

ESTIMATED SEDIMENT DEPOSITION IN
LAKE CORPUS CHRISTI, TEXAS, 1972-85

By Norman F. Leibbrand

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CONTENTS

| | Page |
|---|------|
| Abstract----- | 1 |
| Introduction----- | 2 |
| Sediment stations and records----- | 4 |
| Analysis of suspended-sediment records----- | 21 |
| Future sedimentation----- | 23 |
| Summary----- | 23 |
| Selected references----- | 25 |

ILLUSTRATIONS

| | Page |
|---|------|
| Figure 1. Map showing location of study area----- | 3 |

TABLES

| | |
|---|----|
| Table 1. Monthly, yearly, and cumulative average discharge and sediment loads for station 08194000 Nueces River at Cotulla, Texas, 1972-85----- | 7 |
| 2. Monthly, yearly, and cumulative average discharge and sediment loads for station 08207000 Frio River at Calliham, Texas, 1972-81----- | 10 |
| 3-5. Monthly, yearly, and cumulative average discharge and suspended sediment loads for: | |
| 3. Station 08211000 Nueces River near Mathis, Texas, 1972-85----- | 12 |
| 4. Station 08208000 Atascosa River at Whitsett, Texas, 1972-85----- | 15 |
| 5. Station 08210000 Nueces River near Three Rivers, Texas, 1972-85----- | 18 |
| 6. Summary of sedimentation studies of Lake Corpus Christi----- | 23 |

CONVERSION FACTORS

Factors for converting inch-pound units to metric (International System) units are given in the following table:

| Multiply inch-pound unit | By | To obtain metric unit |
|--|--------|--------------------------|
| acre-foot (acre-ft) | 1,233 | cubic meter |
| mile | 1.609 | kilometer |
| pound per cubic foot (lb/ft ³) | 16.02 | kilogram per cubic meter |
| square mile | 2.590 | square kilometer |
| ton | 0.9072 | megagram |

ESTIMATED SEDIMENT DEPOSITION IN
LAKE CORPUS CHRISTI, TEXAS, 1972-85

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ABSTRACT

The investigation of sediment deposition in Lake Corpus Christi was initiated by researching the published and unpublished sediment data for the 1972-85 water years for stations located upstream and downstream of the lake. Regression analysis was used to fill in the missing data. Data were tabulated for monthly discharge (acre-feet) and sediment load (tons, acre-feet, and percent by weight). Yearly totals and cumulative averages were computed and included in the tables.

An estimated 10,300 acre-feet (wet volume) of sediment has been deposited in Lake Corpus Christi during the 14-year period of record (1972-85), an average of 736 acre-feet per year (wet volume). An earlier study by the U.S. Soil Conservation Service, based on 1942-48 changes of lake bottom contours, estimated that 736 acre-feet per year of suspended sediment had entered Lake Corpus Christi during that 6-year period.

Some difference was found in comparison of the results of the U.S. Geological Survey (Water Resources Division) study and the McCaughan and Etheridge Consulting Engineers study. Total sediment outflow from Lake Corpus Christi was estimated at 177 acre-feet (dry) by the Geological Survey and 1,070 acre-feet (dry) by McCaughan and Etheridge Consulting Engineers. This difference may be due to construction of a new dam, completed in 1958, that is higher and inundated the old dam.

INTRODUCTION

The water-storage capacity of Lake Corpus Christi is being reduced by sediment deposition. The amount of sediment deposition in the lake has been documented through 1972 by Brown and others (1948) and McCaughan and Etheridge Consulting Engineers (1973), but no documentation or surveys have been made since then. Similar information was needed for 1972-85; thus, the city of Corpus Christi requested the Geologic Division to obtain this information.

In the spring of 1986, the Geologic Division of the U.S. Geological Survey (USGS) made a request that the Water Resources Division (WRD) cooperate with them in an investigation of the extent of sediment deposition in Lake Corpus Christi during the 1972-85 water years. WRD was requested to compile and update all the sediment records, both published and unpublished, for active and discontinued sediment stations upstream and downstream of Lake Corpus Christi and use those records to make estimates of sediment deposition in the lake during this period of record.

The purpose of this report is to present the results of WRD's investigation to the Geological Division so that they can correlate the results of their field surveys with WRD's results. Other reports of sediment surveys and published data that were used in preparing this report are cited in "Selected references."

Lake Corpus Christi, located on the Nueces River, is impounded by Wesley E. Seale Dam. The dam is located in San Patricio and Jim Wells Counties, about 4.5 mi southwest of Mathis. The lake borders these two counties and extends into Live Oak County (fig. 1). Water is released downstream for domestic, municipal, irrigation, mining, and industrial uses in the Corpus Christi area. The water demands placed on Lake Corpus Christi are rapidly approaching its

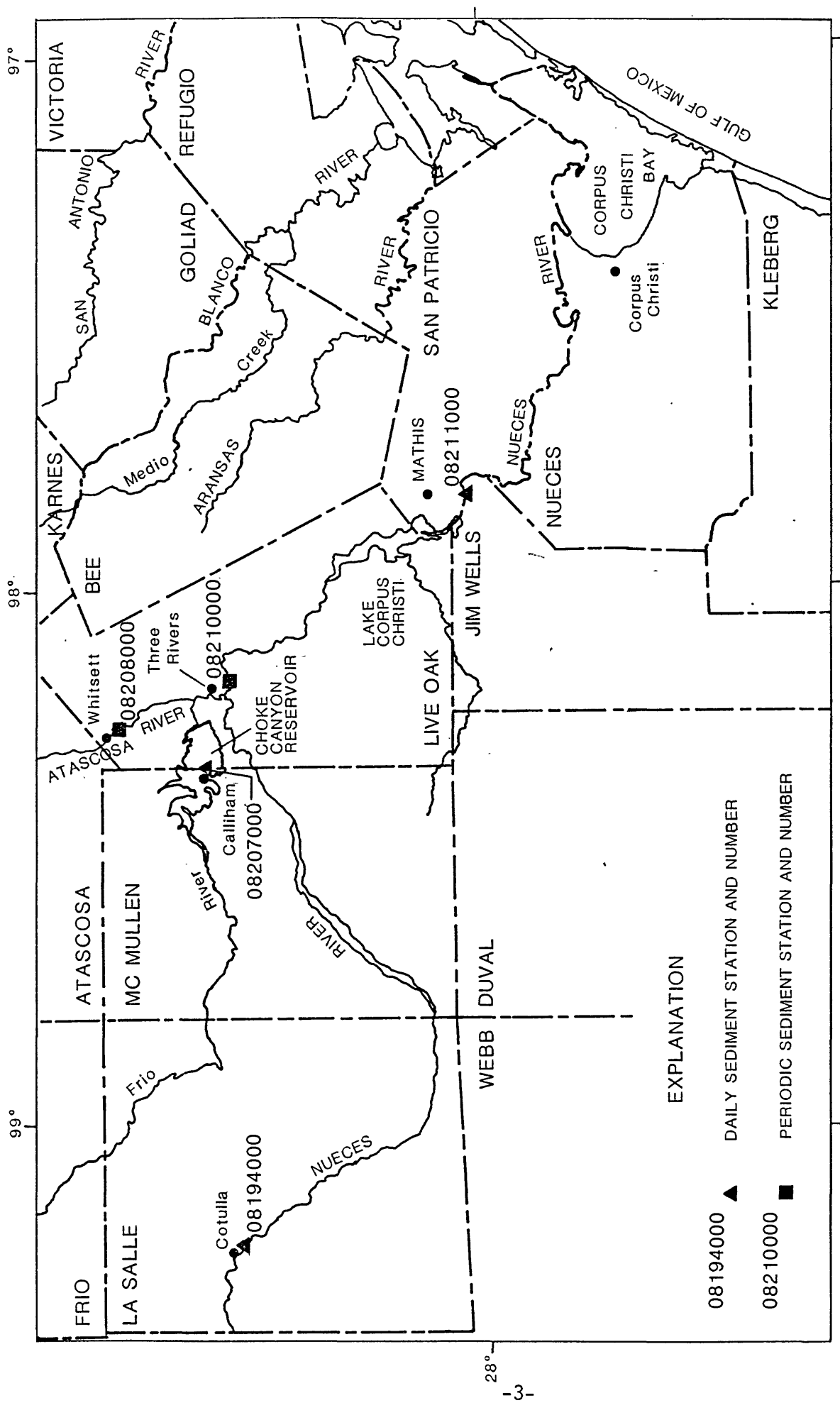


Figure 1.--Location of study area.

annual dependable water yield. To supplement water yield from the basin, Choke Canyon Reservoir has been constructed on the Frio River, the principal tributary to the Nueces River upstream from Lake Corpus Christi. Choke Canyon Reservoir, when filled and fully operational, will be operated to optimize the annual flow into Lake Corpus Christi.

SEDIMENT STATIONS AND RECORDS

Sediment stations, both active and discontinued, are listed below with the agency that operated them, drainage area, type of record, and period of record:

| Station | Agency <u>1/</u> | Drain- age area (mi ²) | Type or record | Period of record |
|--|---------------------|---|-------------------------|------------------------|
| 08194000 Nueces River near Cotulla | TWDB | 5,260 | Daily | 1941-79 |
| 08207000 Frio River at Calliham | TWDB | 5,491 | Daily | 1941-79 |
| | USGS | 5,491 | Periodic (6-9/year) | 1977-81 |
| 08208000 Atascosa River at Whitsett | USGS | 1,171 | Periodic (6-9/year) | 1977-81 |
| 08210000 Nueces River at Three Rivers | USGS | 15,600 | Periodic (6-12/year) | 1975-85 |
| 08211000 Nueces River near Mathis (below Lake Corpus Christi) | TWDB | 16,660 | Daily | 1941-58, 1961-85 |

1/ TWDB, Texas Water Development Board; USGS, U.S. Geological Survey.

The location of these stations is shown in figure 1.

The sediment records generated by the Texas Water Development Board (TWDB) were updated by tabulating existing monthly sediment data from TWDB publications and, as yet, unpublished data. These data were keyed into computer files, one file for each of the three TWDB stations during 1972-79 (to 1984 for the Mathis

station). Then regression analysis was used to complete these sediment records up to 1985.

Prior to regression analysis, the data were transformed to logarithms base 10 to provide for a normal distribution of the data. A log quadratic regression proved to provide the best fit regression. For the daily sediment stations operated by the TWDB (Cotulla, Calliham, and Mathis), regression analyses were done using monthly discharge and monthly sediment load. For those periodic sediment stations operated by the Geological Survey (Whitsett and Three Rivers), the regression analyses were made using instantaneous discharge and sediment loads. Monthly discharges and monthly sediment loads were then computed from continuous records of mean daily discharge. The regression coefficients and R-square value for each station are presented in the following table.

| Station | Log ¹⁰ discharge coefficient | Log ¹⁰ discharge squared coefficient | R-square value |
|----------|--|--|-------------------|
| 08194000 | 0.1260 | 0.1486 | 0.980 |
| 08207000 | .5252 | .1779 | .990 |
| 08208000 | .4789 | .1376 | .978 |
| 08210000 | .4352 | .1649 | .950 |
| 08211000 | .2850 | .0809 | .996 |

Using the log-quadratic equation and the regression coefficients for station 08211000, and assuming a total monthly discharge of 1,000 acre-ft, the monthly sediment load for the Mathis station can be computed from the following:

$$\begin{aligned}
\log^{10} (\text{monthly sediment load}) &= 0.2850 \times \log^{10} (\text{discharge}) + 0.0809 \\
&\quad \times (\log^{10} (\text{discharge}))^2 \\
&= 0.2850 \times 3 + 0.0809 \times (3)^2 \\
&= 0.855 + 0.7821 \\
&= 1.583 \\
\text{monthly sediment load} &= 10^{1.583} \\
&= 38.3 \text{ tons}
\end{aligned}$$

Computation of monthly sediment load using the above equation can also be applied for the Cotulla and Calliham stations. Daily sediment loads can be computed for the Whitsett and Three Rivers stations using values of mean daily discharge. Monthly discharge and suspended sediment loads were computed from 1972 to 1985. However, only the TWDB data for the Cotulla and Calliham stations that had been published (1972-76) and unpublished data (1977-79) were used to update tables 1 and 2 from 1972 to 1979. Data generated by regression analysis were used to update tables 1 and 2 from 1980 to 1985. The stream gage on the Frio River at Calliham was discontinued in February 1981, so the period of record for that station ends at that time. All of the data for the Mathis station generated by TWDB during 1972-84 was tabulated to update table 3. Only the 1985 water year was simulated (regression). In addition, total discharge, total suspended sediment load, and cumulative average were computed and tabulated in the tables by water year.

The two stations operated by the USGS (Whitsett and Three Rivers) were statistically analyzed in the same manner as the three stations operated by the TWDB, but the analyses were based on only a few periodic samples, and therefore, the regression analyses probably are not as accurate. Thus, the data for these two stations consist of data generated wholly by regression analysis for 1972 to 1985 (tables 4 and 5).

TABLE 1.--Monthly, yearly, and cumulative average discharge and sediment loads
for station 08194000 Nueces River at Cotulla, Texas, 1972-85

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1972 | OCT. | 190,700 | 21,740 | 14 | .008 | 1973 | OCT. | 1,760 | 50 | 0 | .002 |
| | NOV. | 24,680 | 2,700 | 2 | .008 | | NOV. | 12 | 0 | 0 | .000 |
| | DEC. | 12,780 | 1,190 | 1 | .007 | | DEC. | 19 | 0 | 0 | .000 |
| | JAN. | 8,370 | 719 | 0 | .006 | | JAN. | 514 | 22 | 0 | .003 |
| | FEB. | 5,600 | 497 | 0 | .007 | | FEB. | 1,360 | 47 | 0 | .003 |
| | MAR. | 2,570 | 216 | 0 | .006 | | MAR. | 1,170 | 39 | 0 | .002 |
| | APR. | 179 | 8 | 0 | .003 | | APR. | 181 | 5 | 0 | .002 |
| | MAY | 6,120 | 547 | 0 | .007 | | MAY | 18 | 0 | 0 | .000 |
| | JUNE | 1,370 | 57 | 0 | .003 | | JUNE | 0 | 0 | 0 | .000 |
| | JULY | 15 | 0 | 0 | .000 | | JULY | 11,530 | 1,470 | 1 | .009 |
| | AUG. | 33,270 | 3,350 | 2 | .007 | | AUG. | 3,140 | 174 | 0 | .004 |
| | SEPT. | 6,300 | 447 | 0 | .005 | | SEPT. | 29,710 | 11,340 | 7 | .028 |
| | YEAR | 292,000 | 31,470 | 21 | .008 | | YEAR | 49,410 | 13,150 | 9 | .020 |
| 1972 | CUM.AVG. | 292,000 | 31,470 | 21 | .008 | 1973 | CUM.AVG. | 170,700 | 22,310 | 15 | .010 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1974 | OCT. | 156,200 | 71,560 | 47 | .034 | 1975 | OCT. | 2,710 | 89 | 0 | .002 |
| | NOV. | 29,000 | 3,470 | 2 | .009 | | NOV. | 15,600 | 1,220 | 1 | .006 |
| | DEC. | 14,340 | 563 | 0 | .003 | | DEC. | 5,240 | 97 | 0 | .001 |
| | JAN. | 7,030 | 147 | 0 | .002 | | JAN. | 4,390 | 107 | 0 | .002 |
| | FEB. | 3,900 | 120 | 0 | .002 | | FEB. | 4,660 | 185 | 0 | .003 |
| | MAR. | 9,030 | 2,630 | 2 | .021 | | MAR. | 2,040 | 72 | 0 | .003 |
| | APR. | 1,400 | 63 | 0 | .003 | | APR. | 4,160 | 337 | 0 | .006 |
| | MAY | 12,240 | 1,330 | 1 | .008 | | MAY | 7,200 | 1,100 | 1 | .011 |
| | JUNE | 205 | 3 | 0 | .001 | | JUNE | 119,700 | 8,320 | 5 | .005 |
| | JULY | 0 | 0 | 0 | .000 | | JULY | 49,630 | 3,370 | 2 | .005 |
| | AUG. | 20,990 | 4,850 | 3 | .017 | | AUG. | 7,980 | 363 | 0 | .003 |
| | SEPT. | 26,150 | 4,700 | 3 | .013 | | SEPT. | 3,800 | 174 | 0 | .003 |
| | YEAR | 280,500 | 89,440 | 59 | .023 | | YEAR | 227,100 | 15,430 | 10 | .005 |
| 1974 | CUM.AVG. | 207,300 | 44,690 | 30 | .016 | 1975 | CUM.AVG. | 212,300 | 37,370 | 25 | .013 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1976 | OCT. | 2,070 | 52 | 0 | .002 | 1977 | OCT. | 26,530 | 1,610 | 1 | .004 |
| | NOV. | 1,930 | 52 | 0 | .002 | | NOV. | 65,340 | 3,780 | 2 | .004 |
| | DEC. | 142 | 0 | 0 | .000 | | DEC. | 24,760 | 1,030 | 1 | .003 |
| | JAN. | 7 | 0 | 0 | .000 | | JAN. | 16,990 | 356 | 0 | .002 |
| | FEB. | 3 | 0 | 0 | .000 | | FEB. | 14,290 | 308 | 0 | .002 |
| | MAR. | 0 | 0 | 0 | .000 | | MAR. | 11,110 | 398 | 0 | .003 |
| | APR. | 0 | 0 | 0 | .000 | | APR. | 39,140 | 4,480 | 3 | .008 |
| | MAY | 2,780 | 261 | 0 | .007 | | MAY | 41,190 | 3,660 | 2 | .007 |
| | JUNE | 1,170 | 50 | 0 | .003 | | JUNE | 11,560 | 623 | 0 | .004 |
| | JULY | 79,990 | 10,290 | 7 | .010 | | JULY | 3,820 | 221 | 0 | .004 |
| | AUG. | 34,510 | 2,960 | 2 | .006 | | AUG. | 696 | 25 | 0 | .003 |
| | SEPT. | 24,940 | 1,720 | 1 | .005 | | SEPT. | 0 | 0 | 0 | .000 |
| | YEAR | 147,500 | 15,390 | 10 | .008 | | YEAR | 255,400 | 16,490 | 11 | .005 |
| 1976 | CUM.AVG. | 199,300 | 32,980 | 22 | .012 | 1977 | CUM.AVG. | 208,700 | 30,230 | 20 | .011 |

TABLE 1.--Monthly, yearly, and cumulative average discharge and sediment loads
for station 08194000 Nueces River at Cotulla, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight, cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1978 | OCT. | 0 | 0 | 0 | .000 | 1979 | OCT. | 279 | 1 | 0 | .000 |
| | NOV. | 384 | 11 | 0 | .002 | | NOV. | 17 | 0 | 0 | .000 |
| | DEC. | 2,025 | 66 | 0 | .002 | | DEC. | 130 | 0 | 0 | .000 |
| | JAN. | 287 | 4 | 0 | .001 | | JAN. | 39 | 0 | 0 | .000 |
| | FEB. | 0 | 0 | 0 | .000 | | FEB. | 3 | 0 | 0 | .000 |
| | MAR. | 0 | 0 | 0 | .000 | | MAR. | 0 | 0 | 0 | .000 |
| | APR. | 0 | 0 | 0 | .000 | | APR. | 11,278 | 1,530 | 1 | .010 |
| | MAY | 8,737 | 2,940 | 2 | .025 | | MAY | 6,533 | 518 | 0 | .006 |
| | JUNE | 17,083 | 4,190 | 3 | .018 | | JUNE | 152,495 | 18,560 | 12 | .009 |
| | JULY | 11 | 0 | 0 | .000 | | JULY | 882 | 24 | 0 | .002 |
| | AUG. | 700 | 123 | 0 | .013 | | AUG. | 0 | 0 | 0 | .000 |
| | SEPT. | 5,980 | 961 | 1 | .012 | | SEPT. | 0 | 0 | 0 | .000 |
| | YEAR | 35,207 | 8,300 | 5 | .017 | | YEAR | 171,656 | 20,630 | 14 | .009 |
| 1978 | CUM.AVG. | 183,900 | 27,100 | 18 | .011 | 1979 | CUM.AVG. | 182,300 | 26,290 | 17 | .011 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1980 | OCT. | 0 | 0 | 0 | .000 | 1980 | OCT. | 0 | 0 | 0 | .000 |
| | NOV. | 0 | 0 | 0 | .000 | | NOV. | 0 | 0 | 0 | .000 |
| | DEC. | 0 | 0 | 0 | .000 | | DEC. | 0 | 0 | 0 | .000 |
| | JAN. | 0 | 0 | 0 | .000 | | JAN. | 0 | 0 | 0 | .000 |
| | FEB. | 0 | 0 | 0 | .000 | | FEB. | 0 | 0 | 0 | .000 |
| | MAR. | 0 | 0 | 0 | .000 | | MAR. | 0 | 0 | 0 | .000 |
| | APR. | 0 | 0 | 0 | .000 | | APR. | 24,004 | 2,534 | 2 | .008 |
| | MAY | 47,535 | 6,929 | 5 | .011 | | MAY | 63,147 | 10,714 | 7 | .029 |
| | JUNE | 24,339 | 2,585 | 2 | .008 | | JUNE | 237,078 | 93,593 | 61 | .029 |
| | JULY | 0 | 0 | 0 | .000 | | JULY | 23,419 | 2,446 | 2 | .008 |
| | AUG. | 21,652 | 2,189 | 1 | .007 | | AUG. | 1,788 | 96 | 1 | .004 |
| | SEPT. | 124 | 8.2 | 0 | .005 | | SEPT. | 4,560 | 282 | 0 | .005 |
| | YEAR | 93,649 | 11,710 | 8 | .009 | | YEAR | 353,996 | 109,666 | 72 | .023 |
| 1980 | CUM.AVG. | 172,500 | 24,670 | 16 | .011 | 1981 | CUM.AVG. | 190,600 | 33,170 | 22 | .013 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1982 | OCT. | 98,507 | 21,646 | 14 | .016 | 1983 | OCT. | 0 | 0 | 0 | .000 |
| | NOV. | 18,972 | 1,818 | 1 | .007 | | NOV. | 0 | 0 | 0 | .000 |
| | DEC. | 7,079 | 488 | 0 | .005 | | DEC. | 0 | 0 | 0 | .000 |
| | JAN. | 4,596 | 285 | 0 | .004 | | JAN. | 0 | 0 | 0 | .000 |
| | FEB. | 1,866 | 101 | 0 | .004 | | FEB. | 0 | 0 | 0 | .000 |
| | MAR. | 6,222 | 414 | 0 | .005 | | MAR. | 0 | 0 | 0 | .000 |
| | APR. | 1,851 | 100 | 0 | .004 | | APR. | 0 | 0 | 0 | .000 |
| | MAY | 21,172 | 2,120 | 1 | .007 | | MAY | 0 | 0 | 0 | .000 |
| | JUNE | 4,858 | 305 | 0 | .005 | | JUNE | 0 | 0 | 0 | .000 |
| | JULY | 856 | 44 | 0 | .004 | | JULY | 0 | 0 | 0 | .000 |
| | AUG. | 1 | 1 | 0 | .130 | | AUG. | 0 | 0 | 0 | .000 |
| | SEPT. | 0 | 0 | 0 | .000 | | SEPT. | 18,337 | 1,733 | 1 | .007 |
| | YEAR | 165,979 | 27,323 | 18 | .012 | | YEAR | 18,337 | 1,733 | 1 | .007 |
| 1982 | CUM.AVG. | 188,400 | 32,640 | 22 | .013 | 1983 | CUM.AVG. | 174,200 | 30,060 | 20 | .013 |

TABLE 1.--Monthly, yearly, and cumulative average discharge and sediment loads
for station 08194000 Nueces River at Cotulla, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg. cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1984 | OCT. | 2,513 | 140 | 0 | .004 | 1985 | OCT. | 71,167 | 12,912 | 8 | .013 |
| | NOV. | 1,721 | 92 | 0 | .004 | | NOV. | 1,197 | 63 | 0 | .004 |
| | DEC. | 8.2 | 1.7 | 0 | .016 | | DEC. | 1.9 | 1.1 | 0 | .043 |
| | JAN. | 78 | 5.9 | 0 | .006 | | JAN. | 46,769 | 6,760 | 4 | .011 |
| | FEB. | 1 | 1 | 0 | .063 | | FEB. | 5,647 | 367 | 0 | .005 |
| | MAR. | 0 | 0 | 0 | .000 | | MAR. | 9,898 | 752 | 0 | .006 |
| | APR. | 0 | 0 | 0 | .000 | | APR. | 5,716 | 373 | 0 | .005 |
| | MAY | 0 | 0 | 0 | .000 | | MAY | 18,776 | 1,791 | 1 | .007 |
| | JUNE | 0 | 0 | 0 | .000 | | JUNE | 2,901 | 165 | 0 | .004 |
| | JULY | 0 | 0 | 0 | .000 | | JULY | 939 | 49 | 0 | .004 |
| | AUG. | 0 | 0 | 0 | .000 | | AUG. | 0 | 0 | 0 | .000 |
| | SEPT. | 0 | 0 | 0 | .000 | | SEPT. | 0 | 0 | 0 | .000 |
| | YEAR | 4,321 | 241 | 0 | .004 | | YEAR | 163,013 | 23,234 | 15 | .010 |
| 1984 | CUM.AVG. | 161,200 | 27770 | 18 | .013 | 1985 | CUM.AVG. | 161,300 | 27,440 | 18 | .012 |

TABLE 2.--Monthly, yearly, and cumulative average discharge and sediment loads
for station 08207000 Frio River at Calliham, Texas, 1972-81

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1972 | OCT. | 116,900 | 16,080 | 11 | .010 | 1973 | OCT. | 2,850 | 162 | 0 | .004 |
| | NOV. | 15,780 | 1,670 | 1 | .008 | | NOV. | 1,430 | 28 | 0 | .001 |
| | DEC. | 7,360 | 383 | 0 | .004 | | DEC. | 1,840 | 53 | 0 | .002 |
| | JAN. | 4,870 | 102 | 0 | .002 | | JAN. | 2,320 | 66 | 0 | .002 |
| | FEB. | 3,610 | 95 | 0 | .002 | | FEB. | 3,480 | 229 | 0 | .005 |
| | MAR. | 2,270 | 110 | 0 | .004 | | MAR. | 2,630 | 133 | 0 | .004 |
| | APR. | 1,580 | 83 | 0 | .004 | | APR. | 8,710 | 3,140 | 2 | .026 |
| | MAY | 20,880 | 12,870 | 8 | .045 | | MAY | 2,020 | 145 | 0 | .005 |
| | JUNE | 2,590 | 263 | 0 | .007 | | JUNE | 30,200 | 19,160 | 13 | .047 |
| | JULY | 595 | 32 | 0 | .004 | | JULY | 107,500 | 12,980 | 9 | .009 |
| | AUG. | 4,180 | 1,880 | 1 | .033 | | AUG. | 22,700 | 4,140 | 3 | .013 |
| | SEPT. | 24,070 | 11,720 | 8 | .036 | | SEPT. | 45,560 | 17,270 | 11 | .028 |
| | YEAR | 204,700 | 45,290 | 30 | .016 | | YEAR | 231,200 | 57,510 | 38 | .018 |
| 1972 | CUM.AVG. | 204,700 | 45,290 | 30 | .016 | 1973 | CUM.AVG. | 218,000 | 51,400 | 34 | .017 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1974 | OCT. | 88,300 | 10,160 | 7 | .008 | 1975 | OCT. | 8,520 | 618 | 0 | .005 |
| | NOV. | 16,050 | 1,850 | 1 | .008 | | NOV. | 7,920 | 613 | 0 | .005 |
| | DEC. | 8,570 | 186 | 0 | .002 | | DEC. | 6,760 | 189 | 0 | .002 |
| | JAN. | 7,510 | 146 | 0 | .001 | | JAN. | 6,710 | 360 | 0 | .004 |
| | FEB. | 5,400 | 136 | 0 | .002 | | FEB. | 21,610 | 3,620 | 2 | .012 |
| | MAR. | 14,570 | 3,050 | 2 | .015 | | MAR. | 5,790 | 779 | 1 | .010 |
| | APR. | 3,480 | 234 | 0 | .005 | | APR. | 5,910 | 853 | 1 | .011 |
| | MAY | 11,050 | 3,040 | 2 | .020 | | MAY | 55,560 | 34,140 | 22 | .045 |
| | JUNE | 3,840 | 341 | 0 | .007 | | JUNE | 22,550 | 5,800 | 4 | .019 |
| | JULY | 862 | 80 | 0 | .007 | | JULY | 10,160 | 2,880 | 2 | .021 |
| | AUG. | 31,840 | 17,760 | 12 | .041 | | AUG. | 4,770 | 358 | 0 | .006 |
| | SEPT. | 71,330 | 45,870 | 30 | .047 | | SEPT. | 9,350 | 2,270 | 1 | .018 |
| | YEAR | 262,800 | 82,850 | 54 | .023 | | YEAR | 165,600 | 52,480 | 34 | .023 |
| 1974 | CUM.AVG. | 232,900 | 61,880 | 41 | .019 | 1975 | CUM.AVG. | 216,100 | 59,530 | 39 | .020 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1976 | OCT. | 4,380 | 240 | 0 | .004 | 1977 | OCT. | 40,760 | 21,160 | 14 | .038 |
| | NOV. | 3,970 | 272 | 0 | .005 | | NOV. | 32,830 | 4,120 | 3 | .009 |
| | DEC. | 3,850 | 290 | 0 | .006 | | DEC. | 21,990 | 2,220 | 1 | .007 |
| | JAN. | 4,000 | 340 | 0 | .006 | | JAN. | 17,140 | 2,040 | 1 | .009 |
| | FEB. | 2,290 | 159 | 0 | .005 | | FEB. | 13,960 | 1,170 | 1 | .006 |
| | MAR. | 2,140 | 208 | 0 | .007 | | MAR. | 12,010 | 1,500 | 1 | .009 |
| | APR. | 20,620 | 14,160 | 9 | .050 | | APR. | 112,000 | 33,420 | 22 | .022 |
| | MAY | 60,770 | 54,100 | 35 | .065 | | MAY | 34,210 | 8,350 | 5 | .018 |
| | JUNE | 6,920 | 603 | 0 | .006 | | JUNE | 13,000 | 1,640 | 1 | .009 |
| | JULY | 66,380 | 31,490 | 21 | .035 | | JULY | 6,060 | 468 | 0 | .006 |
| | AUG. | 18,610 | 2,230 | 1 | .009 | | AUG. | 3,010 | 203 | 0 | .005 |
| | SEPT. | 9,570 | 1,060 | 1 | .008 | | SEPT. | 3,800 | 466 | 0 | .009 |
| | YEAR | 203,500 | 105,200 | 69 | .038 | | YEAR | 310,800 | 76,760 | 50 | .018 |
| 1976 | CUM.AVG. | 213,600 | 68,670 | 45 | .024 | 1977 | CUM.AVG. | 229,800 | 70,020 | 46 | .022 |

TABLE 2.--Monthly, yearly, and cumulative average discharge and sediment loads
for station 08207000 Frio River at Calliham, Texas, 1972-81--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1978 | OCT. | 8,868 | 6,630 | 4 | .055 | 1979 | OCT. | 2,070 | 94 | 0 | .003 |
| | NOV. | 9,820 | 3,270 | 2 | .024 | | NOV. | 2,905 | 94 | 0 | .002 |
| | DEC. | 6,190 | 437 | 0 | .005 | | DEC. | 2,919 | 119 | 0 | .003 |
| | JAN. | 5,986 | 280 | 0 | .003 | | JAN. | 5,335 | 698 | 0 | .010 |
| | FEB. | 4,276 | 176 | 0 | .003 | | FEB. | 3,147 | 135 | 0 | .003 |
| | MAR. | 3,225 | 157 | 0 | .004 | | MAR. | 11,643 | 4,450 | 3 | .028 |
| | APR. | 2,582 | 190 | 0 | .005 | | APR. | 32,658 | 17,330 | 11 | .039 |
| | MAY | 2,368 | 783 | 1 | .024 | | MAY | 11,198 | 2,450 | 2 | .016 |
| | JUNE | 61,454 | 33,210 | 22 | .040 | | JUNE | 79,470 | 16,650 | 11 | .015 |
| | JULY | 2,112 | 822 | 1 | .029 | | JULY | 9,679 | 3,800 | 2 | .029 |
| | AUG. | 54,542 | 19,610 | 13 | .026 | | AUG. | 2,780 | 92 | 0 | .002 |
| | SEPT. | 22,834 | 11,100 | 7 | .036 | | SEPT. | 1,814 | 74 | 0 | .003 |
| | YEAR | 184,257 | 76,670 | 50 | .031 | | YEAR | 165,618 | 45,990 | 30 | .020 |
| 1978 | CUM.AVG. | 223,300 | 70,970 | 46 | .023 | 1979 | CUM.AVG. | 216,100 | 67,840 | 44 | .023 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1980 | OCT. | 1,172 | 151 | 0 | .009 | 1981 | OCT. | 9,610 | 3,146 | 2 | .024 |
| | NOV. | 1,359 | 182 | 0 | .010 | | NOV. | 1,066 | 134 | 0 | .009 |
| | DEC. | 2,838 | 496 | 0 | .013 | | DEC. | 1,002 | 124 | 0 | .009 |
| | JAN. | 3,279 | 610 | 0 | .014 | | JAN. | 1,858 | 276 | 0 | .011 |
| | FEB. | 1,658 | 237 | 0 | .011 | | FEB. | 986 | 121 | 0 | .009 |
| | MAR. | 812 | 95 | 0 | .009 | | MAR. | | | | |
| | APR. | 644 | 72 | 0 | .008 | | APR. | | | | |
| | MAY | 97,353 | 202007 | 132 | .152 | | MAY | | | | |
| | JUNE | 8,932 | 2,797 | 2 | .023 | | JUNE | | | | |
| | JULY | 289 | 30 | 0 | .008 | | JULY | | | | |
| | AUG. | 36,584 | 31,323 | 21 | .063 | | AUG. | | | | |
| | SEPT. | 17,425 | 8,448 | 6 | .036 | | SEPT. | | | | |
| | YEAR | 172,345 | 246448 | 162 | .105 | | YEAR | 14,522 | 3,801 | 3 | .019 |
| 1980 | CUM.AVG. | 211,200 | 87,690 | 57 | .031 | 1981 | CUM.AVG. | 203,400 | 84,210 | 55 | .030 |

TABLE 3.--Monthly, yearly, and cumulative average discharge and suspended sediment loads for station 08211000 Nueces River near Mathis, Texas, 1972-85

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|------------|----------|---------------------|--------------------|-------|------|------------|----------|---------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1972 | OCT. | 913,000 | 53,680 | 35 | .004 | 1973 | OCT. | 9,890 | 323 | 0 | .002 |
| | NOV. | 80,890 | 5,480 | 4 | .005 | | NOV. | 8,210 | 294 | 0 | .003 |
| | DEC. | 25,730 | 1,050 | 1 | .003 | | DEC. | 7,580 | 131 | 0 | .001 |
| | JAN. | 19,660 | 479 | 0 | .002 | | JAN. | 7,620 | 243 | 0 | .002 |
| | FEB. | 16,940 | 210 | 0 | .001 | | FEB. | 5,810 | 105 | 0 | .001 |
| | MAR. | 6,370 | 84 | 0 | .001 | | MAR. | 6,450 | 160 | 0 | .002 |
| | APR. | 8,180 | 158 | 0 | .001 | | APR. | 6,380 | 225 | 0 | .003 |
| | MAY | 154,900 | 3,240 | 2 | .002 | | MAY | 8,190 | 193 | 0 | .002 |
| | JUNE | 15,240 | 256 | 0 | .001 | | JUNE | 250,700 | 6,690 | 4 | .002 |
| | JULY | 7,700 | 265 | 0 | .003 | | JULY | 103,900 | 3,540 | 2 | .003 |
| | AUG. | 9,200 | 301 | 0 | .002 | | AUG. | 34,820 | 789 | 1 | .002 |
| | SEPT. | 34,380 | 2,330 | 2 | .005 | | SEPT. | 67,070 | 1,340 | 1 | .001 |
| | YEAR | 1,292,000 | 67,530 | 44 | .004 | | YEAR | 516,600 | 14,030 | 9 | .002 |
| 1972 | CUM.AVG. | 1,292,000 | 67,530 | 44 | .002 | 1973 | CUM.AVG. | 904,300 | 40,780 | 26 | .003 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|------------|----------|---------------------|--------------------|-------|------|------------|----------|---------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1974 | OCT. | 465,900 | 20,480 | 13 | .003 | 1975 | OCT. | 9,940 | 313 | 0 | .002 |
| | NOV. | 65,950 | 1,330 | 1 | .001 | | NOV. | 19,330 | 566 | 0 | .002 |
| | DEC. | 19,830 | 386 | 0 | .001 | | DEC. | 11,730 | 310 | 0 | .002 |
| | JAN. | 14,710 | 286 | 0 | .001 | | JAN. | 10,730 | 793 | 1 | .005 |
| | FEB. | 14,830 | 433 | 0 | .002 | | FEB. | 19,140 | 352 | 0 | .001 |
| | MAR. | 29,340 | 693 | 0 | .002 | | MAR. | 7,980 | 254 | 0 | .002 |
| | APR. | 13,140 | 297 | 0 | .002 | | APR. | 5,990 | 119 | 0 | .001 |
| | MAY | 11,930 | 307 | 0 | .002 | | MAY | 97,470 | 1,610 | 1 | .001 |
| | JUNE | 10,830 | 295 | 0 | .002 | | JUNE | 119,700 | 3,810 | 3 | .002 |
| | JULY | 9,530 | 345 | 0 | .003 | | JULY | 67,310 | 2,480 | 2 | .003 |
| | AUG. | 69,930 | 1,500 | 1 | .002 | | AUG. | 14,820 | 397 | 0 | .002 |
| | SEPT. | 174,600 | 5,020 | 3 | .002 | | SEPT. | 15,340 | 441 | 0 | .002 |
| | YEAR | 900,500 | 31,370 | 21 | .003 | | YEAR | 399,500 | 11,450 | 8 | .002 |
| 1974 | CUM.AVG. | 903,000 | 37,640 | 25 | .003 | 1975 | CUM.AVG. | 777,200 | 31,100 | 20 | .003 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|------------|----------|---------------------|--------------------|-------|------|------------|----------|---------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1976 | OCT. | 6,180 | 116 | 0 | .001 | 1977 | OCT. | 158,000 | 3,330 | 2 | .002 |
| | NOV. | 5,140 | 150 | 0 | .002 | 1977 | NOV. | 270,000 | 10,310 | 7 | .003 |
| | DEC. | 3,930 | 137 | 0 | .003 | | DEC. | 115,000 | 3,410 | 2 | .002 |
| | JAN. | 3,320 | 90 | 0 | .002 | | JAN. | 49,410 | 615 | 0 | .001 |
| | FEB. | 3,300 | 81 | 0 | .002 | | FEB. | 28,870 | 637 | 0 | .002 |
| | MAR. | 3,980 | 103 | 0 | .002 | | MAR. | 16,040 | 385 | 0 | .002 |
| | APR. | 3,300 | 101 | 0 | .002 | | APR. | 276,100 | 12,800 | 8 | .003 |
| | MAY | 70,390 | 3,470 | 2 | .003 | | MAY | 87,910 | 2,330 | 2 | .002 |
| | JUNE | 8,160 | 1,910 | 1 | .017 | | JUNE | 32,310 | 560 | 0 | .001 |
| | JULY | 136,200 | 3,470 | 2 | .002 | | JULY | 8,510 | 198 | 0 | .002 |
| | AUG. | 57,040 | 1,360 | 1 | .002 | | AUG. | 5,640 | 111 | 0 | .001 |
| | SEPT. | 98,620 | 1,700 | 1 | .001 | | SEPT. | 4,660 | 143 | 0 | .002 |
| | YEAR | 399,600 | 12,460 | 8 | .002 | | YEAR | 1,053,000 | 34,830 | 23 | .002 |
| 1976 | CUM.AVG. | 701,600 | 27,368 | 18 | .003 | 1977 | CUM.AVG. | 760,200 | 28,610 | 19 | .003 |

Table 3.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08211000 Nueces River near Mathis, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1978 | OCT. | 6,966 | 194 | 0 | .002 | 1979 | OCT. | 7,257 | 159 | 0 | .002 |
| | NOV. | 6,180 | 168 | 0 | .002 | | NOV. | 6,577 | 184 | 0 | .002 |
| | DEC. | 6,202 | 155 | 0 | .002 | | DEC. | 6,053 | 142 | 0 | .002 |
| | JAN. | 5,889 | 154 | 0 | .002 | | JAN. | 8,090 | 475 | 0 | .004 |
| | FEB. | 5,091 | 103 | 0 | .001 | | FEB. | 5,438 | 133 | 0 | .002 |
| | MAR. | 7,196 | 220 | 0 | .002 | | MAR. | 6,497 | 87 | 0 | .001 |
| | APR. | 6,970 | 255 | 0 | .003 | | APR. | 47,332 | 1,300 | 1 | .002 |
| | MAY | 8,410 | 228 | 0 | .002 | | MAY | 35,443 | 1,310 | 1 | .003 |
| | JUNE | 46,112 | 511 | 0 | .001 | | JUNE | 205,938 | 3,460 | 2 | .001 |
| | JULY | 9,427 | 280 | 0 | .002 | | JULY | 17,811 | 413 | 0 | .002 |
| 1978 | AUG. | 54,111 | 1,000 | 1 | .001 | 1979 | AUG. | 8,727 | 365 | 0 | .003 |
| | SEPT. | 59,576 | 1,010 | 1 | .001 | | SEPT. | 6,333 | 181 | 0 | .002 |
| | YEAR | 222,130 | 4,280 | 3 | .001 | | YEAR | 361,496 | 8,210 | 5 | .002 |
| | CUM.AVG. | 683,300 | 25,140 | 17 | .003 | | CUM.AVG. | 643,100 | 23,020 | 15 | .003 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1980 | OCT. | 7,646 | 208 | 0 | .002 | 1981 | OCT. | 11,849 | 399 | 0 | .002 |
| | NOV. | 7,204 | 234 | 0 | .002 | | NOV. | 6,952 | 167 | 0 | .002 |
| | DEC. | 7,033 | 202 | 0 | .002 | | DEC. | 6,053 | 158 | 0 | .002 |
| | JAN. | 8,654 | 264 | 0 | .002 | | JAN. | 6,216 | 172 | 0 | .002 |
| | FEB. | 6,337 | 160 | 0 | .002 | | FEB. | 5,797 | 165 | 0 | .002 |
| | MAR. | 7,574 | 150 | 0 | .001 | | MAR. | 6,745 | 152 | 0 | .002 |
| | APR. | 8,622 | 237 | 0 | .002 | | APR. | 7,475 | 192 | 0 | .002 |
| | MAY | 124,551 | 3,340 | 2 | .002 | | MAY | 176,690 | 3,640 | 2 | .002 |
| | JUNE | 36,637 | 1,870 | 1 | .004 | | JUNE | 446,168 | 19,620 | 13 | .003 |
| | JULY | 11,190 | 775 | 1 | .005 | | JULY | 161,748 | 8,840 | 6 | .004 |
| 1980 | AUG. | 304,792 | 17,430 | 11 | .004 | 1981 | AUG. | 13,949 | 365 | 0 | .002 |
| | SEPT. | 29,137 | 1,690 | 1 | .004 | | SEPT. | 68,416 | 1,320 | 1 | .001 |
| | YEAR | 559,377 | 26,560 | 17 | .003 | | YEAR | 918,058 | 35,190 | 23 | .003 |
| | CUM.AVG. | 633,800 | 23,410 | 15 | .003 | | CUM.AVG. | 662,200 | 24,590 | 16 | .003 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1982 | OCT. | 104,447 | 3,420 | 2 | .002 | 1983 | OCT. | 8,854 | 174 | 0 | .001 |
| | NOV. | 45,088 | 1,260 | 1 | .002 | | NOV. | 7,582 | 208 | 0 | .002 |
| | DEC. | 13,085 | 363 | 0 | .002 | | DEC. | 8,455 | 208 | 0 | .002 |
| | JAN. | 10,972 | 330 | 0 | .002 | | JAN. | 8,078 | 162 | 0 | .001 |
| | FEB. | 9,245 | 288 | 0 | .002 | | FEB. | 5,992 | 122 | 0 | .001 |
| | MAR. | 8,949 | 231 | 0 | .002 | | MAR. | 7,285 | 98 | 0 | .001 |
| | APR. | 7,937 | 198 | 0 | .002 | | APR. | 8,767 | 328 | 0 | .003 |
| | MAY | 100,208 | 2,310 | 2 | .002 | | MAY | 10,554 | 347 | 0 | .002 |
| | JUNE | 14,366 | 338 | 0 | .002 | | JUNE | 10,716 | 657 | 0 | .005 |
| | JULY | 11,758 | 469 | 0 | .003 | | JULY | 10,010 | 282 | 0 | .002 |
| 1982 | AUG. | 11,012 | 344 | 0 | .002 | 1983 | AUG. | 10,645 | 351 | 0 | .002 |
| | SEPT. | 9,802 | 238 | 0 | .002 | | SEPT. | 8,985 | 360 | 0 | .003 |
| | YEAR | 346,869 | 9,790 | 6 | .002 | | YEAR | 105,923 | 3,300 | 2 | .002 |
| | CUM.AVG. | 633,600 | 23,250 | 15 | .003 | | CUM.AVG. | 589,600 | 21,580 | 14 | .003 |

TABLE 3.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08211000 Nueces River near Mathis, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight, cum. avg, cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1984 | OCT. | 8,364 | 255 | 0 | .002 | 1985 | OCT. | 4,534 | 133 | 0 | .002 |
| | NOV. | 8,425 | 244 | 0 | .002 | | NOV. | 4,501 | 132 | 0 | .002 |
| | DEC. | 9,804 | 611 | 0 | .005 | | DEC. | 5,917 | 168 | 0 | .002 |
| | JAN. | 8,449 | 215 | 0 | .002 | | JAN. | 6,212 | 176 | 0 | .002 |
| | FEB. | 7,852 | 253 | 0 | .002 | | FEB. | 5,831 | 166 | 0 | .002 |
| | MAR. | 8,953 | 477 | 0 | .004 | | MAR. | 6,238 | 176 | 0 | .002 |
| | APR. | 10,756 | 540 | 0 | .004 | | APR. | 20,244 | 533 | 0 | .002 |
| | MAY | 10,792 | 458 | 0 | .003 | | MAY | 99,982 | 2,798 | 2 | .002 |
| | JUNE | 10,625 | 529 | 0 | .004 | | JUNE | 51,141 | 1,366 | 1 | .002 |
| | JULY | 8,540 | 269 | 0 | .002 | | JULY | 48,407 | 1,289 | 1 | .002 |
| | AUG. | 7,055 | 150 | 0 | .002 | | AUG. | 11,173 | 301 | 0 | .002 |
| | SEPT. | 5,738 | 139 | 0 | .002 | | SEPT. | 7,936 | 219 | 0 | .002 |
| | YEAR | 105,353 | 4,140 | 3 | .003 | | YEAR | 272,116 | 7,459 | 5 | .002 |
| 1984 | CUM.AVG. | 552,300 | 20,240 | 13 | .003 | 1985 | CUM.AVG. | 532,300 | 19,330 | 13 | .003 |

TABLE 4.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08208000 Atacosa River at Whitsett, Texas, 1972-85

(ac-ft., acre-feet; % wt, percent weight; cum. avg. cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1972 | OCT. | 20,353 | 5,646 | 4 | .020 | 1973 | OCT. | 552 | 117 | 0 | .016 |
| | NOV. | 1,071 | 197 | 0 | .014 | | NOV. | 356 | 85 | 0 | .018 |
| | DEC. | 1,224 | 222 | 0 | .013 | | DEC. | 346 | 85 | 0 | .018 |
| | JAN. | 813 | 159 | 0 | .014 | | JAN. | 554 | 118 | 0 | .016 |
| | FEB. | 702 | 139 | 0 | .015 | | FEB. | 2,897 | 528 | 0 | .013 |
| | MAR. | 569 | 121 | 0 | .016 | | MAR. | 755 | 150 | 0 | .015 |
| | APR. | 316 | 79 | 0 | .018 | | APR. | 10,217 | 2,550 | 2 | .018 |
| | MAY | 54,138 | 18,884 | 12 | .026 | | MAY | 1,212 | 220 | 0 | .013 |
| | JUNE | 4,066 | 737 | 0 | .013 | | JUNE | 171,534 | 111034 | 73 | .048 |
| | JULY | 475 | 106 | 0 | .016 | | JULY | 4,042 | 666 | 0 | .012 |
| | AUG. | 2,522 | 487 | 0 | .014 | | AUG. | 1,640 | 289 | 0 | .013 |
| | SEPT. | 6,100 | 1,256 | 1 | .015 | | SEPT. | 26,010 | 8,944 | 6 | .025 |
| | YEAR | 92,350 | 28,030 | 18 | .022 | | YEAR | 220,100 | 124800 | 82 | .042 |
| 1972 | CUM.AVG. | 92,350 | 28,030 | 18 | .022 | 1973 | CUM.AVG. | 156,200 | 76,420 | 50 | .036 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1974 | OCT. | 34,870 | 8,903 | 6 | .019 | 1975 | OCT. | 826 | 161 | 0 | .014 |
| | NOV. | 2,886 | 485 | 0 | .012 | | NOV. | 1,622 | 286 | 0 | .013 |
| | DEC. | 1,386 | 246 | 0 | .013 | | DEC. | 675 | 138 | 0 | .015 |
| | JAN. | 1,281 | 230 | 0 | .013 | | JAN. | 582 | 123 | 0 | .016 |
| | FEB. | 982 | 181 | 0 | .014 | | FEB. | 587 | 120 | 0 | .015 |
| | MAR. | 883 | 170 | 0 | .014 | | MAR. | 543 | 117 | 0 | .016 |
| | APR. | 746 | 148 | 0 | .015 | | APR. | 1,488 | 274 | 0 | .014 |
| | MAY | 2,755 | 477 | 0 | .013 | | MAY | 40,402 | 18,757 | 12 | .034 |
| | JUNE | 1,211 | 220 | 0 | .013 | | JUNE | 13,976 | 3,912 | 3 | .021 |
| | JULY | 156 | 51 | 0 | .024 | | JULY | 3,368 | 583 | 0 | .013 |
| | AUG. | 8,598 | 1,745 | 1 | .015 | | AUG. | 802 | 157 | 0 | .014 |
| | SEPT. | 11,064 | 2,524 | 2 | .017 | | SEPT. | 904 | 171 | 0 | .014 |
| | YEAR | 66,820 | 15,380 | 10 | .017 | | YEAR | 65,770 | 24,800 | 16 | .028 |
| 1974 | CUM.AVG. | 126,400 | 56,070 | 37 | .033 | 1975 | CUM.AVG. | 111,300 | 48,250 | 32 | .032 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1976 | OCT. | 689 | 136 | 0 | .015 | 1977 | OCT. | 45,676 | 14,362 | 9 | .023 |
| | NOV. | 434 | 98 | 0 | .017 | | NOV. | 16,181 | 3,710 | 2 | .017 |
| | DEC. | 400 | 94 | 0 | .017 | | DEC. | 8,946 | 1,658 | 1 | .014 |
| | JAN. | 474 | 106 | 0 | .016 | | JAN. | 6,548 | 1,163 | 1 | .013 |
| | FEB. | 393 | 91 | 0 | .017 | | FEB. | 2,124 | 356 | 0 | .012 |
| | MAR. | 413 | 95 | 0 | .017 | | MAR. | 1,204 | 218 | 0 | .013 |
| | APR. | 7,243 | 1,394 | 1 | .014 | | APR. | 136,756 | 83,381 | 55 | .045 |
| | MAY | 19,611 | 4,297 | 3 | .016 | | MAY | 15,848 | 3,612 | 2 | .017 |
| | JUNE | 793 | 154 | 0 | .014 | | JUNE | 2,430 | 412 | 0 | .012 |
| | JULY | 5,286 | 950 | 1 | .013 | | JULY | 659 | 134 | 0 | .015 |
| | AUG. | 161 | 51 | 0 | .023 | | AUG. | 229 | 64 | 0 | .021 |
| | SEPT. | 5,058 | 977 | 1 | .014 | | SEPT. | 1,690 | 309 | 0 | .013 |
| | YEAR | 41,000 | 8,442 | 6 | .015 | | YEAR | 238,300 | 109400 | 72 | .034 |
| 1976 | CUM.AVG. | 97,210 | 40,290 | 26 | .030 | 1977 | CUM.AVG. | 120,700 | 51,810 | 34 | .032 |

TABLE 4.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08208000 Atascosa River at Whitsett, Texas, 1972-85--Continued

(ac-ft; acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1978 | OCT. | 581 | 121 | 0 | .015 | 1979 | OCT. | 1,010 | 189 | 0 | .014 |
| | NOV. | 1,706 | 310 | 0 | .013 | | NOV. | 3,092 | 564 | 0 | .013 |
| | DEC. | 410 | 95 | 0 | .017 | | DEC. | 1,032 | 196 | 0 | .014 |
| | JAN. | 456 | 103 | 0 | .017 | | JAN. | 7,250 | 1,469 | 1 | .015 |
| | FEB. | 511 | 109 | 0 | .016 | | FEB. | 1,507 | 263 | 0 | .013 |
| | MAR. | 419 | 97 | 0 | .017 | | MAR. | 869 | 168 | 0 | .014 |
| | APR. | 374 | 87 | 0 | .017 | | APR. | 14,670 | 3,729 | 2 | .019 |
| | MAY | 669 | 134 | 0 | .015 | | MAY | 3,979 | 696 | 0 | .013 |
| | JUNE | 7,273 | 1,561 | 1 | .016 | | JUNE | 20,890 | 5,983 | 4 | .021 |
| | JULY | 4,155 | 942 | 1 | .017 | | JULY | 1,460 | 258 | 0 | .013 |
| | AUG. | 28,605 | 12,086 | 8 | .031 | | AUG. | 602 | 125 | 0 | .015 |
| | SEPT. | 23,802 | 6,372 | 4 | .020 | | SEPT. | 715 | 141 | 0 | .014 |
| | YEAR | 68,960 | 22,020 | 14 | .023 | | YEAR | 57,080 | 13,780 | 9 | .018 |
| 1978 | CUM.AVG. | 113,300 | 47,550 | 31 | .031 | 1979 | CUM.AVG. | 106,300 | 43,330 | 28 | .030 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1980 | OCT. | 111 | 42 | 0 | .028 | 1981 | OCT. | 942 | 178 | 0 | .014 |
| | NOV. | 196 | 57 | 0 | .021 | | NOV. | 2,664 | 478 | 0 | .013 |
| | DEC. | 1,355 | 257 | 0 | .014 | | DEC. | 1,122 | 206 | 0 | .013 |
| | JAN. | 500 | 109 | 0 | .016 | | JAN. | 1,429 | 255 | 0 | .013 |
| | FEB. | 417 | 95 | 0 | .017 | | FEB. | 899 | 169 | 0 | .014 |
| | MAR. | 381 | 90 | 0 | .017 | | MAR. | 1,954 | 350 | 0 | .013 |
| | APR. | 205 | 59 | 0 | .021 | | APR. | 2,576 | 480 | 0 | .014 |
| | MAY | 78,848 | 50,508 | 33 | .047 | | MAY | 2,652 | 468 | 0 | .013 |
| | JUNE | 865 | 165 | 0 | .014 | | JUNE | 5,840 | 1,017 | 1 | .013 |
| | JULY | 305 | 74 | 0 | .018 | | JULY | 1,746 | 303 | 0 | .013 |
| | AUG. | 55,064 | 31,780 | 21 | .042 | | AUG. | 1,275 | 265 | 0 | .015 |
| | SEPT. | 3,981 | 730 | 0 | .013 | | SEPT. | 13,579 | 3,620 | 2 | .020 |
| | YEAR | 142,200 | 83,960 | 55 | .043 | | YEAR | 36,680 | 7,789 | 5 | .016 |
| 1980 | CUM.AVG. | 110,300 | 47,840 | 31 | .032 | 1981 | CUM.AVG. | 103,000 | 43,840 | 29 | .031 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1982 | OCT. | 2,819 | 496 | 0 | .013 | 1983 | OCT. | 4,562 | 978 | 1 | .016 |
| | NOV. | 1,303 | 232 | 0 | .013 | | NOV. | 571 | 118 | 0 | .015 |
| | DEC. | 843 | 164 | 0 | .014 | | DEC. | 424 | 97 | 0 | .017 |
| | JAN. | 702 | 142 | 0 | .015 | | JAN. | 449 | 101 | 0 | .017 |
| | FEB. | 7,078 | 1,645 | 1 | .017 | | FEB. | 1,250 | 227 | 0 | .013 |
| | MAR. | 1,428 | 253 | 0 | .013 | | MAR. | 3,411 | 651 | 0 | .014 |
| | APR. | 806 | 157 | 0 | .014 | | APR. | 412 | 94 | 0 | .017 |
| | MAY | 7,948 | 1,926 | 1 | .018 | | MAY | 1,097 | 201 | 0 | .013 |
| | JUNE | 3,297 | 670 | 0 | .015 | | JUNE | 2,440 | 435 | 0 | .013 |
| | JULY | 132 | 43 | 0 | .024 | | JULY | 1,559 | 274 | 0 | .013 |
| | AUG. | 26 | 12 | 0 | .034 | | AUG. | 2,536 | 493 | 0 | .014 |
| | SEPT. | 1,134 | 210 | 0 | .014 | | SEPT. | 45,599 | 26,967 | 18 | .043 |
| | YEAR | 27,520 | 5,950 | 4 | .016 | | YEAR | 64,310 | 30,640 | 20 | .035 |
| 1982 | CUM.AVG. | 96,070 | 40,400 | 26 | .031 | 1983 | CUM.AVG. | 93,420 | 39,600 | 26 | .031 |

TABLE 4.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08208000 Atascosa River at Whitsett, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1984 | OCT. | 4,443 | 786 | 1 | .013 | 1985 | OCT. | 12,916 | 2,819 | 2 | .016 |
| | NOV. | 499 | 109 | 0 | .016 | | NOV. | 2,122 | 369 | 0 | .013 |
| | DEC. | 489 | 108 | 0 | .016 | | DEC. | 1,426 | 252 | 0 | .013 |
| | JAN. | 2,375 | 439 | 0 | .014 | | JAN. | 2,376 | 400 | 0 | .012 |
| | FEB. | 450 | 100 | 0 | .016 | | FEB. | 728 | 143 | 0 | .014 |
| | MAR. | 413 | 96 | 0 | .017 | | MAR. | 2,915 | 529 | 0 | .013 |
| | APR. | 283 | 72 | 0 | .019 | | APR. | 14,626 | 4,160 | 3 | .021 |
| | MAY | 367 | 83 | 0 | .017 | | MAY | 2,332 | 401 | 0 | .013 |
| | JUNE | 303 | 75 | 0 | .018 | | JUNE | 2,490 | 422 | 0 | .012 |
| | JULY | 109 | 39 | 0 | .026 | | JULY | 5,932 | 1,297 | 1 | .016 |
| | AUG. | 5 | 11 | 0 | .163 | | AUG. | 29 | 21 | 0 | .054 |
| | SEPT. | 228 | 64 | 0 | .020 | | SEPT. | 4,084 | 930 | 1 | .017 |
| | YEAR | 9,960 | 1,980 | 1 | .015 | | YEAR | 51,980 | 11,740 | 8 | .017 |
| 1984 | CUM.AVG. | 87,000 | 36,690 | 24 | .031 | 1985 | CUM.AVG. | 84,500 | 34,900 | 23 | .030 |

TABLE 5.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08210000 Nueces River near Three Rivers, Texas, 1972-85

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1972 | OCT. | 849,238 | 2080245 | 1,364 | .180 | 1973 | OCT. | 10,300 | 2,426 | 2 | .017 |
| | NOV. | 71,825 | 33,006 | 22 | .034 | | NOV. | 2,287 | 382 | 0 | .012 |
| | DEC. | 24,657 | 5,584 | 4 | .017 | | DEC. | 2,612 | 434 | 0 | .012 |
| | JAN. | 16,901 | 3,560 | 2 | .015 | | JAN. | 3,336 | 553 | 0 | .012 |
| | FEB. | 11,165 | 2,119 | 1 | .014 | | FEB. | 8,959 | 1,966 | 1 | .016 |
| | MAR. | 8,412 | 1,565 | 1 | .014 | | MAR. | 6,081 | 1,088 | 0 | .013 |
| | APR. | 2,953 | 493 | 0 | .012 | | APR. | 25,307 | 10,645 | 7 | .031 |
| | MAY | 146,854 | 91,712 | 60 | .046 | | MAY | 3,227 | 538 | 0 | .012 |
| | JUNE | 15,453 | 3,484 | 2 | .017 | | JUNE | 216,193 | 225562 | 148 | .077 |
| | JULY | 2,059 | 348 | 0 | .012 | | JULY | 113,462 | 77,570 | 51 | .050 |
| | AUG. | 24,780 | 6,945 | 5 | .021 | | AUG. | 30,970 | 8,345 | 5 | .020 |
| | SEPT. | 45,531 | 22,135 | 15 | .036 | | SEPT. | 75,760 | 48,141 | 32 | .047 |
| | YEAR | 1,219,800 | 2251200 | 1,477 | .136 | | YEAR | 498,600 | 377600 | 248 | .056 |
| 1972 | CUM.AVG. | 1,219,800 | 2251200 | 1,477 | .136 | 1973 | CUM.AVG. | 859,200 | 1314400 | 862 | .112 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1974 | OCT. | 456,225 | 504676 | 331 | .081 | 1975 | OCT. | 11,213 | 2,103 | 1 | .014 |
| | NOV. | 66,939 | 27,110 | 18 | .030 | | NOV. | 24,139 | 5,566 | 4 | .017 |
| | DEC. | 23,649 | 5,254 | 3 | .016 | | DEC. | 12,391 | 2,354 | 2 | .014 |
| | JAN. | 16,027 | 3,206 | 2 | .015 | | JAN. | 11,562 | 2,162 | 1 | .014 |
| | FEB. | 11,129 | 2,123 | 1 | .014 | | FEB. | 25,202 | 6,987 | 5 | .020 |
| | MAR. | 39,876 | 14,732 | 10 | .027 | | MAR. | 9,672 | 1,758 | 1 | .013 |
| | APR. | 7,032 | 1,246 | 1 | .013 | | APR. | 11,413 | 2,263 | 1 | .015 |
| | MAY | 25,006 | 6,510 | 4 | .019 | | MAY | 127,948 | 157944 | 104 | .091 |
| | JUNE | 6,377 | 1,201 | 1 | .014 | | JUNE | 128,489 | 62,124 | 41 | .036 |
| | JULY | 951 | 175 | 0 | .014 | | JULY | 80,233 | 35,274 | 23 | .032 |
| | AUG. | 96,728 | 56,223 | 37 | .043 | | AUG. | 20,176 | 4,649 | 3 | .017 |
| | SEPT. | 128,031 | 77,978 | 51 | .045 | | SEPT. | 21,402 | 5,611 | 4 | .019 |
| | YEAR | 878,000 | 700400 | 459 | .059 | | YEAR | 483,800 | 288800 | 189 | .044 |
| 1974 | CUM.AVG. | 865,500 | 1109700 | 728 | .094 | 1975 | CUM.AVG. | 770,000 | 904500 | 593 | .086 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1976 | OCT. | 8,952 | 1,932 | 1 | .016 | 1977 | OCT. | 168,685 | 122112 | 80 | .053 |
| | NOV. | 14,722 | 3,687 | 2 | .018 | | NOV. | 294,220 | 363798 | 239 | .091 |
| | DEC. | 5,163 | 870 | 1 | .012 | | DEC. | 110,731 | 52,544 | 34 | .035 |
| | JAN. | 4,368 | 729 | 0 | .012 | | JAN. | 53,029 | 16,351 | 11 | .023 |
| | FEB. | 2,910 | 482 | 0 | .012 | | FEB. | 32,309 | 8,176 | 5 | .019 |
| | MAR. | 2,654 | 441 | 0 | .012 | | MAR. | 25,022 | 5,635 | 4 | .017 |
| | APR. | 30,038 | 9,092 | 6 | .022 | | APR. | 302,377 | 424130 | 278 | .103 |
| | MAY | 89,059 | 41,311 | 27 | .034 | | MAY | 100,187 | 39,947 | 26 | .029 |
| | JUNE | 11,100 | 2,260 | 1 | .015 | | JUNE | 41,011 | 12,105 | 8 | .022 |
| | JULY | 149,469 | 80,167 | 53 | .039 | | JULY | 11,389 | 2,191 | 1 | .014 |
| | AUG. | 75,117 | 33,060 | 22 | .032 | | AUG. | 3,989 | 666 | 0 | .012 |
| | SEPT. | 100,895 | 63,854 | 42 | .046 | | SEPT. | 5,484 | 1,048 | 1 | .014 |
| | YEAR | 494,400 | 237900 | 156 | .035 | | YEAR | 1,148,400 | 1048700 | 688 | .067 |
| 1976 | CUM.AVG. | 714,900 | 771200 | 506 | .079 | 1977 | CUM.AVG. | 787,200 | 817400 | 536 | .076 |

TABLE 5.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08210000 Nueces River near Three Rivers, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1978 | OCT. | 10,407 | 2,680 | 2 | .019 | 1979 | OCT. | 4,792 | 817 | 1 | .013 |
| | NOV. | 12,155 | 2,621 | 2 | .016 | | NOV. | 6,183 | 1,172 | 1 | .014 |
| | DEC. | 7,674 | 1,345 | 1 | .013 | | DEC. | 3,874 | 645 | 0 | .012 |
| | JAN. | 6,734 | 1,161 | 1 | .013 | | JAN. | 13,631 | 3,123 | 2 | .017 |
| | FEB. | 4,873 | 824 | 1 | .012 | | FEB. | 4,955 | 854 | 1 | .013 |
| | MAR. | 3,862 | 642 | 0 | .012 | | MAR. | 9,273 | 2,141 | 1 | .017 |
| | APR. | 3,636 | 615 | 0 | .012 | | APR. | 63,926 | 31,466 | 21 | .036 |
| | MAY | 10,037 | 2,308 | 2 | .017 | | MAY | 27,011 | 6,845 | 4 | .019 |
| | JUNE | 101,994 | 70,260 | 46 | .051 | | JUNE | 215,140 | 162,829 | 107 | .056 |
| | JULY | 5,939 | 1,751 | 1 | .022 | | JULY | 14,432 | 3,048 | 2 | .016 |
| | AUG. | 84,618 | 69,082 | 45 | .060 | | AUG. | 3,552 | 595 | 0 | .012 |
| | SEPT. | 67,132 | 31,050 | 20 | .034 | | SEPT. | 2,932 | 492 | 0 | .012 |
| | YEAR | 319,100 | 184,300 | 121 | .042 | | YEAR | 369,700 | 214,000 | 140 | .043 |
| 1978 | CUM.AVG. | 720,300 | 727,000 | 477 | .074 | 1979 | CUM.AVG. | 676,500 | 662,900 | 435 | .072 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1980 | OCT. | 1,043 | 189 | 0 | .013 | 1981 | OCT. | 9,953 | 2,403 | 2 | .018 |
| | NOV. | 1,457 | 252 | 0 | .013 | | NOV. | 4,221 | 817 | 1 | .014 |
| | DEC. | 3,991 | 699 | 0 | .013 | | DEC. | 2,737 | 456 | 0 | .012 |
| | JAN. | 5,086 | 978 | 1 | .014 | | JAN. | 3,265 | 558 | 0 | .013 |
| | FEB. | 2,136 | 357 | 0 | .012 | | FEB. | 2,047 | 342 | 0 | .012 |
| | MAR. | 1,073 | 193 | 0 | .013 | | MAR. | 4,175 | 794 | 1 | .014 |
| | APR. | 778 | 146 | 0 | .014 | | APR. | 17,802 | 5,934 | 4 | .024 |
| | MAY | 234,547 | 338,715 | 222 | .106 | | MAY | 190,351 | 138,797 | 91 | .054 |
| | JUNE | 36,649 | 13,401 | 9 | .027 | | JUNE | 442,320 | 541,309 | 355 | .090 |
| | JULY | 556 | 114 | 0 | .015 | | JULY | 135,455 | 103,303 | 68 | .056 |
| | AUG. | 317,623 | 554,026 | 363 | .128 | | AUG. | 14,626 | 3,505 | 2 | .018 |
| | SEPT. | 31,417 | 10,595 | 7 | .025 | | SEPT. | 68,758 | 34,344 | 23 | .037 |
| | YEAR | 636,400 | 919,700 | 603 | .106 | | YEAR | 895,700 | 832,600 | 546 | .068 |
| 1980 | CUM.AVG. | 672,000 | 691,400 | 453 | .076 | 1981 | CUM.AVG. | 694,400 | 705,500 | 463 | .075 |

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1982 | OCT. | 116,118 | 61,480 | 40 | .039 | 1983 | OCT. | 19,958 | 6,188 | 4 | .023 |
| | NOV. | 43,716 | 15,355 | 10 | .026 | | NOV. | 1,293 | 231 | 0 | .013 |
| | DEC. | 15,156 | 3,007 | 2 | .015 | | DEC. | 748 | 144 | 0 | .014 |
| | JAN. | 12,131 | 2,289 | 2 | .014 | | JAN. | 667 | 131 | 0 | .014 |
| | FEB. | 15,075 | 3,931 | 3 | .010 | | FEB. | 1,748 | 316 | 0 | .013 |
| | MAR. | 13,274 | 2,588 | 2 | .014 | | MAR. | 7,573 | 2,303 | 2 | .022 |
| | APR. | 7,196 | 1,262 | 1 | .013 | | APR. | 506 | 105 | 0 | .015 |
| | MAY | 104,120 | 78,069 | 51 | .055 | | MAY | 1,221 | 229 | 0 | .014 |
| | JUNE | 19,865 | 5,230 | 3 | .019 | | JUNE | 5,591 | 1,120 | 1 | .015 |
| | JULY | 2,029 | 344 | 0 | .012 | | JULY | 2,102 | 399 | 0 | .014 |
| | AUG. | 518 | 107 | 0 | .015 | | AUG. | 3,524 | 868 | 1 | .018 |
| | SEPT. | 3,506 | 861 | 1 | .018 | | SEPT. | 101,078 | 146,237 | 96 | .106 |
| | YEAR | 352,700 | 174,500 | 114 | .036 | | YEAR | 146,000 | 158,300 | 104 | .080 |
| 1982 | CUM.AVG. | 663,300 | 657,200 | 431 | .073 | 1983 | CUM.AVG. | 620,200 | 615,700 | 404 | .073 |

TABLE 5.--Monthly, yearly, and cumulative average discharge and suspended sediment loads
for station 08210000 Nueces River near Three Rivers, Texas, 1972-85--Continued

(ac-ft, acre-feet; % wt, percent weight; cum. avg., cumulative average)

| WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | | WATER YEAR | MONTH | DISCHARGE ACRE-FEET | SUSPENDED SEDIMENT | | |
|---------------|----------|------------------------|--------------------|-------|------|---------------|----------|------------------------|--------------------|-------|------|
| | | | TONS | AC-FT | % WT | | | | TONS | AC-FT | % WT |
| 1984 | OCT. | 20,964 | 5,646 | 4 | .020 | 1985 | OCT. | 89,705 | 43,764 | 29 | .036 |
| | NOV. | 6,873 | 1,451 | 1 | .016 | | NOV. | 13,427 | 3,910 | 3 | .021 |
| | DEC. | 664 | 131 | 0 | .014 | | DEC. | 674 | 132 | 0 | .014 |
| | JAN. | 4,807 | 1,071 | 1 | .016 | | JAN. | 40,797 | 14,760 | 10 | .027 |
| | FEB. | 625 | 123 | 0 | .014 | | FEB. | 4,810 | 828 | 1 | .013 |
| | MAR. | 636 | 126 | 0 | .015 | | MAR. | 23,155 | 6,031 | 4 | .019 |
| | APR. | 256 | 65 | 0 | .019 | | APR. | 42,074 | 15,918 | 10 | .028 |
| | MAY | 629 | 127 | 0 | .015 | | MAY | 97,231 | 48,249 | 32 | .036 |
| | JUNE | 13,034 | 3,153 | 2 | .018 | | JUNE | 44,557 | 15,613 | 10 | .026 |
| | JULY | 11,116 | 2,790 | 2 | .018 | | JULY | 48,565 | 19,630 | 13 | .030 |
| | AUG. | 90 | 35 | 0 | .029 | | AUG. | 304 | 74 | 0 | .018 |
| | SEPT. | 76 | 32 | 0 | .031 | | SEPT. | 4,618 | 1,106 | 1 | .018 |
| | YEAR | 59,770 | 14,800 | 10 | .018 | | YEAR | 410,000 | 170000 | 112 | .030 |
| 1984 | CUM.AVG. | 577,100 | 569400 | 373 | .072 | 1985 | CUM.AVG. | 565,200 | 540900 | 355 | .070 |

ANALYSIS OF SUSPENDED-SEDIMENT RECORDS

The quantity of sediment is arrived at by making a calculation based on dry material weighing 70 lb/ft^3 (McCaughan and Etheridge Consulting Engineers (1973) reported that the U.S. Soil Conservation Service determined that the weight of the settled sediment in Lake Corpus Christi was nearly 35 lb/ft^3 , in-place, or about one-half of the dry weight). Therefore, to arrive at the in-place volume of sediment in the lake bottom, the volumes shown in the suspended-sediment data should be doubled (tables 1-5).

To make a comparison of the sediment records with the McCaughan and Etheridge Consulting Engineers' (1973) study in Lake Corpus Christi, the records for the Three Rivers and Mathis stations were used. The data for these two stations were collected during October 1972 to September 1985 (14 years).

During this 14-year period, the records at the Three Rivers station show a total flow of 7,912,400 acre-ft, a cumulative average of 565,200 acre-ft, and a total sediment load of 4,970 acre-ft (dry). McCaughan and Etheridge Consulting Engineers (1973) calculated the net drainage area above Mathis to be $16,625 \text{ mi}^2$ (the 31-mi^2 lake surface was not included in the net drainage area); the drainage area above Three Rivers is $15,600 \text{ mi}^2$. Thus, they increased the sediment load at the Three Rivers station in proportion to the drainage basins to compute the total sediment load entering Lake Corpus Christi. Accordingly, the 14-year record being analyzed was increased by the factor of 1.07, resulting in a total estimated sediment input into the lake of 5,320 acre-ft (dry).

During the same 14-year period, from October 1972 to September 1985, the total sediment load leaving the lake and passing the Mathis station (sediment output) was estimated to be 177 acre-ft (dry). This indicates that approximately

5,140 acre-ft (dry) of sediment remained in Lake Corpus Christi during the period of record. To convert this volume (dry) to the conditions on the lake bottom (wet) the volume was doubled, indicating a total wet volume of 10,300 acre-ft or a cumulative average of approximately 736 acre-ft.

The review of State of Texas sediment records (1942-48) by McCaughan and Etheridge Consulting Engineers (1973) indicated that there was a total sediment input into Lake Corpus Christi of 2,990 acre-ft (dry), a total sediment output of 1,070 acre-ft (dry), and approximately 1,920 acre-ft (dry) of sediment remaining in Lake Corpus Christi. After volume adjustments, a total wet volume of 3,840 acre-ft remained in the lake, which represents an annual average of 640 acre-ft. When the 1972 bottom profile study by McCaughan and Etheridge Consulting Engineers (1973) was compared to the March 1948 lake conditions, a total loss of 20,406 acre-ft (wet) was indicated, which represents an annual loss of 832 acre-ft (wet) for the 24.5-year period of record.

A report by the U.S. Soil Conservation Service (Brown and others, 1948), based on changes of bottom contours during 1942-48, showed a total reduction of lake bottom of 4,414 acre-ft or an annual average of 736 acre-ft. The three studies are summarized in table 6.

The estimated volumes of sediment remaining in Lake Corpus Christi are remarkably in agreement, especially the average annual sediment loads reported by the USGS/WRD and Soil Conservation Service. The greatest anomaly in the data occurs between total output loads determined by the USGS/WRD and McCaughan and Etheridge Consulting Engineers (1973), which were 177 acre-ft and 1,070 acre-ft, respectively. The former represents a 14-year record and the latter a 6-year record. Yet the data indicate that 893 acre-ft more sediment flowed out of Lake Corpus Christi during the 1942-48 study than during the 1972-85 study.

Table 6.--Summary of sedimentation studies of Lake Corpus Christi

| Method used to determine sedimentation rate | Study period | Total sediment deposition (wet) (acre-feet) | Average annual sediment sition (wet) (acre-feet) | Total sediment input (dry) (acre-feet) | Average annual sediment input (dry) (acre-feet) | Total sediment output (dry) (acre-feet) | Average annual sediment output (dry) (acre-feet) |
|---|--------------|---|--|--|---|---|--|
| U.S. Geological Survey (WRD) | | | | | | | |
| Sediment records | 1972-85 | 10,300 | 736 | 5,320 | 380 | 177 | 13 |
| U.S. Soil Conservation Service (1948) | | | | | | | |
| Bottom profiles | 1942-48 | 4,414 | 736 | -- | -- | -- | -- |
| McCaughan and Etheridge Consulting Engineers (1973) | | | | | | | |
| Sediment records | 1942-48 | 3,840 | 640 | 2,990 | 498 | 1,070 | 178 |
| Bottom profiles | 1948-72 | 20,406 | 832 | -- | -- | -- | -- |

The USGS/WRD estimated the total sediment output on 13 years of data furnished by the TWDB and 1 year of data (1985 water year) based on regression analysis of the 13 years of record. A possible explanation for this difference may be explained by the history of Lake Corpus Christi. The old Mathis Dam was completed, and storage began on July 24, 1934. By March 1948, much of the storage capacity had been decreased because of sedimentation. Later the Wesley E. Seale Dam was completed and deliberate impoundment began April 26, 1958, submerging the old Mathis Dam. The alteration in Lake Corpus Christi, caused by the construction of the new dam, might account for the smaller sedimentation rate during the 1972-85 study.

FUTURE SEDIMENTATION

The survey in October 1972 showed that Lake Corpus Christi had a total lake volume of 272,352 acre-ft (McCaughan and Etheridge Consulting Engineers, 1973). Using the 14-year total sediment load input of 10,300 acre-ft (wet) arrived at earlier in this report, the total lake volume was reduced to 262,052 acre-ft during 1972-85. Future sediment deposition in Lake Corpus Christi will be influenced by the Choke Canyon Reservoir, which will trap and reduce the sediment inflow from the lower Frio River basin to Lake Corpus Christi. However, if the estimated total cumulative average sediment load of 736 acre-ft (wet) per year were to remain constant over the next 14 years, Lake Corpus Christi will have lost another 10,300 acre-ft (wet) of volume by 1999.

SUMMARY

Published and unpublished sediment data were researched to update sediment tables for the 1972 to 1985 water years. When data were not available, regression analysis was used to fill in the missing data. Simulated sediment loads were always checked for validity. The tables were prepared by tabulating

monthly discharge data and sediment loads. Yearly totals and cumulative averages were computed and entered into the tables. Then all the values and computations in the tables were checked.

It was estimated that 10,300 acre-ft (wet) of sediment had entered Lake Corpus Christi during the 14-year period of record and averaged 736 acre-ft (wet) per year. An earlier study by the Soil Conservation Service, based on changes of bottom contours during 1942-48, indicated that 736 acre-ft per year of suspended sediment had entered Lake Corpus Christi during that 6-year period.

The greatest anomaly found in the comparison of the results of different investigations was between the study by the USGS/WRD and the study by McCaughan and Etheridge Consulting Engineers. A total sediment output of 177 acre-ft (dry) was estimated by the USGS/WRD and 1,070 acre-ft (dry) by McCaughan and Etheridge Consulting Engineers using State of Texas sediment records (1942-48). One possible explanation for this anomaly is that the storage capacity of Lake Corpus Christi was greatly expanded in 1958 when a new dam was completed just downstream from the old dam.

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| Sample | depth(m) | %S _{tot} | %S _{S04} | %S _{AV} | %S _{PY} | %S _{ORG} | %C _{C03} | %C _{ORG} | %Fe |
|--------|----------|-------------------|-------------------|------------------|------------------|-------------------|-------------------|-------------------|-----|
| CW-16 | 843 | .03 | | | | | 2.9 | 19 | |
| CW-15 | 862 | .40 | <.01 | <.01 | .38 | .02 | 4.3 | 1.1 | 3.6 |
| CW-14 | 871 | .12 | | | | | 6.9 | 4.8 | |
| CW-13 | 880 | 4.0 | <.01 | .01 | 3.3 | .12 | 6.0 | 5.8 | 3.4 |
| CW-12 | 898 | .04 | | | | | 7.5 | 1.3 | |
| CW-11 | 908 | .04 | <.01 | <.01 | .03 | .02 | 3.8 | 1.7 | 1.7 |
| CW-10 | 917 | 1.0 | <.01 | <.01 | .84 | .01 | 4.2 | .49 | 3.1 |
| CW-9 | 926 | .13 | | | | | 1.3 | .46 | |
| CW-8 | 935 | .52 | <.01 | <.01 | .46 | .02 | 1.2 | .44 | 3.3 |
| CW-7 | 953 | .06 | | | | | 2.6 | .88 | |
| CW-6 | 971 | 1.5 | <.01 | <.01 | 1.3 | .01 | 3.6 | .35 | 2.9 |
| CW-5a | 981 | .47 | | | | | 1.9 | .52 | |
| CW-5 | 990 | .37 | .07 | <.01 | .16 | .02 | 2.1 | .60 | 2.2 |
| CW-4 | 1008 | .11 | | | | | 2.1 | .26 | |
| CW-3 | 1026 | .80 | .02 | <.01 | .59 | .08 | 6.1 | 6.2 | .90 |
| CW-2 | 1035 | .04 | | | | | 2.5 | .26 | |
| CW-1 | 1043 | .86 | <.01 | <.01 | .78 | .05 | 7.2 | 4.0 | 2.6 |