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RIVER STAGE DATA FOR SOUTH CAROLINA

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Introduction

A project was undertaken at WSFO, Columbia, SC, to establish river stage normals for South Carolina. Many public users have a need to know whether a river stage is near, above, or below its normal seasonal stage. These users include recreational boaters, landowners who graze livestock in lowlying swamplands along rivers, and owners of quarries located along various rivers who use water in their daily operations. Other statistics were also derived from the stage data and may prove useful in hydrologic and engineering applications. While the specific results of this study are unique to South Carolina, the techniques could be applied to other hydrologic service areas to answer user requests and as a reference when preparing statements.

Data Sources and Computation of River Normals

Normals describe the river stage most likely to occur in a specific time period. The normals were established from daily river stages recorded over a period of years. The number of years used varied with the number of continuous records available. For most of the major rivers, 30 years of daily river stages were available. Each month was divided into three intervals: 1st through the 10th day, 11th through the 20th, and the 21st through the remainder of the month. An average was taken of each interval, since these intervals were thought to catch most trends and more accurately reflect the normal seasonal stage than would a monthly average. Flooding incidences and droughts were included, since these were considered normal occurences over a 30 year period.

All data used were stages recorded at or near 7 AM each day. Much of this information was obtained from Daily River Stages compiled by the National Climatic Center, monthly E-15s completed by cooperative river observers, and daily log sheets on file. Data from the past three years had been entered daily on diskettes and thus were readily available to incorporate into the data computations. Graphs were constructed using a spreadsheet format from the TWIN Program to compare the average monthly stage with the maximum and minimum stages (Figs. 1A-1T). Flood stages and dates for each river used in the project were consolidated into a separate listing. Seasonal high flows generally occurred in the spring, and most flooding incidences recorded were in February or March.

Use and Limitations of the Stage Normals for South Carolina Rivers

In South Carolina, rivers range from small, flashy rivers in the foothills, regulated rivers in the midlands, to unregulated rivers in the coastal plains. An example of each type of river is discussed below to illustrate what is or is not reflected in the normals.

The Reedy River is an example of a stream whose watershed is subject to urban encroachment, and over which infiltration of water

into the soil is greatly reduced and the rate of flow of water on the surface is increased (Fig. 2). The Reedy River is a smaller stream where the streamflow rise is directly associated with a storm event, producing sharp peaks and rapid recessions. Following heavy rainfall, usually produced by thunderstorms in the upper basin, the Reedy River and its tributaries can rise swiftly from normal stages to crest stages in a relatively short period of time. Rising in the foothills of the Blue Ridge Mountains about 10 miles northwest of the city of Greenville, SC, the Reedy River flows in a southeasterly direction through the city of Greenville to its confluence with the Saluda River. In its upper reaches the Reedy River has a rather steep slope. The channel capacity is small and floods result from inadequate channel capacity to carry flood flows. The Reedy River can therefore rise to flood stage in a relatively short period of time and fall below flood stage within a 24-hour period. In many cases of past flooding, the maximum stage is not reflected in station records, since stages were recorded only at 7 AM each day. More recently, a stage reading has been made available every 6 hours via GOES.

Resulting normals for the Reedy River station were consistently between 2.7 ft. and 3.5 ft. for a 14 year period with a variance during each month of 0.4 or less. The established normals do not reflect all flooding incidences. However, if it had been possible to include all maximum stages in the computations, the normals would have a much greater variance and no doubt would have resulted in higher values, yet would not be representative of the prevailing stage.

An example of an unregulated river in South Carolina is the Little Pee Dee, which originates northeast of Clio, SC, near the SC - NC border (Fig. 3). The Little Pee Dee is joined by the Lumber River and these rivers drain areas east of the Great Pee Dee River. The Little Pee Dee is a coastal plain river on which floodwaters rise slowly and remain high for long periods of time.

Normals computed from the Galivants Ferry river station records show the Little Pee Dee rising slowly on an average of 0.25 ft. per 10 day increment from January until the middle of February, then very little change through the middle of April. A slow fall was nearly continuous through October, followed by a gradual rise again in November. A one-half foot change on this river could be a significant value in either a low flow or a flood situation. Such small changes occur often, as reflected in the normal computations.

One example of a regulated river in the state is the Saluda River which forms in far western South Carolina near the SC-NC border at an elevation of 800 ft. The Saluda River is controlled almost entirely by an earthen dam at Lake Greenwood, 7 miles upstream from Chappells. However, when heavy rains occur over the Wilson Creek watershed, the Saluda River can reach flood stage at Chappells with no discharge from Lake Greenwood. Spillage is started through flood gates when Greenwood Lake level reaches 441.0 ft.

The normals established for the Chappells river station are computed from regulated flow and do not reflect the natural flow of the river. However, the normals are still representative of the prevailing stage at Chappells (Fig. 4).

Probability of Flood Stages

An estimate of the probability that a river will reach or exceed flood stage at least once in the month was computed, as well as the proportion of days that a river will reach or exceed flood stage during the month. Using the unregulated North Edisto River at Orangeburg as an example (Fig. 5), it was found that given the same climatological conditions, there is a 32% probability that the river will reach flood stage at least once during the month of January, 39% probability in February, and 57% probability in March. In any given January, the proportion of days that the river would likely flood was estimated at 5% or 1.5 days. Comparing this to actual flooding incidences in 1987, it was found that the river was at or above flood stage for 3 days in January of that year. In February, it was estimated from the data sample that 3 days (11%) the river would be at or above flood. There was no flooding in February 1987; however, there were significant rises with a maximum stage of 6.7 ft., only 1.3 ft. below flood. March was estimated to have 15% or 4.65 days at flood stage. In March 1987, the highest stage was 7.9 ft., just 0.1 ft. below flood, but six days of lowland flooding were recorded.

A confidence interval was also constructed indicating a 95% confidence that the true proportion of days estimated to flood during a given month was within the given range. These data should prove useful in long-term planning of river related activities.

Station Histories

Individual station records were searched, and a brief history was written for each station to include pertinent information from the E-19s and also interesting historical information recorded through the years by the individual cooperative weather observers. While specific station histories are of little interest outside of South Carolina, a sample one is included with this report to illustrate the information available and its utility for local and state applications (Appendix).

Benefits of the Study

The overall benefit derived from this project is that a data base is now available for any future studies concerning the rivers in South Carolina. In addition, daily stages can be added to extend the period of continuous records.

As a result of the combined data entries, a printout of river stages is now available as a quick reference, and replaces the daily log sheets which were rapidly deteriorating and difficult to use. Using the normals, we are now able to approximate whether a specific river stage at a specific station location is at a normal seasonal level, or above or below that level. The estabished normals save time since this eliminates the need to review a large volume of past data to compute the normal stage of a river. The stage data are also useful references in preparing river statements regarding seasonal levels, and are already being used at WSFO Columbia for that purpose.

In addition, the study provides a ready reference to flooding incidents observed during the period of record (Fig. 6). Such

information, for example, has potential application in engineering design studies where acceptable levels of risk are related to the flooding tendencies reflected in the data.

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Hamburg, Morris, 1970: Statistical Analysis for Decision Making.

Panofsky, Hans A. and Brier, Glenn W., 1968: Some Applications of Statistics to Meteorology.

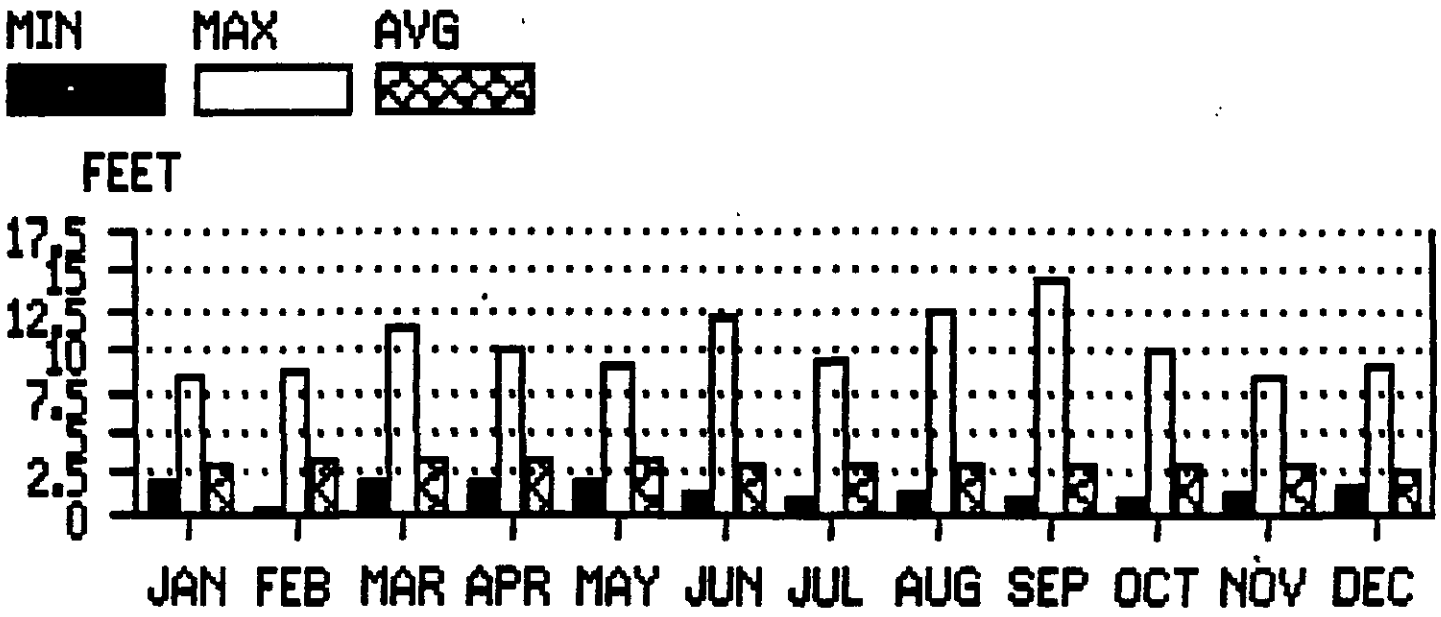
Meyer, Adolph F., 1928: The Elements of Hydrology.

U.S. Geological Survey Topographic Maps, S.C., Map Library, University of South Carolina.

U.S.G.S. Water Resources Data for S.C. Publications.

U.S. Army Corps of Engineers Flood Plain Publications.

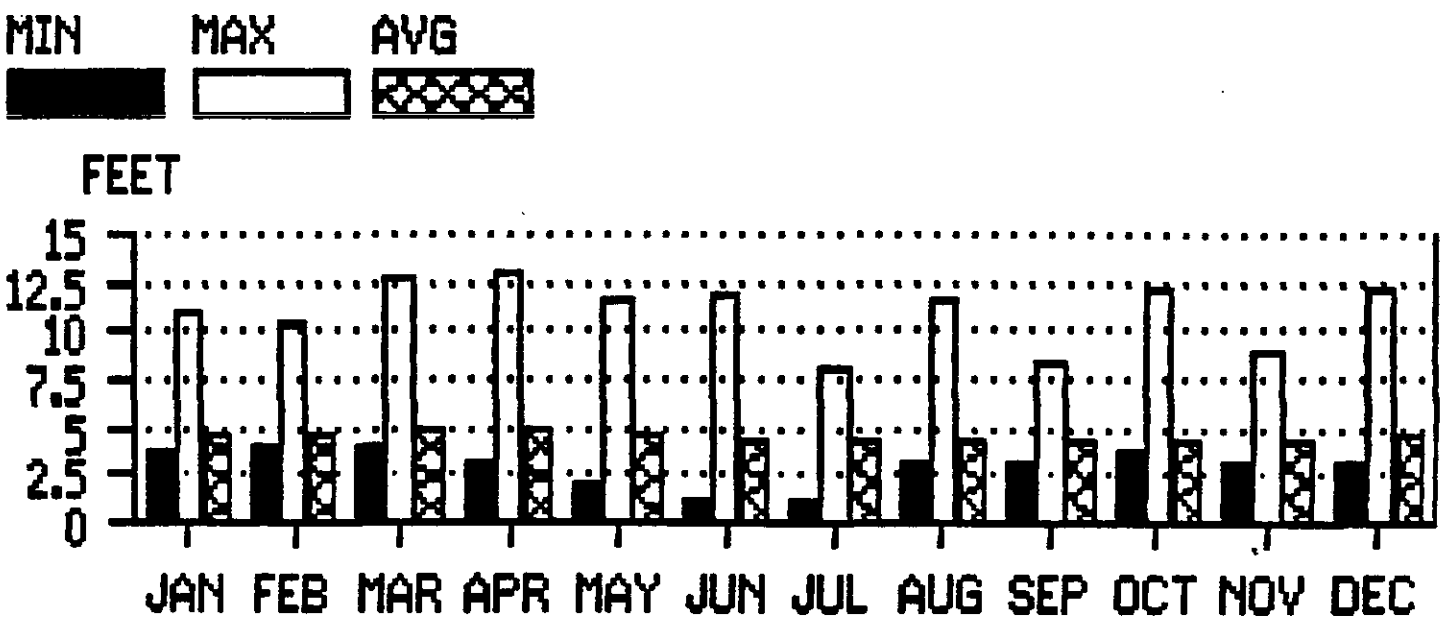
REEDY RIVER AT GREENVILLE, S.C.
PERIOD of RECORD: 1972-1985
FLOOD STAGE 8 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 14 YRS OF RECORDS

Fig. 1A

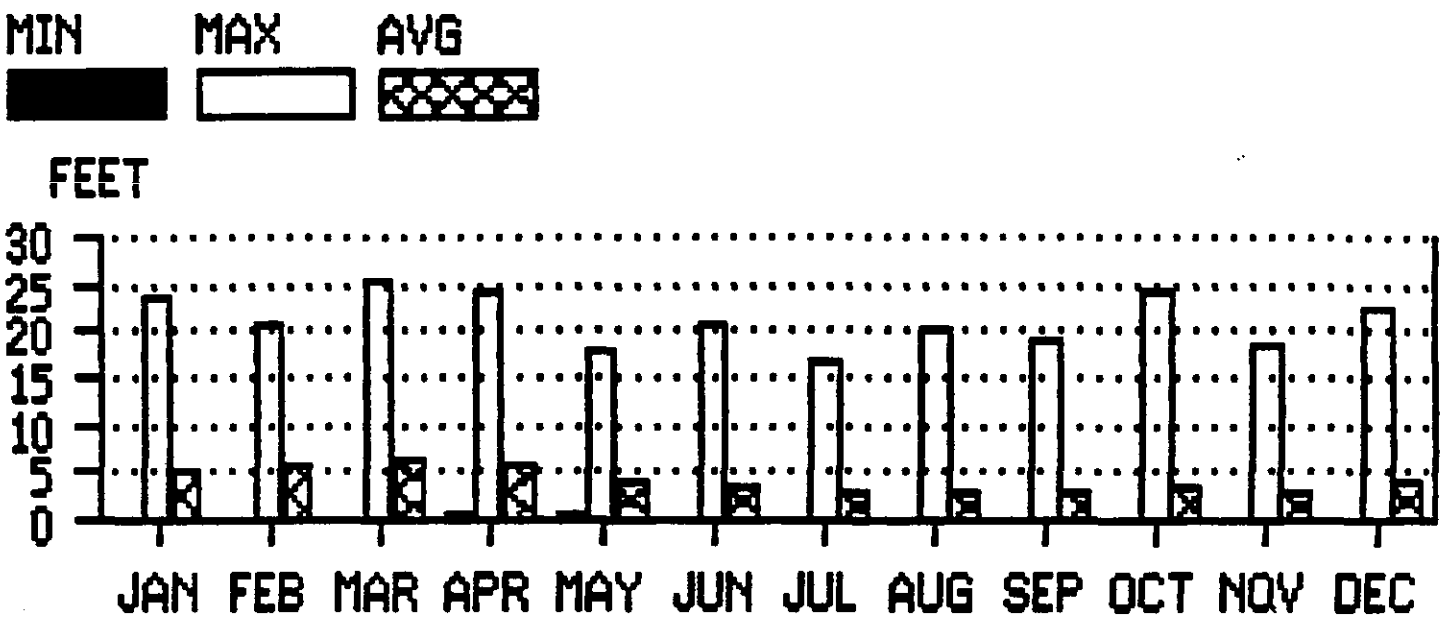
SALUDA RIVER AT WEST PELZER, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 9 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1B

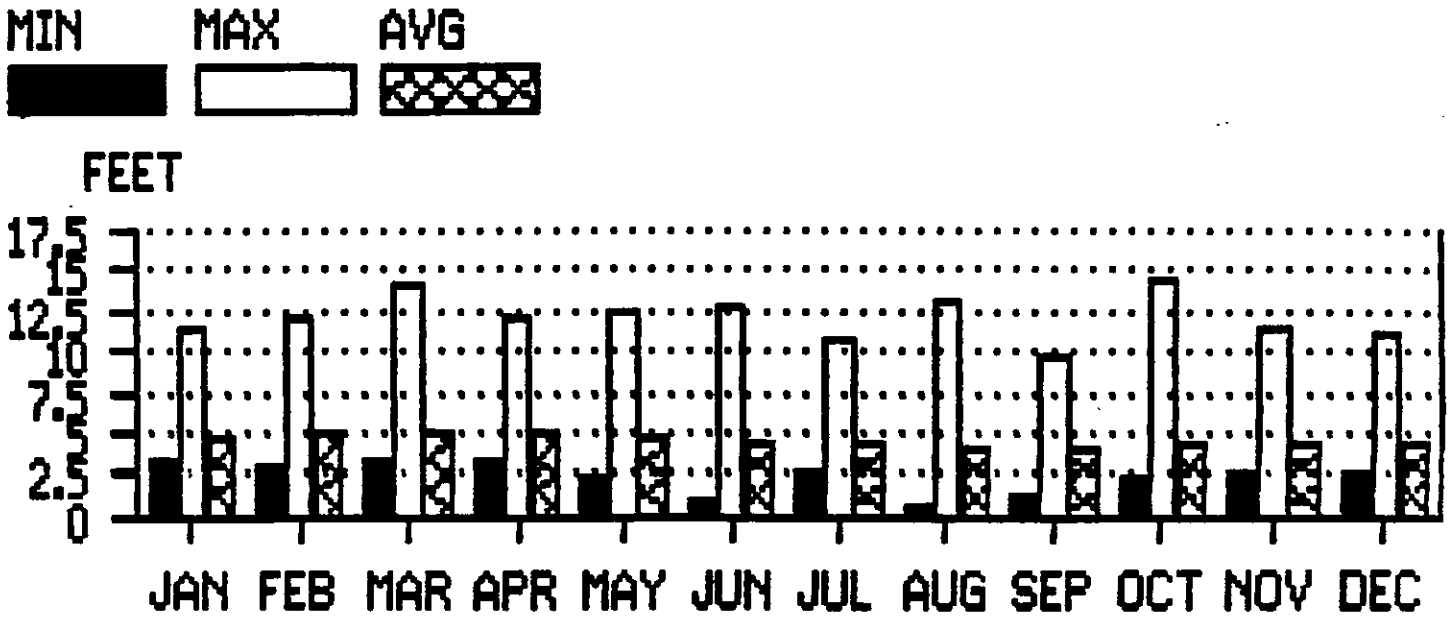
SALUDA RIVER AT CHAPPELLS, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 14 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1C

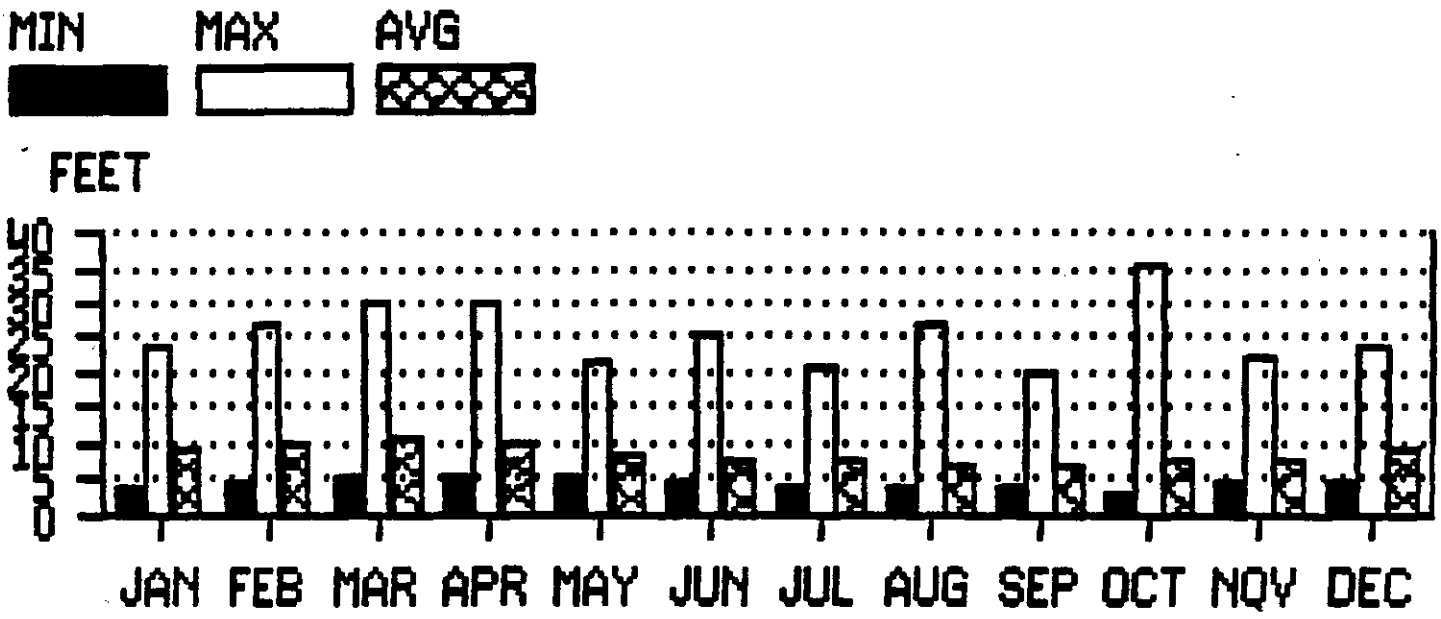
BROAD RIVER AT GAFFNEY, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 10 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1D

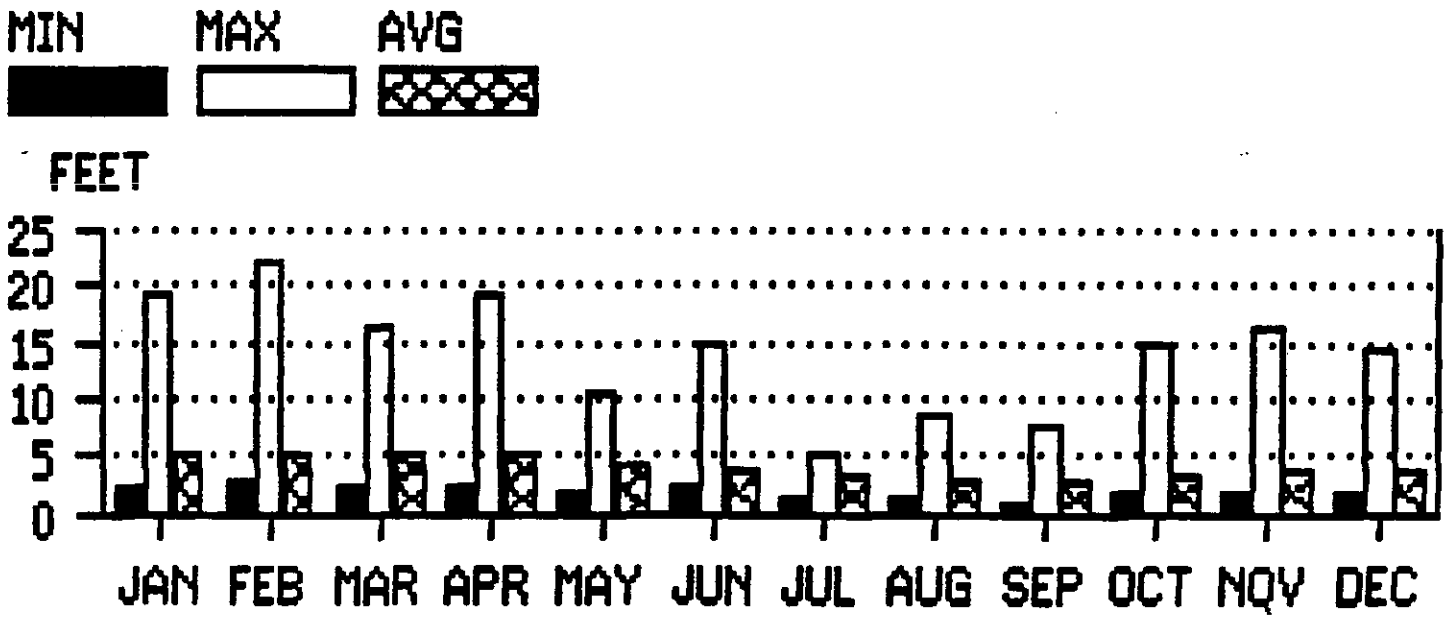
BROAD RIVER AT BLAIR, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 14 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1E

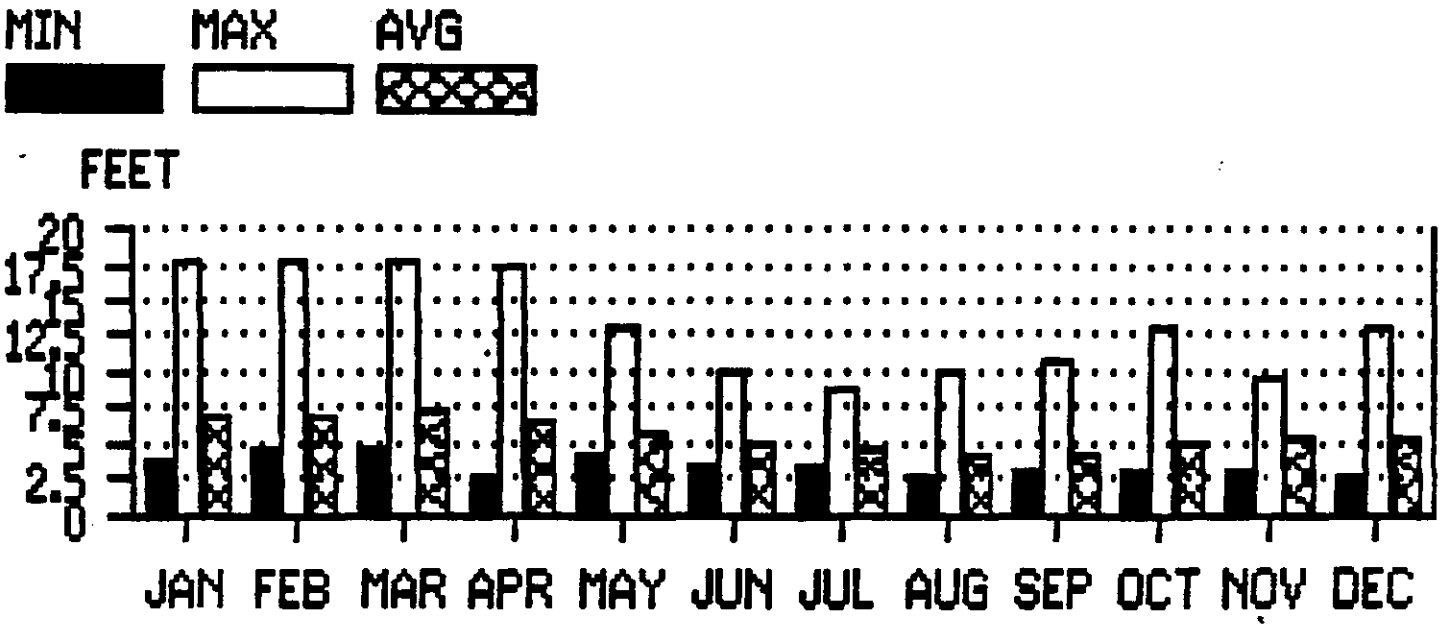
BROAD RIVER AT CARLISLE, S.C.
PERIOD of RECORD: 1977-1983
FLOOD STAGE 18 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 7 YRS OF RECORDS

Fig. 1F

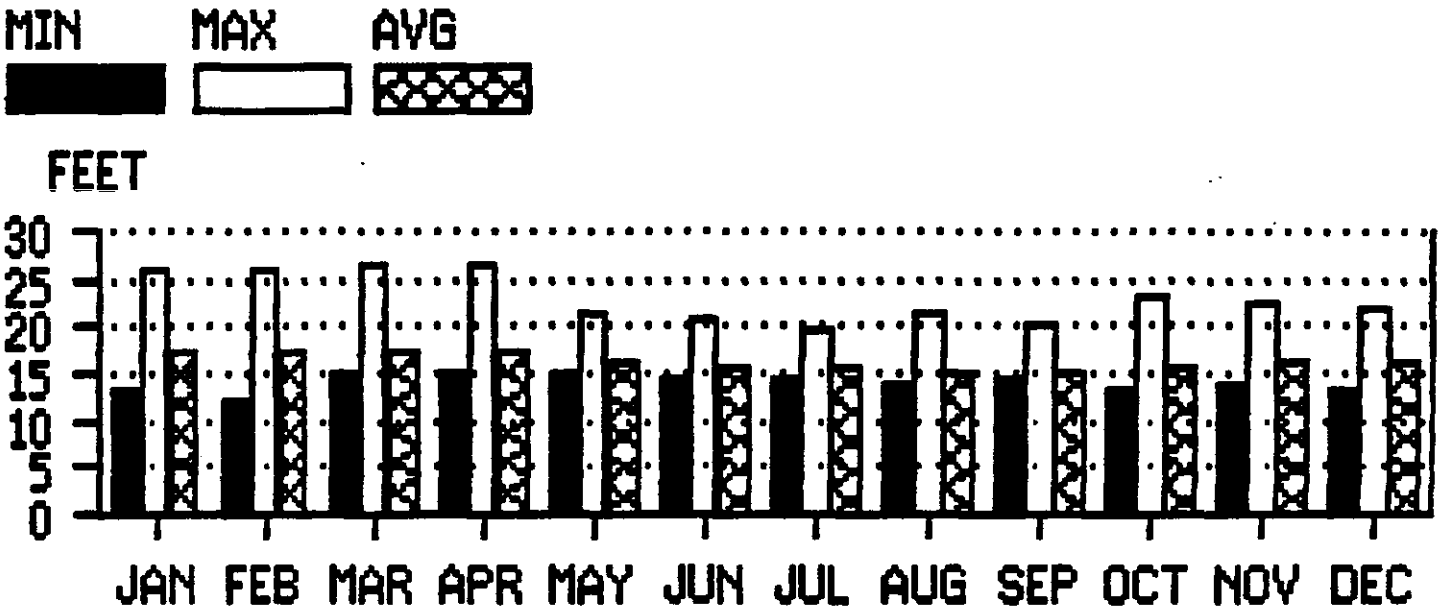
TYGER RIVER AT DELTA, S.C.
PERIOD of RECORD: 1977-1983
FLOOD STAGE 13 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 7 YRS OF RECORDS

Fig. 1G

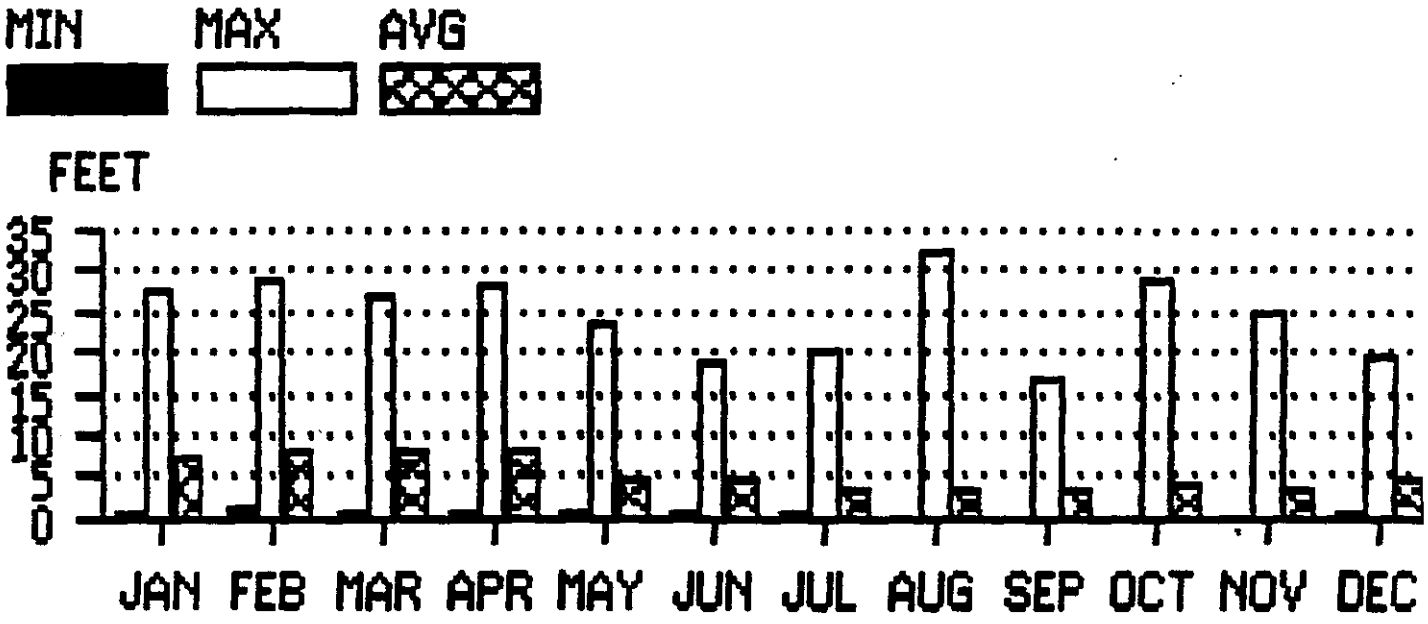
ENOREE RIVER AT WHITMIRE, S.C.
PERIOD of RECORD: 1977-1983
FLOOD STAGE 25 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 7 YEARS OF RECORDS

Fig. 1H

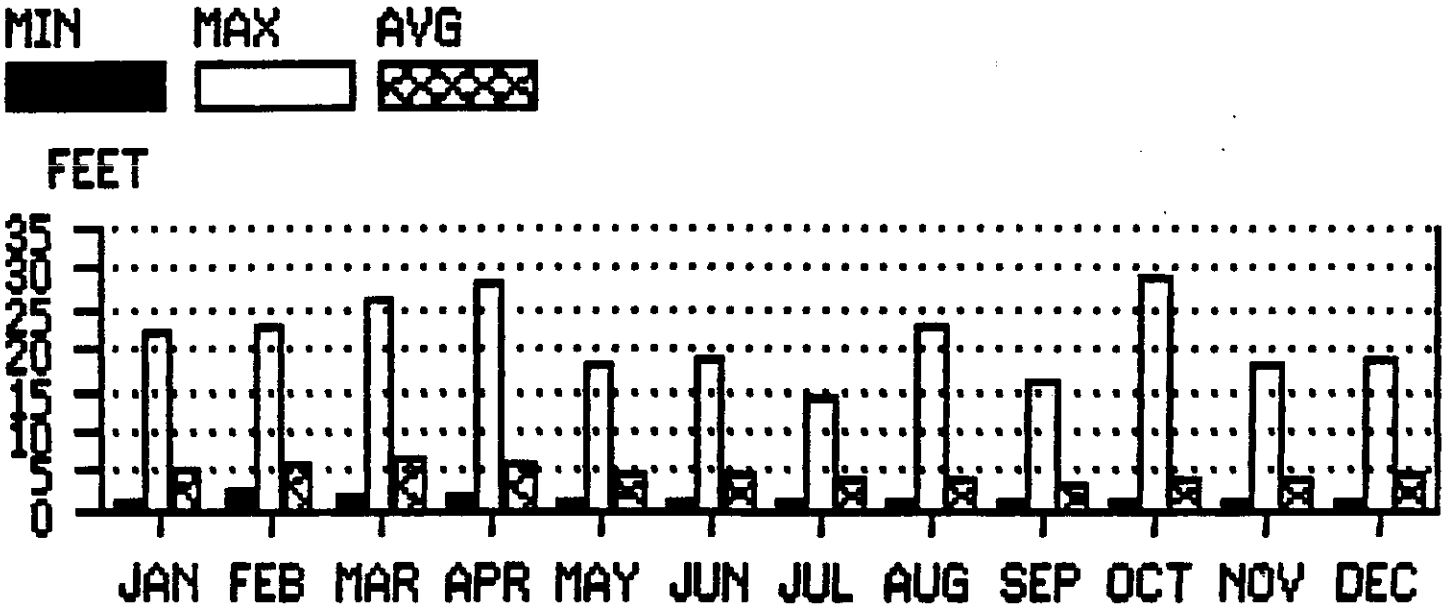
WATEREE RIVER AT CAMDEN, S.C.
PERIOD of RECORD: 1954-1983
FLOOD STAGE 23 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 11

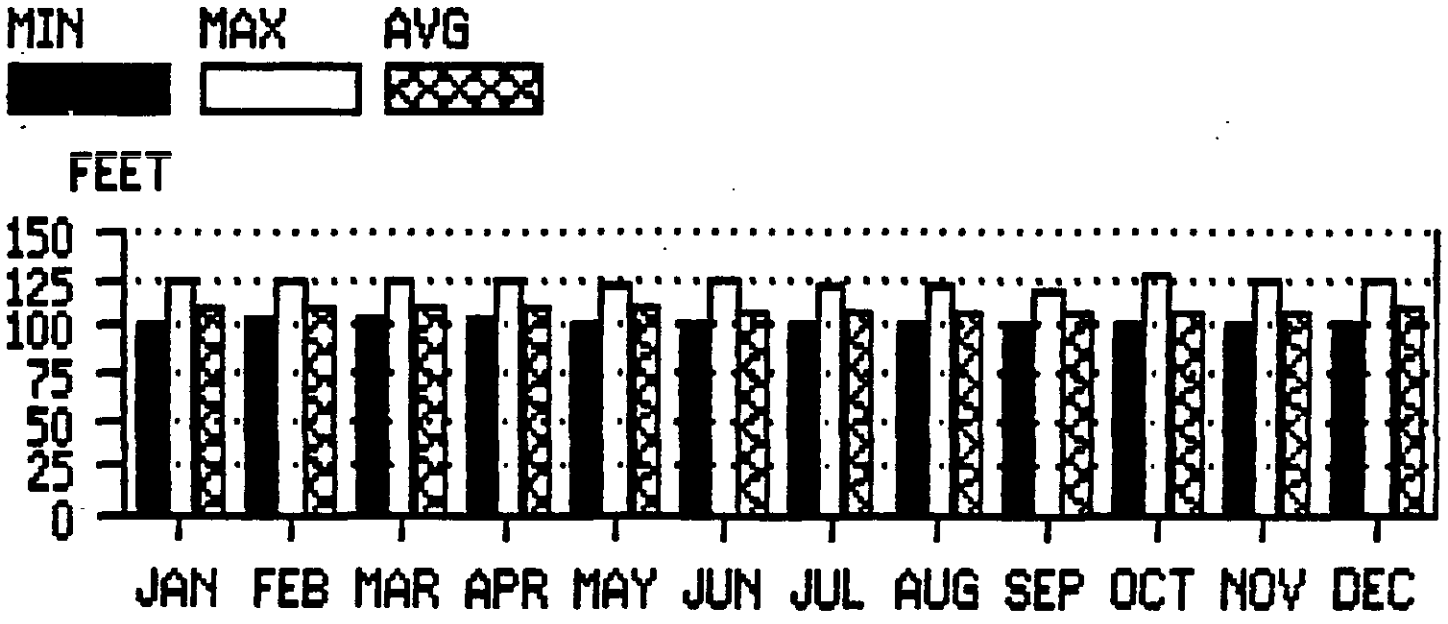
CONGAREE RIVER AT COLUMBIA, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 19 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1J

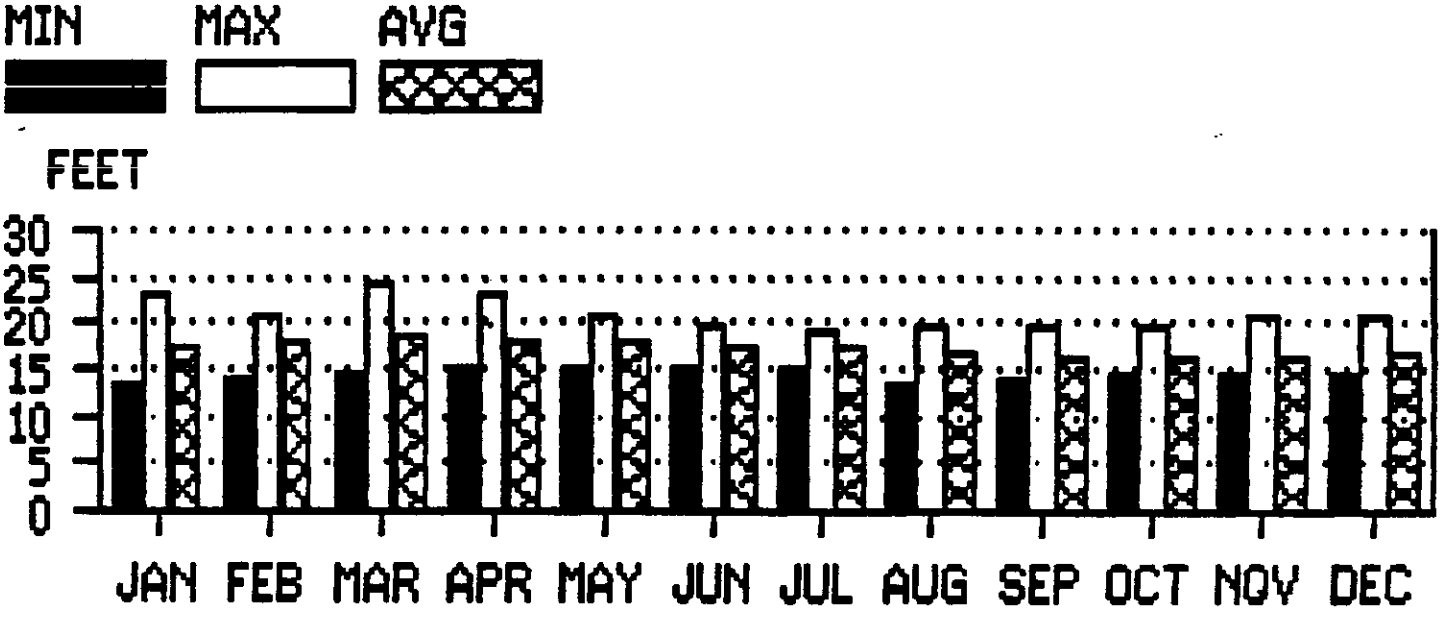
CONGAREE RIVER AT ST.MATTHEWS, S.C.
PERIOD of RECORD: 1972-1985
FLOOD STAGE 115 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 14 YRS OF RECORDS

Fig. 1K

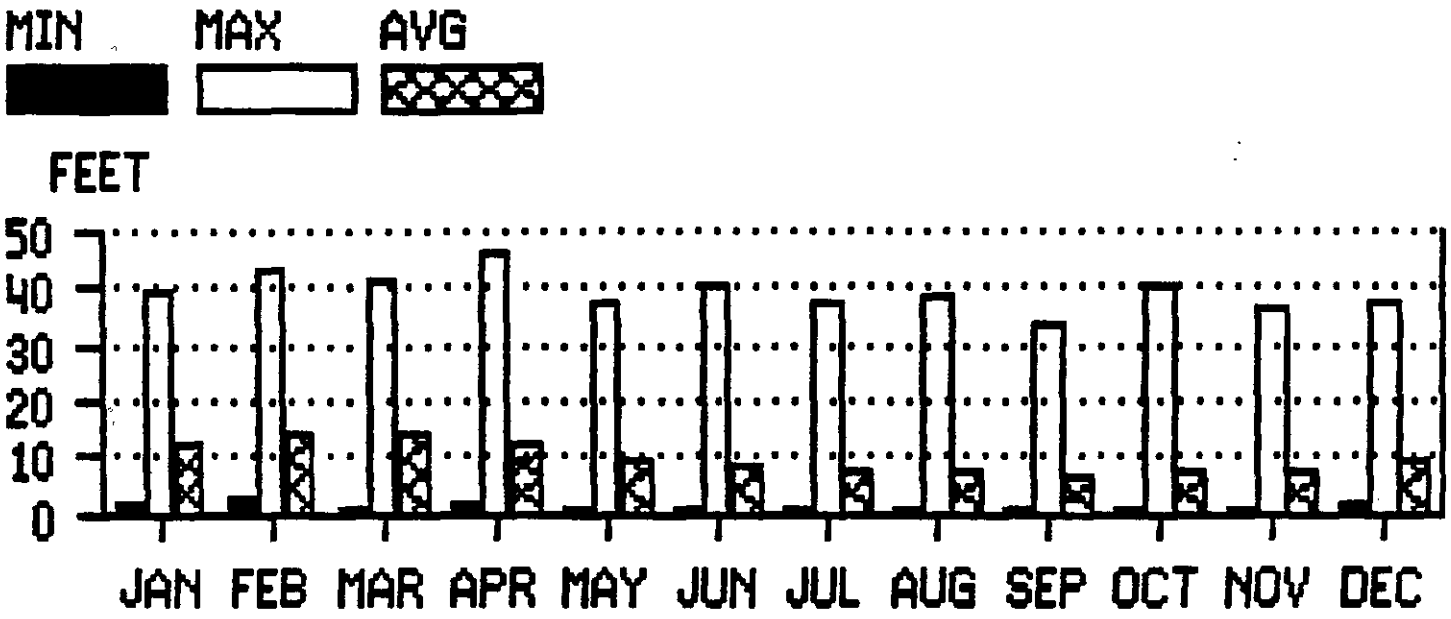
U.SANTEE RIVER AT BUCKINGHAM LDG, S.C.
PERIOD of RECORD: 1978-1985
FLOOD STAGE 21 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 8 YRS OF RECORDS

Fig. 1L

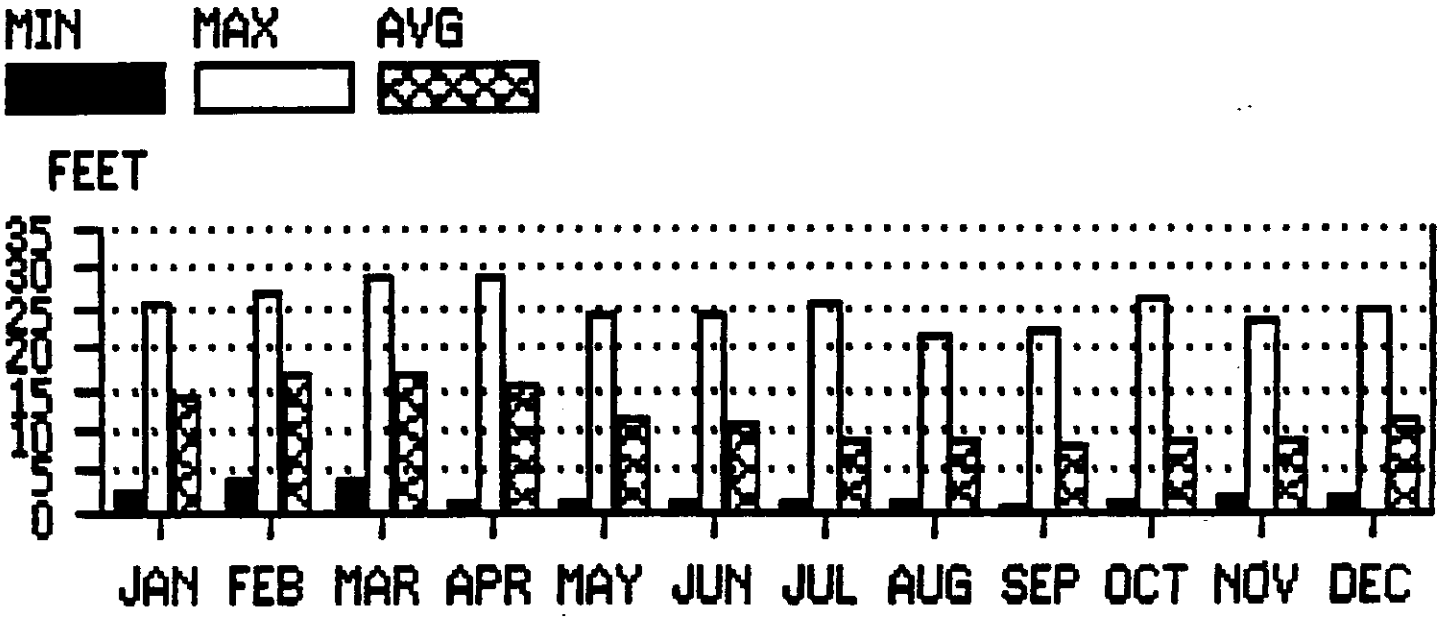
GREAT PEE DEE RIVER AT CHERAW, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 30 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1M

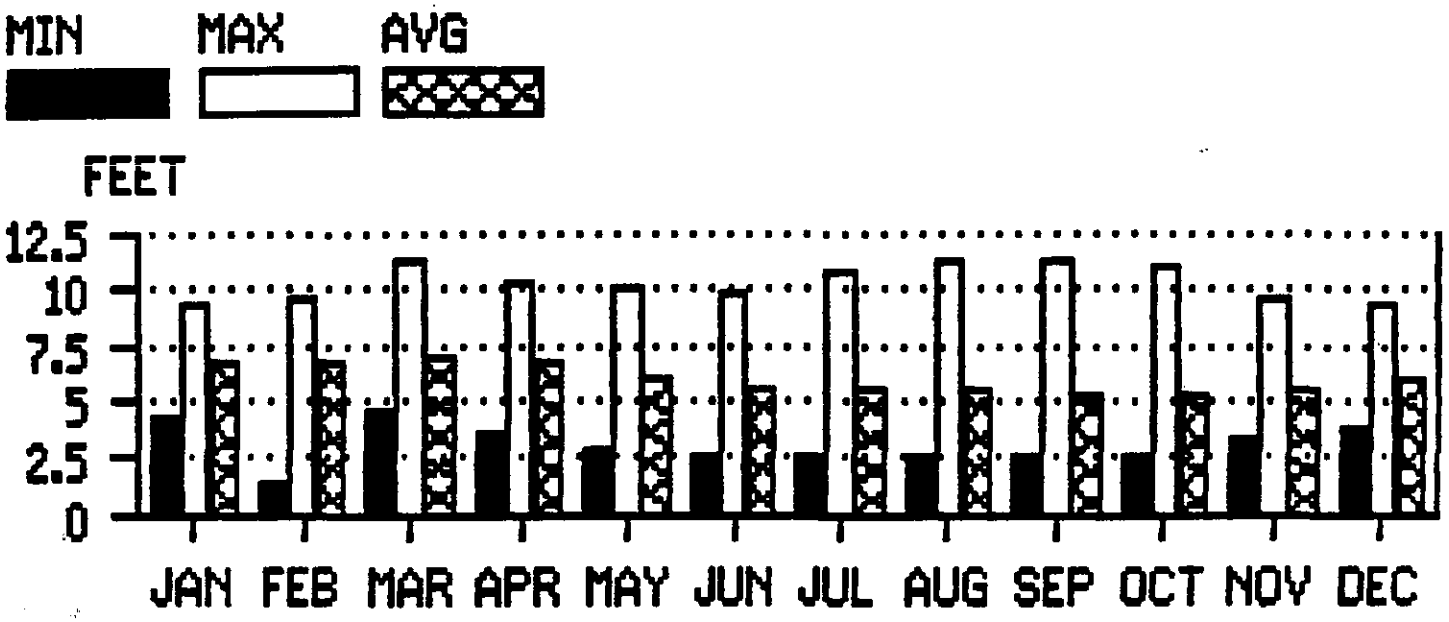
GREAT PEE DEE RIVER AT PEE DEE, S.C.
PERIOD of RECORD: 1954-1983
FLOOD STAGE 19 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1N

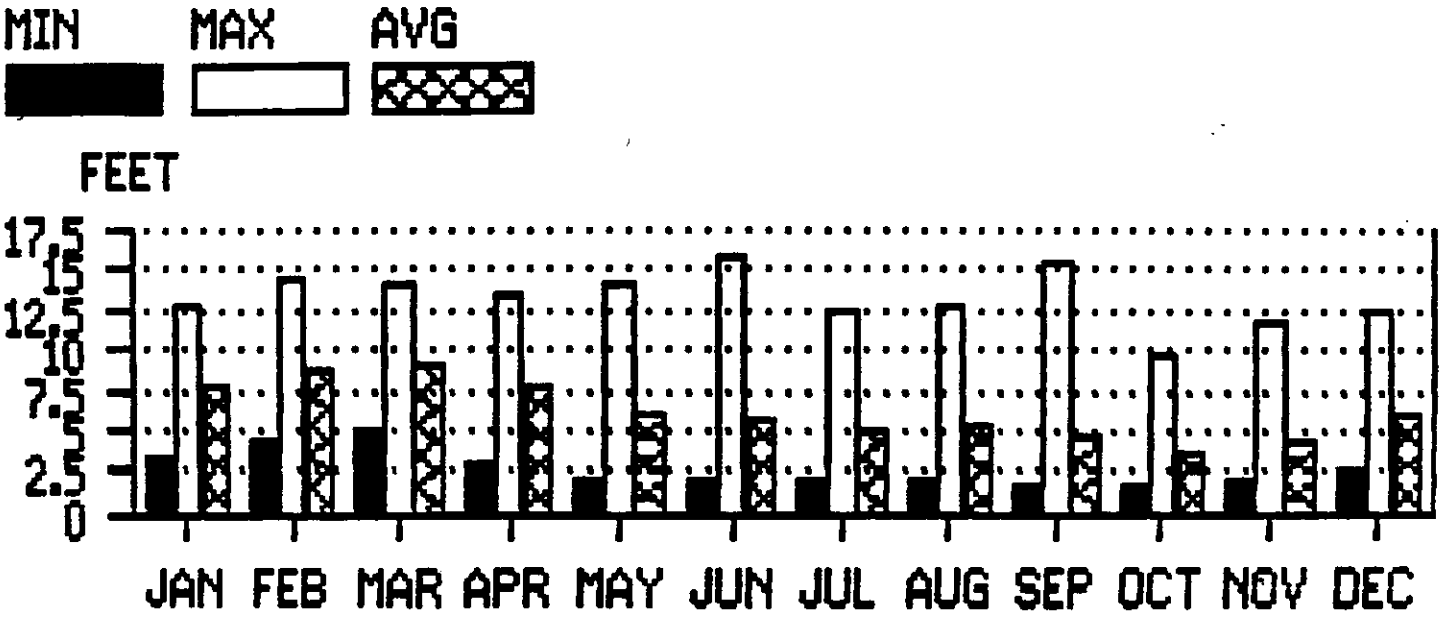
EDISTO RIVER AT ORANGEBURG, S.C.
PERIOD of RECORD:1958-1985
FLOOD STAGE 8 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 28 YRS OF RECORDS

Fig. 10

EDISTO RIVER AT GIVHANS FERRY, S.C.
PERIOD of RECORD: 1967-1985
FLOOD STAGE 10 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 19 YRS OF RECORDS

Fig. 1P

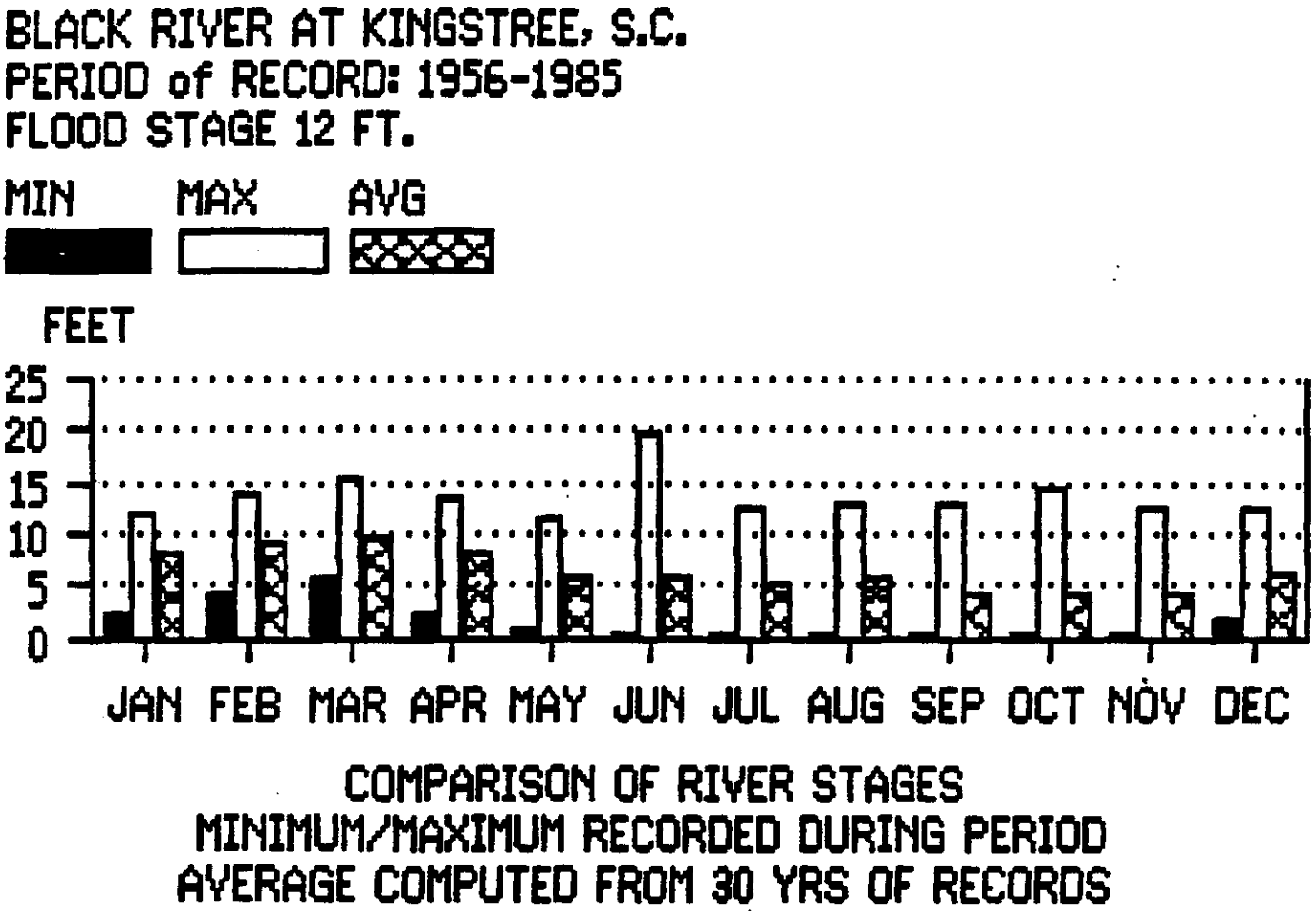
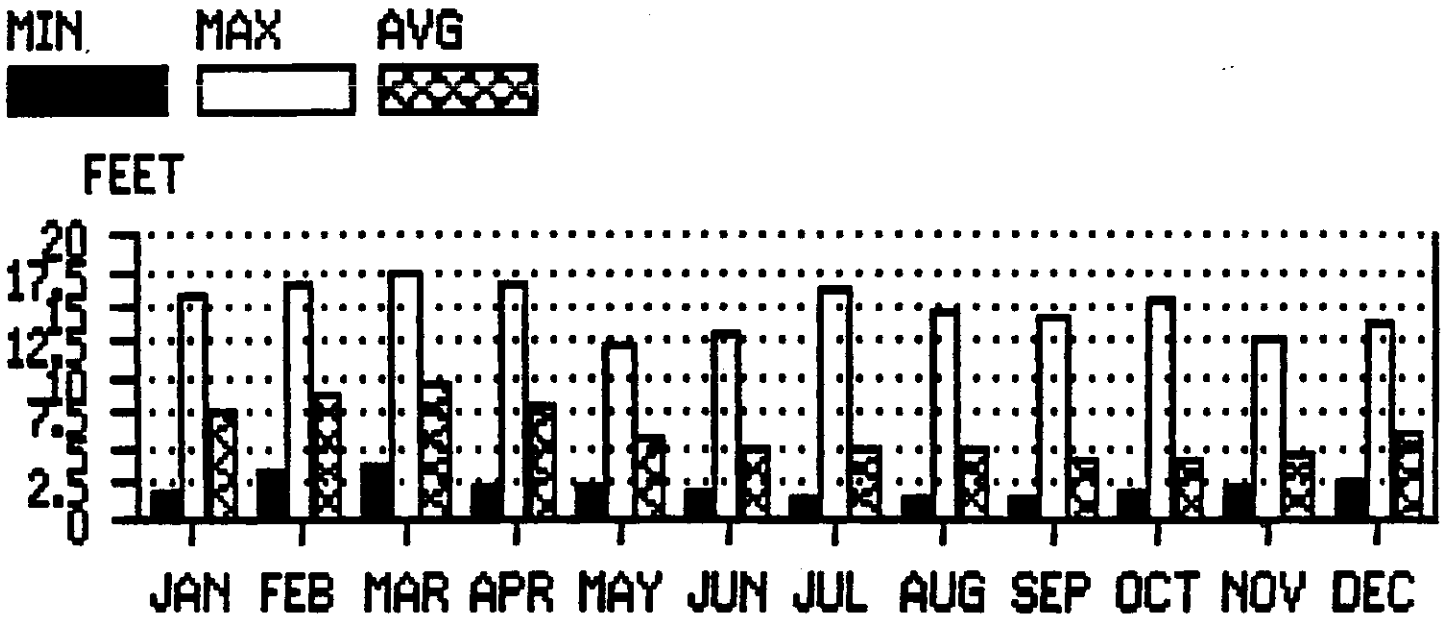

BLACK RIVER AT KINGSTREE, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 12 FT.
MIN
MAX
AVG
FEET
25
20
15
10
5
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1Q

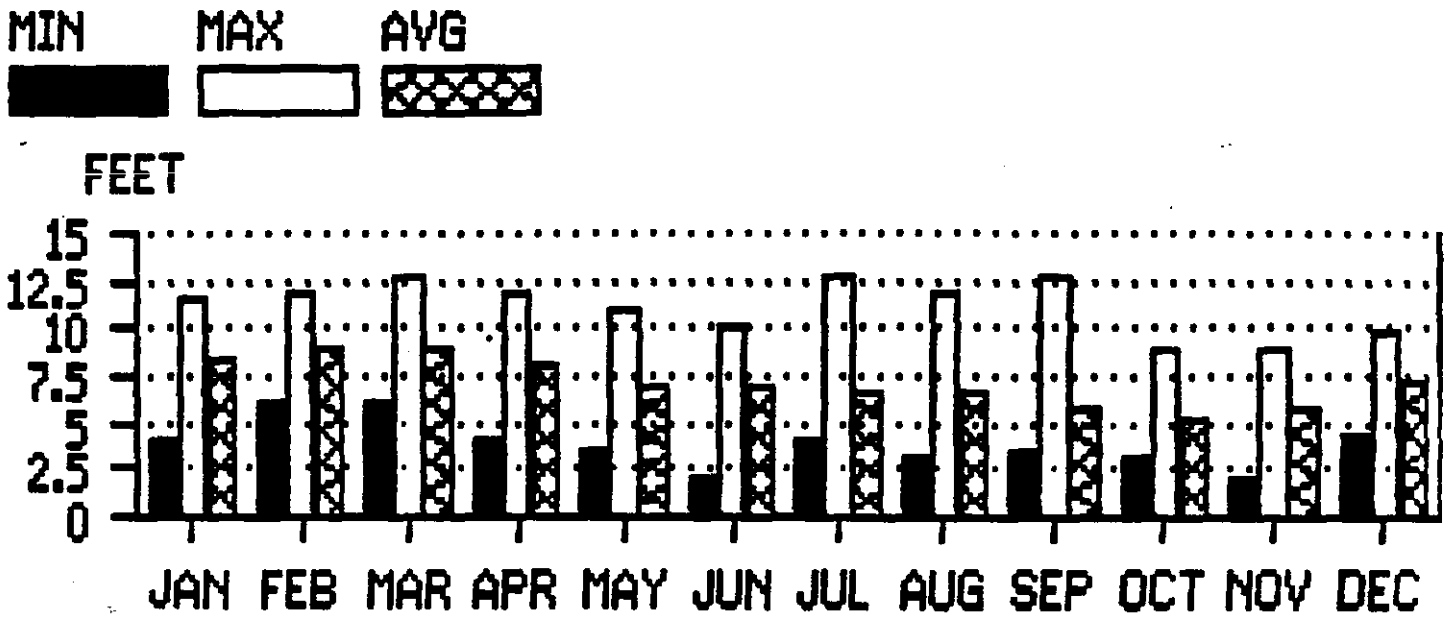
LYNCHES RIVER AT EFFINGHAM, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 14 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1R

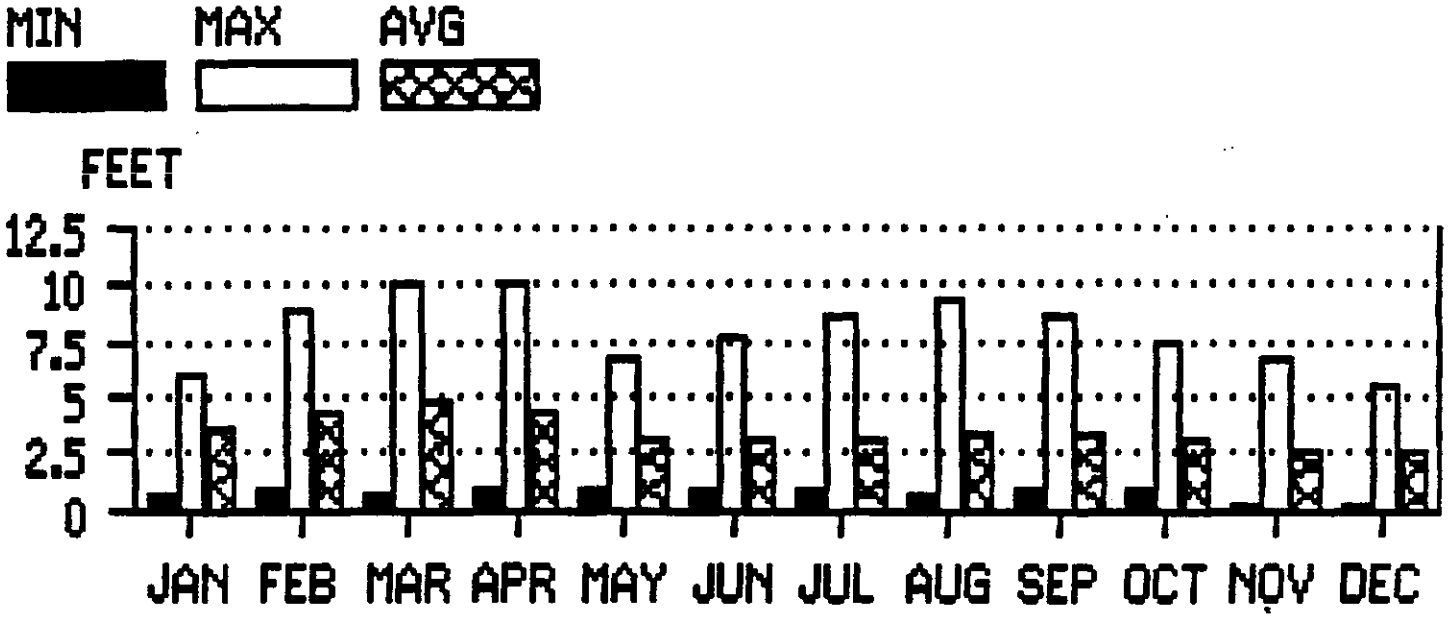
LITTLE PEE DEE AT GALIVANTS FERRY, S.C.
PERIOD of RECORD: 1972-1985
FLOOD STAGE 9 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 14 YRS OF RECORDS

Fig. 15

WACCAMAW RIVER AT CONWAY, S.C.
PERIOD of RECORD: 1956-1985
FLOOD STAGE 7 FT.



COMPARISON OF RIVER STAGES
MINIMUM/MAXIMUM RECORDED DURING PERIOD
AVERAGE COMPUTED FROM 30 YRS OF RECORDS

Fig. 1T

REEDY RIVER at Greenville, S.C.
Flood Stage 8 Feet

N O R M A L R I V E R S T A G E S

MONTH	INTERVAL 1st-10th	INTERVAL 11th-20th	INTERVAL 21st-28th	INTERVAL 21st-30th	INTERVAL 21st-31st
JANUARY	3.12 Ft	2.98 Ft			3.12 Ft
FEBRUARY	3.43 Ft	3.18 Ft	3.27 Ft		
MARCH	3.20 Ft	3.29 Ft			3.46 Ft
APRIL	3.39 Ft	3.25 Ft		3.02 Ft	
MAY	3.19 Ft	3.37 Ft			3.54 Ft
JUNE	3.20 Ft	2.90 Ft		3.05 Ft	
JULY	2.84 Ft	2.91 Ft			2.99 Ft
AUGUST	3.09 Ft	2.95 Ft			2.80 Ft
SEPTEMBER	2.76 Ft	2.99 Ft		2.90 Ft	
OCTOBER	2.94 Ft	2.91 Ft			2.85 Ft
NOVEMBER	2.98 Ft	2.85 Ft		3.01 Ft	
DECEMBER	2.83 Ft	2.91 Ft			2.72 Ft

Normals were computed from 14 years of records (1972-1985)

Fig. 2

LITTLE PEE DEE RIVER at Galivants Ferry, S.C.
Flood Stage 9 Feet

N O R M A L R I V E R S T A G E S

MONTH	INTERVAL 1st-10th	INTERVAL 11th-20th	INTERVAL 21st-28th	INTERVAL 21st-30th	INTERVAL 21st-31st
JANUARY	8.14 Ft	8.45 Ft			8.74 Ft
FEBRUARY	8.94 Ft	9.14 Ft	9.00 Ft		
MARCH	8.86 Ft	8.84 Ft			9.08 Ft
APRIL	8.90 Ft	8.19 Ft		7.51 Ft	
MAY	7.04 Ft	6.79 Ft			6.98 Ft
JUNE	7.04 Ft	6.81 Ft		6.57 Ft	
JULY	6.57 Ft	6.44 Ft			6.39 Ft
AUGUST	6.83 Ft	6.53 Ft			6.09 Ft
SEPTEMBER	5.83 Ft	5.76 Ft		5.57 Ft	
OCTOBER	5.43 Ft	5.20 Ft			5.12 Ft
NOVEMBER	5.47 Ft	5.73 Ft		6.00 Ft	
DECEMBER	6.64 Ft	7.31 Ft			7.85 Ft

Normals were computed from 14 years of records (1972-1985)

Fig. 3

EDISTO RIVER AT ORANGEBURG, S.C.

ESTIMATE OF THE PROBABILITY THAT THE RIVER WILL REACH FLOOD STAGE AT LEAST ONCE DURING THE MONTH:

MONTH	PROBABILITY, %	STD DEV	STD ERR	95% CONFIDENCE INTERVAL 2 (STANDARD ERRORS)
JAN	32.0	47.0	9.0	14.0 - 50.0
FEB	39.0	49.0	9.0	21.0 - 58.0
MAR	57.0	49.0	9.0	38.0 - 76.0
APR	54.0	50.0	9.0	35.0 - 72.0
MAY	21.0	41.0	8.0	6.0 - 37.0
JUN	29.0	45.0	9.0	12.0 - 46.0
JUL	29.0	45.0	9.0	12.0 - 46.0
AUG	36.0	48.0	9.0	18.0 - 54.0
SEP	11.0	31.0	6.0	0 - 22.0
OCT	7.0	26.0	5.0	0 - 17.0
NOV	4.0	19.0	4.0	0 - 11.0
DEC	11.0	31.0	6.0	0 - 22.0

ESTIMATE OF THE PROPORTION OF DAYS THAT THE RIVER WILL REACH FLOOD STAGE IN THE MONTH:

MONTH	% OF DAYS	STD DEV	STD ERR	95% CONFIDENCE INTERVAL 2 (STANDARD ERRORS)
JAN	5.0	10.0	1.9	1.0 - 9.0
FEB	11.0	21.0	3.9	3.0 - 18.0
MAR	15.0	19.0	3.6	8.0 - 22.0
APR	13.0	17.0	3.2	6.0 - 19.0
MAY	3.0	7.0	1.3	0.50- 6.0
JUN	5.0	10.0	1.8	1.0 - 8.0
JUL	3.0	6.0	1.1	0.70- 5.0
AUG	4.0	8.0	1.5	1.0 - 7.0
SEP	2.0	8.0	1.5	0 - 5.0
OCT	6.0	20.0	3.7	0 - 13.0
NOV	1.0	5.0	0.90	0 - 3.0
DEC	2.0	6.0	1.0	0 - 4.0

COMPUTED FROM 28 YEARS OF OBSERVATIONS

Fig. 5

SALUDA RIVER at Chappells, S.C.
Flood Stage 14 Feet

N O R M A L R I V E R S T A G E S

MONTH	INTERVAL 1st-10th	INTERVAL 11th-20th	INTERVAL 21st-28th	INTERVAL 21st-30th	INTERVAL 21st-31st
JANUARY	4.6 Ft	5.1 Ft		5.7 Ft	
FEBRUARY	5.6 Ft	4.9 Ft	5.8 Ft		
MARCH	5.5 Ft	6.5 Ft		6.7 Ft	
APRIL	6.7 Ft	5.7 Ft	4.3 Ft		
MAY	4.2 Ft	4.2 Ft		3.8 Ft	
JUNE	3.8 Ft	3.5 Ft	3.5 Ft		
JULY	2.7 Ft	2.9 Ft		3.0 Ft	
AUGUST	2.8 Ft	2.6 Ft		2.6 Ft	
SEPTEMBER	2.4 Ft	2.7 Ft	2.8 Ft		
OCTOBER	3.2 Ft	3.1 Ft		3.0 Ft	
NOVEMBER	2.8 Ft	2.7 Ft	3.2 Ft		
DECEMBER	3.5 Ft	4.1 Ft		3.8 Ft	

Normals were computed from 30 years of records (1956-1985)

Fig. 4

FLOODING INCIDENCES RECORDED DURING PERIOD OF RECORD
(EACH INCIDENCE REPRESENTS ONE DAY)

RIVER & STATION	YRS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BROAD/ GAFFNEY	30	4	12	/14/	7	5	5	1	6	0	10	2	6
BROAD/ BLAIR	30	85	94	/119/	85	45	22	6	13	13	38	25	54
BROAD/ CARLISLE	7	1	1	0	1	0	0	0	0	0	0	0	0
SALUDA/ CHAPPELLS	30	24	19	/44/	35	10	9	1	7	3	10	7	8
SALUDA/ W.PELZER	30	7	6	9	/12/	6	7	0	2	0	6	0	5
WATEREE/ CAMDEN	30	7	/14/	9	8	1	0	0	4	0	8	4	0
CONGAREE/ COLUMBIA	30	5	8	/14/	10	0	1	0	3	0	9	0	0
CONGAREE/ ST.MATTHEWS	14	/77/	73	75	58	34	21	6	16	7	11	17	34
EDISTO/ ORANGEBURG	28	46	86	/135/	106	29	40	27	37	20	48	8	17
EDISTO/ GIVHANS FY	19	69	138	/175/	132	58	32	34	34	16	0	4	39
GR.PEE DEE/ CHERAW	30	28	/56/	49	40	12	6	5	6	4	19	7	8
GR.PEE DEE/ PEE DEE	30	211	306	/381/	295	85	63	25	32	27	88	28	81
L.PEE DEE/ GALIVANTS	14	165	/239/	227	154	36	13	20	54	16	1	1	37
WACCAMAW/ CONWAY	30	0	43	/127/	101	0	3	22	48	27	10	0	0
BLACK/ KINGSTREE	30	4	66	/83/	58	0	16	5	4	10	24	11	4
LYNCHES/ EFFINGHAM	30	18	23	/50/	25	0	0	6	2	1	8	0	0
U.SANTEE/ BUCKINGHAM	L.8	7	1	/7/	5	0	0	0	0	0	0	0	0
ENOREE/ WHITMIRE	7	1	1	1	1	0	0	0	0	0	0	0	0
REEDY/ GREENVILLE	14	3	/6/	2	2	5	3	2	3	2	4	1	2
TYGER/ DELTA	7	10	7	/9/	4	1	0	0	0	0	2	0	1

Fig. 6

RIVER:	WATEREE
STATION:	CAMDEN, S.C.
LOCATION:	LATITUDE 34 DEG.14'40" LONGITUDE 80 DEG.39'15"
COUNTY:	KERSHAW
FLOOD STAGE:	23 FT
RECORD FLOOD:	40.4 FT 7/18/1916
LENGTH OF RECORDS:	95 YEARS
OBSERVATIONS:	RIVER STAGE IS RECEIVED EVERY 6 HOURS FROM DCP (DATA COLLECTION PLATFORM) GAGE

HISTORY:
The station was established March 1, 1891. The lower section of a staff gage was attached to the central granite pier of the South Carolina and Georgia railroad bridge and the upper section attached to the iron framework of the bridge. A chain and weight gage was installed by USGS (U.S. Geological Survey) on August 12, 1904. The gage was fastened to the upstream end of a floor beam, with an outside scale on the highway bridge. This gage was carried away by the flood of August 26, 1908, and a temporary staff gage was installed on September 20, 1908, on the downstream side of the western iron pier of the bridge that was carried away.

Installation of a new chain and weight river gage was completed on November 23, 1910, on the downstream side of the new iron highway bridge, 2 miles west of Camden. This gage was carried away by the flood of July 18, 1916, and a temporary staff gage was installed September 8, 1916, on the steel cement pier of the old bridge.

On December 28, 1916, a new permanent staff gage was attached to a post set in the bank at the bridge site ferry and on July 23, 1934, a staff gage was installed at the steel highway bridge 3 miles southwest of Camden, 4 miles upstream from the mouth of Big Pine Tree Creek and 7 miles downstream from the Wateree Dam.

A wire weight gage was installed September 1, 1942, by the USGS, and the U.S. Weather Bureau began using this gage October 1, 1942. This gage was attached to the downstream side of the new bridge on U.S. Highway #1, 2.2 miles west of Camden and 7.4 miles downstream from Wateree Dam. A resistance type river gage was installed August 6, 1961, with a remote indicator in the home of the observer.

The National Weather Service removed the resistance gage from service May 1, 1983. The USGS installed a DCP (Data Collection Platform) that is interrogated by satellite and data is transmitted to the National Weather Service every 6 hours. There is no longer an observer at this site.

The Catawba River forms in the Blue Ridge Mountains in western North Carolina about 20 miles north of the Broad River headwaters and flows easterly about 80 miles and then southerly 215 miles to join the Congaree River which then forms the Santee. The lower 73 mile reach below the mouth of Big Wateree Creek is known as Wateree River and the portion above is known as the Catawba River. The Wateree River at

Camden has a drainage area of approximately 5,070 sq.m..

There are thirteen dams above Camden:
(1) Bridgewater Dam, west of Morganton, near Glen Alpine, N.C.
(2) Rhodhiss Dam near Rhodhiss, N.C.
(3) Oxford Dam northeast of Hickory, N.C.
(4) Lookout Dam, east of Hickory, N.C.
(5) Cowans Ford Dam, Lake Norman, N.C.
(6) Mountain Island Dam, Mountain Island Lake, near Mount Holly, N.C.
(7) Lake Wylie Dam northwest of Fort Mill, S.C.
(8) Fishing Creek Dam north of Great Falls, S.C.
(9) Great Falls Dam at Great Falls, S.C.
(10)Dearborn Dam at Great Falls, S.C.
(11)Rocky Creek Dam near Great Falls, S.C.
(12)Cedar Creek Dam near Great Falls, S.C.
(13)Lake Wateree Dam northwest of Camden, S.C.

The early river stage records, 1791-1802 and 1808-1815 were copied from original James Kershaw plantation (The Hermitage) records. The Hermitage was located below Camden, near the old homestead (called the Cornwallis House), which was occupied by Lord Cornwallis after the battle of Camden.

In a letter dated January 13, 1903, an account is given of the murder of the Camden toll bridgekeeper, who was also the river stage observer. The Wateree Bridge offered a reward of $200.00 and the governor of South Carolina offered a reward of $100.00. The bridge keeper was shot in the back while at his post of duty, and attempted robbery was thought to be the motive.

A newsclipping from the State newspaper dated June 28, 1942 stated that up until that time there had been six highway bridges and one railroad trestle destroyed by flood waters, and one bridge destroyed by fire during the Confederate War. At the time of the article, eight highway bridges had been built across the Wateree.

The first record of a bridge being washed out was on August 27, 1831. A ferry operated at the site until 1838.

A new superstructure was built upon the piers of the old bridge. A freshet washed out an abutment of the bridge on the east bank of the river in 1854.

Loyal southerners set fire to the bridge in 1865 to block the advance of Sherman's Cavalry advancing from the northwest. This bridge is referred to as the "Sherman Bridge". A ferry was again pressed into service and operated until 1872.

A steel bridge was then constructed across the river about a mile upstream from the location of the old "Sherman Bridge".

On August 26, 1908, the Wateree swept away the fifth bridge. A gentleman along with a number of hands was on the Wateree iron bridge and was cleaning away the "raft" which had accumulated against the piers of the bridge, when suddenly the bridge went down and everybody

with it. Several people were rescued but not all survived.

In 1910, still another bridge, No. 6, was built at the cost of $42,000.00 and was opened in September 1910. The opening was celebrated with a barbeque. This bridge remained in service until 1916 and in July of that year, still the worst flood, swept the bridge away again. Also, the steel Seaboard Railroad trestle was swept away along with loaded coal gondolas which had been placed on the bridge to weight it down. The highest stage recorded then was 40.4 ft and to date is the record flood. One of the gondolas had been loaded with 30-40 tons of coal and when flood waters subsided was found 1/8 of a mile from the river which indicates the fury of the Wateree at the time of that flood.

In the next year, 1920, Bridge No. 7 was opened to traffic. The bridge proved too narrow for Greyhound buses and super trucks. During maneuvers, large army tanks were not permitted to cross the bridge, because it was feared it might collapse.

On May 1, 1942, another bridge opened to traffic. This bridge now carries the south bound traffic and a bridge was built in 1967 to carry the northbound traffic.

A river stage of 25 feet causes problems at the pumping station at the DuPont Plant, and stages of 35 to 37 feet affect railway traffic in the Camden area.