station the user should specify the year range unless all years are to be printed.

SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA 135. SQUARE MILES

MINIMUM DAILY FLOW IN CFS BY MONTHS

YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	MIN	MONTH
1929	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	94.0	64.0	-1.0	SEPT
1930	52.0	45.0	25.0	20.0	25.0	30.0	27.0	66.0	174.0	132.0	117.0	71.0	20.0	JAN
1931	58.0	32.0	27.0	25.0	25.0	27.0	30.0	44.0	202.0	74.0	58.0	43.0	25.0	JAN
1932	30.0	20.0	26.0	26.0	24.0	27.0	28.0	29.0	212.0	162.0	64.0	41.0	20.0	FEB
1946	44.0	30.0	24.0	16.0	18.0	23.0	42.0	111.0	169.0	167.0	66.0	40.0	26.0	JAN
1947	36.0	25.0	21.0	19.0	14.0	21.0	40.0	70.0	236.0	224.0	74.0	36.0	14.0	FEB
1948	37.0	26.0	24.0	23.0	16.0	18.0	25.0	28.0	314.0	124.0	63.0	35.0	15.0	FEB
1949	30.0	22.0	21.0	20.0	19.0	20.0	45.0	81.0	250.0	130.0	50.0	40.0	19.0	FEB
1950	41.0	32.0	23.0	24.0	26.0	24.0	35.0	25.0	227.0	266.0	99.0	71.0	23.0	MAR
1951	74.0	32.0	18.0	10.0	14.0	12.0	20.0	44.0	182.0	334.0	114.0	52.0	10.0	JAN
1952	45.0	20.0	18.0	19.0	15.0	15.0	22.0	150.0	250.0	142.0	76.0	36.0	15.0	FEB
1953	35.0	30.0	25.0	15.0	14.0	15.0	20.0	25.0	217.0	177.0	64.0	31.0	14.0	FEB
1954	32.0	25.0	15.0	15.0	20.0	15.0	25.0	42.0	164.0	139.0	51.0	29.0	15.0	MAR
1955	22.0	21.0	21.0	19.0	21.0	20.0	19.0	28.0	131.0	168.0	58.0	36.0	19.0	JAN
1956	23.0	23.0	24.0	22.0	21.0	21.0	25.0	62.0	390.0	242.0	82.0	32.0	21.0	FEB
1957	32.0	26.0	26.0	16.0	16.0	19.0	20.0	80.0	444.0	207.0	93.0	59.0	16.0	JAN
1958	44.0	20.0	15.0	15.0	15.0	12.0	20.0	44.0	313.0	132.0	73.0	34.0	22.0	MAR
1959	24.0	24.0	15.0	15.0	14.0	15.0	20.0	56.0	152.0	195.0	59.0	47.0	14.0	FEB
1960	47.0	30.0	20.0	15.0	15.0	15.0	21.0	27.0	324.0	80.0	44.0	29.0	15.0	JAN
1961	31.0	25.0	11.0	10.0	12.0	12.0	14.0	20.0	240.0	60.0	50.0	58.0	10.0	JAN
1962	64.0	54.0	28.0	30.0	16.0	18.0	26.0	91.0	216.0	233.0	93.0	61.0	16.0	FEB
1963	43.0	32.0	24.0	20.0	19.0	16.0	38.0	67.0	412.0	119.0	53.0	56.0	15.0	MAR
1964	35.0	28.0	15.0	17.0	17.0	18.0	20.0	33.0	202.0	215.0	61.0	40.0	15.0	MAR
1965	36.0	20.0	15.0	20.0	15.0	14.0	25.0	68.0	379.0	284.0	86.0	65.0	14.0	MAR
1966	48.0	41.0	23.0	19.0	20.0	18.0	39.0	43.0	230.0	103.0	49.0	40.0	18.0	MAR
1967	37.0	21.0	15.0	16.0	14.0	12.0	17.0	20.0	533.0	217.0	80.0	39.0	12.0	MAR
1968	43.0	35.0	25.0	19.0	17.0	18.0	20.0	38.0	285.0	156.0	112.0	70.0	17.0	FEB
1969	48.0	35.0	19.0	19.0	17.0	15.0	38.0	57.0	228.0	140.0	45.0	25.0	15.0	MAR
1970	39.0	20.0	18.0	12.0	15.0	11.0	16.0	20.0	438.0	198.0	61.0	74.0	11.0	MAR
1971	39.0	18.0	15.0	14.0	24.0	19.0	23.0	75.0	348.0	305.0	136.0	65.0	14.0	JAN

MINIMUM OF RECORD 10.0 FOR JAN 27 1951

-1.0 INDICATES MISSING DATA

Example of MONTH

PEAKDATES

For each crest-gage and S-R recorder station on WRDS, this program prints a station description, which includes location information, along with the years of data available for each station. A partial list is shown in the example.

Example of PEAKDATES

****LIST OF PEAK DATA STATIONS****

WAGON GULCH NEAR DUBOIS, WYOMING
LATITUDE 43-34-42 LONGITUDE 109-44-13 SECTION 30 TOWNSHIP 43 N RANGE 107 W
DRAINAGE AREA 4.89 STATION NO 062187.00
SQUARE MILES

1961 TO 1974

WIND RIVER TRIBUTARY NEAR BURRIS, WYO.
LATITUDE 43-25-09 LONGITUDE 109-23-18 SECTION 8 TOWNSHIP 5 N RANGE 5 W
DRAINAGE AREA 4.71 STATION NO 062212.00
SQUARE MILES

1964 TO 1965

1967 TO 1967

1969 TO 1972

SAND DRAW NEAR CROW HEART, WYO.
LATITUDE 43-15-50 LONGITUDE 109-05-05 SECTION 2 TOWNSHIP 3 N RANGE 3 W
DRAINAGE AREA 12.8 STATION NO 062237.00
SQUARE MILES

1963 TO 1963

1970 TO 1974

WIND RIVER TRIBUTARY NO 2 NEAR CROWHEART, WYO.
LATITUDE 43-14-18 LONGITUDE 109-01-52 SECTION 18 TOWNSHIP 3 N RANGE 2 W
DRAINAGE AREA 3.16 STATION NO 062238.00
SQUARE MILES

1961 TO 1974

LITTLE DRY CREEK NEAR CROWHEART, WYO.
LATITUDE 43-32-10 LONGITUDE 109-05-20 SECTION 35 TOWNSHIP 7 N RANGE 3 W
DRAINAGE AREA 10.5 STATION NO 062262.00
SQUARE MILES

1961 TO 1961

1963 TO 1974

PERMAX

Maximum mean daily discharges in cfs for a selected number of days are printed by water year by this program. Up to eleven periods may be specified. The example uses the periods suggested in ASCE Proceedings Paper No. 4725 (1966). The same analysis can be run for a specified month range. The month range must be within one water year. Thus one month or a range of consecutive months may be specified.

For each station the user should specify the year range (unless all years are to be used), the number of days in each period (up to eleven periods) and month range (unless all months are to be used) to be analyzed.

Example of PERMAX

SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
ELEVATION 6700. FEET MSL DRAINAGE AREA + 135. SQUARE MILES

HIGHEST MEAN DISCHARGE, IN CFS, FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30
FOR THE ENTIRE WATERYEAR

YEAR	1	3	7	14	30	60	90	120	150	183	274	ANNUAL	PEAK	DATE
***** STREAMFLOW RECORD FOR PERIOD REQUESTED NOT COMPLETE *****														
1929	912	735	554	527	433	376	320	272	235	202	144	121	1040.	JUL 12
1930	920	714	702	597	443	302	232	191	164	141	102	91	994.	JUN 3
1931	1570	1430	1265	1033	760	541	430	343	284	239	168	134	2110.	JUN 26
1932	664	600	574	554	450	354	284	242	206	177	124	103	92400.	JUN 05
1946	819	667	556	498	455	382	332	286	248	212	148	119	88900.	JUN 20
1947	1020	945	902	836	675	519	395	312	260	218	152	123	128000.	JUN 03
1948	900	772	655	552	469	399	328	268	224	192	135	108	104000.	JUN 11
1949	1010	963	871	807	748	566	447	366	308	259	181	145	116000.	JUL 02
1950	986	899	734	610	537	491	443	370	311	262	181	150	120000.	JUN 16
1951	1000	933	828	686	532	409	345	295	250	211	148	120	122000.	JUN 06
1952	944	868	821	689	560	422	323	258	215	181	127	104	120000.	JUN 16
1953	902	844	758	616	510	405	350	281	235	198	138	111	108000.	JUN 24
1954	675	638	569	524	415	336	270	221	185	156	111	89	133000.	JUL 23
1955	1080	1050	992	968	881	677	529	425	354	297	206	160	122000.	JUN 02
1956	1330	1303	1217	1100	840	679	537	435	363	304	208	164	161000.	JUN 05
1957	800	751	740	680	549	438	351	289	241	202	141	115	91600.	MAY 22
1958	1010	990	935	903	696	513	395	317	264	222	153	121	119000.	JUN 17
1959	806	709	651	591	525	359	278	224	186	158	111	93	96800.	JUN 15
1960	844	806	763	729	600	405	297	242	210	175	122	98	113000.	MAY 29
1961	802	754	709	695	636	481	390	331	288	248	175	148	100000.	JUN 26
1962	1120	1037	893	731	671	561	435	346	289	245	171	138	123000.	JUN 15
1963	963	937	884	755	641	506	407	323	267	224	156	124	1140.	JUN 27
1964	1100	1053	941	903	784	630	497	404	341	289	200	158	1390.	JUN 16
1965	798	623	512	430	393	333	273	225	192	165	118	102	1010.	JUN 22
1966	1110	1050	1028	948	853	719	549	434	357	296	204	161	1350.	JUN 19
1967	985	882	735	602	537	415	329	273	232	195	138	114	1200.	JUN 19
1968	475	445	425	353	349	315	273	225	191	165	116	98	662.	JUN 21
1969	1150	1063	1006	845	725	660	510	403	340	282	193	153	1350.	JUN 25
1970	1490	1440	1318	1210	956	728	580	480	406	340	236	186	1840.	JUN 23

PERMIN

Minimum mean daily discharges in cfs for a selected number of days are printed by water year. Up to eleven periods may be specified. The example uses the periods suggested in ASCE Proceedings Paper No. 4725 (1966). The same analysis can be run for a specified month range. The month range must be within one water year. Thus one month may be specified, e.g., July, or several months, e.g., April through June.

PERMIN is quite useful for 3-, 5-, 7- and 10-day low flows needed for water quality studies.

For each station the user should specify the year range (unless all years are to be used), the number of days in each period (up to eleven periods) and range (unless all months are desired) to be analyzed.

Example of PERMIN

SUNLIGHT CREEK NEAR PAINTER, WYOMING STATION NO 062065.00
 LATITUDE 44-45-00 LONGITUDE 109-30-40 SECTION 16 TOWNSHIP 55 N RANGE 105 W
 ELEVATION 6700. FEET MSL DRAINAGE AREA 4 135. SQUARE MILES

LOWEST MEAN DISCHARGE, IN CFS, FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30
 FOR THE ENTIRE WATERYEAR

YEAR	1	3	7	14	30	60	90	120	150	183	274
***** STREAMFLOW RECORD FOR PERIOD REQUESTED NOT COMPLETE *****											
1929	20.0	20.0	20.0	20.6	22.2	24.9	26.4	28.6	32.5	36.9	97.6
1930	25.0	25.0	25.0	25.0	25.0	25.0	25.7	26.0	27.3	30.2	94.3
1931	20.0	20.0	21.0	22.9	24.1	25.0	25.1	25.3	26.5	27.9	123.3
1932	16.0	16.0	16.0	16.0	16.0	17.0	19.0	20.3	23.3	27.0	92.5
1933	14.0	14.0	14.0	14.0	14.3	16.7	18.1	19.7	21.7	24.9	93.4
1934	16.0	16.0	16.0	16.0	16.1	17.0	19.0	20.8	22.3	23.7	117.9
1935	19.0	19.0	19.0	19.0	19.1	19.5	19.7	20.0	21.3	23.9	101.4
1936	23.0	23.0	23.0	23.0	23.1	23.6	24.3	24.4	26.5	27.6	101.6
1937	10.0	12.0	12.6	12.9	15.5	17.6	18.5	20.2	23.0	27.7	108.8
1938	15.0	15.0	16.0	16.4	17.7	18.4	20.7	21.8	22.9	26.9	112.7
1939	14.0	14.7	15.0	15.0	16.5	17.8	19.4	20.4	21.7	23.9	83.7
1940	15.0	15.0	15.0	15.0	16.7	18.0	18.4	19.1	20.7	23.0	96.4
1941	19.0	19.0	19.0	19.0	19.0	19.9	20.0	20.2	20.4	21.1	71.9
1942	21.0	21.0	21.0	21.0	21.0	21.5	22.2	22.5	23.0	23.8	156.7
1943	16.0	16.0	16.0	16.0	16.0	16.0	17.0	18.8	20.6	22.8	148.9
1944	12.0	14.0	14.6	14.8	16.6	17.0	18.0	18.9	20.5	23.4	114.8
1945	14.0	14.0	14.0	14.0	14.1	14.5	15.0	16.3	18.2	19.9	107.6
1946	15.0	15.0	15.0	15.0	16.4	16.9	17.5	20.1	21.9	24.0	94.2
1947	10.0	11.0	12.1	12.7	13.5	13.8	15.1	15.3	16.0	18.0	96.1
1948	16.0	16.7	18.6	18.6	20.3	23.2	26.2	30.6	36.4	44.8	127.9
1949	16.0	16.7	17.4	18.0	18.4	20.1	21.8	23.7	26.2	29.1	132.1
1950	15.0	15.7	16.9	17.4	17.7	17.8	18.4	18.9	20.1	22.2	95.8
1951	14.0	14.7	15.1	15.8	17.0	18.1	20.5	22.5	23.8	25.8	128.0
1952	18.0	18.7	19.9	20.7	21.7	22.2	23.6	27.0	30.5	33.2	96.5
1953	12.0	13.0	13.3	14.4	14.9	16.1	17.0	18.3	19.2	20.8	144.3
1954	17.0	18.0	18.1	18.7	20.1	20.2	21.1	23.1	24.6	27.3	93.9
1955	15.0	15.0	15.0	15.9	16.6	18.3	19.1	21.0	24.9	29.3	90.1
1956	11.0	11.7	12.6	13.3	14.4	15.8	15.7	16.8	17.9	20.0	139.9
1957	14.0	14.7	16.0	16.7	18.1	21.0	24.2	24.4	25.5	28.6	163.1

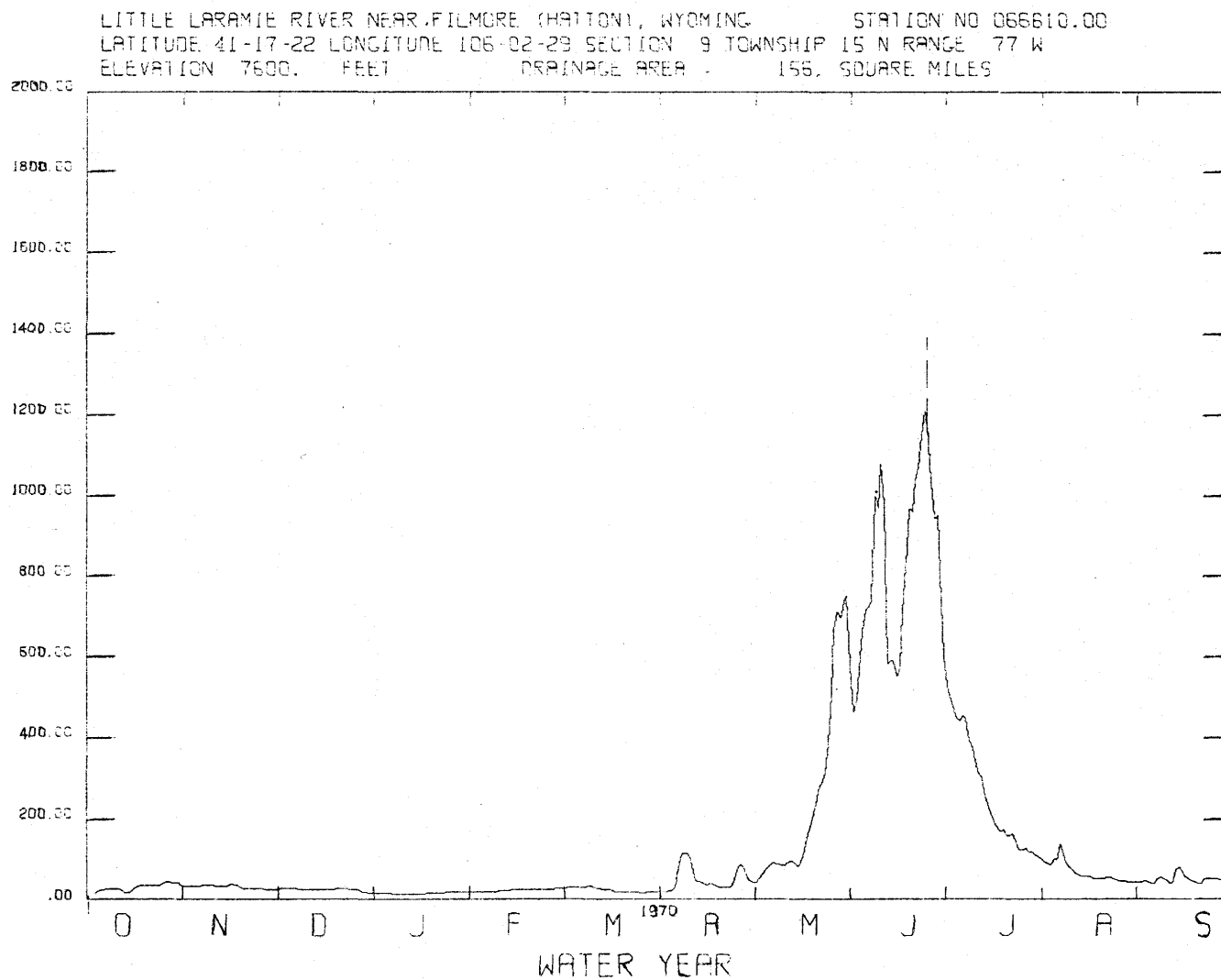
PLQTFLOW

Plots of mean daily flow versus time for any station on the system are provided by this program. Up to ten years can be plotted on a single plot. Each year uses 10", thus a ten-year plot would be 100" long. The program sets the vertical scale to accommodate the largest flow within the period requested. Since this can cause some loss of detail for low-flow years, the user may wish to limit the number of years per plot.

There is an option to include the annual instantaneous peak on the plot which would be plotted as a dashed line. The following two pages show a year of data plotted with and without the peak flow.

For each station the user should specify the year range (unless all years are to be used) and whether or not the peaks are to be plotted.

STREAMFLOW IN C.F.S.

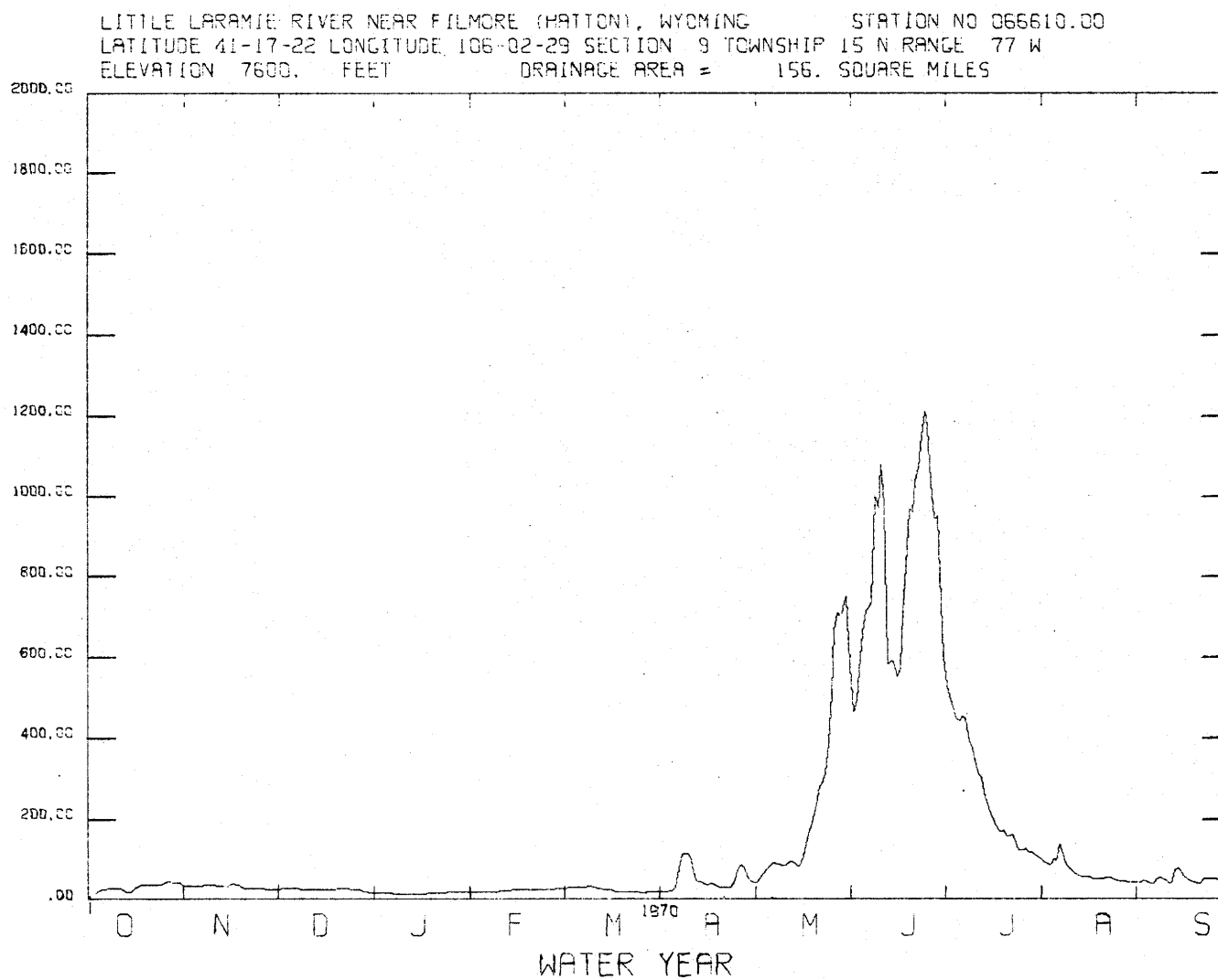


PEAK VALUE

PEAK: 1390 CFS JUNE 26

Example of PLOTFLOW

STREAMFLOW IN C.F.S.



PEAK: 1390 CFS JUNE 26

Example of PLOTFLOW

This program performs a low flow frequency analysis for a recurrence interval of one to 100 years. The Log-Pearson Type III method is used. A period of seven days is commonly used although any number of days may be specified.

The printout includes a listing of: year, low flow value for year, log of this value, statistics of the log values, percent chance, recurrence interval and computed flows. A plot of the data and the computed curve may be produced at the user's request.

For each station the user should specify the year range (unless all years are desired), the month range (unless all months are to be used) and whether or not a plot is to be produced. The month range must be within one water year.

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.  LOW FLOW FREQUENCY ANALYSIS  LOG-PEARSON TYPE III METHOD  .
.
.  7-DAY AVERAGE LOW FLOW  .
.
.  FOR ENTIRE YEARS OF RECORD  .
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.....

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TONGUE RIVER AT STATE LINE, NEAR DECKER, MONTANA STATION NO 063063.00
 LATITUDE 45-00-32 LONGITUDE 106-50-08 SECTION 33 TOWNSHIP 9 S RANGE 40 E
 ELEVATION 3430. FEET DRAINAGE AREA = 1477. SQUARE MILES

PERIOD 1961 - 1974 14 YEARS OF DATA

YEAR	DATE	FLJW VALUE Y	LOG Y = X
1961		7	.857332
1962		133	2.124829
1963		73	1.868644
1964		94	1.973589
1965		128	2.110252
1966		22	1.359835
1967		110	2.042968
1968		150	2.176090
1969		71	1.851869
1970		108	2.037027
1971		85	1.931458
1972		174	2.241297
1973		136	2.135768
1974		125	2.098989
SUMMATION X =		26.809952	
SUMMATION X SQUARED =		53.148331	
SUMMATION X CUBED =		107.436768	
MEAN OF X =		1.914997	
STANDARD DEVIATION =		.372864	
SKEW COEFFICIENT =		-2.188757	

STANDARD DEVIATION AND SKEW COEFFICIENT AS DEFINED FOR LOG PEARSON TYPE III METHOD

```

*****
*
*   LOW FLOW FREQUENCY ANALYSIS  LOG-PEARSON TYPE III METHOD
*
*   7-DAY AVERAGE LOW FLOW
*
*   FOR ENTIRE YEARS OF RECORD
*
*****

```

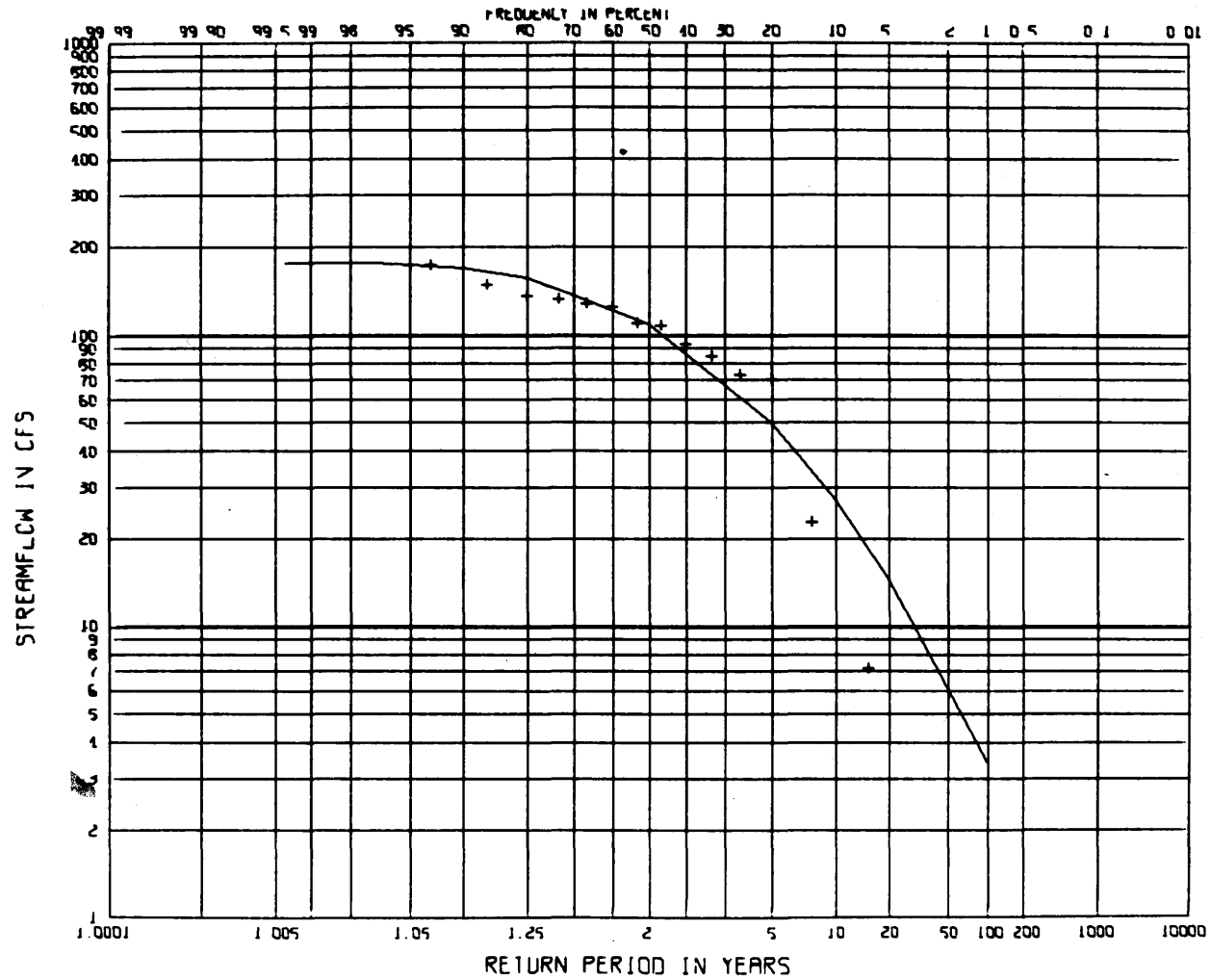
TONGUE RIVER AT STATE LINE, NEAR DECKER, MONTANA STATION NO 063063.00
 LATITUDE 45-00-32 LONGITUDE 106-50-08 SECTION 33 TOWNSHIP 9 S RANGE 40 E
 ELEVATION 3430. FEET DRAINAGE AREA = 1477. SQUARE MILES

PERIOD 1961 - 1974 14 YEARS OF DATA

PERCENT CHANCE	RECURRENCE INTERVAL YEARS	COMPUTED FLOW OR LESS CFS
99.5	1.0050	179.14
99.0	1.0100	178.83
98.0	1.0200	178.06
96.0	1.0417	176.24
90.0	1.1111	169.70
80.0	1.2500	156.82
50.0	2.0000	109.15
20.0	5.0000	50.23
10.0	10.0000	27.30
5.0	20.0114	14.69
1.0	100.0060	3.42

Example of Q7,10

7-DAY AVERAGE LOW FLOW LOC-PEARSON TYPE III ANALYSIS FOR ENTIRE YEARS OF RECORD
 TONGUE RIVER AT STATE LINE, NEAR DELKER, MONTANA STATION NO 063063.00
 PERIOD 1961 - 1974 14 YEARS OF DATA



Example of Q7,10

RESERV

This program prints a tabulation of end-of-the-month reservoir contents in acre-feet and a tabulation of change in reservoir contents for each month. Mean monthly and annual values are also calculated and printed.

For each station the user should specify the year range unless all years are to be printed.

SEMINOLE RESERVOIR NEAR LEO, WYOMING STATION NO 066355.00
 LATITUDE 42-09-21 LONGITUDE 106-54-29 SECTION 8 TOWNSHIP 25N RANGE 84W
 ELEVATION 6357 FT AT SPILLWAY CAP. 1,011,000 AC-FT DRAINAGE AREA 11,189 SQ MI

END OF THE MONTH RESERVOIR CONTENTS
 IN ACRE-FEET

YEAR	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	MEAN ANNUAL
1939	-1	-1	-1	-1	0	6740	90930	244960	228680	95670	19040	25850	-1
1940	37520	44200	44200	43420	47000	64610	66920	128350	158430	67540	23690	27170	62758
1941	45280	54760	61690	62990	65070	82100	98820	257000	334700	208300	114700	121600	125584
1942	132000	143000	132200	107300	83730	64380	160800	283600	551000	533800	438400	360600	249234
1943	325000	299400	277000	249500	221700	231500	343900	413600	613300	569400	454200	392500	355925
1944	342200	313100	274000	221100	167600	121900	168800	276300	462700	430700	313200	256900	279041
1945	240200	217600	181800	142300	117000	107900	145200	363000	653100	770800	780300	746000	372141
1946	702700	671800	639400	595300	554500	543000	610700	693500	819700	727600	610700	562000	644241
1947	502500	472200	437700	380000	339000	344200	405300	636200	932700	978000	922200	871800	601991
1948	818300	780900	737100	682000	624300	590800	650700	825700	947500	873900	797800	728200	755600
1949	675100	628700	610300	575500	546400	522400	604500	848600	1020000	1006000	919200	856000	735225
1950	811600	769500	706300	647200	604000	573800	601800	657000	885400	863700	780400	745400	720591
1951	710600	676100	642000	594800	556900	524900	556200	710200	988400	1031000	992800	941500	743783
1952	898000	859500	790300	714500	636000	536000	625400	901000	1047000	1002000	955400	898900	822000
1953	819200	750300	694700	653200	620900	580200	557300	589200	772600	714600	660200	565300	664808
1954	466200	392600	319900	251600	245000	235700	265900	336300	356600	357200	355500	324900	315616
1955	339500	341600	335600	328400	322000	312100	364100	396200	457000	452800	463300	455700	380691
1956	423400	372500	340700	330700	286000	267800	283700	433000	603900	530900	429800	369000	389283
1957	331200	300300	293000	285700	297400	270300	243000	351400	835600	1033000	1008000	911300	513350
1958	851100	770200	679900	613800	601600	561700	548900	781800	962500	967300	928500	901200	754050
1959	904700	901400	899000	818400	701600	597600	536500	524800	687800	629500	591700	547200	695016
1960	518200	478900	416800	335200	268000	252800	276400	350700	493700	449300	380700	335900	379716
1961	249400	181400	140000	107000	76720	63650	62970	133300	274800	279200	254400	263300	173845
1962	265700	239100	207200	165300	143000	106400	291800	549800	736900	831400	783900	739700	421633
1963	630200	530000	410100	310800	308000	332600	372800	483900	592000	575500	519800	503700	464116
1964	461600	418000	354200	289500	222600	118100	120000	220000	409300	432300	386400	340600	314383
1965	303700	280600	245000	202100	160800	91340	90600	203900	572700	673000	690600	704800	351595
1966	689800	630500	556600	474700	399600	394200	407500	485400	537200	487400	422800	330500	484693
1967	300200	287600	262600	196100	120900	90700	76080	139400	414100	510400	501800	480500	281698
1968	457020	418160	351430	292570	230170	222240	245700	380790	757700	810700	812060	791650	480849
1969	760250	682740	572700	480630	421720	371990	447416	603768	749609	755476	710536	659382	601351
1970	607900	562700	496300	398900	313500	258000	274200	509700	897800	955300	883500	840500	583200
1971	793500	754200	649300	523300	417400	349900	384900	555300	938900	955300	928800	884000	677900
1972	848100	810000	750700	686600	627000	590600	582800	698300	946000	938200	909000	882400	772475
1973	829200	765700	653200	570900	513200	491500	621500	949600	977600	986600	954000	950500	771958
1974	900000	857400	813800	700300	641400	582100	567200	777200	983500	951100	905700	850200	794138
MONTHLY MEANS	542604	504761	456534	400906	347269	318215	354201	491743	683344	678746	627878	587993	507553

-1 INDICATES MISSING DATA

Example of RESERV

SEMINOLE RESERVOIR NEAR LEO, WYOMING STATION NO 066355.00
 LATITUDE 42-09-21 LONGITUDE 106-54-29 SECTION 8 TOWNSHIP 25N RANGE 84W
 ELEVATION 6357 FT AT SPILLWAY CAP. 1,011,000 AC-FT DRAINAGE AREA 11,189 SQ MI

CHANGE IN RESERVOIR STORAGE CONTENTS
 IN ACRE-FEET

YEAR	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	ANNUAL
1939	-99999999	-99999999	-99999999	-99999999	-99999999	6740	84190	154030	-16280	-133010	-76630	6810	-99999999
1940	11670	6680	0	-780	3580	17610	2310	61430	30080	-90890	-43850	3480	1320
1941	18110	9480	6930	1300	2080	17030	16720	158180	77700	-126400	-93600	6900	94430
1942	10400	11000	-10800	-24900	-23570	-19350	96420	122800	267400	-17200	-95400	-77800	239000
1943	-35600	-25600	-22400	-27400	-27900	9800	112400	69700	199700	-43900	-115200	-61700	31900
1944	-50300	-29100	-39100	-52900	-53500	-45700	46900	107500	186400	-32000	-117500	-56300	-135600
1945	-16700	-22600	-35800	-39500	-25300	-9100	37300	217800	290100	117700	10000	-34800	489100
1946	-43300	-30900	-32400	-44100	-40800	-11500	67700	82800	126200	-92100	-116900	-48700	-184000
1947	-59400	-30400	-32500	-59700	-41000	5200	61100	230900	296500	45300	-55800	-50400	309800
1948	-53500	-37400	-43800	-55100	-57700	-33500	59900	185000	111800	-73600	-76100	-69600	-143600
1949	-53100	-36400	-28400	-34800	-29100	-24000	82100	244100	171400	-14000	-86800	-63200	127800
1950	-44400	-42100	-63200	-59100	-43200	-30200	28000	55200	228400	-21700	-83300	-34000	-109600
1951	-35800	-34500	-34100	-47200	-37900	-32000	31300	154000	278200	42600	-38200	-51300	195100
1952	-43500	-38500	-69200	-75800	-78500	-100000	89400	275600	146000	-45000	-46600	-56500	-42600
1953	-79700	-68900	-55600	-41500	-32300	-40700	-22900	31900	183400	-58000	-54400	-94900	-333600
1954	-99100	-73600	-72700	-68300	-6600	-9300	30200	70400	20300	600	-1700	-30500	-240400
1955	14600	2100	-5000	-7200	-6400	-9900	52000	32100	60800	-4200	10500	-7500	130800
1956	-32300	-50900	-31800	-10000	-44700	-18200	15900	149300	170900	-73000	-101100	-60800	-86700
1957	-37800	-30900	-7300	-7300	11700	-27100	-27300	108400	484200	197400	-25000	-96700	542300
1958	-60200	-80900	-90300	-66100	-12200	-39900	-12800	232900	180700	4800	-38700	-27400	-10100
1959	3500	-3300	-2400	-80600	-116800	-104000	-61100	-11700	163000	-58300	-37800	-44500	-354000
1960	-29000	-39300	-62100	-81600	-67200	-15200	23600	74300	143000	-44400	-68600	-44800	-211300
1961	-86500	-68000	-41400	-33000	-30280	-13070	-680	70330	141500	4400	-24800	8900	-72600
1962	2400	-26600	-31900	-41900	-22300	-36600	185400	258000	187100	94500	-47500	-44200	476400
1963	-109500	-100200	-119900	-99300	-2800	24600	40200	111100	108100	-16500	-55700	-16100	-236000
1964	-42100	-43600	-63800	-64700	-66900	-104500	1900	100000	189300	23000	-45900	-45800	-163100
1965	-36900	-23100	-35600	-42900	-41300	-69460	-740	113300	368800	100300	17600	14200	364200
1966	-15000	-59300	-73900	-81900	-75100	-5400	13300	77900	51800	-49800	-64600	-92300	-374300
1967	-30300	-12600	-25000	-66500	-75200	-30200	-14620	63320	274700	96300	-8500	-21300	150000
1968	-23480	-38860	-66730	-58860	-62400	-7930	23460	135090	376910	53000	1360	-20410	311150
1969	-31400	-77510	-110040	-92070	-58910	-49730	75426	156352	145841	5867	-44940	-51154	-132268
1970	-51482	-45200	-66400	-97400	-85400	-55500	16200	235500	388100	57500	-71800	-42900	181218
1971	-47100	-39300	-104900	-126000	-105900	-67500	35000	170400	383600	16400	-26500	-44800	43400
1972	-35900	-38100	-59300	-64100	-59600	-36400	-7800	115500	247700	-7800	-29200	-26600	-1600
1973	-53200	-63500	-112500	-82300	-57700	-21700	130000	328100	28000	9000	-32600	-3500	68100
1974	-50500	-42600	-43600	-113500	-58900	-59300	-14900	210000	206300	-32400	-45400	-55500	-100300

MONTHLY
 MEANS -1326382 -1324510 -1687940 -1947010 -1530000 -1045960 1295486 4951532 6897651 -165533 -1831260 -1435874 824350

-99999999 INDICATES MISSING DATA

NEGATIVE VALUES INDICATES DECREASING STORAGE
 POSITIVE VALUES INDICATES INCREASING STORAGE

Example of RESERV

RESTNS

This program lists the reservoir contents stations stored in WRDS. The example shows a partial listing.

Example of RESTNS
List of Reservoir Stations

BULL LAKE RESERVOIR NEAR LENORE, WYOMING STATION NO 062245.00
LATITUDE 43-12-35 LONGITUDE 109-02-30 SECTION 30 TOWNSHIP 3N RANGE 2W
ELEVATION 5805 FT AT SPILLWAY CAPACITY 152500 ACRE-FEET

BOYSEN RESERVOIR WYOMING STATION NO 062589.00
LATITUDE 43-25-00 LONGITUDE 108-10-37 SECTION 16 TOWNSHIP 5N RANGE 6E W R MER.
ELEVATION 4725 FEET AT SPILLWAY CAPACITY 802,000 ACRE-FEET

ANCHOR RESERVOIR WYOMING STATION NO 062603.00
LATITUDE 43-39-50 LONGITUDE 108-49-27 SECTION 26 TOWNSHIP 43N RANGE 100 W
ELEVATION 6441 FEET AT SPILLWAY CAPACITY 17,350 ACRE-FEET

RUFFALO BILL RESERVOIR NEAR CODY, WYOMING STATION NO 062815.00
LATITUDE 44-30-05 LONGITUDE 109-11-00 SECTION 12 TOWNSHIP 52N RANGE 103W
ELEVATION 5360 FT AT SPILLWAY CAPACITY 421300 ACRE-FEET

BIGHORN LAKE (YELLOWTAIL RES) NEAR ST. XAVIER, MONTANA STATION NO 062864.00
LATITUDE 45-18-27 LONGITUDE 107-57-26 SECTION 18 TOWNSHIP 6S RANGE 31E
ELEVATION 3593 FT AT SPILLWAY CAP. 1356000 AC-FT DRAINAGE AREA 19626 SQ MI

TONGUE RIVER RESERVOIR NEAR DECKER, MONTANA STATION 063070.00
LATITUDE 45-08 LONGITUDE 106-46 SECTION 13 TOWNSHIP 8S RANGE 40E
ELEVATION 3424.4 FT AT SPILLWAY CAP. 68040 AC-FT DRAINAGE AREA 1770 SQ MI

KEYHOLE RESERVOIR NEAR MOORCROFT, WYOMING STATION NO 064270.00
LATITUDE 44-22-55 LONGITUDE 104-46-45 SECTION 27 TOWNSHIP 51N RANGE 66W
ELEVATION 4099.3 FT AT SPILLWAY CAP. 199900 AC-FT DRAINAGE AREA 2000 SQ MI

SEMINDE RESERVOIR NEAR LEO, WYOMING STATION NO 066355.00
LATITUDE 42-09-21 LONGITUDE 106-54-29 SECTION 8 TOWNSHIP 25N RANGE 84W
ELEVATION 6357 FT AT SPILLWAY CAP. 1,011,000 AC-FT DRAINAGE AREA 11,189 SQ MI

PATHFINDER RESERVOIR NEAR ALCOVA, WYOMING STATION NO 066405.00
LATITUDE 42-28-06 LONGITUDE 106-51-12 SECTION 24 TOWNSHIP 29N RANGE 84W
ELEVATION 5850.1 FT AT SPILLWAY CAP. 1016000 AC-FT DRAINAGE AREA 14670 SQ MI

ALCOVA RESERVOIR AT ALCOVA, WYOMING STATION NO 066415.00
LATITUDE 42-32-52 LONGITUDE 106-43-08 SECTION 24 TOWNSHIP 30N RANGE 83W
ELEVATION 5500 FT AT SPILLWAY CAP. 188900 AC-FT DRAINAGE AREA 14735 SQ MI

GLENDO RESERVOIR NEAR GLENDO, WYOMING STATION NO 066527.00
LATITUDE 42-28-21 LONGITUDE 104-57-28 SECTION 24 TOWNSHIP 29N RANGE 68W
ELEVATION 4653 FT AT SPILLWAY CAP. 795200 AC-FT DRAINAGE AREA 19504 SQ MI

GUERNSEY RESERVOIR NEAR GUERNSEY, WYOMING STATION NO 066555.00
LATITUDE 42-17-23 LONGITUDE 104-45-48 SECTION 27 TOWNSHIP 27N RANGE 66W
ELEVATION 4420 FT AT SPILLWAY CAP. 44730 AC-FT DRAINAGE AREA 20183 SQ MI

WHEATLAND RESERVOIR NO. 2 NEAR LOOKOUT, WYOMING STATION NO 066625.00
LATITUDE 41-50-16 LONGITUDE 105-38-18 SECTION 31 TOWNSHIP 22N RANGE 73W
ELEVATION 6964 FT AT SPILLWAY CAP. 98930 AC-FT DRAINAGE AREA 2221 SQ MI

SQRT

Mean daily flows, for any period of record selected, are presented by this program in descending order along with the dates of occurrence. The example shows the beginning and ending of a tabulation for two years of data. Up to ten years of data may be sorted in one run. The mean and standard deviation for the data are printed at the end of the sorted data.

For each station the user should specify the year ranges to be used for each sort process.

Example of SORT

SUNLIGHT CREEK NEAR PAINTER, WYOMING
 LATITUDE 44-45-00 LONGITUDE 109-33-40 SECTION 16 TOWNSHIP 56 N RANGE 10E W
 ELEVATION 6700. FEET MSL DRAINAGE AREA 135. SQUARE MILES

STATION NO 062061.00

DAILY FLOWS IN DESCENDING ORDER
 WATER YEARS 1962 THROUGH 1963

FLOW IN CFS	FROM	THROUGH
1120.0	JUNE 15 1963	JUNE 15 1963
1000.0	JUNE 16 1962	JUNE 16 1963
991.0	JUNE 14 1963	JUNE 14 1963
900.0	JUNE 2 1963	JUNE 2 1963
872.0	JUNE 13 1963	JUNE 13 1963
851.0	JUNE 17 1963	JUNE 17 1963
809.0	JUNE 1 1963	JUNE 1 1963
802.0	JUNE 27 1962	JUNE 27 1962
788.0	JUNE 3 1963	JUNE 3 1963
767.0	JUNE 26 1962	JUNE 26 1962
760.0	JUNE 19 1962	JUNE 19 1962
742.0	JUNE 4 1963	JUNE 5 1963
736.0	JUNE 18 1962	JUNE 18 1962
724.0	JUNE 14 1962	JUNE 14 1962
724.0	MAY 31 1963	MAY 31 1963
724.0	JUNE 16 1962	JUNE 16 1962
724.0	JUNE 20 1963	JUNE 20 1963
712.0	JUNE 30 1962	JUNE 30 1962
700.0	JULY 1 1962	JULY 1 1962
694.0	JUNE 28 1962	JUNE 28 1962
694.0	JUNE 24 1962	JUNE 24 1962
688.0	JULY 2 1962	JULY 3 1962
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.	.	.
22.0	JAN 29 1963	JAN 30 1963
20.0	JAN 13 1963	JAN 13 1963
20.0	MAR 19 1963	MAR 21 1963
20.0	JAN 25 1963	JAN 28 1963
20.0	MAR 12 1962	MAR 14 1962
20.0	FEB 21 1963	FEB 27 1963
20.0	MAR 9 1963	MAR 9 1963
20.0	FEB 11 1963	FEB 12 1963
20.0	MAR 2 1962	MAR 6 1962
20.0	FEB 26 1962	FEB 26 1962
20.0	MAR 28 1963	MAR 28 1963
19.0	MAR 10 1963	MAR 10 1963
19.0	FEB 28 1963	MAR 4 1963
19.0	MAR 18 1963	MAR 18 1963
19.0	MAR 22 1963	MAR 22 1963
19.0	MAR 8 1963	MAR 8 1963
18.0	MAR 7 1962	MAR 11 1962
18.0	MAR 27 1963	MAR 27 1963
18.0	MAR 23 1963	MAR 23 1963
18.0	MAR 5 1963	MAR 5 1963
18.0	MAR 1 1962	MAR 1 1962
18.0	MAR 7 1963	MAR 7 1963
18.0	MAR 11 1963	MAR 11 1963
18.0	MAR 15 1963	MAR 17 1963
17.0	MAR 24 1963	MAR 26 1963
17.0	MAR 6 1963	MAR 6 1963
17.0	MAR 12 1963	MAR 12 1963
17.0	MAR 14 1963	MAR 14 1963
16.0	FEB 27 1962	FEB 28 1962
16.0	MAR 13 1963	MAR 13 1963

MEAN IS 138.6

STANDARD DEVIATION IS 206.4

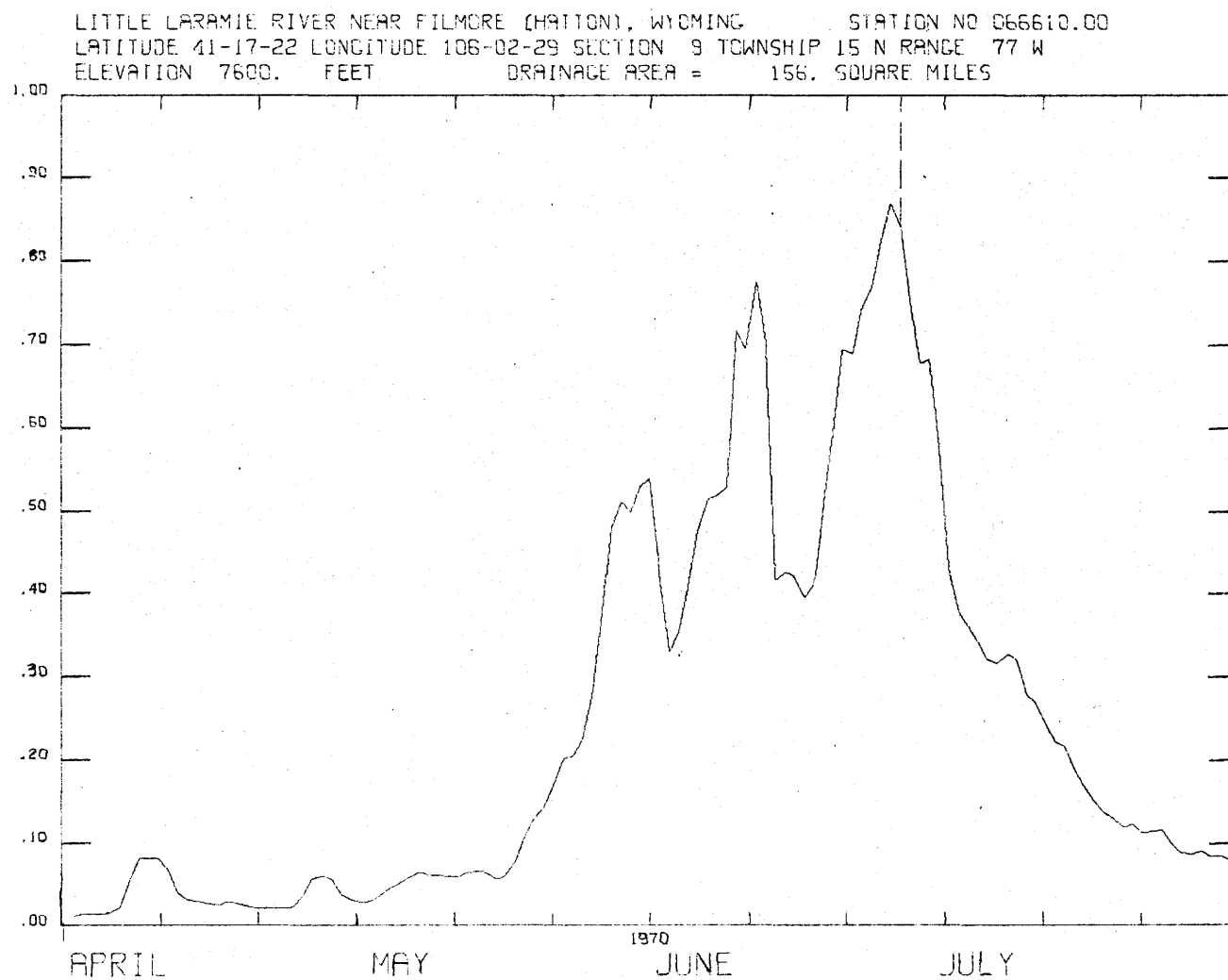
UNITPEAK

This program plots four months of unitized flows. The mean daily flows for the specified four months are unitized by dividing them by the annual instantaneous peak. The four months, which must be within one water year, should include the peak event so that the unitized peak will be plotted.

A series of these plots can be overlaid on a light table and typical storm runoff characteristics can then be defined. This type of analysis was recently initiated by the Wyoming Highway Department. That department should be contacted for further information regarding the analysis.

For each station the user should specify the four-month period of each year to be plotted (the peak should occur within the period) along with the year range.

STREAMFLOW IN C.F.S.



PEAK VALUE

PEAK: 1390 CFS JUNE 26

Example of UNITPEAK

WATER QUALITY DATA

Water quality data for Wyoming have been stored for groundwater as well as for surface water sources. The data have been gathered from as many organizations as has been possible. The sources include the U.S. Geological Survey, Environmental Protection Agency, Bureau of Land Management, Bureau of Reclamation, U.S. Forest Service, Wyoming Department of Environmental Quality, Wyoming Game and Fish and the State Laboratory in Laramie. Portions of the data are not computerized elsewhere. For example, a large amount of sediment data collected and reported in the 1950's by the USGS and groundwater data published in earlier USGS reports previously had not been stored on a computer system.

For each station at which water quality data is collected, a header is stored which includes the name, location and type of station and the source organization. The source organization is the agency responsible for the data. The organization and its station number (if available) are the last items on the second line of the header (see QCADATA for an example). For each sample collected, the sample collector and the testing lab are indicated. This information may be useful to the user who is skeptical of the validity of data from some sources or from certain testing methods. The tables on the following pages indicate the abbreviations used for these agencies.

WATER QUALITY DATA

(continued)

Abbreviation for Source Organization -----	Abbreviation for Sample Collector -----	Agency -----
UNKN	UNKNOWN	Unknown
USGS	USGS	United States Geological Survey
DEQ	WYO DEQ	Wyoming Department of Environmental Quality, Cheyenne
BREC	BUREC	Bureau of Reclamation
USFS	USFS	United States Forest Service
BLM	BLM	Bureau of Land Management
PRIV	PRIVATE OR OWNER	Permittee, private individual or firm or city owner
ERDA	ERDA	Energy Research and Develop- ment Administration, Laramie (now Laramie Energy Technology Center of the U.S. Department of Energy)
EPA	EPA	Environmental Protection Agency
G+F	WYO GAME FISH	Wyoming Game and Fish, Cheyenne
HYW	HYW DEPT	Highway Department
WRI	WRI	Water Resources Research Institute, Laramie
LARL	ST. LAB LARAMIE	State Testing Laboratory, Laramie
ARGN	ARGONNE NAT. LAB	Argonne National Laboratory, Argonne, Illinois
SCS	SOIL CONV. SERV.	Soil Conservation Service
WWYO	W. WYO. COLLEGE	Western Wyoming College, Rock Springs
RMEC	ROCKY MTN ENERGY	Rocky Mountain Energy Company, Denver, Colorado

WATER QUALITY DATA

(continued)

There are two basic types of water quality data stored in the system. These are grab sample data and daily sample data. Grab sample data are derived from samples collected at particular locations at a particular time. They are less frequent and more sporadic than daily samples. Daily sample data are derived from continuous measurements or once-daily observations at particular locations. The daily sample data are stored by water year. Some of the following analytical programs are applicable to only one or the other type of data.

Retrieval Types

Information retrieval may be made in several ways. These are by: identification type, county, city, drainage basin, latitude-longitude, township-range and reference number.

Identification types in the system are:

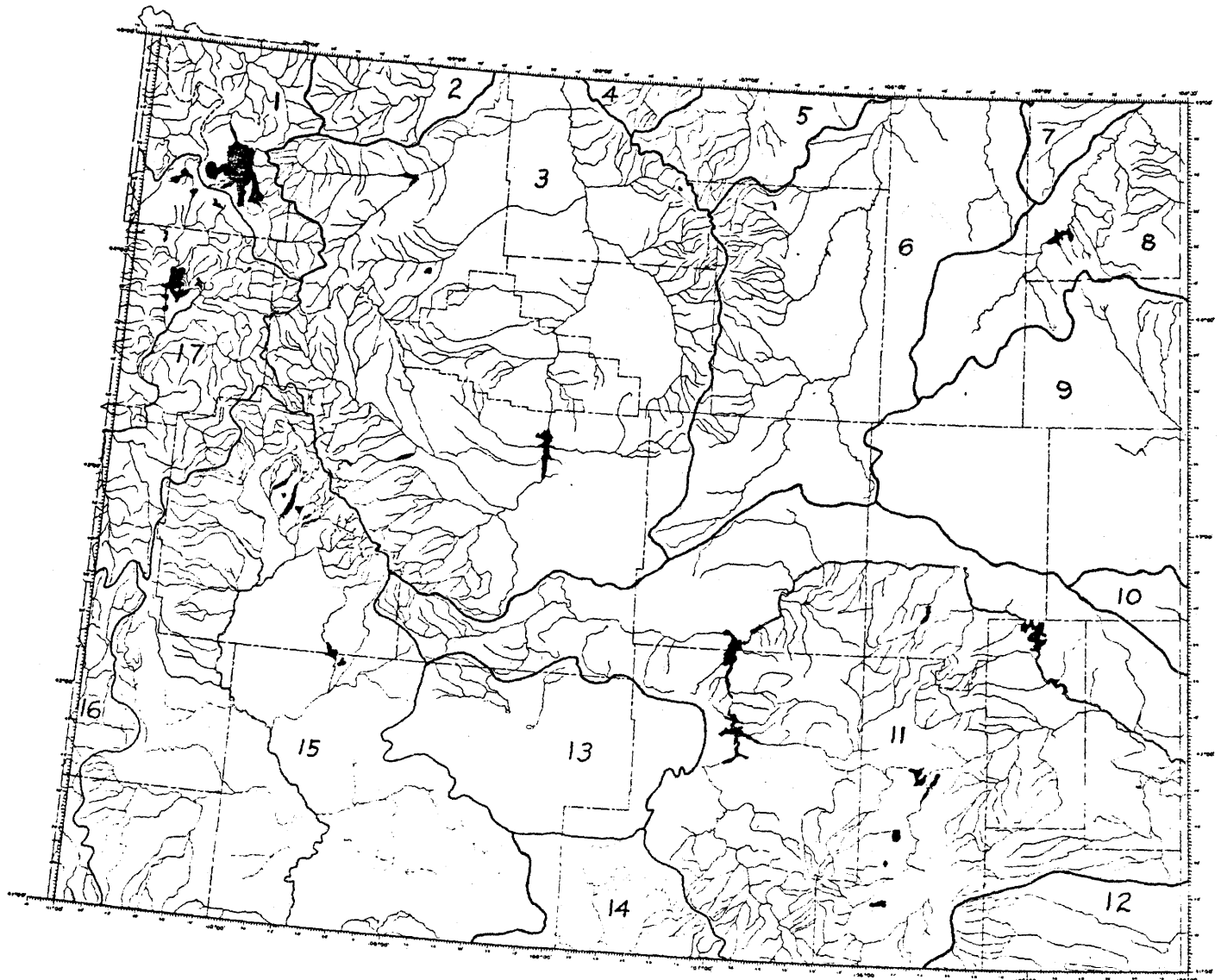
- City System Supply
- City Supply, Individual Source, Well or Spring
- City Supply, Individual Source, Stream
- Other Public System Supply
- Other Public Supply, Individual Source, Well or Spring
- Other Public Supply, Individual Source, Stream
- Individual Drinking Supply, Well or Spring
- Individual Drinking Supply, Stream
- Stock-water Supply, Well or Spring
- Stock-water Supply, Stream
- Irrigation Supply, Well or Spring
- Irrigation Surface
- Industrial Supply, Well or Spring
- Individual Supply, Stream
- USGS Well
- USGS Stream
- Other Agency
- Community Discharge
- Storm Drainage Discharge
- Individual Discharge
- Irrigation Return
- Industrial Discharge
- Radiological Monitoring Station
- Lakes or Reservoirs
- Individual Well or Spring
- Stream (other than USGS)
- ERDA Wells
- Retort Water

For example, the user may request information for all USGS wells.

Similarly the user may request information for an entire county (or Yellowstone Park) or for a city or town in Wyoming. Data may also be retrieved by indicating any state adjacent to Wyoming.

Drainage basins have been defined as shown in Figure 1. These divisions are in conformance with most federal and Wyoming

Figure 1
Wyoming Drainage Basins



- 1 Madison-Yellowstone
- 2 Clarks Fork
- 3 Big Horn
- 4 Little Big Horn
- 5 Tongue
- 6 Powder
- 7 Little Missouri
- 8 Belle Fourche
- 9 Cheyenne

- 10 Niobrara
- 11 North Platte
- 12 South Platte
- 13 Great Divide
- 14 Little Snake
- 15 Green
- 16 Bear
- 17 Snake

Retrieval Types

(continued)

agency divisions. The basins have been divided and subdivided by delineating the streams and their tributaries. The user is therefore able to request information by one of several drainage basin levels. For example, the user may request information for everything in the North Platte basin--a rather large request. However, if the user is only interested in information for the Laramie River basin, this may be requested. Similarly if the user only wants information for the Little Laramie River, this may also be requested. Finally, the user may request information on the North Fork of the Little Laramie River if that is what is desired. Essentially all that the user needs to specify is the drainage basin, either large or small, for a request. The mechanics of filling the request will be taken care of by WRRI personnel.

Latitude-longitude retrieval is defined by a 10-minute grid, referenced to the southeast corner of each square of the grid. For example, a request for information by latitude 41-20 and longitude 109-50 would result in a retrieval for all stations from $41^{\circ} 20' 00''$ to $41^{\circ} 29' 59''$ latitude and from $109^{\circ} 50' 00''$ to $109^{\circ} 59' 59''$ longitude. This type of retrieval is generally more specific than retrieval by drainage basin.

Retrieval by township and range is simply done by specifying the township and range number.

Each station within the system has a WRDS reference number. The user may request information by this reference number. The

Retrieval Types

(continued)

station description printouts always include reference numbers.

Retrievals may also be made by combining retrieval methods. Examples are: stock water supplies (identification type) in township 42N, range 98W (township-range type) or samples for all USGS streams (identification type) in Natrona County (county type). Do not use intersections of two location types, e.g., stations in township 22N, range 78W (township-range type) that also are in the North Laramie River basin (drainage basin type). The only retrieval type that cannot be used in intersections is reference number. A description of the programs for water quality along with examples follow.

LPARAM

This program lists the water quality parameters and their associated code numbers that are stored on the WRDS data base. They are listed in parameter code order. The system currently stores 678 different parameters. New parameters are added when necessary.

While it is technically possible to analyze each sample for every possible parameter, it should be remembered that in reality only a few parameters are analyzed for each sample. The number of parameters analyzed varies widely among the samples. The example shows a small portion of the list.

89 TCT SOLUBLE PHOSPHATE MG/L	90 DISS. ORTHO- PHOSPHATE MG/L AS PO4	91 TOTAL PHOSPHORUS MG/L (P)	92 DISSOLVED PHOSPHORUS MG/L	93 BOTTOM DEPOS PHOSPHORUS MG/KG	94 HYDROLYZABLE PHOSPHORUS TOTAL MG/L	95 TOT. ORGANIC PHOSPHORUS MG/L	96 DISS. ORTHO- PHOSPHATE MG/L AS P
97 DISSOLVED HYDROLYZABLE PHOSPHORUS MG/L	98 DISS ORGANIC PHOSPHORUS MG/L	99 DISS HYDRO+ ORTHOPHOSPHO RUS MG/L	100 TCT. HYDRO+ ORTHOPHOSPHO RUS MG/L	101 TCT. ORGANIC CARBON MG/L	102 DISS ORGANIC CARBON MG/L	103 SUSPENDED ORGANIC CARBON MG/KG	104 TOTAL INORGANIC CARBON MG/L
105 INORGANIC BED MATERIAL CARBON G/KG	106 ORGANIC BED MATERIAL CARBON G/KG	107 SUSPENDED INORGANIC CARBON MG/L	108 SUSPENDED ORGANIC CARBON MG/L	109 TOTAL CARBON MG/L	110 DISSOLVED INORGANIC CARBON MG/L	111 IMMISCIBLE ORGANIC CARBON MG/L	112 CYANIDE UG/L
113 BOTTOM DEPOS CYANIDE UG/G	114 SULFITE MG/L	115 TOTAL SULFIDE MG/L	116 DISSOLVED SULFIDE MG/L	117 TOTAL HARDNESS MG/L (CaCO3)	118 NONCARBONATE HARDNESS MG/L	119 CALCIUM AS CaCO3 MG/L	120 DISSOLVED CALCIUM MG/L
121 TOTAL CALCIUM MG/L	122 DISSOLVED MAGNESIUM MG/L	123 SUSPENDED MAGNESIUM MG/L	124 TOTAL MAGNESIUM MG/L	125 TOTAL SODIUM MG/L	126 DISSOLVED SODIUM MG/L	127 SODIUM ADSORPTION RATIO	128 PERCENT SODIUM
129 DISSOLVED POTASSIUM + SODIUM MG/L	130 DISSOLVED POTASSIUM MG/L	131 TOTAL POTASSIUM MG/L	132 DISSOLVED CHLORIDE MG/L	133 DISSOLVED SULFATE MG/L	134 DISSOLVED FLUORIDE MG/L	135 TOTAL FLUORIDE MG/L	136 DISSOLVED SILICA MG/L
137 DISSOLVED ARSENIC UG/L	138 SUSPENDED ARSENIC UG/L	139 TOTAL ARSENIC UG/L	140 BOTTOM DEPOS ARSENIC UG/G	141 DISSOLVED BARIUM UG/L	142 SUSPENDED BARIUM UG/L	143 TOTAL BARIUM UG/L	144 BOTTOM DEPOS BARIUM UG/G
145 DISSOLVED BERYLLIUM UG/L	146 SUSPENDED BERYLLIUM UG/L	147 TOTAL BERYLLIUM UG/L	148 BOTTOM DEPOS BERYLLIUM UG/G	149 DISSOLVED BISMUTH UG/L	150 SUSPENDED BISMUTH UG/L	151 TOTAL BISMUTH UG/L	152 DISSOLVED BORON UG/L
153 SUSPENDED BORON UG/L	154 TOTAL BORON UG/L	155 BOTTOM DEPOS BORON UG/G	156 DISSOLVED CADMIUM UG/L	157 SUSPENDED CADMIUM UG/L	158 TOTAL CADMIUM UG/L	159 BOTTOM DEPOS CADMIUM UG/G	160 BOTTOM DEPOS CHROMIUM UG/G
161 DISSOLVED CHROMIUM UG/L	162 SUSPENDED CHROMIUM UG/L	163 HEXAVALENT CHROMIUM UG/L	164 TOTAL CHROMIUM UG/L	165 DISSOLVED COBALT UG/L	166 SUSPENDED COBALT UG/L	167 TOTAL COBALT UG/L	168 BOTTOM DEPOS COBALT UG/G
169 DISSOLVED COPPER UG/L	170 SUSPENDED COPPER UG/L	171 TOTAL COPPER UG/L	172 BOTTOM DEPOS COPPER UG/G	173 SUSPENDED IRON UG/L	174 TOTAL IRON UG/L	175 DISSOLVED IRON UG/L	176 FERROUS IRON UG/L

QDDATA

This program prints tabulations of daily values by water year. Values may be for temperature (maximum, minimum, once daily), conductivity, sediment (mg/l or tons/day) or streamflow. A monthly and annual summary of totals, maxima, minima and means appropriate to each kind of data is included.

The following examples show printouts for temperature (once daily), conductivity, streamflow, sediment concentration (mg/l) and sediment load (tons/day).

For each station the user should specify the kind of data (e.g., conductivity) and the water year range, unless all water years are to be included.

REF # 1062 NORTH PLATTE RIVER ABOVE SEMINOLE RES NR SINCLAIR, WYOMING
 ELEVATION 6401 FEET LATITUDE 41-52-20 N LONGITUDE 107- 3-25 W USGS # 6630000.
 - SECTION 13 TOWNSHIP 22-N RANGE 86-W IN CARBON CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 11620000 DRAINAGE AREA 8134.00 NONCONTRIBUTING 4073.00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** TEMPERATURES (C.) FOR WATER YEAR 1968 ***

DAY	MEASURED ONCE DAILY											
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	**	**	**	**	1.00	.00	4.00	9.00	10.00	12.00	17.00	14.00
2	**	**	**	**	1.00	.00	4.00	9.00	11.00	13.00	18.00	14.00
3	**	**	**	**	1.00	.00	.00	9.00	12.00	14.00	17.00	12.00
4	**	**	**	**	1.00	.00	1.00	9.00	12.00	15.00	18.00	12.00
5	**	**	**	**	1.00	.00	1.00	9.00	11.00	15.00	18.00	11.00
6	**	**	**	**	1.00	.00	2.00	8.00	12.00	15.00	22.00	11.00
7	**	**	**	**	1.00	.00	2.00	5.00	11.00	14.00	19.00	12.00
8	**	**	**	**	1.00	.00	2.00	5.00	11.00	16.00	19.00	12.00
9	**	**	**	**	1.00	.00	1.00	6.00	11.00	18.00	19.00	12.00
10	**	**	**	1.00	1.00	.00	3.00	7.00	10.00	17.00	17.00	13.00
11	**	**	**	1.00	1.00	.00	6.00	8.00	10.00	17.00	19.00	13.00
12	**	**	**	1.00	1.00	.00	7.00	9.00	11.00	17.00	17.00	14.00
13	**	**	**	1.00	1.00	.00	6.00	8.00	12.00	17.00	18.00	13.00
14	**	**	**	1.00	1.00	.00	2.00	8.00	11.00	17.00	16.00	14.00
15	**	**	**	1.00	.00	.00	3.00	7.00	11.00	18.00	13.00	13.00
16	**	**	**	1.00	.00	.00	4.00	6.00	12.00	17.00	12.00	9.00
17	**	**	**	1.00	.00	.00	3.00	6.00	12.00	19.00	13.00	9.00
18	**	**	**	1.00	1.00	.00	2.00	7.00	12.00	18.00	12.00	9.00
19	**	**	**	1.00	.00	.00	3.00	7.00	16.00	**	12.00	10.00
20	**	**	**	1.00	1.00	.00	3.00	8.00	16.00	19.00	14.00	13.00
21	**	**	**	1.00	1.00	.00	4.00	9.00	16.00	18.00	13.00	11.00
22	**	**	**	1.00	1.00	.00	3.00	10.00	16.00	18.00	16.00	9.00
23	**	**	**	1.00	1.00	.00	2.00	11.00	16.00	18.00	13.00	8.00
24	**	**	**	1.00	1.00	1.00	3.00	8.00	14.00	18.00	11.00	8.00
25	**	**	**	1.00	1.00	1.00	4.00	8.00	12.00	18.00	14.00	12.00
26	**	**	**	1.00	1.00	2.00	4.00	9.00	12.00	19.00	14.00	13.00
27	**	**	**	1.00	1.00	1.00	4.00	8.00	13.00	18.00	15.00	12.00
28	**	**	**	1.00	.00	2.00	5.00	9.00	14.00	18.00	14.00	10.00
29	**	**	**	1.00	.00	2.00	6.00	11.00	15.00	19.00	14.00	9.00
30	**	**	**	1.00		4.00	8.00	12.00	12.00	19.00	14.00	10.00
31	**		**	1.00		4.00		10.00		16.00	14.00	
MAX	***	***	***	1.00*	1.00	4.00	8.00	12.00	16.00	19.00*	22.00	14.00
MIN	***	***	***	1.00*	.00	.00	.00	5.00	10.00	12.00*	11.00	8.00
MEAN	***	***	***	1.00*	.79	.58	3.37	8.23	12.47	16.90*	15.55	11.40

YEAR MAXIMUM = 22.00*
 YEAR MINIMUM = 1.00*
 YEAR MEAN = 8.05*

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA
 *** INDICATES TOTAL MONTH'S DATA MISSING

Example of QDDATA

REF # 1062 NORTH PLATTE RIVER ABOVE SEMINGUE RES NR SINCLAIR, WYOMING
 ELEVATION 6401 FEET LATITUDE 41-52-20 N LONGITUDE 107- 2-25 W USGS # 6630000.
 - SECTION 13 TOWNSHIP 22-N RANGE 86-W IN CARBON CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 11620000 DRAINAGE AREA 8134.00 NONCONTRIBUTING 4073.00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** SPECIFIC CONDUCTIVITY (MICROHMS AT 25 DEGREES C.) FOR WATER YEAR 1968 ***

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	**	**	**	**	490.00	540.00	496.00	522.00	212.00	254.00	357.00	421.00
2	**	**	**	**	494.00	517.00	476.00	440.00	230.00	267.00	357.00	417.00
3	**	**	**	**	496.00	520.00	425.00	382.00	200.00	286.00	346.00	413.00
4	**	**	**	**	490.00	532.00	374.00	325.00	184.00	304.00	360.00	414.00
5	**	**	**	**	484.00	532.00	373.00	298.00	189.00	322.00	371.00	428.00
6	**	**	**	**	476.00	529.00	445.00	285.00	222.00	339.00	368.00	425.00
7	**	**	**	**	481.00	514.00	491.00	286.00	201.00	333.00	368.00	406.00
8	**	**	**	**	478.00	516.00	501.00	298.00	198.00	354.00	339.00	386.00
9	**	**	**	**	484.00	504.00	491.00	286.00	203.00	362.00	363.00	401.00
10	**	**	**	468.00	484.00	500.00	498.00	290.00	207.00	362.00	463.00	408.00
11	**	**	**	468.00	487.00	521.00	527.00	294.00	227.00	356.00	406.00	417.00
12	**	**	**	471.00	482.00	515.00	579.00	286.00	239.00	365.00	380.00	434.00
13	**	**	**	475.00	484.00	520.00	554.00	271.00	241.00	379.00	384.00	439.00
14	**	**	**	489.00	485.00	505.00	519.00	261.00	210.00	392.00	382.00	444.00
15	**	**	**	488.00	491.00	504.00	466.00	253.00	206.00	394.00	396.00	452.00
16	**	**	**	482.00	485.00	482.00	485.00	250.00	205.00	384.00	390.00	461.00
17	**	**	**	474.00	481.00	483.00	493.00	266.00	195.00	389.00	358.00	459.00
18	**	**	**	472.00	478.00	454.00	442.00	267.00	194.00	291.00	373.00	467.00
19	**	**	**	474.00	473.00	444.00	473.00	277.00	192.00	**	370.00	447.00
20	**	**	**	486.00	467.00	465.00	455.00	308.00	181.00	404.00	374.00	439.00
21	**	**	**	487.00	463.00	454.00	473.00	307.00	187.00	407.00	384.00	442.00
22	**	**	**	491.00	465.00	456.00	534.00	304.00	194.00	395.00	385.00	434.00
23	**	**	**	488.00	487.00	471.00	535.00	254.00	193.00	383.00	399.00	440.00
24	**	**	**	484.00	498.00	500.00	530.00	238.00	191.00	378.00	403.00	455.00
25	**	**	**	485.00	508.00	487.00	552.00	242.00	209.00	378.00	414.00	466.00
26	**	**	**	480.00	528.00	490.00	562.00	260.00	229.00	363.00	411.00	472.00
27	**	**	**	479.00	552.00	487.00	568.00	255.00	248.00	349.00	422.00	458.00
28	**	**	**	479.00	578.00	484.00	553.00	268.00	239.00	250.00	435.00	456.00
29	**	**	**	484.00	570.00	505.00	552.00	259.00	228.00	346.00	439.00	460.00
30	**	**	**	487.00		498.00	557.00	223.00	223.00	347.00	449.00	464.00
31	**	**	**	487.00		503.00		203.00		352.00	440.00	
MAX	***	***	***	491.00*	578.00	540.00	579.00	522.00	248.00	407.00*	463.00	472.00
MIN	***	***	***	468.00*	463.00	444.00	373.00	203.00	181.00	254.00*	339.00	386.00
MEAN	***	***	***	480.82*	493.76	497.61	499.30	288.97	209.23	356.17*	390.03	437.50

YEAR MAXIMUM = 579.00*
 YEAR MINIMUM = 181.00*
 YEAR MEAN = 403.20*

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA
 *** INDICATES TOTAL MONTH'S DATA MISSING

Example of QDDATA

REF # 1071 ROCK CREEK AT ATLANTIC CITY, WYOMING
 ELEVATION 7850 FEET LATITUDE 42-30-47 N LONGITUDE 108-44-46 W USGS # 6637910.
 - SECTION 2 TOWNSHIP 29-N RANGE 99-W IN , FREMONT CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 11563300 DRAINAGE AREA 21.30 ACNCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** STREAMFLOW (CUBIC FEET PER SECOND) FOR WATER YEAR 1966 ***

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.2	7.4	4.0	8.6	6.8	7.0	12.0	15.0	9.5	7.8	2.7	.9
2	7.4	5.2	6.7	7.5	6.0	6.8	12.0	13.0	11.0	10.0	6.9	3.0
3	6.7	2.0	7.8	6.2	5.8	6.4	11.0	12.0	9.5	7.4	5.0	3.9
4	5.5	3.2	5.8	7.2	5.6	5.8	12.0	12.0	13.0	6.4	5.8	.9
5	6.7	4.2	5.2	8.0	5.2	5.4	12.0	14.0	23.0	5.5	5.8	5.3
6	8.2	4.2	7.8	8.4	5.8	6.2	12.0	12.0	22.0	5.0	5.8	5.5
7	7.4	4.0	12.0	8.9	6.2	7.2	12.0	9.0	24.0	4.5	5.8	2.0
8	8.2	5.0	8.6	8.0	6.2	9.4	8.6	10.0	34.0	4.5	5.5	3.6
9	8.2	5.2	9.0	6.6	6.0	7.8	10.0	8.6	32.0	4.5	5.5	4.7
10	8.6	5.2	8.6	5.8	5.2	7.2	10.0	9.0	27.0	4.0	5.8	5.5
11	8.6	5.2	7.4	6.4	5.0	6.6	14.0	10.0	25.0	3.6	5.2	6.1
12	7.4	5.5	7.1	6.0	6.2	7.2	9.5	17.0	19.0	3.6	7.1	4.7
13	7.4	6.4	7.4	7.2	5.0	8.4	6.0	15.0	17.0	3.0	6.7	5.2
14	6.7	5.0	7.1	8.2	4.6	9.0	2.5	7.1	17.0	3.6	5.8	7.8
15	7.8	7.1	4.5	7.2	4.5	8.2	2.5	6.1	17.0	3.8	3.8	5.8
16	7.4	6.4	5.0	6.2	4.7	7.1	6.4	6.4	19.0	3.2	3.2	4.2
17	9.5	6.7	4.7	5.6	5.2	6.1	8.6	7.4	22.0	3.2	4.2	4.7
18	8.2	7.1	5.2	6.4	7.0	7.8	5.8	9.0	18.0	5.8	4.0	5.0
19	8.6	9.5	4.8	6.2	7.6	8.2	15.0	5.5	16.0	4.7	4.2	5.2
20	9.0	5.8	5.7	5.4	8.8	10.0	16.0	5.5	14.0	4.5	6.1	4.5
21	6.7	4.5	4.6	4.6	8.2	8.6	14.0	5.5	13.0	3.8	5.0	3.6
22	7.1	5.0	5.6	5.0	6.4	9.7	10.0	6.1	12.0	3.4	5.2	3.4
23	5.8	7.1	6.7	5.2	6.2	8.2	14.0	6.4	12.0	2.9	5.2	3.0
24	6.1	8.6	5.4	5.6	6.4	6.4	13.0	5.2	12.0	2.7	5.5	2.2
25	6.7	6.4	4.4	4.4	8.4	15.0	12.0	5.0	8.6	2.7	5.2	.9
26	7.1	5.8	3.8	5.2	7.6	15.0	11.0	4.7	9.0	3.4	5.0	.9
27	6.7	4.6	3.5	6.0	8.8	14.0	13.0	4.7	8.6	2.9	4.7	.8
28	6.4	3.0	3.6	6.4	8.0	12.0	12.0	4.5	7.1	4.0	5.5	1.2
29	9.0	5.2	6.6	6.8		9.5	11.0	4.2	7.1	2.9	4.7	2.7
30	6.7	5.0	9.8	6.2		10.0	10.0	10.0	6.7	2.9	2.2	2.1
31	5.8		9.0	7.2		12.0		7.6		2.5	.6	
MAX	9.5	9.5	12.0	8.8	8.8	15.0	16.0	17.0	34.0	10.0	7.1	7.8
MIN	5.5	2.0	3.5	4.4	4.5	5.4	2.5	4.2	6.7	2.5	.6	.8
MEAN	7.4	5.5	6.4	6.5	6.3	8.5	10.6	8.6	16.2	4.3	5.0	3.6
TOTAL	229.3	165.5	197.4	202.5	177.4	264.2	318.3	267.7	485.1	132.7	153.7	109.4
TOTAL(AC-FT)	456.0	328.4	391.7	401.8	352.0	524.2	631.5	531.2	962.5	263.3	305.0	217.1

YEAR MAXIMUM # 34.00
 YEAR MINIMUM # .62
 YEAR MEAN # 7.41
 YEAR TOTAL = 2703.76 SFC = 5364.50 AC-FT

Example of QDDATA

REF # 1071 ROCK CREEK AT ATLANTIC CITY, WYOMING
 ELEVATION 7850 FEET LATITUDE 42-30-47 N LONGITUDE 108-44-46 W USGS # 6637910.
 SECTION 2 TOWNSHIP 29-N RANGE 99-W IN FREMONT CNTY 8LM AREA# 0
 DRAINAGE BASIN CODE 11563300 DRAINAGE AREA 21.30 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** SUSPENDED SEDIMENT CONCENTRATION (MG/L) FOR WATER YEAR 1966 ***

DAY	QCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64.0	74.0	25.0	120.0	19.0	660.0	230.0	280.0	98.0	50.0	71.0	12.0
2	74.0	48.0	76.0	120.0	19.0	660.0	310.0	180.0	110.0	36.0	120.0	64.0
3	67.0	13.0	51.0	120.0	19.0	660.0	**	150.0	93.0	34.0	120.0	67.0
4	64.0	38.0	49.0	120.0	19.0	660.0	210.0	120.0	110.0	41.0	92.0	40.0
5	76.0	43.0	47.0	120.0	19.0	660.0	220.0	120.0	190.0	39.0	98.0	36.0
6	100.0	42.0	63.0	120.0	19.0	660.0	240.0	91.0	72.0	41.0	82.0	46.0
7	98.0	46.0	74.0	120.0	160.0	660.0	440.0	37.0	140.0	46.0	85.0	51.0
8	91.0	60.0	53.0	120.0	160.0	660.0	400.0	22.0	250.0	46.0	100.0	37.0
9	90.0	60.0	57.0	120.0	160.0	660.0	500.0	15.0	120.0	47.0	110.0	29.0
10	98.0	71.0	71.0	120.0	160.0	660.0	790.0	17.0	57.0	56.0	120.0	32.0
11	94.0	86.0	78.0	120.0	160.0	660.0	500.0	46.0	63.0	44.0	120.0	37.0
12	78.0	110.0	58.0	120.0	160.0	660.0	390.0	120.0	55.0	40.0	120.0	46.0
13	68.0	170.0	56.0	120.0	160.0	660.0	390.0	120.0	62.0	30.0	110.0	69.0
14	68.0	140.0	53.0	120.0	160.0	540.0	23.0	6.0	61.0	45.0	120.0	130.0
15	79.0	220.0	57.0	120.0	160.0	700.0	16.0	5.0	48.0	35.0	110.0	86.0
16	80.0	160.0	52.0	120.0	160.0	**	85.0	3.0	50.0	25.0	93.0	56.0
17	80.0	110.0	41.0	120.0	160.0	630.0	160.0	58.0	49.0	22.0	93.0	52.0
18	83.0	120.0	29.0	120.0	160.0	670.0	520.0	110.0	40.0	69.0	85.0	50.0
19	89.0	150.0	50.0	120.0	160.0	**	**	4.0	34.0	36.0	78.0	53.0
20	80.0	120.0	41.0	120.0	660.0	**	240.0	2.0	40.0	66.0	390.0	45.0
21	69.0	92.0	46.0	19.0	660.0	370.0	**	2.0	40.0	70.0	160.0	30.0
22	60.0	72.0	40.0	19.0	660.0	430.0	420.0	2.0	32.0	160.0	110.0	34.0
23	57.0	80.0	36.0	19.0	660.0	440.0	480.0	7.0	35.0	26.0	94.0	35.0
24	62.0	72.0	43.0	19.0	660.0	450.0	470.0	4.0	37.0	25.0	120.0	13.0
25	69.0	63.0	25.0	19.0	660.0	**	360.0	2.0	43.0	30.0	230.0	10.0
26	78.0	75.0	28.0	19.0	660.0	**	350.0	4.0	45.0	76.0	86.0	12.0
27	62.0	82.0	24.0	19.0	660.0	**	540.0	2.0	51.0	63.0	97.0	5.0
28	69.0	48.0	29.0	19.0	660.0	690.0	470.0	2.0	48.0	86.0	120.0	20.0
29	86.0	41.0	28.0	19.0		510.0	290.0	4.0	35.0	70.0	110.0	44.0
30	84.0	36.0	120.0	19.0		420.0	210.0	79.0	45.0	62.0	48.0	32.0
31	58.0		120.0	19.0		300.0		100.0		59.0	8.0	
MAX	160.0	220.0	120.0	120.0	660.0	700.0*	790.0*	280.0	250.0	160.0	390.0	130.0
MIN	57.0	13.0	24.0	19.0	19.0	300.0*	16.0*	2.0	32.0	25.0	8.0	5.0
MEAN	76.6	84.8	52.3	84.2	290.5	589.2*	353.9*	55.6	71.8	51.1	113.2	42.5

YEAR MAXIMUM = 790.00*
 YEAR MINIMUM = 2.00*
 YEAR MEAN = 145.54*

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA

Example of QDDATA

REF # 1071 ROCK CREEK AT ATLANTIC CITY, WYOMING
 ELEVATION 7850 FEET LATITUDE 42-30-47 N LONGITUDE 108-44-46 W USGS # 6637710.
 SECTION 2 TOWNSHIP 29-N RANGE 99-W IN ,FREMONT CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 11563300 DRAINAGE AREA 21.30 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** SUSPENDED SEDIMENT DISCHARGE (TONS/DAY) FOR WATER YEAR 1966 ***

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.	2.	0.	3.	0.	12.	11.	11.	3.	1.	1.	0.
2	2.	1.	1.	2.	0.	12.	10.	6.	3.	1.	3.	1.
3	1.	0.	1.	2.	0.	11.	6.	5.	2.	1.	2.	1.
4	1.	0.	1.	2.	0.	10.	7.	4.	4.	1.	1.	0.
5	1.	1.	1.	3.	0.	10.	7.	5.	12.	1.	2.	1.
6	2.	1.	1.	3.	0.	11.	8.	4.	4.	1.	1.	1.
7	2.	1.	2.	3.	3.	13.	14.	1.	9.	1.	1.	0.
8	2.	1.	1.	3.	3.	15.	9.	1.	23.	1.	2.	0.
9	2.	1.	1.	2.	3.	14.	14.	0.	10.	1.	2.	0.
10	2.	1.	2.	2.	2.	13.	21.	0.	4.	1.	2.	1.
11	2.	1.	2.	2.	2.	12.	19.	1.	4.	0.	2.	1.
12	2.	2.	1.	2.	3.	13.	10.	6.	3.	0.	2.	1.
13	1.	3.	1.	2.	2.	15.	6.	6.	3.	0.	2.	1.
14	1.	2.	1.	3.	2.	13.	0.	0.	3.	0.	2.	3.
15	2.	4.	1.	2.	2.	15.	0.	0.	2.	0.	1.	1.
16	2.	3.	1.	2.	2.	15.	2.	0.	3.	0.	1.	1.
17	2.	2.	1.	2.	2.	10.	4.	1.	3.	0.	1.	1.
18	2.	2.	0.	2.	3.	14.	8.	3.	5.	1.	1.	1.
19	2.	4.	1.	2.	3.	12.	25.	0.	2.	1.	1.	1.
20	2.	2.	1.	2.	16.	11.	15.	0.	2.	1.	7.	1.
21	1.	1.	1.	0.	15.	9.	11.	0.	1.	1.	2.	0.
22	1.	1.	1.	0.	11.	8.	11.	0.	1.	2.	2.	0.
23	1.	2.	1.	0.	11.	10.	18.	0.	1.	0.	1.	0.
24	1.	2.	1.	0.	11.	6.	16.	0.	1.	0.	2.	0.
25	1.	1.	0.	0.	15.	21.	12.	0.	1.	0.	3.	0.
26	2.	1.	0.	0.	14.	22.	10.	0.	1.	1.	1.	0.
27	1.	1.	0.	0.	16.	22.	19.	0.	1.	1.	1.	0.
28	1.	0.	0.	0.	14.	21.	15.	0.	1.	1.	2.	0.
29	2.	1.	1.	0.	0.	13.	9.	0.	1.	1.	1.	0.
30	2.	1.	3.	0.	0.	11.	8.	2.	1.	1.	0.	0.
31	1.		3.	0.		10.		2.		0.	0.	
MAX	2.	4.	3.	3.	16.	21.	25.	11.	23.	2.	7.	3.
MIN	1.	0.	0.	0.	0.	6.	0.	0.	1.	0.	0.	0.
MEAN	2.	1.	1.	2.	6.	13.	11.	2.	4.	1.	2.	1.
TOTAL(TONS)	48.	41.	31.	48.	156.	405.	325.	58.	110.	18.	51.	15.

YEAR MAXIMUM = 25.00
 YEAR MINIMUM = .00
 YEAR MEAN = 3.59
 YEAR TOTAL = 1309.40 TONS

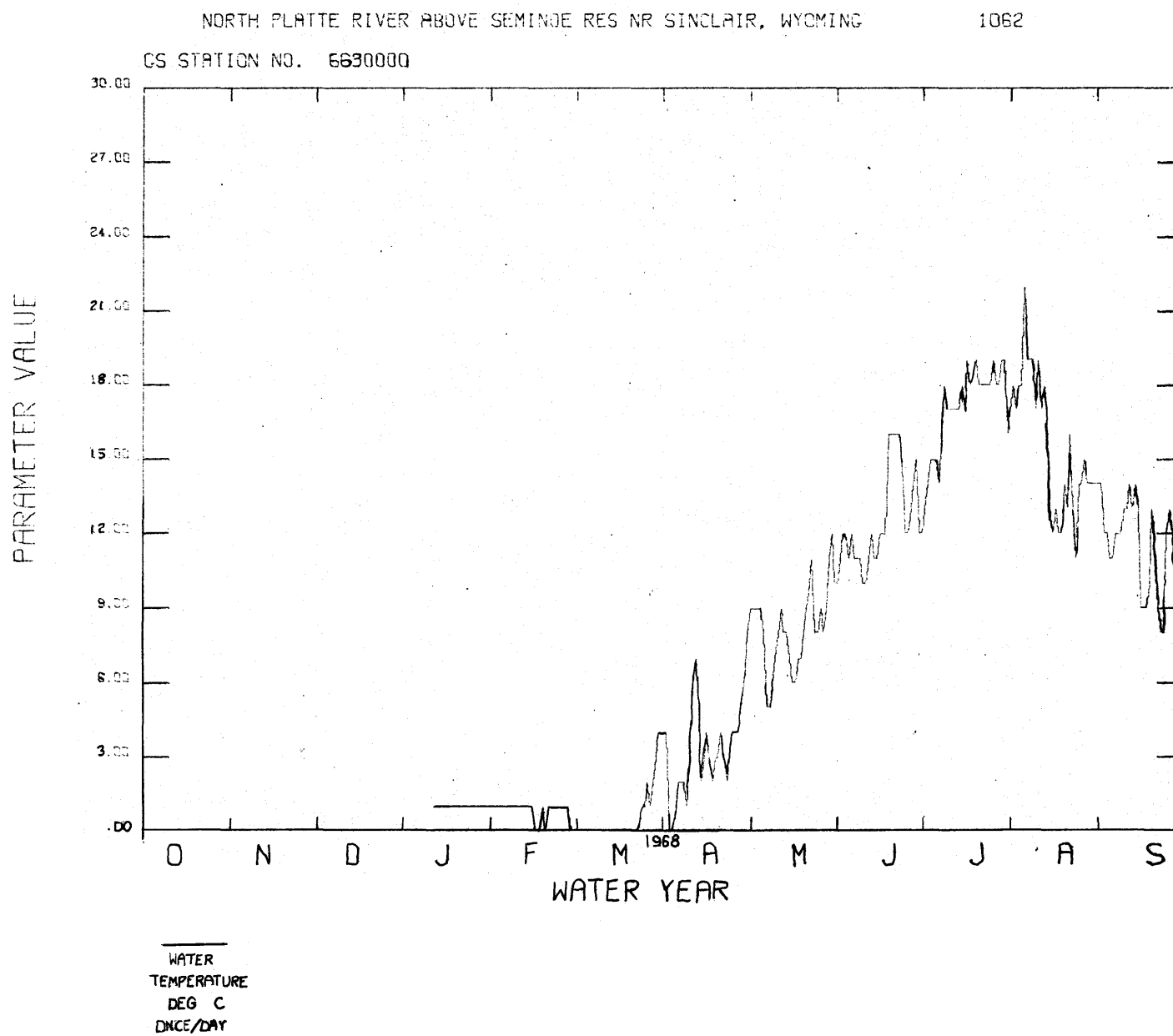
Example of QDDATA

QDPLQT

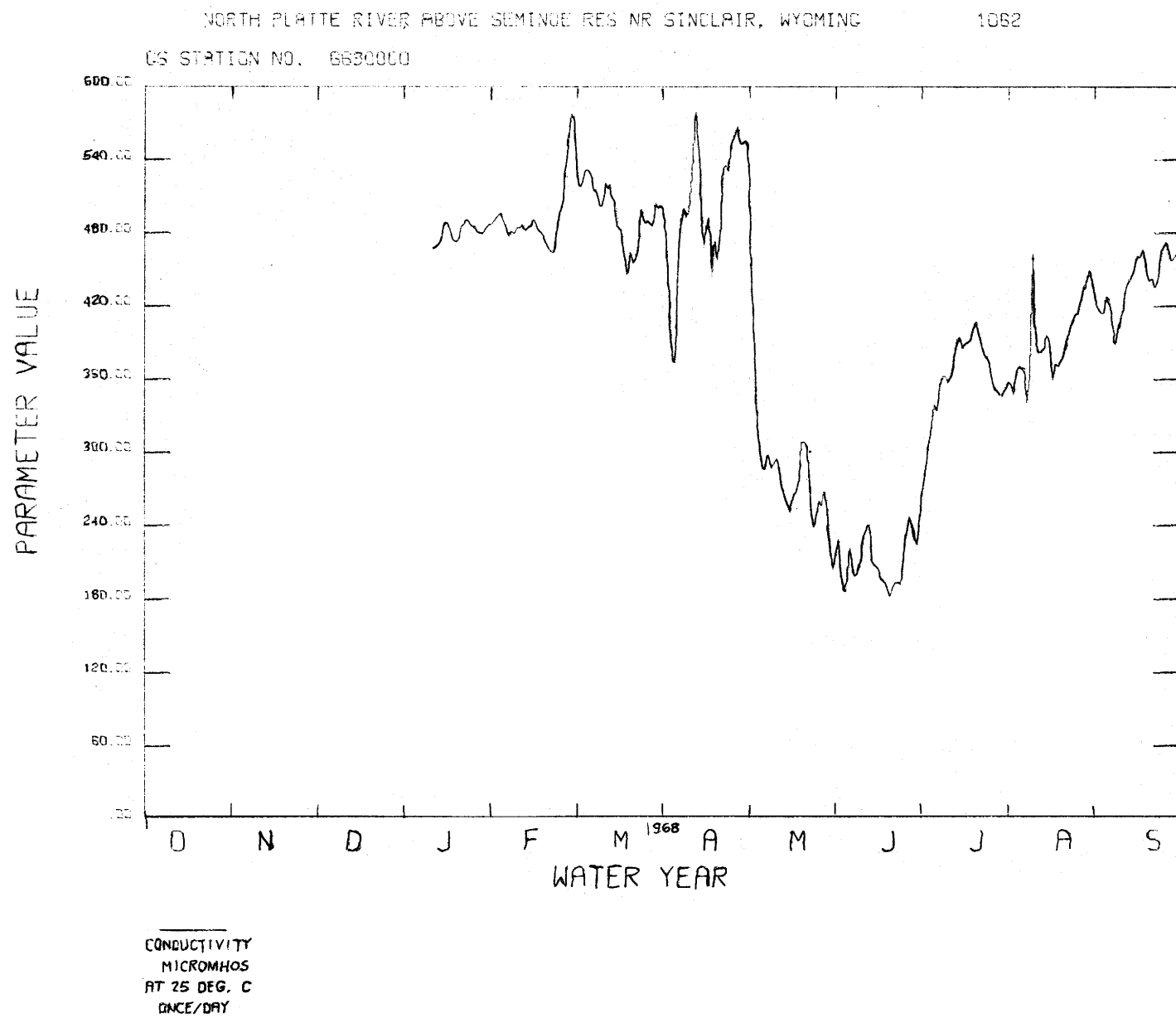
This program plots daily water quality values versus time. Specified years are plotted on a continuous plot by water year using a constant time scale. Missing values are indicated by blanks on the plot. Up to three parameters may be plotted on the same graph; however, care must be taken to plot values that are of similar magnitude. If they are not, the vertical scaling will not fit both parameters well.

The following examples illustrate temperature and conductivity plotted separately for the North Platte River in 1968 and streamflow and sediment (tons/day) plotted together for Rock Creek in 1966.

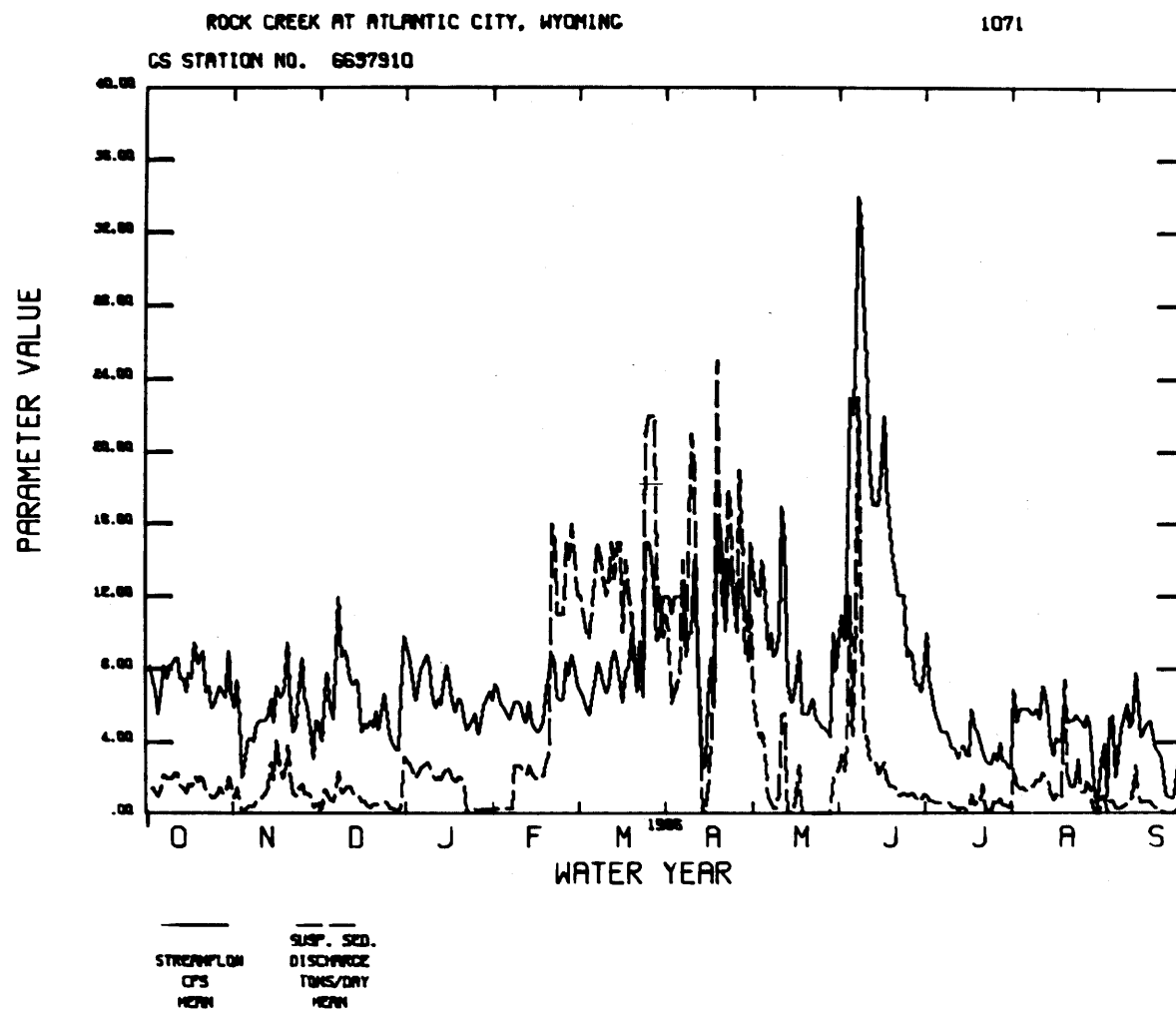
For each station the user should specify the date range and the daily sample parameters to be plotted, indicating which ones are to be plotted on the same graph.



Example of QDPLOT



Example of QDPLOT



QGCQMSTAT

At some locations water quality samples have been collected by different agencies or individuals. Rather than combine all the data at one station, each set of data is stored under a separate station header. The user may combine the data using QGCQMSTAT. Up to six stations may be combined for which statistics will be printed for all available parameters. See the QGSTAT program for a description of the statistics printed.

The following example shows the combined statistics for the Blacks Fork River where three agencies have collected data. The data for each separate station may be listed using QGDATA or QGDATSTAT.

The user should specify the stations to be combined and the date range, unless all dates are to be included.

Example of QGCOMSTAT

REF # 1164 BLACKS FORK RIVER NEAR MILLBURNE WYO USAR STATION
 ELEVATION 8575 FEET LATITUDE 41- 2- 0 N LONGITUDE 110-35- 0 W BREC # 3.
 - SECTION 11 TOWNSHIP 12-N RANGE 117-W IN ,UINITA ONLY BLM AREA 0
 DRAINAGE BASIN CODE 15190600 DRAINAGE AREA .00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION STREAM (OTHER THAN USGS)
 WELL PERMIT # 0

* AFTER A VALUE TAGS IT AS LESS-THAN

REF # 2831 BLACKS FORK NEAR MILLBURNE, WYOMING
 ELEVATION 8380 FEET LATITUDE 41- 3-26 N LONGITUDE 110-34-27 W USGS # 92,8500.
 - SECTION 35 TOWNSHIP 13-N RANGE 117-W IN ,UINITA ONLY BLM AREA 0
 DRAINAGE BASIN CODE 15190000 DRAINAGE AREA 156.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

REF # 2797 BLACKS FORK NEAR MILLBURNE, WYOMING
 ELEVATION 8380 FEET LATITUDE 41- 3-26 N LONGITUDE 110-34-27 W EPA # 0.
 - SECTION 11 TOWNSHIP 12-N RANGE 117-W IN ,UINITA ONLY BLM AREA 0
 DRAINAGE BASIN CODE 15190600 DRAINAGE AREA .00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION STREAM (OTHER THAN USGS)
 WELL PERMIT # 0

2 JULY 59	TIME	0	7	24	34	43	47	56
COLLECTED BY	BUREC		WATER	INSTANT.	CONDUCTIVITY			TOTAL
TESTING LAB	UNKNOWN		TEMPERATURE	STREAMFLOW	MICROMHOS	FIELD PH	BICARBONATE	FILTRABLE
SAMPLE # 0	SAMPLE DPTH	0	DEG. C	CFS	AT 25 DEG. C	STAND. UNITS	ION MG/L	RESIDUE MG/L
WATER DPTH	0	ENDATE	0					
UNTREATED								
SAMPLE SIZE	60.0000		169.000	197.000	196.000	196.000	196.000	65.0000
MAXIMUM	19.0000		1385.00	334.000	8.50000	153.000	153.000	155.000
MINIMUM	.000000		16.1000	42.0000	7.10000	21.0000	21.0000	31.0000
MEAN	9.03333		241.914	128.218	7.86837	69.3665	69.3665	96.6154
STND DEV	3.83877		293.156	60.3626	.322521	34.6141	34.6141	34.8616
RATIO VALUE	1.30711		.747787	.415931	.699288	.359308	.359308	.324542
TREND TEST	POS		POS	POS	POS	POS	POS	POS
MOMENT COEFFICIENT OF SKEWNESS	-.722742		1.95510	.683664	-.425077	.715153	.715153	-.145424
COEF OF VAR (PER CENT)	42.4956		121.182	47.0780	4.09896	49.9003	49.9003	36.0829

2 JULY 59	TIME	0	117	126	130	132	133	136
COLLECTED BY	BUREC		TOTAL	DISSOLVED	DISSOLVED	DISSOLVED	DISSOLVED	DISSOLVED
TESTING LAB	UNKNOWN		HARDNESS	SODIUM	POTASSIUM	CHLORIDE	SULFATE	SILICA
SAMPLE # 0	SAMPLE DPTH	0	MG/L (CACO3)	MG/L	MG/L	MG/L	MG/L	MG/L
WATER DPTH	0	ENDATE	0					
UNTREATED								
SAMPLE SIZE	68.0000		196.000	196.000	196.000	196.000	196.000	4.00000
MAXIMUM	131.000		4.80000	8.00000	4.00000	19.2100	19.2100	6.00000
MINIMUM	19.0000		.230000	.000000	.000000	.960000	.960000	4.30000
MEAN	80.7353		1.71490	.590488	1.06260	7.84633	7.84633	5.27500
STND DEV	33.4404		.729379	.569441	.885771	3.72861	3.72861	.780491
RATIO VALUE	.284822		.781372	1.97791	1.04514	1.19269	1.19269	2.60465
TREND TEST	POS		POS	NEG	POS	POS	POS	NEG
MOMENT COEFFICIENT OF SKEWNESS	-.213203		.621101	11.3131	.831797	.702828	.702828	-.295775
COEF OF VAR (PER CENT)	41.4197		42.5319	96.4487	63.3586	47.5204	47.5204	14.7960

2 JULY 59	TIME	0	152
COLLECTED BY	BUREC		DISSOLVED
TESTING LAB	UNKNOWN		BORON
SAMPLE # 0	SAMPLE DPTH	0	UG/L
WATER DPTH	0	ENDATE	0
UNTREATED			
SAMPLE SIZE	4.00000		
MAXIMUM	100.000		
MINIMUM	.000000		
MEAN	25.0000		
STND DEV	50.0000		
RATIO VALUE	1.77778		
TREND TEST	NEG		
MOMENT COEFFICIENT OF SKEWNESS	1.00000		
COEF OF VAR (PER CENT)	200.000		

QGDATA

As the following example shows, QGDATA prints a tabulation of grab sample data. All water quality parameters for all dates are printed unless the user specifies particular parameters or a date range to be utilized. Other options include flagging those water quality parameters that exceed U.S. Public Health drinking water standards or Environmental Protection Agency water standards. It is also possible to print only those values that exceed USPH standards. Values that meet the standard will not be printed with this option. Data that have been analyzed at specified labs may optionally be omitted. Up to three labs may be excluded. The user may also specify the retrieval type.

For the first grab sample for each station the following are printed: the date and time of collection or the beginning date for data representing average values over a period of time, the agency that collected the data (see table under Water Quality Data), the laboratory that analyzed the sample (see table under Water Quality Data), sample number (if samples were identified by number), sample depth (for wells and lakes), ending date for data representing average values over a period of time, and treatment method applied to the source water (e.g., chlorinated). Subsequent samples for the same station show only sample date and time or beginning and ending dates of average values and sample number unless one of the other items changes, e.g., testing lab, sample depth, etc. If one of these items is different from the previous sample, the entire sample information is printed as in the first sample.

QGDATA (continued)

The example shows a request for QGDATA for Reliance, Wyoming, with values over USPH standards flagged. All water quality parameters for all dates (there were only two samples) are printed.

Each parameter has a heading that includes the units of the parameter. The number at the top of each parameter heading is a WRDS code. An asterisk after a value means that the actual value for the parameter is less than the value printed, e.g., cyanide was less than 8 micrograms per liter. Iron and manganese are flagged as exceeding USPH standards. Small numbers such as those for methylene blue active substance are printed with an E. This stands for exponent, i.e., .100000E-01 is .100000 times 10 to the -1 power, making the number .010000.

Only parameters for which measurements were made are listed. If a parameter was measured for one sample but not for a second sample at one station, a series of asterisks are printed for the second sample parameter.

The user should specify the retrieval type, the parameters to be printed (unless all are to be presented), the date range (unless all dates are to be included), whether or not values should be tagged for USPH or EPA standards and any laboratories that should be excluded (up to three).

Example of QCDATA

REF # 46 TOWN OF RELIANCE, WYOMING
 ELEVATION 6550 FEET LATITUDE 41-49- 0 N LONGITUDE 109-11- 0 W DEQ 4 0.
 - SECTION 31 TOWNSHIP 20-N RANGE 104-W IN RELIANCE, SKEETWIR CNTY BLM AREA 0
 DRAINAGE BASIN CODE 15200300 DRAINAGE AREA .00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION CITY SYSTEM SUPPLY
 WELL PERMIT # 0

+ AFTER A VALUE TAGS IT AS EXCEEDING USPH STANDARDS
 * AFTER A VALUE TAGS IT AS LESS-THAN

2 OCT 73	TIME 0	34	49	50	112	117	120
COLLECTED BY	WYO DEQ	CONDUCTIVITY	BICARBONATE	CARBONATE	CYANIDE	TOTAL	DISSOLVED
TESTING LAB	AG. LAB LARAMIE	MICROMHOS	ION MG/L	ION MG/L	UG/L	HARDNESS	CALCIUM
SAMPLE # 0	SAMPLE DPTH 0	AT 25 DEG. C				MG/L (CAC03)	MG/L
WATER DPTH	0 ENDATE 0						
UNKNOWN		779.000	137.000	.000000	8.00000	* 190.000	41.0000
17 JAN 74	TIME 0 # 0	689.000	130.000	.000000	8.00000	* 190.000	39.0000
2 OCT 73	TIME 0	122	126	127	128	130	132
COLLECTED BY	WYO DEQ	DISSOLVED	DISSOLVED	SODIUM	PERCENT	DISSOLVED	DISSOLVED
TESTING LAB	AG. LAB LARAMIE	MAGNESIUM	SODIUM	ABSORPTION	SODIUM	POTASSIUM	CHLORIDE
SAMPLE # 0	SAMPLE DPTH 0	MG/L	MG/L	RATIO		MG/L	MG/L
WATER DPTH	0 ENDATE 0						
UNKNOWN		21.0000	74.0000	2.32019	45.7097	13.0000	72.0000
17 JAN 74	TIME 0 # 0	23.0000	59.0000	1.85267	40.0729	12.0000	44.0000
2 OCT 73	TIME 0	133	134	136	137	141	152
COLLECTED BY	WYO DEQ	DISSOLVED	DISSOLVED	DISSOLVED	DISSOLVED	DISSOLVED	DISSOLVED
TESTING LAB	AG. LAB LARAMIE	SULFATE	FLUORIDE	SILICA	ARSENIC	BARIUM	BORON
SAMPLE # 0	SAMPLE DPTH 0	MG/L	MG/L	MG/L	UG/L	UG/L	UG/L
WATER DPTH	0 ENDATE 0						
UNKNOWN		156.000	.600000	11.0000	7.00000	* 500.000	* 300.000
17 JAN 74	TIME 0 # 0	170.000	.700000	9.40000	8.00000	500.000	* 190.000
2 OCT 73	TIME 0	156	153	169	175	178	185
COLLECTED BY	WYO DEQ	DISSOLVED	HEXAVALENT	DISSOLVED	DISSOLVED	DISSOLVED	DISSOLVED
TESTING LAB	AG. LAB LARAMIE	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	MANGANESE
SAMPLE # 0	SAMPLE DPTH 0	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
WATER DPTH	0 ENDATE 0						
UNKNOWN		1.00000	* 10.0000	* 10.0000	* 600.000	* 10.0000	* 3200.00
17 JAN 74	TIME 0 # 0	1.00000	* 10.0000	* 10.0000	* 10400.0	* 10.0000	* 3500.00
2 OCT 73	TIME 0	194	206	233	342	343	467
COLLECTED BY	WYO DEQ	DISSOLVED	DISSOLVED	DISSOLVED	DISSOLVED	METHYLENE	DISSOLVED
TESTING LAB	AG. LAB LARAMIE	SILVER	ZINC	SELENIUM	PHENOLS	BLUE ACTIVE	SOLIDS
SAMPLE # 0	SAMPLE DPTH 0	UG/L	UG/L	UG/L	UG/L	SUBST. MG/L	1800 MG/L
WATER DPTH	0 ENDATE 0						
UNKNOWN		50.0000	* 200.000	* 1.00000	* 1.00000	* .100000E-01*	470.000
17 JAN 74	TIME 0 # 0	50.0000	* 2800.00	* 1.00000	* 1.00000	* .100000E-01*	420.000
2 OCT 73	TIME 0	504	612	628			
COLLECTED BY	WYO DEQ	DISSOLVED					
TESTING LAB	AG. LAB LARAMIE	NITRATE	LABORATORY	TOTAL			
SAMPLE # 0	SAMPLE DPTH 0	NO3 MG/L	PH	CO3 MG/L			
WATER DPTH	0 ENDATE 0						
UNKNOWN		.300000	7.10000	67.2029			
17 JAN 74	TIME 0 # 0	.000000	6.90000	63.9210			

QGDATSTAT

This program combines tabulation of data with statistics. All the options and features of QGDATA and QGSTAT are combined. In addition, values may also be printed in milliequivalents.

The following two examples illustrate QGDATSTAT. The milliequivalent option is used in the first example and a specified range of dates is used in the second example.

The user should specify the same items as listed under QGDATA and whether or not milliequivalents are to be printed.

REF # 59 CITY OF LARAMIE, WYOMING CITY SPRINGS
 ELEVATION 7225 FEET LATITUDE 41-18-30 N LONGITUDE 105-33-0 W PRIV # 0
 SE-SW SECTION 36 TOWNSHIP 16-N RANGE 73-W IN LARAMIE ,ALBANY CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 11062100 DRAINAGE AREA .00 NONCENTRIALTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION CITY SUPPLY, INDIVIDUAL SOURCE, WELL OR SPRING
 WELL PERMIT # 0

* AFTER A VALUE TAGS IT AS LESS-THAN

1 AUG 73	TIME 0	34	49	50	117	120	122
COLLECTED BY PRIVATE OR OWNER		CONDUCTIVITY	BICARBONATE	CARBONATE	TOTAL	DISSOLVED	DISSOLVED
TESTING LAB AG. LAB LARAMIE		MICROMHOS	ION MG/L	ION MG/L	HARDNESS	CALCIUM	MAGNESIUM
SAMPLE # 0	SAMPLE DPTH 0	AT 25 DEG. C	(MILLIEQUIV)	(MILLIEQUIV)	MG/L (CACC3)	MG/L	MG/L
WATER DPTH 0	DATE 0						
CHLORINATED AND FLUORIDATED							
		384.000	233.000 (3.81887	.000000 (.000000	201.000	52.0000 (2.59460	17.0000 (1.39842
19 FEB 74	TIME 0 # 0	368.000	214.000 (3.50746	6.00000 (.199980	195.000	55.0000 (2.74450	14.0000 (1.15164
11 MAR 74	TIME 0 # 0	378.000	226.000 (3.70414	.000000 (.000000	188.000	52.0000 (2.59480	14.0000 (1.15164
18 APR 74	TIME 0 # 0	374.000	224.000 (3.67136	.000000 (.000000	203.000	50.0000 (2.49500	19.0000 (1.56294
21 MAY 74	TIME 0 # 0	307.000	174.000 (2.85186	.000000 (.000000	153.000	41.0000 (2.04590	12.0000 (.987120
12 JUNE 74	TIME 0 # 0	364.000	217.000 (3.55663	.000000 (.000000	190.000	51.0000 (2.54490	16.0000 (1.31616
22 JULY 74	TIME 0 # 0	392.000	220.000 (3.60580	.000000 (.000000	191.000	49.0000 (2.44510	17.0000 (1.39842
SAMPLE SIZE		7.00000	7.00000	7.00000	7.00000	7.00000	7.00000
MAXIMUM		392.000	233.000	6.00000	203.000	55.0000	19.0000
MINIMUM		307.000	174.000	.000000	153.000	41.0000	12.0000
MEAN		366.714	215.429	.857143	188.714	50.0000	15.5714
STND DEV		27.9585	19.3033	2.26779	16.7204	4.39697	2.37045
RATIO VALUE		2.21982	2.53975	2.72222	2.90723	2.09190	3.46045
TREND TEST		NEG	NEG	NEG	NEG	NEG	NEG
MOMENT COEFFICIENT OF SKEWNESS		-1.44583	-1.47768	1.88982	-1.44478	-1.15283	-.888661E-01
COEF OF VAR (PER CENT)		7.62678	8.96044	264.575	8.86015	8.79393	15.2231

Example of QGDATSTAT

RBF # 1013 BIG HORN RIVER AT KAKE, WYOMING
 ELEVATION 3660 FEET LATITUDE 44-45-31 N LONGITUDE 108-10-51 W USGS # 6279500.
 SECTION 9 TOWNSHIP 55-N RANGE 94-W IN BIG HORN CNTY RLM AREA# 0
 DRAINAGE BASIN CODE 3200000 DRAINAGE AREA 15761.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

* AFTER A VALLE TACS IT AS LESS-THAN

1 MAY 66	TIME 0	23	31	34	42	45	49
COLLECTED BY USGS			COLOR	CONDUCTIVITY		TOTAL	
TESTING LAB	UNKNOWN	STREAMFLOW	PLATINUM	MICROMHOS	FIELD PH	ALKALINITY	BICARBONATE
SAMPLE # 0	SAMPLE DPTH 0	CFS	COBALT UNITS	AT 25 DEG. C	STAND. UNITS	MG/L	ION MG/L
WATER ORTH	0 ENDATE 660507						
UNTREATED							
		756.000	3.00000	1180.00	7.60000	184.000	224.000
8 MAY 66 - 15 MAY 66 # 0		1779.00	3.00000	700.000	7.60000	131.000	160.000
16 MAY 66 - 22 MAY 66 # 0		949.000	3.00000	1030.00	7.80000	164.000	200.000
23 MAY 66 - 31 MAY 66 # 0		1916.00	3.00000	756.000	7.70000	127.000	155.000
1 JUNE 66 - 10 JUNE 66 # 0		1376.00	*****	879.000	7.10000	142.000	173.000
11 JUNE 66 - 30 JUNE 66 # 0		1302.00	*****	1070.00	7.20000	173.000	211.000
1 JULY 66 - 8 JULY 66 # 0		884.000	*****	1110.00	7.70000	159.000	194.000
9 JULY 66 - 24 JULY 66 # 0		727.000	*****	1350.00	6.00000	190.000	232.000
25 JULY 66 - 31 JULY 66 # 0		582.000	*****	1290.00	7.40000	164.000	200.000
1 AUG 66 - 12 AUG 66 # 0		628.000	*****	1260.00	7.70000	198.000	241.000
13 AUG 66 - 31 AUG 66 # 0		655.000	*****	1340.00	7.80000	186.000	227.000
1 SEPT 66 - 20 SEPT 66 # 0		994.000	*****	1380.00	7.30000	200.000	244.000
21 SEPT 66 - 30 SEPT 66 # 0		785.000	*****	1330.00	7.40000	191.000	233.000
	SAMPLE SIZE	13.0000	4.00000	13.0000	13.0000	13.0000	13.0000
	MAXIMUM	1916.00	3.00000	1380.00	8.00000	200.000	244.000
	MINIMUM	582.000	3.00000	700.000	7.10000	127.000	155.000
	MEAN	1025.62	3.00000	1128.85	7.57692	169.923	207.231
	STND DEV	437.651	.000000	231.257	.271274	24.7200	30.0919
	RATIO VALUE	1.57869	.000000	.911870	1.86469	1.45712	1.44889
	TREND TEST	NEG	POS	POS	NEG	NEG	NEG
	MOMENT COEFFICIENT OF SKEWNESS	.927579	.000000	-.651461	-.332717	-.484188	-.483215
	COEF OF VAR (PER CENT)	42.6720	.000000	20.4862	3.58027	14.5477	14.5210

Example of QGDATSTAT

QGPRINT

This program plots grab sample data versus time. Up to five parameters may be plotted on the same graph. In plotting more than one parameter on one plot, care must be exercised to see that the magnitudes of the parameter data are similar. If the magnitudes vary greatly, the vertical scale will not be satisfactory for both parameters. For example, dissolved solids, which may range from 100 to 3000 mg/l, and pH, which may range from 6 to 8, may be plotted on the same graph. This will result in a reasonable plot for dissolved solids but a straight line very close to 0 for pH.

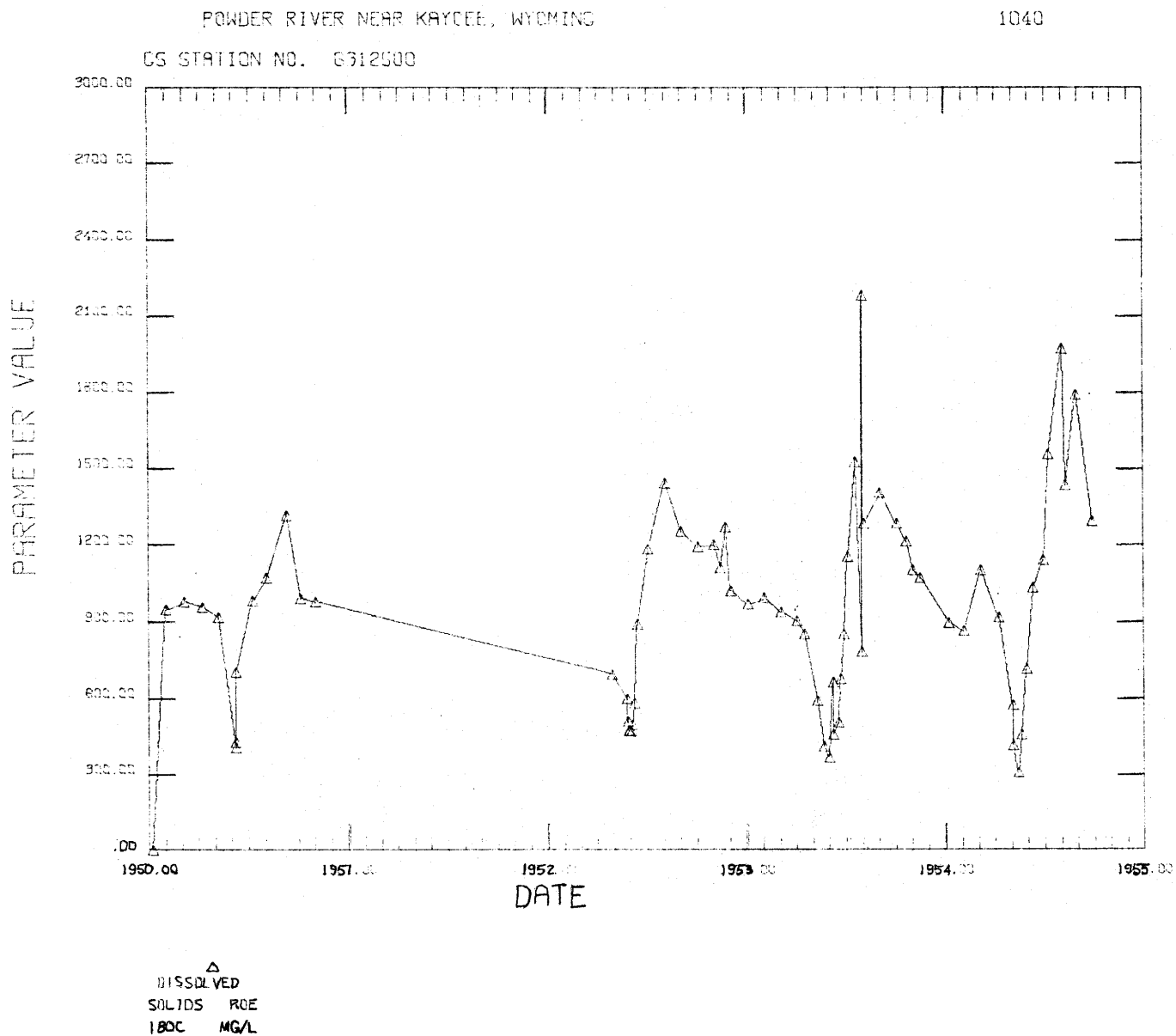
The first example is a plot of dissolved solids for the Powder River near Kaycee from 1950 through September 1954. The line between points can be misleading. Note the straight line from late 1950 to early 1952. The dissolved solids undoubtedly varied during this period as they did at other times; however, the program merely plots a line between the last 1950 sample and the first 1952 sample.

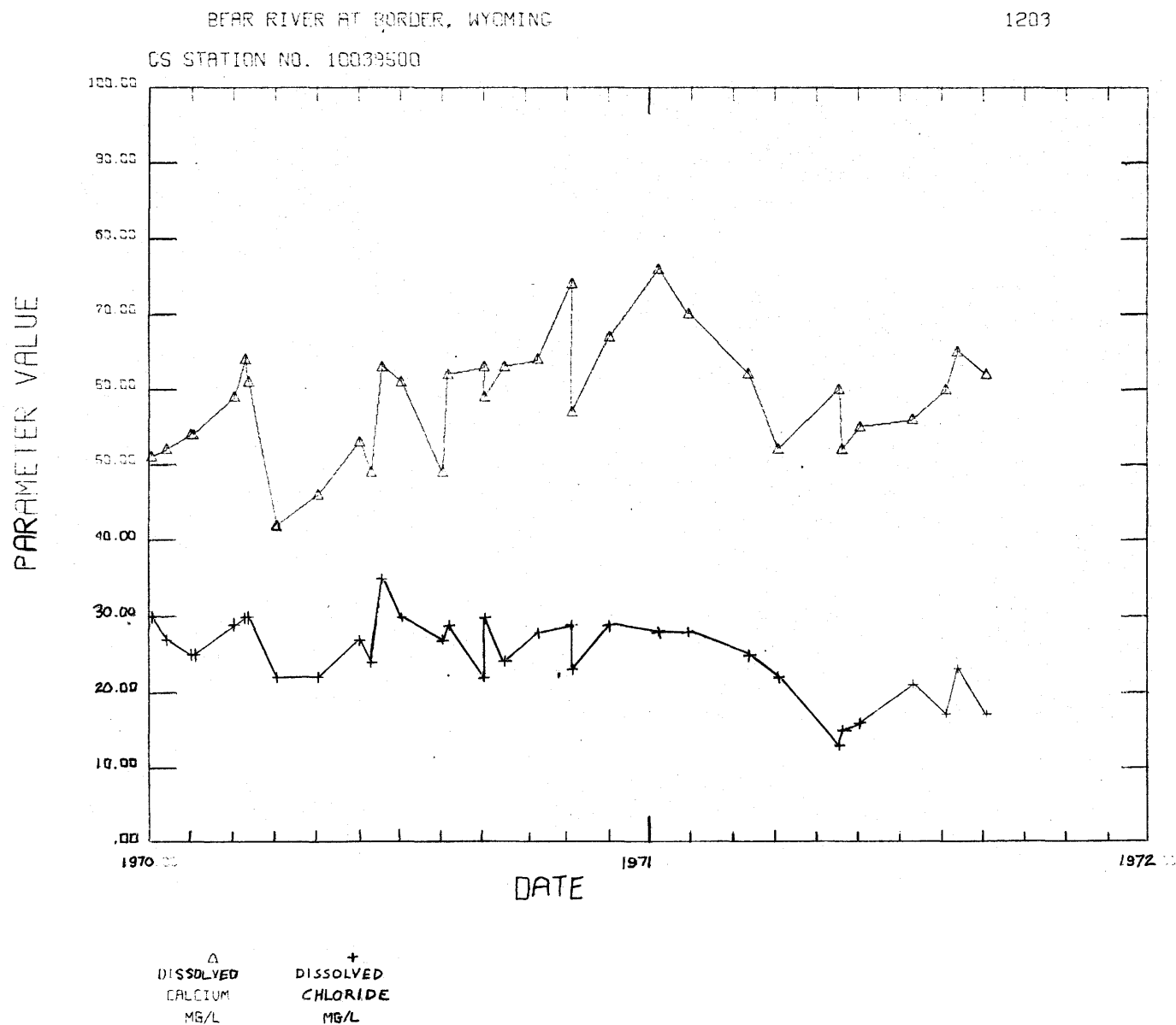
The second example is a plot of dissolved calcium and dissolved chloride versus time for 1970 and 1971. The time scale is expanded from that of the first plot. For up to five years of data, the horizontal plotting distance is the same, thereby varying the time scale. For more than five years of data, the horizontal scale remains constant and the plot length is simply extended for each year plotted.

QGLOT (continued)

For each station the user should specify the date range and the parameters to be combined on one plot. In addition, if the user wants data that have been analyzed at particular laboratories to be excluded from the plot, up to three labs may be specified for exclusion.

Example of QGLOT





Example of QGPLOT

QGSTAT

This program prints station headers and computed statistics for grab sample data. Statistics are calculated for all the parameters using all dates unless the user specifies which parameters and dates are to be used. Data from up to three specified labs may optionally be omitted. The user may also specify the retrieval type.

The statistics printed for each parameter are: the number of values for each chemical parameter, maximum, minimum, mean, standard deviation, coefficient of skewness, coefficient of variation, ratio value and trend test. The ratio value is the K used in the Von Neumann Ratio Test (Chou, 1969). The test is used to determine if a parameter indicates a time trend. The results of the test are printed as 'POS,' 'NEG' or 'NULL.' 'POS' indicates there appears to be a correlation of the parameter with time. 'NEG' indicates that there does not appear to be a correlation of the parameter with time. 'NULL' means that not enough data were available (less than four data points) to make the test.

The following example was obtained by requesting QGSTAT for reference number 59 for the six parameters shown.

The user should specify the retrieval type, the parameters to be printed (unless all are to be presented), the date range (unless all dates are to be included) and any laboratories that should be excluded (up to three).

RRF # 59 CITY OF LARAMIE, WYOMING CITY SPRINGS
 ELEVATION 7225 FEET LATITUDE 41-19-30 N LONGITUDE 105-23-0 W PRIV # 0
 SE-SW SECTION 36 TOWNSHIP 16-N RANGE 73-W IN LARAMIE, ALBANY CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 11062100 DRAINAGE AREA .00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION CITY SUPPLY, INDIVIDUAL SOURCE, WELL OR SPRING
 WELL PERMIT # 0

* AFTER A VALUE TAGS IT AS LESS-THAN

1 AUG 73 TIME 0	34	49	50	117	152	457
COLLECTED BY PRIVATE OR OWNER	CONDUCTIVITY	BICARBONATE	CARBONATE	TOTAL	DISSOLVED	DISSOLVED
TESTING LAB AC, LAP LARAMIE	MICROMHOS	ION MG/L	ION MG/L	HARDNESS	BORON UG/L	SOLIDS ROE
SAMPLE # 0 SAMPLE DPTH 0	AT 25 DEG. C			MG/L (CACCB)		180C MG/L
WATER DPTH 0 ENDATE 0						
CHLORINATED AND FLUORIDATED						
SAMPLE SIZE	7.00000	7.00000	7.00000	7.00000	2.00000	7.00000
MAXIMUM	392.000	233.000	6.00000	203.000	20.0000	232.000
MINIMUM	307.000	174.000	.000000	153.000	.000000	172.000
MEAN	366.714	215.429	.657143	188.714	10.0000	212.000
STND DEV	27.9685	19.3033	2.26779	16.7204	14.1421	19.8326
RATIO VALUE	2.71092	2.53975	2.72222	2.90723	4.00000	3.01740
TREND TEST	NEG	NEG	NEG	NEG	NULL	NEG
MOMENT COEFFICIENT OF SKEWNESS	-1.44583	-1.47768	1.83982	-1.44478	.000000	-1.07168
COEF OF VAR (PER CENT)	7.62678	8.96044	264.575	8.86015	141.421	9.35501

Example of QGSTAT

QHEAD, QHEAD1, QHEAD2, QHEAD3

These programs list station headers and, optionally, dates of sample data.

QHEAD lists only station headers. Each header includes the reference number, station name, elevation, latitude, longitude, sample collector (USGS for the first example header) (see table under Water Quality Data), station number of the sample collector (if available), township, range, section, fraction of section (to the nearest 40 acres if known), county (or state if outside of Wyoming), city or town if it is a community source in Wyoming, drainage basin code (devised at WRRRI), drainage area for streams, non-contributing drainage area for streams, depth for wells, discharge permit number if applicable and station identification type (types listed under Retrieval Types).

QHEAD1 lists station headers and the dates of collection of all grab samples. For example, LaBarge Creek has grab sample data for December 4, 1963, while Green River near LaBarge has grab sample data available from October 1, 1963, through September 3, 1971.

QHEAD2 lists station headers and water years of daily samples available. The example shows daily data are stored for Green River near LaBarge for: temperature measured once daily from 1964 through 1975, mean daily streamflow from 1964 through 1975 and conductivity measured daily from 1965 through 1975.

QHEAD3 lists station headers with both dates of grab sample data and water years of daily data as shown in the example.

To request one of these listings the user should specify the program and the retrieval information to be used. For example: QHEAD3 for Lincoln County.

RBF # 1145 LA BARGE CREEK NEAR LA BARGE, WYOMING
 ELEVATION 6593 FEET LATITUDE 42-14- 0 N LONGITUDE 110-12- 0 W LSGS # 9209000.
 - SECTION 18 TOWNSHIP 26-N RANGE 112-W IN LINCOLN CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 15420000 DRAINAGE AREA 193.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

****DATES OF GRAB SAMPLES****

DEC 4, 1963

RBF # 1146 GREEN RIVER NEAR LA BARGE, WYOMING
 ELEVATION 6520 FEET LATITUDE 42-11- 0 N LONGITUDE 110-10- 0 W LSGS # 9209400.
 - SECTION 33 TOWNSHIP 26-N RANGE 112-W IN LINCOLN CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 15410000 DRAINAGE AREA 391.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

****DATES OF GRAB SAMPLES****

OCT 1, 1963	UCT 15, 1963	NOV 1, 1963	NOV 12, 1963	DEC 1, 1963	DEC 14, 1963	JAN 1, 1964	JAN 19, 1964	FEB 1, 1964
FEB 20, 1964	MAR 1, 1964	MAR 12, 1964	APR 1, 1964	APR 20, 1964	MAY 1, 1964	MAY 14, 1964	MAY 20, 1964	JUNE 1, 1964
JUNE 16, 1964	JULY 1, 1964	JULY 14, 1964	AUG 1, 1964	AUG 16, 1964	SEPT 1, 1964	OCT 1, 1964	OCT 17, 1964	NOV 1, 1964
NOV 16, 1964	DEC 1, 1964	DEC 16, 1964	JAN 1, 1965	FEB 1, 1965	FEB 21, 1965	MAR 1, 1965	APR 1, 1965	APR 21, 1965
MAY 1, 1965	MAY 6, 1965	MAY 11, 1965	JUNE 1, 1965	JUNE 17, 1965	JUNE 26, 1965	JULY 14, 1965	JULY 18, 1965	AUG 1, 1965
AUG 19, 1965	SEPT 1, 1965	SEPT 11, 1965	SEPT 21, 1965	OCT 1, 1965	OCT 16, 1965	NOV 1, 1965	NOV 8, 1965	NOV 26, 1965
DEC 9, 1965	DEC 16, 1965	DEC 30, 1965	JAN 11, 1966	JAN 21, 1966	FEB 1, 1966	MAR 1, 1966	MAR 31, 1966	APR 4, 1966
APR 13, 1966	MAY 1, 1966	MAY 11, 1966	MAY 20, 1966	JUNE 6, 1966	JUNE 21, 1966	JULY 1, 1966	AUG 1, 1966	SEPT 1, 1966
OCT 1, 1966	OCT 5, 1966	NOV 1, 1966	NOV 21, 1966	DEC 1, 1966	JAN 1, 1967	JAN 3, 1967	FEB 1, 1967	MAR 1, 1967
MAR 26, 1967	APR 2, 1967	APR 4, 1967	MAY 1, 1967	MAY 27, 1967	JUNE 1, 1967	JUNE 8, 1967	JULY 1, 1967	JULY 12, 1967
AUG 1, 1967	SEPT 1, 1967	OCT 1, 1967	OCT 2, 1967	NOV 1, 1967	NOV 26, 1967	DEC 1, 1967	DEC 6, 1967	JAN 1, 1968
JAN 19, 1968	JAN 23, 1968	FEB 1, 1968	MAR 1, 1968	MAR 26, 1968	APR 1, 1968	APR 4, 1968	MAY 1, 1968	MAY 30, 1968
JUNE 1, 1968	JUNE 18, 1968	JULY 1, 1968	JULY 24, 1968	AUG 1, 1968	AUG 9, 1968	AUG 13, 1968	AUG 25, 1968	SEPT 1, 1968
SEPT 3, 1968	OCT 1, 1968	OCT 9, 1968	NOV 1, 1968	NOV 10, 1968	DEC 1, 1968	DEC 19, 1968	JAN 1, 1969	FEB 1, 1969
MAR 1, 1969	MAR 14, 1969	APR 1, 1969	APR 7, 1969	APR 24, 1969	MAY 1, 1969	MAY 9, 1969	MAY 17, 1969	JUNE 1, 1969
JUNE 14, 1969	JULY 1, 1969	AUG 1, 1969	SEPT 1, 1969	OCT 1, 1969	OCT 2, 1969	OCT 18, 1969	NOV 1, 1969	NOV 18, 1969
DEC 1, 1969	JAN 1, 1970	FEB 1, 1970	FEB 1, 1970	FEB 6, 1970	MAR 1, 1970	MAR 6, 1970	APR 1, 1970	MAY 1, 1970
MAY 20, 1970	MAY 26, 1970	JUNE 1, 1970	JUNE 10, 1970	JUNE 12, 1970	JUNE 21, 1970	JULY 1, 1970	JULY 8, 1970	JULY 15, 1970
AUG 1, 1970	AUG 9, 1970	SEPT 1, 1970	SEPT 2, 1970	SEPT 9, 1970	SEPT 16, 1970	OCT 7, 1970	OCT 15, 1970	NOV 10, 1970
DEC 9, 1970	JAN 9, 1971	MAR 4, 1971	MAR 4, 1971	APR 1, 1971	MAY 12, 1971	JULY 15, 1971	AUG 9, 1971	SEPT 3, 1971

****DATES OF DAILY SAMPLES****

TEMPERATURE ONCE DAILY 1964-1975
 STREAMFLOW MEAN 1964-1975
 CONDUCTIVITY ONCE DAILY 1965-1975

RBF # 2492 WELL NORTHWEST OF KEMMERER, WYOMING
 ELEVATION 9000 FEET LATITUDE 41-56-20 N LONGITUDE 110-46-28 W HLM # 0.
 -SE SECTION 24 TOWNSHIP 23-N RANGE 112-W IN LINCOLN CNTY BLM AREA# 0
 DRAINAGE BASIN CODE 16060200 DRAINAGE AREA .00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION INDIVIDUAL WELL OR SPRING
 WELL PERMIT # 0

****DATES OF GRAB SAMPLES****

JUNE 24, 1975

REGDAY

This program does a least squares regression analysis between two daily sample parameters at a station. It has all the features and options described in REGGRAB. The only differences are that the regression is for daily samples instead of grab samples and while the printout and plot give information on the regression line, the individual data points are neither printed nor plotted because they are too numerous. The data may be listed by the QDDATA program.

The following example indicates a poor correlation between suspended sediment and conductivity.

For the stations desired the user should specify: the dependent (Y-axis) and independent (X-axis) parameters; linear or curvilinear fit; no transformation, $\log_{10}$ transformation or $\log_e$ transformation on specified parameters; forced or not forced through the origin; significance level, alpha (.01, .02, .05, .10, .20); plot or no plot; and the beginning water year unless all water years are to be used.

REF # 1046 POWDER RIVER AT ARVADA, WYCMING
 ELEVATION 3622 FEET LATITUDE 44-38-45 N LONGITUDE 106- 8- 0 W USGS = 6317000.
 - SECTION 21 TOWNSHIP 54-N RANGE 77-W IN ,SHERIDAN CNTY BLM AREA= 0
 DRAINAGE BASIN CODE 6100000 DRAINAGE AREA 6050.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT = 0 CLASSIFICATION USGS STREAM
 WELL PERMIT = 0

*** LINEAR REGRESSION ANALYSIS ***
 NO TRANSFORMATION APPLIED TO DATA
 DAILY VALUES

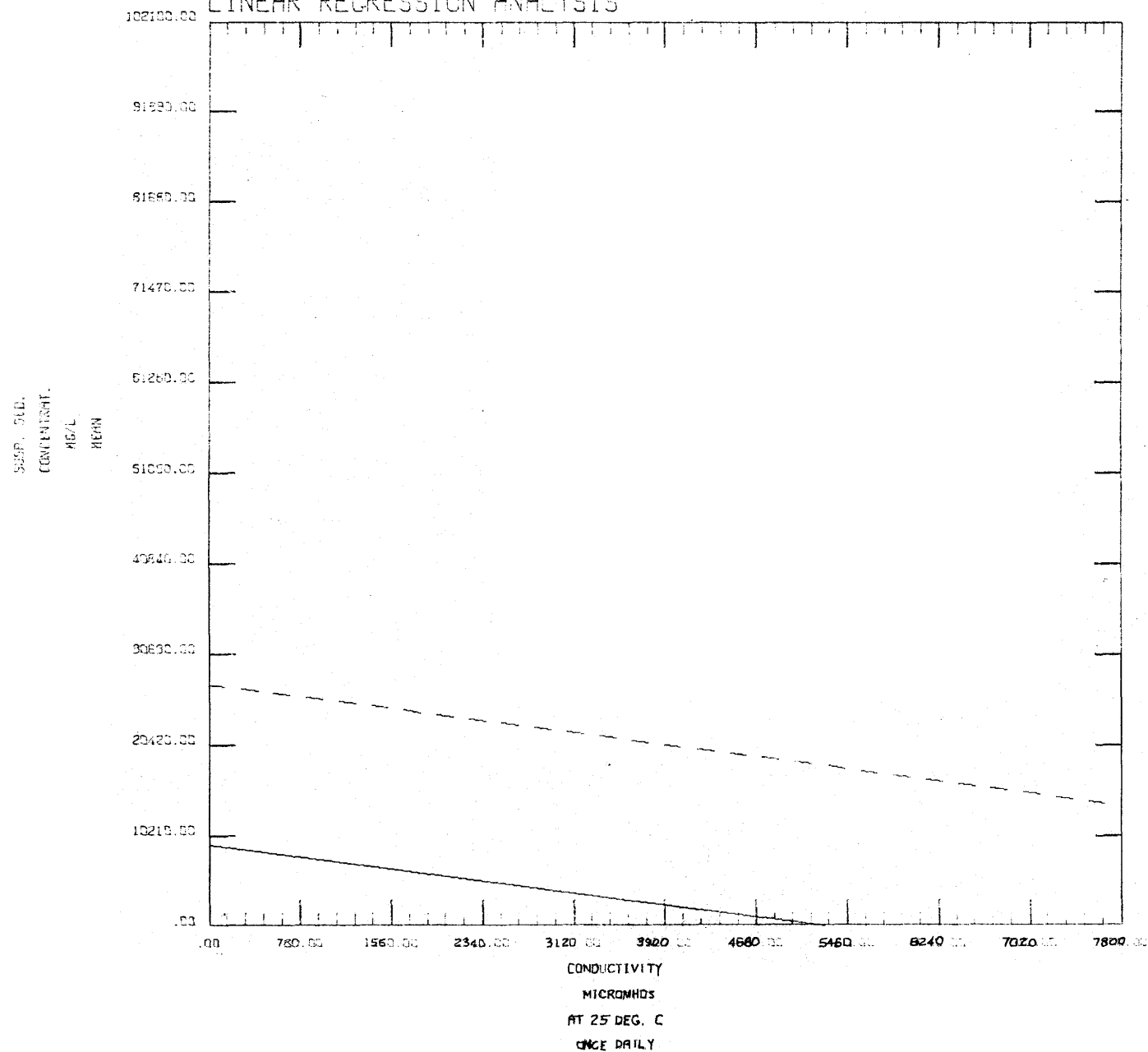
DEPENDENT VARIABLE	INDEPENDENT VARIABLE
SUSP. SED. CONCENTRAT. MG/L MEAN	CONDUCTIVITY MICROMHCS AT 25 DEG. C CNCE DAILY

MEAN	4547.79	2610.00
STANDARD DEVIATION	6.91	.63

Y = 9115.78 -1.75X
 SAMPLE SIZE IS 1353
 STANDARD ERROR 9234.23
 STANDARD ERROR SQUARED 85270992.00
 COEFFICIENT OF DETERMINATION, R SQUARED .026
 COEFFICIENT OF CORRELATION, R -.160
 FOR ALPHA .050 B IS NOT SIGNIFICANT
 MINIMUM X 621.00 CONFIDENCE LIMITS 26.70,69 AND -10112.85
 MAXIMUM X 7760.00 CONFIDENCE LIMITS 13880.13 AND -22811.45

Example of REGDAY

POWDER RIVER AT ARVADA, WYOMING
LINEAR REGRESSION ANALYSIS



REF. NUMBER = 1046

$Y = 3115.78 - 1.75X$

SAMPLE SIZE IS 1353

STANDARD ERROR = 3234.23

STND. ERR. SQ. = 85270392.00

R SQUARED = .026

$R = -.160$

ALPHA = .050 B IS NOT SIG.

REGGRAB

REGGRAB does a least squares regression analysis between two grab sample parameters at a station. The regression fit may be linear or curvilinear. Data transformations may be logarithmic base 10 or logarithmic base e. The fit may be forced through the origin if requested. Thus 36 possible regression types may be specified including semi-logarithmic fits. Plots of the data and regression curve are optional.

Confidence limits are calculated and plotted (if plots are desired) for linear regressions. Also on linear regressions, a test is made of the significance of the second coefficient. The user may specify the significance level, alpha, to be used in the confidence limits and test of the coefficient significance (T test).

For the stations desired the user should specify: the dependent (Y-axis) and independent (X-axis) parameters; linear or curvilinear fit; no transformation, $\log_{10}$ transformation or $\log_e$ transformation on specified parameters; forced or not forced through the origin; significance level, alpha (.01, .02, .05, .10, .20); plot or no plot; and up to five date ranges unless all dates are to be used.

REGGRAB (continued)

The following examples illustrate some of the possible options of REGGRAB. The first example is a linear, non-transformed, and not forced regression of dissolved solids versus conductivity with $\alpha = .05$ for the Encampment River. The data are tabulated and their means and standard deviations printed. The regression equation is $Y = 7.03 + .65X$. Standard error and correlation statistics are given as an indication of how good the regression fit is. The statement, "for alpha .050 B is significant" indicates that the second coefficient in the equation, .65, is significant. The plot shows graphically what the printout indicates--a fairly good fit.

Example of REGGRAB

REF # 1057 ENCAMPMENT RIVER AT MOUTH NEAR ENCAMPMENT, WYOMING
 ELEVATION 6970 FEET LATITUDE 41-18-12 N LONGITUDE 106-42-53 W USGS # 6625000.
 SECTION 3 TOWNSHIP 15-N RANGE 83-W IN CARBON CNTY BLM AREA= 0
 DRAINAGE BASIN CODE 11830000 DRAINAGE AREA 269.00 NONCONTRIBUTING .00 WELL DEPTH)
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** LINEAR REGRESSION ANALYSIS ***
 NO TRANSFORMATION APPLIED TO DATA

DEPENDENT INDEPENDENT
 VARIABLE VARIABLE

DISSOLVED CONDUCTIVITY
 SOLIDS ROE MICROMHOS
 180C MG/L AT 25 DEG. C

76.00	58.00
58.00	35.00
49.00	62.00
146.00	185.00
140.00	221.00
188.00	258.00
184.00	259.00
164.00	271.00
112.00	171.00
60.00	86.00
226.00	285.00
286.00	409.00
344.00	504.00
322.00	480.00
210.00	311.00
220.00	332.00
58.00	105.00
108.00	170.00
146.00	223.00
172.00	275.00
86.00	101.00
50.00	67.00
72.00	89.00
144.00	210.00
234.00	339.00
192.00	254.00
186.00	281.00
206.00	281.00
208.00	288.00
176.00	278.00
158.00	270.00
48.00	54.00
48.00	58.00
254.00	381.00
264.00	400.00
222.00	340.00
188.00	271.00
208.00	318.00
218.00	328.00
200.00	294.00
184.00	272.00
150.00	220.00
40.00	61.00
78.00	123.00
156.00	263.00
270.00	441.00
316.00	463.00
228.00	347.00
198.00	292.00
204.00	312.00
214.00	323.00
190.00	299.00
40.00	52.00
60.00	91.00
142.00	219.00
310.00	446.00
220.00	348.00
142.00	250.00
196.00	295.00
180.00	273.00
170.00	282.00
174.00	267.00
50.00	62.00
48.00	58.00

MEAN 165.48 245.48
 STANDARD DEVIATION 1.23 1.88

Y = 7.03 + .65X
 SAMPLE SIZE IS 64

STANDARD ERROR 12.19

STANDARD ERROR SQUARED 148.71

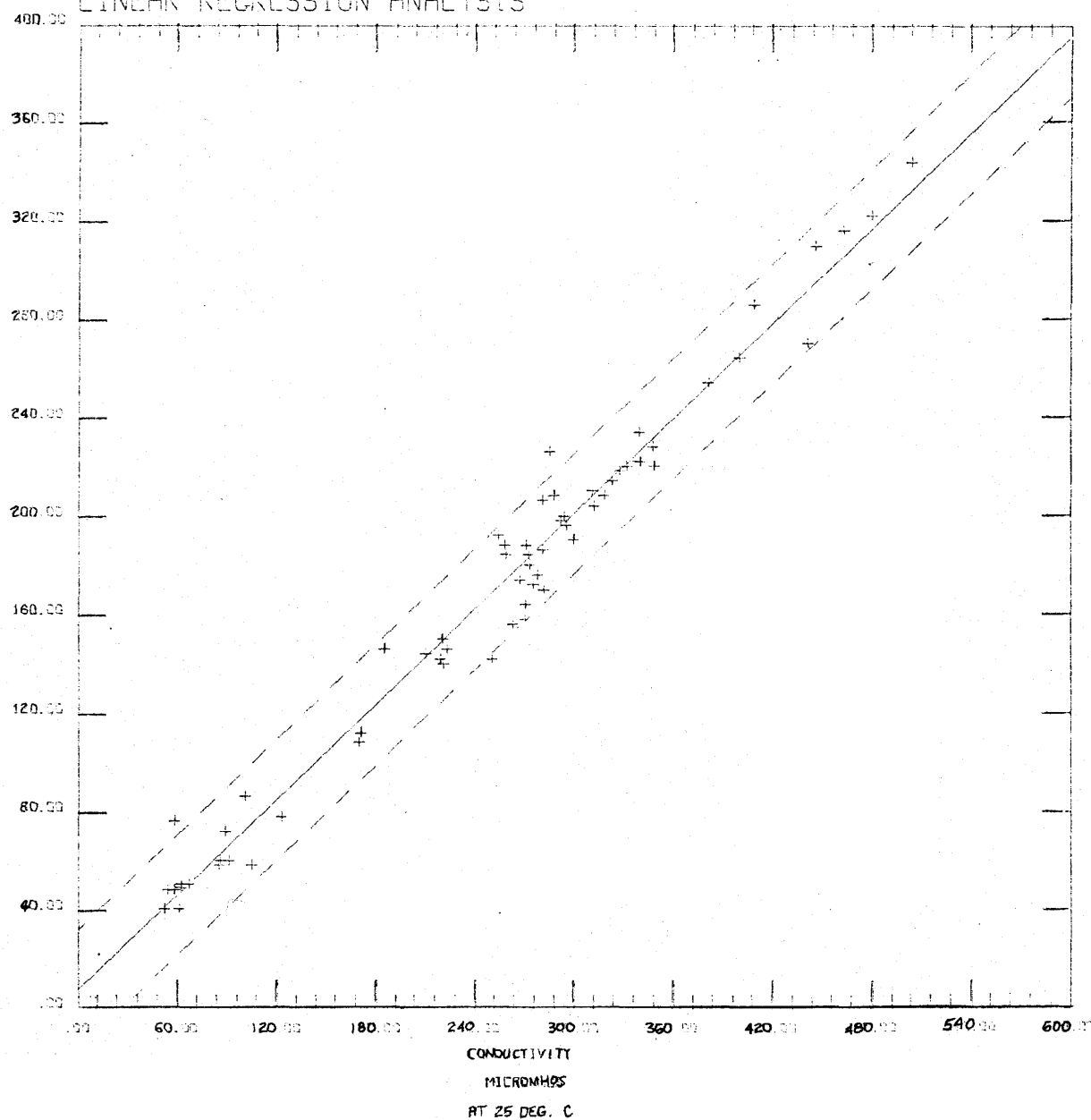
COEFFICIENT OF DETERMINATION, R SQUARED .976

COEFFICIENT OF CORRELATION, R .988

FOR ALPHA .050 IS SIGNIFICANT

MINIMUM X 52.00 CONFIDENCE LIMITS 65.17 AND 16.02
 MAXIMUM X 504.00 CONFIDENCE LIMITS 357.30 AND 367.39

ENCAMPMENT RIVER AT MOUTH NEAR ENCAMPMENT, WYOMING LINEAR REGRESSION ANALYSIS



REF. NUMBER = 1057

Y= 7.03+ .65X

SAMPLE SIZE IS 64

STANDPRD ERROR= 12.19

STND. ERR. SQ.= 148.71

R SQUARED= .976

R= .986

ALPHA= .050 B IS SIG.

Example of REGGRAB

REGGRAB (continued)

The second REGGRAB example is the same kind of regression except streamflow is the independent variable instead of conductivity. The statistics and plot indicate a poor fit. The test on the second coefficient indicates that it is not significant, i.e., one can just as well use the mean in the estimation relationship $Y = 165.48$.

The plot shows what is generally characteristic between streamflow and parameters expressed as concentrations--high concentrations at low flows. Regressions forced through the origin are not applicable to these cases.

REF # 1057 ENCAMPMENT RIVER AT MOUTH NEAR ENCAMPMENT, WYOMING
 ELEVATION 6970 FEET LATITUDE 41-18-12 N LONGITUDE 106-42-53 W USGS # 6625000.
 - SECTION 3 TOWNSHIP 15-N RANGE 83-W IN CARBON CNTY BLM AREA= 0
 DRAINAGE BASIN CODE 11030000 DRAINAGE AREA 265.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** LINEAR REGRESSION ANALYSIS ***
 NO TRANSFORMATION APPLIED TO DATA

DEPENDENT VARIABLE INDEPENDENT VARIABLE

DISSOLVED SOLIDS PCE 180C MG/L STREAMFLOW CFS

76.00	220.00
58.00	68.00
49.00	332.00
146.00	144.00
140.00	95.00
188.00	67.00
184.00	49.00
164.00	56.00
112.00	130.00
60.00	544.00
226.00	145.00
286.00	87.00
344.00	60.00
322.00	46.00
210.00	75.00
220.00	49.00
58.00	50.00
108.00	105.00
146.00	76.00
172.00	69.00
86.00	271.00
50.00	1050.00
72.00	1130.00
144.00	217.00
234.00	98.00
192.00	124.00
186.00	74.00
206.00	46.00
208.00	57.00
176.00	69.00
158.00	82.00
48.00	2220.00
48.00	119.00
254.00	88.00
264.00	54.00
222.00	61.00
188.00	84.00
208.00	63.00
218.00	50.00
200.00	57.00
184.00	52.00
150.00	99.00
40.00	788.00
78.00	662.00
156.00	180.00
270.00	70.00
316.00	55.00
228.00	71.00
198.00	73.00
204.00	67.00
214.00	85.00
190.00	65.00
40.00	1220.00
60.00	1490.00
142.00	268.00
310.00	56.00
220.00	77.00
142.00	190.00
196.00	83.00
180.00	109.00
170.00	84.00
174.00	62.00
50.00	912.00
48.00	2560.00

Example of REGGRAB

MEAN 165.48 286.23
 STANDARD DEVIATION 1.23 8.29

Y = 189.75 -.08X

SAMPLE SIZE IS 64

STANDARD ERROR 64.56

STANDARD ERROR SQUARED 4167.92

COEFFICIENT OF DETERMINATION, R SQUARED .327

COEFFICIENT OF CORRELATION, R -.572

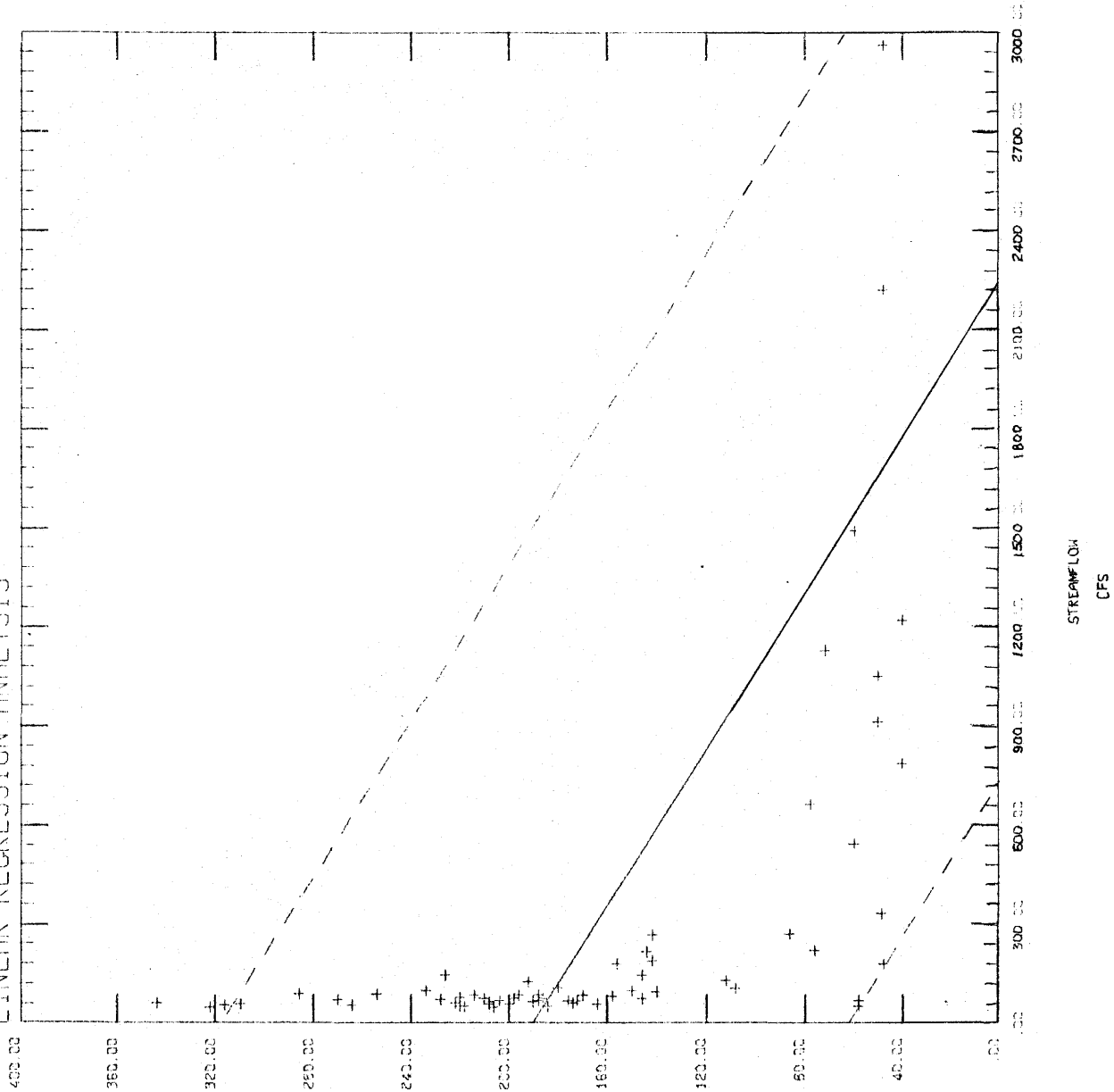
FOR ALPHA .050 R IS NOT SIGNIFICANT

MINIMUM X 46.00 CONFIDENCE LIMITS 313.58 AND 58.12

MAXIMUM X 2960.00 CONFIDENCE LIMITS 89.85 AND -212.24

Example of REGGRAB

ENCAMPMENT RIVER AT MOUTH NEAR ENCAMPMENT, WYOMING LINEAR REGRESSION ANALYSIS



REF. NUMBER = 1057
Y = 183.75 - .08X
SAMPLE SIZE IS 64
STANDARD ERROR = 64.56
STND. ERR. SQ. = 4167.92
R SQUARED = .327
R = -.572
ALPHA = .050 B IS NOT SIG.

DISSEMINATED
5/17/05 RGE
1500 MC/L

REGGRAB (continued)

The third example is a linear fit of $\log_{10}$ transformed dissolved potassium versus total hardness. The equation can be expressed as

$$\log_{10} Y = -.95 + .62 \log_{10} X \quad \text{or} \quad Y = 10^{-.95} X^{.62}.$$

For comparative purposes regression plots of linear and curvilinear fits of the same data, except with the parameters reversed and not transformed, are also included.

Example of REGGRAB

REF # 1088 NORTH PLATTE RIVER BELOW CASPER, WYOMING
 ELEVATION 5070 FEET LATITUDE 42-51-45 N LONGITUDE 106-13- 0 * USGS # 6645000.
 - SECTION 4 TOWNSHIP 33-N RANGE 70-W IN ,NATHONA CNTY BLM AREA= 0
 DRAINAGE BASIN CODE 11380000 DRAINAGE AREA 16523.00 NONCENTRIBUTING 4720.00 WELL DEPTH 0
 DISCHARGE PERMIT = 0 CLASSIFICATION USGS STREAM
 WELL PERMIT = 0

* AFTER A VALUE TAGS IT AS LESS-THAN
 *** LINEAR REGRESSION ANALYSIS ***
 BASE 10 LOGARITHMIC TRANSFORMATION APPLIED TO DATA

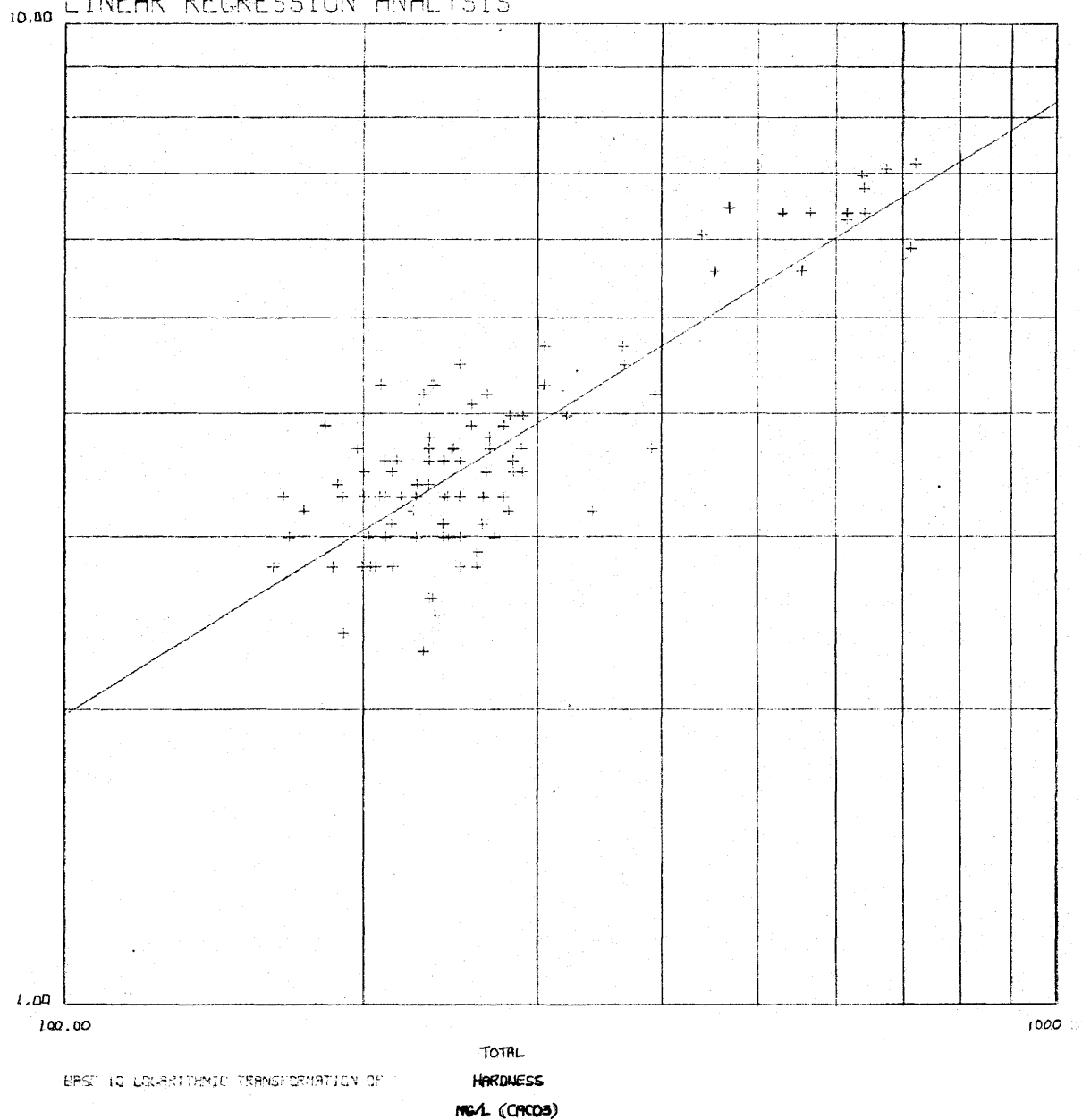
DEPENDENT VARIABLE	INDEPENDENT VARIABLE	TRANSFORMED DEPENDENT VARIABLE	TRANSFORMED INDEPENDENT VARIABLE	
DISSOLVED POTASSIUM MG/L	TOTAL HARDNESS MG/L CaCO3	DISSOLVED POTASSIUM MG/L	TOTAL HARDNESS MG/L CaCO3	
3.30	190.00	.52	2.28	
3.50	200.00	.54	2.30	
4.50	367.00	.65	2.56	
5.60	452.00	.75	2.66	
5.60	552.00	.75	2.74	
6.40	640.00	.81	2.81	
5.90	712.00	.77	2.85	
5.90	712.00	.77	2.85	
7.20	720.00	.86	2.86	
6.40	528.00	.81	2.72	
4.30	208.00	.63	2.32	
4.70	304.00	.67	2.48	
6.10	438.00	.79	2.64	
6.40	564.00	.81	2.75	
7.00	636.00	.85	2.80	
6.40	614.00	.81	2.79	
6.40	614.00	.81	2.79	
6.80	638.00	.83	2.80	
7.10	673.00	.85	2.83	
6.30	613.00	.80	2.79	
6.50	467.00	.81	2.67	
4.30	304.00	.63	2.48	
3.70	232.00	.57	2.37	
3.50	213.00	.54	2.32	
3.40	188.00	.53	2.27	
3.30	166.00	.52	2.22	
2.80	162.00	.45	2.21	
4.30	235.00	.63	2.37	
3.00	168.00	.48	2.23	
3.20	174.00	.51	2.24	
3.90	183.00	.59	2.26	
4.30	234.00	.63	2.37	
4.10	257.00	.61	2.41	
3.70	197.00	.57	2.29	
3.60	216.00	.56	2.33	
4.00	320.00	.60	2.51	
4.00	289.00	.60	2.46	
4.00	289.00	.60	2.46	
3.60	282.00	.56	2.45	
3.90	276.00	.59	2.44	
3.90	276.00	.59	2.44	
3.60	283.00	.56	2.45	
.	.	.	.	
.	.	.	.	
.	.	.	.	
.	.	.	.	
.	.	.	.	
2.90	260.00	.46	2.41	
2.40	190.00	.38	2.28	
3.30	200.00	.52	2.30	
3.60	210.00	.56	2.32	
3.10	240.00	.49	2.38	
MEAN	3.89	298.21	.57	2.44
STANDARD DEVIATION	.01	1.29	.00	.00

LOG Y = -.95+ .62 LOG X
 SAMPLE SIZE IS 107
 STANDARD ERROR .06
 STANDARD ERROR SQUARED .00
 COEFFICIENT OF DETERMINATION, R SQUARED .734
 COEFFICIENT OF CORRELATION, R .857
 FOR ALPHA .050 IS SIGNIFICANT
 MINIMUM X 2.21 CONFIDENCE LIMITS .55 AND .31
 MAXIMUM X 2.86 CONFIDENCE LIMITS .95 AND .71

DISSOLVED
POTASSIUM
MG/L

BASE 10 LOGARITHMIC TRANSFORMATION OF

NORTH PLATTE RIVER BELOW CASPER, WYOMING LINEAR REGRESSION ANALYSIS



Example of REGGRAB

REF. NUMBER = 1058

Y=10 TO THE A POWER TIMES

X TO THE B POWER

A = -.95

B = .62

SAMPLE SIZE IS 107

STANDARD ERROR= .06

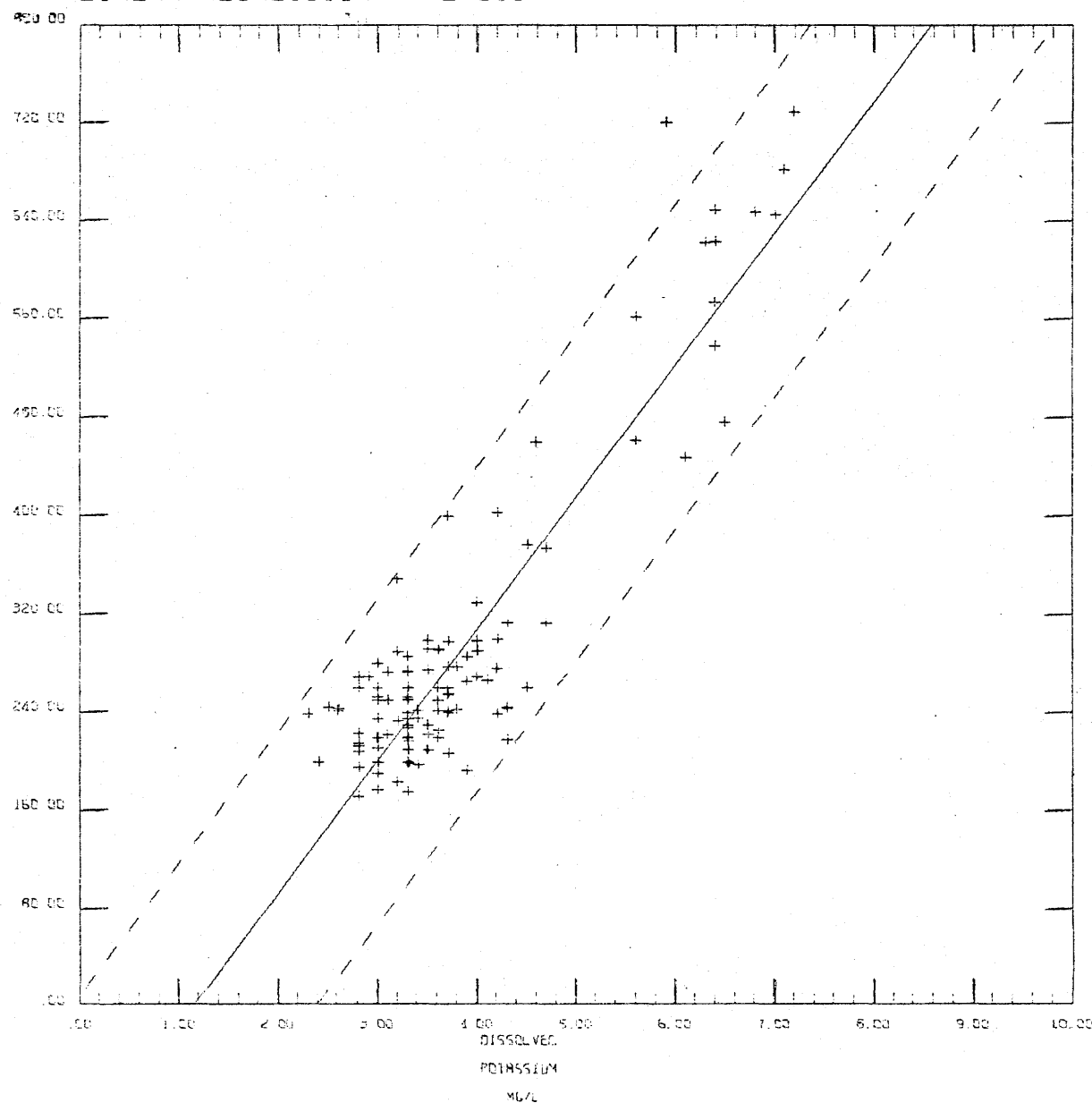
STND. ERR SQ.= .00

R SQUARED= .734

R= .857

ALPHA= .050 B IS SIG.

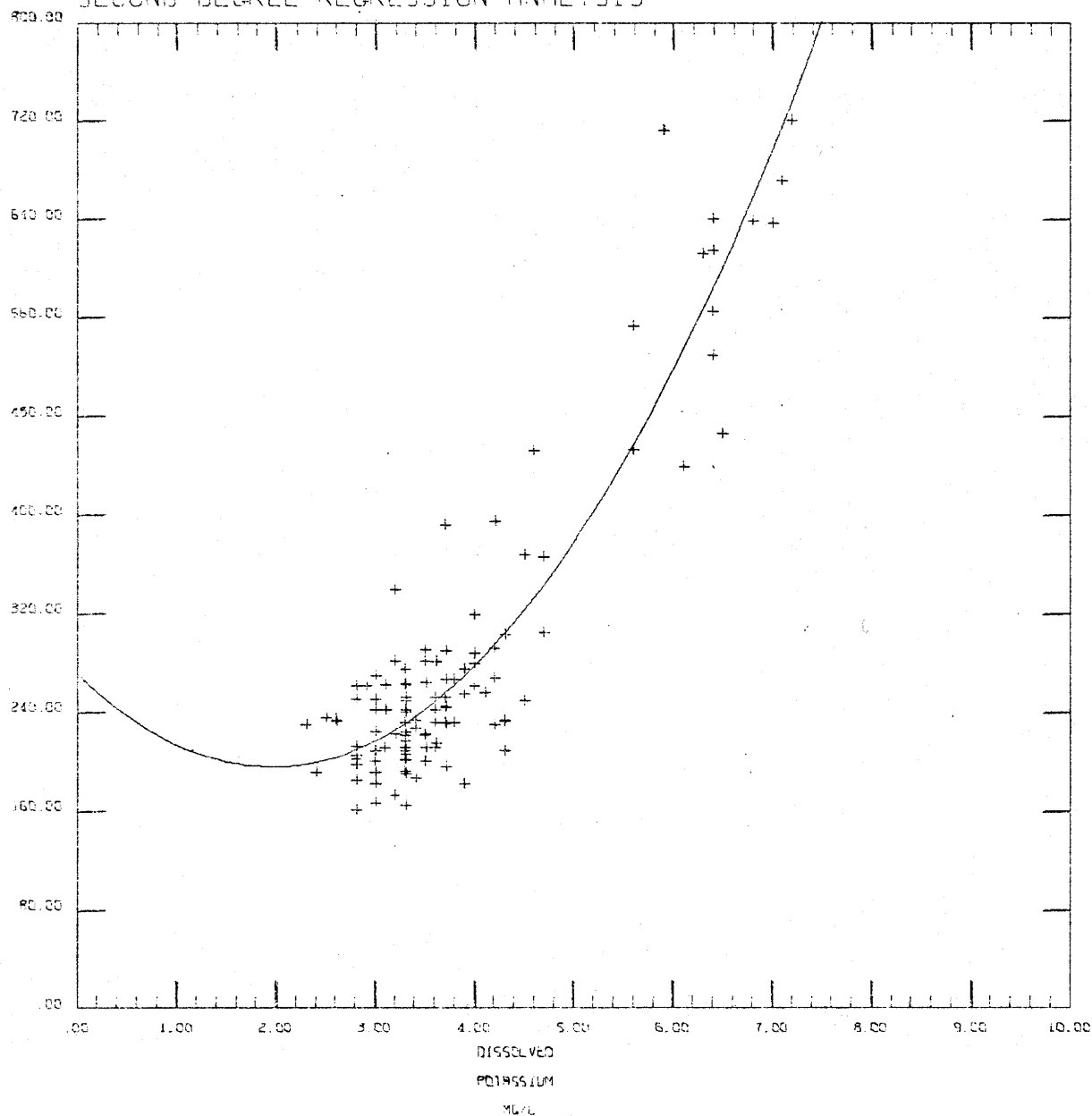
NORTH PLATTE RIVER BELOW CASPER, WYOMING LINEAR REGRESSION ANALYSIS



REF. NUMBER = 1088
 $Y = -122.53 + 107.370X$
 SAMPLE SIZE IS 128
 STANDARD ERROR = 56.35
 STD. ERR. SQ. = 3174.85
 R SQUARED = .813
 R = .902
 ALPHA = .025 B IS SIG.

Example of REGTAB

NORTH PLATTE RIVER BELOW CASPER, WYOMING
SECOND DEGREE REGRESSION ANALYSIS



REF. NUMBER = 1068

Y= 270.01 -76.234X+ 19.5785X**2

SAMPLE SIZE IS 128

STANDARD ERROR= 50.08

STND. ERR. SD.= 2507.64

REGMON

This program does least squares regression analysis between monthly averages of two daily sample parameters at a station. The daily values for a particular month are averaged and these average values are used in the regression. The program has all the features and options of REGGRAB. The only differences are that it is for average monthly data and the individual data values are not tabulated.

This program may be useful for correlating suspended sediment and conductivity or sediment load and streamflow. The following example shows a fairly good correlation between conductivity and suspended sediment for October data. This is in contrast to the poor fit in the example for REGDAY for the same parameters at the same station.

The user should specify the same items as described for REGDAY.

Example of REGMON

```
REF #      1046      POWDER RIVER AT ARVADA, WYOMING
ELEVATION  3622 FEET  LATITUDE 44-38-45 N  LONGITUDE 106- 8- 0 W  USGS =      6317000.
- SECTION 21  TOWNSHIP 54-N  RANGE 77-W  IN  ,SHERIDAN CNTY BLM AREA=  0
DRAINAGE BASIN CODE 6100000  DRAINAGE AREA 6050.00  NONCONTRIBUTING  .00  WELL DEPTH  0
DISCHARGE PERMIT =  0  CLASSIFICATION USGS STREAM
WELL PERMIT =  0
```

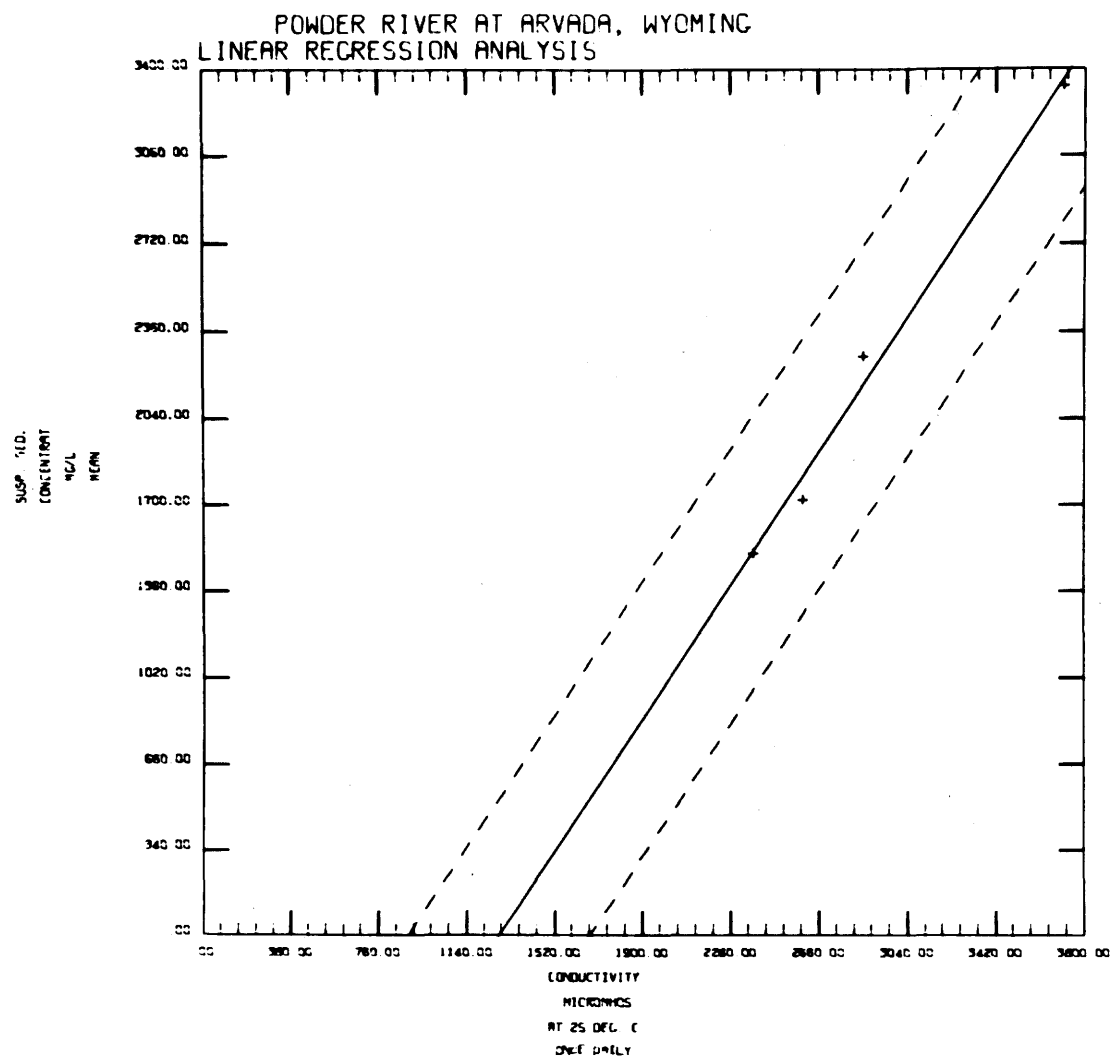
```
*** LINEAR REGRESSION ANALYSIS ***
NO TRANSFORMATION APPLIED TO DATA
* AFTER A VALUE TAGS IT AS LESS-THAN
```

DEPENDENT VARIABLE	INDEPENDENT VARIABLE
SUSP. SEC. CONCENTRAT. MG/L MEAN	CONDUCTIVITY MICROMHOS AT 25 DEG. C ONCE DAILY

MEAN	2208.97	2880.56
STANDARD DEVIATION	235.27	169.63

REGRESSION ON MEAN OF DAILY VALUES FOR OCT

```
Y = -1764.94 + 1.38X
SAMPLE SIZE IS 4
STANDARD ERROR 102.71
STANDARD ERROR SQUARED 10549.99
COEFFICIENT OF DETERMINATION, R SQUARED .989
COEFFICIENT OF CORRELATION, R .995
FOR ALPHA .050 R IS SIGNIFICANT
MINIMUM X 2373.55 CONFIDENCE LIMITS 2050.48 AND 968.54
MAXIMUM X 3712.27 CONFIDENCE LIMITS 2968.42 AND 2744.30
```



OCT

REF. NUMBER = 1046

 $Y = -1764.94 + 1.38X$

SAMPLE SIZE IS 4

STANDARD ERROR= 102.71

STND. ERR. SQ.= 10549.99

R SQUARED= .989

R= .995

ALPHA= .050 B IS SIG.

Example of REGMON

REGSTA

REGSTA does least squares regression analyses for one parameter between two stations. The features and options are the same as those of REGDAY except REGDAY works on two parameters at one station. Since the stations must have concurrent data, daily samples are usually used in this program.

The following example is a linear regression of daily samples of suspended sediment for Middle Fork Powder River versus Powder River.

The user should specify: the dependent (Y-axis) and independent (X-axis) stations; the parameter; linear or curvilinear fit; no transformation, $\log_{10}$ transformation or $\log_e$ transformation on specified stations; forced or not forced through the origin; significance level, alpha (.01, .02, .05, .10, .20); plot or no plot; the beginning water year (for daily data only) unless all data are to be used; and five date ranges (for grab data only) unless all data are to be used.

DEPENDENT HEADER

REF # 1030 MIDDLE FORK POWDER RIVER ABOVE KAYCEE, WYOMING
 ELEVATION 4875 FEET LATITUDE 43-38-51 N LONGITUDE 106-48-29 W USGS # 6309500.
 - SECTION 34 TOWNSHIP 43-N RANGE 83-W IN ,JOHNSON CNTY BLM AREA= 0
 DRAINAGE BASIN CODE 6460000 DRAINAGE AREA 450.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

INDEPENDENT HEADER

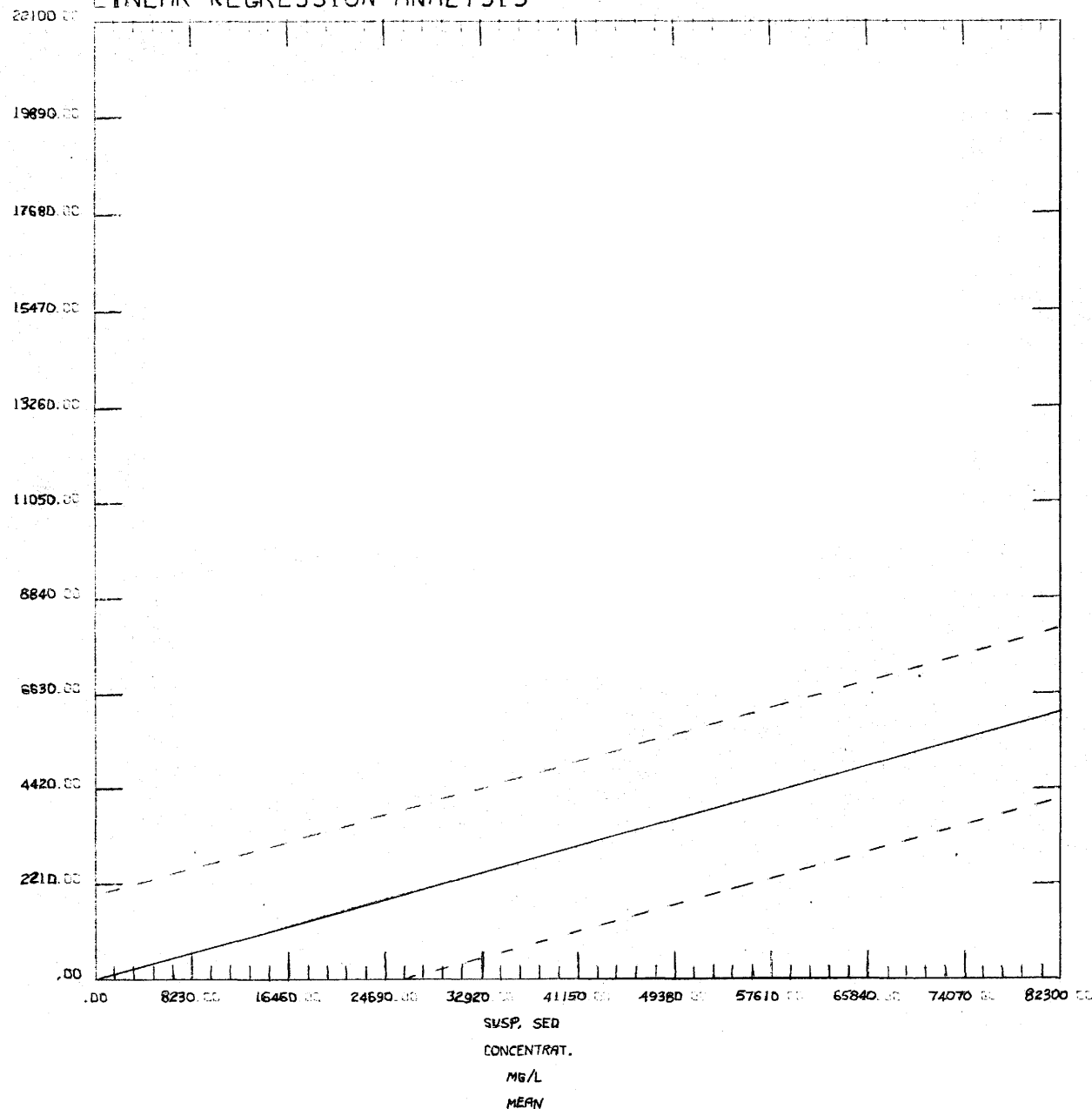
REF # 1046 POWDER RIVER AT ARVADA, WYOMING
 ELEVATION 3622 FEET LATITUDE 44-38-45 N LONGITUDE 106- 8-0 W USGS # 6317000.
 - SECTION 21 TOWNSHIP 54-N RANGE 77-W IN ,SHERIDAN CNTY BLM AREA= 0
 DRAINAGE BASIN CODE 6100000 DRAINAGE AREA 6050.00 NONCONTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT # 0 CLASSIFICATION USGS STREAM
 WELL PERMIT # 0

*** LINEAR REGRESSION ANALYSIS ***
 NO TRANSFORMATION APPLIED TO DATA
 DAILY VALUES

DEPENDENT VARIABLE	INDEPENDENT VARIABLE
SUSP. SED. CONCENTR. MG/L MEAN	SUSP. SED. CONCENTRAT. MG/L MEAN
MEAN 331.36	4869.93
STANDARD DEVIATION 1.70	13.15
Y = -36.62 + .08X	
SAMPLE SIZE IS 731	
STANDARD ERROR 1007.70	
STANDARD ERROR SQUARED 1015467.19	
COEFFICIENT OF DETERMINATION, R SQUARED .342	
COEFFICIENT OF CORRELATION, R .585	
FOR ALPHA .050 R IS SIGNIFICANT	
MINIMUM X .00	CONFIDENCE LIMITS 1940.18 AND -2013.42
MAXIMUM X 82200.00	CONFIDENCE LIMITS 8236.62 AND 4112.34

Example of REGSTA

POWDER RIVER AT ARVADA, WYOMING LINEAR REGRESSION ANALYSIS



REF. NUMBER = 1030

$Y = -36.62 + .08X$

SAMPLE SIZE IS 731

STANDARD ERROR= 1007.70

STND. ERR. SO.= 1015467.19

R SQUARED= .342

$R = .585$

ALPHA= .050 B IS SIG.

RUNAVE

This program calculates and prints a tabulation of running averages for daily conductivity (micromhos at 25 Deg. C) by water year. Any number of days from 2 to 180 may be specified. The following printout shows an example for a 20-day running average. The value for the first of October is the running average of conductivity for September 12-October 1. The second value is the average for September 13-October 2, etc. The monthly and annual maxima, minima and means are included. Each year's values may also optionally be plotted. The plot shows a 5-day running average.

For each station the user should specify the water year range (unless all water years are to be included), the number of days in the running average and whether or not a plot is to be made.

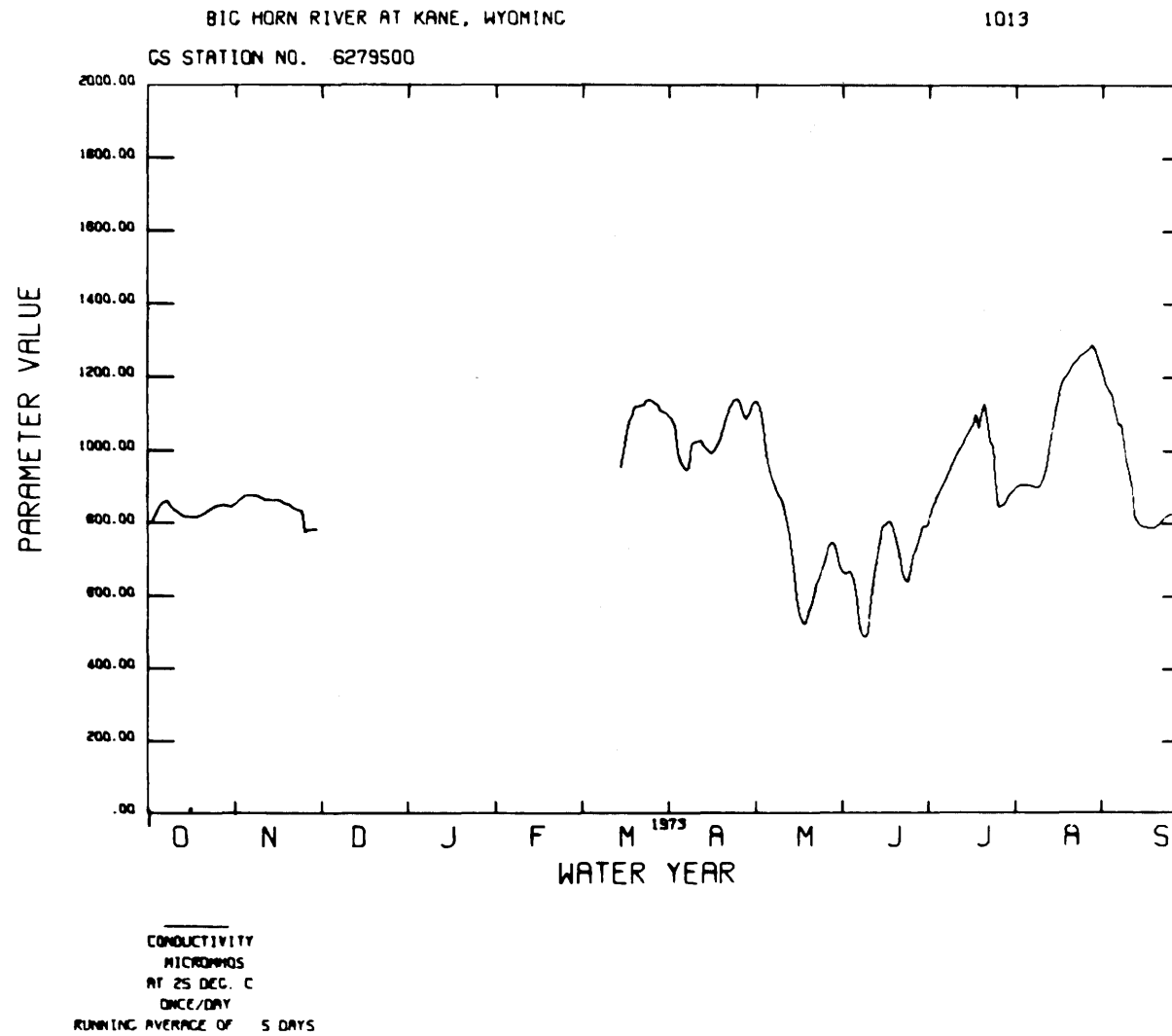
REF # 1013 BIG HORN RIVER AT KANE, WYCMING
 ELEVATION 3660 FEET LATITUDE 44-45-31 N LONGITUDE 108-10-51 W USGS = 6279500.
 - SECTION 9 TOWNSHIP 55-N RANGE 94-W IN ,BIG HORN CNTY BLM AREA= 0
 DRAINAGE BASIN CODE 3200000 DRAINAGE AREA 15765.00 ACNCCNTRIBUTING .00 WELL DEPTH 0
 DISCHARGE PERMIT = 0 CLASSIFICATION USGS STREAM
 WELL PERMIT * 0

VALUES ARE FOR A RUNNING AVERAGE OF 20 DAYS BEGINNING ON THE DAY INDICATED
 *** SPECIFIC CONDUCTIVITY MICRONS AT 25 DEGREES C. FOR WATER YEAR 1974 ***

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	868.75	947.55	981.30	**	**	981.45	964.65	917.55	621.60	719.50	824.65	962.65
2	870.50	957.30	998.40	**	**	987.90	967.35	920.50	609.20	729.55	825.25	968.95
3	872.40	966.50	1009.40	**	**	994.80	967.95	915.80	593.75	741.00	825.05	974.40
4	871.95	976.35	1015.30	**	**	999.80	971.65	916.75	588.85	746.05	826.55	980.05
5	871.80	981.60	1023.45	**	**	1002.80	970.15	920.70	585.60	751.50	827.70	984.70
6	871.40	988.55	1025.60	**	**	1004.90	972.25	925.20	587.00	755.40	827.15	987.00
7	870.75	996.55	1025.10	**	**	1004.95	975.05	923.45	586.65	761.90	829.60	991.65
8	870.15	1004.75	1025.60	**	**	1006.80	970.15	911.25	582.55	770.70	830.65	988.35
9	870.05	1012.30	1025.10	**	**	1006.70	961.05	894.50	574.75	778.65	828.25	984.15
10	869.75	1015.80	1026.10	**	**	1006.05	951.00	877.70	561.15	787.50	827.15	979.45
11	870.75	1015.35	1024.30	**	**	1005.55	945.95	864.95	547.75	794.00	824.55	976.65
12	870.35	1005.30	1021.80	**	**	1002.80	941.50	856.85	541.20	797.40	824.70	974.30
13	868.95	999.70	**	**	**	1003.20	942.15	850.60	534.10	798.15	825.80	970.20
14	868.60	998.55	**	**	**	1002.80	937.60	845.30	536.20	800.30	827.90	965.60
15	867.60	987.40	**	**	**	997.15	930.60	834.30	543.45	800.90	829.35	961.70
16	868.20	982.25	**	**	**	995.45	925.35	821.50	555.35	799.65	830.50	957.05
17	869.35	981.75	**	**	**	995.25	920.00	801.90	565.00	801.65	835.55	953.85
18	870.35	981.25	**	**	**	990.55	919.20	780.15	578.75	800.25	837.10	951.60
19	870.85	979.25	**	**	**	987.50	913.95	761.70	592.35	799.45	846.95	949.85
20	871.70	977.75	**	**	**	985.40	905.70	747.05	596.05	804.05	857.55	947.95
21	872.40	976.75	**	**	**	980.20	895.05	738.90	604.95	805.30	868.40	944.95
22	874.20	975.75	**	**	**	973.05	884.80	736.40	618.40	806.50	878.60	943.00
23	875.95	974.75	**	**	968.95	967.40	877.15	732.30	633.55	807.40	887.15	941.05
24	878.80	973.25	**	**	970.15	962.35	873.65	723.60	641.70	811.40	896.15	939.35
25	880.95	976.40	**	**	970.10	960.50	875.10	705.65	651.60	813.90	905.85	937.10
26	891.60	975.90	**	**	973.20	961.75	871.65	682.45	662.50	816.00	914.55	934.75
27	902.00	974.90	**	**	975.95	961.50	872.20	660.45	674.45	820.50	924.05	932.95
28	910.85	973.90	**	**	977.15	962.50	880.40	647.80	686.45	821.05	931.50	931.10
29	919.45	970.50	**	**		960.25	893.60	636.35	698.55	822.20	940.00	930.30
30	928.90	974.30	**	**		961.40	908.35	629.25	708.20	822.60	947.50	930.45
31	938.40		**	**		961.50		629.35		823.80	955.85	
MAX	938.40	1015.80	1026.10*	***	977.15*	1006.80	975.05	925.20	708.20	823.80	955.85	991.65
MIN	867.60	947.55	981.30*	***	968.95*	960.25	871.65	629.25	534.10	719.50	824.55	930.30
MEAN	879.92	983.41	1016.79*	***	972.58*	986.28	926.17	800.33	602.05	790.59	860.05	959.17
YEAR MAXIMUM		1026.10*										
YEAR MINIMUM		934.10*										
YEAR MEAN		873.69*										

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA
 *** INDICATES TOTAL MONTH'S DATA MISSING

Example of RUNAVE

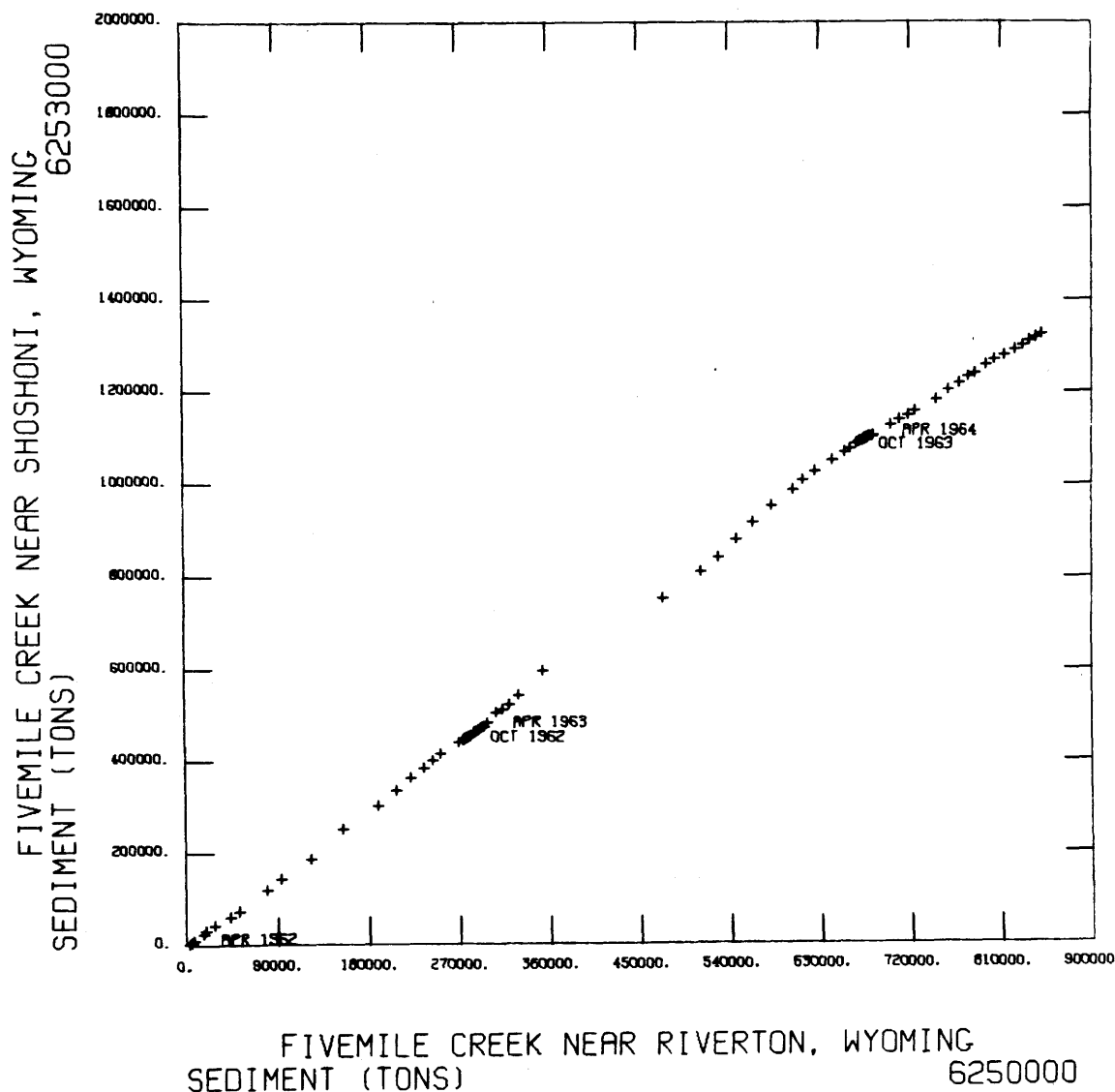


SEDDUBMASS

This program produces a double mass curve for two stations from daily water quality data for sediment (tons/day). For each station a cumulative total is computed with every tenth day plotted, one station against another. If missing data are encountered, the plot is ended and a new plot is begun. If less than thirty days of data are available, no plot is made.

For each plot the user should specify the dependent (Y-axis) station, the independent (X-axis) station and the water year range.

Example of SEDDUBMASS



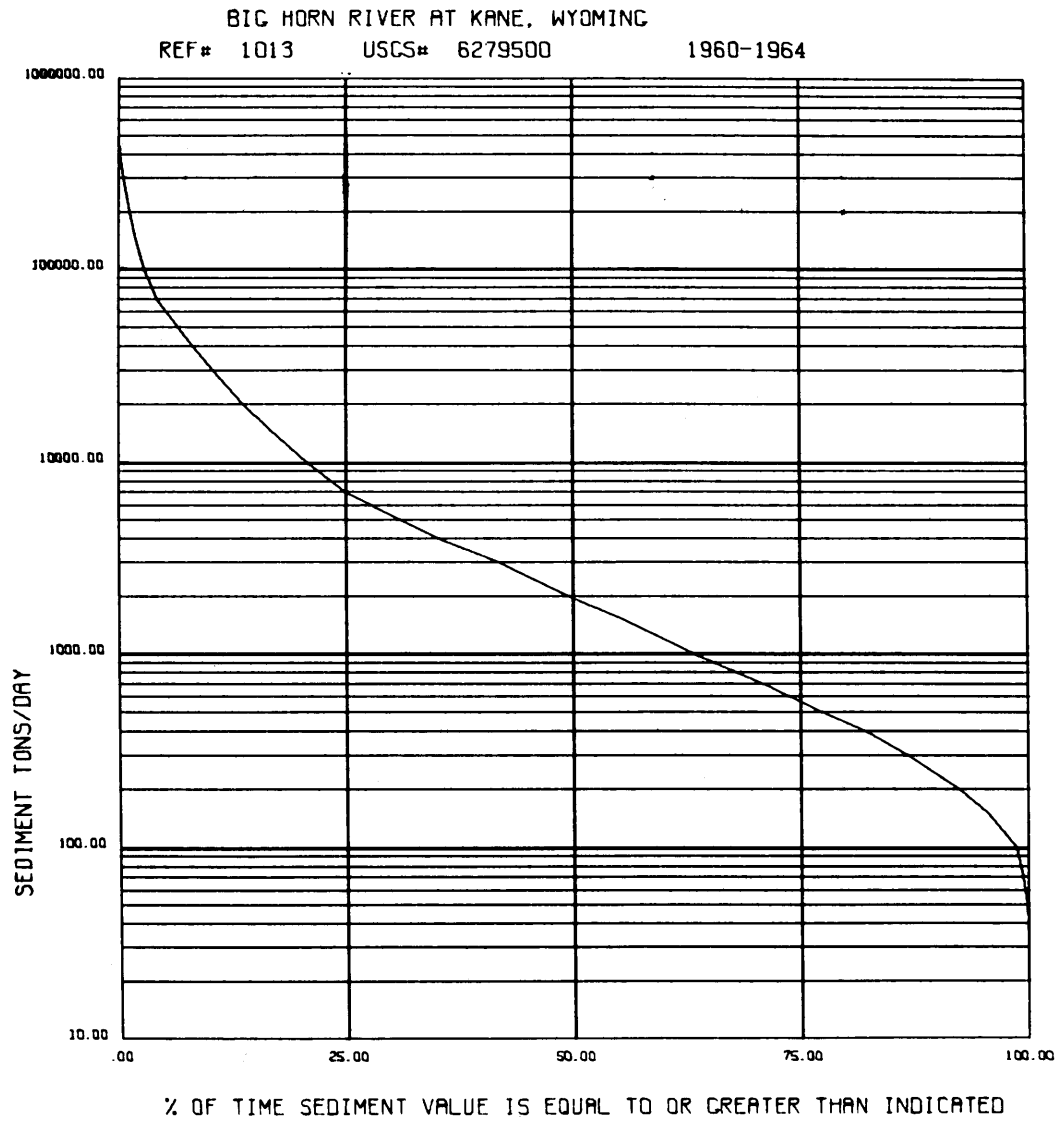
SEDDURCUR

This program plots a cumulative distribution (i.e., a duration curve) of sediment in tons per day. The curve is derived from daily values for the years available or specified. An option is available to analyze only specified portions of each water year.

The following example of the Big Horn River with 1960 through 1964 data indicates that: 25 percent of the time the sediment load is 7200 tons per day or more; 50 percent of the time the load is 1100 tons per day or more; and 75 percent of the time the load is 580 tons per day or more.

For each station the user should specify the water year range (unless all water years are to be used) and the portion of each water year to analyze (unless the entire year is used). For example, a user may specify water year 1970 to 1975 (each entire year used), or water year 1970 to 1975 using only 15 June to 31 August of each year in the analysis.

Example of SEDDURCUR

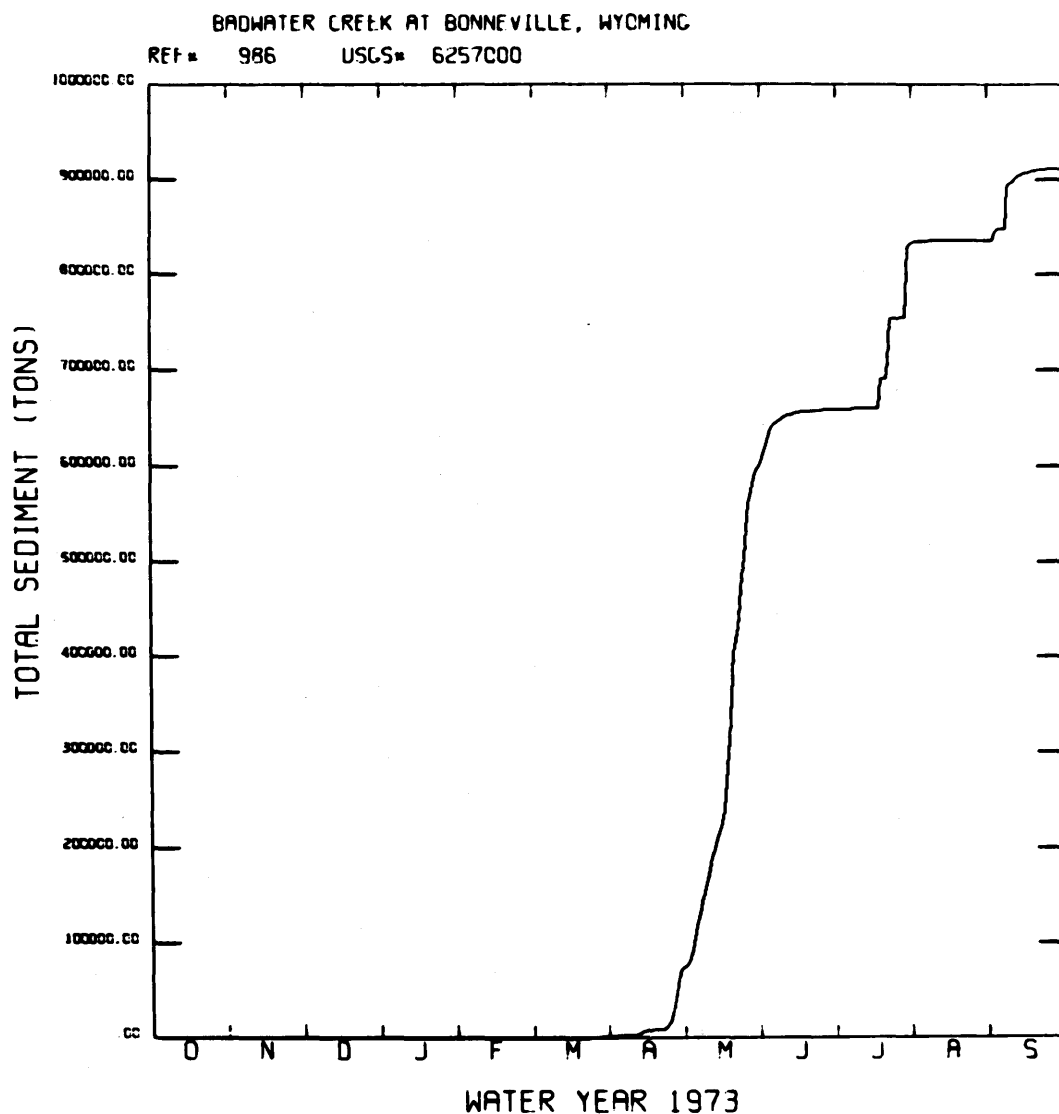


SEDMASS

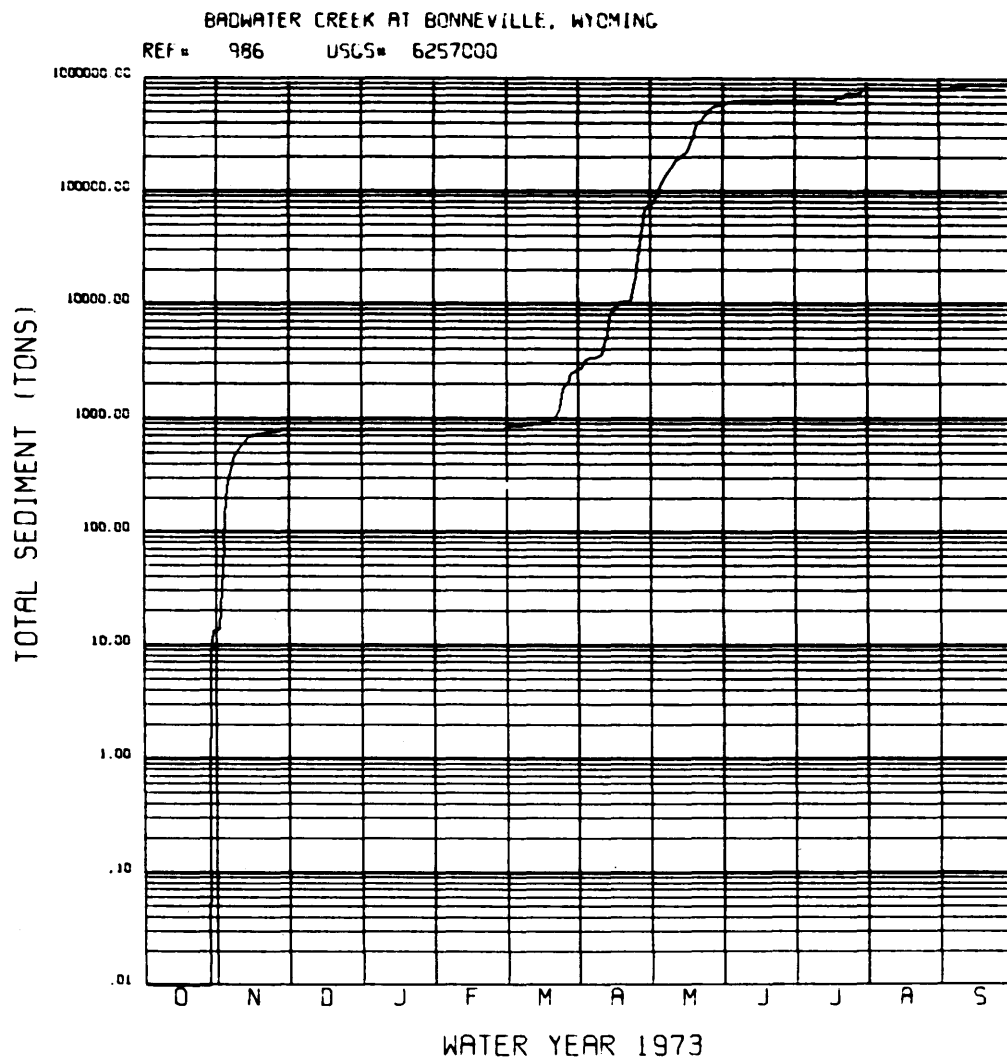
SEDMASS plots daily cumulative sediment in tons by water year. The graph may be arithmetic or semi-logarithmic (log base 10 on the Y-axis). The graphs utilize daily sample data. The following examples illustrate the effect of the logarithmic scale.

For each station the user should specify the water year range (unless all water years are to be included) and whether the plot should be arithmetic or semi-logarithmic.

Example of SEDMASS



Example of SEDMASS

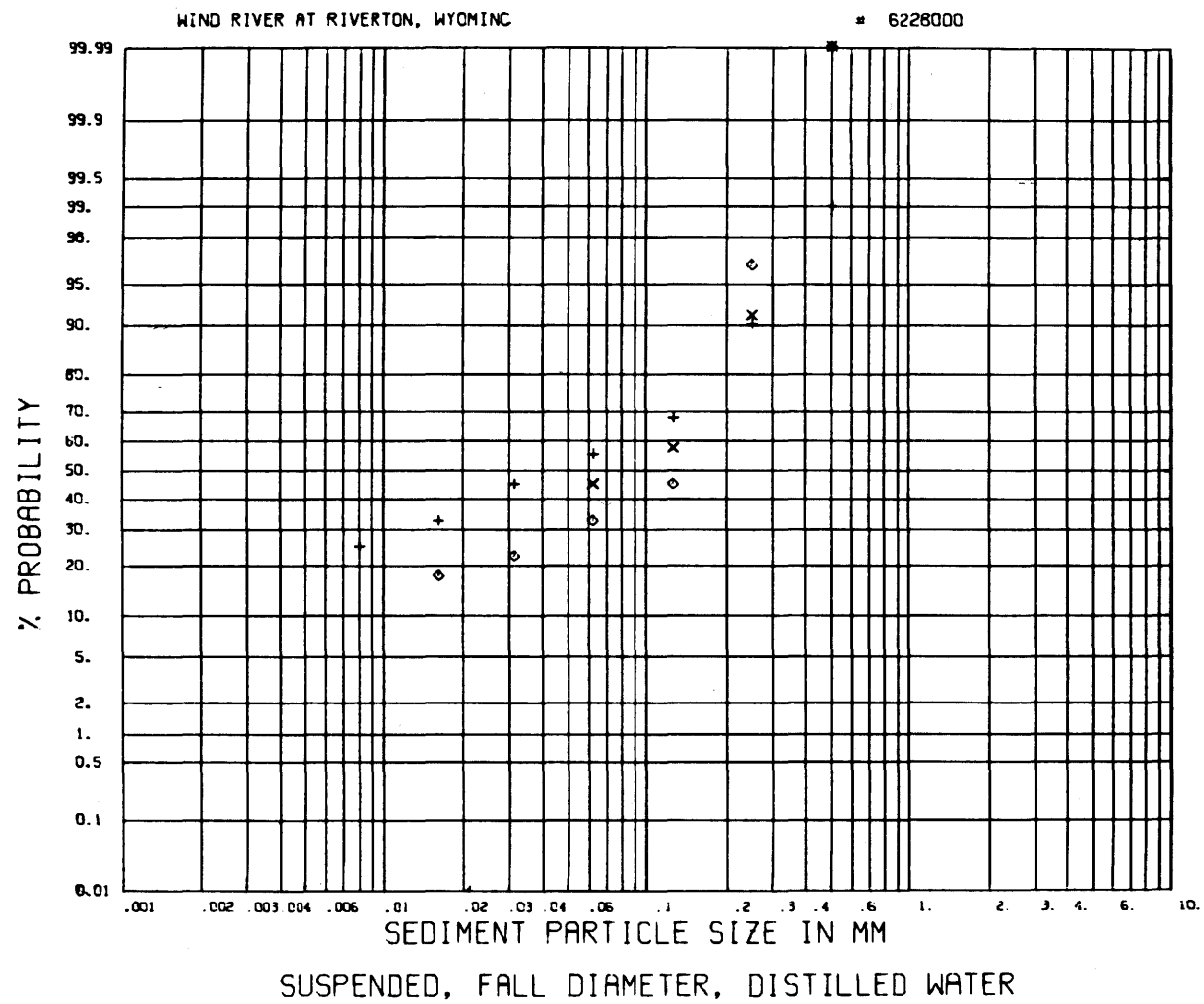


SEDSIZE

This program plots the percent of the total sediment passing various screen sizes for grab samples. Drawing a line between points approximates the sediment particle size cumulative distribution. Up to 3 samples may be plotted on one graph as illustrated in the following example.

For each station the user should specify the date range (unless all dates are to be used) and the sediment type.

Number	Sediment Type
-----	-----
1	Suspended, fall diameter, native water
2	Suspended, fall diameter, distilled water
3	Bed material, fall diameter, distilled water
4	Bed material, sieve diameter
5	Total, fall diameter, distilled water
6	Total, fall diameter, native water
7	Total, sieve diameter
8	Bedload, sieve diameter



Example of SEDSIZE

WELL LEVEL DATA

Static well level data from water wells throughout Wyoming have been stored into WRDS. Some wells have data going back to 1900, while others have only more recent data. The information has been collected from the Wyoming State Engineer's Office, the USGS Oil and Gas Division and the USGS Water-Supply Papers and miscellaneous reports. For every well, a header is stored which contains the following information when available: name (or owner) of well, location information, type of casing, geological formations, well depth and diameter, transmissivity, registration number, type and date of drilling and plugging and use of well.

Two types of level data are available, grab and daily data. Grab level data are gathered from the field at random intervals. Yield of well is also sometimes noted for grab samples. Daily level data are recorded in the field by continuous recorders or by once-a-day observations. The daily data are stored by month.

Retrieval Types

There are several ways to specify which wells are to be retrieved and analyzed by the following programs: DAILYWELL, GRABWELL, WELLDATES, WELLHEAD and WELLSAMP. For these programs, wells may be retrieved by: WRDS reference number, county (or state if adjacent to Wyoming), township, ten-minute block of latitude and longitude, owner (if separately coded), state registration number or drainage basin (see Figure 1 and description under Water Quality Data).

DAILYWELL

This program prints daily well level data in a yearly format (i.e., one year per page) for each well requested. The levels may be printed in feet below ground or feet above sea level.

The user should specify the retrieval type, the calendar year range (unless all years are to be printed) and the reference point (ground or sea) for the well levels.

L. S. FULLER WELL NEAR PARKMAN, WYOMING. THE WELL IS IN THE CHUGWATER
FORMATION AND HAS A 4 INCH CASING.
IN SHERIDAN COUNTY SW1/4 SW1/4 SECTION 15 TOWNSHIP 58 N RANGE 89 W
SIXTH P.M. ELEVATION 4580.0 FEET LATITUDE 45 0 0 LONGITUDE 107 36 0
DOMESTIC USE, WELL IS 60.0 FEET DEEP BASIN CODE= 4030000 REF. NO. 1797**

*** DAILY WELL LEVEL DATA IN FEET BELOW GROUND ***
FOR 1976 TIME 0
ONCE A DAY

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	49.2	49.2	49.0	48.6	48.6	47.9	47.3	46.8	46.9	46.8	49.0	**
2	49.2	49.2	49.0	48.7	48.6	47.9	47.3	46.8	46.9	46.7	49.0	48.6
3	49.2	49.2	49.0	48.7	48.7	47.9	47.3	46.8	46.9	46.8	49.0	48.5
4	49.2	49.3	49.0	48.7	48.7	47.9	47.3	46.8	46.9	46.8	49.0	48.5
5	49.2	49.3	49.0	48.7	48.7	47.9	47.3	46.8	46.9	46.8	49.0	48.5
6	**	49.3	49.0	48.7	48.7	47.9	47.3	46.7	46.9	46.8	49.0	48.5
7	**	49.2	48.9	48.7	48.7	47.9	47.3	46.7	47.1	46.9	49.0	48.5
8	**	49.2	48.9	48.7	48.7	47.9	47.3	46.7	47.1	46.9	49.0	48.5
9	49.1	49.2	48.9	48.7	48.7	47.9	47.3	46.6	47.1	46.9	49.0	48.5
10	49.1	49.2	48.9	48.7	48.7	47.9	47.3	46.6	47.1	46.9	49.0	48.5
11	49.1	49.1	48.9	48.6	48.8	47.9	47.3	46.6	47.1	47.0	49.0	48.5
12	49.1	49.1	49.0	48.6	48.8	47.9	47.3	46.6	47.2	47.0	48.9	48.5
13	49.1	49.1	49.0	48.6	48.8	47.9	47.1	46.5	47.2	47.0	48.9	48.5
14	49.1	49.1	49.0	48.6	48.8	47.9	47.1	46.5	47.2	47.0	48.9	48.4
15	49.2	49.0	49.0	48.6	48.8	47.9	47.1	46.5	47.2	47.0	48.8	48.4
16	49.2	49.0	49.0	48.6	48.8	47.9	47.1	46.5	47.2	47.0	48.8	48.4
17	49.2	49.0	49.0	48.5	48.8	47.9	47.1	46.4	47.3	47.0	48.8	48.4
18	49.3	49.0	49.0	48.5	48.8	47.9	47.1	46.4	47.3	47.0	48.8	48.4
19	49.3	49.0	48.9	48.8	48.8	47.9	47.1	46.4	47.3	47.0	48.8	48.4
20	49.3	49.1	48.8	48.8	48.8	47.9	47.0	46.5	**	47.0	48.9	48.4
21	49.2	49.1	48.8	48.8	48.8	47.8	47.0	46.5	**	47.0	48.8	48.4
22	49.2	49.1	48.7	48.8	48.8	47.7	47.0	46.5	**	48.9	48.8	48.4
23	49.2	49.1	48.7	48.8	48.8	47.7	47.0	46.5	**	48.9	**	48.3
24	49.2	49.1	48.7	48.8	47.9	47.7	47.1	46.5	**	48.9	**	48.3
25	49.2	49.1	48.7	48.8	47.9	47.7	47.0	46.6	**	48.9	**	48.3
26	49.2	49.1	48.7	48.7	47.9	47.7	47.0	46.8	**	49.0	**	48.3
27	49.2	49.0	48.5	48.7	47.9	47.7	47.0	46.8	**	49.0	**	48.2
28	49.3	49.0	48.6	48.7	47.9	47.7	47.0	46.8	46.7	49.0	**	48.2
29	49.3	**	48.6	48.7	47.9	47.7	46.8	46.8	46.8	49.0	**	48.2
30	49.3		48.6	48.7	47.9	47.3	46.8	46.8	46.8	49.0	**	48.3
31	**		48.6		47.9		46.8	46.8		49.0		48.3

Example of DAILYWELL

GRABWELL

For each well requested this program prints the following for grab samples: header, date, time, well level and yield. The header and date are always given. If the time of sample is unknown it is left blank. The well level may be printed in feet below ground or feet above sea level. The yield is left blank if it was not recorded. See the DAILYWELL program for a listing of daily sample data.

The wells may be requested by various procedures as described under Retrieval Types. The example shows the results of a request for GRABWELL for township 35N and range 81W.

The user should specify the retrieval type, date range (unless all dates are to be printed) and reference point (ground or sea) for the well levels.

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
 IN NATRONA COUNTY NW1/4 NW1/4 NW1/4 SECTION 7 TOWNSHIP 35 N RANGE 81 W
 SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 43 1 40 LONGITUDE 106 37 0
 UNUSED USE, WELL IS 49.0 FEET DEEP BASIN CCDE=11410000 REF. NO. 284**
 W.C. REF. NO. 468C

DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)	DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)	DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)
JUNE 9 1968		10.5		JULY 31 1968		11.0		AUG. 21 1968		11.2	
SEP. 26 1968		11.4		OCT. 29 1968		11.3		NOV. 21 1968		11.3	
DEC. 18 1968		11.2		JAN. 29 1969		11.1		FEB. 26 1969		11.1	
MAR. 19 1969		11.1		APR. 23 1969		11.0		MAY 27 1969		11.0	
JUNE 25 1969		10.8									

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
 IN NATRONA COUNTY SE1/4 SE1/4 SE1/4 SECTION 13 TOWNSHIP 35 N RANGE 81 W
 SIXTH P.M. ELEVATION 5350.0 FEET LATITUDE 43 0 0 LONGITUDE 106 30 0
 UNUSED USE, WELL IS 17.0 FEET DEEP BASIN CCDE=11410000 REF. NO. 285**
 W.C. REF. NO. 4681

DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)	DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)	DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)
JUNE 9 1968		1.5		JULY 31 1968		2.9		AUG. 21 1968		3.5	
SEP. 26 1968		3.3		OCT. 30 1968		3.3		NOV. 21 1968		3.5	
DEC. 18 1968		3.5		JAN. 29 1969		3.8		FEB. 26 1969		3.9	
MAR. 19 1969		3.9		APR. 23 1969		3.1		MAY 27 1969		2.4	
JUNE 25 1969		1.8									

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
 IN NATRONA COUNTY SW1/4 SW1/4 SW1/4 SECTION 30 TOWNSHIP 35 N RANGE 81 W
 SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 42 58 0 LONGITUDE 106 37 0
 UNUSED USE, WELL IS 28.0 FEET DEEP BASIN CCDE=11410200 REF. NO. 286**
 W.C. REF. NO. 4682

DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)	DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)	DATE	TIME	WATER LEVEL BELOW GROUND (FEET)	YIELD (GPM)
JUNE 9 1968		4.6		JULY 31 1968		5.0		AUG. 21 1968		6.1	
SEP. 26 1968		6.3		OCT. 29 1968		5.9		NOV. 21 1968		6.1	
DEC. 18 1968		5.6		JAN. 29 1969		5.4		FEB. 26 1969		5.4	
MAR. 19 1969		5.5		APR. 23 1969		5.0		MAY 27 1969		3.4	
JUNE 25 1969		4.4									

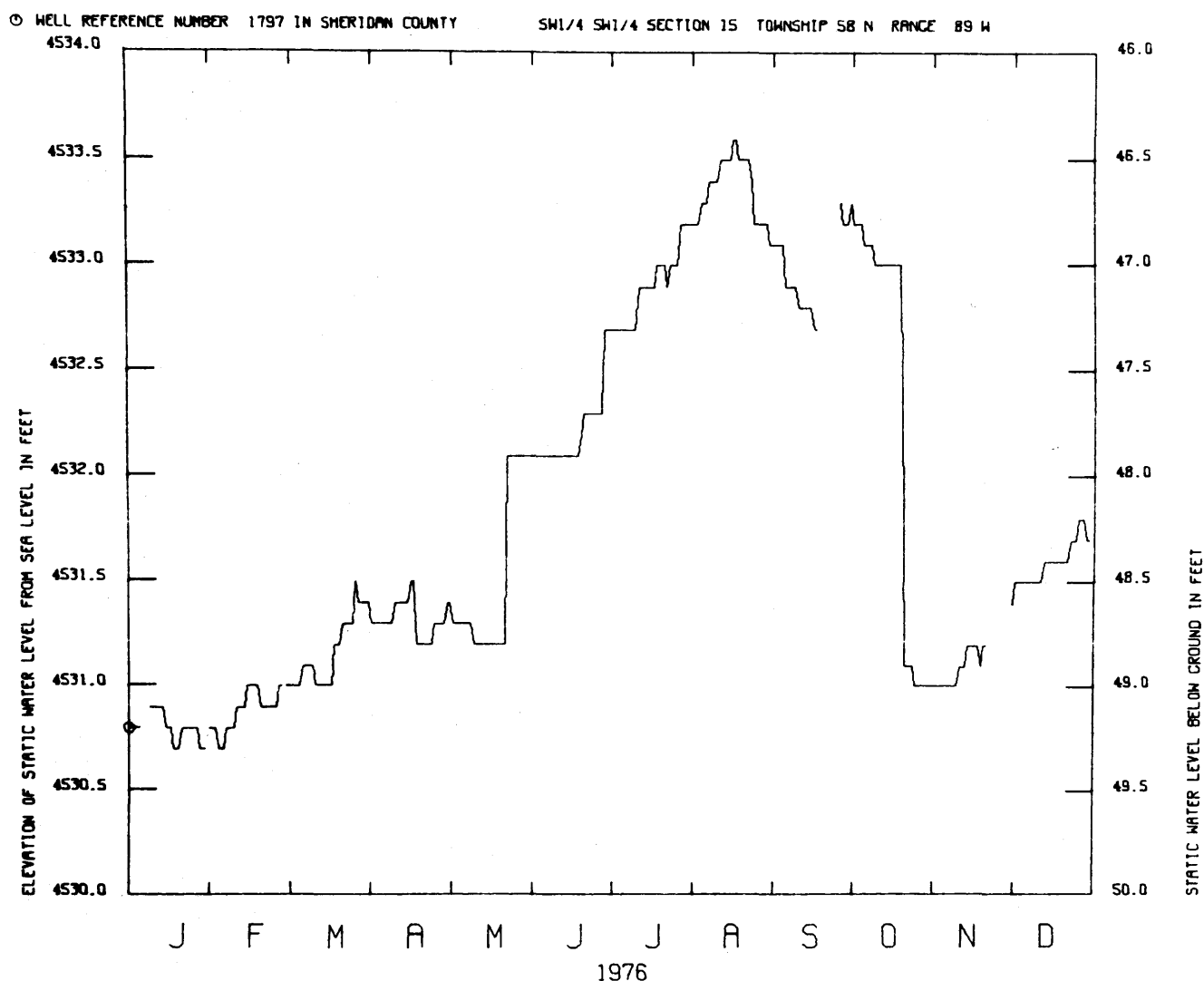
Example of GRABWELL

PLOTLEVEL

This program plots elevation of water in a well gathered from daily samples against time. Static water level below ground is also shown on the plot. Up to five wells may be plotted together on one graph. A maximum of ten years may be plotted on one graph. Each year is 10" long, thus a graph for 10 years would be 100" in length.

For each well or group of wells, the user should specify a calendar year range unless all years on file are to be plotted.

Example of PLOTLEVEL

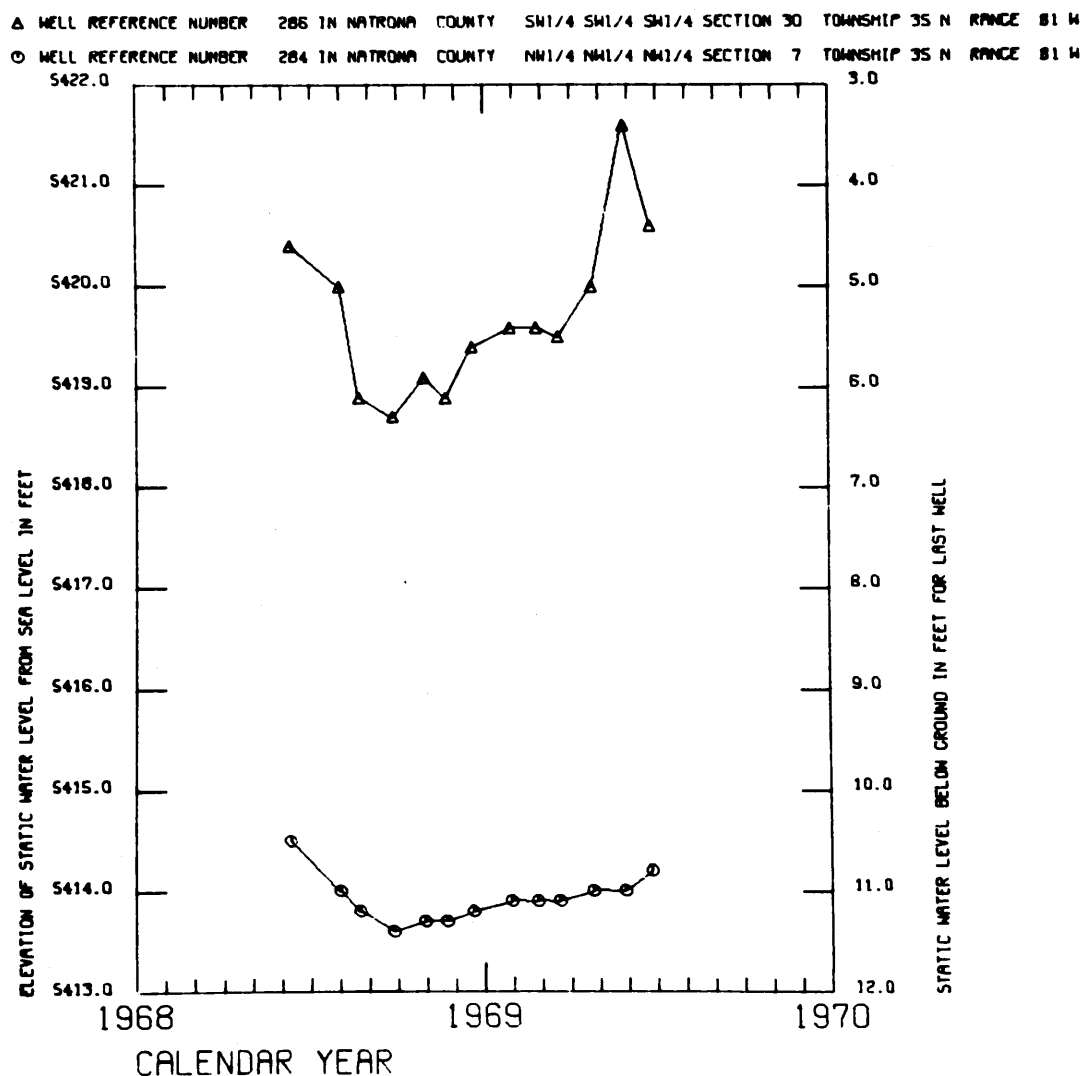


PLOTLEVELG

Elevation of water in a well gathered by grab samples is plotted against time by this program. Static water level below ground is also shown on the plot. Up to five wells may be plotted together on one graph. A maximum of 10 years may be plotted on one graph. Each year is 3" long, thus a graph for 10 years would be 30" in length.

For each well or group of wells, the user should specify a date range unless all dates on file are to be plotted.

Example of PLOTLEVELG



WELLDATES

For each well requested, this program prints a header and dates of grab samples. It also indicates the type of data recorded (level, yield or both) for each date.

The user should specify the retrieval type.

Example of WELLDATES

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY NW1/4 NW1/4 NW1/4 SECTION 7 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 43 1 40 LONGITUDE 106 37 0
UNUSED USE, WELL IS 49.0 FEET DEEP BASIN CCDE=11410000 REF. NO. 284**
W.C. REF. NO. 4680

*** DATES OF GRAB SAMPLES FOR LEVELS (L) AND YIELDS (Y) ***
JUNE 9 1968L JULY 31 1968L AUG 21 1968L SEPT 26 1968L OCT 29 1968L NOV 21 1968L DEC 18 1968L JAN 29 1969L
FEB 26 1969L MAR 19 1969L APR 23 1969L MAY 27 1969L JUNE 25 1969L

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY SE1/4 SE1/4 SE1/4 SECTION 13 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5350.0 FEET LATITUDE 43 0 0 LONGITUDE 106 30 0
UNUSED USE, WELL IS 17.0 FEET DEEP BASIN CCDE=11410000 REF. NO. 285**
W.C. REF. NO. 4681

*** DATES OF GRAB SAMPLES FOR LEVELS (L) AND YIELDS (Y) ***
JUNE 9 1968L JULY 31 1968L AUG 21 1968L SEPT 26 1968L OCT 20 1968L NOV 21 1968L DEC 18 1968L JAN 29 1969L
FEB 26 1969L MAR 19 1969L APR 23 1969L MAY 27 1969L JUNE 25 1969L

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY SW1/4 SW1/4 SW1/4 SECTION 30 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 42 58 0 LONGITUDE 106 37 0
UNUSED USE, WELL IS 28.0 FEET DEEP BASIN CCDE=11410200 REF. NO. 286**
W.C. REF. NO. 4682

*** DATES OF GRAB SAMPLES FOR LEVELS (L) AND YIELDS (Y) ***
JUNE 9 1968L JULY 31 1968L AUG 21 1968L SEPT 26 1968L OCT 29 1968L NOV 21 1968L DEC 18 1968L JAN 29 1969L
FEB 26 1969L MAR 19 1969L APR 23 1969L MAY 27 1969L JUNE 25 1969L

WELLHEAD

This program lists just the headers of the wells requested.

The user should specify the retrieval type.

Example of WELLHEAD

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY NW1/4 NW1/4 NW1/4 SECTION 7 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 43 1 40 LONGITUDE 106 37 0
UNUSED USE, WELL IS 49.0 FEET DEEP BASIN CCDE=11410000 REF. NO. 284**
W.C. REF. NO. 4680

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY SE1/4 SE1/4 SE1/4 SECTION 13 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5350.0 FEET LATITUDE 43 0 0 LONGITUDE 106 30 0
UNUSED USE, WELL IS 17.0 FEET DEEP BASIN CCDE=11410000 REF. NO. 285**
W.C. REF. NO. 4681

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY SW1/4 SW1/4 SW1/4 SECTION 30 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 42 58 0 LONGITUDE 106 37 0
UNUSED USE, WELL IS 28.0 FEET DEEP BASIN CCDE=11410200 REF. NO. 286**
W.C. REF. NO. 4682

WELLSAMP

For each well requested, this program prints the following for grab samples: number of samples (for levels, yields, and both levels and yields) and date range (for levels, yields, and both levels and yields). For each retrieval type (see description under Retrieval Types), the following are printed: total number of stations and total number of grab samples (for levels, yields, and both levels and yields).

The user should specify the retrieval type.

Example of WELLSAMP

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY NW1/4 NW1/4 SECTION 7 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 43 1 40 LONGITUDE 106 37 0
UNUSED USE, WELL IS 49.0 FEET DEEP BASIN CODE=11410000 REF. NO. 284**
W.C. REF. NO. 4680

DATE RANGE	GRAB SAMPLES	DATE RANGE	GRAB SAMPLES	DATE RANGE	GRAB SAMPLES
FOR LEVELS		FOR YIELDS		FOR LEVELS AND YIELDS	
JUNE 9 1968 JUNE 25 1969	13			JUNE 9 1968 JUNE 25 1969	13

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY SE1/4 SE1/4 SECTION 13 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5350.0 FEET LATITUDE 43 0 0 LONGITUDE 106 30 0
UNUSED USE, WELL IS 17.0 FEET DEEP BASIN CODE=11410000 REF. NO. 285**
W.C. REF. NO. 4681

DATE RANGE	GRAB SAMPLES	DATE RANGE	GRAB SAMPLES	DATE RANGE	GRAB SAMPLES
FOR LEVELS		FOR YIELDS		FOR LEVELS AND YIELDS	
JUNE 9 1968 JUNE 25 1969	13			JUNE 9 1968 JUNE 25 1969	13

UNNAMED WELL NORTHWEST OF CASPER, WYOMING. WELL IS IN THE ALLUVIUM.
IN NATRONA COUNTY SW1/4 SW1/4 SECTION 30 TOWNSHIP 35 N RANGE 81 W
SIXTH P.M. ELEVATION 5425.0 FEET LATITUDE 42 58 0 LONGITUDE 106 37 0
UNUSED USE, WELL IS 28.0 FEET DEEP BASIN CODE=11410200 REF. NO. 286**
W.C. REF. NO. 4682

DATE RANGE	GRAB SAMPLES	DATE RANGE	GRAB SAMPLES	DATE RANGE	GRAB SAMPLES
FOR LEVELS		FOR YIELDS		FOR LEVELS AND YIELDS	
JUNE 9 1968 JUNE 25 1969	13			JUNE 9 1968 JUNE 25 1969	13

TOTAL NUMBER OF STATIONS = 3
TOTAL NUMBER OF GRAB SAMPLES FOR LEVELS = 39
TOTAL NUMBER OF GRAB SAMPLES FOR YIELDS = 0
TOTAL NUMBER OF GRAB SAMPLES FOR LEVELS AND YIELDS = 39

CLIMATIC DATA

Five classifications of climatic data from weather stations in Wyoming are stored in WRDS. These are:

1) Daily observations for:

- mean air temperature (F.)
- maximum air temperature (F.)
- minimum air temperature (F.)
- precipitation (inches)
- snowfall (inches) (by water year)
- snowdepth (inches) (by water year)
- wind (miles)
- evaporation (inches)

There are presently 336 daily observation stations in WRDS. Data for some stations are complete from 1899 through 1975. For others only data from 1948 to 1975 are presently stored. Data are stored by calendar year unless otherwise specified. The stations and years of available data are too numerous to list here. A complete listing of available daily data can be obtained by requesting the program LISTDATESD.

2) Hourly observations for precipitation (inches).

There are presently 174 hourly precipitation stations in WRDS. Data from 1948 through 1975 (calendar years) are stored although not all stations have all of these years. A complete listing of available data can be obtained by requesting the program LISTDATESP.

CLIMATIC DATA

(continued)

3) Hourly observations for:

air temperature (F.)
wet bulb temperature (F.)
dew point (F.)
relative humidity (percent)
wind speed (miles/day)
wind direction (16 points)

Hourly climatic data are received from National Weather Service airways stations as listed below. Hourly observations were made from 1948 through 1964 (calendar years).

Station Number -----	Station Name -----	Month and Year Range -----
24016	Casper/Wardell Field	01/48-03/50
24089	Casper/Air Terminal	03/50-12/76
24018	Cheyenne Municipal	01/48-12/76
24019	Douglas	01/48-12/54
24118	Fort Bridger	01/48-12/54
24021	Lander/Hunt	01/48-12/76
24022	Laramie/General Brees	01/48-12/54
24088	Moorcroft	01/50-07/52
24057	Rawlins/Municipal	01/55-12/64
24027	Rock Springs/Municipal	01/48-12/76
24029	Sheridan/County	01/48-12/76
24031	Sinclair	01/48-02/51

4) Three-hour observations.

Data for three-hour observations are of the same data types and the same National Weather Service airways stations as for hourly observations. Three-hour observations began in 1965.

5) Six-hour observations for miscellaneous stations.

Observations for several research and special study sites are stored as six-hour observations.

CLIMATIC DATA

(continued)

Computer programs have been written, as described below, to easily retrieve these climatic data. Each program can use only some of the available parameters. Where appropriate, after a program description the parameters that may be used are listed as "parameters that may be used." Values can always be printed in the units listed above (for example, inches). When a program can print values in other units, these are listed after each program as "other units that may be used."

To request a program to be run, the user should specify the program name, station number, parameter to be used, calendar year range, and any other items described under each program. If no year range is indicated, all years available will be analyzed.

When several parameters can be used by one program, only some of the parameters are shown as examples. These will show the types of printouts that are available.

When daily values are missing for precipitation or evaporation, monthly and annual values are sometimes estimated. The treatment of these estimated values is discussed under appropriate program descriptions.

DAILY CLIMATIC DATA

ANTEPREC

The average 5-day antecedent precipitation values for specified years for the months April through October are printed and plotted with this program. For example, the value for April 1 (.19 in the example) is the total precipitation for March 27-31 averaged over the years specified (1899-1975 in the example). When missing data are encountered, the corresponding 5-day value is not calculated.

Example of ANTEPREC

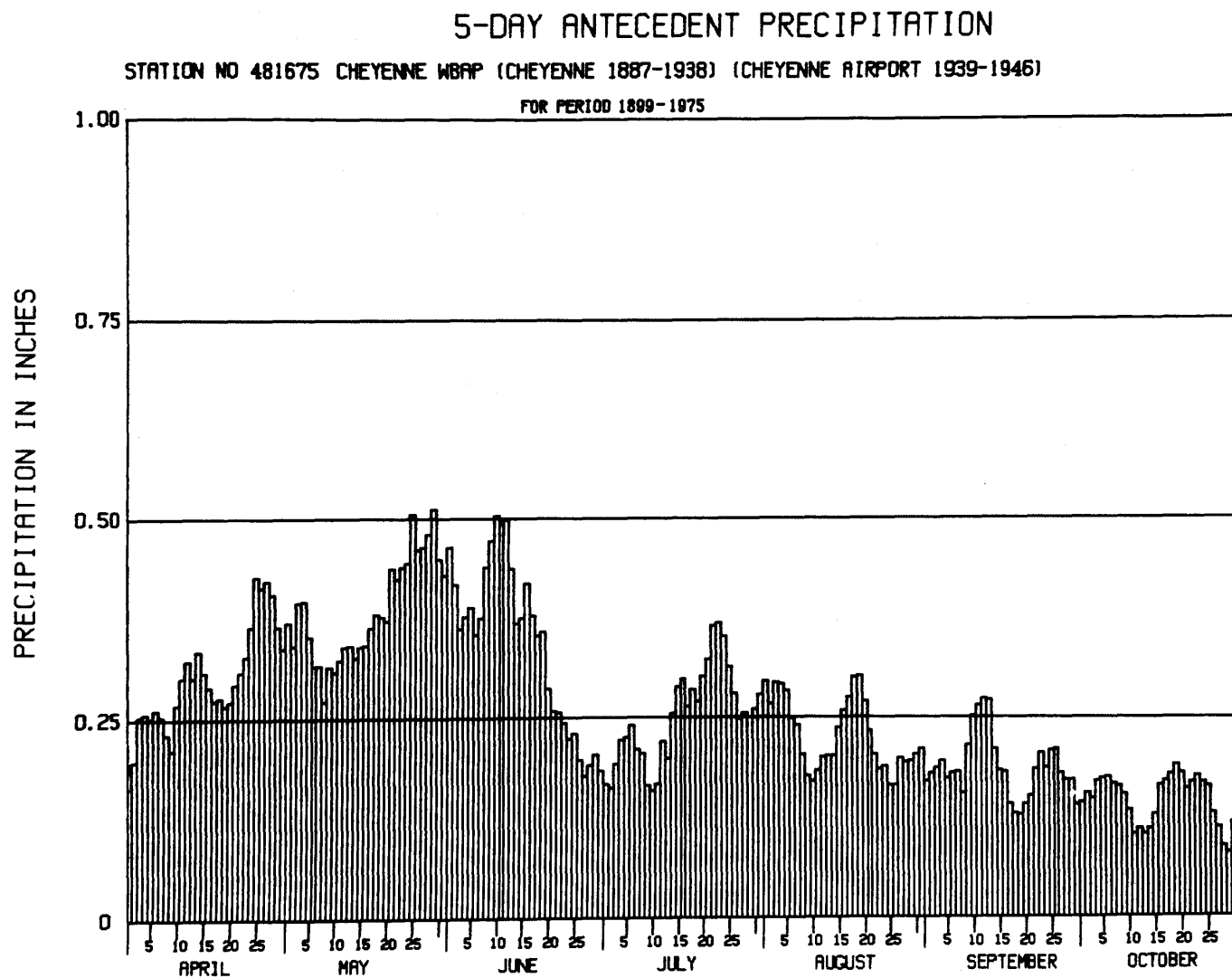
*** 5-DAY ANTECEDENT PRECIPITATION ***

CHEYENNE WBAP (CHEYENNE 1887-1938) (CHEYENNE AIRPORT 1939-1946)

STATION NO. 481675 LATITUDE 41- 9- 0 LONGITUDE 104-49- 0 ELEVATION 6131.0 FEET

FOR PERIOD 1899 - 1975

DAY	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
1	.19	.37	.46	.17	.29	.17	.14
2	.20	.34	.42	.16	.27	.18	.15
3	.25	.39	.36	.19	.25	.19	.15
4	.26	.40	.38	.22	.29	.19	.17
5	.25	.35	.39	.22	.28	.17	.17
6	.26	.32	.35	.24	.25	.18	.17
7	.25	.32	.37	.21	.24	.18	.17
8	.23	.27	.44	.20	.20	.15	.16
9	.21	.31	.47	.16	.18	.21	.15
10	.27	.31	.50	.16	.17	.25	.13
11	.30	.32	.49	.17	.18	.26	.10
12	.32	.34	.50	.22	.20	.27	.11
13	.30	.34	.44	.20	.20	.27	.10
14	.33	.33	.37	.25	.20	.21	.11
15	.31	.34	.37	.29	.24	.18	.13
16	.29	.34	.42	.30	.26	.18	.16
17	.27	.36	.38	.26	.27	.14	.17
18	.28	.38	.35	.28	.30	.13	.18
19	.27	.38	.36	.27	.30	.13	.19
20	.27	.37	.29	.30	.27	.14	.18
21	.29	.44	.26	.32	.23	.15	.16
22	.31	.42	.26	.36	.20	.18	.17
23	.33	.44	.24	.37	.18	.20	.18
24	.36	.44	.22	.35	.19	.19	.17
25	.43	.50	.23	.31	.16	.21	.16
26	.41	.46	.20	.28	.16	.21	.13
27	.42	.46	.18	.25	.20	.18	.11
28	.40	.48	.19	.25	.19	.17	.09
29	.36	.51	.20	.25	.15	.17	.08
30	.34	.45	.18	.26	.20	.14	.12
31		.43		.28	.21		.12



Example of ANTEPREC

AVEPREC

This program prints average daily precipitation and average monthly totals for a specific station and year range. Thus given a year range of 1970 through 1979, the value printed for January first is the average of all of the January firsts for the given 10-year period. The program also prints the number of days from the beginning of the year needed to get the given percentage of the average annual precipitation for the following percentages: 10, 25, 35, 50, 67, 75 and 90.

Other units that may be used: centimeters.

KEELINE (KEELINE 2SW 1953-1963) STATION NO. 485085
AVERAGE DAILY PRECIPITATION (INCHES) FOR 1958 TO 1960

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	.02	.06	.04	.08	.00	.04	.00	.00	.00	.00	.02	.00
2	.03	.00	.05	.08	.00	.00	.00	.00	.00	.01	.00	.00
3	.00	.03	.00	.00	.03	.00	.01	.00	.00	.00	.02	.01
4	.00	.00	.04	.25	.35	.02	.07	.00	.00	.00	.08	.23
5	.00	.00	.00	.16	.19	.00	.05	.00	.10	.00	.00	.04
6	.00	.05	.00	.03	.00	.00	.02	.00	.00	.00	.00	.00
7	.00	.00	.00	.01	.08	.18	.04	.00	.35	.02	.05	.00
8	.00	.02	.00	.00	.00	.18	.02	.00	.01	.00	.06	.05
9	.00	.12	.02	.01	.00	.00	.00	.00	.02	.02	.00	.00
10	.00	.02	.09	.12	.05	.01	.11	.00	.01	.00	.01	.00
11	.00	.03	.00	.06	.00	.01	.00	.00	.00	.00	.01	.02
12	.00	.00	.00	.01	.00	.15	.00	.00	.00	.00	.00	.04
13	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00	.03	.02
14	.07	.03	.13	.00	.13	.02	.01	.08	.00	.04	.00	.00
15	.00	.00	.03	.00	.07	.06	.03	.00	.10	.00	.00	.00
16	.08	.04	.03	.10	.01	.02	.10	.02	.15	.05	.07	.00
17	.02	.02	.01	.04	.06	.00	.04	.02	.03	.00	.04	.00
18	.02	.02	.02	.00	.02	.12	.00	.01	.02	.00	.00	.00
19	.00	.01	.00	.02	.00	.06	.15	.00	.00	.00	.00	.07
20	.00	.00	.12	.00	.27	.18	.09	.00	.00	.00	.00	.00
21	.00	.00	.00	.05	.00	.08	.00	.00	.00	.01	.00	.04
22	.00	.12	.00	.05	.25	.00	.00	.00	.02	.00	.02	.01
23	.00	.00	.00	.07	.05	.10	.03	.02	.15	.02	.00	.00
24	.00	.00	.03	.03	.00	.10	.01	.01	.04	.00	.00	.00
25	.00	.04	.08	.00	.00	.03	.00	.00	.15	.00	.01	.00
26	.00	.03	.19	.00	.01	.01	.01	.00	.04	.00	.00	.00
27	.00	.05	.11	.03	.10	.00	.05	.00	.03	.00	.05	.03
28	.00	.07	.01	.06	.00	.00	.01	.00	.03	.00	.04	.00
29	.02		.00	.01	.00	.30	.00	.00	.03	.02	.01	.00
30	.00		.10	.00	.01	.18	.10	.00	.03	.07	.00	.00
31	.00		.01		.00		.00	.00		.00		.00
TOTAL	.25	.74	1.12	1.26	1.68	1.88	.94	.18	1.29	.27	.52	.57

AVERAGE YEARLY TOTAL = 10.72

NUMBER OF DAYS NEEDED TO GET GIVEN PERCENTAGE
OF AVERAGE ANNUAL PRECIPITATION FOR 1958 TO 1960

PERCENT	NUMBER OF DAYS
10	61
25	95
35	124
50	159
67	191
75	235
90	305

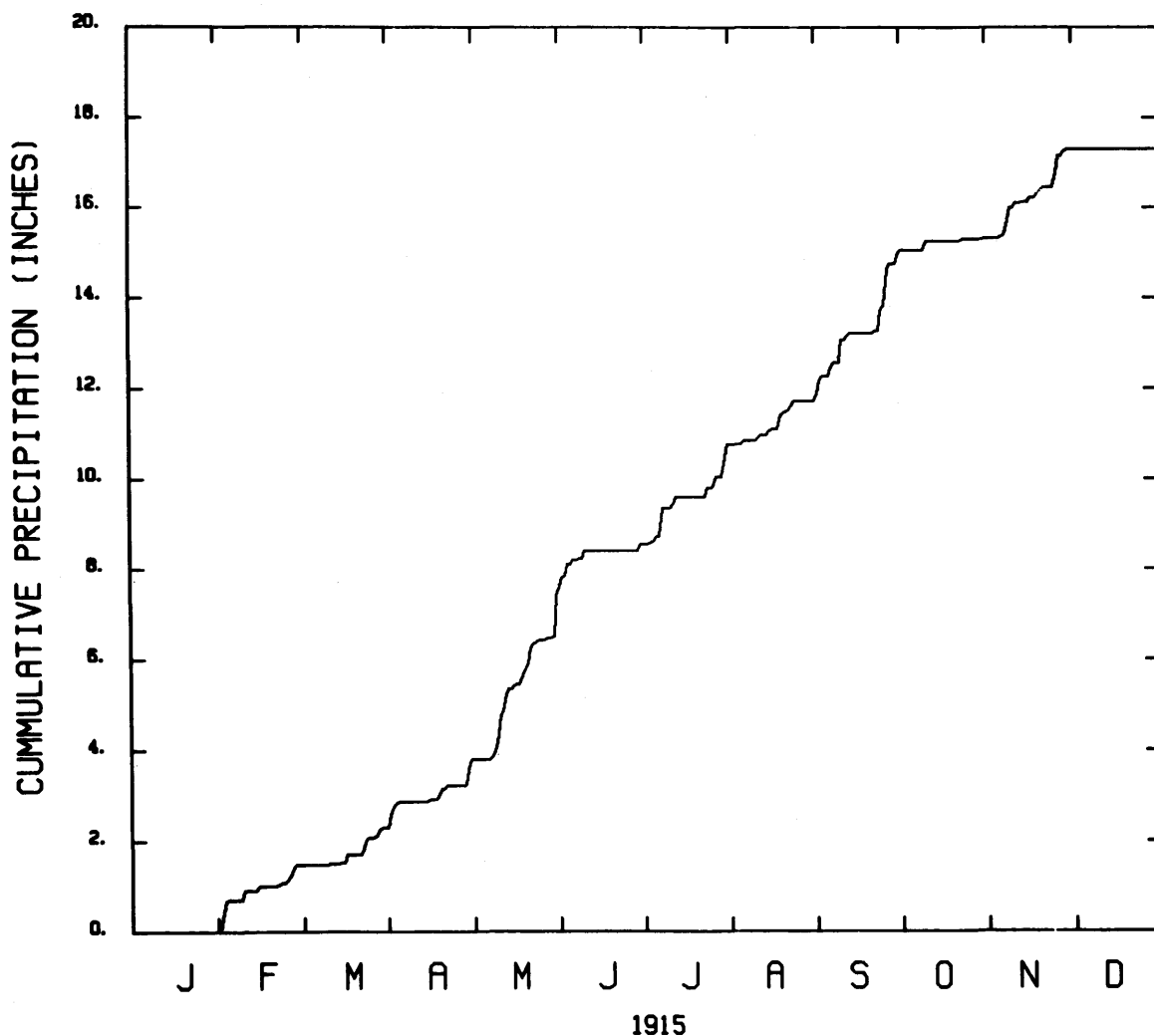
Example of AVEPREC

CUM

This program plots a cumulative total for daily precipitation. Each year is plotted on a separate graph. When missing data are encountered the plot for that year is stopped.

Example of CUM

LAKE YELLOWSTONE (YNP)
LATITUDE 443400 LONGITUDE 1102400 ELEVATION 7731
STATION NO. 485345



DEGREE

This program prints daily degree day temperatures for a given station, year and base temperature. The degree day temperature for a specific day is the maximum plus the minimum divided by two (i.e., the mean daily temperature) minus the given base temperature.

$$\text{degree day temperature for day } i = \frac{\max_i + \min_i}{2} - \text{base}$$

The maximum, minimum and mean of the degree days for each month are printed. The mean month equals the sum of the degree days for that month divided by the number of days with available data.

$$\text{mean month} = \frac{\sum_{i=1}^{31} \text{degree day}_i}{N}$$

where N = number of days with available data in the month.

The average degree day for the year, which is the mean annual temperature minus the base temperature, is also printed. An option is available to not include negative degree day values (blanks are inserted). In this case monthly summaries are not printed and the average degree day for the year is computed using non-negative degree day values only.

$$\text{Average degree day for year} = \frac{\sum_{i=1}^{365} \text{non-negative degree day}_i}{N}$$

(non-negative values only)

where N = number of non-negative degree days.

DEGREE (continued)

The example shows a tabulation of degree days with the negative values included.

The user should specify the base temperature and whether or not negative values are to be printed.

DEGREE DAY TABLE FOR 1963 IN DEGREES F.

BASE TEMPERATURE IS 32 DEGREES F.

REDBIRD INW (REDBIRD 1941-1970) STATION NO. 487555

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-7.0	8.0	4.0	22.5	30.0	32.0	34.0	51.5	36.0	31.5	4.0	.0
2	-2.0	-18.5	-1.0	15.5	17.0	32.5	42.5	43.0	34.5	27.5	11.0	3.0
3	-3.0	1.0	-3.0	1.5	22.5	33.0	47.5	38.5	31.5	34.0	5.5	5.0
4	-3.5	21.0	-5.0	8.5	20.5	34.0	43.0	43.0	31.5	32.0	11.5	6.0
5	-11.5	15.0	-4.5	14.5	26.5	31.0	45.0	44.0	38.5	34.5	14.0	2.5
6	-4.0	10.0	1.0	25.0	33.0	31.5	46.0	46.0	37.5	31.5	12.0	6.5
7	5.0	10.0	4.0	23.5	33.0	33.0	43.5	45.0	39.0	26.0	9.5	4.0
8	5.5	8.0	2.0	24.0	30.5	31.5	46.0	49.5	39.0	25.5	5.0	-14.5
9	.5	4.0	7.5	16.0	35.5	28.0	47.5	45.5	38.0	34.0	9.5	-18.0
10	-21.0	-11.0	3.0	9.0	25.5	31.0	47.5	44.5	36.5	28.5	5.5	-20.5
11	-44.5	-16.5	1.5	10.5	29.0	30.5	42.5	46.5	35.0	26.5	1.5	-28.0
12	-46.5	-10.0	-4.5	14.5	22.5	39.0	41.5	40.0	35.0	31.0	-3.5	-28.5
13	-30.5	-1.5	-4.5	19.5	22.0	38.0	39.0	34.0	37.5	29.5	3.5	-34.5
14	-17.5	-5.5	.5	23.5	25.5	39.5	40.5	40.5	38.0	27.0	8.5	-36.5
15	-25.5	-1.5	7.0	27.5	26.5	31.5	48.0	48.0	27.0	22.0	16.0	-25.5
16	-23.0	.0	5.5	12.5	27.0	32.5	42.0	40.0	41.0	21.5	11.5	-21.0
17	-19.0	-3.5	-8.0	12.5	21.0	30.5	39.0	38.0	38.5	23.0	-2.5	-22.5
18	-33.5	2.0	2.0	11.0	24.0	37.5	45.5	41.5	29.0	23.0	1.5	-21.0
19	-48.5	6.0	5.5	11.0	19.0	36.0	42.5	39.5	34.5	25.0	3.0	-25.0
20	-15.0	-2.0	11.0	8.5	11.5	36.0	46.5	47.0	28.5	24.0	3.5	-16.0
21	6.0	-15.0	13.0	1.5	9.5	43.0	46.5	39.0	24.0	23.0	-12.5	-21.5
22	-18.5	3.5	20.0	1.5	19.5	38.5	48.0	33.0	30.0	28.5	-4.5	-13.0
23	-41.5	1.5	19.5	5.5	27.0	40.0	47.0	40.0	35.5	24.0	2.0	-9.5
24	-32.0	8.5	20.5	11.5	29.0	43.5	47.0	42.5	30.0	26.0	7.0	.0
25	-31.0	5.0	12.0	15.5	32.5	39.0	53.0	43.0	28.0	27.5	-.5	1.0
26	-40.0	7.5	7.5	21.0	22.0	37.5	46.5	45.5	31.5	18.0	9.5	3.0
27	-41.5	3.0	17.0	15.5	27.0	41.0	32.0	46.5	33.0	7.0	6.5	-9.0
28	-29.5	8.5	29.0	14.0	28.0	45.5	36.0	37.0	29.5	1.5	.5	-5.5
29	-31.5		19.0	16.5	31.5	39.5	41.0	31.0	25.5	16.0	.5	-3.0
30	-33.5		19.0	21.5	30.0	36.5	42.0	32.5	31.5	16.5	-2.0	-2.0
31	-9.5		20.5		33.0		43.5	33.5		7.0		5.5
DEG.DY.MAX	6.00	21.00	29.00	27.50	35.50	45.50	53.00	51.50	41.00	34.50	16.00	6.50
DEG.DY.MIN	-48.50	-18.50	-8.00	1.50	9.50	28.00	32.00	31.00	24.00	1.50	-12.50	-36.50
MEAN MONTH	-20.87	1.34	7.13	14.50	25.52	35.75	43.35	41.58	33.48	24.27	4.57	-10.92
AVERAGE DEGREE DAY FOR YEAR	16.6											

Example of DEGREE

DOUBLEMASS

This program prints cumulative totals and plots a double mass curve for precipitation for a given year range. One station is plotted on the Y-axis and the mean for one to ten stations is plotted on the X-axis. If there are missing data in the given year range, the plot is not made.

The user should specify the station for the Y-axis and the group of stations (or one station) to be combined for the X-axis (up to ten).

Other units that may be used: centimeters.

Example of DOUBLEMASS

DOUBLE MASS CURVE FOR PRECIPITATION

SINGLE STATION

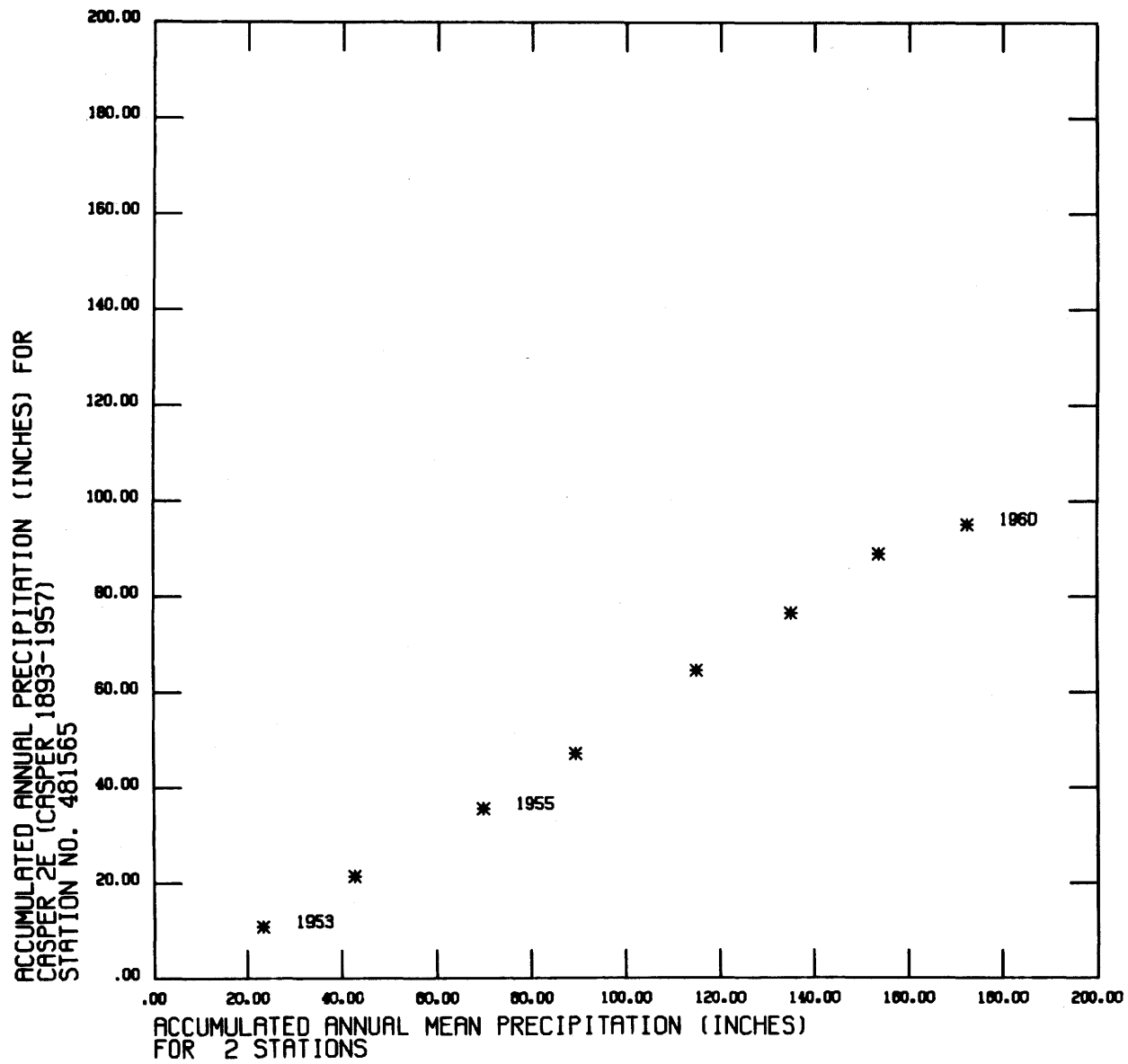
CASPER 2E (CASPER 1893-1957) STATION NO. 481565

COMBINED STATIONS

ALVA 5SE (ALVA 1943-1946) STATION NO. 480200
BEDFORD 2SE STATION NO. 480605

ACCUMULATED PRECIPITATION (INCHES)

YEAR	SINGLE STATION	COMBINED STATIONS
1953	11.	23.
1954	21.	43.
1955	35.	70.
1956	47.	89.
1957	64.	115.
1958	77.	135.
1959	89.	154.
1960	95.	172.



Example of DOUBLEMASS

DROUGHT

This program tabulates and plots the following for a given group of stations:

mean for all stations in group of total annual precipitation
for given year range

mean for all stations in group of total annual precipitation
for each year in range

running average values of total annual precipitation

One station, instead of a group of stations, may also be used. The annual precipitation for each year is plotted as a bar graph based around the mean for all years. Thus each bar indicates a positive or negative deviation from the mean.

The running average value is printed and plotted at the end of each year range utilized. If an entire year is missing, the running average that would have used that value is not computed.

Some researchers suggest that if the running average is above the mean for several years, those years can be called wet years, for instance years 1958 through 1963 in the example. If the running average is below the mean, those are considered drought years (e.g., 1966 through 1972).

The user should specify the stations to be combined for each plot (one station or up to 10 combined stations may be used) and the number of years in the running average.

Other units that may be used: centimeters.

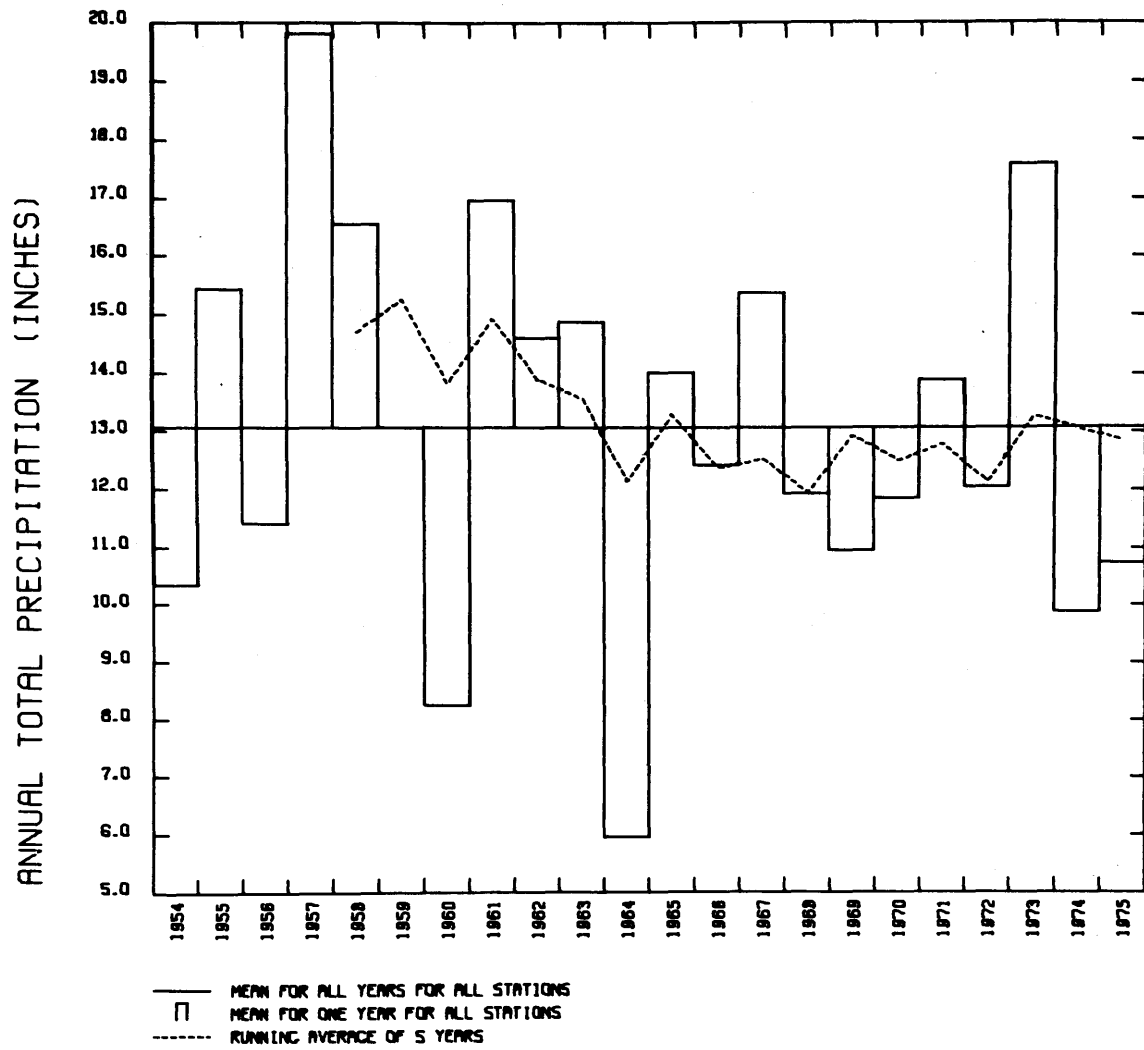
ANNUAL TOTAL PRECIPITATION AND
 RUNNING AVERAGE OF 5 YEARS
 IN INCHES

CHEYENNE WBAP (CHEYENNE 1887-1938) (CHEYENNE AIRPORT 1939-1946) STATION NO. 481675

MEAN FOR ALL STATIONS LISTED ABOVE FOR
 TOTAL ANNUAL PRECIPITATION FOR ENTIRE YEAR PERIOD = 13.09

YEAR	ANNUAL	RUNNING AVERAGE
1954	10.3	
1955	15.5	
1956	11.4	
1957	19.8	
1958	16.6	14.7
1959	13.1	15.3
1960	8.2	13.8
1961	17.0	14.9
1962	14.6	13.9
1963	14.9	13.6
1964	5.9	12.1
1965	14.0	13.3
1966	12.4	12.4
1967	15.4	12.5
1968	11.9	11.9
1969	10.9	12.9
1970	11.8	12.5
1971	13.9	12.8
1972	12.0	12.1
1973	17.6	13.3
1974	9.9	13.0
1975	10.7	12.8

STATION NUMBER
481675



Example of DROUGHT

FREZTAB

The number of freeze-free days per week is tabulated by year with this program. The calculations begin on April 2 (14th week of the calendar year) and continue through October 28 (43rd week). The chart at the bottom of the printout indicates the beginning day of selected weeks of the year. For each week the average number of freeze-free days and the percent chance of freeze is also printed.

Example of FREZTAB

WHEATLAND 4N (WHEATLAND 1913-1946, 1964-1967) (WHEATLAND 1N 1946-1964)
STATION NO. 489615 LATITUDE 42- 7- 0 LONGITUDE 104-57- 0 ELEVATION 4638.0 FEET

*** NUMBER OF DAYS OF FREEZE-FREE TEMPERATURES BY WEEK OF THE YEAR ***

YEAR	WEEK																																										
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43													
1950	2	2	4	1	3	3	7	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	3	5	7	4														
1951	2	0	2	5	5	7	7	7	4	6	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	4	7	6	2	1													
1952	2	1	2	4	7	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	-1	-1	3	3	4													
1953	2	0	2	6	5	4	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	4	7	6	3													
1954	4	4	3	6	1	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	5	7	6	4	1													
1955	0	3	6	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	5	6	4	5	5													
1956	1	3	1	3	6	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	7	7	6	6													
1957	0	1	5	3	7	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	5	5	2													
1958	2	2	7	0	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	5	6	2													
1959	4	2	1	6	7	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	3	4	4													
1960	3	4	5	3	3	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	1	6													
1961	2	1	4	1	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	4	5	6	5													
1962	2	3	7	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	7	7	7	7	2													
1963	4	5	2	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4													
1964	1	2	5	-1	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	-1	-1	6	2	5	5													
1965	4	5	7	6	7	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	2	4	7	5	5													
1966	1	6	1	3	5	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	3	4	2													
1967	3	7	3	1	0	4	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5	7	3	2													
1968	1	5	2	2	4	1	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5	7	6	3	4	2													
1969	4	4	3	5	7	7	7	7	6	7	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	1													
1970	2	2	0	5	3	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5	7	2	4	3													
1971	2	3	7	3	5	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	1	6	6	3	6													
1972	5	3	4	3	5	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	5	4	4	4													
1973	1	2	1	4	4	3	5	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	5	6	5													
1974	3	3	3	5	2	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	4	4	3	3	2													
1975	0	0	4	7	4	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	3	3	6	5	3													
MEAN	2.2	2.8	3.5	4.0	4.9	5.7	6.5	6.8	6.8	7.0	6.9	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.8	6.6	5.9	5.3	5.2	4.9	4.1													

*** PER CENT CHANCE OF FREEZE OCCURRING DURING WEEK ***

WEEK	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
CHANCE	100	96	84	92	73	50	46	15	11	3	3	0	0	0	0	0	0	0	0	0	0	3	15	28	52	68	64	80	92	100

-1 INDICATES MISSING DATA

14 TH WEEK STARTS APRIL 2
16 TH WEEK STARTS APRIL 16
18 TH WEEK STARTS APRIL 30
20 TH WEEK STARTS MAY 14
22 ND WEEK STARTS MAY 28
24 TH WEEK STARTS JUNE 11
26 TH WEEK STARTS JUNE 25
28 TH WEEK STARTS JULY 9

30 TH WEEK STARTS JULY 23
32 ND WEEK STARTS AUGUST 6
34 TH WEEK STARTS AUGUST 20
36 TH WEEK STARTS SEPTEMBER 3
38 TH WEEK STARTS SEPTEMBER 17
40 TH WEEK STARTS OCTOBER 1
42 ND WEEK STARTS OCTOBER 15

LISTDATAD

This program prints one year of daily climatic data with summaries for a given parameter and station. The types of summaries included depend upon the parameter printed. The summaries may include monthly and annual maximum, minimum, mean and total values.

Parameters that may be used: mean air temperature, maximum air temperature, minimum air temperature, precipitation, snowfall, snowdepth, wind and evaporation.

Other units that may be used: Celsius, centimeters and miles per hour.

SUNDANCE STATION NO. 488705
 LATITUDE 442400 LONGITUDE 1042100 ELEVATION 4750 FEET
 *** MEAN DAILY AIR TEMPERATURES FOR 1970 ***
 DEGREES FAHRENHEIT

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	16.5	28.0	23.5	22.5	36.0	48.5	63.0	70.0	74.0	59.0	22.0	33.0
2	13.5	10.0	36.5	32.5	45.0	55.0	63.5	70.5	65.5	55.0	24.5	31.0
3	15.5	22.0	23.0	23.0	47.0	57.0	64.0	68.5	67.0	53.0	25.0	30.5
4	7.0	22.5	24.0	34.0	54.5	57.5	63.5	69.5	68.5	61.0	26.5	34.0
5	-7.5	19.0	24.5	41.5	53.5	61.0	73.0	74.5	72.0	59.0	36.0	21.5
6	.5	29.5	29.5	48.0	66.0	64.5	71.5	75.0	68.5	53.0	39.5	34.5
7	-2.5	31.0	38.5	51.5	59.5	67.5	69.5	71.5	62.5	29.0	39.0	41.0
8	-5.5	26.5	38.0	34.0	53.0	67.0	71.5	72.0	67.5	28.0	34.0	40.5
9	13.0	31.5	19.5	40.5	43.0	66.0	72.5	69.0	61.0	33.5	37.0	28.5
10	32.0	35.5	14.5	47.5	46.0	60.0	73.5	66.5	50.0	36.0	36.0	14.0
11	29.0	30.0	17.0	44.0	47.0	52.5	74.5	74.5	56.0	39.0	34.5	17.5
12	22.5	30.0	19.5	26.0	49.5	50.5	71.0	73.5	41.5	48.5	36.5	22.5
13	27.0	16.5	16.5	26.0	46.0	54.5	68.0	77.0	30.5	39.5	34.0	17.0
14	31.0	24.0	33.0	28.0	38.0	65.5	67.5	71.0	35.5	34.5	27.0	25.5
15	22.0	33.5	24.5	29.5	44.5	58.5	61.5	61.0	45.0	36.5	34.5	23.0
16	1.0	35.0	29.0	29.0	56.0	59.5	73.0	70.0	49.0	47.0	41.0	26.0
17	-5.5	43.0	32.0	26.5	65.5	59.0	70.5	76.0	55.5	45.0	38.5	25.0
18	6.5	27.5	25.0	27.0	56.0	57.0	75.5	73.5	63.0	46.5	34.5	12.5
19	13.0	25.5	22.5	27.5	55.5	62.5	69.5	67.0	66.5	48.5	26.0	5.0
20	19.5	31.5	18.5	29.0	64.5	60.0	65.5	65.5	64.0	46.0	28.0	13.0
21	25.0	36.0	28.5	32.0	57.0	61.0	72.5	70.5	44.5	49.0	25.0	17.0
22	36.0	30.5	26.0	32.5	52.5	71.0	74.0	66.5	46.5	41.5	5.5	11.5
23	33.5	34.5	32.0	37.0	58.0	73.5	66.0	71.5	55.0	41.5	9.0	9.5
24	38.0	30.5	37.0	41.5	60.0	70.0	64.5	74.5	50.0	44.5	31.5	10.0
25	37.5	27.5	27.5	45.5	49.0	71.5	72.5	72.5	38.5	40.5	34.5	11.0
26	29.0	32.0	21.5	45.5	60.5	70.5	73.0	76.5	42.5	32.5	23.5	18.0
27	33.0	30.5	19.0	44.0	63.5	79.0	70.0	68.0	52.0	24.5	23.0	20.0
28	30.0	19.5	25.5	40.0	57.0	78.0	72.0	67.5	54.5	26.5	28.0	19.5
29	20.0		30.0	32.0	54.0	75.0	70.5	72.5	59.5	31.5	39.0	23.5
30	17.5		24.0	33.5	57.0	63.5	70.0	64.5	60.0	31.0	48.0	23.0
31	24.5		20.5		47.0		67.5	72.5		19.5		29.0
MAX	38.00	43.00	38.50	51.50	66.00	79.00	75.50	77.00	74.00	61.00	48.00	41.00
MIN	-7.50	10.00	14.50	22.50	36.00	48.50	61.50	61.00	30.50	19.50	5.50	5.00
MEAN MONTH	18.47	28.32	25.82	35.03	52.95	63.22	69.50	70.68	55.53	41.29	30.70	22.18

MEAN ANNUAL TEMPERATURE FOR 1970 42.81
 MAX TEMPERATURE FOR 1970 96.00 JUN 27
 MIN TEMPERATURE FOR 1970 -22.00 JAN 8
 MAX MEAN DAILY TEMPERATURE FOR 1970 79.00 JUN 27
 MIN MEAN DAILY TEMPERATURE FOR 1970 -7.50 JAN 5

Example of LISTDATAD

SUNDANCE STATCN NO. 488705

LATITUDE 442400 LONGITUDE 1042100 ELEVATION 4750 FEET

*** MINIMUM AIR TEMPERATURES FOR 1970 ***
DEGREES FAHRENHEIT

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	9.	22.	13.	8.	26.	36.	45.	56.	64.	44.	13.	26.
2	9.	-4.	29.	27.	28.	39.	47.	57.	51.	43.	21.	18.
3	11.	8.	10.	11.	28.	45.	50.	53.	54.	36.	22.	21.
4	0.	9.	14.	18.	38.	45.	47.	57.	52.	43.	12.	28.
5	-17.	3.	12.	31.	33.	46.	58.	60.	60.	41.	26.	11.
6	-9.	14.	15.	31.	54.	50.	56.	62.	56.	36.	28.	23.
7	-10.	23.	25.	41.	48.	54.	55.	59.	50.	21.	32.	33.
8	-22.	12.	28.	19.	36.	54.	56.	56.	51.	19.	28.	35.
9	-6.	15.	7.	23.	32.	51.	60.	55.	39.	24.	26.	22.
10	22.	22.	4.	35.	37.	50.	61.	50.	34.	29.	31.	5.
11	14.	15.	7.	33.	37.	41.	61.	61.	44.	26.	26.	5.
12	11.	20.	5.	18.	37.	46.	58.	58.	29.	35.	32.	14.
13	15.	10.	2.	21.	30.	38.	52.	65.	26.	33.	29.	2.
14	22.	15.	24.	20.	31.	55.	53.	56.	32.	28.	23.	17.
15	8.	28.	14.	25.	31.	45.	44.	46.	34.	20.	22.	11.
16	-8.	25.	18.	22.	40.	47.	57.	53.	38.	32.	31.	14.
17	-13.	33.	24.	19.	50.	47.	53.	60.	40.	28.	33.	16.
18	-10.	10.	23.	23.	46.	45.	65.	59.	45.	31.	29.	2.
19	-4.	20.	16.	21.	42.	51.	55.	50.	50.	34.	21.	-9.
20	10.	23.	4.	23.	53.	48.	54.	47.	49.	29.	18.	2.
21	15.	24.	17.	24.	46.	45.	56.	59.	32.	40.	14.	8.
22	30.	15.	18.	23.	49.	54.	60.	50.	31.	27.	-3.	2.
23	19.	21.	22.	25.	45.	60.	51.	55.	40.	29.	-4.	2.
24	29.	15.	32.	27.	50.	53.	47.	60.	36.	33.	17.	4.
25	31.	15.	21.	30.	33.	57.	58.	55.	29.	29.	23.	-4.
26	22.	22.	9.	30.	45.	53.	60.	65.	27.	22.	15.	6.
27	21.	21.	7.	32.	49.	62.	55.	55.	37.	18.	18.	12.
28	17.	15.	16.	31.	48.	61.	60.	54.	37.	24.	11.	10.
29	12.		25.	25.	38.	61.	57.	60.	42.	23.	27.	14.
30	3.		14.	23.	44.	46.	55.	51.	45.	25.	39.	16.
31	13.		11.		38.		53.	58.		5.		20.
MAX	31.00	33.00	32.00	41.00	54.00	62.00	65.00	65.00	64.00	44.00	39.00	35.00
MIN	-22.00	-4.00	2.00	8.00	26.00	36.00	44.00	46.00	26.00	5.00	-4.00	-9.00
MEAN	7.87	16.79	15.74	24.60	40.06	49.50	54.81	56.19	41.80	29.26	22.00	12.45
MAXIMUM FOR YEAR 65.00 SEV.												
MINIMUM FOR YEAR -22.00 JAN 8												

Example of LISTDATAID

ALBIN STATION NO. 480080
 LATITUDE 412500 LONGITUDE 1040600 ELEVATION 5345 FEET
 *** PRECIPITATION (INCHES) FOR 1948 ***

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	.00	.00	T	.08	.05	.00	.05	.00	.00	.00	.00	.00
2	.00	.14	.00	.00	T	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.21	.00	.00	.15	.00	.45	.00	.00	.00	.00
4	.00	.00	.07	.03	.00	.06	.00	.30	.00	.00	.00	.00
5	.00	.00	.00	.06	T	.00	.00	.05	.00	.00	.10	.09
6	.03	.00	.00	.00	.00	.00	.00	.00	.00	.25	.00	.00
7	.03	.00	.00	.00	T	.00	.00	.00	.22	.00	.24	.00
8	.03	.00	.36	.00	.05	.00	T	.74	.00	.00	.00	.00
9	.00	.00	.00	.00	T	.00	.00	.06	.00	.00	.00	.00
10	.00	.12	.00	.00	T	.00	.00	.00	.00	.00	.24	.00
11	.00	.06	.00	.00	.00	T	.24	.00	.00	.00	.24	.10
12	T	.26	.00	.00	T	T	T	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.48	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.27	.18	.00	.00	.00	.00	.00
15	T	.00	.05	.00	.00	.67	.00	.30	.00	.00	.00	.00
16	.02	.00	.00	.00	.00	.02	.00	.00	.00	.43	.00	.00
17	.09	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.09
18	.00	.00	T	.00	T	.00	T	.00	.00	.00	.21	.00
19	.00	.00	.00	.00	.00	.08	.00	.00	.00	.00	.20	.00
20	.00	.00	.10	.00	.00	.04	T	.00	.45	.00	.10	.00
21	.00	.00	.25	.00	.00	.07	.00	.00	.00	.00	.00	.18
22	.30	.00	.30	.00	.00	.31	.00	.00	.00	.00	.18	.48
23	.10	.03	.00	.02	T	.15	.00	.00	.00	.00	.20	.14
24	.30	.00	.00	1.27	.74	T	T	.00	.00	.00	.00	.00
25	.07	.00	T	T	.03	.04	.02	.00	.00	.00	.00	.00
26	.03	.00	.05	.00	.00	.10	.00	.11	.00	.00	.00	.00
27	.00	.00	.00	.00	.07	T	.00	.00	.00	.00	.09	.00
28	.00	T	.00	.00	.14	.00	T	.00	.00	.00	.00	.00
29	.00	T	.00	T	.05	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	T	.03	.00	.00	.00	.00	.00	.00	.00
31	.00	.00	.00	.00	T	.00	.00	.00	.00	.00	.00	.00
TOTAL	.58	.38	1.09	1.46	1.16	1.96	.97	1.41	.67	.68	1.90	1.08

MAXIMUM FOR YEAR 1.27 APR 24
 TOTAL FOR YEAR 13.34

T INDICATES TRACE

Example of LISTDATAD

BATES CREEK STATION NO. 480550
 LATITUDE 423300 LONGITUDE 1061900 ELEVATION 6410 FEET
 *** SNOWDEPTH (INCHES) FOR WATER YEAR 1957 ***

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	2.00	.00	3.00	.00	.00	.00	.00	.00	.00	.00
2	.00	1.00	**	.00	3.00	.00	.00	.00	.00	.00	.00	.00
3	.00	12.00	**	.00	3.00	1.00	5.00	.00	.00	.00	.00	.00
4	.00	10.00	**	.00	3.00	2.00	5.00	.00	.00	.00	.00	.00
5	.00	7.00	1.00	.00	2.00	4.00	2.00	.00	.00	.00	.00	.00
6	.00	6.00	4.00	**	2.00	4.00	1.00	.00	.00	.00	.00	.00
7	.00	6.00	3.00	**	**	2.00	1.00	.00	.00	.00	.00	.00
8	.00	5.00	3.00	**	**	2.00	1.00	.00	.00	.00	.00	.00
9	.00	4.00	3.00	1.00	**	**	.00	.00	.00	.00	.00	.00
10	.00	4.00	3.00	1.00	**	.00	.00	.00	.00	.00	.00	.00
11	.00	4.00	**	1.00	.00	.00	3.00	.00	.00	.00	.00	.00
12	.00	3.00	**	1.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	3.00	**	2.00	.00	1.00	.00	.00	.00	.00	.00	.00
14	.00	3.00	1.00	2.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	4.00	1.00	3.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	3.00	**	3.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	3.00	**	3.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	3.00	**	3.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	4.00	**	3.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	4.00	**	3.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	4.00	**	3.00	2.00	.00	.00	.00	.00	.00	.00	.00
22	.00	4.00	1.00	3.00	.00	2.00	.00	.00	.00	.00	.00	.00
23	.00	3.00	1.00	3.00	.00	4.00	.00	.00	.00	.00	.00	.00
24	**	3.00	1.00	5.00	.00	2.00	.00	.00	.00	.00	.00	.00
25	**	3.00	1.00	5.00	.00	2.00	.00	.00	.00	.00	.00	.00
26	.00	3.00	1.00	5.00	.00	**	.00	.00	.00	.00	.00	.00
27	.00	2.00	1.00	5.00	.00	**	.00	.00	.00	.00	.00	.00
28	.00	2.00	.00	5.00	.00	**	.00	.00	.00	.00	.00	.00
29	1.00	2.00	.00	4.00	.00	**	.00	.00	.00	.00	.00	.00
30	.00	2.00	.00	4.00	.00	**	.00	.00	.00	.00	.00	.00
31	.00	.00	.00	3.00	.00	.00	.00	.00	.00	.00	.00	.00
MAX	1.00*	12.00	4.00*	5.00*	3.00*	4.00*	5.00	.00	.00	.00	.00	.00
MIN	.00*	.00	.00*	.00*	.00*	.00*	.00	.00	.00	.00	.00	.00
MEAN	.03*	3.90	1.42*	2.54*	.75*	1.04*	.60	.00	.00	.00	.00	.00

MAXIMUM FOR YEAR 12.00* NOV 3

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA

Example of LISTDATAD

BOYSEN DAM STATION NO. 481000
 LATITUDE 432500 LONGITUDE 1081100 ELEVATION 4642 FEET
 *** WIND VELOCITY (MILES/DAY) FOR 1960 ***

CAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	**	**	**	**	**	67.	37.	40.	47.	**	**	**
2	**	**	**	**	**	34.	88.	36.	31.	**	**	**
3	**	**	**	**	41.	43.	61.	50.	23.	**	**	**
4	**	**	**	**	36.	63.	57.	50.	56.	**	**	**
5	**	**	**	**	99.	96.	28.	44.	29.	**	**	**
6	**	**	**	**	25.	58.	28.	78.	30.	**	**	**
7	**	**	**	**	34.	32.	27.	55.	63.	**	**	**
8	**	**	**	**	63.	54.	32.	113.	104.	**	**	**
9	**	**	**	**	55.	44.	29.	39.	30.	**	**	**
10	**	**	**	**	40.	40.	39.	43.	27.	**	**	**
11	**	**	**	**	30.	50.	50.	37.	51.	**	**	**
12	**	**	**	**	28.	51.	47.	40.	38.	**	**	**
13	**	**	**	**	50.	38.	30.	52.	28.	**	**	**
14	**	**	**	**	67.	67.	42.	32.	59.	**	**	**
15	**	**	**	**	34.	64.	39.	49.	55.	**	**	**
16	**	**	**	**	52.	61.	57.	77.	52.	**	**	**
17	**	**	**	**	57.	64.	67.	43.	50.	**	**	**
18	**	**	**	**	90.	42.	32.	25.	23.	**	**	**
19	**	**	**	**	49.	47.	26.	23.	18.	**	**	**
20	**	**	**	**	38.	55.	36.	28.	20.	**	**	**
21	**	**	**	**	61.	91.	38.	28.	96.	**	**	**
22	**	**	**	**	108.	74.	31.	46.	74.	**	**	**
23	**	**	**	**	145.	87.	35.	101.	32.	**	**	**
24	**	**	**	**	59.	32.	44.	32.	40.	**	**	**
25	**	**	**	**	56.	43.	49.	62.	20.	**	**	**
26	**	**	**	**	46.	71.	31.	28.	49.	**	**	**
27	**	**	**	**	32.	57.	5.	28.	25.	**	**	**
28	**	**	**	**	76.	51.	29.	104.	31.	**	**	**
29	**	**	**	**	35.	51.	54.	25.	97.	**	**	**
30	**	**	**	**	27.	64.	38.	41.	37.	**	**	**
31	**	**	**	**	40.		76.	28.		**		**
MAX	***	***	***	***	145.00*	96.00	88.00	113.00	104.00	***	***	***
MIN	***	***	***	***	25.00*	32.00	5.00	23.00	18.00	***	***	***
MEAN	***	***	***	***	54.24*	56.37	41.35	47.65	44.50	***	***	***
CTAL	***	***	***	***	1573.00*	1691.00	1782.00	1477.00	1335.00	***	***	***
MEAN FOR YEAR 48.73*												
TOTAL FOR YEAR 7358.00*												

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA
 *** INDICATES TOTAL MONTH'S DATA MISSING

Example of LISTDATAD

BOYSEN DAM STATION NO. 481000
 LATITUDE 432500 LONGITUDE 1081100 ELEVATION 4642 FEET

*** EVAPORATION (INCHES) FOR 1970 ***

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	**	**	**	**	**	.17	.31	.30	.19	**	**	**
2	**	**	**	**	**	.27	.32	.40	.24	**	**	**
3	**	**	**	**	**	.30	.43	.30	.20	**	**	**
4	**	**	**	**	**	.30	.30	.32	.30	**	**	**
5	**	**	**	**	**	.25	.35	.35	.30	**	**	**
6	**	**	**	**	.35	.30	.25	.37	.13	**	**	**
7	**	**	**	**	.26	.30	.37	.32	.20	**	**	**
8	**	**	**	**	.08	.40	.35	.34	.40	**	**	**
9	**	**	**	**	.07	.30	.35	.46	.25	**	**	**
10	**	**	**	**	.12	.20	.35	.27	.20	**	**	**
11	**	**	**	**	.16	.14	.25	.33	.17	**	**	**
12	**	**	**	**	.16	.08	.32	.30	.20	**	**	**
13	**	**	**	**	.08	.10	.20	.35	.04	**	**	**
14	**	**	**	**	.30	.24	.43	.55	.04	**	**	**
15	**	**	**	**	.10	.24	.26	.35	.04	**	**	**
16	**	**	**	**	.30	.37	.29	.25	.15	**	**	**
17	**	**	**	**	.37	.20	.24	.40	.20	**	**	**
18	**	**	**	**	.36	.30	.30	.40	.15	**	**	**
19	**	**	**	**	.20	.12	.41	.30	.25	**	**	**
20	**	**	**	**	.25	.43	.25	.31	.20	**	**	**
21	**	**	**	**	.28	.25	.21	.29	.20	**	**	**
22	**	**	**	**	.22	.33	.33	.30	.10	**	**	**
23	**	**	**	**	.19	.22	.36	.50	.02	**	**	**
24	**	**	**	**	.27	.28	.31	.20	.12	**	**	**
25	**	**	**	**	.23	.31	.39	.30	.24	**	**	**
26	**	**	**	**	.28	.30	.29	.28	.02	**	**	**
27	**	**	**	**	.25	.40	.44	.20	.04	**	**	**
28	**	**	**	**	.30	.45	.23	.36	.19	**	**	**
29	**	**	**	**	.17	.40	.17	.19	.09	**	**	**
30	**	**	**	**	.23	.30	.30	.18	.27	**	**	**
31	**	**	**	**	.25		.20	.23		**	**	**
MEAN	***	***	***	***	.22	.27	.31	.32	.17	***	***	***
TOTAL	***	***	***	***	6.95E	8.25	9.56	10.00	5.14	***	***	***
TOTAL FOR YEAR		39.90*										

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA
 *** INDICATES TOTAL MONTH'S DATA MISSING
 E INDICATES ESTIMATED VALUE

Example of LISTDATA

LISTDATESD

For every station on file, this program lists a header and the years of data stored for each parameter. The example shows a partial listing.

Example of LISTDATESD

HEADERS AND YEARS FOR DAILY CLIMATIC DATA

STATION NO. 248857 WEST YELLOWSTONE (RIVERSIDE 1905-1922)

MAXIMUM TEMPERATURES

1905 TO 1909

MINIMUM TEMPERATURES

1905 TO 1909

PRECIPITATION

1905 TO 1975

STATION NO. 480080 ALBIN

MAXIMUM TEMPERATURES

1948 TO 1975

MINIMUM TEMPERATURES

1948 TO 1975

PRECIPITATION

1941 TO 1975

SNOWFALL

1949 TO 1975

SNOWDEPTH

1949 TO 1975

STATION NO. 480085 ALCOVA

MAXIMUM TEMPERATURES

1899 TO 1906

MINIMUM TEMPERATURES

1899 TO 1906

PRECIPITATION

1899 TO 1906

STATION NO. 480091 ALCOVA 17NW

MAXIMUM TEMPERATURES

1964 TO 1975

MINIMUM TEMPERATURES

1964 TO 1975

PRECIPITATION

1962 TO 1975

SNOWFALL

1963 TO 1975

SNOWDEPTH

1963 TO 1975

STATION NO. 480092 ALCOVA 26WNW

PRECIPITATION

1956 TO 1960

SNOWFALL

1957 TO 1960

SNOWDEPTH

1957 TO 1960

MONTHLYD

This program lists monthly and annual summaries (either total or mean values, depending on the type of data) calculated from daily climatic data for a specific station, type of data and year range. It also computes the mean, standard deviation and sample size for each month separately in the given year range. Three sets of these statistics are given corresponding to (1) all months with at least some data, (2) complete months only (includes estimated values) and (3) complete years only (includes estimated values). The annual value for each year is used with the annual mean value for complete years only (years with estimated values are also used) to compute the percent of mean for all years that have no missing data. The maximum daily value and its date of occurrence are given. For temperatures the minimum daily value and its date of occurrence are also included.

Parameters that may be used: mean air temperature, precipitation, snowfall, wind and evaporation.

Other units that may be used: centimeters.

MONTHLY AND ANNUAL SUMMARY

RECLUSE 3NNE (RECLUSE 1930-1935) STATION NO. 487540

LATITUDE 444700 LONGITUDE 1054100 ELEVATION 4200 FEET

*** MEAN MONTHLY AIR TEMPERATURES (F.) ***

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	PERCENT OF MEAN
1941	24.45	29.46	31.18	40.73	55.10	60.48	70.74	69.74	54.42	44.26	38.93	28.68	45.68	102.63
1942	22.44	21.80	31.87	47.77	49.48	59.27	70.95	69.10	56.97	46.82	32.98	27.40	44.74	100.51
1943	16.74	29.52	24.73	48.58	48.18	58.52	73.00	71.69	59.55	48.68	35.32	26.73	45.10	101.33
1944	22.71	20.62	24.40	42.30	54.60	56.82	66.05	66.74	56.92	51.50	33.08	24.47	43.35	97.39
1945	23.03	23.23	34.03	38.52	50.56	56.05	70.65	69.39	56.03	49.95	32.67	23.03	43.93	98.69
1946	27.52	27.59	37.82	50.02	49.02	60.47	71.61	66.45	56.72	39.97	28.33	23.97	44.96	101.00
1947	19.92	17.86	29.16	42.50	52.10	56.87	72.66	73.31	59.55	52.37	26.43	27.82	44.13	99.14
1948	23.55	19.84	27.55	45.72	54.63	62.80	69.21	70.63	64.07	49.15	29.67	18.82	44.64	100.28
1949	5.92	15.30	30.53*	49.45	55.87	62.57	72.35	73.23	57.87	44.23*	43.42	21.34	44.34*	****
1950	7.92	29.61	27.06	39.83	47.48	60.43	66.31	66.92	56.67	51.77	30.45	29.85	42.86	96.29
1951	18.94	28.29	22.50	38.53	54.74	54.65	59.15	67.29	52.98*	43.63	30.75*	16.39	41.49*	****
1952	20.03	26.33	27.39	48.43	53.69	65.58	67.85	69.44	64.03	48.63	30.35	26.92	45.72	102.72
1953	30.29	26.07	36.13	37.17	47.47	64.38	72.68	70.03*	60.83	52.79	38.38	26.59*	46.90*	****
1954	19.37	36.71	27.76	43.20	51.53	60.72	76.40*	69.23	60.82	45.34	41.67	27.74	46.65*	****
1955	23.26	17.34*	22.77	43.78	54.03	57.79*	71.76	72.10	58.22	49.50*	21.40	21.16	42.76*	****
1956	23.15	21.26	32.11	38.98	54.61	69.08	70.42	67.29	61.55	51.25*	31.13*	28.27	45.76*	****
1957	**	27.73	34.18	39.10	52.77	60.00	71.63*	70.90	57.55	48.94*	30.10	32.82*	47.79*	****
1958	31.43*	25.93	30.58	40.82	59.13*	59.24*	65.00*	71.94	60.97	51.87*	32.93*	23.81	46.13*	****
1959	24.15	23.77*	36.79	41.75	49.35	66.78	71.71	72.50	59.09*	45.18	28.94*	30.15	45.85*	****
1960	**	**	46.04*	43.82	55.68	64.20	75.69	69.27	60.76*	48.53	35.35	27.27	52.66*	****

ALL MONTHS WITH AT LEAST SOME DATA

MEAN	21.32*	24.65*	30.69*	43.05	52.50*	60.83*	70.79*	69.86*	58.78*	48.21*	32.61*	25.66*	45.27*
STDEV	6.48*	5.29*	5.78*	4.04	3.24*	3.77*	2.93*	2.17*	2.90*	3.48*	5.20*	4.04*	2.32*
N	18	19	20	20	20	20	20	20	20	20	20	20	20

COMPLETE MONTHS ONLY

MEAN	20.73	25.13	29.85	43.05	52.15	61.09	70.75	69.85	58.98	47.90	33.03	25.21	44.51
STDEV	6.14	5.28	4.77	4.04	2.92	3.89	2.47	2.23	2.76	3.67	5.72	3.86	.95
N	17	17	18	20	19	18	17	19	17	15	16	18	10

COMPLETE YEARS ONLY

MEAN	20.73	24.59	29.52	44.44	51.48	59.73	69.90	69.34	58.49	48.31	31.82	25.77	44.51
STDEV	5.41	4.45	4.23	4.15	2.90	2.93	2.47	2.22	3.30	3.81	3.60	3.25	.95
N	10	10	10	10	10	10	10	10	10	10	10	10	10

MAXIMUM DAILY VALUE 105.00* AUG 7, 1949

MINIMUM DAILY VALUE -31.00* FEB 13, 1949

* INDICATES PARTIAL VALUES
 ** INDICATES TOTAL MONTH'S DATA MISSING
 **** INDICATES VALUE NOT CALCULATED

Example of MONTHLYD

MONTHLY AND ANNUAL SUMMARY

GRANDALL CREEK STATION NO. 482135

LATITUDE 445400 LONGITUDE 1094000 ELEVATION 6600 FEET

*** TOTAL PRECIPITATION (CENTIMETERS) ***

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	PERCENT OF MEAN
1950	5.05	2.36	4.11	3.40	.69	2.13	7.42	1.63	8.53	1.32	4.04	1.47	42.16	114.70
1951	10.19	2.44	2.49	2.67	3.40	3.76	7.42	3.28	2.50	4.50	.89	3.94	47.24	128.52
1952	3.02	3.81	1.04	1.30	2.87	1.73	3.28	5.21	.58	.00	.41	2.77	26.01	70.76
1953	6.35	4.01	1.85	3.99	3.43	1.02	1.09	4.42	1.70	1.09	2.77	2.21	33.93	92.32
1954	5.56	1.37	5.00	4.90	.76	4.11	2.29	2.39	1.73	1.96	.48	2.72	33.27	90.52
1955	.69	3.61	2.31	2.39	1.83	2.44	1.65	1.35	2.13	.00	2.72	5.66	26.77	72.83
1956	5.05	1.70	7.92	3.99	2.54	2.01	2.36	2.29	1.98	2.57	4.09	5.11	41.61	113.18
1957	3.71	8.92	3.10	3.02	3.07*	8.97	.56	1.45	2.59	5.45	.69	3.61	45.14*	****
1958	2.82	2.39	1.93	2.41	3.96	6.78	4.95	2.41	2.29	.69	3.33	.89	34.85	94.80
1959	2.74	6.40	2.13	1.50	6.02	1.02	3.56	1.24	2.13	7.87	2.11	.30	37.03	100.75
1960	1.52	2.72	5.21	2.77	.13	1.78	1.19	4.83	.94	2.90	1.83	.41	26.21	71.31
1961	.00	1.52	1.98	2.31	7.24	1.37	4.85	3.86	6.68	2.49	2.01	2.11	36.42	99.09
1962	3.61	3.89	1.98	.25	4.65	7.01	3.78	5.64	6.45	3.35	.81	.25	41.68	113.39
1963	5.51	2.97	.53	10.06	5.23	3.91	1.65	.20	**	.00	.00	3.58	33.65*	****
1964	8.43	1.17	1.98	4.06	4.42	3.89	1.14	.56	1.73	3.40	2.31	6.35	39.45	107.31
1965	5.09	.89	3.43	5.84	3.78	4.39	3.43	3.53	4.27	.00	.63	1.19	36.47	99.23
1966	1.14	1.78	2.16	3.30	3.48	4.93	.97	4.17	5.21	1.75	3.81	4.06	36.75	99.99
1967	4.88	1.78	2.79	3.02	4.62	8.15	2.92	1.65	.84	6.76	2.16	3.43	43.00	116.98
1968	3.23	1.65	1.80	.66	5.08	7.24	1.27	8.13	3.10	1.96	3.33	3.56	41.00	111.53
1969	3.56	2.34	1.09	1.75	3.78	7.42	1.47	.25	2.69	2.26	1.68	2.03	30.33	82.50
1970	7.37	1.55	1.98	5.11	3.91	3.76	2.21	3.30	6.83	1.02	4.62	2.57	44.22	120.30
ALL MONTHS WITH AT LEAST SOME DATA														
MEAN	4.26	2.82	2.71	3.27	3.57*	4.18	2.83	2.94	3.23*	2.44	2.13	2.77	37.01*	
STDEV	2.53	1.89	1.68	2.11	1.74*	2.51	1.97	2.01	2.29*	2.20	1.38	1.72	6.23*	
N	21	21	21	21	21	21	21	21	20	21	21	21	21	
COMPLETE MONTHS ONLY														
MEAN	4.26	2.82	2.71	3.27	3.59	4.18	2.83	2.94	3.23	2.44	2.13	2.77	36.76	
STDEV	2.53	1.89	1.68	2.11	1.79	2.51	1.97	2.01	2.29	2.20	1.38	1.72	6.23	
N	21	21	21	21	20	21	21	21	20	21	21	21	19	
COMPLETE YEARS ONLY														
MEAN	4.23	2.49	2.80	2.93	3.51	3.94	3.01	3.16	3.27	2.41	2.32	2.69	36.76	
STDEV	2.65	1.34	1.69	1.50	1.79	2.38	1.98	1.97	2.35	2.13	1.31	1.79	6.23	
N	19	19	19	19	19	19	19	19	19	19	19	19	19	
PERCENT OF ANNUAL	11.5	6.8	7.6	8.0	9.5	10.7	8.2	8.6	8.9	6.6	6.3	7.3	100.0	

MAXIMUM DAILY VALUE 4.32* OCT 15, 1957

* INDICATES PARTIAL VALUES
 ** INDICATES TOTAL MONTH'S DATA MISSING
 *** INDICATES VALUE NOT CALCULATED

Example of MONTHLY

NORMALTEMP

This program computes and prints normal temperatures for a given station. The normal temperature for January first is the average of the mean daily temperatures for all of the January firsts for 1941 through 1970. The mean daily temperature for a day is the average of the maximum and the minimum temperature for that day. The maximum and minimum normal temperature values for each month are printed along with the normal monthly temperatures. If there are no missing data, the normal annual temperature is printed.

NORMAL MEAN DAILY TEMPERATURE 1941-1970

AFTON (GROVER 1903-1946) (GROVER 2S 1946-1957) (AFTON 2N 1957-1963) STATION NO. 484095

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	13.0	16.5	21.3	33.6*	41.3*	49.7	56.9	62.6	56.1	47.5	33.4*	21.0*
2	13.0	15.4	22.1	33.9*	43.4*	50.8	57.3	62.5	56.3	47.1	32.9*	22.7*
3	8.9	17.3	20.7	31.9*	44.1*	51.2	58.7	62.3	55.6	46.2	33.2*	24.6*
4	8.2	18.3	21.1	32.3*	45.7*	51.2	57.7	61.7	55.5	46.9	34.9*	22.4*
5	12.7	17.0	18.2	34.0*	46.3*	52.2	58.4	61.9	56.3	46.2	32.7*	22.3*
6	14.1	19.1	19.9	34.1*	46.1*	51.9	58.7	60.2	55.5	45.2	32.4*	21.2*
7	15.3	19.1	21.8	32.3*	47.7*	52.3	59.1	61.1	56.3	45.3	32.2*	19.2*
8	14.2	17.9	23.3	33.0*	46.2*	51.3	59.5	61.8	55.7	45.4	31.1*	17.4*
9	12.4	18.9	25.4	34.5*	47.1*	52.8	60.1	60.9	54.1	45.4	29.7*	14.6*
10	12.3	19.8	23.2	34.7*	46.6*	52.2	60.3	60.3	53.7	44.4	31.6*	15.4*
11	14.0	20.3	21.0	34.2*	45.7*	52.6	59.4	60.6	54.1	45.3	32.4*	17.7*
12	12.9	20.5	21.2	35.1*	45.8*	52.4	60.2	60.7	52.9	45.0	31.6*	17.2*
13	14.2	18.8	23.9	36.3*	46.7*	52.6	60.6	59.4	52.9	44.0	30.7*	17.3*
14	16.8	18.9	23.9	37.1*	46.6*	53.0	61.0	59.2	52.4	42.8	29.8*	15.6*
15	18.0	17.8	22.9	36.7*	45.8*	52.2	61.5	59.2	51.3	42.1	28.4*	15.6*
16	16.0	20.6	22.9	37.5*	47.6*	53.3	61.1	59.6	50.4	42.7	24.3*	16.2*
17	13.5	21.4	26.3	38.3*	48.3*	52.9	61.8	59.6	49.5	41.6	24.6*	15.8*
18	12.9	20.3	24.7	37.6*	47.7*	54.7	62.3	59.5	49.7	41.6	25.4*	15.1*
19	12.3	17.5	24.8	39.0*	49.3*	55.9	62.7	59.3	50.8	41.9	25.9*	17.5*
20	14.6	18.5	24.1	39.0*	49.8*	55.2	62.3	58.7	49.3	41.7	26.0*	18.2*
21	13.5	20.0	24.5	39.9*	49.4*	54.8	62.2	58.0	48.6	41.0	25.2*	20.8*
22	14.8	23.3	27.4	40.8*	49.2*	55.3	61.8	58.0	47.4	39.0	21.2*	19.9*
23	18.3	22.4	29.1	39.7*	49.1*	55.5	63.4	58.5	49.0	39.5	24.5*	18.1*
24	19.7	20.5	29.3	39.7*	49.9*	55.5	62.4	58.4	48.8	39.2	26.9*	16.8*
25	19.4	20.3	27.8	39.9*	50.4*	55.1	61.8	57.8	49.5	39.2	26.1*	14.8*
26	18.7	18.6	28.7	39.7*	51.3*	55.2	62.2	58.7	50.4	39.5	24.9*	14.7*
27	16.4	17.9	28.1	39.2*	50.8*	54.7	62.4	57.3	49.8	38.0	23.9*	14.6*
28	14.6	18.2	28.3	41.5*	50.5*	54.3	61.9	56.8	49.1	37.3	22.0*	14.8*
29	12.9		30.6	41.4*	49.6*	54.5	61.8	56.5	48.6	36.4	20.0*	14.8*
30	13.1		31.3	40.6*	49.9*	55.1	61.6	54.9	48.0	37.0	22.4*	14.0*
31	13.9		31.6		50.1*		62.4	56.0		35.4		12.2*
MAX	19.68	23.30	31.60	41.47*	51.29*	55.87	63.37	62.62	56.27	47.52	34.91*	24.59*
MIN	8.18	15.42	18.20	31.90*	41.29*	49.72	58.90	54.87	47.45	35.37	20.02*	12.24*
ORM. MONTH	14.34	19.12	24.83	36.90*	47.68*	53.35	60.76	59.42	51.93	42.25	28.01*	17.50*

NORMAL ANNUAL TEMPERATURE 38.07*

* INDICATES ENCOUNTERED MISSING DATA

Example of NORMAL TEMP

OCCUR

This program calculates, prints and plots the number of precipitation occurrences in each class of eighteen class sizes for a given station and year range. The class sizes are as follows: for inches 0., .1, .2, .3, .4, .5, .6, .7, .8, .9, 1., 1.2, 1.4, 1.6, 1.8, 2., 2.5, 3.; for centimeters 0., .2, .5, .8, 1., 1.3, 1.5, 1.8, 2., 2.3, 2.5, 3., 3.6, 4.1, 4.6, 5.1, 6.4, 7.6. The printout is tabulated by year. For each class size the plot combines all years by adding the totals for all years analyzed. If a year contains missing data that year is not used in the calculations.

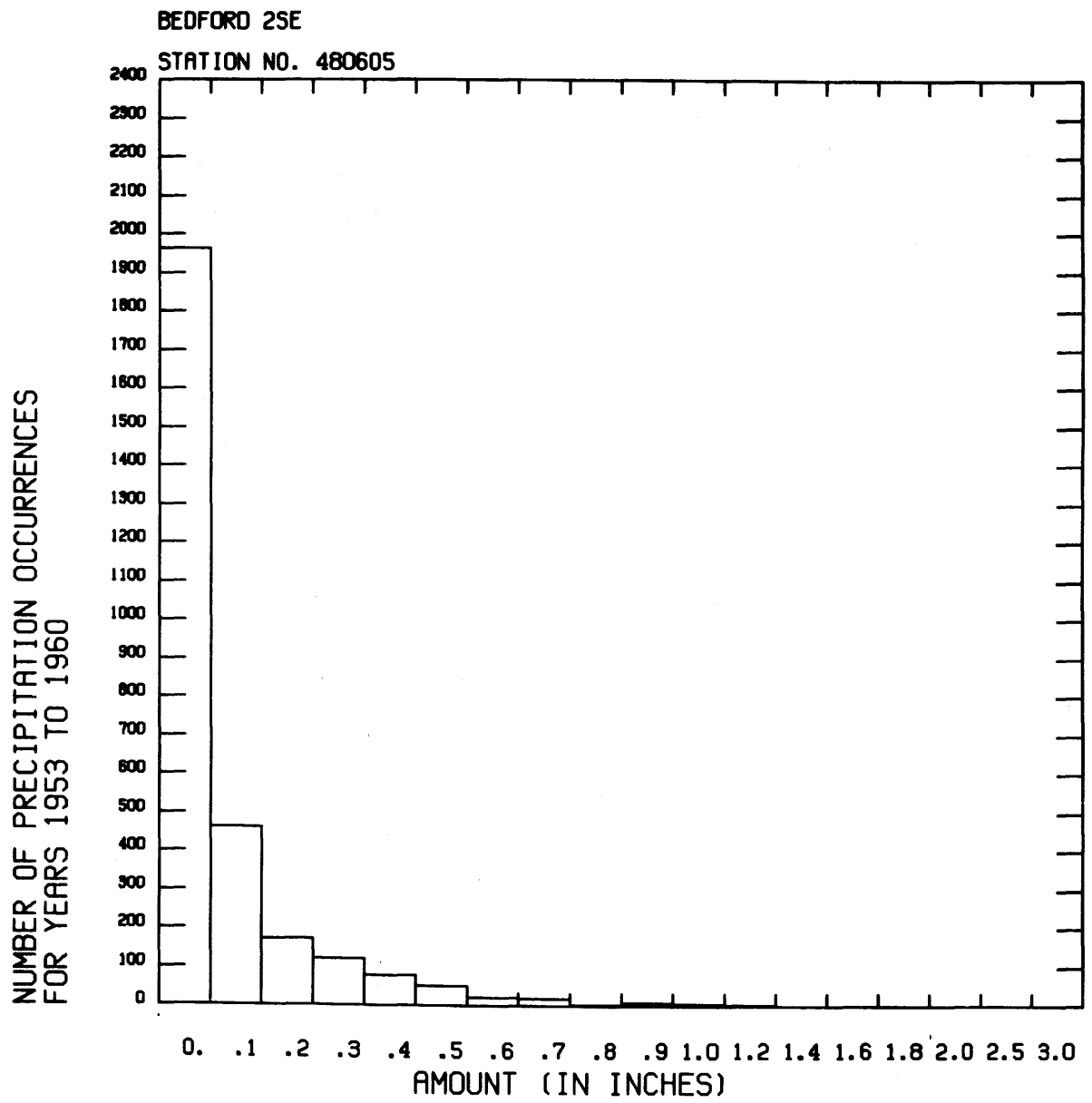
Other units that may be used: centimeters.

Example of OCCUR

BEDFCRD 2SE STATION NO. 480605																		
NUMBER OF PRECIPITATION OCCURRENCES (IN INCHES)																		
YEAR	0.	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0
1953	247	58	22	13	7	6	7	2	0	2	0	0	0	1	0	0	0	0
1954	259	41	23	12	17	5	3	2	1	1	0	0	1	0	0	0	0	0
1955	234	61	25	17	11	6	1	5	0	1	3	1	0	0	0	0	0	0
1956	249	65	16	16	6	7	1	2	1	2	1	0	0	0	0	0	0	0
1957	221	73	19	20	14	9	3	3	0	0	1	1	1	0	0	0	0	0
1958	254	51	20	20	6	3	4	1	2	1	1	1	0	1	0	0	0	0
1959	252	53	28	12	6	8	2	2	0	1	1	0	0	0	0	0	0	0
1960	247	61	20	12	11	8	2	3	1	1	0	0	0	0	0	0	0	0
TOTAL	1963	463	173	122	78	52	23	20	5	9	7	3	2	2	0	0	0	0

VALUE FOR SPECIFIC CLASS SIZE INDICATES NUMBER OF PRECIPITATION OCCURRENCES FOR THAT CLASS SIZE OR LESS THAN THAT CLASS SIZE BUT GREATER THAN THE NEXT SMALLER CLASS SIZE.
THAT IS, CLASS SIZE N IS USED FOR VALUES LESS THAN OR EQUAL TO N AND GREATER THAN N-1

Example of OCCUR



PARGREATER

This program tabulates the number of days a type of data was greater than or less than (depending on the option) specified values (up to eleven). Each year is treated separately. The mean of the number of days for each specified value for the year range is printed. If a year contains missing data, that year is not used. The following four options are available:

1. greater than or equal to
2. less than
3. greater than
4. less than or equal to

In the following example, precipitation was used with the greater than option.

The user should specify the eleven values and which of the four options are to be used.

Parameters that may be used: maximum air temperature, minimum air temperature and precipitation.

Other units that may be used: centimeters.

LAKE YELLOWSTONE (YNP) STATION NO. 485345
 NUMBER OF DAYS PRECIPITATION
 WAS
 GREATER THAN SPECIFIED INCHES

YEAR	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
1924	66	50	25	16	10	5	3	2	1	0	0
1928	92	53	27	11	6	2	2	2	2	1	1
1929	88	53	28	15	11	7	5	4	2	1	1
1933	83	38	15	7	3	1	1	0	0	0	0
1934	104	54	26	13	6	6	3	2	1	0	0
1937	47	28	16	12	6	2	2	1	1	0	0
1941	112	49	22	14	6	3	2	2	1	0	0
1942	103	31	11	6	3	2	1	0	0	0	0
1947	64	34	16	11	8	5	4	2	1	1	1
1949	152	68	31	15	5	3	2	1	1	1	1
1952	125	61	19	12	10	5	4	3	1	1	1
1955	184	74	40	19	11	7	5	4	2	2	1
1956	141	58	28	11	4	2	1	1	1	1	0
1960	144	50	24	14	9	9	4	2	1	1	0
1963	146	68	37	19	9	6	3	2	1	0	0
1966	127	40	27	16	11	9	4	4	3	2	2
1967	190	69	38	20	13	8	2	2	0	0	0
1968	159	57	39	22	11	5	4	3	1	1	1
1970	183	87	43	27	8	4	0	0	0	0	0
1972	151	64	28	13	7	5	3	2	1	0	0
1974	132	52	22	10	8	4	1	1	1	0	0
MEAN	123.48	54.19	26.76	14.43	7.86	4.76	2.67	1.90	1.05	.57	.43

Example of PARGREATER

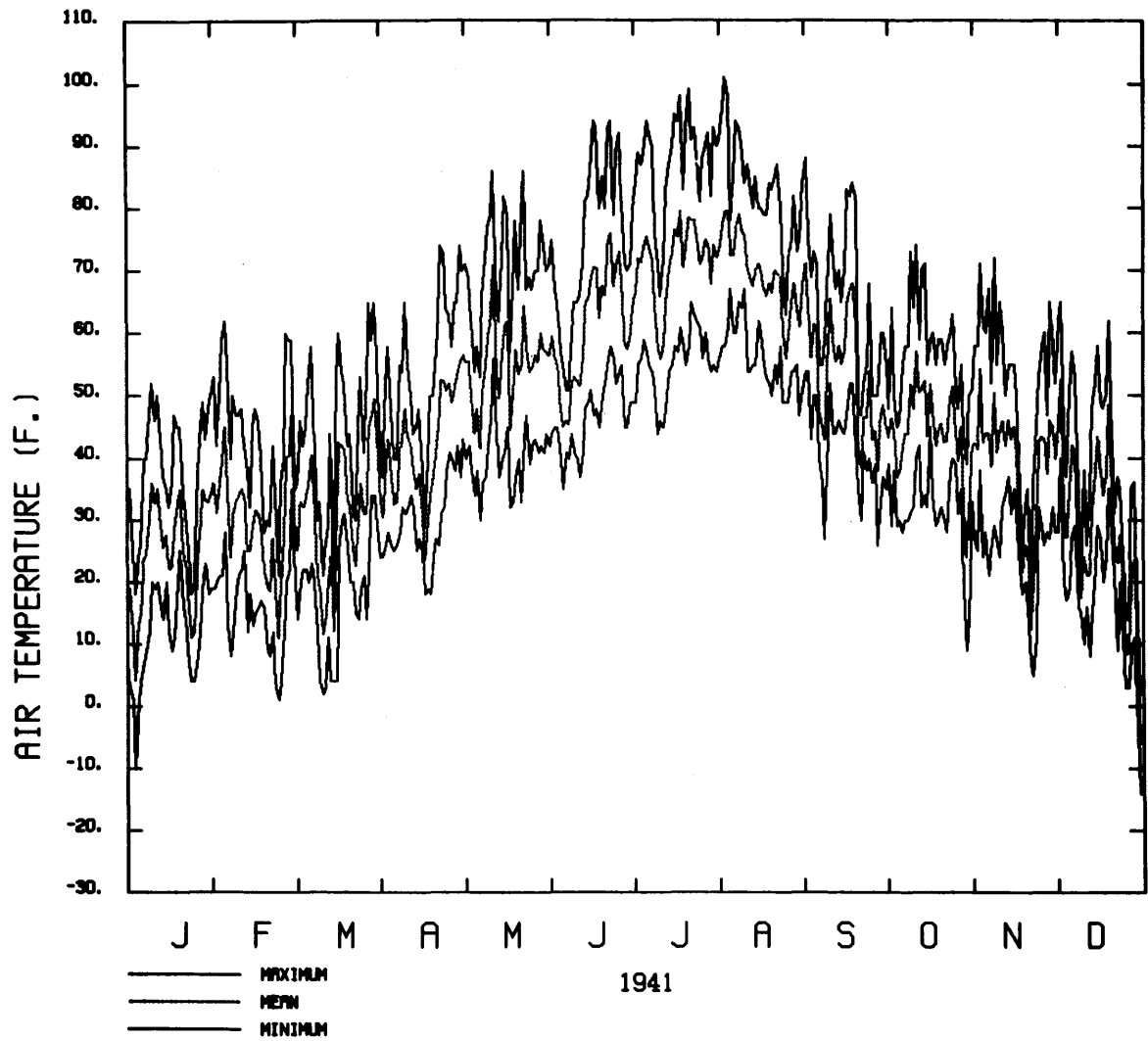
PLQTDAYD

This program plots daily climatic values for a specific station, parameter and year range. Each year is plotted on a separate graph. Blank spaces indicate missing data.

Parameters that may be used: mean, maximum and minimum air temperature on one graph, mean air temperature alone, precipitation, snowfall, snowdepth, wind and evaporation.

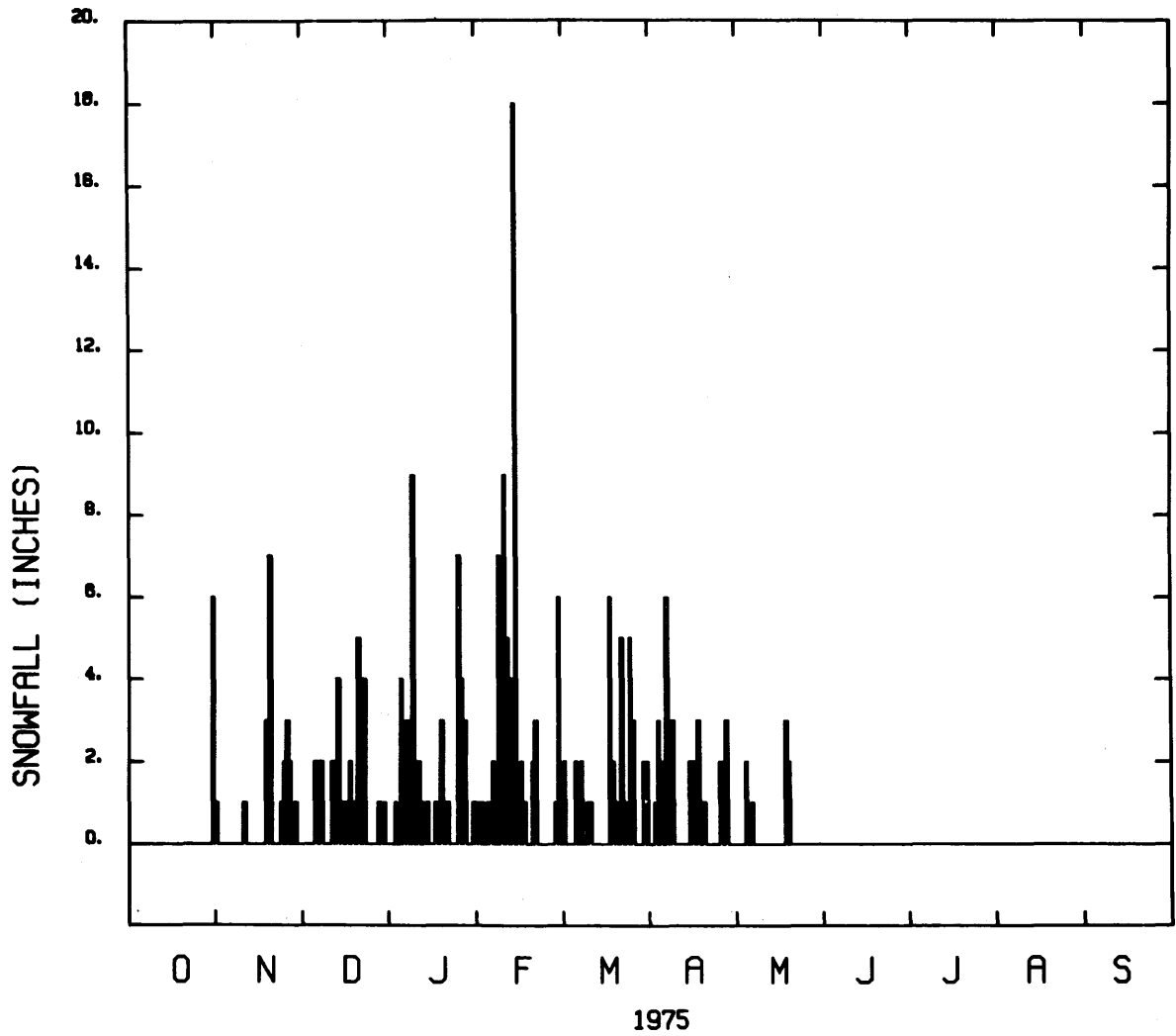
Example of PLOTDAYD

RECLUSE 3NE (RECLUSE 1930-1935)
LATITUDE 444700 LONGITUDE 1054100 ELEVATION 4200
STATION NO. 487540



Example of PLOTDAYD

MORAN SHNH (MORAN 1911-1961)
LATITUDE 435100 LONGITUDE 1103500 ELEVATION 6798
STATION NO. 486440



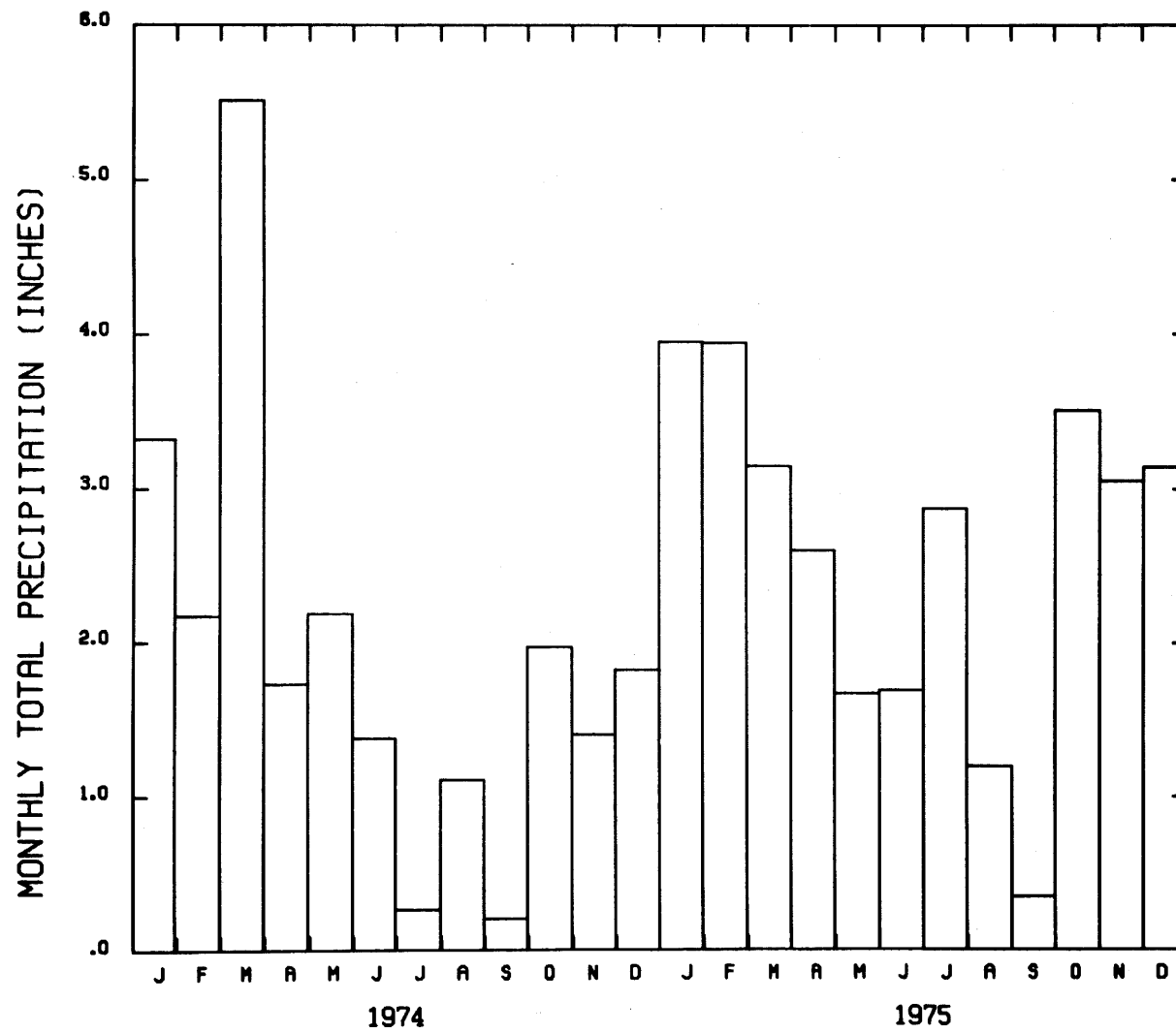
PLOTMONTH

This program plots monthly mean or monthly totals as a bar graph for a given parameter. Up to twenty-four years may be plotted on one graph. If a month contains missing data, an asterisk (*) is printed below the month. If the month's value has been estimated, an E is printed below the month. Mean monthly values for a given year range may optionally be plotted on the same graph. These will be plotted with a dashed line. No symbols are printed for missing or estimated data that correspond to these values. The first example shows a plot of monthly total precipitation. The second example shows a similar plot with the mean monthly value for the years 1965 to 1970 added to the graph with a dashed line.

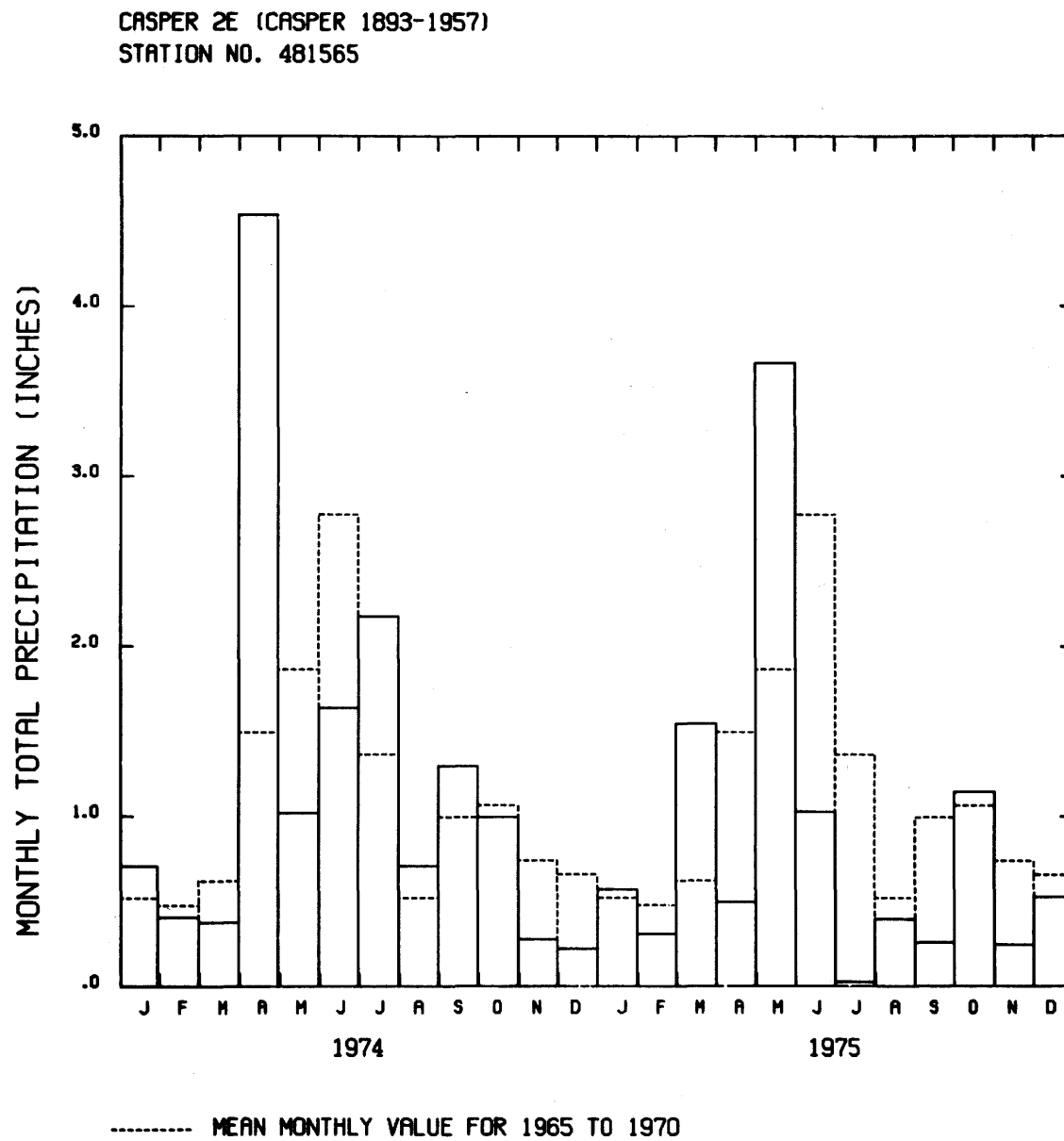
The user should specify whether or not the mean values for several years should be plotted.

Parameters that may be used: mean air temperature, precipitation, snowfall, wind and evaporation.

MORAN SNNW (MORAN 1911-1961)
STATION NO. 486440



Example of PLOTMONTH



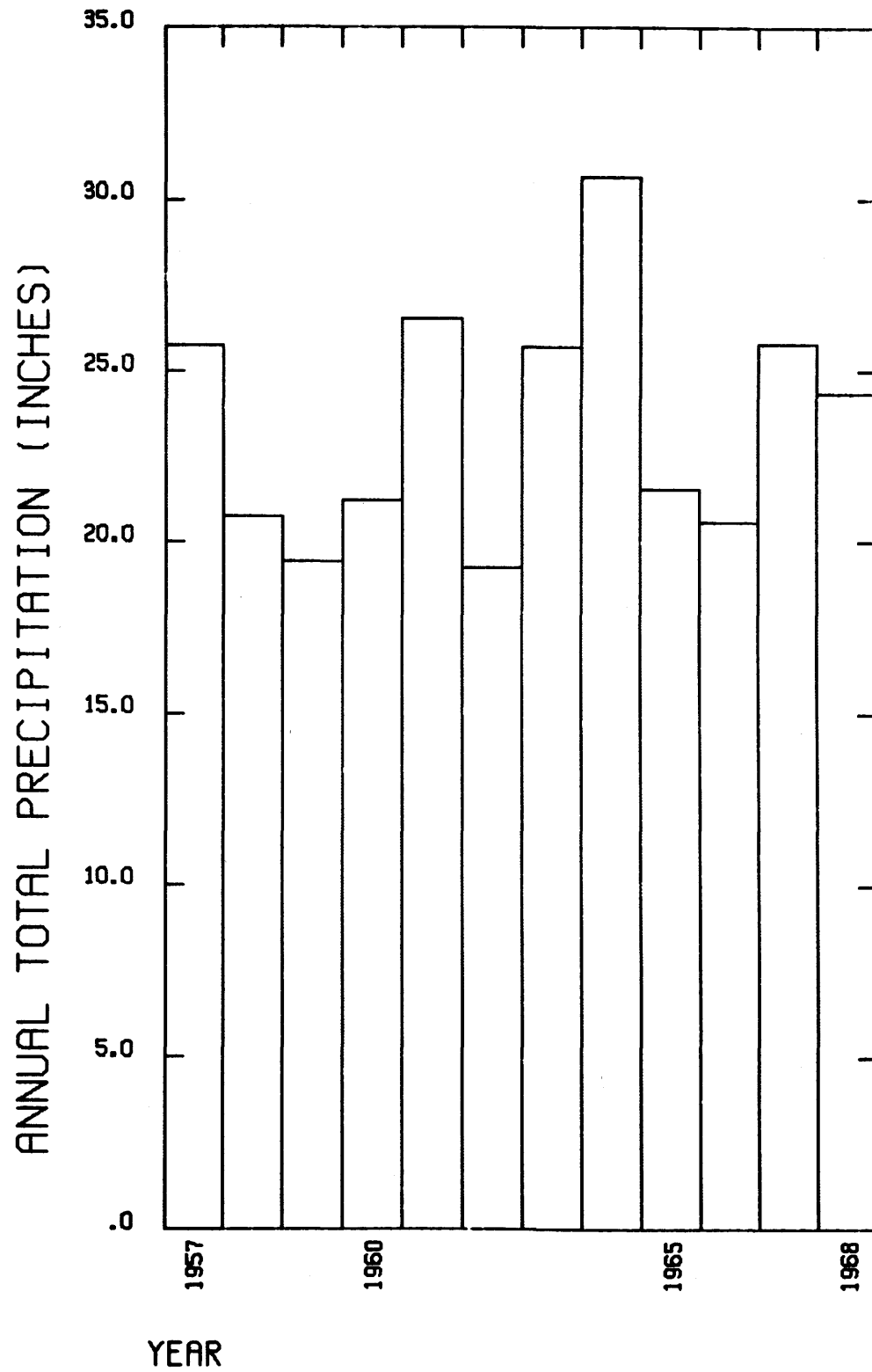
Example of PLOTMONTH

PLQTYEAR

This program plots annual climatic values given a specific station, parameter and year range. The annual values are computed from daily data. If the year contains missing values, an asterisk (*) is printed below that year. If the annual value is estimated, an E is printed below that year.

Parameters that may be used: mean air temperature, precipitation, snowfall, wind and evaporation (only summer months, June - September, are used for evaporation).

Example of PLOTYEAR
MORAN SWNW (MORAN 1911-1961)
STATION NO. 486440



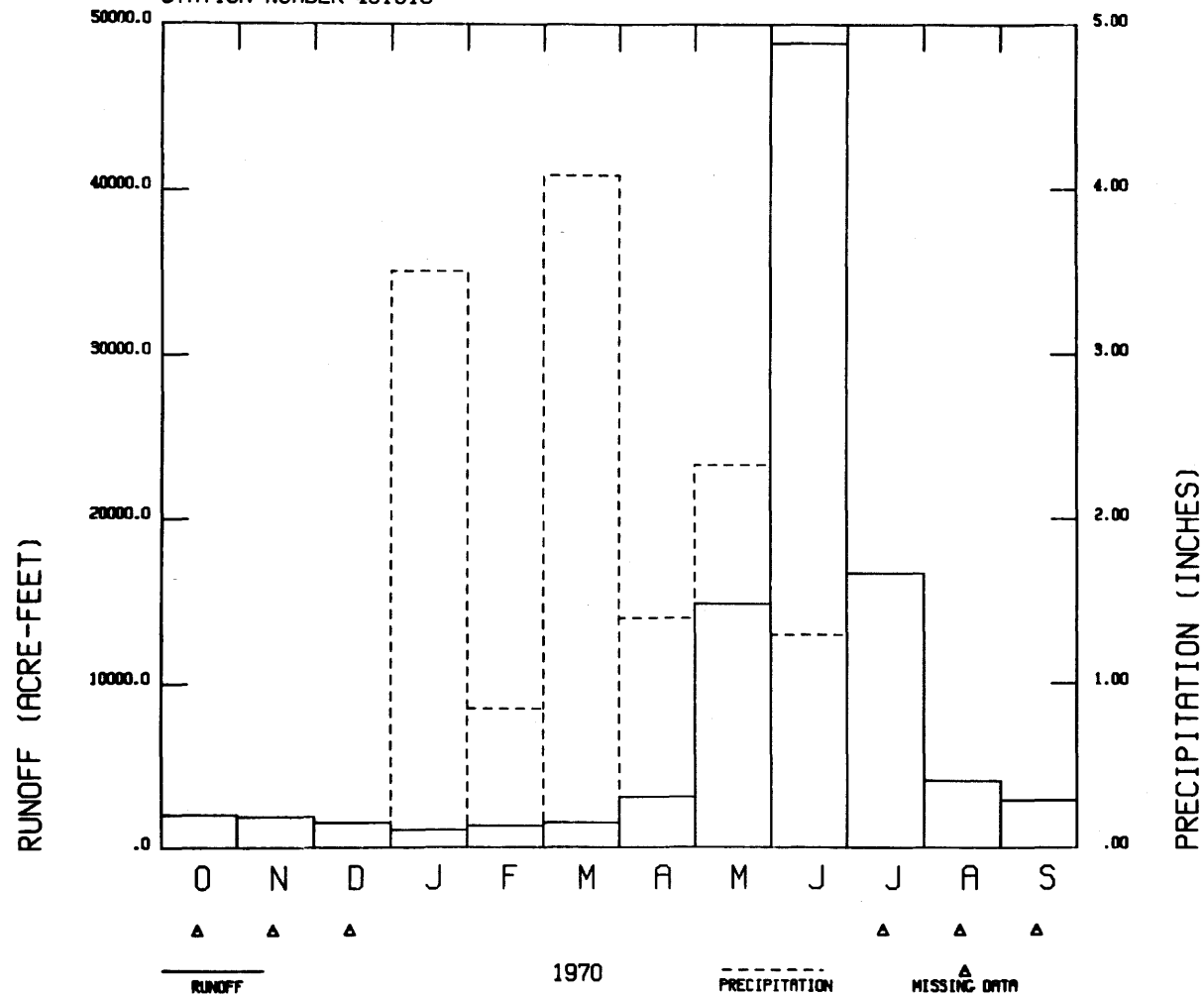
PLRUNOFF

This program plots monthly runoff, and optionally, monthly precipitation on the same graph against time. If a month contains missing data a symbol is printed below that month, an asterisk (*) for runoff and a triangle (Δ) for precipitation. Data are plotted by water year.

The user should specify the runoff station, the water year range and the precipitation station (if precipitation values are to be plotted).

LITTLE LARAMIE RIVER NEAR FILMORE (HATTON), WYOMING

STATION NO 066610.00

CENTENNIAL
STATION NUMBER 481610

Example of PLRUNOFF

PRQBTEMP

This program has three options for tabulating daily temperature probabilities, assuming a normal distribution. Values are tabulated by month.

The options are:

- 1) percent probability of maximum daily temperature of at least specified degrees Fahrenheit
- 2) percent probability of minimum daily temperature of less than specified degrees Fahrenheit
- 3) percent probability of mean daily temperature of at least specified degrees Fahrenheit

The specified degrees Fahrenheit are 15 to 100 degrees incremented by five with 32 degrees also included. The example illustrates option number two.

For each station the user should specify the year range (unless all years are to be used), month range (unless all months are desired) and the temperature options that are to be used.

WHEATLAND 4N (WHEATLAND 1913-1946, 1964-1967) (WHEATLAND IN 1946-1964)
 STATION NO. 489615 LATITUDE 42- 7- 0 LONGITUDE 104-57- 0 ELEVATION 4638.0 FEET

MONTH OF JANUARY FOR PERIOD 1899 - 1975

DAY	PER CENT PROBABILITY OF MINIMUM DAILY TEMPERATURE OF LESS THAN																		
	15	20	25	30	32	35	40	45	50	55	60	65	70	75	80	85	90	95	100
1	47	59	70	80	83	87	92	96	98	99	100	100	100	100	100	100	100	100	100
2	45	59	73	83	87	91	96	98	99	100	100	100	100	100	100	100	100	100	100
3	49	62	74	83	87	90	95	98	99	100	100	100	100	100	100	100	100	100	100
4	50	62	72	81	84	88	93	96	98	99	100	100	100	100	100	100	100	100	100
5	44	57	69	79	83	87	93	96	98	99	100	100	100	100	100	100	100	100	100
6	44	56	68	78	82	86	92	96	98	99	100	100	100	100	100	100	100	100	100
7	44	57	70	81	84	89	94	97	99	99	100	100	100	100	100	100	100	100	100
8	36	51	65	78	82	87	94	97	99	100	100	100	100	100	100	100	100	100	100
9	40	54	67	78	82	87	93	96	98	99	100	100	100	100	100	100	100	100	100
10	40	54	67	79	83	87	93	97	99	99	100	100	100	100	100	100	100	100	100
11	41	53	65	76	80	84	91	95	97	99	99	100	100	100	100	100	100	100	100
12	42	55	68	78	82	87	93	96	98	99	100	100	100	100	100	100	100	100	100
13	38	53	68	80	84	89	94	97	99	100	100	100	100	100	100	100	100	100	100
14	34	50	66	79	83	89	95	98	99	100	100	100	100	100	100	100	100	100	100
15	44	58	72	83	86	90	95	98	99	100	100	100	100	100	100	100	100	100	100
16	44	59	72	83	87	91	96	98	99	100	100	100	100	100	100	100	100	100	100
17	40	55	69	81	85	89	95	98	99	100	100	100	100	100	100	100	100	100	100
18	42	55	68	79	83	88	93	97	99	99	100	100	100	100	100	100	100	100	100
19	45	58	70	81	84	89	94	97	99	99	100	100	100	100	100	100	100	100	100
20	44	57	69	80	83	87	93	96	98	99	100	100	100	100	100	100	100	100	100
21	51	63	73	82	85	89	94	97	98	99	100	100	100	100	100	100	100	100	100
22	43	56	68	78	82	86	92	96	98	99	100	100	100	100	100	100	100	100	100
23	41	54	67	78	82	87	93	96	98	99	100	100	100	100	100	100	100	100	100
24	41	55	69	80	83	88	94	97	99	100	100	100	100	100	100	100	100	100	100
25	42	56	69	80	84	89	94	97	99	100	100	100	100	100	100	100	100	100	100
26	48	62	74	84	87	91	96	98	99	100	100	100	100	100	100	100	100	100	100
27	47	60	73	83	86	90	95	98	99	100	100	100	100	100	100	100	100	100	100
28	43	56	69	79	83	87	93	96	98	99	100	100	100	100	100	100	100	100	100
29	47	60	72	82	85	90	94	97	99	100	100	100	100	100	100	100	100	100	100
30	46	60	73	84	87	91	96	98	99	100	100	100	100	100	100	100	100	100	100
31	45	60	73	84	88	92	96	98	99	100	100	100	100	100	100	100	100	100	100

Example of PROTEMP

RUN

This program calculates, prints and plots the running average of total annual precipitation for a given set of stations and year range. The running average value is plotted at the end of each period utilized. Up to ten stations may be combined for the analysis. If an entire year is missing, the running averages that would have used that year are not calculated nor plotted. An asterisk (*) is placed after a value if missing data were encountered while calculating that value. When an estimated value is encountered an E is printed after the corresponding years.

The user should specify the stations to be combined (one to ten stations may be used) and the number of years in the running average.

Other units that may be used: centimeters.

Example of RUN

```
RUNNING AVERAGE OF 5 YEARS
FOR TOTAL ANNUAL PRECIPITATION
IN INCHES
ARCHER STATION NO. 480270
CARPENTER 3E STATION NO. 481547
CHEYENNE WRAP (CHEYENNE 1887-1938) (CHEYENNE AIRPORT 1939-1946) STATION NO. 481675
PECLA STATION NO. 484440
PINE BLUFFS STATION NO. 487235
```

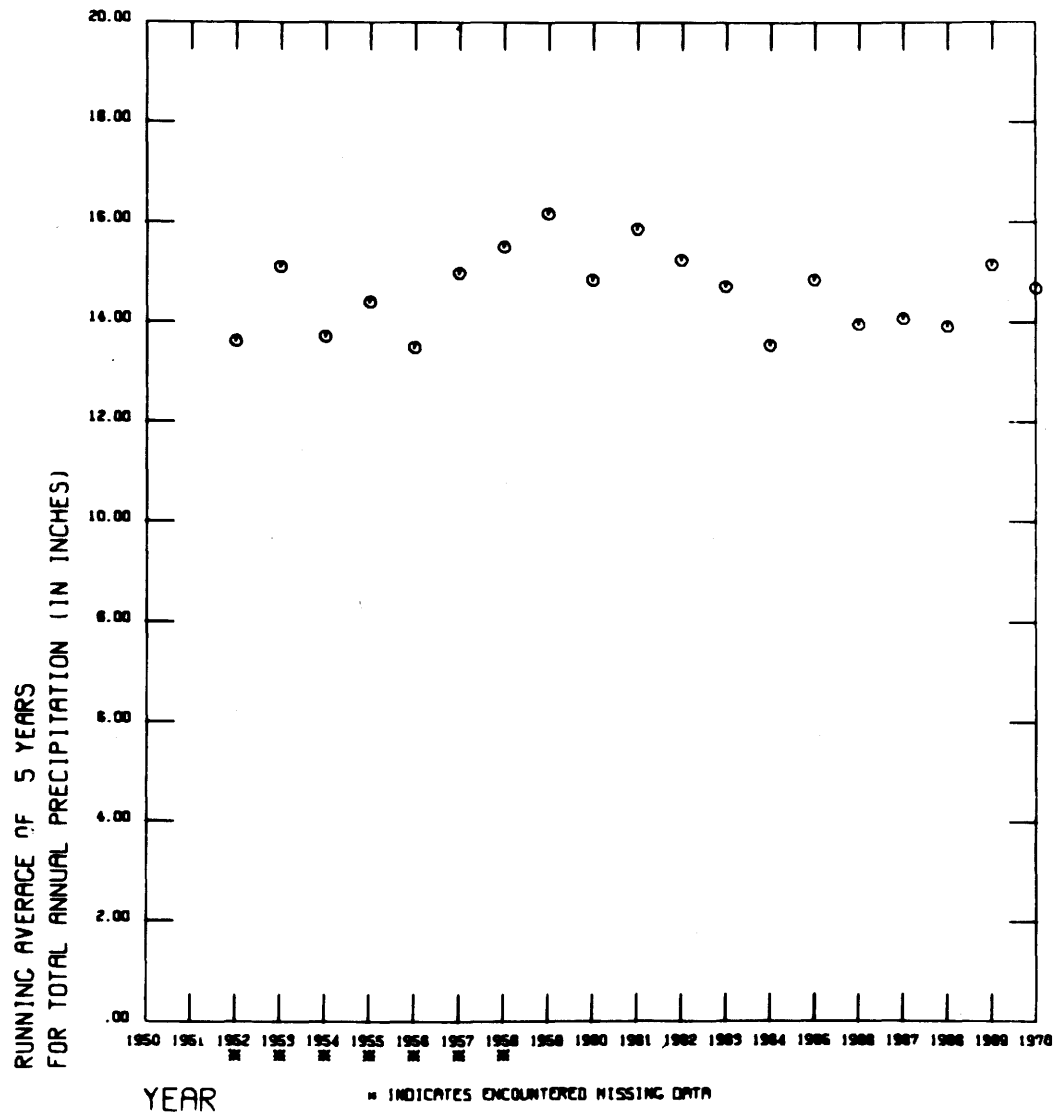
1950	**
1951	**
1952	13.6*
1953	15.1*
1954	13.7*
1955	14.4*
1956	13.5*
1957	15.0*
1958	15.5*
1959	16.2
1960	14.6
1961	15.9
1962	15.2
1963	14.7
1964	13.5
1965	14.9
1966	14.0
1967	14.1
1968	13.9
1969	15.1
1970	14.7

* INDICATES ENCOUNTERED MISSING DATA
** INDICATES ENTIRE YEAR MISSING FOR COMPLETION

Example of RUN

STATION NUMBERS

480270 481547 481675 484440 487235



SNOWGREATER

This program prints the following for each year for a given station, water year range and specified depth:

- number of days snowfall greater than or equal to specified depth in inches,
- first snowfall greater than or equal to specified depth in inches (prints date),
- last snowfall greater than or equal to specified depth in inches (prints date),
- depth in inches of snow on first of December, January, February and March.

The following summary is printed for the given year range:

- average number of days per year snowfall was greater than or equal to specified depth in inches,
- average depth on December 1,
- average depth on January 1,
- average depth on February 1,
- average depth on March 1.

If snowfall data for a specific year are missing or accumulated in the next day for one or more days, that year is not printed.

The user should specify the depth to be used.

Other units that may be used: centimeters.

FORT LARAMIE 11NW (FORT LARAMIE(NEAR)1927-1955) STATION NO. 483490

WATER YEAR	NUMBER OF DAYS SNOWFALL GREATER THAN OR EQUAL TO	FIRST SNOWFALL GREATER THAN OR EQUAL TO	LAST SNOWFALL GREATER THAN OR EQUAL TO	DEPTH IN INCHES OF SNOW ON FIRST DAY OF			
	.5 INCH	.5 INCH	.5 INCH	DEC	JAN	FEB	MAR
1950	20	OCT 19	MAY 7	.00	.00	.00	.00
1954	11	NOV 20	MAY 2	.00	.00	.00	.00
1959	17	NOV 16	APR 19	.00	.00	.00	.00
1960	13	OCT 1	MAY 5	.00	.00	3.00	3.00
1961	15	NOV 4	APR 11	.00	2.00	.00	.00
1962	14	OCT 29	APR 7	.00	.00	.00	1.00
1964	7	DEC 10	APR 12	.00	.00	.00	.00
1965	15	NOV 20	SEP 18	.00	.00	.00	.00

AVERAGE NUMBER OF DAYS PER YEAR SNOWFALL WAS GREATER THAN OR EQUAL TO .5 INCH 14.00
 AVERAGE DEPTH ON DECEMBER 1 .00
 AVERAGE DEPTH ON JANUARY 1 .25
 AVERAGE DEPTH ON FEBRUARY 1 .38
 AVERAGE DEPTH ON MARCH 1 .50

Example of SNOWGREATER

TEMPBELOW

This program works with minimum air temperature and a specified temperature (DEG) in degrees Fahrenheit. It lists for each year:

- number of days temperature below DEG,
- last day before August 1 below DEG,
- first day after August 1 below DEG,
- number of days between last day and first day (last day and first day not counted).

The program also calculates the mean for all years for "number of days temperature below DEG" and "number of days between last day and first day." If a year contains missing data that year is not used in the computations.

The user should specify the temperature (DEG) to use.

KEMMERER 4SW (DIAMONDVILLE 1902) (KEMMEREF 1902-1969)

STATION NO. 485105

YEAR	NUMBER OF DAYS MINIMUM AIR TEMPERATURE BELOW 32.0 DEGREES F.	LAST DAY BEFORE AUGUST 1 BELOW 32.0 DEGREES F.	FIRST DAY AFTER AUGUST 1 BELOW 32.0 DEGREES F.	NUMBER OF DAYS BETWEEN LAST DAY AND FIRST DAY
1941	222	MAY 20	AUG 31	102
1942	226	JUN 27	SEP 14	78
1943	213	JUL 13	AUG 31	48
1944	224	JUN 18	AUG 15	57
1945	244	JUL 1	SEP 8	68
1946	240	JUN 25	SEP 9	75
1947	226	JUL 1	AUG 23	52
1962	212	JUN 8	AUG 23	75
1963	204	JUN 30	OCT 10	101
1965	237	MAY 28	AUG 30	93
1966	245	JUN 25	AUG 21	56
1967	220	MAY 20	SEP 13	115
1968	247	JUL 1	AUG 16	45
1969	218	JUN 30	SEP 23	84
1970	236	MAY 31	SEP 10	101
1974	239	JUN 10	AUG 21	71
MEAN	228.31			76.31

IF A YEAR CONTAINS MISSING DATA THAT YEAR IS NOT USED IN THE COMPUTATIONS

Example of TEMPBELOW

HOURLY PRECIPITATION DATA

DAILYPRINTP

This program prints daily precipitation values calculated from hourly precipitation values.

For each station the user should specify the year range unless all years are to be printed.

Other units that may be used: centimeters.

MULE CREEK (MOVED 2 MILES IN 1972) STATION NUMBER 486600
 LATITUDE 43-21 LONGITUDE 104- 7 ELEVATION 4120 NIOBRARA COUNTY

*** PRECIPITATION (INCHES) FOR 1971 ***
 DAILY VALUES COMPUTED FROM HOURLY VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	.00	.06	.00	.00	.00	.00	.00*	.00	.00	.38	.00	.00
2	.00	.01	.00	.00	.00	.00	**	.00	.00	.00	.00	.00
3	.00	.10	.00	.00	.40	.34	.00*	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.46	**	.00	1.00	.00	.00	.00
5	.00	.03	.20	.00	.39	.00	**	.00	.00	.00	.05	.00
6	.00	.00	.02	.00	.00	.05	**	.00	.09	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	**	.00	.22	.00	.00	.05
8	.00	.00	.00	.00	.06	.00	**	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.21	.05	**	.42	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	**	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	**	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.10	**	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	**	.00	.00	.00	.05	.00
14	.00	.00	.00	.00	.00	.00	**	.00	.00	.00	.00	.00
15	.00	.10	.00	.00	.00	.00	**	.00	.00	.00	.21	.10
16	.00	.01	.00	.00	.08	.00	**	.00	.00	.22	.52	.00
17	.00	.03	.06	.00	.00	.00	**	.12	.00	.08	.05	.00
18	.00	.05	.00	1.99	.00	.00	**	.16	.00	.00	.00	.00
19	.00	.00	.00	.42	.00	.00	**	.06	.00	.00	.00	.00
20	.03	.00	.00	.00	.00	.00	**	.00	.00	.00	.00	.00
21	.00	.00	NEXT	.20	.00	.00	.00*	.00	.00	.00	.00	.00
22	.00	.00	.15	.00	2.81	.00	.00	.00	.00	.00	NEXT	.00
23	.00	.00	.00	.07	1.51	.00	.00	.00	.00	.00	.05	.00
24	.00	.00	.00	.43	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.09	.00	.40	.30	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.82	.53	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.05	.17	.00	.00
28	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00
29	.00		.00	.00	.35	.06	.00	.00	.00	.00	.00	.00
30	.00		.00	.00	.05	.57	.00	.00	.00	.00	.00	.00
31	.09		.00		.00		.00	.00		.00		.00
TOTAL	.12	.48	.43	3.51	6.21	1.63	.00*	.76	2.18	1.38	.93	.15

MAXIMUM FOR YEAR 2.81* MAY 22
 TOTAL FOR YEAR 17.78*

* INDICATES PARTIAL VALUES
 ** INDICATES MISSING DATA
 NEXT INDICATES TOTAL IN SUBSEQUENT
 HOUR OR DAY

Example of DAILYPRINTP

LISTDATAP

This program lists hourly precipitation data. One month's worth of data is printed per page. The following are also printed: daily total, monthly total, maximum amount in one day (day is also given), maximum amount in one hour (day and hour of month are also given) and number of events in month (i.e., number of hours precipitation was greater than zero). Stations may be retrieved by station number, county, or a range of latitudes and longitudes.

The user should specify the retrieval type and the month and year range (unless all data are to be used).

Other units that may be used: centimeters.

MONETA 21SSE STATION NUMBER 486382

LATITUDE 42-52 LONGITUDE 107-30 ELEVATION 6139 FREMONT COUNTY

*** HOURLY PRECIPITATION (INCHES) FOR JULY

1954 ***

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	DAILY TOTAL
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
31	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

MONTHLY TOTAL = .71
 MAXIMUM AMOUNT IN ONE DAY = .41 DAY = 19
 MAXIMUM AMOUNT IN ONE HOUR = .40 DAY = 19 HOUR OF MONTH = 455
 NUMBER OF EVENTS IN MONTH = 6

Example of LISTDATAP

LISTDATESP

This program lists hourly precipitation stations and optionally the years of data available for each station. For this option it lists headers, station numbers and location data along with year and quater year ranges. For example, 1977 1 specifies the first quarter (January, February and March) of 1977. The total number of headers and the number of data records on file are also listed. The example shows a partial listing of the printout.

The program may be run for all stations or the user may specify a county or a range of latitudes and longitudes to be used. The user should also specify whether or not date ranges are to be printed.

Example of LISTDATESP

HEADERS AND DATES FOR HOURLY PRECIPITATION

ALADDIN STATION NUMBER 480050

LATITUDE 44-38 LONGITUDE 104-11 ELEVATION 3740 CROOK COUNTY

1951 2 - 1951 4

ALADDIN 6S STATION NUMBER 480056

LATITUDE 44-33 LONGITUDE 104-12 ELEVATION 3845 CROOK COUNTY

1952 2 - 1952 2

ANTELOPE SPRINGS STATION NUMBER 480237

LATITUDE 43-26 LONGITUDE 106-35 ELEVATION 5175 NATRONA COUNTY

1950 3 - 1950 3

ARAPAHOE RANCH STATION NUMBER 480250

LATITUDE 43-43 LONGITUDE 108-32 ELEVATION 5205 HOT SPRINGS COUNTY

1948 3 - 1948 4

1949 2 - 1950 2

BADWATER 2N (BADWATER 1940-1955) STATION NUMBER 480470

LATITUDE 43-21 LONGITUDE 107-25 ELEVATION 6362 NATRONA COUNTY

1948 3 - 1960 1

BARNUM 1N (BARNUM 1905-1938) (MOVED 3 MILES IN 1923) STATION NUMBER 480528

LATITUDE 43-42 LONGITUDE 106-55 ELEVATION 5145 JOHNSON COUNTY

1949 4 - 1958 2

BASIN STATION NUMBER 480540

LATITUDE 44-23 LONGITUDE 108- 3 ELEVATION 3837 BIG HORN COUNTY

1949 3 - 1958 2

BEULAH 8WSW STATION NUMBER 480640

LATITUDE 44-31 LONGITUDE 104-16 ELEVATION 4170 CROOK COUNTY

1952 3 - 1958 2

MONTHLYP

This program lists monthly and annual summaries (total values) calculated from hourly precipitation values for a specific station and year range. It also computes the mean, standard deviation and sample size for each month separately in the given year range. Three sets of these statistics are given corresponding to (1) all months with at least some data, (2) complete months only and (3) complete years only. The annual value for each year is used with the annual mean value for complete years only to compute the percent of mean for all years that have no missing data. The maximum daily value and its date of occurrence are also given.

For each station the user should specify the year range unless all years are to be printed.

Other units that may be used: centimeters.

MONTHLY AND ANNUAL SUMMARY
COMPUTED FROM HOURLY VALUES

MULE CREEK (MOVED 2 MILES IN 1972) STATION NUMBER 486600
LATITUDE 43-21 LONGITUDE 104- 7 ELEVATION 4120 NIQBRARA COUNTY

*** TOTAL PRECIPITATION (INCHES) ***

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	PERCENT OF MEAN
1955	.37	1.58	1.12	2.78	4.19	3.24	2.42	1.94	1.34	.34	.87	.59	20.78	133.17
1956	.08	.37	.44	1.54	5.74	1.26	1.59	1.78	1.06	.94	.46	.38	14.64	93.82
1957	.34	.10	.92	1.67	7.84	3.30	1.09	.61	1.51	1.03	.00	.24	18.67	119.65
1958	.14	.83	.96	1.59	.56	2.05	5.86	.37	.00	.00	.70	.41	13.47	86.33
1959	.51	.27	.91	.63	2.51	2.22	.44	.20	2.52	.27	.73	.24	11.45	73.38
1960	.54	.45	.23	1.19	2.02	3.31	.59	.42	.31	.14	.76	.75	10.71	68.64
1961	.16	.36	.47	1.32	1.86	.33	4.99	.98	2.47	1.38	.34	.16	14.86	95.23
1962	.26	.70	.77	.46	6.44	3.27	3.02	.19	.17	.67	.17	.10	16.24	104.08
1963	.44*	.18	.47	2.94	2.13	1.63	1.55	2.01	1.26	.47	.00	.27	13.35*	****
1964	.13	.48	.79	2.24	2.04	2.98	.76	.80	.79	.11	.22	.57	11.96	76.65
1965	.55	.52	.45	.77	8.00	5.61	4.14	.73	2.26	.18	.12	.19	23.45	150.29
1966	.33	.85	.52	1.25	.34	.94	2.88	2.13	.88	2.35	.43	.34	13.24	84.85
1967	.32	.30	.87	3.38	2.07	6.21	.76	.35	1.60	.50	.38	.51	17.32	111.00
1968	.12	.25	.78	1.28	2.38	3.66	1.70	2.51	.46	.27	.16	.51	14.08	90.24
1969	.42	1.23	.35	1.46	1.86	3.95	6.70	.29	.19	.77	.34	.02	17.58	112.67
1970	.00*	.05	.95	1.26	2.38	2.10	1.25	.06	.88	1.03	.26	.53	10.75*	****
1971	.12	.48	.43	3.51	6.21	1.63	.00*	.76	2.18	1.38	.93	.15	17.78*	****
1972	.37	.10*	.25*	1.64	1.60	2.43	.87*	**	**	**	**	**	7.19*	****
1973	**	.08	1.23	4.27	1.61	1.42	3.24	.36	2.51	.59	.76	.48	16.55*	****
1974	.74	.03	.00	1.67	.57	.42*	2.49	2.94	.72	1.85	.04	.07	11.56*	****
1975	.47	.26	1.36	1.70	2.03	5.72	2.11	.96	.00*	.93*	.10	.00*	15.66*	****
ALL MONTHS WITH AT LEAST SOME DATA														
MEAN	.32*	.45*	.68*	1.83	3.07	2.75*	2.31*	1.07*	1.11*	.76*	.39*	.33*	14.82*	
STDEV	.19*	.40*	.36*	1.00	2.35	1.65*	1.83*	.87*	.90*	.62*	.30*	.21*	3.76*	
N	20	21	21	21	21	21	21	20	20	20	20	20	21	
COMPLETE MONTHS ONLY														
MEAN	.34	.47	.70	1.83	3.07	2.86	2.50	1.02	1.16	.75	.39	.34	15.60	
STDEV	.18	.40	.35	1.00	2.35	1.61	1.81	.87	.89	.63	.30	.20	3.65	
N	18	20	20	21	21	20	19	20	19	19	20	19	14	
COMPLETE YEARS ONLY														
MEAN	.31	.59	.69	1.54	3.42	3.03	2.64	.95	1.04	.64	.41	.36	15.60	
STDEV	.16	.41	.27	.81	2.57	1.63	2.06	.80	.91	.64	.27	.21	3.65	
N	14	14	14	14	14	14	14	14	14	14	14	14	14	
PERCENT OF ANNUAL	2.0	3.8	4.4	9.8	21.9	19.4	16.9	6.1	6.7	4.1	2.6	2.3	100.0	
MAXIMUM DAILY VALUE				2.81* MAY 22, 1971										

* INDICATES PARTIAL VALUES
** INDICATES TOTAL MONTH'S DATA MISSING

Example of MONTHLY

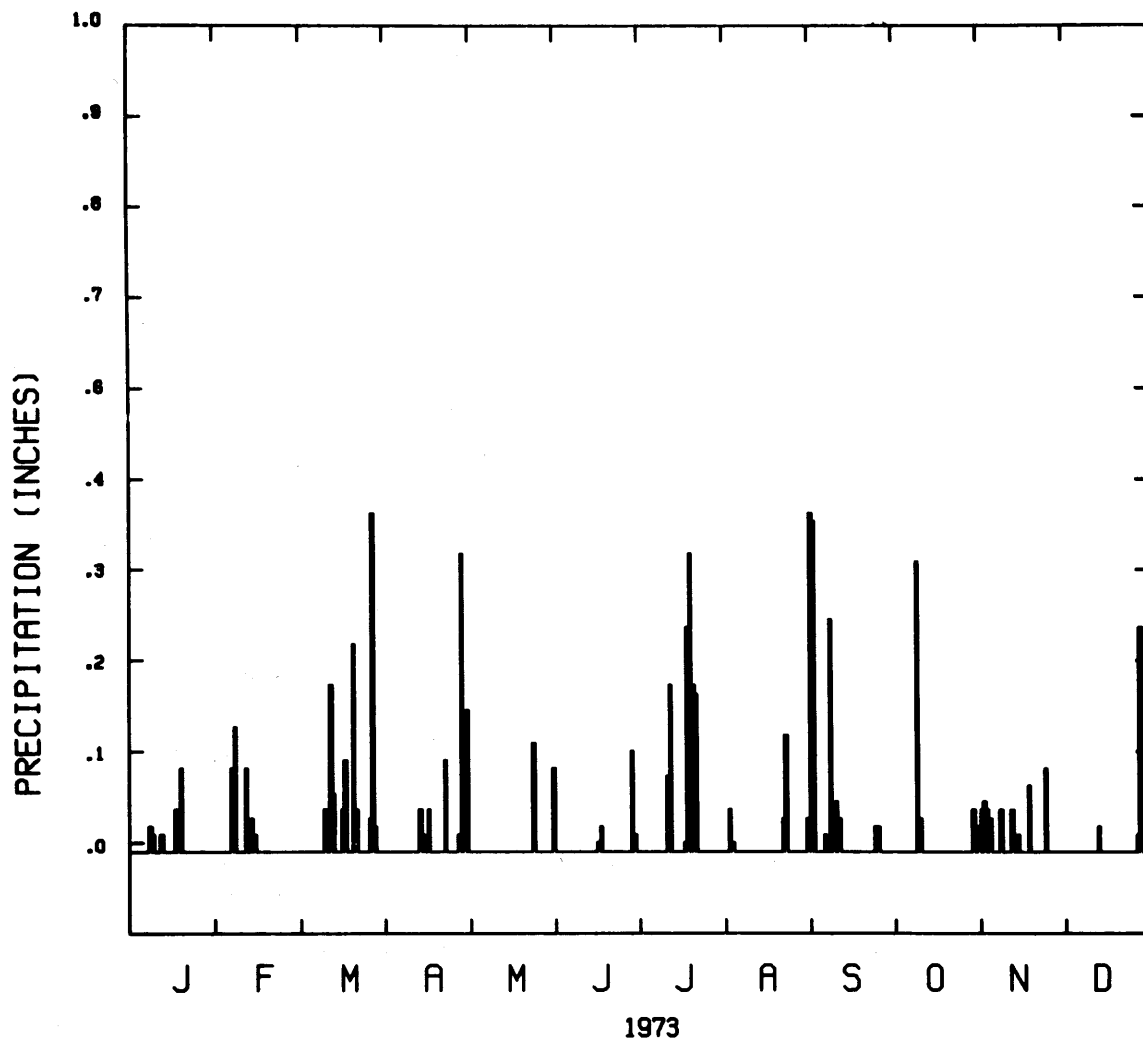
PLOTDAYP

This program plots daily precipitation values calculated from hourly values. Each year is plotted on a separate graph.

For each station the user should specify the year range unless all years are to be plotted.

Example of PLOTDAYP

BIG PINEY
LATITUDE 4232 LONGITUDE 11007 ELEVATION 6821
STATION NO. 480695



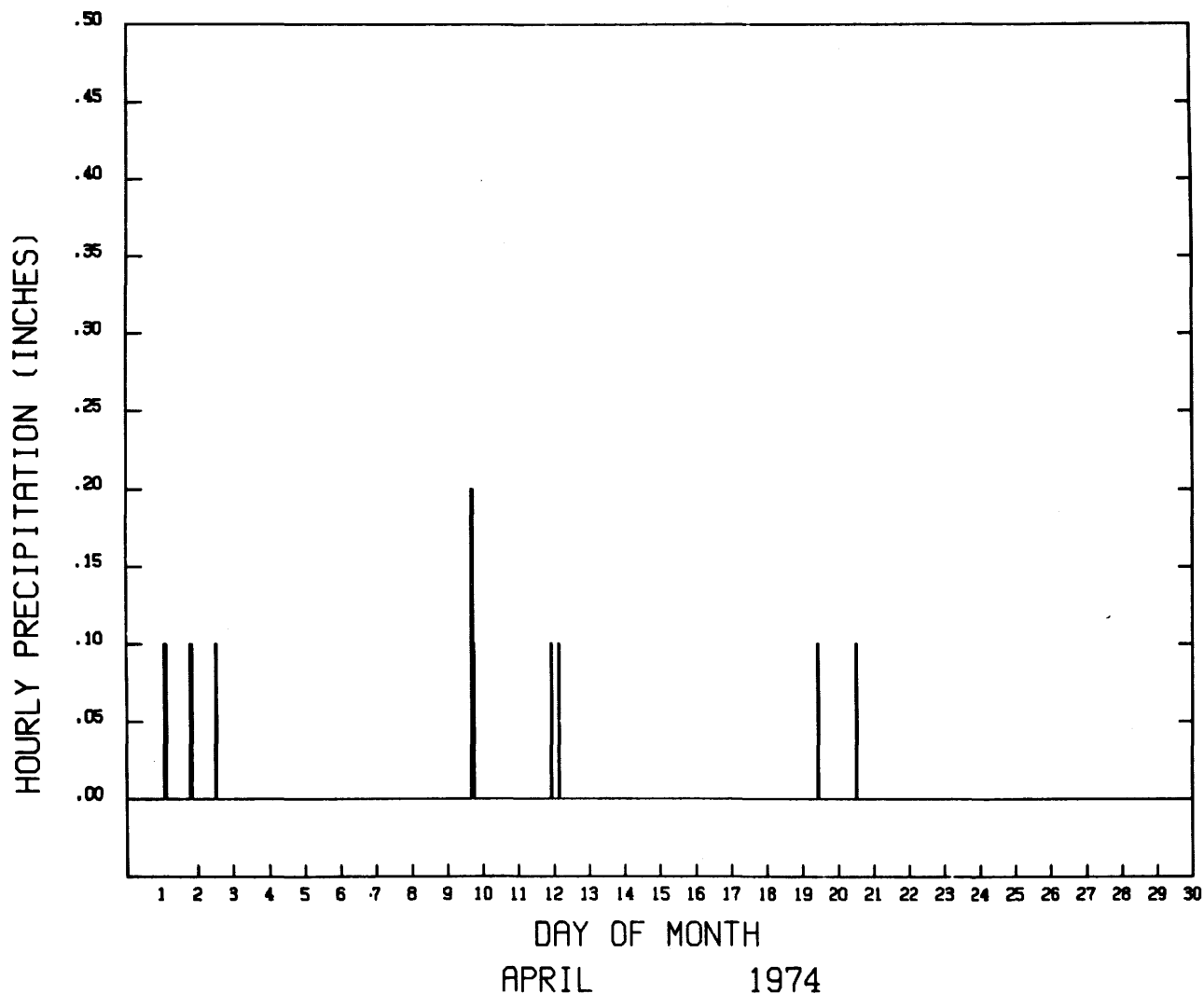
PLOTHOURP

This program plots hourly precipitation values against time for a given station and a month and year range. Each month is plotted on a separate graph. Missing values are indicated by blanks on the graph. Stations may be retrieved by station number, county or a range of latitudes and longitudes.

The user should specify the retrieval type and a month and year range (unless all data are to be plotted).

Example of PLOTHOURP

CRESTON (MOVED 2 MILES IN 1961)
LATITUDE 4144 LONGITUDE 10744 ELEVATION 7040
STATION NUMBER 482175



STORM

This program tabulates hourly precipitation data by storm occurrence, given a specific station and a year range. A precipitation occurrence of one hour or longer constitutes a storm. For each storm the program prints beginning date, beginning hour of day, duration of storm in hours, total amount of precipitation in inches and intensity of storm in inches per hour. Missing data and trace values are assumed to have a value of zero.

For each station the user should specify the year range unless all years are to be used.

Other units that may be used: centimeters.

Example of STORM

NEWCASTLE STATION NUMBER 486660
 LATITUDE 43-51 LONGITUDE 104-13 ELEVATION 4315 WESTON COUNTY
 STORM DATA 1948 - 1948
 MISSING DATA AND TRACE VALUES ARE ASSUMED TO HAVE A VALUE OF ZERO

DATE	BEGINNING HOUR	DURATION IN HOURS	AMOUNT IN INCHES	INTENSITY INCHES/HOUR
1 AUG 48	19	2	.42	.21
5 AUG 48	14	5	.59	.12
7 AUG 48	17	1	.02	.02
8 AUG 48	4	2	.06	.03
8 AUG 48	8	1	.01	.01
9 AUG 48	17	2	.13	.06
10 AUG 48	17	1	.02	.02
10 AUG 48	20	1	.01	.01
13 AUG 48	17	2	.20	.10
6 SEP 48	6	2	.10	.05
6 SEP 48	10	3	.04	.01
6 SEP 48	24	1	.02	.02
7 SEP 48	4	4	.05	.01
19 SEP 48	8	2	.08	.04
19 SEP 48	24	3	.09	.03
20 SEP 48	5	1	.01	.01
20 SEP 48	13	1	.01	.01
1 OCT 48	22	3	.14	.05
2 OCT 48	5	1	.01	.01
5 OCT 48	16	1	.03	.03
5 OCT 48	22	2	.04	.02
28 OCT 48	17	1	.02	.02
29 OCT 48	5	2	.16	.08
29 OCT 48	8	1	.01	.01
29 OCT 48	11	1	.01	.01
3 NOV 48	18	2	.03	.01
3 NOV 48	24	1	.01	.01
4 NOV 48	2	1	.01	.01
4 NOV 48	4	1	.01	.01
6 NOV 48	23	6	.19	.03
8 NOV 48	23	1	.01	.01
9 NOV 48	1	3	.04	.01
10 NOV 48	3	3	.04	.01
12 NOV 48	1	6	.04	.01
17 NOV 48	13	3	.04	.01
17 NOV 48	18	1	.01	.01
22 NOV 48	19	4	.07	.02
24 NOV 48	12	1	.01	.01
24 NOV 48	20	1	.01	.01
15 DEC 48	2	2	.04	.02
23 DEC 48	24	4	.05	.01
24 DEC 48	17	1	.01	.01

ONE, THREE AND SIX HOUR CLIMATIC DATA

(Precipitation Excluded)

DAILYPRINTH

Daily climatic values which were calculated from one, three or six hour data are printed with this program. A variety of monthly and annual summaries are printed, depending on the parameter analyzed. These include maxima, minima, means and totals tabulated monthly and annually. The day of occurrence for the annual maximum and minimum are also printed.

For each station the user should specify the parameter type and year range (unless all years are to be printed).

Parameters that may be used: air temperature, wet bulb temperature, dew point, relative humidity and wind speed.

Other units that may be used: Celsius, kilometers per hour and knots.

HOURLY CLIMATIC VALUES FOR AIR TEMPERATURE (F.)
 DATA COMBINED TO FORM DAILY VALUES FOR 1956
 RAWLINS MUNICIPAL AIRPORT STATION NUMBER 24057
 LATITUDE 41-48 LONGITUDE 107-12 ELEVATION 6736 CARBON COUNTY

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1	24.0	-6.3	26.3	40.7	44.3	65.9	59.1	63.0	62.4*	53.6	22.5	29.8
2	25.5	-3.4	29.8	23.0	53.3	67.3	57.4	65.2	66.9	54.0	20.1	30.4
3	29.1	3.5	34.3	26.8	49.8	64.4	59.0	65.1	55.4	54.3*	18.6	36.0
4	40.5	9.1	37.3	33.0	55.8	63.2	63.2	66.5	54.2	53.7	17.8	38.0
5	40.4	13.7	29.0	32.7	51.7	59.3	66.5	66.9	47.9	57.7	27.4	34.4
6	36.2	17.6	15.4	26.0	53.3	55.8	70.4	66.5	53.2	51.0	36.0	18.7
7	40.4	18.1	15.3	40.5	55.8	61.6	68.2	66.6	58.0	54.8	28.0	9.5
8	34.8	11.3	28.2	28.6	59.6	65.7	64.5	64.6	62.3	55.8	30.7	.9
9	28.5	12.6	34.2	35.5	59.8	66.1	67.8	68.4	65.1	52.2	39.7	16.8
10	33.1	17.6	16.1	45.5	45.9	68.4	68.9	64.7	64.3	53.1	44.8	27.6
11	29.3	21.4	4.1	36.5	48.5	70.0	65.5	67.5	63.3	57.4	44.8	31.7
12	30.1	28.8	11.0	40.8	45.3	71.8	65.0	69.5	62.2	51.6	43.3	30.1
13	36.2	26.3	18.0	45.6	35.5	71.4	69.0	70.3	65.4	38.9	42.8	34.4
14	27.3	17.7	10.0	42.3	39.5	69.3	69.8	70.1	64.9	42.0	15.2	26.0
15	34.9	15.9	9.9	42.3	48.0	65.9	71.0	70.8	63.6	45.7	12.5	24.5
16	30.9*	6.4	29.7	43.5	55.4	56.2	68.2	64.9	61.4	46.0	23.9	28.4
17	20.3	10.3	34.3	39.8	60.2	62.8	67.9	59.5	59.1	44.4	31.9	24.2
18	24.5	14.3	35.6	38.9	62.0	66.3	65.2	57.0	60.5	44.6	23.3	27.5
19	24.2	12.3	38.8	40.9	64.5	68.2	65.0	54.1	59.4	42.9	9.8	23.5
20	18.1	24.8	39.6	44.8	58.8	66.3	67.4	57.1	63.0	44.2	8.4	19.0
21	22.7	31.0	37.5	49.3	57.8	58.5	67.1	64.4	57.0	50.3	20.6	22.0
22	25.8	35.1	44.9	44.3	54.0	55.2	63.8	67.8	46.4	46.1	29.8	14.9
23	28.6	38.0	44.8	39.0	54.3	66.0	67.1	68.3	48.2	53.8	25.9	13.3
24	16.5	18.5	48.3	49.0	57.5	68.7	72.9	67.6	55.3	31.1	27.5	19.8
25	20.9	19.6	50.6	47.6	59.2	63.2	72.0	69.5	57.5	27.8	27.5	21.6
26	30.5	18.7	45.5	51.2	56.5	65.8	70.0	68.2	57.9	39.9	27.1	25.4
27	28.6	17.3	24.8	47.4	56.5	68.5	72.6	61.0	60.0	45.4	24.5	28.0
28	15.1	23.8	25.8	37.8	54.0	71.0	69.5	56.5	53.6	37.0	24.7	27.6
29	6.7	29.0	36.2	39.9	57.0	73.8	68.5	60.3	50.0	30.8	30.8	29.6
30	10.9		45.3	41.4	59.8	68.6	58.6	52.4	54.2	32.2	33.6	32.7
31	-8		46.8		61.5		58.7	48.5		34.5		29.6
MAX	40.54*	38.00	50.63	51.21	64.54	73.83	72.92	70.79	66.92*	57.71*	44.79	38.04
MIN	-7.5*	-6.33	4.08	23.04	35.54	55.79	57.38	48.54	46.38*	27.83*	8.42	.92
MEAN	26.26*	17.35	30.56	39.82	54.03	65.63	66.45	63.97	58.41*	46.02*	27.11	25.04
MAXIMUM FOR YEAR			73.83*	JUN 29								
MINIMUM FOR YEAR			-6.33*	FEB 1								

* INDICATES PARTIAL VALUES

Example of DAILYPRINT

HOURLY CLIMATIC VALUES FOR WIND SPEED (MILES PER HOUR)
 DATA COMBINED TO FORM DAILY VALUES FOR 1951
 TOTALS ARE IN MTLES
 MCCROCROFT STATION NUMBER 24088
 LATITUDE 44-16 LONGITUDE 104-57 ELEVATION 4282 CROOK COUNTY

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4.8	4.6	3.7	6.7	8.2	15.8	8.8	6.5	8.0	9.8	12.1	20.8
2	9.5	11.3	8.6	3.6	5.0	12.3	15.2	11.3	8.0	4.6	12.2	23.1
3	8.3	12.7	4.3	6.5	3.6	9.7	8.3	21.3	9.1	8.6	13.0	9.2
4	5.1	6.3	8.1	12.0	5.0	8.0	33.2	20.1	6.3	9.2	10.7	9.4
5	5.0	6.8	14.5	7.7	8.0	16.4	11.4	7.3	5.7	4.9	13.3	7.6
6	6.1	5.9	10.7	10.3	8.5	7.3	11.5	6.8	8.4	4.5	5.9	23.8
7	7.5	7.2	8.5	6.6	11.9	13.6	12.2	11.5	6.3	5.0	4.8	16.5
8	4.7	4.8	8.7	6.3	11.7	7.3	12.8	6.2	10.1	3.4	5.6	2.4
9	6.1	7.8	11.3	10.8	10.5	4.6	9.2	8.4	9.8	2.8	4.3	5.4
10	4.5	14.3	7.4	13.1	9.2	5.1	9.2	6.4	8.8	5.5	8.3	15.8
11	8.0	10.7	3.3	11.2	9.3	5.8	4.5	10.8	12.2	9.8	15.8	10.6
12	3.0	5.4	3.2	8.1	25.0	9.3	4.0	8.3	10.7	6.0	5.8	8.5
13	5.1	4.9	4.5	10.8	14.4	8.7	7.3	13.9	10.7	5.8	10.0	11.5
14	11.5	5.4	3.0	18.9	4.6	10.2	5.7	10.2	7.5	9.1	8.8	9.8
15	9.4	6.0	8.5	12.9	11.1	4.5	7.8	4.6	4.1	13.9	13.0	5.6
16	12.5	4.8	12.6	5.4	6.3	9.9	13.8	5.6	4.5	6.5	9.7	4.9
17	16.8	3.5	7.3	7.0	7.2	9.7	5.5	9.3	4.5	12.9	7.7	6.6
18	3.9	3.5	10.7	7.5	6.6	8.2	7.8	7.1	3.7	10.0	5.8	13.5
19	4.5	3.9	5.4	11.6	7.9	10.0	9.7	11.4	8.0	8.1	11.0	14.0
20	5.1	3.9	4.0	6.8	8.1	10.1	7.8	10.5	13.3	5.4	13.1	4.5
21	10.2	8.6	5.2	6.9	6.5	5.6	7.1	7.5	7.7	3.3	8.0	6.0
22	10.3	8.2	6.5	4.6	10.1	5.4	4.3	19.0	9.0	5.3	4.6	7.3
23	5.7	7.8	7.3	6.3	6.3	6.4	7.3	10.3	5.4	13.7	3.1	2.6
24	5.2	9.1	6.9	3.4	9.5	17.9	7.2	9.2	8.3	15.8	4.7	2.9
25	3.8	3.1	5.2	7.4	17.1	9.2	6.0	5.0	8.3	9.0	5.3	4.1
26	11.3	3.6	6.4	10.2	7.8	8.5	5.1	7.1	15.9	5.8	6.6	8.1
27	9.0	4.7	7.9	6.4	17.4	12.5	5.6	13.5	4.4	6.0	6.6	6.0
28	4.0	4.8	6.8	7.9	11.9	6.2	12.0	11.0	15.8	4.0	8.0	11.2
29	3.5		4.3	10.5	11.1	12.2	9.6	12.7	7.3	11.8	7.0	9.5
30	4.7		4.1	11.6	10.3	4.3	7.3	9.5	8.0	8.8	8.8	13.6
31	6.3		7.3		11.3		6.1	8.0		9.8		11.6
MAX	16.83	14.25	14.46	18.92	25.00	17.88	33.17	21.25	15.92	15.75	15.75	23.83
MIN	3.00	3.13	3.04	3.42	3.58	4.25	4.00	4.58	3.71	2.83	3.13	2.38
MEAN	6.95	6.55	6.97	8.64	9.72	9.16	9.13	10.01	8.33	7.72	8.44	9.88
TOTAL	5168.00	4400.00	5185.99	6219.99	7230.98	6593.99	6793.98	7445.98	5994.99	5741.00	6080.00	7352.98
MEAN FOR YEAR	8.47											
TOTAL FOR YEAR	74207.81											

Example of DAILYPRINT

LISTDATAH

This program lists hourly climatic data by month given a station and a month and year range. The daily average is also printed. When three or six hour observation data are listed, blanks are inserted for the hours when the data were not recorded.

For each station the user should specify the parameter type and the month and year range (unless all data are to be printed).

Parameters that may be used: air temperature, wet bulb temperature, dew point, relative humidity, wind speed and wind direction.

HOURLY CLIMATE VALUES FOR AIR TEMPERATURE (F.)
 FORT BRIDGER STATION NUMBER 24118
 LATITUDE 41-24 LONGITUDE 110-25 ELEVATION 7003 UTAH COUNTY
 JANUARY 1949

	JANUARY 1947																							DAILY AVE	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	13	15	22	20	18	19	19	25	24	27	27	29	30	28	28	26	25	24	23	23	23	24	16	16	22
2	15	15	13	12	8	7	2	-2	-2	-1	1	8	7	8	8	6	5	1	-1	-1	-1	-2	-2	-3	4
3	-3	-4	-3	-2	-3	-2	-6	-5	-5	-4	-2	-1	0	2	1	2	-2	-6	-3	-2	-2	-2	-2	-2	-2
4	-1	-2	-2	-4	-4	-4	-3	-3	-3	-2	1	3	4	4	4	4	3	2	0	0	-2	-2	-3	-2	0
5	-2	-4	-1	0	1	1	0	0	-1	4	6	10	12	14	16	15	15	14	13	14	18	19	21	20	8
6	19	17	19	20	22	22	22	21	21	22	24	25	27	27	29	28	27	25	24	24	25	26	25	24	23
7	24	25	25	24	24	21	22	22	22	24	27	30	30	33	33	32	28	25	20	20	23	25	25	24	25
8	24	24	20	24	25	23	24	23	16	15	14	15	14	12	12	10	10	8	8	8	6	6	5	5	14
9	5	4	3	2	2	2	0	-3	-5	-3	-2	-2	-1	0	0	-2	-2	-5	-7	-9	-7	-8	-7	-7	-2
10	-9	-10	-7	-6	-7	-7	-8	-7	-5	0	-4	-1	0	0	-1	-1	-2	-2	-3	-2	-1	-1	-2	-2	-3
11	0	0	0	1	0	1	1	0	-3	-3	-1	0	7	8	8	11	10	5	6	6	6	8	8	8	3
12	10	7	6	6	2	7	3	4	7	15	12	14	13	15	18	18	14	15	12	10	13	12	14	15	10
13	16	16	17	18	18	17	18	16	17	20	19	18	17	20	19	17	18	18	18	19	19	18	18	19	17
14	19	20	22	22	23	20	19	17	20	20	20	20	24	23	22	22	19	18	15	13	15	12	12	12	18
15	15	14	14	14	14	12	11	10	10	11	13	14	14	15	15	15	14	9	9	10	9	8	8	9	11
16	9	4	0	1	-1	4	4	5	4	2	3	5	8	12	6	5	2	-1	-1	-2	-1	-5	-5	-7	2
17	-9	-8	-5	-4	-2	-2	-1	4	6	8	9	10	9	11	11	11	10	9	8	10	10	9	10	11	5
18	10	10	9	8	6	4	4	3	1	2	6	9	10	11	10	10	7	4	1	0	0	1	-2	-1	5
19	-2	-6	-7	-4	-4	-8	-8	-10	-9	-14	-10	-9	-8	-5	-3	-3	-3	-4	-5	-6	-6	-4	-4	-3	-6
20	-2	0	1	0	2	2	2	4	6	10	11	10	10	10	9	8	6	3	1	1	-3	-5	-6	-6	3
21	-10	-8	-9	-4	-4	-6	-2	-2	-3	-2	-2	0	1	2	2	4	4	4	2	4	4	2	0	3	0
22	1	6	13	13	16	16	5	5	7	9	13	14	12	17	14	15	13	14	8	7	6	9	12	13	10
23	12	14	12	11	11	6	6	5	4	4	4	2	4	5	6	4	1	-3	-4	-5	-8	-12	-13	-12	2
24	-12	-12	-12	-12	-12	-13	-12	-12	-13	-11	-10	-8	-4	-6	-6	-4	-4	-10	-8	-10	-11	-14	-15	-12	-10
25	-15	-9	-18	-14	-15	-15	-15	-15	-14	-10	-12	-7	-4	-9	-8	-10	-8	-14	-18	-14	-10	-10	-11	-6	-11
26	-14	-10	-13	-14	-19	-12	-14	-14	-7	-7	-8	-8	-5	-4	-1	-2	-2	-7	-9	-7	-8	-6	-5	-8	-8
27	-11	-12	-12	-7	-1	1	4	6	8	9	10	11	12	12	11	10	10	10	9	8	8	7	5	5	4
28	5	2	2	4	4	4	3	2	1	1	2	3	7	7	8	6	5	3	0	-1	-1	-2	-2	-3	2
29	-3	-6	-5	-6	-5	-5	-6	-7	-6	0	3	3	8	8	10	10	10	8	10	11	11	12	11	12	3
30	11	11	11	11	11	11	11	10	11	13	13	15	16	17	15	14	14	10	8	6	6	6	8	9	11
31	8	8	7	5	2	-2	-3	-1	-1	2	6	8	11	12	11	10	9	6	3	1	0	2	0	2	4

Example of LISTDATAH

HOURLY CLIMATIC VALUES FOR WIND DIRECTION
 FORT BRIDGER STATION NUMBER 24118
 LATITUDE 41-24 LONGITUDE 110-25 ELEVATION 7003 UINIA COUNTY
 JANUARY 1949

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	DAILY AVE
1	WSW	WSW	WNW	WNW	WSW	W	WSW	WSW	WSW	W	WSW	WSW	WSW	WSW	W	WSW	WSW	WSW	WSW	WSW	WSW	W	NW	W	W
2	WNW	W	W	WSW	WSW	W	W	W	WSW	W	WSW	W	W	WNW	WNW	WNW	WNW	WNW	W	W	W	W	W	W	W
3	W	WNW	WNW	WNW	CALM	CALM	S	SSW	SE	SE	SSE	SSE	SE	SE	SE	SSE	CALM	W	WSW	WSW	WSW	WSW	W	W	SW
4	W	W	WSW	WSW	W	W	W	WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
5	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WSW	WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
6	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	W	W	W	W	W	W	W	WNW	W	W	W	W	W	W	W	W	W
7	WSW	WSW	WSW	WSW	W	W	W	WSW	WSW	W	WNW	W	WNW	WSW	WSW	WSW	W	WNW	SW	SW	SW	WSW	WSW	WSW	WSW
8	W	WSW	WNW	WSW	W	WSW	WSW	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	N	WNW	N	NE	NE	NE	W
9	NE	ENE	ENE	NE	NE	NE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	E	ENE	ENE	ESE	ESE	ESE	ENE
10	ENE	ENE	ENE	E	E	E	E	CALM	E	E	E	ENE	NE	ENE	ENE	SE	SE	SE	ESE	ESE	ESE	ESE	ESE	ESE	E
11	E	ESC	CALM	ESE	NE	S	CALM	SE	S	S	S	SE	N	ENE	ENE	ENE	CALM	CALM	CALM	CALM	CALM	CALM	SE	E	E
12	SE	E	W	E	SE	NE	CALM	W	E	CALM	E	E	F	NW	NW	ESE	WSW	W	CALM	CALM	CALM	CALM	CALM	WSW	E
13	CALM	W	W	WSW	W	WNW	WNW	E	WNW	NE	ESE	ENE	E	ESE	ENE	E	ENE	E	ESE	ESE	E	E	E	CALM	E
14	NW	W	W	W	W	SW	WSW	WSW	WSW	WSW	WSW	W	W	W	W	W	WNW	WNW	W	WSW	WSW	WSW	WSW	WSW	W
15	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	W	W	NW	NW	WNW	WNW	CALM	SE	SE	SE	SE	SE	ESE	W
16	ESE	SE	SE	ESE	ESE	SE	ESE	ESE	ESE	SE	SE	SE	ESE	ESE	ESE	E	E	NE	NE	NW	SW	CALM	W	ESE	ESE
17	SW	W	W	W	WSW	WSW	WSW	WSW	WSW	W	WSW	W	WSW	W	W	SW	W	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW
18	WSW	W	W	W	WSW	WSW	WSW	WSW	WSW	WSW	W	WSW	W	W	W	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW
19	W	WSW	CALM	CALM	SE	ESE	CALM	CALM	N	NE	E	NE	NW	NW	NW	NE	NE	NE	N	NE	WNW	W	W	W	N
20	W	CALM	CALM	SSW	CALM	CALM	CALM	W	W	WNW	WSW	WNW	W	W	WNW	WNW	WNW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W
21	WSW	S	SSW	S	SE	SE	CALM	CALM	CALM	CALM	CALM	ESE	CALM	CALM	SE	SE	SSE	SSW	ENE	WSW	SSE	S	NE	WSW	SSE
22	SSE	S	SSW	SSW	SSW	S	CALM	NE	ENE	NE	WSW	WNW	NW	WNW	ESE	WSW	S	CALM	ESE	ESE	CALM	W	W	CALM	SW
23	CALM	S	E	E	NE	NE	N	NE	NE	NNE	NNE	NNE	NNE	N	N	NE	CALM	E	CALM	E	NW	N	NW	NE	NNE
24	NE	E	ENE	ENE	ENE	ESE	CALM	N	NE	ENE	NE	NNE	E	NW	WNW	WNW	CALM	S	CALM	CALM	WNW	W	W	WNW	ENE
25	W	WNW	S	W	S	CALM	N	CALM	CALM	CALM	CALM	CALM	CALM	CALM	CALM	CALM	CALM	WNW	SW	SW	WSW	W	WSW	WSW	WSW
26	W	WNW	ESE	E	S	WNW	WSW	WNW	CALM	CALM	CALM	CALM	CALM	CALM	CALM	CALM	CALM	CALM	NW	W	CALM	CALM	CALM	CALM	WNW
27	E	W	W	WSW	WSW	W	W	WSW	WSW	W	W	W	WNW	W	W	W	W	W	W	W	W	W	W	W	W
28	NW	NE	ENE	ESE	SE	ESE	ESE	ESE	ESE	SE	SE	SE	S	W	WNW	WSW	W	W	W	W	W	W	W	W	W
29	W	WSW	W	W	W	W	W	WSW	WSW	WSW	WSW	WSW	W	W	WSW	WSW	WSW	W	WSW	WNW	W	WSW	W	W	W
30	W	W	W	WSW	W	W	W	WNW	WNW	WNW	WSW	WSW	W	W	W	W	W	W	WSW	WSW	W	WSW	W	WNW	W
31	W	W	W	W	W	W	W	WNW	W	W	W	WNW	WNW	WNW	W	W	WSW	W	WSW	WSW	WSW	W	WSW	WSW	W

Example of LISTDATAH

WINDROSE

Two tables of wind speed versus wind direction are tabulated and a windrose is optionally plotted with this program. The first table is for "percent of time wind is within class size," the second table is for "percent of time wind speed is less than indicated amount," with each table indicating a value for each wind direction. The user may specify a range of months if only those months of each year are to be used in the calculations. The month range must be within one calendar year.

For each station the user should specify the month range (unless all are desired), the year range and whether or not a plot is to be made.

Other units that may be used: kilometers per hour.

CHEYENNE MUNICIPAL AIRPORT STATION NUMBER 24018
 LATITUDE 41- 9 LONGITUDE 104-49 ELEVATION 6126 LARAMIE COUNTY

CROSS-CORRELATION OF WIND SPEED AND DIRECTION
 FROM JAN 1952 TO DEC 1953
 PERCENT OF TIME WIND IS WITHIN CLASS SIZE

	CLASS SIZE IN MILES PER HOUR										
	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-UP
N	.3	.4	.8	.7	.8	.2	.2	.0	.0	.0	.0
NNE	.2	.4	.6	.5	.4	.1	.0	.0	.0	.0	.0
NE	.4	.4	.6	.3	.1	.0	.0	.0	.0	.0	.0
ENE	.2	.5	.5	.2	.1	.0	.0	.0	.0	.0	.0
E	.3	.7	.6	.2	.0	.0	.0	.0	.0	.0	.0
ESE	.4	.8	.7	.3	.1	.0	.0	.0	.0	.0	.0
SE	.6	1.1	1.3	.6	.3	.0	.0	.0	.0	.0	.0
SSE	.6	1.5	2.3	1.2	.5	.0	.0	.0	.0	.0	.0
S	.8	2.0	2.2	.7	.2	.0	.0	.0	.0	.0	.0
SSW	1.4	2.9	1.7	.6	.1	.0	.0	.0	.0	.0	.0
SW	1.8	2.7	1.0	.4	.2	.0	.0	.0	.0	.0	.0
WSW	1.9	4.2	2.7	1.7	1.3	.6	.3	.1	.0	.0	.0
W	1.4	3.6	4.7	2.3	2.2	1.4	.7	.7	.3	.0	.0
WNW	.6	1.2	2.7	2.5	3.0	1.5	.6	.3	.1	.0	.0
NW	.5	1.0	1.7	1.7	1.6	.6	.2	.1	.0	.0	.0
NNW	.4	.8	1.3	1.4	1.6	1.0	.3	.1	.0	.0	.0
VAR	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
CALM	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
TOT	12.5	24.3	25.7	15.2	12.5	5.6	2.3	1.5	.5	.0	.0

17537 HOURS OF DATA
 7 HOURS OF NO DATA
 17544 TOTAL HOURS

Example of WINDROSE

Example of WINDROSE

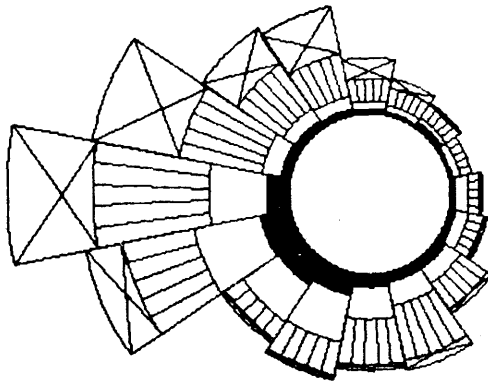
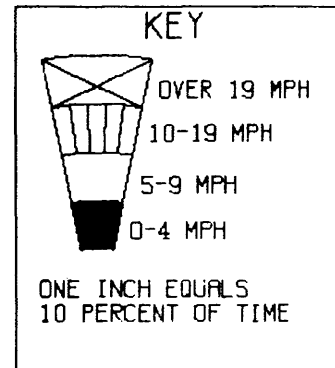
CHEYENNE MUNICIPAL AIRPORT STATION NUMBER 24018
 LATITUDE 41- S LONGITUDE 104-49 ELEVATION 6126 LARAMIE COUNTY
 FROM JAN 1952 TO DEC 1953
 PERCENT OF TIME WIND SPEED IS LESS THAN INDICATED AMOUNT

	AMOUNT IN MILES PER HOUR			
	5	10	20	INFINITY
N	.3	.8	2.2	3.5
NNE	.2	.6	1.7	2.3
NE	.4	.7	1.7	1.8
ENE	.2	.7	1.4	1.4
E	.3	1.1	1.9	2.0
ESE	.4	1.2	2.2	2.4
SE	.6	1.7	2.7	4.0
SSE	.6	2.1	5.6	6.2
S	.8	2.8	5.8	6.0
SSW	1.4	4.4	6.6	6.8
SW	1.8	4.5	5.9	6.1
WSW	1.9	6.1	10.6	12.9
W	1.4	5.0	12.1	17.4
WNW	.6	1.8	7.0	12.4
NW	.5	1.4	4.8	7.4
NNW	.4	1.2	3.9	6.9
VAR	.0	.0	.0	.0
CALM	.5	.5	.5	.5
TOT	12.5	36.8	77.6	100.0

17537 HOURS OF DATA
 7 HOURS OF NO DATA
 17544 TOTAL HOURS

Example of WINDROSE

WIND ROSE
CHEYENNE MUNICIPAL AIRPORT
JANUARY 1952 TO DECEMBER 1953



WINDS VARIABLE	
PERCENT OF AT SPEEDS	
TIME	LESS THAN
.0	5 MPH
.0	10 MPH
.0	20 MPH
.0	INF.

CALM .5 PERCENT OF TIME
NO WINDS GREATER THAN 45 MPH

SNOW COURSE DATA

Snow course data collected and published by the Soil Conservation Service since 1919 are stored on WRDS. The data include snow depth, water equivalent and snow density for snow course measurements made primarily in the mountains of Wyoming. Also included are data for some snow courses that are near Wyoming in adjacent states. Measurements are generally made on or near the first of the month for January through June. Supplemental measurements are sometimes made in the middle of these months.

SNQWCOURSE

Data and summary statistics for any specified station may be obtained with this program. If there are supplemental data, they will be printed separately.

The user may request the data only, the data and statistics or the statistics only.

CASPER MOUNTAIN SNOW COURSE IN NORTH PLATTE RIVER BASIN, SCS NO. 6G1MP
 LATITUDE 42-44- 0 LONGITUDE 106-18- 0 ELEVATION 7940
 SECTION 16 TOWNSHIP 32N RANGE 79W 6TH PRINCIPAL MERIDIAN REF. NO. 160008

* JANUARY 1 *	* FEBRUARY 1 *	* MARCH 1 *	* APRIL 1 *	* MAY 1 *	* JUNE 1 *
* OBSERVATION DATE *	* OBSERVATION DATE *	* OBSERVATION DATE *	* OBSERVATION DATE *	* OBSERVATION DATE *	* OBSERVATION DATE *
*SNOW *SNOW *WATER	*SNOW *SNOW *WATER	*SNOW *SNOW *WATER	*SNOW *SNOW *WATER	*SNOW *SNOW *WATER	*SNOW *SNOW *WATER*
*DEPTH*DEN. *EQUIV	*DEPTH*DEN. *EQUIV	*DEPTH*DEN. *EQUIV	*DEPTH*DEN. *EQUIV	*DEPTH*DEN. *EQUIV	*DEPTH*DEN. *EQUIV*
*INCH *PERCNT*INCH	*INCH *PERCNT*INCH	*INCH *PERCNT*INCH	*INCH *PERCNT*INCH	*INCH *PERCNT*INCH	*INCH *PERCNT*INCH *

DEC 30, 60	JAN. 31, 61	MAR. 1, 61	MAR. 29, 61	MAY 3, 61	
27 20 5.5	29 24 6.9	42 24 10.0	62 25 15.3	43 34 14.8	
DEC 29, 61	JAN. 31, 62	FEB. 28, 62	MAR. 29, 62	MAY 8, 62	
32 27 8.8	44 30 13.0	52 28 14.8	64 29 18.5	22 41 9.1	
JAN. 2, 63	JAN. 31, 63	MAR. 4, 63	MAR. 28, 63	MAY 1, 63	
12 17 2.0	24 20 4.9	60 15 9.2	42 27 11.3	39 38 14.9	
DEC 31, 63	JAN. 31, 64	FEB. 28, 64	APR 1, 64	MAY 1, 64	
13 13 1.7	26 26 6.7	45 26 11.6	49 32 15.6	75 37 27.4	
JAN. 4, 65	JAN. 28, 65	FEB. 25, 65	MAR. 31, 65	APR 30, 65	
23 20 4.7	37 18 6.5	40 28 11.2	46 31 14.3	39 35 13.8	
JAN. 3, 66	JAN. 31, 66	MAR. 2, 66	MAR. 31, 66	MAY 2, 66	
17 20 3.4	25 24 6.0	39 25 9.6	34 31 10.4	39 36 13.9	
JAN. 5, 67	FEB. 1, 67	FEB. 27, 67	MAR. 31, 67	MAY 1, 67	
34 24 8.2	41 29 12.0	53 29 15.2	46 35 16.0	61 30 18.4	
JAN. 3, 68	JAN. 30, 68	MAR. 1, 68	APR 1, 68	MAY 1, 68	
40 25 9.9	41 30 12.5	54 29 15.4	49 36 17.7	68 37 25.4	
DEC 31, 68	JAN. 30, 69	MAR. 3, 69	APR 1, 69	APR 28, 69	
27 25 6.8	32 27 8.7	42 27 11.2	46 31 14.2	53 32 17.2	
JAN. 5, 70	JAN. 29, 70	FEB. 20, 70	MAR. 31, 70	APR 28, 70	
38 23 8.8	48 24 11.4	42 29 12.2	77 29 22.2	76 37 28.1	
JAN. 6, 71	JAN. 28, 71	FEB. 27, 71	APR 1, 71	MAY 1, 71	JUNE 1, 71
30 28 8.5	33 28 9.4	42 23 9.6	55 28 15.5	53 37 19.6	37 40 14.9
JAN. 4, 72	FEB. 1, 72	FEB. 29, 72	MAR. 31, 72	APR 28, 72	
36 24 8.6	39 27 10.6	40 30 12.1	52 29 15.0	59 31 18.2	

Example of SNOWCOURSE

CASPER MOUNTAIN SNOW COURSE IN NORTH PLATTE RIVER BASIN, SCS NO. 6G1MP
 LATITUDE 42-44- 0 LONGITUDE 106-18- 0 ELEVATION 7940
 SECTION 16 TOWNSHIP 32N RANGE 79W 6TH PRINCIPAL MERIDIAN REF. NO. 160008

*** SNOW COURSE STATISTICS ***

FIRST OF THE MONTH OBSERVATIONS

	* JANUARY	* FEBRUARY	* MARCH	* APRIL	* MAY	* JUNE	*

WATER EQUIVALENT							
(INCHES)							
NO. OF OBSERVATIONS	12	12	12	12	12	1	
MEAN	6.4	9.0	11.8	15.5	18.4	14.9	
STANDARD DEVIATION	2.9	2.8	2.2	3.1	5.9	-99.9	
COEF. OF VARIATION	44.8	31.2	18.7	20.0	31.9	-99.9	
COEF. OF SKEW	-0.5	.0	.5	.4	.4	-99.9	

SNOW DEPTH							
(INCHES)							
NO. OF OBSERVATIONS	12	12	12	12	12	1	
MEAN	27.4	34.9	45.9	51.8	52.3	37.0	
STANDARD DEVIATION	9.5	7.9	6.9	11.4	16.5	-99.9	
COEF. OF VARIATION	34.6	22.7	15.1	22.0	31.5	-99.9	
COEF. OF SKEW	-0.4	.1	.8	.7	-0.1	-99.9	

SNOW DENSITY							
(PERCENT)							
NO. OF OBSERVATIONS	12	12	12	12	12	1	
MEAN	22.3	25.6	26.0	30.1	35.5	40.3	
STANDARD DEVIATION	4.4	3.9	4.1	3.2	3.2	-99.9	
COEF. OF VARIATION	19.8	15.2	15.6	10.5	8.9	-99.9	
COEF. OF SKEW	-0.6	-0.7	-1.5	.3	-0.2	-99.9	

Example of SNOWCOURSE

-99.9 INDICATES INSUFFICIENT DATA

CASPER MOUNTAIN SNOW COURSE IN NORTH PLATTE RIVER BASIN, SCS NO. 661MP
 LATITUDE 42-44- 0 LONGITUDE 106-18- 0 ELEVATION 7940
 SECTION 16 TOWNSHIP 32N RANGE 79W 6TH PRINCIPAL MERIDIAN REF. NO. 160008

*****SUPPLEMENTAL DATA*****

	* JANUARY 15 *			* FEBRUARY 15 *			* MARCH 15 *			* APRIL 15 *			* MAY 15 *			* JUNE 15 *		
YEAR	* OBSERVATION DATE *			* OBSERVATION DATE *			* OBSERVATION DATE *			* OBSERVATION DATE *			* OBSERVATION DATE *			* OBSERVATION DATE *		
	*SNOW	*SNOW	*WATER	*SNOW	*SNOW	*WATER	*SNOW	*SNOW	*WATER	*SNOW	*SNOW	*WATER	*SNOW	*SNOW	*WATER	*SNOW	*SNOW	*WATER
	DEPTH	*DENS.	*EQUIV	*DEPTH*	*DENS.	*EQUIV	*DEPTH*	*DENS.	*EQUIV	*DEPTH*	*DENS.	*EQUIV	*DEPTH*	*DENS.	*EQUIV	*DEPTH*	*DENS.	*EQUIV
	*INCH	*PERCNT*	*INCH	*INCH	*PERCNT*	*INCH	*INCH	*PERCNT*	*INCH	*INCH	*PERCNT*	*INCH	*INCH	*PERCNT*	*INCH	*INCH	*PERCNT*	*INCH

1961	JAN. 16, 61			FEB. 16, 61			MAR. 15, 61			APR 14, 61								
	26	23	5.9	38	25	9.4	41	26	10.6	68	25	16.8						
1962	JAN. 17, 62			FEB. 15, 62			MAR. 14, 62			APR 16, 62								
	44	27	11.7	44	30	13.1	53	31	16.4	55	34	18.6						
1963	JAN. 16, 63			FEB. 13, 63			MAR. 15, 63			APR 15, 63								
	23	18	4.1	25	21	5.2	52	22	11.5	33	32	10.7						
1964	JAN. 15, 64			FEB. 14, 64			MAR. 13, 64			APR 15, 64			MAY 8, 64					
	27	19	5.1	55	17	9.3	47	29	13.5	85	31	26.4	81	36	29.5			
1965	JAN. 15, 65			FEB. 16, 65			MAR. 15, 65			APR 14, 65			MAY 10, 65					
	22	22	4.8	46	24	10.9	48	28	13.4	57	28	16.0	65	25	16.5			
1966	JAN. 14, 66			FEB. 15, 66			MAR. 15, 66			APR 15, 66								
	17	21	3.5	48	18	8.8	37	28	10.4	39	32	12.5						
1967	JAN. 16, 67			FEB. 15, 67			MAR. 15, 67			B 17, 67			MAY 15, 67					
	41	26	10.7	46	29	13.4	52	31	16.2	53	32	16.8	52	35	18.2			
1968	JAN. 15, 68			FEB. 15, 68			MAR. 15, 68			APR 15, 68			MAY 15, 68					
	37	29	10.6	40	32	12.7	56	31	17.2	60	36	21.6	57	39	22.0			
1969	JAN. 15, 69			FEB. 14, 69			MAR. 14, 69			APR 15, 69			MAY 16, 69					
	30	29	8.6	32	30	9.6	45	28	12.4	46	32	14.7	19	40	7.6			
1970										APR 16, 70			MAY 14, 70					
										73	37	27.1	62	38	23.8			
1971				FEB. 16, 71			MAR. 15, 71			APR 21, 71			MAY 14, 71					
				36	26	9.5	41	27	11.0	64	28	17.7	49	38	18.8			
1972	JAN. 17, 72			FEB. 14, 72			MAR. 15, 72			APR 14, 72			MAY 17, 72					
	39	25	9.6	48	26	12.5	44	29	12.6	53	32	16.9	42	40	16.8			

Example of SNOWCOURSE

SNOWDATES

Snow course data are presently complete on the system through 1977. A listing of all stations and years on file would be too voluminous to include here. A complete listing in the format shown in the following example can be obtained by requesting SNOWDATES.

Example of SNOWDATES

*** LISTING OF SNOW DATA ***

OLD FAITHFUL SNOW COURSE IN MADISON RIVER BASIN, SCS NO.		
LATITUDE 0-0-0 LONGITUDE 9-0-0 ELEVATION 7360	REF. NO.	10001
1975 TO 1976		
NORRIS BASIN SNOW COURSE IN MADISON RIVER BASIN, SCS NO. 10E2		
LATITUDE 44-44-0 LONGITUDE 110-42-0 ELEVATION 7500	REF. NO.	10002
1936 TO 1971		
1973 TO 1976		
21 MILE SNOW COURSE, IN MADISON RIVER BASIN, SCS NO. 11E6		
LATITUDE 44-54-0 LONGITUDE 111-4-0 ELEVATION 7150		
SECTION 1 TOWNSHIP 11S RANGE 5E MONTANA PRINCIPAL MERIDIAN	REF. NO.	10003
1973 TO 1976		
WEST YELLOWSTONE SNOW COURSE IN MADISON RIVER BASIN, SCS NO. 11E7		
LATITUDE 44-40-0 LONGITUDE 111-6-0 ELEVATION 6700		
SECTION 34 TOWNSHIP 13S RANGE 5E MONTANA PRINCIPAL MERIDIAN	REF. NO.	10004
1934 TO 1976		
MADISON PLATEAU SNOW COURSE IN MADISON RIVER BASIN, SCS NO. 11E31		
LATITUDE 44-35-0 LONGITUDE 111-9-0 ELEVATION 7750		
SECTION 28 TOWNSHIP 14S RANGE 5E MONTANA PRINCIPAL MERIDIAN	REF. NO.	10005
1968 TO 1972		
WHISKEY CREEK SNOW COURSE IN MADISON RIVER BASIN, SCS NO. 11E30		
LATITUDE 44-36-0 LONGITUDE 111-11-0 ELEVATION 6800		
SECTION 19 TOWNSHIP 14S RANGE 5E MONTANA PRINCIPAL MERIDIAN	REF. NO.	10006
1967 TO 1972		
CANYON SNOW COURSE IN YELLOWSTONE RIVER BASIN, SCS NO. 10E3		
LATITUDE 44-44-0 LONGITUDE 110-30-0 ELEVATION 7750	REF. NO.	20001
1937 TO 1976		

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- Water Resources Council. 1967. A Uniform Technique for Determining Flood Flow Frequencies. Bulletin No. 15. Washington, D. C.

APPENDIX USER CHARGES

The following prices will be charged for job requests. Only one job setup is charged per request. Thus a request for surface water and water quality data would have only one setup fee (\$20.00) plus individual program charges.

SURFACE WATER PROGRAMS

Job Setup - irrespective of number of analyses or stations.	\$20.00
CREST (per station)	1.00
DAYAVE (per station)	2.00
DAYFLOW (per station-year)	0.25
DURCUR (daily flows, per station)	2.00
DURCUR (monthly or annual flows, per station)	4.00
FLOWDATES	Job setup only
GUMBEL (peak flows, per station)	2.00
GUMBEL (annual flows, per station)	4.00
HAZEN (peak flows, per station)	2.00
HAZEN (annual flows, per station)	4.00
HYGRAPH (per station-year)	4.00
LACOR (per correlation)	1.00
LOGPT3 (peak flows, per station)	2.00
LOGPT3 (annual flows, per station)	4.00
MADIS (per station)	1.00
MOCOR (per correlation)	1.00
MONMAX (per station)	2.00
MONMIN (per station)	2.00
PEAKDATES	Job setup only
PERMAX (per station)	2.00
PERMIN (per station)	2.00
PLOTFLOW (per station-year)	0.50
Q7,10 (per station-type)	4.00
RESERV (per station)	1.00
RESTNS	Job setup only
SQRT (per station-year)	1.00
UNITPEAK (per station-year)	0.50

APPENDIX
USER CHARGES
(continued)

WATER QUALITY PROGRAMS

Job Setup - irrespective of number of analyses or stations.	\$20.00
LPARAM (per list)	1.00
QHEAD	Job setup only
QHEAD1	Job setup only
QHEAD2	Job setup only
QHEAD3	Job setup only
QDDATA (per station-year)	0.25
QDPLQT (per station-year)	0.50
QGCOMSTAT (per set of combined stations)	2.00
QGDATA (per station)	2.00
QGDATSTAT (per station)	2.00
QGPLQT (per station)	2.00
QGSTAT (per station)	1.00
REGDAY (per regression)	2.00
REGGRAB (per regression)	2.00
REGMON (per regression)	2.00
REGSTA (per regression)	2.00
RUNAVE (per station-year)	2.00
SEDDUBMASS (per pair of stations)	3.00
SEDDURCUR (per station)	2.00
SEDMASS (per station-year)	1.00
SEDSIZE (per graph)	1.00

WELL LEVEL PROGRAMS

Job Setup - irrespective of number of analyses or stations.	\$20.00
DAILYWELL (per station-year)	0.25
GRABWELL (per station)	2.00
PLQTLEVELD (per station group-year)	0.50
PLQTLEVELG (per station-group)	2.50
WELLDATES	Job setup only
WELLHEAD	Job setup only
WELLSAMP	Job setup only

APPENDIX
USER CHARGES
(continued)

CLIMATIC DATA PROGRAMS

Job Setup - irrespective of number of analyses or stations.	\$20.00
ANTEPREC (per station)	3.00
AVEPREC (per station)	3.00
CUM (per station-year)	0.25
DAILYPRINTH (per type-station-year)	0.25
DAILYPRINTP (per station-year)	0.25
DEGREE (per station-year)	0.25
DOUBLEMASS (per station-combination)	3.00
DRUGHT (per station)	3.00
FREZTAB (per station)	3.00
LISTDATAD (per type-station-year)	0.25
LISTDATAH (per type-station-month)	0.25
LISTDATAP (per station-month)	0.25
LISTDATESD	Job setup only
LISTDATESP	Job setup only
MONTHLYD (per type-station)	3.00
MONTHLYP (per station)	3.00
NORMALTEMP (per station)	3.00
OCCUR (per station)	3.00
PARGREATER (per type-station)	3.00
PLTDAYD (per type-station-year)	0.50
PLTDAYP (per station-year)	0.50
PLTHOURP (per station-month)	0.50
PLTMONTH (per type-station)	3.00
PLTYEAR (per type-station)	3.00
PLRUNOFF (per station)	3.00
PROBTEMP (per type-station-month)	0.50
RUN (per station)	3.00
SNOWGREATER (per station)	3.00
STORM (per station-year)	3.00
TEMPBELOW (per station)	3.00
WINDROSE (per station-month range)	3.00

SNOWCOURSE PROGRAMS

Job Setup - irrespective of number of analyses or stations.	\$20.00
SNOWCOURSE (per station)	0.50
SNOWDATES	Job setup only

APPENDIX
USER CHARGES
(continued)

EXAMPLE

Assume a request for a station with 20 years of streamflow records and 5 years of daily sediment records for which DAYFLOW, PLOTFLOW, MADIS, DURCUR, LOGPT3, QDDATA, QDPLQT and SEDDURCUR are desired. The cost would be:

Job Setup (only one setup is charged per request)	\$20.00
DAYFLOW - 20 years @ \$0.25/year	5.00
PLOTFLOW - 20 years @ \$0.50/year	10.00
MADIS - 1 station @ \$1.00/station	1.00
DURCUR - 1 station @ \$2.00/station	2.00
LOGPT3 - 1 station @ \$2.00/station	2.00
QDDATA - 5 years @ \$0.25/year	1.25
QDPLQT - 5 years @ \$0.50/year	2.50
SEDDURCUR - 1 station @ \$2.00/station	<u>2.00</u>
TOTAL	\$45.75

BEDFCRD 2SE STATION NO. 480605

NUMBER OF PRECIPITATION OCCURRENCES (IN INCHES)

YEAR	0.	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0	1.2	1.4	1.6	1.8	2.0	2.5	3.0
1953	247	58	22	13	7	6	7	2	0	2	0	0	0	1	0	0	0	0
1954	259	41	23	12	17	5	3	2	1	1	0	0	1	0	0	0	0	0
1955	234	61	25	17	11	6	1	5	0	1	3	1	0	0	0	0	0	0
1956	249	65	16	16	6	7	1	2	1	2	1	0	0	0	0	0	0	0
1957	221	73	19	20	14	9	3	3	0	0	1	1	1	0	0	0	0	0
1958	254	51	20	20	6	3	4	1	2	1	1	1	0	1	0	0	0	0
1959	252	53	28	12	6	8	2	2	0	1	1	0	0	0	0	0	0	0
1960	247	61	20	12	11	8	2	3	1	1	0	0	0	0	0	0	0	0
TOTAL	1963	463	173	122	78	52	23	20	5	9	7	3	2	2	0	0	0	0

Example of OCCUR

VALUE FOR SPECIFIC CLASS SIZE INDICATES NUMBER OF PRECIPITATION OCCURRENCES FOR THAT CLASS SIZE OR LESS THAN THAT CLASS SIZE BUT GREATER THAN THE NEXT SMALLER CLASS SIZE.
THAT IS, CLASS SIZE N IS USED FOR VALUES LESS THAN OR EQUAL TO N AND GREATER THAN N-1

RUNNING AVERAGE OF 5 YEARS
FOR TOTAL ANNUAL PRECIPITATION
IN INCHES

ARCHER STATION NO. 480270

CARPENTER 3E STATION NO. 481547

CHEYENNE WRAP (CHEYENNE 1887-1938) (CHEYENNE AIRPORT 1939-1946) STATION NO. 481675

HECLA STATION NO. 484440

PINE BLUFFS STATION NO. 487235

1950	**
1951	**
1952	13.6*
1953	15.1*
1954	13.7*
1955	14.4*
1956	13.5*
1957	15.0*
1958	15.5*
1959	16.2
1960	14.8
1961	15.9
1962	15.2
1963	14.7
1964	13.5
1965	14.9
1966	14.0
1967	14.1
1968	13.9
1969	15.1
1970	14.7

* INDICATES ENCOUNTERED MISSING DATA
** INDICATES ENTIRE YEAR MISSING FOR COMPLETION

Example of RUN