# HYDROLOGY REPORT
# SOLS WASH
# TOWN OF WICKENBURG

prc

PRC Toups

A Planning Research Company

HYDROLOGY REPORT

SOLS WASH

TOWN OF WICKENBURG

January 6, 1981

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Project No.

To: MARICOPA COUNTY FLOOD CONTROL DISTRICT
3335 West Durango Street
Phoenix, Arizona 85009

Attn: Mr. Dave Johnson

Date: January 23, 1981

Subject: Sols Wash Hydrology

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General remarks:

FLOOD CONTROL DISTRICT
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| | | | |
|---|---|---|---|
| | H ENG | 1 | HYDROLOGY |
| | ASST | 2 | |
| | ADMIN | | SUSP |
| | C | | FILE |
| | ENGR | | DESTROY |
| 3 | ~~GSB~~ SSH | 4 | ~~TJL~~ OK. |
| | MARKS | | |

Info - Comments

Enclosure: [X]

Copies to:

By: [signature] P.E.

Talked to (or other agencies) engineer who indicated Wickenburg was looking into co-op with S.C.S. maybe to increase dike height to contain and/or divert 100 yr event. 2-2-81

TRANSMITTAL

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HYDROLOGY REPORT

SOLS WASH

TOWN OF WICKENBURG

## I. INTRODUCTION

The purpose of this surface water hydrology report is to generate flood peak discharges for Sols Wash at its confluence with the Hassayampa River. The objectives of this report are: 1) to present the basic physiographic and hydrologic characteristics of the study area; 2) to document the methods used in the hydrologic analysis and; 3) to present discharge frequency values for existing conditions.

## II. BACKGROUND

Presently there exists an authorized Flood Insurance Study for the Town of Wickenburg. This study was completed in October 1976 and published in July 1977. The study (reference 5) addresses the flood potential of the Hassayampa River, Sols Wash and other smaller floodprone streams with respect to the Town of Wickenburg. As noted in the study, the discharge-frequency relationships for the Hassayampa River were developed using stream flow data for thirty (30) years of record at stream gage 95155 located on the Hassayampa River. Discharge-frequency values for Sols Wash, a tributary of the Hassayampa River, were computed using an S-graph derived from reconstitutions of observed flood events on Indian Bend Wash loacted in the Phoenix-Scottsdale area. Table 1 presents the Summary of Discharges found in the published Flood Insurance Study.

This report presents an engineering method for calculating discharge-freqneucy values for Sols Wash different from that used in the Flood Insurance Study. Stream flow data for gaging stations are available upstream and downstream of Sols Wash's confluence with the Hassayampa River. This data was used to generate discharge-frequency values for the two locations by means of the Log-Pearson Type III statistical analysis as recommended by the Federal Emergency Management Agency (FEMA) (reference 12).

## II. BACKGROUND (cont'd)

Once this data was obtained, the Soil Conservation Service's TR-20 computer model (reference 10) was used to reconstruct the discharge-frequency values based on the recorded stream flow. The TR-20 input data consisted of precipitation values, drainage subareas, curve numbers and concentration times. Precipitation values were interpolated from the NOAA Atlas Volume 8 for Arizona (reference 4) with a one day type II storm distribution applied over the entire watershed. Curve numbers were estimated from the National Engineering Handbook, Section 4 (reference 9) and soils maps (reference 7). Times of concentration was based upon estimated stream valocities attained during flood flow routings. Since the TR-20 program is capable of modeling individual drainage areas with respect to their runoff characteristics, it was considered that, if the reconstruction of historical events were possible, then the calibration of discharge-frequency values for individual drainage areas (e.g. Sols Wash) would be the result of the analysis.

## III. GENERAL DESCRIPTION OF DRAINAGE AREA

### Physiography and Topography:

The Hassayampa River, of which Sols Wash is a tributary, is the principal water course through the Town of Wickenburg. The watershed for the Hassayampa River is located in northwestern Maricopa and southern Yavapai Counties. The watershed eventually drains to the Gila River. Gaging station 95155 is lcoated upstream of Wickenburg and has a drainage area of approximately 417 square miles which is characterized by rugged mountain type terrain ranging in elevation from about 2,300 feet to 7,700 feet, National Geodetic Vertical Datum of 1929. The average stream gradient for this drainage area is about 2.6 percent or 137 feet per mile. The drainage area contributing to gaging station 95165 consists of a total of 774 square miles. The 357 square miles contributing downstream of gaging station 95155 consists of mildly sloping desert type terrain and rolling hills bordered by a fringe of poorly defined mountains and foothills. Sols Wash is a part of this 357 square mile watershed and has a drainage area

Physiography and Topography: (cont'd)

of 144 square miles at its confluence with the Hassayampa River. The stream gradient for Sols Wash is about 1.2 percent or 65 feet per mile. The average channel slope of the Hassayampa River from gaging station 95155 to gaging station 95165 is 0.5 percent or 24 feet per mile. The change in channel slope is constant with the change of topographic conditions of the drainage area found between gaging stations. For drainage subareas and concentration points (identification numbers) see Plates 1 and 2.

Vegetation:

Vegetation varies with latitude and elevation. In the northern portion of the watershed, which is the mountanous area, heavy forest can be found with chaparral cover prevailing as elevation descend. In the central region, chaparral growth continues with juniper, palo verde, mesquite and scrub oak type trees existing among the shrubs. The southern portion is best characterized by typical desert terrain which is sparse and includes cacti and other desert shrubs. Vegetation tends to be thicker adjacent to the stream courses. Annual grasses occur after winter rains.

Soils:

The soils within the watershed can generally be divided into two types; those found on the gently sloping plains and alluvial fans, and those in the mountains and low hills. The soils of the plains and alluvial fans are mostly gravelly, sandy loams that range from shallow to very deep depending on the slope of the topography. In the mountains and hilly areas, the soils are shallow to very shallow, consisting of very gravelly, sandy loams. Rock outcrops of granites and volcanics are common throughout the area. Bedrock can often be found just below the surface and is covered with only a few cobbles and stones in the process of disintegration.

Runoff Characteristics:

Little stream flow occurs in the study area except during and immediately following heavy precipitation. Climatic and drainage area characteristics

Runoff Characteristics: (cont'd)

are not conducive to continuous runoff. Stream flow increases rapidly in response to effective rainfall. Base flow is negligible in the Wickenburg area. Snow melt does not add significant runoff to winter floods.

Structures Affecting Runoff:

Flood control dams have been constructed in 1976 by the Soil Conservation Service on both Sunny Cove and Sunset Washes. Both dams are earthfill structures with ungated outlets and are designed to control all flows up to and including a 100-year flood (reference 11). The Sunny Cove Dam has a drainage area of 1.35 square miles while Sunset Dam has a drainage area of 0.60 square miles. The TR-20 computer input for this study does not account for these structures for three reasons. First, these structures, which control only 1.95 square miles of the total drainage area, will have a very minimal effect at gaging station 95165 where the size of uncontrolled watershed is 774 square miles. Second, these structures do not contribute directly or indirectly to Sols Wash, the tributary being analyzed for hydrology in this study. Third, the majority of the historical flood flows which have been utilized in the statistical analysis to establish a discharge-frequency relationship at gaging station 95165 occurred prior to the existence of these structures.

An earth embankment constructed across Sols Wash directs flow into a channel leading out of the drainage area. This structure is located adjacent to Sols Tank and intercepts a drainage area of approximately 58 square miles.

Based on field measurements and normal depth calculations, it is expected that a discharge exceeding 4,000 cfs will overtop portions of the structure and eventually contribute to its failure. The United States Geological Survey quadrangle map titled "Congress SW, Arizona" and dated 1969, shows the earth embankment structure. Inquiries to Maricopa County, Yavapai County, SCS, and the Town of Wickenburg have failed to reveal the public agency or firm responsible for its construction or design

Structures Affecting Runoff: (cont'd)

specifications for the structure. Because of the many unknowns and probable failure of the structure in a 100-year event, all hydrologic computations in this study include this 58 square mile area.

## IV. HYDROLOGIC ANALYSIS

### Log-Pearson Type III Analysis:

There exists no runoff data suitable for deriving direct discharge-frequency relationships for Sols Wash. There does, however, exist historic stream gage data for the Hassayampa River upstream and downstream of the Sols Wash confluence. Utilizing this stream gage data a Log-Pearson Type III statistical analysis was performed. Thirty-eight (38) years of records were investigated for the upstream stream gage station 95155 and twenty-five (25) years of records were investigated for the dosntream station 95165. The results of the Log-Pearson analysis are presented in Table 1. These results compare favorably with the Flood Insurance Study for the Town of Wickenburg, published in July 1977, which employed thirty (30) years of record for stream gage station 95155. (see Table 1).

### Watershed Modeling Technique, TR-20:

Upon having established a discharge-frequency relationship for the Hassayampa stream gage stations, SCS TR-20 watershed modeling techniques were utilized and a rainfall/runoff analysis was performed for the Hassayampa River watershed. In this technique, an attempt was made to reconstruct discharge-frequency relationships which were previously established by the Log-Pearson statistical analysis. The results of this rainfall/runoff analysis were evaluated and curve numbers were adjusted as necessary in this iterative reconstitution process.

The TR-20 technique produced an extremely close reconstruction of the discharge-frequency relationship for upstream station 95155. The technique, however, produced discharge-frequency relationships with consistent higher peaks for the downstream station 95165. The consistent higher peaks appears to be a result of techniques capability limitation. The TR-20 program

TABLE 1

SUMMARY OF DISCHARGES

| FLOODING SOURCE | METHOD | LOCATION | DRAINAGE AREA sq. mi. | PEAK DISCHARGES (cfs) 10-year | 50-year | 100-year |
|---|---|---|---|---|---|---|
| Hassayampa River | Log-Pearson Type III[1] | Gaging Sta. 95155 | 417 | 20,000 | 51,000 | 71,000 |
| | Toups TR-20[2] | Gaging Sta. 95155 | 417 | 25,000 | 54,000 | 71,000 |
| | Regression Equation[3] | Gaging Sta. 95155 | 417 | 13,000 | 32,000 | 41,000 |
| | Flood Ins. Study[4] | Wickenburg upstream corporate limit | 564 | 14,500 | 47,000 | 71,000 |
| Hassayampa River | Log-Pearson Type III[1] | Gaging Sta. 95165 | 774 | 17,000 | 56,000 | 85,000 |
| | Toups TR-20[2] | Gaging Sta. 95165 | 774 | 36,000 | 77,000 | 100,000 |
| | Regression Equation[3] | Gaging Sta. 95165 | 774 | 25,000 | 68,000 | 91,000 |
| | Flood Ins. Study[4] | Wickenburg downstream corporate limit | 671 | 14,000 | 46,000 | 70,000 |
| Sols Wash | Toups TR-20[2] | Confluence with Hassayampa | 145 | 5,400 | 11,200 | 14,700 |
| | Regression Equation[3] | Confluence with Hassayampa | 145 | 6,800 | 20,000 | 29,000 |
| | Flood Ins. Study[4] | Confluence with Hassayampa | 145 | 4,000 | 16,500 | 24,000 |
| | SCS[5] | Confluence with Hassayampa | 145 | 7,500 | 12,100 | 14,400 |

1 - Log-Pearson Type III computer input-output in Appendix
2 - Toups TR-20 computer input-output in Appendix
3 - Regression Equation calculations in Appendix
4 - Discharge values from Flood Insurance Study - Town of Wickenburg, July, 1977 (reference 5)
5 - 10-year and 50-year values extrapolated holding 100-year and 25-year value of 9,750 cfs (reference 11)

Watershed Modeling Technique, TR-20: (cont'd)

is not able to model infiltration losses which may occur during the routing of flood flows within a given reach. In this analysis, for instance, in a reach length of approximately 15 miles, from station 95155 to station 95165, where the channel gradient is very flat and the floodplain is fairly wide, the TR-20 program did not account for any infiltration losses. It should be noted that a flat channel gradient and wider floodplain allows higher infiltration losses.

Although the TR-20 computer model was higher in discharge-frequency values for gaging station 95165, the values associated with Sols Wash are consistently lower, except for the 10-year event, than those presented in the July 1977 Flood Insurance Study (Plate 4). Efforts were not undertaken to manipulate the computer program to duplicate the statistical discharge-frequency values. The computer values for Sols Wash are in general agreement with those presented by SCS.

On August 17, 1971, a major flood peak occurred in Sols Wash. Based on slope area measurements, SCS estimated a peak discharge of 9,500 cfs. USGS also made slope area measurements of this flow and estimated a peak discharge of 10,600 cfs with the measurement being rated poor. The 25-year discharge using the TR-20 program was calculated by SCS to be 9,750 cfs (reference 11). A peak discharge of 14,400 cfs is given by SCS as the 100-year flood peak for Sols Wash (reference 5). These two values were plotted on probability paper with 10-year and 50-year values being extrapolated and entered into Table 1.

Regression Equations:

Regression equations were also used to estimate the magnitude and frequency of floods for the Hassayampa River and Sols Wash (reference 8). Methods outlined in the Arizona Department of transportation Report, "ADOT-RS-14 [121] Final Report", were used to estimate the flows for the 10-, 50-, and 100-year flood event (see Table 1). Compared to the Log-Pearson Type III results, the results of the regression equation generally varied. For gaging station 95155, the results are considerably lower

Regression Equations: (cont'd)

while, for gaging station 95165, the results are higher than the Log-Pearson results. Because of the failure to closely model results of the Log-Pearson Type III analysis, use of the regression equations for Sols Wash are not supported by this report.

## V. CONCLUSIONS AND RECOMMENDATIONS

This report presents a hydrologic analysis of Sols Wash, a tributary to the Hassayampa River, in the Town of Wickenburg to determine peak flood discharges in accordance with the Guidelines of the Federal Emergency Management Agency (FEMA). The results of this analysis and other pertinent hydrologic data developed by the Soil Conservation Service as well as the Corps of Engineers in preparation of the 1975 Flood Insurance Study for Wickenburg have been presented in Table 1, Summary of Discharges. The discharge values reported in Table 1, compared, show an extremely close agreement in flood peaks between the results of this analysis and that of the SCS study.

The analysis presented in this report is based on establishing discharge-frequency relationships for two stream gage stations on the Hassayampa River in accordance with FEMA guidelines. Utilizing these relationships as a guide, a rainfall/runoff model was created to reconstitute the same discharge-value relationships. This modeling required optimization of hydrologic parameters in order to produce the desired reconstitution. Through this process, hydrologic parameters of the entire watershed were optimized including those of Sols Wash. It is, therefore, believed that the peak discharges for Sols Wash presented in this report are based on the "best-fit" hydrologic parameters and the rainfall/runoff process which is most likely to occur over the Sols Wash watershed.

Furthermore, the results of this analysis compares very favorably with those of the SCS study presented in reference 11.

It is, therefore, recommended that the results of this study be submitted to FEMA for their review and approval in connection with revising the hydrology for Sols Wash and that portion of the Flood Insurance Study that is affected.

## VI. REFERENCES


1. Arizona Department of Transportation, "Hydrologic Design for Highway Drainage in Arizona", June, 1975.

2. U.S. Army Corps of Engineers, "Floodplain Information, Hassayampa River, Vicinity of Wickenburg, Arizona", April, 1972.

3. U.S. Army Corps of Engineers, "Hydrology for Flood Insurance Studies, Wickenburg and Vicinity, Maricopa and Yavapai Counties", November, 1975.

4. U.S. Department of Commerce, NOAA Atlas 2, "Precipitation, Frequency Atlas of the Western United States, Volume VIII, Arizona", 1973.

5. U.s. Department of Housing and Urban Development, Flood Insurance Study, Town of Wickenburg, Arizona, July 1977.

6. U.S. Geological Survey, Mapping: Phoenix, Arizona, 1969, 1:250,000 Scale and Congress SW, Arizona, 1969, 1: 24,000 Scale.

7. U.S. Soil Conservation Service, "General Soil Map, Maricopa County, Arizona", 1973.

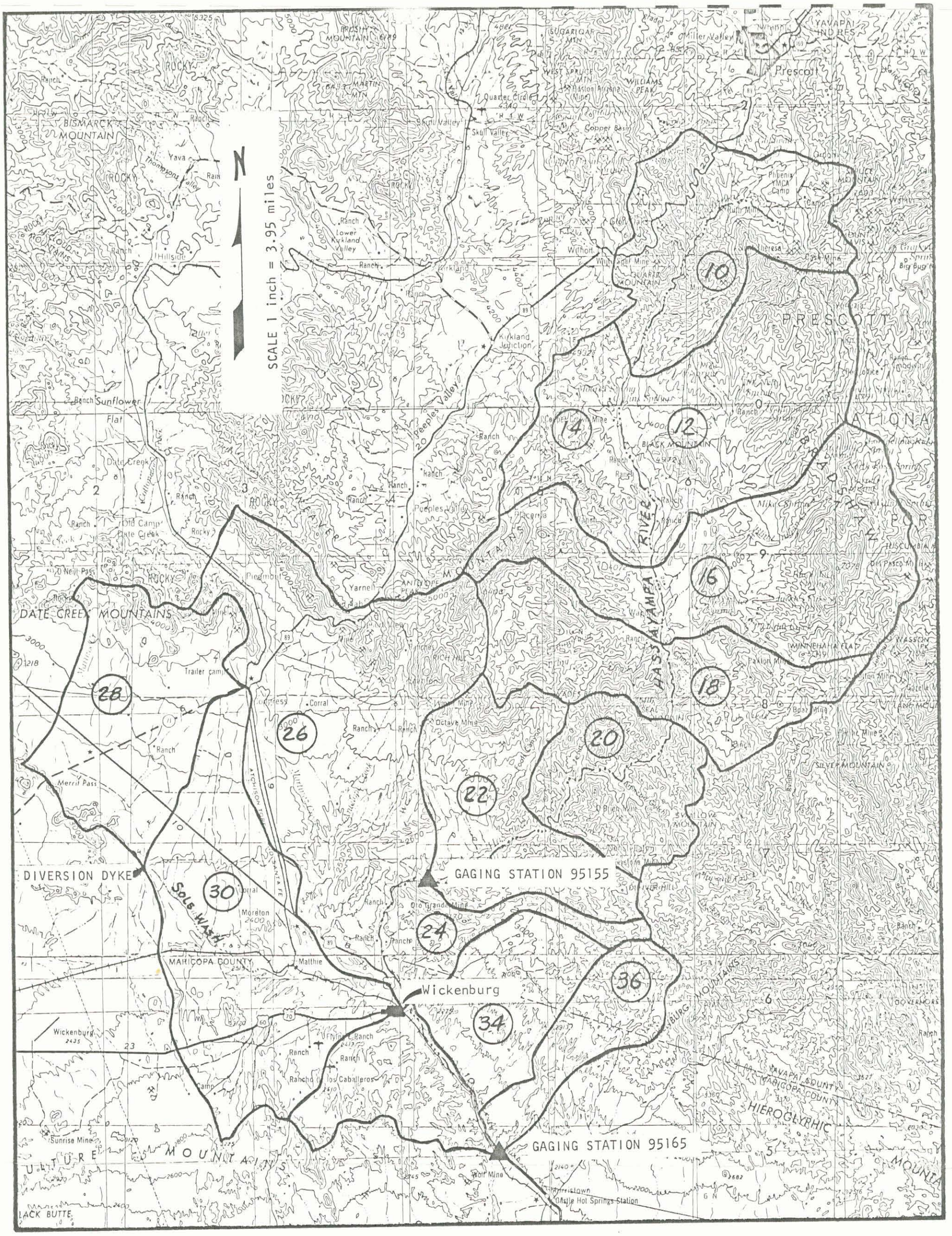
8. U.S.G.S. "Methods for Estimating the Magnitude and Frequency of Floods in Arizona", September, 1978.

9. U.S. Soil Conservation Service, "National Engineering Handbook, Section 4, Hydrology", August, 1972.

10. U.S. Soil Conservation Service, "Technical Release No. 20", May, 1975.

11. U.S. Soil Conservation Service, "Watershed Work Plan, Wickenburg Watershed, Maricopa and Yavapai Counties, Arizona", December, 1974.

12. U.S. Water Resources Council, "Flood Flow Frequency, Bulletin #17A", March, 1976.



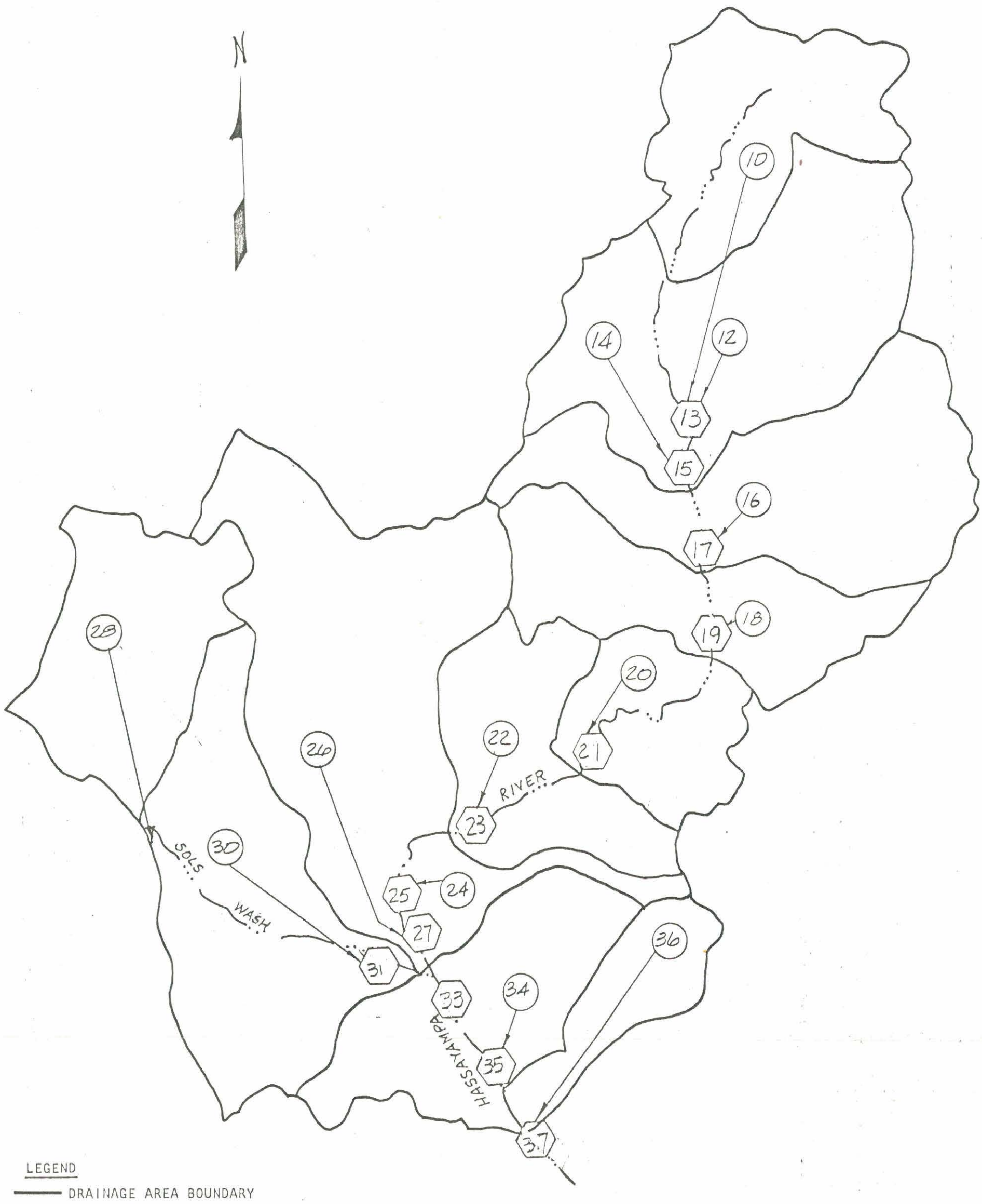

LEGEND

DRAINAGE AREA BOUNDARY

(30) DRAINAGE SUBAREA

WATER COURSE FLOWLINE

DRAINAGE AREA MAP




LEGEND

DRAINAGE AREA BOUNDARY

(30) IDENTIFICATION NUMBER / DRAINAGE SUBAREA RUNOFF

(31) IDENTIFICATION NUMBER, COMBINE TWO HYDROGRAPHS

WATER COURSE FLOWLINE

TR-20 SCHEMATIC MAP

GAGING STATION 95155 - HASSAYAMPA RIVER

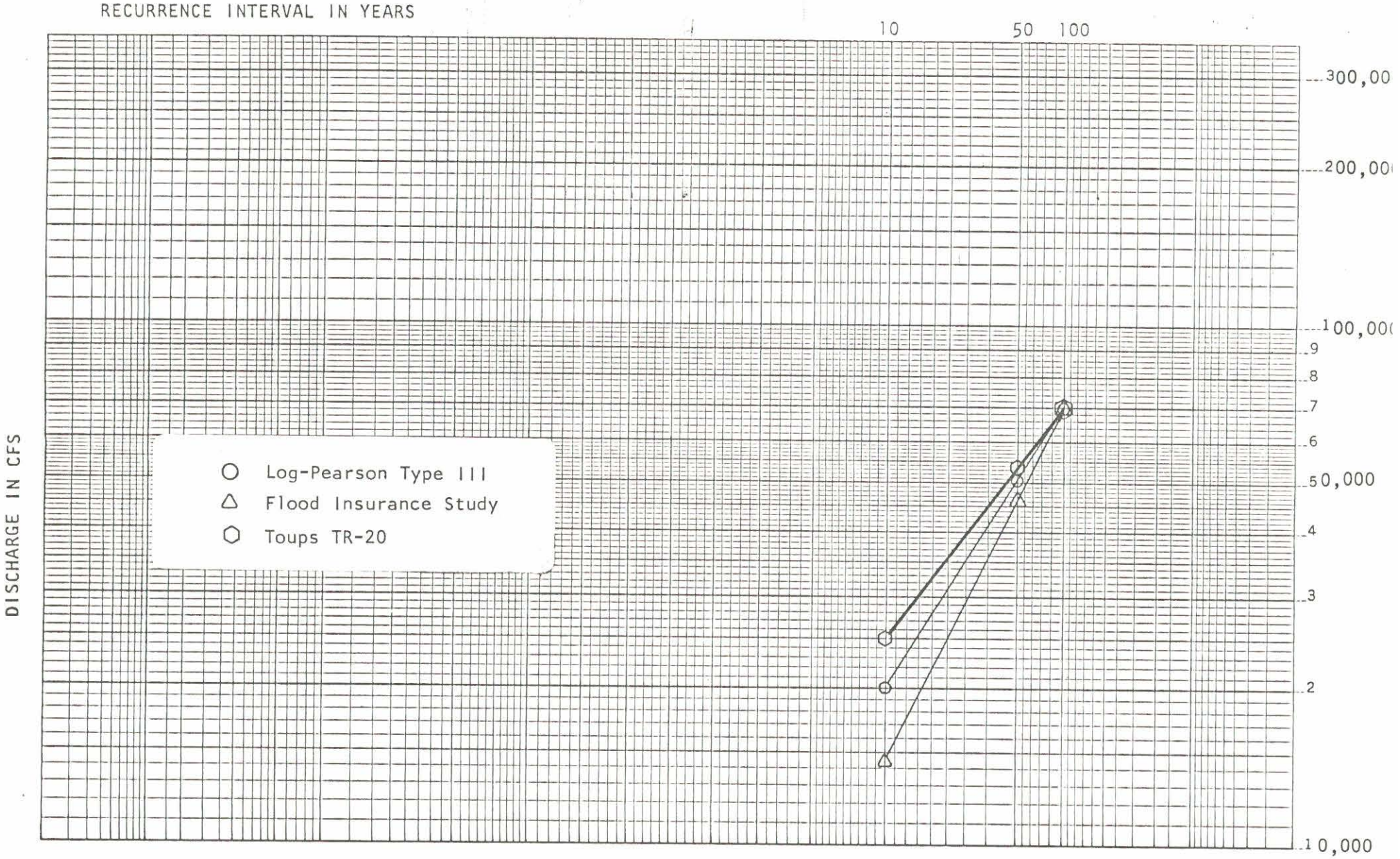



PLATE 3

GAGING STATION 95165 - HASSAYAMPA RIVER

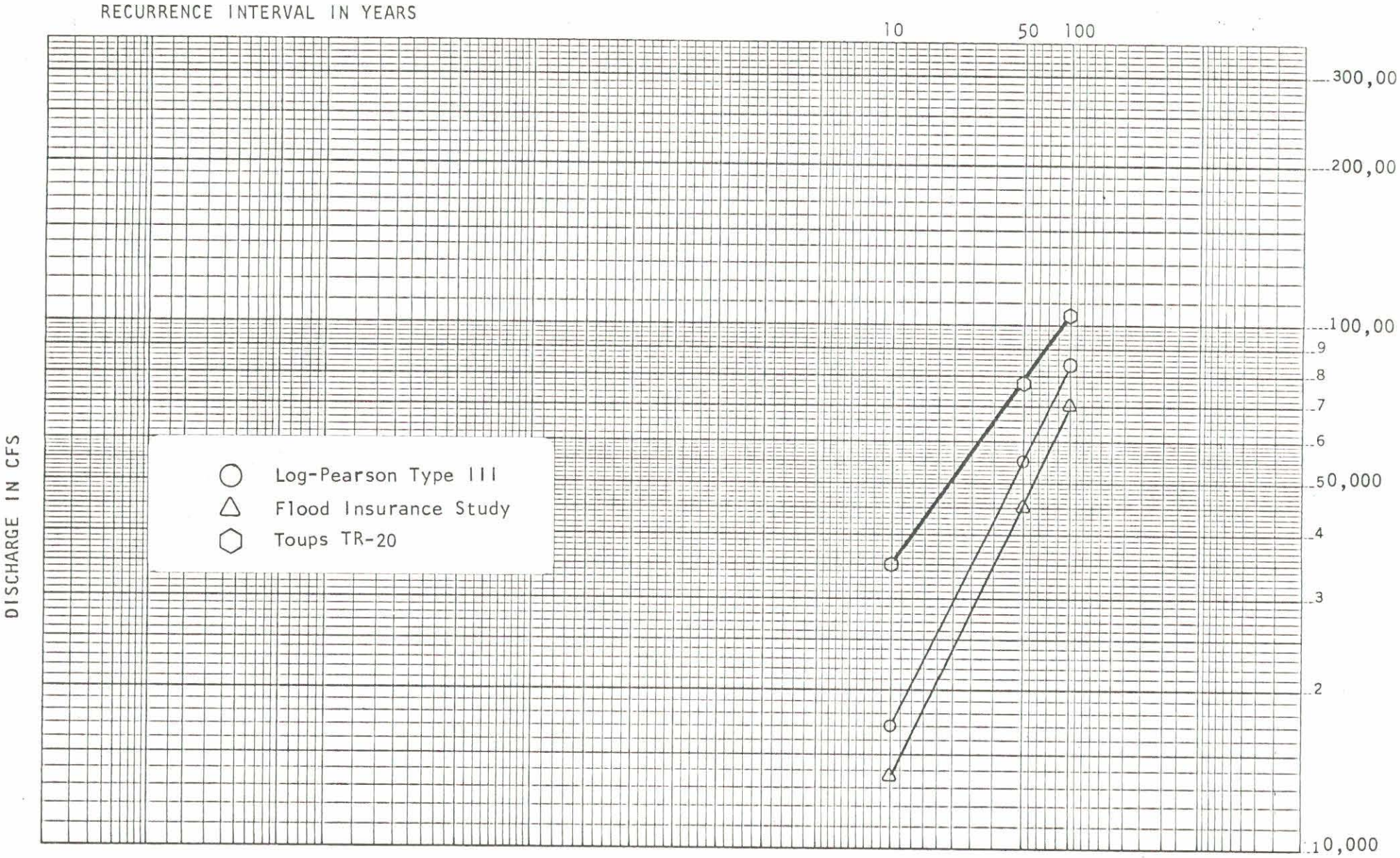



PLATE 4

SOLS WASH - JUST ABOVE THE CONFLUENCE WITH HASSAYAMPA RIVER

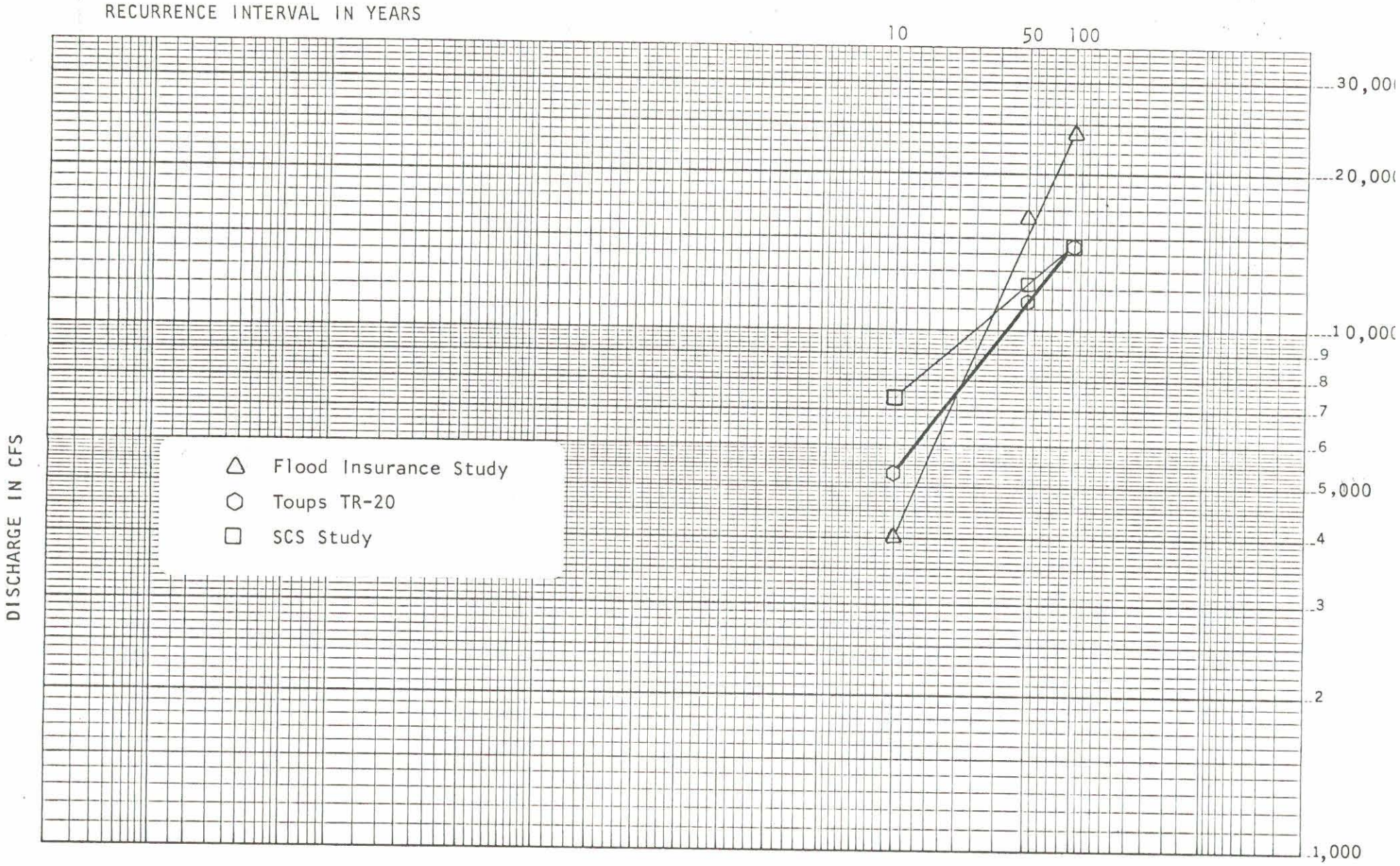



PLATE 5

# APPENDIX

Log-Pearson Type III Computer Input-Output

FLOOD FLOW FREQUENCY COMPUTATION

STATION 09515500 HASSAYAMPA RIVER AT BOX DAMSITE NR WICKENBURG AZ.

| N | NQH | NOUTL | IYRA | IPLOT | IEXPP | SKEW | A | B | PRELM |
|---|---|---|---|---|---|---|---|---|---|
| 38 | 0 | 0 | 0 | 1 | 1 | -.100 | 0.000 | 0.000 | 0.000 |

FINAL RESULTS

| DAY | MONTH | YEAR | FLOW | ORDERED | RANK | PLOT POS |
|---|---|---|---|---|---|---|
| 0 | 0 | 1925 | 25500. | 58000. | 1 | .0256 |
| 0 | 0 | 1927 | 27100. | 27100. | 2 | .0513 |
| 0 | 0 | 1937 | 22000. | 27000. | 3 | .0769 |
| 0 | 0 | 1938 | 10000. | 25500. | 4 | .1026 |
| 0 | 0 | 1946 | 1710. | 22000. | 5 | .1282 |
| 0 | 0 | 1947 | 2300. | 16000. | 6 | .1538 |
| 0 | 0 | 1948 | 5600. | 11200. | 7 | .1795 |
| 0 | 0 | 1949 | 2910. | 10600. | 8 | .2051 |
| 0 | 0 | 1950 | 5500. | 10000. | 9 | .2308 |
| 0 | 0 | 1951 | 27000. | 10000. | 10 | .2564 |
| 0 | 0 | 1952 | 1590. | 9060. | 11 | .2821 |
| 0 | 0 | 1953 | 865. | 8840. | 12 | .3077 |
| 0 | 0 | 1954 | 3090. | 5600. | 13 | .3333 |
| 0 | 0 | 1955 | 8840. | 5560. | 14 | .3590 |
| 0 | 0 | 1956 | 1210. | 5560. | 15 | .3846 |
| 0 | 0 | 1957 | 1980. | 5500. | 16 | .4103 |
| 0 | 0 | 1958 | 10600. | 5110. | 17 | .4359 |
| 0 | 0 | 1959 | 5110. | 4630. | 18 | .4615 |
| 0 | 0 | 1960 | 3210. | 4560. | 19 | .4872 |
| 0 | 0 | 1961 | 1150. | 3210. | 20 | .5128 |
| 0 | 0 | 1962 | 1510. | 3090. | 21 | .5385 |
| 0 | 0 | 1963 | 2150. | 2910. | 22 | .5641 |
| 0 | 0 | 1964 | 1230. | 2600. | 23 | .5897 |
| 0 | 0 | 1965 | 9060. | 2300. | 24 | .6154 |
| 0 | 0 | 1966 | 5560. | 2150. | 25 | .6410 |
| 0 | 0 | 1967 | 1740. | 1980. | 26 | .6667 |
| 0 | 0 | 1968 | 11200. | 1740. | 27 | .6923 |
| 0 | 0 | 1969 | 4630. | 1710. | 28 | .7179 |
| 0 | 0 | 1970 | 58000. | 1590. | 29 | .7436 |
| 0 | 0 | 1971 | 556. | 1510. | 30 | .7692 |
| 0 | 0 | 1972 | 800. | 1230. | 31 | .7949 |
| 0 | 0 | 1973 | 2600. | 1210. | 32 | .8205 |
| 0 | 0 | 1974 | 5560. | 1150. | 33 | .8462 |
| 0 | 0 | 1975 | 154. | 865. | 34 | .8718 |
| 0 | 0 | 1976 | 4560. | 800. | 35 | .8974 |
| 0 | 0 | 1977 | 315. | 556. | 36 | .9231 |
| 0 | 0 | 1978 | 16000. | 315. | 37 | .9487 |
| 0 | 0 | 1979 | 10000. | 154. | 38 | .9744 |

| | |
|---|---|
| MEAN | 3.5736 |
| STD DEV | .5673 |
| COMPUTED SKEW | -.1436 |
| REGIONAL SKEW | -.1000 |
| ADOPTED SKEW | -.1076 |

| COMPUTED FLOW (CFS) | EXPECTED PROBABILITY FLOW | PROBABILITY | .05 LIMIT | .95 LIMIT |
|---|---|---|---|---|
| 135708. | 177875. | .002 | 344541. | 70173. |
| 94975. | 116779. | .005 | 223435. | 51584. |
| 70529. | 83039. | .010 | 155899. | 39861. |
| 50787. | 57482. | .020 | 104969. | 29942. |
| 35114. | 38382. | .040 | 67477. | 21651. |
| 19669. | 20676. | .100 | 33982. | 12910. |
| 11318. | 11620. | .200 | 17913. | 7776. |
| 3834. | 3834. | .500 | 5473. | 2691. |
| 1257. | 1222. | .800 | 1828. | 796. |
| 692. | 655. | .900 | 1058. | 399. |
| 420. | 384. | .950 | 677. | 221. |
| 162. | 133. | .990 | 294. | 70. |

FLOOD FLOW FREQUENCY COMPUTATION

STATION 09516500 HASSAYAMPA RIVER NR MORRISTOWN AZ.

| N | NQH | NOUTL | IYRA | IPLOT | IEXPP | SKEW | A | B | PRELM |
|---|---|---|---|---|---|---|---|---|---|
| 25 | 0 | 0 | 0 | 1 | 1 | -.100 | 0.000 | 0.000 | 0.000 |

FINAL RESULTS

| DAY | MONTH | YEAR | FLOW | ORDERED | RANK | PLOT POS |
|---|---|---|---|---|---|---|
| 0 | 0 | 1939 | 6200. | 47500. | 1 | .0385 |
| 0 | 0 | 1940 | 160. | 24000. | 2 | .0769 |
| 0 | 0 | 1941 | 6100. | 10000. | 3 | .1154 |
| 0 | 0 | 1942 | 100. | 9280. | 4 | .1538 |
| 0 | 0 | 1943 | 7700. | 7700. | 5 | .1923 |
| 0 | 0 | 1944 | 3520. | 6200. | 6 | .2308 |
| 0 | 0 | 1945 | 2200. | 6100. | 7 | .2692 |
| 0 | 0 | 1946 | 2310. | 6000. | 8 | .3077 |
| 0 | 0 | 1947 | 6000. | 6000. | 9 | .3462 |
| 0 | 0 | 1964 | 6000. | 4800. | 10 | .3846 |
| 0 | 0 | 1965 | 9280. | 3520. | 11 | .4231 |
| 0 | 0 | 1966 | 3210. | 3210. | 12 | .4615 |
| 0 | 0 | 1967 | 1150. | 2310. | 13 | .5000 |
| 0 | 0 | 1968 | 4800. | 2200. | 14 | .5385 |
| 0 | 0 | 1969 | 650. | 2000. | 15 | .5769 |
| 0 | 0 | 1970 | 47500. | 2000. | 16 | .6154 |
| 0 | 0 | 1971 | 2000. | 1600. | 17 | .6538 |
| 0 | 0 | 1972 | 700. | 1150. | 18 | .6923 |
| 0 | 0 | 1973 | 2000. | 800. | 19 | .7308 |
| 0 | 0 | 1974 | 650. | 700. | 20 | .7692 |
| 0 | 0 | 1975 | 50. | 650. | 21 | .8077 |
| 0 | 0 | 1976 | 800. | 650. | 22 | .8462 |
| 0 | 0 | 1977 | 1600. | 160. | 23 | .8846 |
| 0 | 0 | 1978 | 24000. | 100. | 24 | .9231 |
| 0 | 0 | 1979 | 10000. | 50. | 25 | .9615 |

| | |
|---|---|
| MEAN | 3.3452 |
| STD DEV | .7024 |
| COMPUTED SKEW | -.5728 |
| REGIONAL SKEW | -.1000 |
| ADOPTED SKEW | -.1000 |

| COMPUTED FLOW (CFS) | EXPECTED-PROBABILITY FLOW | PROBABILITY | .05 LIMIT | .95 LIMIT |
|---|---|---|---|---|
| 191289. | 326699. | .002 | 869173. | 71674. |
| 122574. | 184152. | .005 | 490981. | 49404. |
| 84596. | 116479. | .010 | 305640. | 36166. |
| 56202. | 71534. | .020 | 181676. | 25575. |
| 35508. | 42187. | .040 | 101716. | 17261. |
| 17277. | 19017. | .100 | 41456. | 9200. |
| 8699. | 9147. | .200 | 18019. | 4945. |
| 2274. | 2274. | .500 | 3938. | 1318. |
| 572. | 542. | .800 | 1006. | 277. |
| 274. | 247. | .900 | 517. | 113. |
| 148. | 125. | .950 | 302. | 53. |
| 46. | 31. | .990 | 111. | 12. |

TR-20 Computer Input-Output

HASSAYAMPA RIVER + SOLS WASH

TR-20 HYDROLOGY

12/16

EXECUTIVE CONTROL CARD OPERATION LIST PASS= 1

LISTING OF DATA IN CORE

# TR 20 INPUT LISTING

0 HASSAYAMPA RIVER + SOLS WASH

VELOCITY INCREMENT

1 CTABLE .2000

| | | | | | |
|---|---|---|---|---|---|
| 8 | 0.0000 | .0800 | .1800 | .2500 | .3200 |
| 8 | .3700 | .4100 | .4500 | .4900 | .5100 |
| 8 | .5400 | .5700 | .5900 | .6100 | .6300 |
| 8 | .6500 | .6600 | .6700 | .6900 | .7000 |
| 8 | .7100 | .7200 | .7300 | .7400 | .7500 |
| 8 | .7600 | .7700 | .7700 | .7800 | .7900 |
| 8 | .7900 | .8000 | .8100 | .8100 | .8200 |
| 8 | .8200 | .8300 | .8300 | .8400 | .8400 |
| 8 | .8400 | .8500 | .8500 | .8600 | .8600 |
| 8 | .8600 | .8600 | .8700 | .8700 | .8700 |
| 8 | .8800 | .8800 | .8800 | .8900 | .8900 |
| 8 | .8900 | .8900 | .8900 | .8900 | .9000 |
| 8 | .9000 | .9000 | .9000 | .9000 | .9100 |
| 8 | .9100 | .9100 | .9100 | .9100 | .9100 |
| 8 | .9200 | .9200 | .9200 | .9200 | .9200 |
| 8 | .9200 | .9200 | .9200 | .9300 | .9300 |

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 50 1.0000

| | ELEVATION | DISCHARGE | END AREA |
|---|---|---|---|
| 8 | 1.0000 | 5000.0000 | 1250.0000 |
| 8 | 2.0000 | 10000.0000 | 2222.0000 |
| 8 | 3.0000 | 20000.0000 | 4000.0000 |
| 8 | 4.0000 | 50000.0000 | 6250.0000 |
| 8 | 5.0000 | 70000.0000 | 5833.0000 |
| 8 | 6.0000 | 90000.0000 | 6000.0000 |

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 51 1.0000

| | ELEVATION | DISCHARGE | END AREA |
|---|---|---|---|
| 8 | 1.0000 | 5000.0000 | 1250.0000 |
| 8 | 2.0000 | 10000.0000 | 2222.0000 |
| 8 | 3.0000 | 20000.0000 | 4000.0000 |
| 8 | 4.0000 | 50000.0000 | 6250.0000 |
| 8 | 5.0000 | 70000.0000 | 5833.0000 |
| 8 | 6.0000 | 90000.0000 | 6000.0000 |

9 ENDTBL

XSECTN NO. DRAINAGE AREA

2 XSECTN 52 1.0000

```
                          ELEVATION   DISCHARGE    END AREA
 8                           1.0000  20000.0000   5000.0000
 8                           2.0000  50000.0000  10000.0000
 8                           3.0000  70000.0000  10915.0000
 8                           4.0000 110000.0000  14667.0000
 9 ENDTBL

                    TIME INCREMENT
 4 DIMHYD

 8              0.0000      .0300      .1000      .1900      .3100
 8               .4700      .6600      .8200      .9300      .9900
 8              1.0000      .9900      .9300      .8600      .7800
 8               .6800      .5600      .4600      .3900      .3300
 8               .2800      .2410      .2070      .1740      .1470
 8               .1260      .1070      .0910      .0770      .0660
 8               .0550      .0470      .0400      .0340      .0290
 8               .0250      .0210      .0180      .0150      .0130
 8               .0110      .0090      .0080      .0070      .0060
 8               .0050      .0040      .0030      .0020      .0010
 8              0.0000     0.0000     0.0000     0.0000     0.0000
 9 ENDTBL

   COMPUTED PEAK K FACTOR =  484.00

                    TIME INCREMENT
 5 RAINFL 1                  .5000

 8              0.0000      .0050      .0110      .0160      .0220
 8               .0280      .0350      .0410      .0480      .0560
 8               .0630      .0710      .0800      .0890      .0980
 8               .1090      .1200      .1330      .1470      .1630
 8               .1810      .2040      .2350      .2830      .6630
 8               .7350      .7720      .7990      .8200      .8380
 8               .8540      .8680      .8800      .8910      .9020
 8               .9120      .9210      .9290      .9370      .9450
 8               .9520      .9590      .9650      .9720      .9780
 8               .9840      .9390      .9950     1.0000     1.0000
 9 ENDTBL
```

STANDARD CONTROL INSTRUCTIONS

```
6 RUNOFF 1  10        5     62.8200     78.0000     2.80000 0 0 0 0 1
6 REACH  3  50   5    6  41667.0000      0.0000     0.00000 0 0 0 0 1
6 RUNOFF 1  12        5     59.6800     72.0000     3.30000 0 0 0 0 1
6 ADDHYD 4  13   5 6 7                                   0 0 0 0 0 1
6 RUNOFF 1  14        5     47.1100     72.0000     2.10000 0 0 0 0 1
6 ADDHYD 4  15   5 7 6                                   0 0 0 0 0 1
6 REACH  3  50   6    5  16667.0000      0.0000     0.00000 0 0 0 0 0
6 RUNOFF 1  16        6     92.6500     70.0000     2.90000 0 0 0 0 1
6 ADDHYD 4  17   5 6 7                                   0 0 0 0 0 1
6 REACH  3  50   7    5  16667.0000      0.0000     0.00000 0 0 0 0 0
6 RUNOFF 1  18        3     60.3100     80.0000     2.50000 0 0 0 0 1
6 ADDHYD 4  19   5 3 7                                   0 0 0 0 0 1
6 REACH  3  51   7    5  34375.0000      0.0000     0.00000 0 0 0 0 1
6 RUNOFF 1  20        6     40.8300     80.0000     1.60000 0 0 0 0 1
6 ADDHYD 4  21   5 6 7                                   0 0 0 0 0 1
6 REACH  3  50   7    5  27083.0000      0.0000     0.00000 0 0 0 0 0
6 RUNOFF 1  22        6     53.4000     80.0000     2.30000 0 0 0 0 1
6 ADDHYD 4  23   5 6 7                                   0 0 0 0 0 1
6 REACH  3  52   7    5  29000.0000      0.0000     0.00000 0 0 0 0 1
6 RUNOFF 1  24        6     19.0000     78.0000     3.50000 0 0 0 0 1
6 ADDHYD 4  25   5 6 7                                   0 0 0 0 0 1
6 RUNOFF 1  26        5    109.4000     78.0000     6.40000 0 0 0 0 1
6 ADDHYD 4  27   5 7 3                                   0 0 0 0 0 1
6 RUNOFF 1  28        5     58.4000     76.0000     5.80000 0 0 0 0 1
6 REACH  3  50   5    6  62500.0000      0.0000     0.00000 0 0 0 0 0
6 RUNOFF 1  30        5     85.1000     75.0000     8.70000 0 0 0 0 1
6 ADDHYD 4  31   5 6 7                                   0 0 0 0 0 1
6 ADDHYD 4  33   3 7 5                                   0 0 0 0 0 1
6 REACH  3  52   5    6  37500.0000      0.0000     0.00000 0 0 0 0 1
6 RUNOFF 1  32        1      5.6000     75.0000      .15000 0 0 0 0 1
6 RUNOFF 1  34        5     60.5000     76.0000     3.50000 0 0 0 0 1
6 ADDHYD 4  35   5 6 7                                   0 0 0 0 0 1
6 RUNOFF 1  36        5     24.8000     76.0000     5.70000 0 0 0 0 1
6 ADDHYD 4  37   5 7 6                                   0 0 0 0 0 1
  ENDATA

END OF LISTING
```

Storm 1 = 10-Yr Freqy. Storm
2 = 50-Yr Freqy. Storm
3 = 100-Yr Freqy. Storm

SUMMARY TABLE 1

MODEL GAGE STA. 95155

| ALT | STORM | | ID | DA SQ-MI. | RAIN TBLE | AMC | DELTA-T HRS. | TZERO HRS. | PRECIP IN. | PRECIP DURATION | PEAK-Q CFS | PEAK-TIME | PEAK-ELEV | RUNOFF IN. | CSM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10-YR | 1 | 10 | 62.82 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 9877.30 | 13.76 | 0.00 | 1.13 | 157.23 |
| 1 | | 1 | 50 | 62.82 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 9241.08 | 16.49 | 1.85 | 1.13 | 147.10 |
| 1 | | 1 | 12 | 59.68 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 5531.28 | 14.23 | 0.00 | .81 | 92.68 |
| 1 | | 1 | 13 | 122.50 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 12362.80 | 16.31 | 0.00 | .97 | 100.92 |
| 1 | | 1 | 14 | 47.11 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 6075.58 | 13.40 | 0.00 | .81 | 128.97 |
| 1 | | 1 | 15 | 169.61 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 14206.06 | 16.20 | 0.00 | .93 | 83.76 |
| 1 | | 1 | 16 | 92.65 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 8043.86 | 13.99 | 0.00 | .71 | 86.82 |
| 1 | | 1 | 17 | 262.26 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 17976.42 | 14.48 | 0.00 | .85 | 68.54 |
| 1 | | 1 | 18 | 60.31 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 11636.62 | 13.50 | 0.00 | 1.25 | 192.95 |
| 1 | | 1 | 19 | 322.57 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 23129.33 | 15.22 | 0.00 | .92 | 71.70 |
| 1 | | 1 | 51 | 322.57 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 22615.35 | 17.12 | 3.09 | .92 | 70.11 |
| 1 | | 1 | 20 | 40.83 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 10236.03 | 12.92 | 0.00 | 1.17 | 250.70 |
| 1 | | 1 | 21 | 363.40 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 23965.38 | 17.08 | 0.00 | .95 | 65.95 |
| 1 | | 1 | 22 | 53.40 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 10413.67 | 13.42 | 0.00 | 1.17 | 195.01 |
| 1 | | 1 | 23 | 416.80 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 25273.32 | 18.50 | 0.00 | .98 | 60.64 |
| 1 | 50-YR | 2 | 10 | 62.82 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 17935.12 | 13.67 | 0.00 | 1.96 | 285.50 |
| 1 | | 2 | 50 | 62.82 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 16991.23 | 16.16 | 2.70 | 1.96 | 270.47 |
| 1 | | 2 | 12 | 59.68 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 11231.38 | 14.17 | 0.00 | 1.53 | 180.19 |
| 1 | | 2 | 13 | 122.50 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 23497.49 | 15.95 | 0.00 | 1.75 | 191.82 |
| 1 | | 2 | 14 | 47.11 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 12445.74 | 13.32 | 0.00 | 1.53 | 264.18 |
| 1 | | 2 | 15 | 169.61 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 27206.69 | 15.77 | 0.00 | 1.69 | 160.41 |
| 1 | | 2 | 16 | 92.65 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 17181.07 | 13.92 | 0.00 | 1.39 | 185.44 |
| 1 | | 2 | 17 | 262.26 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 38390.25 | 14.33 | 0.00 | 1.59 | 146.38 |
| 1 | | 2 | 18 | 60.31 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 20430.52 | 13.45 | 0.00 | 2.12 | 338.76 |
| 1 | | 2 | 19 | 322.57 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 49376.26 | 14.76 | 0.00 | 1.68 | 153.07 |
| 1 | | 2 | 51 | 322.57 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 48739.20 | 16.09 | 3.96 | 1.68 | 151.10 |
| 1 | | 2 | 20 | 40.83 | 1 | 2 | .20 | 0.00 | 3.80 | 24.00 | 16872.06 | 12.88 | 0.00 | 1.87 | 413.23 |
| 1 | | 2 | 21 | 363.40 | 1 | 2 | .20 | 0.00 | 3.80 | 24.00 | 51426.29 | 16.04 | 0.00 | 1.71 | 141.51 |
| 1 | | 2 | 22 | 53.40 | 1 | 2 | .20 | 0.00 | 3.80 | 24.00 | 17121.64 | 13.39 | 0.00 | 1.88 | 320.63 |
| 1 | | 2 | 23 | 416.80 | 1 | 2 | .20 | 0.00 | 3.80 | 24.00 | 54372.00 | 17.02 | 0.00 | 1.73 | 130.45 |
| 1 | 100-YR | 3 | 10 | 62.82 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 21874.23 | 13.64 | 0.00 | 2.37 | 348.20 |
| 1 | | 3 | 50 | 62.82 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 20799.69 | 16.06 | 3.03 | 2.37 | 331.10 |
| 1 | | 3 | 12 | 59.68 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 14136.09 | 14.15 | 0.00 | 1.89 | 236.86 |
| 1 | | 3 | 13 | 122.50 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 29081.82 | 15.82 | 0.00 | 2.14 | 237.40 |
| 1 | | 3 | 14 | 47.11 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 15685.37 | 13.30 | 0.00 | 1.89 | 332.95 |
| 1 | | 3 | 15 | 169.61 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 33897.22 | 15.63 | 0.00 | 2.07 | 199.85 |
| 1 | | 3 | 16 | 92.65 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 21897.06 | 13.89 | 0.00 | 1.74 | 236.34 |
| 1 | | 3 | 17 | 262.26 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 49284.97 | 14.24 | 0.00 | 1.95 | 187.92 |
| 1 | | 3 | 18 | 60.31 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 24661.95 | 13.43 | 0.00 | 2.54 | 408.92 |
| 1 | | 3 | 19 | 322.57 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 63712.07 | 14.56 | 0.00 | 2.06 | 197.51 |
| 1 | | 3 | 51 | 322.57 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 63175.78 | 15.71 | 4.66 | 2.06 | 195.85 |
| 1 | | 3 | 20 | 40.83 | 1 | 2 | .20 | 0.00 | 4.20 | 24.00 | 19978.62 | 12.87 | 0.00 | 2.20 | 489.31 |
| 1 | | 3 | 21 | 363.40 | 1 | 2 | .20 | 0.00 | 4.20 | 24.00 | 66738.04 | 15.66 | 0.00 | 2.08 | 183.65 |
| 1 | | 3 | 22 | 53.40 | 1 | 2 | .20 | 0.00 | 4.20 | 24.00 | 20265.90 | 13.39 | 0.00 | 2.21 | 379.51 |
| 1 | | 3 | 23 | 416.80 | 1 | 2 | .20 | 0.00 | 4.20 | 24.00 | 71044.78 | 16.45 | 0.00 | 2.10 | 170.45 |
| 2 | | 1 | 10 | 62.82 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 9877.30 | 13.76 | 0.00 | 1.13 | 157.23 |
| 2 | | 1 | 50 | 62.82 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 9241.08 | 16.49 | 1.85 | 1.13 | 147.10 |
| 2 | | 1 | 12 | 59.68 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 5531.28 | 14.23 | 0.00 | .81 | 92.68 |
| 2 | | 1 | 13 | 122.50 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 12362.80 | 16.31 | 0.00 | .97 | 100.92 |
| 2 | | 1 | 14 | 47.11 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 6075.58 | 13.40 | 0.00 | .81 | 128.97 |
| 2 | | 1 | 15 | 169.61 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 14206.06 | 16.20 | 0.00 | .93 | 83.76 |
| 2 | | 1 | 16 | 92.65 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 8043.86 | 13.99 | 0.00 | .71 | 86.82 |
| 2 | | 1 | 17 | 262.26 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 17976.42 | 14.48 | 0.00 | .85 | 68.54 |
| 2 | | 1 | 18 | 60.31 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 11636.62 | 13.50 | 0.00 | 1.25 | 192.95 |
| 2 | | 1 | 19 | 322.57 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 23129.33 | 15.22 | 0.00 | .92 | 71.70 |
| 2 | | 1 | 51 | 322.57 | 1 | 2 | .20 | 0.00 | 3.00 | 24.00 | 22615.35 | 17.12 | 3.09 | .92 | 70.11 |
| 2 | | 1 | 20 | 40.83 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 10236.03 | 12.92 | 0.00 | 1.17 | 250.70 |
| 2 | | 1 | 21 | 363.40 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 23965.38 | 17.08 | 0.00 | .95 | 65.95 |
| 2 | | 1 | 22 | 53.40 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 10413.67 | 13.42 | 0.00 | 1.17 | 195.01 |

MODEL GAGE STA. 9516

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | 23 | 416.80 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 25273.32 | 18.50 | 0.00 | .98 | 60.64 |
| 2 | 1 | 52 | 416.80 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 24819.49 | 20.57 | 1.16 | .98 | 59.55 |
| 2 | 1 | 24 | 19.00 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 2352.76 | 14.35 | 0.00 | 1.06 | 123.83 |
| 2 | 1 | 25 | 435.80 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 25303.44 | 20.55 | 0.00 | .98 | 58.06 |
| 2 | 1 | 26 | 109.40 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 8470.42 | 16.41 | 0.00 | 1.06 | 77.43 |
| 2 | 1 | 27 | 545.20 | 1 | 2 | .20 | 0.00 | 2.90 | 24.00 | 29937.65 | 20.37 | 0.00 | 1.00 | 54.91 |
| 2 | 1 | 28 | 58.40 | 1 | 2 | .20 | 0.00 | 2.43 | 24.00 | 2862.40 | 16.01 | 0.00 | .65 | 49.01 |
| 2 | 1 | 30 | 85.10 | 1 | 2 | .20 | 0.00 | 2.43 | 24.00 | 2874.98 | 18.04 | 0.00 | .61 | 33.78 |
| 2 | 1 | 31 | 143.50 | 1 | 2 | .20 | 0.00 | 2.43 | 24.00 | 5006.16 | 21.16 | 0.00 | .63 | 34.89 |
| 2 | 1 | 33 | 688.70 | 1 | 2 | .20 | 0.00 | 2.43 | 24.00 | 34812.89 | 20.44 | 0.00 | .92 | 50.55 |
| 2 | 1 | 52 | 688.70 | 1 | 2 | .20 | 0.00 | 2.43 | 24.00 | 34398.58 | 22.81 | 1.48 | .92 | 49.95 |
| 2 | 1 | 32 | 5.60 | 1 | 2 | .20 | 0.00 | 2.43 | 24.00 | 2146.93 | 11.98 | 0.00 | .60 | 383.38 |
| 2 | 1 | 34 | 60.50 | 1 | 2 | .20 | 0.00 | 2.64 | 24.00 | 5291.92 | 14.38 | 0.00 | .78 | 87.47 |
| 2 | 1 | 35 | 749.20 | 1 | 2 | .20 | 0.00 | 2.64 | 24.00 | 35324.67 | 22.79 | 0.00 | .91 | 47.15 |
| 2 | 1 | 36 | 24.80 | 1 | 2 | .20 | 0.00 | 2.64 | 24.00 | 1514.45 | 15.87 | 0.00 | .78 | 61.07 |
| 2 | 1 | 37 | 774.00 | 1 | 2 | .20 | 0.00 | 2.64 | 24.00 | 35849.36 | 22.77 | 0.00 | .91 | 46.32 |
| 2 | 2 | 10 | 62.82 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 17935.12 | 13.67 | 0.00 | 1.96 | 285.50 |
| 2 | 2 | 50 | 62.82 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 16991.23 | 16.16 | 2.70 | 1.96 | 270.47 |
| 2 | 2 | 12 | 59.68 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 11231.38 | 14.17 | 0.00 | 1.53 | 188.19 |
| 2 | 2 | 13 | 122.50 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 23497.49 | 15.95 | 0.00 | 1.75 | 191.82 |
| 2 | 2 | 14 | 47.11 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 12445.74 | 13.32 | 0.00 | 1.53 | 264.18 |
| 2 | 2 | 15 | 169.61 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 27206.69 | 15.77 | 0.00 | 1.69 | 160.41 |
| 2 | 2 | 16 | 92.65 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 17181.07 | 13.92 | 0.00 | 1.39 | 185.44 |
| 2 | 2 | 17 | 262.26 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 38390.25 | 14.33 | 0.00 | 1.59 | 146.38 |
| 2 | 2 | 18 | 60.31 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 20430.52 | 13.45 | 0.00 | 2.12 | 338.76 |
| 2 | 2 | 19 | 322.57 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 49376.26 | 14.76 | 0.00 | 1.68 | 153.07 |
| 2 | 2 | 51 | 322.57 | 1 | 2 | .20 | 0.00 | 4.10 | 24.00 | 48739.20 | 16.09 | 3.96 | 1.68 | 151.10 |
| 2 | 2 | 20 | 40.83 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 16439.50 | 12.88 | 0.00 | 1.83 | 403.86 |
| 2 | 2 | 21 | 363.40 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 51376.49 | 16.04 | 0.00 | 1.70 | 141.38 |
| 2 | 2 | 22 | 53.40 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 16734.37 | 13.39 | 0.00 | 1.83 | 313.38 |
| 2 | 2 | 23 | 416.80 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 54255.76 | 17.02 | 0.00 | 1.72 | 130.17 |
| 2 | 2 | 52 | 416.80 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 53318.99 | 18.69 | 2.17 | 1.72 | 127.92 |
| 2 | 2 | 24 | 19.00 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 3886.39 | 14.32 | 0.00 | 1.69 | 204.55 |
| 2 | 2 | 25 | 435.80 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 54360.89 | 18.67 | 0.00 | 1.72 | 124.74 |
| 2 | 2 | 26 | 109.40 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 13898.06 | 16.37 | 0.00 | 1.69 | 127.04 |
| 2 | 2 | 27 | 545.20 | 1 | 2 | .20 | 0.00 | 3.75 | 24.00 | 64542.78 | 18.53 | 0.00 | 1.71 | 118.38 |
| 2 | 2 | 28 | 58.40 | 1 | 2 | .20 | 0.00 | 3.33 | 24.00 | 5753.41 | 15.93 | 0.00 | 1.24 | 98.52 |
| 2 | 2 | 30 | 85.10 | 1 | 2 | .20 | 0.00 | 3.33 | 24.00 | 5810.05 | 17.96 | 0.00 | 1.18 | 68.27 |
| 2 | 2 | 31 | 143.50 | 1 | 2 | .20 | 0.00 | 3.33 | 24.00 | 10621.01 | 19.83 | 0.00 | 1.21 | 74.01 |
| 2 | 2 | 33 | 688.70 | 1 | 2 | .20 | 0.00 | 3.33 | 24.00 | 74167.68 | 18.63 | 0.00 | 1.61 | 107.69 |
| 2 | 2 | 52 | 688.70 | 1 | 2 | .20 | 0.00 | 3.33 | 24.00 | 73411.18 | 20.48 | 3.09 | 1.61 | 106.59 |
| 2 | 2 | 32 | 5.60 | 1 | 2 | .20 | 0.00 | 3.33 | 24.00 | 4300.58 | 11.96 | 0.00 | 1.16 | 767.96 |
| 2 | 2 | 34 | 60.50 | 1 | 2 | .20 | 0.00 | 3.55 | 24.00 | 10062.86 | 14.34 | 0.00 | 1.40 | 166.33 |
| 2 | 2 | 35 | 749.20 | 1 | 2 | .20 | 0.00 | 3.55 | 24.00 | 75419.97 | 20.46 | 0.00 | 1.59 | 100.67 |
| 2 | 2 | 36 | 24.80 | 1 | 2 | .20 | 0.00 | 3.55 | 24.00 | 2855.93 | 15.70 | 0.00 | 1.40 | 115.16 |
| 2 | 2 | 37 | 774.00 | 1 | 2 | .20 | 0.00 | 3.55 | 24.00 | 76706.87 | 20.44 | 0.00 | 1.58 | 99.10 |
| 2 | 3 | 10 | 62.82 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 21874.23 | 13.64 | 0.00 | 2.37 | 348.20 |
| 2 | 3 | 50 | 62.82 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 20799.69 | 16.06 | 3.03 | 2.37 | 331.10 |
| 2 | 3 | 12 | 59.68 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 14136.09 | 14.15 | 0.00 | 1.89 | 236.86 |
| 2 | 3 | 13 | 122.50 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 29081.82 | 15.82 | 0.00 | 2.14 | 237.40 |
| 2 | 3 | 14 | 47.11 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 15685.37 | 13.30 | 0.00 | 1.89 | 332.95 |
| 2 | 3 | 15 | 169.61 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 33897.22 | 15.63 | 0.00 | 2.07 | 199.85 |
| 2 | 3 | 16 | 92.65 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 21897.06 | 13.89 | 0.00 | 1.74 | 236.34 |
| 2 | 3 | 17 | 262.26 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 49284.97 | 14.24 | 0.00 | 1.95 | 187.92 |
| 2 | 3 | 18 | 60.31 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 24661.95 | 13.43 | 0.00 | 2.54 | 408.92 |
| 2 | 3 | 19 | 322.57 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 63712.07 | 14.56 | 0.00 | 2.06 | 197.51 |
| 2 | 3 | 51 | 322.57 | 1 | 2 | .20 | 0.00 | 4.60 | 24.00 | 63175.78 | 15.71 | 4.66 | 2.06 | 195.85 |
| 2 | 3 | 20 | 40.83 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 19586.18 | 12.87 | 0.00 | 2.16 | 479.70 |
| 2 | 3 | 21 | 363.40 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 66679.49 | 15.66 | 0.00 | 2.07 | 183.49 |
| 2 | 3 | 22 | 53.40 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 19868.75 | 13.39 | 0.00 | 2.16 | 372.07 |
| 2 | 3 | 23 | 416.80 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 70905.60 | 16.45 | 0.00 | 2.09 | 170.12 |
| 2 | 3 | 52 | 416.80 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 69746.76 | 17.95 | 2.99 | 2.09 | 167.34 |
| 2 | 3 | 24 | 19.00 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 4656.81 | 14.31 | 0.00 | 2.00 | 245.10 |
| 2 | 3 | 25 | 435.80 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 71220.46 | 17.93 | 0.00 | 2.08 | 163.42 |
| 2 | 3 | 26 | 109.40 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 16632.83 | 16.36 | 0.00 | 2.00 | 152.04 |
| 2 | 3 | 27 | 545.20 | 1 | 2 | .20 | 0.00 | 4.15 | 24.00 | 85264.73 | 17.81 | 0.00 | 2.07 | 156.30 |

MODEL SOLS WASH

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 29 | 58.40 | 1 | 2 | .20 | 0.00 | 3.76 | 24.00 | 7309.70 | 15.91 | 0.00 | 1.55 | 125.17 |
| 2 | 3 | 30 | 85.10 | 1 | 2 | .20 | 0.00 | 3.76 | 24.00 | 7400.64 | 17.93 | 0.00 | 1.49 | 86.96 |
| 2 | 3 | 31 | 143.50 | 1 | 2 | .20 | 0.00 | 3.76 | 24.00 | 13708.23 | 19.50 | 0.00 | 1.51 | 95.53 |
| 2 | 3 | 33 | 688.70 | 1 | 2 | .20 | 0.00 | 3.76 | 24.00 | 96762.87 | 17.91 | 0.00 | 1.95 | 140.50 |
| 2 | 3 | 52 | 688.70 | 1 | 2 | .20 | 0.00 | 3.76 | 24.00 | 95775.13 | 19.53 | 3.64 | 1.95 | 139.07 |
| 2 | 3 | 32 | 5.60 | 1 | 2 | .20 | 0.00 | 3.76 | 24.00 | 5432.09 | 11.96 | 0.00 | 1.46 | 970.02 |
| 2 | 3 | 34 | 60.50 | 1 | 2 | .20 | 0.00 | 3.92 | 24.00 | 12196.00 | 14.33 | 0.00 | 1.67 | 201.59 |
| 2 | 3 | 35 | 749.20 | 1 | 2 | .20 | 0.00 | 3.92 | 24.00 | 98567.23 | 19.51 | 0.00 | 1.93 | 131.56 |
| 2 | 3 | 36 | 24.80 | 1 | 2 | .20 | 0.00 | 3.92 | 24.00 | 3457.56 | 15.69 | 0.00 | 1.67 | 139.42 |
| 2 | 3 | 37 | 774.00 | 1 | 2 | .20 | 0.00 | 3.92 | 24.00 | 100405.95 | 19.49 | 0.00 | 1.92 | 129.72 |
| 3 | 1 | 29 | 58.40 | 1 | 2 | .20 | 0.00 | 2.50 | 24.00 | 3064.49 | 16.00 | 0.00 | .69 | 52.47 |
| 3 | 1 | 30 | 85.10 | 1 | 2 | .20 | 0.00 | 2.50 | 24.00 | 3079.35 | 18.03 | 0.00 | .65 | 36.19 |
| 3 | 1 | 31 | 143.50 | 1 | 2 | .20 | 0.00 | 2.50 | 24.00 | 5395.22 | 21.01 | 0.00 | .67 | 37.60 |
| 3 | 1 | 33 | 143.50 | 1 | 2 | .20 | 0.00 | 2.50 | 24.00 | 5395.22 | 21.01 | 0.00 | .67 | 37.60 |
| 3 | 1 | 52 | 143.50 | 1 | 2 | .20 | 0.00 | 2.50 | 24.00 | 5147.60 | 27.03 | .50 | .67 | 35.87 |
| 3 | 1 | 32 | 5.60 | 1 | 2 | .20 | 0.00 | 2.50 | 24.00 | 2300.91 | 11.98 | 0.00 | .64 | 410.88 |
| 3 | 2 | 29 | 58.40 | 1 | 2 | .20 | 0.00 | 3.41 | 24.00 | 6035.92 | 15.93 | 0.00 | 1.30 | 103.35 |
| 3 | 2 | 30 | 85.10 | 1 | 2 | .20 | 0.00 | 3.41 | 24.00 | 6098.50 | 17.95 | 0.00 | 1.24 | 71.66 |
| 3 | 2 | 31 | 143.50 | 1 | 2 | .20 | 0.00 | 3.41 | 24.00 | 11180.88 | 19.75 | 0.00 | 1.26 | 77.92 |
| 3 | 2 | 33 | 143.50 | 1 | 2 | .20 | 0.00 | 3.41 | 24.00 | 11180.88 | 19.75 | 0.00 | 1.26 | 77.92 |
| 3 | 2 | 52 | 143.50 | 1 | 2 | .20 | 0.00 | 3.41 | 24.00 | 10919.02 | 23.64 | .70 | 1.26 | 76.09 |
| 3 | 2 | 32 | 5.60 | 1 | 2 | .20 | 0.00 | 3.41 | 24.00 | 4507.05 | 11.96 | 0.00 | 1.22 | 804.83 |
| 3 | 3 | 29 | 58.40 | 1 | 2 | .20 | 0.00 | 3.89 | 24.00 | 7796.54 | 15.90 | 0.00 | 1.65 | 133.50 |
| 3 | 3 | 30 | 85.10 | 1 | 2 | .20 | 0.00 | 3.89 | 24.00 | 7899.55 | 17.92 | 0.00 | 1.58 | 92.83 |
| 3 | 3 | 31 | 143.50 | 1 | 2 | .20 | 0.00 | 3.89 | 24.00 | 14663.65 | 19.47 | 0.00 | 1.61 | 102.19 |
| 3 | 3 | 33 | 143.50 | 1 | 2 | .20 | 0.00 | 3.89 | 24.00 | 14663.65 | 19.47 | 0.00 | 1.61 | 102.19 |
| 3 | 3 | 52 | 143.50 | 1 | 2 | .20 | 0.00 | 3.89 | 24.00 | 14343.55 | 22.87 | .81 | 1.61 | 99.96 |
| 3 | 3 | 32 | 5.60 | 1 | 2 | .20 | 0.00 | 3.89 | 24.00 | 5783.73 | 11.96 | 0.00 | 1.56 | 1032.81 |

10-YR

50-YR

100-YR

SUMMARY TABLE 3

| IDENTIFICATION NO. | 10-YR Q1 | 50-YR Q2 | 100-YR Q3 | DISCHARGE, CFS Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|---|---|---|---|---|---|---|---|---|---|---|
| XSEC/STRUC NO. 10 | | | | | | | | | | |
| ALTERNATE 1 | 9877.30 | 17935.12 | 21874.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 9877.30 | 17935.12 | 21874.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 12 | | | | | | | | | | |
| ALTERNATE 1 | 5531.28 | 11231.38 | 14136.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 5531.28 | 11231.38 | 14136.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 13 | | | | | | | | | | |
| ALTERNATE 1 | 12362.80 | 23497.49 | 29081.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 12362.80 | 23497.49 | 29081.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 14 | | | | | | | | | | |
| ALTERNATE 1 | 6075.58 | 12445.74 | 15685.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 6075.58 | 12445.74 | 15685.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 15 | | | | | | | | | | |
| ALTERNATE 1 | 14206.06 | 27206.69 | 33897.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 14206.06 | 27206.69 | 33897.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 16 | | | | | | | | | | |
| ALTERNATE 1 | 8043.86 | 17181.07 | 21897.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 8043.86 | 17181.07 | 21897.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 17 | | | | | | | | | | |
| ALTERNATE 1 | 17976.42 | 38390.25 | 49284.97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 17976.42 | 38390.25 | 49284.97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 18 | | | | | | | | | | |
| ALTERNATE 1 | 11636.62 | 20430.52 | 24661.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 11636.62 | 20430.52 | 24661.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 19 | | | | | | | | | | |
| ALTERNATE 1 | 23129.33 | 49376.26 | 63712.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 23129.33 | 49376.26 | 63712.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 20 | | | | | | | | | | |
| ALTERNATE 1 | 10236.03 | 16872.06 | 19978.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 10236.03 | 16489.50 | 19586.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 21 | | | | | | | | | | |
| ALTERNATE 1 | 23965.38 | 51426.29 | 66738.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 23965.38 | 51376.49 | 66679.49 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 22 | | | | | | | | | | |
| ALTERNATE 1 | 10413.67 | 17121.64 | 20265.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 10413.67 | 16734.37 | 19868.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 23 | | | | | | | | | | |
| ALTERNATE 1 | 25273.32 | 54372.00 | 71044.78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE 2 | 25273.32 | 54255.76 | 70905.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 24 | | | | | | | | | | |
| ALTERNATE 2 | 2352.76 | 3886.39 | 4656.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 25 | | | | | | | | | | |
| ALTERNATE 2 | 25303.44 | 54360.83 | 71220.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| XSEC/STRUC NO. 26 | | | | | | | | | | | |
| ALTERNATE | 2 | 8470.42 | 13998.06 | 16632.83 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 27 | | | | | | | | | | | |
| ALTERNATE | 2 | 29937.65 | 64542.78 | 85264.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 28 | | | | | | | | | | | |
| ALTERNATE | 2 | 2862.40 | 5753.41 | 7309.70 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 3 | 3064.49 | 6035.92 | 7796.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 30 | | | | | | | | | | | |
| ALTERNATE | 2 | 2874.98 | 5810.05 | 7400.64 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 3 | 3079.35 | 6098.50 | 7899.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 31 | | | | | | | | | | | |
| ALTERNATE | 2 | 5006.16 | 10621.01 | 13708.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 3 | 5395.22 | 11180.88 | 14663.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 32 | | | | | | | | | | | |
| ALTERNATE | 2 | 2146.93 | 4300.58 | 5432.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 3 | 2300.91 | 4507.05 | 5783.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 33 | | | | | | | | | | | |
| ALTERNATE | 2 | 34812.89 | 74167.68 | 96762.87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 3 | 5395.22 | 11180.88 | 14663.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 34 | | | | | | | | | | | |
| ALTERNATE | 2 | 5291.92 | 10062.86 | 12196.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 35 | | | | | | | | | | | |
| ALTERNATE | 2 | 35324.67 | 75419.97 | 98567.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 36 | | | | | | | | | | | |
| ALTERNATE | 2 | 1514.45 | 2955.93 | 3457.56 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 37 | | | | | | | | | | | |
| ALTERNATE | 2 | 35849.36 | 76706.37 | 100405.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 50 | | | | | | | | | | | |
| ALTERNATE | 1 | 9241.08 | 16991.23 | 20799.69 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 2 | 9241.08 | 16991.23 | 20799.69 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 51 | | | | | | | | | | | |
| ALTERNATE | 1 | 22615.35 | 48739.20 | 63175.78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 2 | 22615.35 | 48739.20 | 63175.78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| XSEC/STRUC NO. 52 | | | | | | | | | | | |
| ALTERNATE | 2 | 34398.58 | 73411.18 | 95775.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALTERNATE | 3 | 5147.60 | 10919.02 | 14343.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

sok wash

ENDJOB CARD ENCOUNTERED. END OF JOB.

# REGRESSION EQUATIONS: CALCULATIONS

ESTIMATING THE MAGNITUDE AND FREQUENCY OF FLOODS

(Reference 8)

Basis Hydrologic Parameters:

| STREAM | FLOOD FREQUENCY REGION | A DRAINAGE AREA (sq.mi.) | E MEAN WATERSHED ELEVATION IN THOUSANDS | P MEAN ANNUAL PRECIPITATION IN INCHES |
|---|---|---|---|---|
| Hassayampa River | | | | |
| @ Gage Sta. 95155 | 3 | 417 | 4.75 | 19.3 |
| @ Gage Sta. 95165 | 3 | 774 | 3.19 | 16.9 |
| Sols Wash | | | | |
| above Hassayampa River confluence | 3 | 145 | 2.75 | 10.0 |

The following regression equations are applicable for region 3.

$$Q_{10} = 74.7 \; A^{.638} \; E^{-1.0} \; P^{.971} \text{ cfs}$$

$$Q_{50} = 329 \; A^{.617} \; E^{-1.22} \; P^{.933} \text{ cfs}$$

$$Q_{100} = 553 \; A^{.610} \; E^{-.133} \; P^{.915} \text{ cfs}$$

## RESULTS OF REGRESSION EQUATIONS

| STREAM | FLOOD PEAKS IN cfs | | |
|---|---|---|---|
| | 10-Year | 50-Year | 100-Year |
| Hassayampa River | | | |
| @ Gage Sta. 95155 | 13,078 | 32,187 | 41,428 |
| @ Gage Sta. 95165 | 25,399 | 67,693 | 90,851 |
| Sols Wash | | | |
| above Hassayampa River confluence | 6,825 | 20,268 | 28,745 |