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UNITED STATES OF AMERICA
DEPARTMENT OF STATE

INTERNATIONAL BOUNDARY COMMISSION
UNITED STATES AND MEXICO

WATER BULLETIN NUMBER 1

# Flow of the Rio Grande and Tributary Contributions

*From San Marcial, New Mexico, to the Gulf of Mexico*

1931

AND

ANALYSES OF WATER SAMPLES

*For*

*Silt, Salt, and Chemical Constituents*

1924 – 1931

INTERNATIONAL BOUNDARY COMMISSION
UNITED STATES AND MEXICO

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WATER BULLETIN NUMBER 1

# Flow of the Rio Grande and Tributary Contributions

*From San Marcial, New Mexico to the Gulf of Mexico*

For the Year 1931

*Also*

ANALYSES OF WATER SAMPLES

*for*

*Silt, Salt, and Chemical Constituents*

For the Years 1924 - 1931

## FOREWORD

This compilation of stream discharge measurements is the first unified publication of data relative to the cooperative determination of the flow of the international portion of the Rio Grande. It is published jointly by the American and Mexican Sections of the International Boundary Commission and represents the results of stream flow measurements made on the Rio Grande and on certain tributaries near their confluence, from San Marcial, New Mexico, which is at the head of Elephant Butte reservoir, to the Gulf of Mexico, for the year 1931.

International stream gaging was begun in 1897, with the operation of the station at El Paso, Texas. A number of stations on the Lower Rio Grande and tributaries below El Paso were established in 1900 and operated until 1914. From 1914 to 1923 all such work was suspended except for a few months in 1919. In 1923 the work was resumed and carried on independently by the two countries until 1931.

The duties and functions of the American Section of the International Water Commission were transferred to the American Section of the International Boundary Commission by Act of June 30, 1932. On January 1, 1932, the Mexican Section of the International Boundary Commission similarly took over the duties of the Mexican Section of the International Water Commission.

The present cooperative arrangement for obtaining hydrographic data is the result of the concurrence and agreement by both Sections of the International Commission that a coordinated result should be insured and that an accurate and complete hydrographic record of international flow was necessary.

From the descriptive matter accompanying the data of each gaging station it will appear which of the stations were operated by the American Section of the Commission and which by the Mexican Section.

## ACKNOWLEDGMENTS

During the first half of 1931 the hydrographic work of the American Section was accomplished by the United States Geological Survey. Since then the American Section has itself carried on such work.

The United States Bureau of Reclamation has cooperated by furnishing data on the salt content of Rio Grande water. Specific acknowledgment is made where the data appear herein.

The United States Department of Agriculture has assisted greatly by analyzing water samples for silt, salt and chemical constituents. Specific acknowledgments are likewise made where the data appear.

During the year 1931 the hydrographic work of the Mexican Government on the Rio Grande was accomplished directly by the Department of Agriculture and Development of Mexico through its branch offices at Monterrey, Nuevo Leon and Chihuahua, Chihuahua. Original current meter measurements and charts of automatic recorders were furnished to the Mexican Section of the International Boundary and Water Commission, and daily discharge records were computed from these data.

## STREAM GAGING STATION RECORDS—1931

The records of the various gaging stations appear in this publication in the same sequence as they naturally occur in passing down the river, except that Cienegas Creek is above the Del Rio station.

There is here reported the results of measurements at fourteen points along the Rio Grande and the contributing flow from ten tributaries.

The flow of the Rio Conchos was not measured directly, but its flow may be approximated by taking the difference in flow at the Upper Presidio and Lower Presidio stations. Irrigation diversions between these two stations as well as backwater at Lower Presidio station from Alamito Creek during times of storm flow therein, prevent an accurate determination of the Rio Conchos discharge.

## SALT DETERMINATIONS AND CHEMICAL ANALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1924-1931

Collected here are the available data with reference to the quality of the water of the Rio Grande and tributaries near their confluence for the years 1924 to 1931, inclusive, with reference to its use particularly for irrigation.

Necessary explanations are made where the data are presented.

## SILT SAMPLING OF RIO GRANDE WATER

All silt sampling data available for the years 1923 to 1931 for the Rio Grande below El Paso are presented here. They are of particular value when considering the probable life of storage reservoirs on the river.

## RIO GRANDE AT SAN MARCIAL STATION

**Description:** Automatic water-stage recorder located at highway bridge half a mile northeast of San Marcial, New Mexico. Zero of gage is 4,412.05 feet above mean sea level.

**Records:** Based upon 159 current meter measurements during the year from the bridge. Computations by shifting channel methods. 1931 records considered only fair.

**Records Available:** January, 1895 to December, 1931. Records prior to January, 1922 at station 1½ miles downstream.

**Remarks:** There are many irrigation diversions above this station in New Mexico and Colorado which modify the river flow. With all closed basins eliminated the drainage area above this station is 27,806 square miles, all in the United States.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Oct. 11, 1904 | (Max. recorded) | 33,000 | Prior to 1916 | (Several years) | No Flow |
| May 18, 1924 | | 12,400 | Several Days, 1924 | | No Flow |
| Apr. 20, 1925 | | 3,300 | Several Days, 1925 | | No Flow |
| May 29, 1926 | 4.50 | 10,900 | Several Days, 1926 | | No Flow |
| Sept. 14, 1927 | | 10,100 | July 24, 1927 | | 62 |
| May 5, 1928 | | 7,500 | Several Days, 1928 | | No Flow |
| **Extreme High Flow** | | | **Extreme Low Flow** | | |
| Sept. 24, 1929 | 7.40 | ..... | July 7-10, 1929 | | 2 |
| July 26, 1930 | 3.94 | 5,880 | Several Days, 1930 | | No Flow |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | † 540 | 685 | 768 | 768 | 1,360 | 445 | 0 | 0 | 0 | 756 | 448 | 580 |
| 2 | † 540 | 715 | 745 | 705 | 1,460 | 406 | 146 | 0 | 25.8 | 769 | 506 | 566 |
| 3 | † 540 | 685 | 922 | 665 | 1,730 | 331 | 360 | *370 | 54.6 | 796 | 463 | 558 |
| 4 | * 809 | 863 | 906 | 555 | 1,900 | 257 | 1,250 | 636 | 24.6 | 967 | 382 | 630 |
| 5 | * 715 | 809 | 782 | 531 | 2,080 | 220 | 1,290 | *133 | 15.7 | 1,220 | 325 | 674 |
| 6 | * 725 | 755 | 641 | 585 | 1,950 | 176 | 559 | 110 | 19.1 | 1,130 | 282 | 603 |
| 7 | 796 | 735 | 620 | 583 | 1,780 | 156 | 240 | 83 | 15.0 | 1,050 | 247 | 693 |
| 8 | 695 | 655 | 809 | 498 | 2,110 | 153 | 83 | 27 | * 1.37 | 785 | 234 | 675 |
| 9 | 675 | 655 | 876 | 406 | 1,750 | 126 | 61 | *415 | 0 | 473 | 233 | 653 |
| 10 | * 579 | 695 | 922 | 406 | 1,820 | 88 | 39 | *862 | 0 | 528 | 295 | 790 |
| 11 | 655 | 735 | 745 | 425 | 2,110 | 81 | 6 | 386 | 0 | 1,640 | 272 | 717 |
| 12 | * 627 | 836 | 561 | 503 | 1,900 | 64 | 2 | 132 | 0 | 2,680 | 298 | 1,020 |
| 13 | 585 | 906 | 675 | 508 | 1,640 | 56 | 0 | 88 | 0 | 934 | 251 | 996 |
| 14 | 655 | 938 | 705 | 486 | 1,750 | 5.5 | 0 | 68 | 0 | 685 | 252 | 746 |
| 15 | 599 | 954 | 705 | 492 | 1,290 | 0 | 0 | 36.5 | 0 | 583 | 652 | 697 |
| 16 | 585 | 1,140 | 685 | 498 | 1,120 | 0 | 0 | 18.2 | 0 | 487 | 593 | 882 |
| 17 | 599 | 986 | 695 | 715 | 1,580 | 0 | 0 | 6.8 | 675 | 423 | 473 | 888 |
| 18 | 627 | 863 | 715 | 1,360 | 2,000 | 0 | 0 | .4 | 1,420 | 414 | 471 | 664 |
| 19 | 648 | 822 | 768 | 2,140 | 2,080 | 0 | 0 | 0 | 1,670 | * 510 | 439 | 413 |
| 20 | 655 | 850 | 745 | 1,440 | 2,220 | 0 | 0 | 0 | 2,740 | * 618 | 422 | 437 |
| 21 | 579 | 768 | 755 | 1,020 | 2,160 | 0 | 0 | 0 | 2,160 | *1,290 | 480 | 677 |
| 22 | 641 | 745 | 822 | 890 | 1,710 | 0 | 0 | 0 | 1,440 | *3,010 | 407 | 812 |
| 23 | 613 | 822 | 938 | 1,150 | *1,420 | 0 | 0 | 0 | 1,200 | 1,860 | 430 | 1,330 |
| 24 | 573 | 906 | 986 | 1,290 | *1,140 | 0 | 0 | 56.5 | *1,280 | 1,150 | 671 | 1,000 |
| 25 | 555 | 922 | 876 | 1,710 | * 890 | 0 | 0 | 25.85 | 4,020 | 778 | 650 | 875 |
| 26 | 520 | 906 | 705 | 1,500 | 768 | 0 | 0 | 29.25 | *5,930 | 480 | 1,060 | 886 |
| 27 | 585 | 863 | 768 | 1,260 | 695 | 0 | 0 | 18.2 | *1,860 | 441 | 864 | 998 |
| 28 | 627 | 863 | 1,080 | 1,000 | 627 | 0 | 0 | 0 | *1,730 | 427 | 467 | 996 |
| 29 | 768 | ..... | 1,150 | 1,420 | 599 | 0 | 0 | 0 | 2,360 | 364 | 491 | 961 |
| 30 | * 705 | ..... | 986 | 1,290 | 561 | 0 | 0 | 0 | 1,080 | 352 | 456 | 901 |
| 31 | 725 | ..... | 922 | ..... | 503 | ..... | 0 | 0 | ..... | 428 | ..... | 833 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | ..... | ..... | ..... | ..... | 637 | 39,200 | |
| February | 2.53 | 1.73 | 1,360 | 606 | 824 | 45,800 | |
| March | 2.61 | 1.99 | 1,350 | 543 | 806 | 49,600 | |
| April | 3.18 | 2.08 | 2,450 | 375 | 893 | 53,100 | |
| May | 3.03 | 1.92 | 2,480 | 481 | 1,510 | 92,800 | |
| June 14 | 2.00 | .75 | 460 | 0 | 85.5 | 5,090 | |
| July | 3.63 | ..... | 4,900 | 0 | 130 | 8,010 | |
| August | 3.20 | ..... | 2,410 | 0 | 113 | 6,940 | |
| September 26 | 4.07 | ..... | 8,130 | 0 | 991 | 58,950 | |
| October | 3.48 | 1.95 | 3,840 | 286 | 904 | 55,600 | |
| November | 3.49 | 2.20 | 3,410 | 193 | 450 | 26,800 | |
| December | 3.23 | 2.45 | 2,450 | 264 | 779 | 47,900 | |
| Yearly | 4.07 | .75 | 8,130 | 0 | 677 | 489,790 | 17.6 |

*Partly Estimated †Estimated

## RIO GRANDE AT EL PASO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located in the pass opposite Courchesne quarry, four miles northwest of El Paso, Texas. Zero of gage is 3,720.65 feet above mean sea level.

**Records:** Based upon 157 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** May, 1897 to December, 1931. Records are also available for station at Old Fort Bliss, 1,500 feet above International Dam and three miles below present station, from May, 1889 to June, 1893, and for station at pump house of Smelter Company, one mile below present station, from January, 1895, to May, 1897.

**Remarks:** There are many irrigation diversions above this station in New Mexico and Colorado. The river flow is regulated at Elephant Butte reservoir. With all closed basins eliminated the drainage area above this station is 32,819 square miles, all in the United States.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| June 12, 1905 | (Max. recorded) | 23,700 | Prior to 1916 | (Several years) | No Flow |
| Aug. 16, 1924 | 3.52 | 2,900 | Feb. 1, 1924 | | 145 |
| Sept. 3, 1925 | 7.10 | 9,160 | Jan. 30, 1925 | 0.60 | 140 |
| July 12, 1926 | 4.96 | 4,910 | Jan. 31, 1926 | 0.13 | 136 |
| **Extreme High Flow** | | | Jan. 29, 1927 | | 127 |
| July 26, 1927 | 4.94 | 5,350 | Jan. 8, 1928 | 0.42 | 131 |
| Aug. 13, 1928 | 4.40 | 4,060 | **Extreme Low Flow** | | |
| Aug. 11, 1929 | 6.18 | 6,870 | Feb. 7, 1929 | 0.46 | 128 |
| Aug. 8, 1930 | 4.14 | 3,310 | Jan. 25, 1930 | 0.30 | 102 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 158 | 155 | 391 | 992 | 938 | 1,360 | 1,170 | 1,840 | 1,110 | 557 | 277 | 267 |
| 2 | 153 | * 149 | 397 | 956 | 712 | 1,190 | 2,220 | 2,850 | 1,130 | 561 | 258 | 240 |
| 3 | 149 | * 136 | 317 | 880 | 648 | 1,300 | 2,290 | 4,210 | 1,100 | 541 | 255 | 230 |
| 4 | 153 | * 124 | 312 | 832 | 672 | 1,150 | 2,230 | 3,080 | 1,060 | 541 | 351 | 216 |
| 5 | 160 | 132 | 304 | 992 | 592 | 1,070 | 1,690 | 2,490 | 1,020 | 524 | 460 | 217 |
| 6 | 155 | 137 | 290 | 1,150 | 592 | 1,030 | 1,210 | 1,630 | 1,030 | 501 | 528 | 219 |
| 7 | 160 | 126 | 281 | 938 | 505 | 1,130 | 1,040 | 1,200 | 994 | 427 | 645 | 194 |
| 8 | 168 | 122 | 308 | 920 | 452 | 1,290 | 966 | 1,260 | 907 | 391 | 830 | 183 |
| 9 | 153 | 160 | 360 | 872 | 415 | 1,120 | 1,010 | 1,680 | 791 | 457 | 756 | 191 |
| 10 | 143 | 250 | 409 | 904 | 427 | 1,000 | 979 | 1,500 | 698 | 432 | 431 | 186 |
| 11 | 149 | 263 | 512 | 872 | 648 | 1,010 | 835 | 1,830 | 573 | * 346 | 375 | 194 |
| 12 | 141 | 254 | 584 | 947 | 760 | 912 | 1,020 | 1,560 | 665 | * 371 | 345 | 194 |
| 13 | 147 | 276 | 584 | 1,080 | 1,010 | 888 | 1,120 | 1,100 | 751 | * 326 | 304 | 194 |
| 14 | 158 | 335 | 672 | 1,010 | 1,120 | 947 | 993 | 927 | 922 | 302 | 276 | 204 |
| 15 | 153 | 330 | 760 | 920 | 1,170 | 992 | 829 | 821 | 1,040 | 282 | 267 | 200 |
| 16 | 151 | 380 | 974 | 929 | 1,230 | 1,090 | 785 | 732 | 1,250 | 267 | 248 | 196 |
| 17 | 143 | 355 | 947 | 1,400 | 1,370 | 965 | 794 | 1,050 | 1,320 | 256 | 260 | 191 |
| 18 | 141 | 312 | 864 | 1,290 | 1,400 | 956 | 925 | 1,120 | 1,360 | 256 | 213 | 178 |
| 19 | 139 | 322 | 752 | 1,290 | 1,200 | 896 | 1,480 | 967 | 1,400 | 232 | 259 | 220 |
| 20 | 141 | 272 | 696 | 929 | 1,110 | 896 | 2,020 | 930 | 1,230 | 250 | 486 | 349 |
| 21 | 145 | 281 | 616 | 712 | 938 | 1,140 | 1,560 | 858 | 957 | 343 | 607 | 412 |
| 22 | 145 | 263 | 600 | 696 | 888 | 1,280 | 1,340 | 1,030 | 725 | 528 | 586 | 524 |
| 23 | 139 | 272 | 608 | 938 | 808 | 1,050 | 1,040 | 1,150 | 633 | 449 | 408 | 262 |
| 24 | 137 | 286 | 712 | 1,000 | 784 | 1,030 | 1,080 | 1,480 | 582 | 545 | 298 | 247 |
| 25 | 135 | 304 | 680 | 840 | 896 | 1,060 | 828 | 1,480 | 555 | 812 | 269 | 218 |
| 26 | 134 | 304 | 776 | 752 | 816 | 1,060 | 1,040 | 1,200 | 499 | 986 | 235 | 209 |
| 27 | 160 | 335 | 1,290 | 696 | 824 | 947 | 1,230 | 1,010 | 683 | 604 | 237 | 217 |
| 28 | 155 | 370 | 1,010 | 720 | 929 | 956 | 1,070 | 906 | 539 | 454 | 248 | 205 |
| 29 | 149 | ..... | 929 | 947 | 956 | 965 | 1,110 | 866 | 450 | 354 | 249 | 199 |
| 30 | 141 | ..... | 1,340 | 1,240 | 1,030 | 1,220 | 1,180 | 892 | 491 | 300 | 255 | 186 |
| 31 | 132 | ..... | 1,110 | ..... | 1,210 | ..... | 1,460 | 1,040 | ..... | 286 | ..... | 182 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 0.95 | 0.82 | 172 | 126 | 148 | 9,100 | |
| February 4 | 1.69 | 0.72 | 415 | 117 | 250 | 13,900 | |
| March | 2.59 | 1.25 | 1,610 | 242 | 658 | 40,500 | |
| April | 3.07 | 1.90 | 1,890 | 608 | 955 | 56,800 | |
| May | 2.70 | 1.60 | 1,560 | 380 | 873 | 53,700 | |
| June | 2.82 | 2.05 | 1,450 | 792 | 1,060 | 63,100 | |
| July | 4.75 | 1.94 | 3,960 | 678 | 1,240 | 76,440 | |
| August 3 | 5.20 | 1.82 | 4,710 | 676 | 1,440 | 88,640 | |
| September | 2.76 | 1.69 | 1,430 | 413 | 882 | 52,480 | |
| October | 2.56 | 1.27 | 1,220 | 182 | 435 | 26,740 | |
| November | 2.21 | 1.19 | 958 | 168 | 374 | 22,250 | |
| December | 2.0 | 1.10 | 609 | 167 | 230 | 14,130 | |
| Yearly | 5.20 | 0.72 | 4,710 | 117 | 712 | 517,780 | 15.8 |

*Partly Estimated

## RIO GRANDE AT TORNILLO BRIDGE STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located at highway bridge 2 miles west of Tornillo, El Paso County, Texas. Zero of gage is 3,577.16 feet above sea level.

**Records:** Based upon 157 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** October, 1927 to December, 1931. Station maintained for several years prior to October, 1927 by United States Bureau of Reclamation.

**Remarks:** The river flow is greatly modified at this station by irrigation diversions into Mexico and the United States and by Elephant Butte reservoir in the United States.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Aug. 15, 1928 | 12.92 | 1,710 | Sept. 14, 15, 1928 | 8.45 | .2 |
| Aug. 14, 1929 | 14.72 | 3,440 | June 14, 1929 | 8.28 | No Flow |
| Aug. 11, 12, 1930 | 12.63 | 1,640 | Mar. 14, 1930 | 7.80 | No Flow |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 115 | 147 | 118 | 195 | 990 | 352 | 211 | 272 | 149 | 219 | 81.5 | 205 |
| 2 | 98 | 142 | 105 | 213 | 692 | 427 | 259 | 776 | 186 | 249 | 217 | 245 |
| 3 | 118 | 149 | 102 | 208 | 522 | 324 | 627 | 1,180 | 222 | 267 | 202 | 249 |
| 4 | 124 | 149 | 70 | 178 | 388 | 384 | 923 | 1,510 | 190 | 246 | 192 | 238 |
| 5 | 119 | 143 | 38 | 166 | 280 | 216 | 1,190 | 1,940 | 146 | 238 | 197 | 232 |
| 6 | 118 | 140 | 47 | 205 | 200 | 138 | 1,210 | 2,690 | 151 | 182 | 332 | 206 |
| 7 | 127 | 140 | 50 | 223 | 121 | 180 | 887 | 2,530 | 182 | 140 | 194 | 202 |
| 8 | 124 | 136 | 51 | 112 | 54 | 176 | 329 | 1,390 | 69.2 | 130 | 155 | 210 |
| 9 | 121 | 73 | 92 | 96 | 19 | 267 | 158 | *1,040 | 11.7 | 83.3 | 422 | 203 |
| 10 | 132 | 18 | 47 | 52 | 21 | 216 | 381 | *1,110 | 10.9 | 90.4 | 337 | *176 |
| 11 | 145 | 55 | 28 | 50 | 23 | 167 | 258 | *1,210 | 6.4 | 120 | 212 | *183 |
| 12 | 138 | 125 | 21 | 98 | 21 | 192 | 200 | 1,080 | 9.2 | 138 | 204 | 183 |
| 13 | 143 | 118 | 50 | 133 | 31 | 115 | 175 | 975 | 18.0 | 219 | 156 | 170 |
| 14 | 140 | 124 | 50 | 248 | 59 | 142 | 270 | 546 | 36.4 | 199 | 109 | 175 |
| 15 | 143 | 142 | 139 | 216 | 136 | 120 | 213 | 312 | 22.5 | 194 | 88 | 166 |
| 16 | 151 | 189 | 344 | 108 | 300 | 57 | 97 | 195 | 144 | 184 | 138 | 163 |
| 17 | 143 | 253 | 472 | 141 | 463 | 95 | 33 | 106 | 338 | 173 | 179 | 168 |
| 18 | 140 | 208 | 388 | 706 | 584 | 50 | 69 | 87.8 | 740 | 178 | 197 | 150 |
| 19 | 133 | 174 | 296 | 740 | 414 | 15 | 99 | 87.2 | 895 | 169 | 218 | 137 |
| 20 | 135 | 138 | 209 | 701 | 248 | 16 | 472 | 48.8 | 998 | 159 | 167 | 132 |
| 21 | 135 | 91 | 151 | 320 | 67 | 16 | 736 | 10.4 | 910 | 161 | 336 | 148 |
| 22 | 135 | 87 | 142 | 133 | 95 | 173 | 692 | 11.5 | 650 | 61.8 | 379 | 148 |
| 23 | 132 | 83 | 125 | 481 | 69 | 232 | 416 | 33.9 | 525 | 9.9 | 316 | 185 |
| 24 | 130 | 83 | 49 | 715 | 84 | 74 | 126 | 186 | 474 | 16.5 | 204 | 166 |
| 25 | 130 | 63 | 31 | 648 | 53 | 25 | 64.7 | 302 | 403 | 24.8 | 143 | 62.1 |
| 26 | 128 | 96 | 54 | 535 | 22 | 21 | 29.9 | 280 | 358 | 250 | 76.3 | 71.5 |
| 27 | 151 | 80 | 70 | 490 | 12 | 47 | 24.8 | 150 | 262 | 392 | 120 | 69.6 |
| 28 | 165 | 108 | 360 | 454 | 34 | 29 | 42.2 | 132 | 318 | 256 | 266 | 39.9 |
| 29 | 171 | ..... | 284 | 740 | 29 | 61 | 14.4 | 80 | 307 | 218 | 230 | 29.3 |
| 30 | 158 | ..... | 200 | 840 | 42 | 54 | 12.7 | 105 | 228 | 136 | 202 | 17.1 |
| 31 | 147 | ..... | 320 | ..... | 92 | ..... | 28.6 | 213 | ..... | 115 | ..... | 36.4 |

| Month | Gage Height Extreme-Feet High | Gage Height Extreme-Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 10.24 | 9.57 | 181 | 80.0 | 135 | 8,300 | |
| February | 10.58 | 8.74 | 288 | 10.0 | 123 | 6,830 | |
| March | 11.03 | 8.80 | 540 | 12.0 | 145 | 8,920 | |
| April | 11.80 | 8.86 | 965 | 20.0 | 338 | 20,100 | |
| May | 12.00 | 9.15 | 1,060 | 5.0 | 199 | 12,200 | |
| June | 11.01 | 9.03 | 512 | 5.5 | 146 | 8,690 | |
| July | 12.28 | 8.90 | 1,260 | 6.8 | 331 | 20,330 | |
| August 6 | 14.35 | 8.78 | 2,850 | 6.8 | 664 | 40,840 | |
| September 9 | 11.75 | 8.69 | 1,020 | 3.2 | 299 | 17,770 | |
| October | 11.01 | 8.86 | 521 | 8.4 | 168 | 10,350 | |
| November | 11.11 | 9.51 | 546 | 38.8 | 209 | 12,440 | |
| December | 10.65 | 9.00 | 265 | 17.1 | 154 | 9,460 | |
| Yearly | 14.35 | 8.69 | 2,850 | 3.2 | 243 | 176,230 | |

*Partly Estimated

## RIO GRANDE AT FORT QUITMAN STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located at lower end of El Paso Valley, 1½ miles below Old Fort Quitman and 11½ miles south of Finlay, in Hudspeth County, Texas. Zero of gage is 3,452.462 feet above mean sea level.

**Records:** Based upon 76 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** January, 1923 to December, 1931.

**Remarks:** There are many irrigation diversions above this station in New Mexico, Colorado, Texas, and Mexico. The river flow is regulated at Elephant Butte reservoir. With all closed basins eliminated the drainage area above this station is 34,450 square miles; 33,616 being in the United States and 834 in Mexico.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| July 10, 1924 | 5.83 | 2,200 | April 15, 1923 | ..... | 49 |
| Sept. 11, 1925 | 7.02 | 2,600 | Aug. 12, 1924 | ..... | 75 |
| Sept, 28, 1926 | 6.46 | 2,450 | July 23, 24, 1925 | ..... | 20 |
| Sept. 21, 1927 | 4.68 | 1,440 | Sept. 7, 8, 1926 | ..... | 45 |
| Aug. 15, 1928 | 4.97 | 1,730 | July 13, 1927 | ..... | 45 |
| | | | Mar. 31, 1928 | ..... | 34 |
| **Extreme High Flow** | | | **Extreme Low Flow** | | |
| Aug. 26, 1923 | 6.7 | 2,600 | | | |
| Aug. 20, 1929 | 6.38 | 2,460 | Apr. 14, 1929 | 0.32 | 40 |
| Aug. 14, 1930 | 4.64 | 1,360 | July 5, 1930 | 0.54 | 58 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 176 | 184 | 160 | 203 | 1,200 | 102 | 218 | 88 | 107 | 431 | 259 | 248 |
| 2 | 179 | 176 | 169 | 237 | 1,360 | 97 | 491 | 248 | 127 | 372 | 240 | 264 |
| 3 | 166 | 172 | 182 | 168 | 1,390 | 150 | 344 | 485 | 144 | 357 | 223 | 268 |
| 4 | 149 | 163 | 169 | 128 | 1,060 | 215 | 305 | 723 | 136 | 352 | 204 | 271 |
| 5 | 144 | 156 | 156 | 134 | * 805 | 242 | 403 | 842 | 161 | 354 | 216 | 281 |
| 6 | 154 | 158 | 131 | 156 | * 605 | 260 | 556 | 939 | 209 | 340 | 207 | 290 |
| 7 | 155 | 158 | 105 | 140 | * 458 | 228 | 778 | 1,070 | 184 | 315 | 205 | 292 |
| 8 | 154 | 160 | 96 | 169 | 360 | 203 | 877 | 1,220 | 149 | 280 | 256 | 289 |
| 9 | 155 | 152 | 94 | 210 | 284 | 191 | 690 | 1,540 | 157 | 221 | 306 | 274 |
| 10 | 160 | 150 | 94 | 188 | * 224 | 205 | 365 | 1,820 | 118 | 204 | 332 | 251 |
| 11 | 149 | 160 | 86 | 149 | * 176 | 233 | 312 | 1,730 | 91 | 179 | 461 | 231 |
| 12 | 161 | 177 | 77 | 144 | 144 | 212 | 292 | 1,400 | 66.8 | 162 | 414 | 212 |
| 13 | 164 | 161 | 80 | 146 | 124 | 196 | 255 | 1,300 | 60.3 | 159 | 357 | 202 |
| 14 | 164 | 177 | 61 | 163 | 109 | 189 | 191 | 1,180 | 53.3 | 158 | 329 | 225 |
| 15 | 160 | 212 | 86 | 158 | 113 | 174 | 152 | 861 | 45.7 | 162 | 295 | 214 |
| 16 | 163 | 212 | 122 | 193 | 118 | 172 | 160 | 562 | 76.7 | 159 | 267 | 211 |
| 17 | 158 | 205 | 132 | 1,600 | 115 | 191 | 149 | 395 | 93 | 144 | 255 | 212 |
| 18 | 156 | 200 | 190 | * 830 | 169 | 150 | 115 | 321 | 100 | 164 | 228 | 208 |
| 19 | 158 | 212 | 260 | * 880 | 297 | 120 | 114 | 227 | 298 | 157 | 225 | 205 |
| 20 | 156 | 268 | 315 | *1,110 | 360 | 110 | 103 | 164 | 617 | 163 | 212 | 206 |
| 21 | 144 | 250 | 315 | 1,140 | 308 | 93 | 114 | 125 | 751 | 169 | 209 | 194 |
| 22 | 124 | 230 | 284 | 930 | 224 | 74 | 266 | 97 | 805 | 169 | 206 | 196 |
| 23 | 117 | 219 | 252 | 1,000 | 166 | 67 | 380 | 82 | 755 | 172 | 261 | 256 |
| 24 | 120 | 196 | 221 | 930 | 142 | 67 | 364 | 72.2 | 617 | 195 | 408 | 280 |
| 25 | 121 | 188 | 196 | 1,140 | 108 | 96 | 175 | 77 | 584 | 186 | 403 | 304 |
| 26 | 125 | 161 | 172 | 1,140 | 99 | 84 | 124 | 98 | 510 | 144 | 343 | 305 |
| 27 | 138 | 146 | 149 | 1,060 | 101 | 67 | 102 | 165 | 498 | 148 | 290 | 240 |
| 28 | 150 | 138 | 149 | 1,000 | 87 | 61 | 88.9 | 212 | 437 | 228 | 256 | 206 |
| 29 | 166 | ..... | 138 | 980 | 81 | 68 | 74.6 | 147 | 452 | 357 | 219 | 194 |
| 30 | 174 | ..... | 218 | 1,060 | 82 | 106 | 65.4 | 139 | 492 | 310 | 223 | 160 |
| 31 | 184 | ..... | 246 | ..... | 86 | ..... | 56.0 | 128 | ..... | 297 | ..... | 148 |

| Month | Gage Height | | Second Feet | | | Acre Feet | |
|---|---|---|---|---|---|---|---|
| | Extreme–Feet | | Extreme | | | | Per |
| | High | Low | High | Low | Average | Total | Sq. Mile |
| January | 1.83 | 1.41 | 188 | 115 | 153 | 9,410 | |
| February | 2.26 | 1.38 | 274 | 122 | 184 | 10,200 | |
| March | 2.39 | 0.79 | 319 | 58 | 165 | 10,100 | |
| April 17 | 6.05 | 1.31 | 2,330 | 122 | 583 | 34,700 | |
| May | 5.13 | 1.29 | 1,780 | 80 | 353 | 21,700 | |
| June | 2.60 | 1.00 | 304 | 58 | 147 | 8,750 | |
| July | 4.98 | 1.03 | 1,310 | 51.5 | 280 | 17,220 | |
| August | 5.98 | 1.39 | 1,850 | 67 | 595 | 36,600 | |
| September 15 | 4.14 | 1.09 | 926 | 42.5 | 296 | 17,640 | |
| October | 2.90 | 1.49 | 473 | 136 | 232 | 14,300 | |
| November | 2.68 | 1.82 | 417 | 200 | 277 | 16,480 | |
| December | 2.33 | 1.54 | 320 | 144 | 237 | 14,550 | |
| Yearly | 6.05 | 0.79 | 2,330 | 42.5 | 292 | 211,650 | 6.1 |

*Partly Estimated

## RIO GRANDE AT UPPER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located 1 mile from Haciendita, Texas, 8 miles above the confluence of the Rio Conchos and about 10 miles northwest of the towns of Ojinaga, Chihuahua, and Presidio, Texas. Zero of gage is 2,579.40 feet above mean sea level, International Boundary Commission datum.

**Records:** Based on 190 current meter measurements during the year from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** 1900 to 1912; August, 1923 to 1926; 1928 to 1931.

**Remarks:** River flow is greatly modified at this station by Elephant Butte reservoir and diversions for irrigation in both the United States and Mexico. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 37,488 square miles, of which 35,229 are in the United States and 2,259 in Mexico.

**Previous Extreme Flows:**

**Maximum Mean Daily**

| Date | Gage | Sec. Ft. |
|---|---|---|
| June, 1911 | ----- | 14,500 |
| **Extreme High Flow** | | |
| Aug. 28, 1923 | 8.69 | 3,100 |
| Sept. 3, 1924 | 8.01 | 1,400 |
| Aug. 12, 1925 | 9.71 | 3,400 |
| Oct. 4, 1926 | 10.40 | 3,400 |
| Aug. 1928 | ----- | 11,250 |
| Sept. 10, 1929 | 8.07 | 3,200 |
| Oct. 7, 1930 | 10.24 | 2,800 |

**Minimum Mean Daily**

| Date | Gage | Sec. Ft. |
|---|---|---|
| 1901—Dry first 7 months | | |
| 1902—Dry with exception of January | | |
| 1903-04—Dry most of the time | | |
| 1908-09-10—Dry most of the time | | |
| **Extreme Low Flow** | | |
| Aug. 5, 6, 1923 | 4.99 | 149 |
| Feb. 9 to 11, 1924 | 5.48 | 185 |
| Aug. 4, 1925 | 4.95 | 49.4 |
| April, 1928—Dry | | |
| April, May, June and July, 1929—Dry | | |
| Oct. 1, 1930 | 4.56 | 21.2 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 265 | 148 | 251 | 81.2 | 819 | 106 | 0 | 49.4 | 106 | 1,320 | 113 | 148 |
| 2 | 226 | 148 | 205 | 74.2 | 890 | 98.9 | 0 | 45.9 | 74.2 | 809 | 166 | 141 |
| 3 | 201 | 155 | 180 | 70.6 | 911 | 88.3 | 290 | 38.8 | 60.0 | 420 | 180 | 141 |
| 4 | 194 | 166 | 166 | 81.2 | 1,020 | 70.6 | 159 | 70.6 | 56.5 | 335 | 180 | 131 |
| 5 | 194 | 170 | †148 | 113 | 1,150 | 56.5 | 261 | 88.3 | 49.4 | 261 | 166 | 226 |
| 6 | 184 | 177 | †155 | 95.3 | 1,050 | 45.9 | 166 | 84.8 | 45.9 | 251 | 166 | 237 |
| 7 | 166 | 177 | †166 | 109 | 622 | 45.9 | 152 | 268 | 38.8 | 240 | 155 | 219 |
| 8 | 148 | 191 | †170 | 84.8 | 551 | 45.9 | 170 | 381 | 38.8 | 212 | 145 | 251 |
| 9 | 145 | 205 | †177 | 74.2 | 519 | 56.5 | 166 | 491 | 35.3 | 184 | 145 | 205 |
| 10 | 226 | 191 | †180 | 63.6 | 480 | 134 | 381 | 901 | 28.3 | 170 | 145 | 180 |
| 11 | 141 | 166 | †159 | 60.0 | 420 | 117 | 530 | 2,800 | 24.7 | 155 | 141 | 194 |
| 12 | 145 | 148 | †131 | 60.0 | 350 | 124 | 470 | 2,300 | 21.2 | 141 | 141 | 191 |
| 13 | 141 | 148 | †109 | 60.0 | 268 | 88.3 | 509 | 1,500 | 14.1 | 184 | 166 | 173 |
| 14 | 141 | 141 | † 98.9 | 70.6 | 219 | 70.6 | 590 | 1,450 | 10.6 | 184 | 184 | 173 |
| 15 | 141 | 141 | † 95.3 | 63.6 | 170 | 70.6 | 420 | 1,200 | 3.5 | 212 | 201 | 173 |
| 16 | 141 | 148 | † 88.3 | 60.0 | 155 | 74.2 | 410 | 901 | 0 | 170 | 201 | 173 |
| 17 | 170 | 208 | † 84.8 | 328 | 141 | 117 | 410 | 660 | 0 | 159 | 191 | 230 |
| 18 | 194 | 159 | † 81.2 | 290 | 166 | 63.6 | 590 | 480 | 0 | 152 | 184 | 166 |
| 19 | 170 | 177 | † 74.2 | 1,100 | 201 | 49.4 | 530 | 350 | 0 | 145 | 180 | 117 |
| 20 | 155 | 191 | 70.6 | 1,400 | 155 | 45.9 | 441 | 300 | 0 | 180 | 180 | 117 |
| 21 | 148 | 191 | 63.6 | 682 | 134 | 38.8 | 410 | 244 | 0 | 240 | 184 | 117 |
| 22 | 145 | 180 | 60.0 | 710 | 117 | 35.3 | 639 | 215 | 0 | 166 | 240 | 124 |
| 23 | 166 | 180 | 70.6 | 840 | 120 | 35.3 | 230 | 194 | 360 | 155 | 230 | 120 |
| 24 | 141 | 219 | 120 | 999 | 191 | 28.3 | 180 | 191 | 2,700 | 145 | 215 | 117 |
| 25 | 141 | 237 | 145 | 922 | 205 | 14.1 | 124 | 166 | 2,200 | 134 | 208 | 106 |
| 26 | 138 | 261 | 134 | 840 | 173 | 10.6 | 95.3 | 124 | 798 | 134 | 191 | 166 |
| 27 | 138 | 261 | 131 | 689 | 145 | 0 | 88.3 | 81.2 | 660 | 134 | 155 | 194 |
| 28 | 124 | 251 | 109 | 696 | 124 | 0 | 120 | 60.0 | 540 | 134 | 148 | 184 |
| 29 | 134 | ..... | 95.3 | 706 | 106 | 0 | 109 | 84.8 | 477 | 131 | 131 | 170 |
| 30 | 166 | ..... | 91.8 | 2,100 | 124 | 0 | 70.6 | 70.6 | 622 | 131 | 131 | 155 |
| 31 | 159 | ..... | 91.8 | ..... | 120 | .... | 56.5 | 63.6 | ..... | 120 | ..... | 148 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 6.00 | 5.45 | 320 | 145 | 162 | 10,090 | |
| February | 5.97 | 4.99 | 190 | 35.3 | 184 | 10,170 | |
| March | 5.77 | 4.79 | 210 | 38.8 | 127 | 7,740 | |
| April | 8.89 | 4.69 | 2,600 | 49.1 | 452 | 26,830 | |
| May | 8.10 | 5.25 | 1,400 | 21.9 | 381 | 23,440 | |
| June | 6.23 | 3.90 | 330 | 0 | 56.5 | 3,430 | |
| July | 7.81 | 3.74 | 1,200 | 0 | 283 | 17,380 | |
| August | 9.78 | 4.86 | 3,100 | 14.8 | 512 | 31,450 | |
| September | 10.56 | 4.20 | 4,850 | 0 | 300 | 17,780 | |
| October | 8.86 | 5.35 | 2,400 | 99.9 | 244 | 14,900 | |
| November | 6.10 | 5.35 | 260 | 99.9 | 173 | 10,240 | |
| December | 6.30 | 5.41 | 350 | 80.2 | 166 | 10,280 | |
| Yearly | 10.56 | 3.74 | 4,850 | 0 | 254 | 183,750 | 4.9 |

†Estimated

## RIO GRANDE AT LOWER PRESIDIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 6 miles below the towns of Presidio, Texas, and Ojinaga, Chihuahua, and 7½ miles below the confluence of the Rio Conchos with the Rio Grande.

**Records:** Based on 193 current meter measurements during the year from cable car. Computations by shifting channel methods. 1931 records considered poor.

**Records Available:** 1900 to 1912; August, 1923, to 1926; 1928 to 1931.

**Remarks:** The river flow is greatly modified by irrigation diversions and Elephant Butte reservoir in the United States and by Boquilla reservoir, on the Rio Conchos, as well as by irrigation diversions in Mexico. The river section at this station is very changeable due to combined effects of sediment and variation in flow of the Rio Grande and the Rio Conchos, and is subject to backwater from storm flows in the Alamito Creek which enters the river about ½ mile below this station. This station was operated by the Chihuahua Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated, the drainage area above this station is 60,109 square miles, of which 35,250 are in the United States and 24,859 in Mexico.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Sept. 1902 | — | 45,000 | May and June, 1902 | ..... | 10.6 |
| Sept. 1904 | — | 149,210 | May, 1904 | ..... | 3.5 |
| Aug. 1906 | — | 37,410 | April, 1911 | ..... | 14.1 |
| **Extreme High Flow** | | | **Extreme Low Flow** | | |
| Sept. 15, 1923 | 24.93 | 38,420 | Aug. 6, 1923 | 13.35 | 595 |
| Jan. 1, 1924 | 17.59 | 6,600 | Dec. 1, 1924 | 14.34 | 835 |
| Sept. 7, 1925 | 21.65 | 18,250 | April 25, 1925 | 13.71 | 826 |
| Aug. 27, 1926 | 20.34 | 13,400 | May 28, 29, 1926 | 14.30 | 1,420 |
| Aug. 1928 | — | 14,400 | April, 1928 | ..... | 1,020 |
| July 30, 1929 | 17.09 | 4,450 | Oct. 11, 1929 | 14.67 | 1,050 |
| Aug. 11, 1930 | 19.88 | 13,000 | Oct. 1, 1930 | 13.06 | 109 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 770 | 420 | 1,320 | 459 | 2,300 | 689 | 1,450 | 819 | 982 | 1,970 | 1,200 | 1,130 |
| 2 | 699 | 470 | 1,050 | 410 | 2,000 | 1,050 | 869 | 742 | 879 | 2,900 | 1,270 | 1,180 |
| 3 | 600 | 724 | 1,100 | 749 | 1,600 | 999 | 1,350 | 1,070 | 1,130 | 1,750 | 1,150 | 1,450 |
| 4 | 480 | 742 | 1,200 | 579 | 1,500 | 971 | 1,450 | 950 | 939 | 1,620 | 1,400 | 1,720 |
| 5 | 441 | 770 | 1,300 | 611 | 1,750 | 780 | 1,300 | 1,250 | 851 | 1,500 | 1,230 | 1,350 |
| 6 | 480 | 770 | 929 | 720 | 1,850 | 819 | 1,320 | 759 | 971 | 1,480 | 1,200 | 1,200 |
| 7 | 470 | 780 | 1,130 | 551 | 1,250 | 1,070 | 1,550 | 961 | 862 | 1,270 | 1,180 | 1,050 |
| 8 | 473 | 770 | 1,450 | 660 | 1,150 | 1,600 | 971 | 890 | 851 | 1,050 | 1,300 | 1,200 |
| 9 | 466 | 770 | 1,420 | 590 | 939 | 1,200 | 2,350 | 830 | 840 | 1,100 | 1,230 | 1,530 |
| 10 | 445 | 770 | 1,270 | 470 | 911 | 1,350 | 3,450 | 1,700 | 911 | 1,130 | 1,350 | 1,180 |
| 11 | 424 | 699 | 1,140 | 519 | 851 | 1,250 | 2,450 | 3,850 | 840 | 1,180 | 1,300 | 1,050 |
| 12 | 431 | 689 | 925 | 512 | 1,050 | 1,150 | 2,400 | 2,350 | 830 | 1,130 | 1,070 | 1,230 |
| 13 | 530 | 671 | 851 | 604 | 858 | 950 | 1,500 | 3,600 | 840 | 1,370 | 971 | 1,070 |
| 14 | 477 | 650 | 749 | 540 | 950 | 971 | 1,800 | 3,300 | 999 | 1,350 | 879 | 1,200 |
| 15 | 466 | 636 | 699 | 544 | 901 | 999 | 1,650 | 2,900 | 1,100 | 1,070 | 879 | 1,100 |
| 16 | 388 | 802 | 650 | 494 | 890 | 999 | 1,300 | 3,150 | 1,020 | 1,050 | 858 | 1,130 |
| 17 | 399 | 961 | 625 | 1,450 | 901 | 1,150 | 1,480 | 3,520 | 999 | 982 | 890 | 950 |
| 18 | 480 | 766 | 675 | 4,500 | 890 | 901 | 1,550 | 4,300 | 1,070 | 999 | 851 | 876 |
| 19 | 441 | 689 | 551 | 2,450 | 816 | 742 | 1,350 | 2,400 | 1,250 | 1,070 | 840 | 975 |
| 20 | 480 | 660 | 742 | 2,620 | 780 | 671 | 1,300 | 1,850 | 1,400 | 1,300 | 999 | 999 |
| 21 | 480 | 639 | 611 | 1,800 | 759 | 780 | 1,250 | 1,600 | 1,650 | 1,620 | 1,100 | 1,070 |
| 22 | 480 | 629 | 622 | 1,550 | 876 | 1,020 | 2,320 | 1,700 | 1,750 | 1,200 | 1,430 | 1,180 |
| 23 | 388 | 611 | 562 | 2,030 | 798 | 1,350 | 2,200 | 1,650 | 2,600 | 1,100 | 1,450 | 1,050 |
| 24 | 381 | 600 | 579 | 2,130 | 1,750 | 1,320 | 1,780 | 2,220 | 3,500 | 1,050 | 1,130 | 1,100 |
| 25 | 388 | 625 | 1,020 | 2,150 | 1,600 | 1,200 | 2,050 | 1,970 | 2,800 | 1,180 | 1,070 | 1,070 |
| 26 | 629 | 650 | 851 | 1,670 | 1,300 | 851 | 1,900 | 1,800 | 1,670 | 1,300 | 1,070 | 1,100 |
| 27 | 569 | 1,020 | 660 | 1,650 | 1,225 | 689 | 1,200 | 1,730 | 1,400 | 1,300 | 978 | 1,070 |
| 28 | 501 | 911 | 579 | 1,620 | 1,100 | 650 | 1,070 | 1,450 | 1,450 | 1,400 | 971 | 1,070 |
| 29 | 629 | ..... | 516 | 1,800 | 1,050 | 791 | 1,320 | 1,500 | 1,320 | 1,250 | 830 | 1,100 |
| 30 | 660 | ..... | 791 | 2,350 | 930 | 1,200 | 950 | 1,320 | 1,450 | 1,150 | 911 | 975 |
| 31 | 420 | ..... | 780 | ..... | 800 | ..... | 879 | 1,230 | ..... | 1,130 | ..... | 876 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 14.24 | 13.42 | 710 | 360 | 494 | 30,480 | |
| February | 14.83 | 13.62 | 1,130 | 545 | 710 | 39,460 | |
| March | 15.29 | 13.42 | 1,430 | 485 | 883 | 54,270 | |
| April | 18.67 | 13.45 | 7,100 | 390 | 1,290 | 76,940 | |
| May | 16.73 | 14.11 | 3,200 | 670 | 1,170 | 72,050 | |
| June | 15.52 | 14.11 | 2,300 | 440 | 1,010 | 59,850 | |
| July | 18.21 | 14.60 | 6,900 | 650 | 1,600 | 98,520 | |
| August | 19.46 | 14.50 | 7,500 | 950 | 1,910 | 117,770 | |
| September | 18.24 | 14.30 | 9,500 | 820 | 1,310 | 77,690 | |
| October | 16.96 | 14.60 | 3,200 | 930 | 1,320 | 81,240 | |
| November | 15.29 | 14.44 | 1,520 | 770 | 1,100 | 65,430 | |
| December | 16.70 | 14.60 | 3,700 | 880 | 1,140 | 69,870 | |
| Yearly | 19.46 | 13.42 | 9,500 | 360 | 1,160 | 843,570 | 14.0 |

## RIO GRANDE AT BOQUILLAS STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car, located 4 miles below mouth of Tornillo Creek and a quarter of a mile south of Boquillas, Brewster County, Texas.

**Records:** Based upon 96 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods after May 1. 1931 records considered good.

**Records Available:** From June, 1928, to December, 1931.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte reservoir in the United States, and by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 69,373 square miles; 39,734 being in the United States and 29,639 in Mexico.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Sept., 1904 | 32.4 | (Per local residents) | Sept. 21, 1928 | 1.78 | 1,080 |
| Aug. 27, 1928 | 8.38 | 16,200 | July 15, 1929 | 1.23 | 750 |
| Sept. 11, 1929 | 11.90 | 27,600 | Sept. 29, 1930 | 0.35 | 123 |
| Oct. 5, 1930 | 9.60 | 19,040 | | | |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 854 | 530 | 970 | 394 | 2,420 | 1,210 | 865 | 1,300 | 1,010 | 1,240 | 975 | 1,270 |
| 2 | 764 | 522 | 818 | 620 | 2,150 | 1,090 | 1,100 | 1,050 | 1,100 | 1,350 | 907 | 1,570 |
| 3 | 674 | 474 | 1,040 | 522 | †1,600 | 1,080 | 1,350 | 1,170 | 921 | 2,390 | 1,070 | 1,490 |
| 4 | 602 | 450 | 1,000 | 442 | †1,450 | 1,110 | 1,160 | 1,010 | 751 | 1,730 | 1,080 | 1,310 |
| 5 | 557 | 466 | 960 | 434 | †1,350 | 1,110 | 1,450 | 1,270 | 763 | 1,480 | 1,090 | 1,270 |
| 6 | 530 | 566 | 1,050 | 566 | †1,400 | 1,580 | 1,290 | 1,010 | 756 | 1,340 | 1,200 | 1,130 |
| 7 | 683 | 602 | 1,110 | 490 | †1,600 | 1,240 | 1,390 | 1,080 | 664 | 1,220 | 1,180 | 1,230 |
| 8 | 602 | 665 | 890 | 629 | †1,500 | 1,010 | 1,680 | 1,410 | 655 | 1,220 | 1,050 | 1,360 |
| 9 | 539 | 701 | 1,030 | 530 | †1,400 | 1,070 | 2,940 | 1,700 | 662 | 1,250 | 1,030 | 1,330 |
| 10 | 482 | 683 | 1,190 | 530 | 1,200 | 1,530 | 3,770 | 5,030 | 593 | 1,100 | 1,080 | 1,290 |
| 11 | 466 | 647 | 1,210 | 566 | 1,160 | 1,160 | 3,630 | 2,640 | 629 | 1,400 | 1,120 | 1,340 |
| 12 | 458 | 620 | 1,040 | 450 | 1,190 | 1,080 | 2,140 | 3,130 | 659 | 1,100 | 1,250 | 1,130 |
| 13 | 426 | 629 | 809 | 458 | 1,170 | 1,040 | 2,090 | 3,140 | 589 | 1,390 | 1,160 | 1,100 |
| 14 | 418 | 593 | 683 | 482 | 1,060 | 1,010 | 1,920 | 2,610 | 566 | 1,340 | 1,060 | 1,210 |
| 15 | 474 | 566 | 611 | 584 | 881 | 940 | 1,840 | 2,710 | 620 | 1,200 | 1,030 | 1,190 |
| 16 | 466 | 602 | 530 | 539 | 845 | 930 | 1,830 | 2,690 | 618 | 1,230 | 1,060 | 1,170 |
| 17 | 434 | 575 | 530 | 5,240 | 854 | 940 | 1,770 | 3,750 | 585 | 1,050 | 1,240 | 1,140 |
| 18 | 434 | 530 | 482 | 4,960 | 910 | 1,140 | 1,630 | 3,410 | 610 | 1,020 | 1,340 | 1,240 |
| 19 | 434 | 782 | 426 | 2,340 | 1,170 | 1,220 | 1,310 | 2,590 | 728 | 967 | 1,310 | 1,060 |
| 20 | 434 | 737 | 418 | 1,950 | 900 | 1,020 | 1,700 | 1,970 | 826 | 969 | 1,300 | 992 |
| 21 | 442 | 647 | 364 | 1,540 | 845 | 1,240 | 1,810 | 1,710 | 673 | 1,020 | 1,280 | 1,000 |
| 22 | 442 | 593 | 434 | 1,270 | 1,210 | 1,110 | 1,110 | 1,580 | 753 | 1,230 | 1,170 | 1,090 |
| 23 | 450 | 548 | 498 | 1,310 | 920 | 881 | 1,250 | 1,300 | 810 | 1,360 | 1,160 | 1,110 |
| 24 | 418 | 539 | 434 | 1,740 | 791 | 854 | 1,180 | 1,180 | 764 | 1,100 | 1,290 | 1,110 |
| 25 | 410 | 530 | 426 | 1,570 | 827 | 791 | 1,290 | 963 | 3,000 | 984 | 1,290 | 1,140 |
| 26 | 394 | 522 | 370 | 1,320 | 1,450 | 863 | 1,230 | 1,070 | 2,760 | 935 | 1,250 | 1,120 |
| 27 | 410 | 514 | 593 | 1,320 | 1,280 | 791 | 1,400 | 981 | 1,770 | 1,000 | 1,310 | 1,010 |
| 28 | 426 | 566 | 692 | 1,270 | 1,990 | 629 | 1,130 | 818 | 1,460 | 1,060 | 1,190 | 954 |
| 29 | 410 | ..... | 557 | 1,330 | 2,170 | 755 | 1,170 | 783 | 1,320 | 1,060 | 1,160 | 1,100 |
| 30 | 418 | ..... | 458 | 1,600 | 1,180 | 973 | 1,070 | 705 | 1,380 | 1,120 | 1,210 | 1,230 |
| 31 | 498 | ..... | 394 | ..... | 1,080 | ..... | 1,230 | 738 | ..... | 1,050 | ..... | 1,090 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 1.68 | 1.12 | 872 | 386 | 498 | 30,600 | |
| February | 1.71 | 1.18 | 900 | 434 | 586 | 32,600 | |
| March 22 | 2.05 | 1.03 | 1,260 | 328 | 710 | 43,700 | |
| April | 6.70 | 1.06 | 10,890 | 346 | 1,230 | 73,200 | |
| May | 4.13 | 1.35 | 4,750 | 683 | 1,290 | 79,250 | |
| June | 3.00 | 1.26 | 2,900 | 611 | 1,050 | 62,500 | |
| July | 6.19 | 1.47 | 12,050 | 781 | 1,630 | 100,610 | |
| August 10 | 6.25 | 1.30 | 12,150 | 639 | 1,820 | 112,060 | |
| September | 3.40 | 1.20 | 3,600 | 541 | 966 | 57,510 | |
| October | 2.70 | 1.64 | 4,290 | 918 | 1,220 | 75,180 | |
| November | 2.05 | 1.53 | 1,380 | 857 | 1,160 | 69,110 | |
| December | 2.50 | 1.55 | 1,960 | 894 | 1,190 | 72,950 | |
| Yearly | 6.25 | 1.03 | 12,150 | 328 | 1,118 | 809,270 | 11.7 |

†Estimated

## RIO GRANDE AT LANGTRY STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car, located at Langtry, Val Verde County, Texas. Zero of gage is 1091.69 feet above mean sea level.

**Records:** Based upon 22 current meter measurements from cable car during the year. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** May, 1900 to October, 1914; December, 1919, to March, 1920; and January, 1924 to December, 1931.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte reservoir in the United States, also by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 77,518 square miles; 45,779 being in the United States and 31,739 in Mexico.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Sept. 13, 1904 | 34.25 | 132,000 | May 8, 13, 1903 | ---- | 270 |
| Sept. 16, 1919 | 46.9 | †152,000 | Aug. 25, 27, 1924 | 1.0 | 840 |
| June 18,* 1922 | 56.9 | ---- ---- | Apr. 22, 25, 1925 | 1.2 | 995 |
| June 2, 1924 | 6.0 | 13,000 | July 3, 8, 1926 | 1.85 | 1,340 |
| May 29, 1925 | 18.0 | 50,000 | June 16, 1927 | ---- | 1,340 |
| Aug. 25, 1926 | 10.72 | 24,500 | June 19, 26, 1928 | ---- | 1,170 |
| July 2, 1927 | 11.34 | 25,600 | July 24, 1929 | 1.52 | 1,100 |
| Aug. 9, 1928 | 19.4 | 46,400 | May 25, 26, 1930 | 0.55 | 407 |
| Sept. 12, 1929 | 11.15 | 22,000 | Note † Float measurement by W. H. Dodd | | |
| Aug. 16, 1930 | 6.15 | 9,700 | Note * From flood marks by W. H. Dodd | | |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 952 | 776 | † 740 | 800 | 1,760 | 1,480 | 1,030 | 1,420 | 1,060 | 1,500 | 1,390 | 1,380 |
| 2 | 888 | 800 | † 930 | 720 | 4,370 | 1,370 | 1,330 | 1,540 | 966 | 1,490 | 1,320 | 1,430 |
| 3 | 1,110 | 848 | †1,080 | 665 | 4,680 | 1,430 | 1,230 | 1,580 | 1,260 | 1,400 | 1,260 | 1,530 |
| 4 | 1,080 | * 840 | † 950 | 728 | 2,990 | 1,380 | 1,560 | 1,360 | 1,610 | 1,640 | 1,140 | 1,860 |
| 5 | 1,000 | † 800 | †1,100 | 824 | 3,470 | 1,350 | 1,670 | 1,460 | 1,270 | 2,430 | 1,300 | 1,790 |
| 6 | 936 | † 770 | †1,100 | 728 | 2,160 | 1,330 | 1,480 | 1,290 | 1,030 | 1,880 | 1,330 | 1,580 |
| 7 | 880 | † 800 | †1,150 | 665 | 1,950 | 1,330 | 1,700 | 1,470 | 959 | 1,690 | 1,340 | 1,560 |
| 8 | 832 | † 830 | 1,210 | 776 | *1,820 | 1,670 | 1,650 | 1,260 | 952 | 1,610 | 1,420 | 1,430 |
| 9 | 888 | † 890 | 1,360 | 808 | *1,950 | 1,590 | 1,720 | 1,280 | 944 | 1,500 | 1,410 | 1,490 |
| 10 | 968 | * 928 | 1,180 | 792 | 1,820 | 1,820 | 2,430 | 1,920 | 863 | 1,450 | 1,310 | 1,640 |
| 11 | 920 | 960 | 1,140 | 840 | 1,540 | 1,760 | 4,660 | 6,470 | 927 | 1,420 | 1,230 | 1,690 |
| 12 | 872 | 984 | 1,430 | 744 | 1,480 | 1,820 | 3,880 | 3,350 | 826 | 1,360 | 1,300 | 1,670 |
| 13 | 824 | 952 | 1,480 | 776 | 1,380 | 1,540 | 2,880 | 2,990 | 864 | 1,590 | 1,340 | 1,680 |
| 14 | 800 | 912 | 1,360 | 800 | 1,350 | 1,370 | 2,470 | 3,260 | 865 | 1,420 | 1,450 | 1,470 |
| 15 | 768 | 920 | 1,170 | 704 | 1,310 | 1,330 | 2,460 | 3,190 | 849 | 1,590 | 1,410 | 1,400 |
| 16 | 776 | 904 | 1,050 | 688 | 1,430 | 1,290 | 2,120 | 2,730 | 802 | 1,590 | 1,300 | 1,500 |
| 17 | 800 | 888 | 952 | 832 | 1,340 | 1,210 | 1,850 | 2,750 | 794 | 1,440 | 1,270 | 1,500 |
| 18 | 864 | 888 | 904 | 992 | 2,510 | 1,200 | 2,040 | 3,570 | 838 | 1,420 | 1,270 | 1,490 |
| 19 | 848 | 880 | 888 | 4,840 | 1,260 | 1,210 | 2,070 | 3,580 | 826 | 1,360 | 1,450 | 1,490 |
| 20 | 792 | 832 | 856 | 5,360 | 1,210 | 1,380 | 1,740 | 3,230 | 798 | 1,290 | 1,540 | 1,590 |
| 21 | 784 | 840 | 800 | 3,150 | 1,430 | 1,480 | 1,650 | 2,500 | 906 | 1,230 | 1,540 | 1,390 |
| 22 | 784 | 888 | 760 | 2,160 | 1,260 | 1,280 | 3,460 | 2,010 | 1,080 | 1,500 | 1,520 | 1,290 |
| 23 | 784 | 880 | 720 | 2,370 | 1,180 | 1,430 | 1,980 | 1,870 | 924 | 1,290 | 1,500 | 1,270 |
| 24 | 784 | 848 | 672 | 1,820 | 1,480 | 1,380 | 1,520 | 1,820 | 911 | 1,410 | 1,380 | 1,380 |
| 25 | 776 | 976 | 744 | 1,700 | 1,320 | 1,130 | 1,550 | 1,560 | 1,010 | 1,580 | 1,340 | 1,380 |
| 26 | 800 | 968 | 760 | 1,700 | 1,140 | 1,100 | 1,490 | 1,450 | 1,440 | 1,390 | 1,430 | 1,400 |
| 27 | 800 | 952 | 696 | 2,090 | 1,140 | 1,070 | 1,540 | 1,240 | 2,920 | 1,290 | 1,520 | 1,400 |
| 28 | 768 | * 968 | 688 | 2,020 | 1,690 | 1,120 | 1,580 | 1,300 | 2,660 | 1,220 | 1,500 | 1,380 |
| 29 | 760 | ..... | 650 | 2,960 | 1,930 | 2,440 | 1,690 | 1,270 | 1,910 | 1,230 | 1,550 | 1,280 |
| 30 | 768 | ..... | 912 | 3,720 | 4,810 | 1,070 | 1,500 | 1,120 | 1,640 | 1,260 | 1,430 | 1,180 |
| 31 | 784 | ..... | 872 | ..... | 2,130 | ..... | 1,470 | 1,050 | ..... | 1,300 | ..... | 1,290 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 1.54 | 1.02 | 1,150 | 752 | 851 | 52,300 | |
| February | 1.35 | 1.04 | 992 | 760 | 880 | 48,900 | |
| March 29 | 1.87 | 0.91 | 1,480 | 628 | 978 | 60,100 | |
| April | 5.73 | 0.92 | 8,480 | 628 | 1,590 | 94,600 | |
| May 3 | 7.45 | 1.42 | 12,950 | 1,070 | 1,980 | 122,000 | |
| June | 5.81 | 1.31 | 8,710 | 936 | 1,410 | 83,900 | |
| July | 5.32 | 1.32 | 7,520 | 940 | 1,981 | 121,790 | |
| August | 5.98 | 1.45 | 9,200 | 1,040 | 2,158 | 132,680 | |
| September | 3.18 | 1.13 | 3,100 | 784 | 1,157 | 68,840 | |
| October | 3.71 | 1.58 | 4,030 | 1,190 | 1,476 | 90,780 | |
| November | 1.98 | 1.53 | 1,560 | 1,130 | 1,383 | 82,300 | |
| December | 2.35 | 1.59 | 2,000 | 1,140 | 1,478 | 90,860 | |
| Yearly | 7.45 | 0.91 | 12,950 | 628 | 1,450 | 1,049,050 | 13.5 |

*Partly Estimated †Estimated

## PECOS RIVER STATION NEAR COMSTOCK, TEXAS

**Description:** Staff-gage and cable with sit down cable car located at the Pecos high bridge of the Southern Pacific Railroad 12 miles northwest of Comstock, Val Verde County, Texas, and 5½ miles above the confluence with the Rio Grande. Zero of gage is 1,058.01 feet above mean sea level.

**Records:** Based upon 13 current meter measurements during the year made from cable car and by wading. Staff-gage read twice daily and more frequently during large changes of stage. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** May, 1900 to December, 1931.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and by the reservoirs of the Carlsbad irrigation project in New Mexico. With all closed basins eliminated the drainage area above this station is 38,283 square miles, all in the United States.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Apr. 6, 1900 | 35.75 | ..... | Aug. 1, 1918 | ..... | 106 |
| Sept. 21, 1924 | 9.80 | 12,800 | Aug. 22, 23, 1924 | ..... | 129 |
| May 28, 1925 | 23.6 | 65,000 | May 26, 1925 | ..... | 134 |
| July 23, 1926 | 5.20 | 4,380 | Sept. 15, 17, 1926 | 0.18 | 179 |
| June 13, 1927 | 10.60 | 14,600 | Several days, 1927 | -0.10 | 113 |
| May 13, 1928 | 12.47 | 19,800 | Apr. 29, 30, 1928 & | | |
| June 30, 1929 | 4.88 | 3,970 | July 16, 1928 | ..... | 139 |
| Oct. 14, 1930 | 6.53 | 6,320 | July 24, 1929 | ..... | 131 |
| | | | Aug. 31, 1930 | -0.15 | 97 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 377 | 356 | 336 | 280 | 1,370 | 800 | 335 | 200 | 189 | 198 | 201 | 267 |
| 2 | 356 | 493 | 356 | 280 | 570 | 680 | 321 | 199 | 189 | 199 | 199 | 267 |
| 3 | 377 | 356 | 336 | 262 | 680 | 625 | 313 | 206 | 190 | 199 | 218 | 267 |
| 4 | 377 | 317 | 336 | 245 | 832 | 625 | 309 | 198 | 190 | 200 | 207 | 263 |
| 5 | 356 | 317 | 317 | 245 | 544 | 570 | 299 | 192 | 191 | 201 | 205 | 263 |
| 6 | 356 | 317 | 317 | 245 | 588 | 544 | 289 | 185 | 192 | 209 | 206 | 267 |
| 7 | 336 | 336 | 336 | 228 | 1,200 | 518 | 282 | 185 | 193 | 202 | 206 | 305 |
| 8 | 356 | 356 | 356 | 222 | 1,350 | 518 | 274 | 184 | 194 | 201 | 210 | 298 |
| 9 | 377 | 356 | 336 | 222 | 1,350 | 493 | 272 | 184 | 195 | 200 | 208 | 283 |
| 10 | 377 | 356 | 317 | 225 | 1,280 | 493 | 276 | *226 | 196 | 199 | 209 | 281 |
| 11 | 377 | 356 | 317 | 219 | 1,350 | 493 | 273 | *1,290 | 197 | 198 | 216 | 279 |
| 12 | 377 | 356 | 317 | 219 | 1,420 | 468 | 266 | *611 | 193 | 202 | 217 | 277 |
| 13 | 336 | 377 | 317 | 219 | 1,420 | 444 | 260 | 384 | 188 | 202 | 218 | 276 |
| 14 | 356 | 377 | 317 | 212 | 1,350 | 421 | 255 | 301 | 195 | 201 | 222 | 267 |
| 15 | 336 | 399 | 336 | 212 | 1,350 | 421 | 245 | 239 | 198 | 198 | 226 | 265 |
| 16 | 356 | 377 | 493 | 216 | 1,420 | 399 | 251 | 216 | 197 | 202 | 227 | 253 |
| 17 | 356 | 399 | 399 | 225 | 1,500 | 377 | 251 | 216 | 198 | 198 | 309 | 244 |
| 18 | 336 | 377 | 336 | 319 | 2,620 | 377 | 250 | 217 | 196 | 197 | 294 | 252 |
| 19 | 336 | 377 | 336 | 702 | 1,160 | 356 | 271 | 208 | 197 | 196 | 330 | 271 |
| 20 | 317 | 356 | 336 | 280 | 865 | 377 | 259 | 215 | 195 | 195 | 279 | 252 |
| 21 | 317 | 356 | 336 | 280 | 680 | 399 | 259 | 209 | 191 | 194 | 283 | 237 |
| 22 | 317 | 356 | 356 | 280 | 625 | 377 | 255 | 326 | 192 | 213 | 269 | 235 |
| 23 | 317 | 356 | 336 | 298 | 652 | 377 | 244 | 250 | 192 | 203 | 262 | 243 |
| 24 | 317 | 336 | 317 | 245 | 652 | 356 | 237 | 197 | 193 | 206 | 255 | 245 |
| 25 | 317 | 356 | 317 | 245 | 598 | 336 | 226 | 198 | 194 | 202 | 247 | 232 |
| 26 | 336 | 336 | 298 | 225 | 570 | 336 | 219 | 192 | 194 | 216 | 254 | 229 |
| 27 | 444 | 356 | 298 | 245 | 493 | 317 | 216 | 193 | 198 | 203 | 251 | 234 |
| 28 | 444 | 336 | 298 | 298 | 544 | 356 | 215 | 193 | 196 | 199 | 251 | 229 |
| 29 | 414 | ..... | 298 | 2,740 | 1,900 | 336 | 214 | 193 | 197 | 193 | 251 | 222 |
| 30 | 399 | ..... | 280 | 2,680 | 1,340 | 356 | 204 | 194 | 197 | 208 | 271 | 224 |
| 31 | 377 | ..... | 280 | ..... | 1,140 | ..... | 203 | 191 | ..... | 200 | ..... | 225 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | .98 | .64 | 459 | 309 | 360 | 22,100 | |
| February | 1.16 | .62 | 549 | 306 | 361 | 20,000 | |
| March | 1.16 | .52 | 564 | 280 | 331 | 20,400 | |
| April 29 | 7.80 | .32 | 8,620 | 212 | 427 | 25,400 | |
| May | 6.10 | 1.02 | 5,680 | 459 | 1,080 | 66,400 | |
| June | 1.62 | .68 | 794 | 321 | 451 | 26,800 | |
| July | .72 | .34 | 339 | 200 | 259 | 15,950 | |
| August 13 | *3.00 | .30 | *1,830 | 183 | 264 | 16,250 | |
| September | .30 | .26 | 201 | 188 | 194 | 11,540 | |
| October | .80 | .26 | 384 | 193 | 203 | 12,480 | |
| November | .68 | .28 | 346 | 197 | 240 | 14,280 | |
| December | .69 | .46 | 312 | 220 | 257 | 15,770 | |
| Yearly | 7.80 | .26 | 8,620 | 183 | 369 | 267,370 | 7.0 |

*Partly Estimated

## GOODENOUGH SPRINGS STATION NEAR COMSTOCK, TEXAS

**Description:** Automatic water-stage recorder located ½ mile above confluence with Rio Grande and 11¾ miles southwest of Comstock, Val Verde County, Texas.

**Records:** Based upon 16 current meter measurements during the year by wading. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** February, 1929 to December, 1931.

**Remarks:** The flow of this spring channel is very uniform and is not modified by diversions or storage. The surface drainage area above this station is one square mile, all in the United States.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Apr. 28, 1930 | 2.98 | ..... | 1929, Several Periods | | 124 |
| | | | Apr. 4, 1930 | 0.27 | 93 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | † 143 | 171 | 155 | 147 | 143 | 155 | 174 | 167 | 161 | 159 | 154 | 147 |
| 2 | † 143 | 171 | 155 | 147 | 144 | 155 | 175 | 167 | 162 | 161 | 152 | 146 |
| 3 | † 143 | 171 | 155 | 147 | 143 | 155 | 173 | 168 | 163 | 160 | 152 | 147 |
| 4 | † 143 | 167 | 155 | 147 | 143 | 155 | 169 | 167 | 163 | 160 | 153 | 145 |
| 5 | † 143 | 167 | 155 | 143 | 143 | 155 | 165 | 167 | 164 | 159 | 153 | 143 |
| 6 | † 143 | 163 | 155 | 143 | 147 | 151 | 165 | 166 | 164 | 160 | 153 | 142 |
| 7 | † 143 | 163 | 155 | 143 | 147 | 151 | 162 | 166 | 165 | 160 | 153 | 144 |
| 8 | † 143 | 163 | 151 | 143 | 147 | 151 | 161 | 165 | 167 | 160 | 152 | 145 |
| 9 | † 143 | 159 | 151 | 139 | 147 | 155 | 160 | 165 | 168 | 160 | 153 | 143 |
| 10 | † 143 | 159 | 155 | 139 | 147 | 151 | 164 | 165 | 168 | 160 | 153 | 143 |
| 11 | † 143 | 159 | 155 | 139 | 147 | 155 | 180 | 165 | 168 | 160 | 152 | 142 |
| 12 | † 143 | 159 | 155 | 139 | 147 | 155 | 185 | 164 | 168 | 158 | 152 | 142 |
| 13 | 143 | 159 | 155 | 135 | 147 | 155 | 188 | 163 | 168 | 157 | 152 | 140 |
| 14 | 139 | 155 | 151 | 135 | 147 | 155 | 188 | 163 | 167 | 157 | 152 | 139 |
| 15 | 139 | 159 | 151 | 135 | 147 | 155 | 184 | 163 | 166 | 156 | 152 | 139 |
| 16 | 143 | 159 | 151 | 135 | 147 | 155 | 181 | 162 | 165 | 156 | 153 | 140 |
| 17 | 143 | 159 | 151 | 135 | 147 | 155 | 177 | 162 | 165 | 156 | 153 | 140 |
| 18 | 143 | 155 | 155 | 135 | 147 | 155 | 175 | 162 | 165 | 155 | 152 | 139 |
| 19 | 143 | 155 | 155 | 135 | 147 | 155 | 176 | 161 | 165 | 155 | 152 | 139 |
| 20 | 143 | 155 | 155 | 135 | 147 | 155 | 173 | 161 | 166 | 155 | 152 | 139 |
| 21 | 143 | 155 | 151 | 135 | 147 | 155 | 171 | 160 | 165 | 155 | 151 | 139 |
| 22 | 143 | 155 | 151 | 135 | 147 | 155 | 169 | 160 | 163 | 155 | 151 | 138 |
| 23 | 143 | 155 | 151 | 135 | 147 | 155 | 169 | 160 | 161 | 155 | 151 | 137 |
| 24 | 143 | 155 | 151 | 135 | 147 | 155 | 169 | 159 | 161 | 154 | 150 | 136 |
| 25 | 143 | 155 | 151 | 135 | 147 | 155 | 168 | 159 | 161 | 152 | 149 | 136 |
| 26 | 143 | 155 | 151 | 135 | 147 | 155 | 169 | 158 | 160 | 154 | 150 | 136 |
| 27 | 143 | 155 | 151 | 135 | 147 | 155 | 168 | 158 | 160 | 154 | 147 | 136 |
| 28 | 147 | 155 | 151 | 135 | 147 | 160 | 168 | 158 | 159 | 152 | 150 | 137 |
| 29 | 155 | ..... | 151 | 142 | 147 | 159 | 167 | 158 | 160 | 154 | 150 | 137 |
| 30 | 167 | ..... | 151 | 143 | 151 | 167 | 167 | 159 | 160 | 154 | 148 | 137 |
| 31 | 171 | ..... | 147 | ..... | 155 | ..... | 167 | 161 | ..... | 154 | ..... | 136 |

| Month | Gage Height | | Second Feet | | | Acre Feet | |
|---|---|---|---|---|---|---|---|
| | Extreme—Feet | | Extreme | | | | Per |
| | High | Low | High | Low | Average | Total | Sq. Mile |
| January | 1.04 | .66 | 172 | 140 | 145 | 8,920 | |
| February | 1.05 | .80 | 173 | 138 | 160 | 8,890 | |
| March | .83 | .74 | 157 | 149 | 153 | 9,410 | |
| April 20 | 1.56 | .67 | 208 | 133 | 139 | 8,270 | |
| May | .94 | .73 | 159 | 142 | 147 | 9,040 | |
| June | 1.38 | .86 | 199 | 151 | 155 | 9,220 | |
| July 19 | 1.50 | .96 | 236 | 159 | 172 | 10,570 | |
| August | .98 | .95 | 168 | 157 | 162 | 10,000 | |
| September | .99 | .97 | 169 | 159 | 164 | 9,760 | |
| October | .99 | .89 | 165 | 152 | 157 | 9,630 | |
| November | .90 | .82 | 156 | 147 | 152 | 9,020 | |
| December | .83 | .70 | 149 | 135 | 140 | 8,630 | |
| Yearly | 1.56 | .66 | 236 | 133 | 154 | 111,360 | 111,360 |

†Estimated

## DEVILS RIVER STATION NEAR DEL RIO, TEXAS

**Description:** Automatic water-stage recorder 2,200 feet above Southern Pacific Railroad bridge and Sells Creek, and 12 miles northwest of Del Rio. Zero of gage is 935.63 feet above mean sea level.

**Records:** Based upon 20 current meter measurements during the year by wading. Computations by shifting channel methods after March 1. 1931 records considered good.

**Records Available:** May, 1900 to March, 1914, at a point one mile below present station. December, 1923 to December, 1931, at present site.

**Remarks:** The weekly flow of this spring fed river is not modified, but the hourly flow is modified by power dams. The drainage area above this station is 4,663 square miles, all in the United States.

**Previous Extreme Flows:**

**Extreme High Flow**

| Date | Gage | Sec. Ft. |
|---|---|---|
| Apr. 6, 1900 | 25.4 | Old Datum |
| October, 1914 | 30.15 | Present Datum |
| May 31, 1924 | 5.0 | 5,620 |
| May 29, 1925 | 24.96 | ..... |
| Apr. 29, 1926 | 8.77 | 20,900 |
| Sept. 28, 1927 | 10.68 | 30,200 |
| Oct. 1, 1928 | 12.05 | 38,700 |
| June 30, 1929 | 10.12 | 26,500 |
| June 16, 1930 | 6.68 | 10,200 |

**Extreme Low Flow**

| Date | Gage | Sec. Ft. |
|---|---|---|
| Aug. 21, 1924 | 1.77 | 378 |
| May 15, 1925 | 1.69 | 318 |
| Sept. 15-22, 1926 | ..... | 366 |
| Sept. 27, 1927 | ..... | 302 |
| Sept. 10, 1928 | 1.45 | 185 |
| Sept. 2, 1930 | 1.17 | 82 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | † 590 | 766 | 405 | 426 | 3,320 | 921 | 578 | 536 | 455 | 473 | 507 | 496 |
| 2 | † 490 | 799 | 519 | 418 | 1,710 | 877 | 568 | 603 | 451 | 404 | 385 | 470 |
| 3 | † 605 | 722 | 670 | 608 | 4,320 | 821 | 577 | 495 | 447 | 551 | 634 | 482 |
| 4 | † 465 | 722 | 608 | 510 | 1,550 | 777 | 587 | 510 | 470 | 495 | 445 | 483 |
| 5 | † 290 | 702 | 436 | 347 | 1,280 | 744 | 577 | 489 | 465 | 481 | 558 | 500 |
| 6 | † 460 | 702 | 558 | 510 | 1,050 | 722 | 556 | 505 | 491 | 473 | 531 | 478 |
| 7 | † 530 | 702 | 638 | 528 | 978 | 712 | 555 | 496 | 466 | 468 | 452 | 504 |
| 8 | † 580 | 680 | 406 | 431 | 921 | 702 | 585 | 505 | 446 | 436 | 598 | 541 |
| 9 | † 560 | 660 | 519 | 528 | 877 | 689 | 500 | 500 | 468 | 465 | 464 | 468 |
| 10 | † 560 | 660 | † 540 | 510 | 821 | 832 | 526 | 509 | 514 | 464 | 549 | 598 |
| 11 | † 310 | 618 | † 540 | 519 | 744 | 712 | 603 | 629 | 452 | 517 | 502 | 588 |
| 12 | † 480 | 598 | † 540 | 377 | 733 | 670 | 535 | 692 | 502 | 421 | 459 | 440 |
| 13 | † 590 | 608 | 459 | 428 | 391 | 649 | 543 | 537 | 531 | 447 | 566 | 285 |
| 14 | † 570 | 618 | 638 | 473 | 436 | 649 | 543 | 504 | 484 | 482 | 492 | 320 |
| 15 | † 330 | 608 | 584 | 361 | 578 | 638 | 543 | 515 | 485 | 433 | 506 | 447 |
| 16 | † 590 | 598 | 660 | 473 | 588 | 628 | 551 | 449 | 484 | 574 | 500 | 432 |
| 17 | 588 | 568 | 501 | 473 | 628 | 608 | 533 | 595 | 497 | 443 | 651 | 355 |
| 18 | 360 | 578 | 588 | 568 | 649 | 588 | 532 | 501 | 513 | 375 | 507 | 427 |
| 19 | 568 | 578 | 441 | 394 | 860 | 578 | 654 | 478 | 515 | 354 | 520 | 441 |
| 20 | 568 | 548 | 350 | 344 | 832 | 568 | 743 | 490 | 536 | 437 | 496 | 389 |
| 21 | 588 | 548 | 548 | 568 | 766 | 588 | 1,180 | 520 | 438 | 398 | 484 | 393 |
| 22 | 338 | 491 | 702 | 482 | 702 | 528 | 742 | 507 | 487 | 424 | 500 | 491 |
| 23 | 598 | 437 | 411 | 360 | 691 | 578 | 578 | 530 | 498 | 594 | 482 | 488 |
| 24 | 608 | 598 | 588 | 377 | 670 | 510 | 598 | 509 | 492 | 612 | 536 | 488 |
| 25 | 405 | 578 | 451 | 568 | 660 | 548 | 547 | 539 | 481 | 615 | 490 | 242 |
| 26 | 427 | 511 | 476 | 433 | 680 | 542 | 557 | 468 | 484 | 598 | 502 | 345 |
| 27 | 618 | 588 | 608 | 294 | 660 | 598 | 556 | 485 | 517 | 519 | 422 | 382 |
| 28 | 649 | 578 | 618 | 455 | 660 | 618 | 546 | 467 | 482 | 508 | 475 | 324 |
| 29 | 680 | ..... | 268 | 16,600 | 691 | 628 | 517 | 471 | 470 | 484 | 517 | 409 |
| 30 | 722 | ..... | 480 | 4,920 | 843 | 618 | 499 | 498 | 473 | 494 | 471 | 381 |
| 31 | 821 | ..... | 649 | ..... | 1,070 | ..... | 496 | 468 | ..... | 524 | ..... | 347 |

| Month | Gage Height Extreme-Feet High | Gage Height Extreme-Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January 18 | 1.92 | .86 | 978 | 118 | 533 | 32,800 | |
| February | 1.87 | 1.09 | 921 | 172 | 620 | 34,400 | |
| March | 1.66 | .93 | 733 | 155 | 529 | 32,500 | |
| April 29 | 12.79 | .98 | 38,240 | 172 | 1,140 | 67,800 | |
| May | 6.57 | 1.20 | 9,980 | 345 | 1,010 | 62,100 | |
| June | 1.83 | .99 | 966 | 186 | 661 | 39,300 | |
| July | 2.34 | .98 | 1,480 | 190 | 587 | 36,110 | |
| August | 1.70 | .99 | 744 | 171 | 516 | 31,740 | |
| September | 1.58 | 1.03 | 643 | 210 | 483 | 28,750 | |
| October | 1.63 | .91 | 678 | 144 | 483 | 29,680 | |
| November | 1.60 | .93 | 681 | 187 | 507 | 30,150 | |
| December | 1.61 | *.96 | 646 | 119 | 433 | 26,650 | |
| Yearly | 12.79 | .86 | 38,240 | 118 | 625 | 451,980 | 111. |

*Partly Estimated †Estimated

## RIO GRANDE AT DEL RIO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located 900 feet upstream from international highway bridge at Del Rio, Val Verde County, Texas. Zero of gage is 864.80 feet above mean sea level.

**Records:** Based upon 24 current meter measurements during the year from cable car. Computations by shifting channel methods after July 1. 1931 records considered good.

**Records Available:** December, 1923 to December, 1931. Records are also available for station 11 miles upstream from May, 1900 to April, 1915; and for station 7½ miles upstream at McKees Switch from December, 1919 to March, 1920. Several springs but no important tributaries enter the river between the various station sites.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 123,318 square miles; 88,539 being in the United States and 34,779 in Mexico.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| June 18 or 19, 1922 | 32.8 | (Present gage) ..... | Aug. 26, 1924 | 2.32 | 1,710 |
| Sept. 22, 1924 | 5.60 | 14,400 | Apr. 24, 25, 1925 | 2.36 | 1,770 |
| May 29, 1925 | 22.00 | ..... | July 7, 1926 | 2.20 | 2,110 |
| Aug. 26, 1926 | 7.70 | 25,100 | June 1, July 17, 1927 | 2.26 | 2,060 |
| Sept. 28, 1927 | 7.90 | 25,900 | June 27, 1928 | 2.44 | 1,930 |
| Aug. 10, 1928 | 10.12 | 35,600 | May 23-26, 1930 | 1.42 | 938 |
| Aug. 17, 1930 | 5.20 | 11,200 | | | |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2,350 | 2,460 | 1,970 | 2,070 | 8,270 | 4,300 | 2,620 | 2,530 | 2,120 | 2,650 | 2,290 | 2,540 |
| 2 | 2,240 | 2,500 | 1,910 | 1,840 | *5,560 | 3,570 | 2,370 | 2,510 | 2,120 | 2,530 | 2,300 | 2,410 |
| 3 | 2,300 | 2,480 | 2,240 | 1,910 | *8,390 | 3,350 | 2,680 | 2,510 | 2,110 | 2,530 | 2,430 | 2,440 |
| 4 | 2,370 | 2,370 | 2,460 | 1,760 | *5,840 | 3,240 | 2,550 | 2,590 | 2,290 | 2,480 | 2,280 | 2,590 |
| 5 | 2,180 | 2,330 | *2,020 | 1,600 | *5,700 | 3,130 | 2,830 | 2,340 | 2,590 | 2,740 | 2,170 | 2,960 |
| 6 | 2,260 | 2,280 | *2,280 | 1,900 | 5,270 | 3,020 | 2,930 | 2,430 | 2,480 | 3,360 | 2,320 | 2,930 |
| 7 | 2,260 | 2,240 | *2,600 | 1,810 | 4,180 | 2,920 | 2,730 | 2,270 | 2,080 | 2,960 | 2,330 | 2,840 |
| 8 | 2,230 | 2,240 | 2,430 | 1,660 | 4,340 | 2,920 | 2,900 | 2,470 | 2,050 | 2,740 | 2,360 | 2,840 |
| 9 | 2,180 | 2,240 | 2,320 | 1,800 | 4,340 | 3,240 | 2,820 | 2,380 | 2,080 | 2,660 | 2,360 | 2,540 |
| 10 | 2,260 | 2,320 | 2,650 | 1,860 | 4,340 | 3,460 | 2,970 | 2,270 | 2,100 | 2,540 | 2,420 | 2,770 |
| 11 | 2,090 | 2,330 | 2,350 | 1,780 | 4,180 | 3,460 | 4,070 | 3,700 | 1,970 | 2,540 | 2,290 | 2,840 |
| 12 | 2,210 | 2,330 | 2,410 | 1,810 | 4,050 | 3,240 | 5,640 | 7,300 | 2,040 | 2,440 | 2,160 | 2,750 |
| 13 | 2,260 | 2,350 | 2,520 | 1,700 | 3,680 | 3,240 | 5,200 | 4,620 | 2,010 | 2,340 | 2,330 | 2,700 |
| 14 | 2,160 | 2,350 | 2,710 | 1,780 | 3,460 | 3,020 | 4,100 | 4,250 | 1,970 | 2,580 | 2,290 | 2,590 |
| 15 | 1,920 | 2,350 | 2,620 | 1,750 | 3,570 | 2,820 | 3,710 | 4,330 | 1,950 | 2,430 | 2,410 | 2,580 |
| 16 | 2,120 | 2,330 | 2,600 | 1,730 | 3,570 | 2,730 | 3,680 | 4,080 | 1,960 | 2,690 | 2,390 | 2,540 |
| 17 | 2,190 | 2,280 | 2,350 | 1,720 | 3,680 | 2,670 | 3,400 | 3,900 | 1,920 | 2,610 | 2,580 | 2,620 |
| 18 | 1,970 | 2,300 | 2,280 | 1,940 | 5,500 | 2,560 | 3,160 | 3,860 | 1,900 | 2,420 | 2,290 | 2,610 |
| 19 | 2,000 | 2,280 | 2,050 | 2,190 | 4,860 | 2,500 | 3,710 | 4,720 | 1,900 | 2,280 | 2,390 | 2,700 |
| 20 | 2,090 | 2,240 | 1,960 | 6,590 | 3,460 | 2,500 | 3,480 | 4,610 | 1,900 | 2,380 | 2,520 | 2,650 |
| 21 | 2,050 | 2,160 | 1,970 | 5,610 | 3,240 | 2,690 | 3,710 | 4,140 | 1,830 | 2,170 | 2,590 | 2,740 |
| 22 | 1,810 | 2,120 | 2,140 | 4,050 | 3,130 | 2,730 | 3,280 | 3,660 | 1,890 | 2,260 | 2,610 | 2,670 |
| 23 | 1,980 | 2,190 | 1,910 | 3,240 | 3,020 | 2,540 | 4,570 | 3,330 | 2,080 | 3,280 | 2,550 | 2,560 |
| 24 | 2,000 | 2,300 | 1,940 | 3,240 | *3,020 | 2,600 | 3,150 | 3,030 | 1,960 | 2,620 | 2,540 | 2,540 |
| 25 | 1,880 | 2,210 | 1,800 | 3,020 | *3,020 | 2,640 | 2,730 | 3,010 | 1,900 | 2,620 | 2,350 | 2,420 |
| 26 | 1,850 | 2,120 | 1,840 | 2,920 | 2,920 | 2,370 | 2,720 | 2,660 | 1,990 | 2,790 | 2,350 | 2,340 |
| 27 | 2,260 | 2,070 | 1,980 | 2,650 | 2,710 | 2,370 | 2,590 | 2,560 | 2,330 | 2,540 | 2,350 | 2,570 |
| 28 | 2,280 | 2,120 | 1,900 | 3,130 | 2,650 | 2,640 | 2,630 | 2,290 | 3,670 | 2,390 | 2,470 | 2,320 |
| 29 | 2,430 | ..... | 1,770 | *15,200 | 4,740 | 2,600 | 2,600 | 2,340 | 3,420 | 2,250 | 2,550 | 2,470 |
| 30 | 2,560 | ..... | 1,600 | 12,560 | 8,600 | 4,140 | 2,690 | 2,410 | 2,830 | 2,260 | 2,570 | 2,420 |
| 31 | 2,560 | ..... | 2,070 | ..... | 6,960 | ..... | 2,490 | 2,130 | ..... | 2,300 | ..... | 2,340 |

| Month | Gage Height Extreme-Feet High | Gage Height Extreme-Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 2.67 | 2.03 | 2,670 | 1,640 | 2,170 | 133,000 | |
| February | 2.66 | 2.18 | 2,650 | 1,820 | 2,280 | 127,000 | |
| March | 2.72 | 1.94 | 2,770 | 1,540 | 2,180 | 134,000 | |
| April † | 9.70 | 1.88 | 26,840 | 1,480 | 3,230 | 192,000 | |
| May | 5.57 | 2.64 | 10,860 | 2,620 | 4,520 | 278,000 | |
| June | 4.18 | 2.34 | 6,510 | 2,070 | 2,970 | 177,000 | |
| July | 4.40 | 2.40 | 7,510 | 2,210 | 3,250 | 199,760 | |
| August | 4.87 | 2.24 | 8,910 | 1,960 | 3,260 | 200,790 | |
| September | 3.17 | 1.95 | 3,850 | 1,680 | 2,180 | 129,800 | |
| October | 3.33 | 2.24 | 4,290 | 2,030 | 2,560 | 157,450 | |
| November | 2.69 | 2.23 | 2,790 | 1,970 | 2,400 | 142,490 | |
| December | 2.85 | 2.23 | 3,180 | 2,050 | 2,610 | 160,330 | |
| Yearly | 9.70 | 1.88 | 26,840 | 1,480 | 2,800 | 2,031,620 | 16.5 |

*Partly Estimated †High Apr. 29; Low Apr. 5

## CIENEGAS CREEK STATION NEAR DEL RIO, TEXAS

**Description:** Staff-gage 900 feet above confluence with Rio Grande, 3 miles southwest of Del Rio, Texas, and 1½ miles above the Del Rio gaging station on the Rio Grande.

**Records:** Based upon 4 current meter measurements during last four months of the year. Computations by averaging discharge between measurements. 1931 record considered poor.

**Records Available:** Record began September 1, 1931.

**Remarks:** The flow of this spring fed creek is modified by diversion for irrigation above this station. The drainage area above this station is 18 square miles, all in the United States.

*Daily Discharge in Second Feet and Period Summary, 1931*

| Day | Sept. | Oct. | Nov. | Dec. | Day | Sept. | Oct. | Nov. | Dec. | Day | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.24 | 5.85 | 6.75 | 7.96 | 11 | 5.24 | 5.85 | 6.75 | 7.94 | 21 | 5.24 | 6.75 | 7.96 | 7.94 |
| 2 | 5.24 | 5.85 | 6.75 | 7.96 | 12 | 2.24 | 6.75 | 6.75 | 7.94 | 22 | 5.24 | 6.75 | 7.96 | 7.94 |
| 3 | 5.24 | 5.85 | 6.75 | 7.96 | 13 | 5.24 | 6.75 | 6.75 | 7.94 | 23 | 5.24 | 6.75 | 7.96 | 7.94 |
| 4 | 5.24 | 5.85 | 6.75 | 7.96 | 14 | 5.24 | 6.75 | 6.75 | 7.94 | 24 | 5.24 | 6.75 | 7.96 | 7.94 |
| 5 | 5.24 | 5.85 | 6.75 | 7.96 | 15 | 5.24 | 6.75 | 6.75 | 7.94 | 25 | 5.24 | 6.75 | 7.96 | 7.94 |
| 6 | 5.24 | 5.85 | 6.75 | 7.96 | 16 | 5.24 | 6.75 | 6.75 | 7.94 | 26 | 5.24 | 6.75 | 7.96 | 7.94 |
| 7 | 5.24 | 5.85 | 6.75 | 7.96 | 17 | 5.24 | 6.75 | 6.75 | 7.94 | 27 | 5.24 | 6.75 | 7.96 | 7.94 |
| 8 | 5.24 | 5.85 | 6.75 | 7.96 | 18 | 5.24 | 6.75 | 6.75 | 7.94 | 28 | 5.24 | 6.75 | 7.96 | 7.94 |
| 9 | 5.24 | 5.85 | 6.75 | 7.96 | 19 | 5.24 | 6.75 | 6.75 | 7.94 | 29 | 5.24 | 6.75 | 7.96 | 7.94 |
| 10 | 5.24 | 5.85 | 6.75 | 7.96 | 20 | 5.24 | 6.75 | 6.75 | 7.94 | 30 | 5.24 | 6.75 | 7.96 | 7.94 |
| | | | | | | | | | | 31 | | 6.75 | | 7.94 |

| | Sept. | Oct. | Nov. | Dec. | Period |
|---|---|---|---|---|---|
| Average Second Feet | 5.24 | 6.40 | 7.15 | 7.95 | 6.68 |
| Total Acre Feet | 312 | 394 | 426 | 489 | 1,621 |

## SAN FELIPE CREEK STATION NEAR DEL RIO, TEXAS

**Description:** Staff-gage at Silos farm road bridge 1¾ miles south of Del Rio, Texas, 2 miles above the confluence with the Rio Grande, and 4 miles below the Del Rio gaging station on the Rio Grande.

**Records:** Based upon 6 current meter measurements from bridge and by wading during last 4 months of the year. Computations by averaging discharge between measurements. 1931 records considered fair.

**Records Available:** Record began September 1, 1931.

**Remarks:** The flow of this spring fed creek is greatly modified by irrigation and municipal diversions above this station. All diversions are practically constant except Del Rio City pump. Current meter measurements were all made while city pump of 5 sec. ft. capacity was operating, hence 5 sec. ft. were added to all measurements and total monthly metered pumping diversion subtracted from total monthly creek flow to get monthly flow passing this station. The drainage area above this station is 62 square miles, all in the United States.

*Daily Discharge in Second Feet and Period Summary, 1931*

| Day | Sept. | Oct. | Nov. | Dec. | Day | Sept. | Oct. | Nov. | Dec. | Day | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 71.4 | 64.9 | 55.1 | 58.2 | 11 | 64.9 | 57.5 | 55.1 | 59.2 | 21 | 64.9 | 55.1 | 58.2 | 59.2 |
| 2 | 71.4 | 64.9 | 55.1 | 58.2 | 12 | 64.9 | 57.5 | 55.1 | 59.2 | 22 | 64.9 | 55.1 | 58.2 | 58.6 |
| 3 | 71.4 | 64.9 | 55.1 | 58.2 | 13 | 64.9 | 57.5 | 55.1 | 59.2 | 23 | 64.9 | 55.1 | 58.2 | 58.6 |
| 4 | 71.4 | 64.9 | 55.1 | 59.2 | 14 | 64.9 | 57.5 | 55.1 | 59.2 | 24 | 64.9 | 55.1 | 58.2 | 58.6 |
| 5 | 71.4 | 64.9 | 55.1 | 59.2 | 15 | 64.9 | 57.5 | 58.2 | 59.2 | 25 | 64.9 | 55.1 | 58.2 | 58.6 |
| 6 | 71.4 | 64.9 | 55.1 | 59.2 | 16 | 64.9 | 57.5 | 58.2 | 59.2 | 26 | 64.9 | 55.1 | 58.2 | 58.6 |
| 7 | 71.4 | 64.9 | 55.1 | 59.2 | 17 | 64.9 | 57.5 | 58.2 | 59.2 | 27 | 64.9 | 55.1 | 58.2 | 58.6 |
| 8 | 71.4 | 64.9 | 55.1 | 59.2 | 18 | 64.9 | 57.5 | 58.2 | 59.2 | 28 | 64.9 | 55.1 | 58.2 | 58.6 |
| 9 | 64.9 | 64.9 | 55.1 | 59.2 | 19 | 64.9 | 57.5 | 58.2 | 59.2 | 29 | 64.9 | 55.1 | 58.2 | 58.6 |
| 10 | 64.9 | 57.5 | 55.1 | 59.2 | 20 | 64.9 | 55.1 | 58.2 | 59.2 | 30 | 64.9 | 55.1 | 58.2 | 58.6 |
| | | | | | | | | | | 31 | | 55.1 | | 58.6 |

| | Sept. | Oct. | Nov. | Dec. | Period |
|---|---|---|---|---|---|
| Average Second Feet | 66.6 | 58.7 | 56.8 | 58.9 | 60.2 |
| Total Acre Feet | 3,869 | 3,510 | 3,310 | 3,550 | 14,239 |

## PINTO CREEK STATION NEAR DEL RIO, TEXAS

**Description:** Automatic water-stage recorder, cable with sit down cable car, and concrete control dam, 500 feet above Del Rio-Eagle Pass highway and 5½ miles above confluence with Rio Grande.

**Records:** Based upon 16 current meter measurements during the year by wading and from cable car. Computations by shifting channel methods after July 1. 1931 records considered good.

**Records Available:** November, 1928 to December, 1931.

**Remarks:** The flow of this spring fed creek is modified by small irrigation diversions above the station. The drainage area above this station is 229 square miles, all in the United States.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| July 3, 1929 | 9.77 | ..... | Several Periods, 1929 | | No. flow |
| Apr. 28, 1930 | 6.50 | 2,000 | Several Periods, 1930 | | No. flow |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 14 | 12 | 13 | 43 | 25 | 17.9 | 12.0 | 5.21 | 8.71 | 5.76 | 9.02 |
| 2 | 8.4 | 41 | 11 | 13 | 43 | 21 | 17.9 | 12.1 | 5.28 | 9.14 | 5.75 | 9.06 |
| 3 | 6.9 | 14 | 11 | 13 | 93 | 19 | 16.3 | 12.1 | 5.65 | 9.01 | 6.18 | 9.22 |
| 4 | 6.2 | 14 | 12 | 13 | 72 | 19 | 14.8 | 11.1 | 6.42 | 8.89 | 6.72 | 9.39 |
| 5 | 7.4 | 13 | 12 | 12 | 77 | 19 | 14.8 | 11.0 | 8.04 | 8.77 | 7.25 | 9.35 |
| 6 | 8.4 | 13 | 12 | 12 | 33 | 17 | 14.8 | 11.0 | 8.11 | 8.65 | 7.24 | 10.7 |
| 7 | 12 | 13 | 12 | 13 | 33 | 17 | 14.9 | 11.0 | 9.73 | 8.53 | 7.78 | 12.9 |
| 8 | 12 | 12 | 12 | 13 | 25 | 17 | 14.9 | 10.9 | 10.8 | 8.40 | 7.76 | 12.0 |
| 9 | 16 | 12 | 12 | 12 | 23 | 17 | 15.0 | 10.9 | 10.8 | 7.73 | 7.75 | 13.2 |
| 10 | 17 | 12 | 12 | 12 | 21 | 19 | 42.9 | 10.8 | 10.9 | 7.61 | 7.74 | *12.4 |
| 11 | 19 | 12 | 11 | 12 | 19 | 25 | 26.2 | 18.8 | 11.0 | 7.05 | 7.72 | *11.5 |
| 12 | 12 | 12 | 11 | 11 | 19 | 17 | 16.7 | 12.7 | 11.1 | 7.03 | 7.16 | *11.7 |
| 13 | 10 | 13 | 12 | 11 | 19 | 16 | 15.1 | 10.7 | 11.2 | 7.02 | 8.70 | *11.9 |
| 14 | 9.0 | 12 | 12 | 12 | 17 | 14 | 15.2 | 10.6 | 11.2 | 7.01 | 9.68 | *12.0 |
| 15 | 9.0 | 14 | 19 | 12 | 19 | 14 | 13.8 | 10.6 | 10.3 | 5.99 | 9.67 | *12.2 |
| 16 | 13 | 19 | 21 | 11 | 17 | 14 | 12.4 | 9.6 | 10.4 | 4.68 | 9.65 | 12.1 |
| 17 | 17 | 14 | 16 | 12 | 19 | 14 | 16.9 | 9.5 | 10.4 | 4.31 | 7.64 | 12.0 |
| 18 | 14 | 12 | 13 | 13 | 19 | 14 | 20.5 | 9.5 | 10.5 | 4.30 | 7.08 | 13.0 |
| 19 | 12 | 12 | 12 | 13 | 19 | 14 | 22.6 | 9.4 | 10.6 | 3.94 | 7.06 | 15.3 |
| 20 | 12 | 11 | 11 | 13 | 19 | 14 | 17.0 | 9.4 | 10.6 | 3.72 | 7.05 | 15.2 |
| 21 | 11 | 11 | 11 | 12 | 19 | 14 | 17.0 | 9.3 | 10.7 | 4.11 | 6.54 | 15.1 |
| 22 | 12 | 11 | 11 | 11 | 19 | 14 | 15.5 | 29.9 | 10.8 | 4.35 | 7.13 | 13.6 |
| 23 | 11 | 11 | 12 | 6.6 | 19 | 14 | 14.1 | 47.7 | 10.8 | 4.88 | 7.72 | 13.5 |
| 24 | 11 | 11 | 12 | 13 | 19 | 14 | 14.1 | 15.0 | 10.9 | 4.87 | 7.75 | 12.5 |
| 25 | 11 | 11 | 12 | 13 | 19 | 13 | 14.2 | 10.2 | 11.0 | 4.56 | 6.69 | 11.4 |
| 26 | 12 | 11 | 13 | 13 | 19 | 13 | 12.8 | 9.1 | 10.9 | 4.04 | 7.83 | 11.3 |
| 27 | 17 | 11 | 12 | 14 | 19 | 16 | 12.8 | 7.5 | 10.8 | 4.28 | 7.87 | 12.2 |
| 28 | 16 | 12 | 13 | 16 | 21 | 50 | 12.9 | 6.4 | 10.6 | 4.26 | 8.91 | 12.1 |
| 29 | 25 | ..... | 13 | 192 | 31 | 71 | 12.9 | 6.0 | 9.50 | 4.50 | 8.94 | 12.0 |
| 30 | 27 | ..... | 13 | 115 | 56 | 27 | 13.0 | 5.4 | 9.38 | 5.44 | 8.98 | 11.0 |
| 31 | 17 | ..... | 13 | ..... | 35 | ..... | 13.0 | 5.1 | ..... | 5.77 | ..... | 9.88 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 3.65 | 3.46 | 29.0 | 5.6 | 13.0 | 799 | |
| February | 4.22 | 3.54 | 169 | 11.0 | 13.5 | 750 | |
| March | 3.72 | 3.53 | 43.2 | 10.0 | 12.6 | 775 | |
| April † | 5.02 | 3.24 | 553 | 2.5 | 21.7 | 1,290 | |
| May | 4.58 | 3.58 | 309 | 15.8 | 29.8 | 1,830 | |
| June | 4.45 | 3.55 | 254 | 12.0 | 19.7 | 1,170 | |
| July | 4.55 | 3.55 | 295 | 11.9 | 16.5 | 1,020 | |
| August | 4.63 | 3.45 | 331 | 5.1 | 12.1 | 744 | |
| September | 3.55 | 3.44 | 12.8 | 4.9 | 9.8 | 582 | |
| October | 3.53 | 3.40 | 10.3 | 3.7 | 6.2 | 380 | |
| November | 3.55 | 3.46 | 10.7 | 5.1 | 7.7 | 456 | |
| December | 3.58 | 3.53 | 16.6 | 9.1 | 11.9 | 732 | |
| Yearly | 5.02 | 3.24 | 553 | 2.5 | 14.5 | 10,530 | 46.0 |

*Partly Estimated †High Apr. 29; Low Apr. 23.

## RIO GRANDE AT EAGLE PASS STATION

**Description:** Automatic water-stage recorder and cable with stand up cable car, located ½ mile above international highway bridge at Eagle Pass, Texas. Zero of gage is 682.91 feet above mean sea level.

**Records:** Based upon 26 current meter measurements during the year from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** May, 1900 to April, 1916; November, 1923 to December, 1931.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte reservoir in the United States and by irrigation diversions and Boquilla reservoir in Mexico. With all closed basins eliminated the drainage area above this station is 126,962 square miles; 90,043 being in the United States and 36,919 in Mexico.

**Previous Extreme Flows:**

| Extreme High Flow | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| June 29, 1905 | 34.6 | ..... | Apr. 15, 1913 | (Min. recorded) | 1,030 |
| June, 1922 | 43.7 | ..... | Aug. 13-30, 1924 | 2.1 | 1,880 |
| May 30, 1925 | 33.7 | ..... | **Extreme Low Flow** | | |
| Aug. 27, 1926 | 8.46 | 25,000 | July 5, 1928 | 3.32 | 1,870 |
| July 1, 1929 | 8.22 | 20,100 | June 25, 1929 | 3.14 | 1,760 |
| Dec. 14, 1930 | 7.42 | 14,300 | May 26, 1930 | 2.51 | 940 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *3,350 | †3,750 | †2,850 | *2,790 | 14,300 | 6,600 | 4,980 | 3,080 | 2,700 | 3,180 | 2,460 | 2,780 |
| 2 | *3,350 | †3,850 | †2,700 | 2,610 | 10,200 | 5,100 | 3,390 | 3,090 | 2,650 | 2,960 | 2,480 | 2,730 |
| 3 | *3,350 | †4,000 | 2,790 | 2,520 | 11,000 | 4,520 | 3,300 | 3,090 | 2,600 | 2,840 | 2,480 | †2,600 |
| 4 | *3,160 | †3,800 | 2,970 | 2,520 | 12,100 | 4,180 | 3,450 | 3,090 | 2,480 | 2,920 | 2,650 | †2,800 |
| 5 | *3,160 | †3,670 | 3,160 | 2,360 | 7,510 | 4,180 | 3,390 | 3,130 | 2,660 | 2,830 | 2,430 | †3,000 |
| 6 | *2,970 | †3,630 | 3,060 | 2,200 | 6,520 | 3,960 | 3,660 | 2,920 | 2,850 | 3,170 | 2,400 | †3,450 |
| 7 | *2,970 | †3,600 | 3,260 | 2,440 | 5,600 | 3,850 | 3,660 | 2,970 | 2,740 | 3,540 | 2,520 | †3,350 |
| 8 | *2,970 | †3,500 | 3,350 | 2,360 | 5,100 | 3,850 | 3,490 | 2,820 | 2,380 | 3,180 | 2,520 | †3,200 |
| 9 | *2,970 | †3,350 | 3,160 | 2,270 | 5,100 | 3,750 | 3,690 | 2,980 | 2,300 | 2,960 | 2,610 | †3,100 |
| 10 | *3,160 | †3,300 | 3,160 | 2,360 | 4,980 | 4,400 | 3,500 | 2,890 | 2,320 | 2,900 | 2,570 | †2,800 |
| 11 | *3,160 | †3,350 | 3,350 | 2,440 | 4,980 | 4,180 | 4,150 | 3,540 | 2,340 | 2,800 | 2,620 | †2,900 |
| 12 | *2,790 | †3,350 | 3,060 | 2,360 | 4,860 | 4,180 | 5,660 | 6,140 | 2,210 | 2,780 | 2,520 | †3,050 |
| 13 | 2,970 | †3,350 | 3,160 | 2,360 | 4,740 | 3,850 | 5,460 | 6,700 | *2,180 | 2,690 | 2,420 | †2,900 |
| 14 | 2,970 | †3,400 | 3,260 | 2,270 | 4,290 | 3,960 | 5,500 | 5,050 | *2,150 | 2,620 | 2,580 | †2,850 |
| 15 | 2,790 | †3,400 | 3,850 | 2,360 | 4,070 | 3,550 | 4,540 | *4,870 | *2,070 | 2,800 | 2,580 | *2,740 |
| 16 | 2,790 | †3,420 | 3,850 | 2,270 | 4,180 | 3,450 | 4,220 | *5,010 | 2,110 | 2,680 | 2,700 | 2,710 |
| 17 | 3,060 | †3,350 | 3,550 | 2,200 | 4,180 | 3,350 | 4,290 | *4,730 | 2,100 | 3,010 | 2,660 | 2,700 |
| 18 | 2,970 | †3,300 | 3,260 | 2,270 | 4,400 | 3,260 | 4,260 | *4,560 | 2,080 | 2,780 | 2,820 | 2,740 |
| 19 | *2,700 | †3,220 | 3,160 | 2,610 | 6,850 | 3,160 | 4,020 | *4,630 | 2,080 | 2,630 | 2,560 | 2,810 |
| 20 | *2,970 | †3,170 | 2,880 | 3,730 | 4,740 | 3,060 | 4,430 | 5,270 | 2,080 | 2,540 | 2,640 | 2,830 |
| 21 | *2,970 | †3,150 | 2,700 | 7,510 | 3,960 | 3,160 | 4,110 | 5,090 | 2,120 | 2,560 | 2,770 | 2,760 |
| 22 | *2,700 | †3,070 | 2,700 | 5,220 | 3,750 | 3,350 | 4,270 | 4,720 | 2,030 | 2,440 | 2,820 | 2,820 |
| 23 | 2,520 | †3,050 | †2,800 | 4,290 | 3,650 | 3,260 | 4,230 | 5,010 | 2,170 | 2,540 | 2,830 | 2,750 |
| 24 | 2,700 | †3,160 | †2,650 | 3,750 | 3,550 | 3,060 | 4,840 | 4,790 | 2,390 | 3,540 | 2,780 | 2,650 |
| 25 | 2,700 | †3,200 | †2,550 | 3,650 | 3,450 | 3,160 | 3,640 | 4,240 | 2,270 | 2,780 | 2,740 | 2,640 |
| 26 | 2,610 | †3,100 | †2,550 | 3,550 | 3,650 | 3,060 | 3,350 | 3,980 | 2,210 | 2,820 | 2,600 | 2,480 |
| 27 | 2,790 | †3,000 | †2,500 | 3,350 | 3,450 | 2,970 | 3,320 | 3,650 | 2,320 | 2,900 | 2,600 | 2,500 |
| 28 | 3,160 | †2,900 | †2,500 | 3,260 | 3,260 | 3,650 | 3,240 | 3,420 | 2,930 | 2,650 | 2,630 | 2,590 |
| 29 | 3,450 | ..... | †2,450 | 4,060 | 3,450 | *6,160 | 3,250 | 3,210 | 4,020 | 2,500 | 2,730 | 2,490 |
| 30 | 3,750 | ..... | †2,400 | 22,600 | 7,190 | *4,080 | 3,220 | 3,090 | 3,630 | 2,400 | 2,810 | 2,610 |
| 31 | 3,750 | ..... | †2,250 | ..... | 9,030 | ..... | 3,270 | 2,950 | ..... | 2,420 | ..... | 2,510 |

| Month | Gage Height Extreme-Feet High | Gage Height Extreme-Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 4.25 | 3.46 | 3,900 | 2,370 | 3,020 | 186,000 | |
| February | ..... | ..... | ..... | ..... | 3,370 | 187,000 | |
| March | 4.35 | ..... | 4,200 | ..... | 2,970 | 182,260 | |
| April 30 | 11.35 | 3.23 | 30,580 | 2,060 | 3,680 | 219,000 | |
| May | 8.50 | 3.83 | 17,570 | 3,180 | 5,740 | 353,000 | |
| June | 6.50 | 3.66 | 10,250 | 2,830 | 3,880 | 231,000 | |
| July | 5.66 | 3.80 | 7,420 | 3,040 | 3,990 | 245,500 | |
| August | 6.29 | 3.58 | 9,260 | 2,640 | 4,020 | 247,360 | |
| September 22 | 4.39 | 3.11 | 4,210 | 1,880 | 2,440 | 145,130 | |
| October | 4.38 | 3.36 | 4,160 | 2,290 | 2,820 | 173,280 | |
| November | 3.79 | 3.34 | 2,980 | 2,240 | 2,620 | 155,760 | |
| December | 4.12 | 3.49 | 3,610 | 2,380 | 2,860 | 172,250 | |
| Yearly | 11.35 | 3.11 | 30,580 | 1,880 | 3,450 | 2,497,540 | 19.7 |

*Partly Estimated †Estimated

## RIO GRANDE AT LAREDO STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car. Cable and car located at Fort McIntosh, about 2½ miles above the cities of Laredo, Texas, and Nuevo Laredo, Tamaulipas. Water-stage recorder is attached to north abutment of railroad bridge at Laredo. Zero of gage is 351.45 feet above mean sea level.

**Records:** Based on 135 current meter measurements during the year from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** 1904 to 1913; 1923 to 1926; 1928, 1929 and 1931.

**Remarks:** The river flow at this station is modified by many irrigation diversions and Elephant Butte reservoir in the United States and by many irrigation diversions and Boquilla dam in Mexico. This station was operated by the Monterrey Office of the Mexican Department of Agriculture and Development. With all closed basins eliminated the drainage area above this station is 132,915 square miles, of which 91,516 are in the United States and 41,399 in Mexico. Prior to Sept. 1925 gage was at cable, 1½ miles above railroad bridge, and zero of this old gage was 351.35 ft. above mean sea level.

**Previous Extreme Flows:**

**Maximum Mean Daily**

| Date | Gage | | Sec. Ft. |
|---|---|---|---|
| 1904 | ----- | | 67,590 |
| June 30, 1905 | 32.2 | (Peak) | 52,270 |
| 1906 | ----- | | 51,460 |
| 1912 | ----- | | 49,090 |
| Sept. 22, 1924 | 15.25 | | 36,500 |

**Extreme High Flow**

| | | |
|---|---|---|
| June 20, 1922 | 49.0 | ----- |
| Sept. 8, 1923 | 20.31 | 76,710 |
| May 31, 1925 | 34.51 | 200,020 |
| Apr. 22, 1926 | 18.24 | 75,010 |
| Sept. 23, 1928 | 14.70 | 51,630 |
| Sept. 17, 1929 | 10.79 | 27,000 |

**Minimum Mean Daily**

| Date | Gage | Sec. Ft. |
|---|---|---|
| 1904 | ----- | 1,060 |
| 1910 | ----- | 939 |
| 1911 | ----- | 1,210 |

**Extreme Low Flow**

| | | |
|---|---|---|
| July 16, 1923 | 4.95 | 1,900 |
| Aug. 29, 30, 1924 | 3.64 | 1,600 |
| May 28, 1925 | 3.94 | 1,850 |
| Apr. 20, 1926 | 3.51 | 2,080 |
| Apr. 7, 1928 | 2.99 | 1,080 |
| May 9, 10, 1929 | 3.54 | 1,400 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,000 | 4,120 | 2,700 | 2,100 | 15,750 | 8,800 | 4,600 | 3,300 | 2,700 | 3,400 | 2,270 | 2,400 |
| 2 | 2,980 | 3,650 | 2,730 | 2,080 | 17,000 | 8,100 | 4,250 | 3,150 | 2,650 | 3,250 | 2,150 | 2,520 |
| 3 | 2,900 | 3,650 | 2,650 | 2,500 | 13,500 | 5,800 | 4,550 | 3,030 | 2,600 | 2,900 | 2,150 | 2,550 |
| 4 | 2,850 | 3,800 | 2,550 | 2,600 | 10,700 | 4,700 | 3,400 | 3,030 | 2,550 | 2,780 | 2,220 | 2,500 |
| 5 | 2,800 | 3,920 | 2,450 | 2,350 | 12,500 | 4,200 | 3,200 | 2,920 | 2,570 | 2,650 | 2,220 | 2,400 |
| 6 | 2,730 | 3,600 | 2,600 | 2,220 | 10,500 | 3,950 | 3,250 | 2,870 | 2,520 | 2,620 | 2,270 | 2,400 |
| 7 | 2,780 | 3,570 | 2,730 | 2,150 | 7,700 | 3,850 | 3,220 | 2,800 | 2,620 | 2,620 | 2,270 | 2,650 |
| 8 | 2,650 | 3,030 | 2,750 | 2,080 | 6,900 | 3,750 | 3,350 | 2,650 | 2,850 | 2,800 | 2,130 | 3,250 |
| 9 | 2,730 | 3,500 | 2,780 | 2,100 | 5,600 | 3,650 | 3,350 | 2,620 | 2,870 | 3,400 | 2,200 | 3,200 |
| 10 | 2,800 | 3,350 | 2,950 | 2,180 | 5,200 | 3,600 | 3,250 | 2,570 | 2,550 | 3,000 | 2,200 | 2,950 |
| 11 | 2,830 | 3,220 | 2,830 | 2,150 | 5,250 | 2,400 | 3,470 | 3,380 | 2,430 | 2,800 | 2,150 | 2,900 |
| 12 | 2,900 | 3,170 | 2,800 | 2,150 | 5,150 | 3,900 | 3,400 | 4,800 | 2,300 | 2,680 | 2,280 | 2,620 |
| 13 | 2,970 | 3,220 | 3,000 | 2,220 | 5,050 | 3,950 | 3,650 | 3,730 | 2,300 | 2,620 | 2,300 | 2,750 |
| 14 | 2,870 | 3,250 | 2,870 | 2,200 | 4,800 | 3,750 | 5,150 | 6,000 | 2,270 | 2,650 | 2,220 | 2,920 |
| 15 | 2,800 | 3,220 | 2,870 | 2,220 | 4,650 | 3,600 | 5,100 | 5,800 | 2,180 | 2,570 | 2,150 | 2,800 |
| 16 | 2,850 | 3,250 | 4,030 | 2,220 | 4,300 | 3,500 | 4,800 | 4,550 | 2,150 | 2,450 | 2,200 | 2,650 |
| 17 | 2,780 | 3,350 | 5,200 | 2,180 | 4,200 | 3,350 | 4,650 | 4,520 | 2,100 | 2,650 | 2,200 | 2,550 |
| 18 | 2,870 | 3,380 | 3,570 | 2,150 | 4,500 | 3,200 | 4,630 | 4,520 | 2,100 | 2,650 | 2,350 | 2,550 |
| 19 | 2,950 | 3,220 | 3,400 | 2,080 | 4,350 | 3,050 | 6,400 | 4,200 | 2,080 | 2,750 | 2,320 | 2,500 |
| 20 | 2,900 | 3,130 | 3,100 | 2,050 | 4,650 | 3,000 | 8,000 | 4,200 | 2,050 | 2,780 | 2,450 | 2,600 |
| 21 | 2,700 | 3,100 | 2,600 | 2,250 | 6,100 | 2,970 | 4,300 | 4,250 | 1,970 | 2,520 | 2,270 | 2,620 |
| 22 | 2,650 | 3,030 | 2,650 | 4,300 | 4,500 | 2,950 | 3,900 | 5,100 | 1,950 | 2,430 | 2,200 | 2,620 |
| 23 | 2,780 | 3,000 | 2,480 | 6,700 | 4,450 | 2,920 | 3,700 | 5,100 | 1,850 | 2,450 | 2,430 | 2,550 |
| 24 | 2,750 | 2,920 | 2,520 | 5,200 | 4,300 | 3,050 | 3,800 | 4,850 | 1,830 | 2,250 | 2,500 | 2,600 |
| 25 | 2,600 | 2,900 | 2,550 | 4,400 | 3,650 | 3,100 | 3,700 | 5,400 | 1,780 | 2,320 | 2,520 | 2,620 |
| 26 | 2,570 | 2,900 | 2,450 | 3,900 | 3,450 | 3,950 | 4,250 | 4,250 | 1,950 | 3,200 | 2,430 | 2,500 |
| 27 | 2,670 | 2,900 | 2,400 | 3,820 | 3,350 | 2,970 | 3,350 | 3,500 | 1,970 | 2,780 | 2,400 | 2,400 |
| 28 | 2,670 | 2,830 | 2,320 | 3,650 | 3,500 | 3,100 | 3,100 | 3,270 | 1,900 | 2,650 | 2,320 | 2,380 |
| 29 | 2,700 | ..... | 2,200 | 3,600 | 3,350 | 3,700 | 3,050 | 3,030 | 1,880 | 2,680 | 2,300 | 2,150 |
| 30 | 3,900 | ..... | 2,300 | 3,620 | 3,380 | 6,200 | 3,000 | 2,900 | 2,200 | 2,620 | 2,350 | 2,320 |
| 31 | 4,600 | ..... | 2,320 | ..... | 6,500 | ..... | 3,100 | 2,800 | ..... | 2,400 | ..... | 2,130 |

| Month | Gage Height Extreme–Feet High | Gage Height Extreme–Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 6.04 | 5.02 | 5,000 | 2,500 | 2,890 | 177,570 | |
| February | 5.71 | 5.18 | 4,000 | 2,800 | 3,290 | 182,880 | |
| March | 6.79 | 4.89 | 7,900 | 2,100 | 2,820 | 173,260 | |
| April | 7.91 | 4.82 | 14,000 | 2,000 | 2,850 | 169,450 | |
| May | 11.15 | 5.54 | 28,500 | 3,200 | 6,410 | 394,290 | |
| June | 7.71 | 5.38 | 9,500 | 2,800 | 3,970 | 236,090 | |
| July | 9.91 | 5.45 | 20,800 | 2,950 | 4,030 | 247,810 | |
| August | 7.12 | 5.09 | 8,300 | 2,400 | 3,840 | 236,240 | |
| September | 5.45 | 4.59 | 3,500 | 1,800 | 2,260 | 134,330 | |
| October | 5.51 | 4.79 | 4,000 | 2,200 | 2,720 | 167,260 | |
| November | 4.99 | 4.76 | 2,700 | 2,150 | 2,260 | 135,710 | |
| December | 5.41 | 4.72 | 3,600 | 2,130 | 2,600 | 159,820 | |
| Yearly | 11.15 | 4.59 | 28,500 | 1,800 | 3,330 | 2,414,710 | 18.2 |

## RIO SALADO STATION AT "EL CABLE"

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 6 miles above the confluence of the Rio Salado with the Rio Grande and 2 miles southeast of Ciudad Guerrero, Tamaulipas, at a point called "El Cable."

**Records:** Based on station rating curve made up from 154 current meter measurements during previous years from cable car. Computations by shifting channel methods. 1931 records are considered fair.

**Records Available:** 1902 to 1912; 1923 to 1931.

**Remarks:** The flow of the Rio Salado is greatly modified by the Don Martin reservoir, which forms a part of National Irrigation System No. 4, Coahuila-Nuevo Leon. This station was operated by the Monterrey Office of the Mexican Department of Agriculture and Development. The drainage area above this station is 21,830 square miles, entirely in Mexico.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| July, 1909 | ..... | 30,380 | July, 1901 | 0.0 | 0.0 |
| Sept. 24, 1923 | 10.70 | 12,570 | Several days in 1902 | | 0.0 |
| Sept. 18, 1924 | 17.65 | 35,630 | July, 1904 | 0.0 | 0.0 |
| Oct., 1925 | ..... | 38,570 | Aug., 1910 | 0.0 | 0.0 |
| May, 1926 | ..... | 2,940 | Several days in 1912 | | 0.0 |
| June 22, 1927 | 12.63 | 27,510 | Several days in 1923 | 0.43 | 0.7 |
| Sept., 1928 | ..... | 7,230 | Aug. 17 to Sept. 14, 1924, dry | | ..... |
| Sept. 6, 1929 | 9.78 | 3,180 | July, 1925 | ..... | 21.2 |
| May 29, 1930 | 12.99 | 18,030 | Sept., 1926 | ..... | 2.8 |
| | | | Dec. 25 to 31, 1927 | 0.56 | 6.4 |
| | | | Several days in 1928 | | 0.0 |
| | | | Aug. 5 to 12, 1929, dry | | |
| | | | Part of April, Aug., & Sept., 1930, dry | | |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 63.6 | 286 | 77.7 | 31.4 | 86.5 | 424 | 265 | 86.5 | 97.8 | 64.3 | 19.1 | 21.9 |
| 2 | 58.3 | 208 | 77.7 | 27.9 | 111 | 314 | 196 | 86.5 | 74.2 | 102 | 19.1 | 20.5 |
| 3 | 58.3 | 194 | 75.9 | 26.1 | 433 | 192 | 441 | 78.4 | 83.0 | 83.0 | 18.0 | 19.1 |
| 4 | 58.3 | 194 | 77.7 | 26.1 | 388 | 145 | 196 | 72.0 | 50.5 | 72.0 | 15.5 | 29.3 |
| 5 | 58.3 | 173 | 75.9 | 29.3 | 283 | 122 | 111 | 60.7 | 40.6 | 108 | 14.5 | 35.0 |
| 6 | 55.4 | 154 | 75.9 | 24.7 | 258 | 102 | 55.4 | 55.4 | 32.8 | 97.8 | 12.7 | 60.7 |
| 7 | 55.4 | 143 | 75.9 | 21.9 | 477 | 90.1 | 36.7 | 50.5 | 24.7 | 90.1 | 11.7 | 97.8 |
| 8 | 52.3 | 161 | 72.4 | 21.9 | 307 | 75.9 | 29.3 | 43.1 | 20.5 | 67.1 | 10.9 | 57.6 |
| 9 | 55.4 | 187 | 68.9 | 20.5 | 228 | 65.3 | 23.3 | 36.7 | 16.6 | 132 | 16.6 | 90.1 |
| 10 | 55.4 | 173 | 63.6 | 19.1 | 192 | 60.0 | 18.0 | 31.1 | 14.5 | 111 | 15.5 | 83.0 |
| 11 | 58.3 | 166 | 63.6 | 29.3 | 173 | 55.4 | 15.5 | 24.7 | 75.9 | 97.8 | 14.5 | 102 |
| 12 | 68.9 | 166 | 58.3 | 26.1 | 141 | 53.0 | 180 | 36.7 | 60.7 | 78.4 | 13.8 | 93.6 |
| 13 | 63.6 | 161 | 58.3 | 23.3 | 111 | 50.5 | 111 | 86.5 | 36.7 | 72.0 | 12.7 | 102 |
| 14 | 60.0 | 154 | 55.4 | 21.9 | 86.5 | 65.3 | 72.0 | 93.6 | 97.8 | 86.5 | 12.7 | 90.1 |
| 15 | 63.6 | 143 | 50.5 | 20.5 | 65.3 | 58.3 | 47.7 | 78.4 | 60.7 | 74.2 | 11.7 | 52.3 |
| 16 | 68.9 | 166 | 83.0 | 19.1 | 55.4 | 53.0 | 31.1 | 78.4 | 78.4 | 111 | 20.5 | 58.3 |
| 17 | 68.9 | 143 | 187 | 19.1 | 50.5 | 42.4 | 1,870 | 72.0 | 107 | 102 | 19.1 | 52.3 |
| 18 | 63.6 | 127 | 155 | 18.0 | 42.4 | 36.7 | 7,240 | 67.1 | 159 | 78.4 | 35.0 | 43.1 |
| 19 | 63.6 | 117 | 138 | 111 | 36.7 | 29.3 | 5,370 | 57.6 | 252 | 57.6 | 45.2 | 40.6 |
| 20 | 60.0 | 108 | 173 | 75.9 | 75.9 | 23.3 | 1,870 | 52.3 | 388 | 52.3 | 47.7 | 36.7 |
| 21 | 60.0 | 102 | 138 | 65.3 | 53.0 | 20.5 | 1,020 | 50.5 | 215 | 43.1 | 36.7 | 40.6 |
| 22 | 58.3 | 90.1 | 93.6 | 58.3 | 38.8 | 16.6 | 724 | 45.2 | 138 | 38.1 | 36.7 | 38.1 |
| 23 | 58.3 | 111 | 60.0 | 53.0 | 1,240 | 60.0 | 644 | 43.1 | 93.6 | 35.0 | 43.1 | 50.5 |
| 24 | 55.4 | 102 | 52.3 | 47.7 | 1,270 | 53.0 | 556 | 38.1 | 155 | 27.9 | 40.6 | 43.1 |
| 25 | 55.4 | 93.6 | 50.5 | 42.4 | 556 | 42.4 | 609 | 215 | 102 | 24.7 | 32.8 | 58.3 |
| 26 | 55.4 | 86.5 | 45.2 | 42.4 | 258 | 31.1 | 477 | 768 | 72.0 | 35.0 | 35.0 | 50.5 |
| 27 | 50.5 | 86.5 | 43.1 | 40.6 | 168 | 24.7 | 224 | 574 | 55.4 | 32.8 | 29.3 | 50.5 |
| 28 | 50.5 | 83.0 | 38.8 | 35.0 | 132 | 21.9 | 143 | 353 | 286 | 31.1 | 27.9 | 52.3 |
| 29 | 45.2 | ..... | 37.1 | 32.8 | 90.1 | 989 | 97.8 | 232 | 147 | 24.7 | 26.5 | 50.5 |
| 30 | 574 | ..... | 34.6 | 29.3 | 102 | 565 | 90.1 | 180 | 90.1 | 19.1 | 24.7 | 47.7 |
| 31 | 459 | ..... | 31.1 | ..... | 618 | ..... | 86.5 | 127 | ..... | 16.6 | ..... | 43.1 |

| Month | Gage Height | | Second Feet | | | Acre Feet | |
|---|---|---|---|---|---|---|---|
| | Extreme–Feet | | Extreme | | | | Per |
| | High | Low | High | Low | Average | Total | Sq. Mile |
| January | 4.53 | 2.07 | 689 | 70.3 | 88.3 | 2,100 | |
| February | 3.64 | 2.46 | 325 | 81.2 | 146 | 16,190 | |
| March | 3.15 | 1.84 | 194 | 31.1 | 77 | 7,700 | |
| April | 2.79 | 1.54 | 127 | 18.0 | 35.3 | 5,420 | |
| May | 6.20 | 1.90 | 2,010 | 34.6 | 263 | 8,090 | |
| June | 5.25 | 1.61 | 1,260 | 20.5 | 129 | 4,740 | |
| July | 10.70 | 1.44 | 11,580 | 14.8 | 737 | 45,310 | |
| August | 4.76 | 1.67 | 768 | 23.3 | 125 | 7,690 | |
| September | 3.94 | 1.44 | 424 | 14.8 | 104 | 6,200 | |
| October | 3.58 | 1.51 | 307 | 16.6 | 66.7 | 4,100 | |
| November | 2.13 | 1.31 | 50.5 | 10.9 | 24.0 | 1,430 | |
| December | 2.66 | 1.57 | 106 | 19.1 | 55.1 | 3,400 | |
| Yearly | 10.70 | 1.31 | 11,580 | 10.9 | 154 | 112,360 | 5.15 |

## RIO ALAMO STATION AT "EL PASO DEL CANTARO"

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 3 miles from the confluence of the Rio Alamo with the Rio Grande and 2/3 of a mile west of Ciudad Mier, Tamaulipas, Mexico, at a point called "Paso del Cantaro."

**Records:** Based on 155 current meter measurements during the year from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** July 5, 1923, to 1926; 1928, 1930 and 1931.

**Remarks:** This station was operated by the Monterrey Office of the Mexican Department of Agriculture and Development. The drainage area above this station is 1,840 square miles, all in Mexico.

**Previous Extreme Flows:**

**Maximum Mean Daily**

| Date | Gage | Sec. Ft. |
|---|---|---|
| Sept. 19, 1923 | 8.46 | 3,530 |
| June 2, 1924 | 6.30 | 3,440 |
| Sept. 8, 1925 | 14.70 | 8,020 |
| Oct., 1926 | ..... | 2,960 |
| May 13, 1928 | 9.35 | 4,010 |
| June 12, 1930 | 11.48 | 11,300 |

**Minimum Mean Daily**

| Date | Gage | Sec. Ft. |
|---|---|---|
| 1923, Dry part of July and Sept. and all of Aug. | | |
| 1924, Dry part of July, Sept. and Dec. and all of Aug., Oct. and Nov. | | |
| 1926, Dry part of April, May, June and July | | |
| 1928, Dry part of March, April, May, June, July, Aug. and Sept. | | |
| 1930, Dry part of Feb., March, April, May, Aug., Sept. and Oct., and all of Jan. | | |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7 | 92 | 64 | 31 | 108 | 78 | 87 | 177 | 11 | 4 | 5 | 21 |
| 2 | 7 | 78 | 57 | 33 | 512 | 60 | 42 | 81 | 5 | 2 | 3 | 19 |
| 3 | 6 | 71 | 64 | 31 | 883 | 49 | 39 | 65 | 3 | 2 | 2 | 17 |
| 4 | 6 | 71 | 60 | 27 | 191 | 46 | 32 | 57 | 2 | 2 | 1 | 15 |
| 5 | 5 | 78 | 49 | 18 | 131 | 42 | 28 | 49 | 2 | 1 | 1 | 8 |
| 6 | 5 | 71 | 42 | 12 | 74 | 39 | 23 | 40 | 2 | 1 | 2 | 413 |
| 7 | 5 | 71 | 39 | 12 | 102 | 26 | 19 | 42 | 2 | 0 | 3 | 240 |
| 8 | 8 | 69 | 39 | 7 | 42 | 29 | 13 | 37 | 1 | 0 | 4 | 117 |
| 9 | 6 | 63 | 39 | 7 | 32 | 34 | 9 | 34 | 8 | 0 | 5 | 57 |
| 10 | 6 | 63 | 34 | 706 | 32 | 21 | 25 | 30 | 65 | 0 | 8 | 39 |
| 11 | 5 | 63 | 30 | 56 | 27 | 11 | 78 | 81 | 30 | 0 | 15 | 30 |
| 12 | 4 | 63 | 23 | 23 | 42 | 10 | 30 | 102 | 86 | 0 | 17 | 27 |
| 13 | 3 | 63 | 29 | 21 | 42 | 4 | 24 | 57 | 15 | 0 | 15 | 24 |
| 14 | 2 | 63 | 26 | 23 | 32 | 2 | 13 | 30 | 26 | 0 | 19 | 24 |
| 15 | 2 | 63 | 19 | 23 | 23 | 2 | 8 | 23 | 21 | 0 | 13 | 24 |
| 16 | 2 | 71 | 373 | 23 | 25 | 1 | 6 | 19 | 26 | 0 | 8 | 24 |
| 17 | 2 | 81 | 127 | 23 | 30 | 0 | 1,942 | 9 | 23 | 0 | 7 | 24 |
| 18 | 2 | 71 | 64 | 19 | 19 | 0 | 12,360 | 11 | 26 | 0 | 7 | 19 |
| 19 | 2 | 69 | 53 | 9 | 18 | 0 | 2,931 | 9 | 23 | 0 | 8 | 19 |
| 20 | 2 | 64 | 53 | 23 | 11 | 95 | 353 | 6 | 15 | 0 | 17 | 17 |
| 21 | 2 | 69 | 49 | 18 | 7 | 233 | 92 | 4 | 13 | 0 | 15 | 19 |
| 22 | 5 | 63 | 49 | 16 | 8 | 113 | 72 | 3 | 13 | 0 | 13 | 21 |
| 23 | 5 | 60 | 49 | 18 | 3,178 | 72 | 65 | 2 | 11 | 0 | 13 | 21 |
| 24 | 4 | 60 | 42 | 12 | 883 | 53 | 53 | 32 | 13 | 0 | 13 | 21 |
| 25 | 4 | 57 | 39 | 12 | 109 | 34 | 42 | 72 | 13 | 0 | 13 | 19 |
| 26 | 5 | 60 | 42 | 18 | 78 | 164 | 60 | 72 | 9 | 0 | 13 | 17 |
| 27 | 23 | 63 | 42 | 18 | 78 | 60 | 145 | 49 | 23 | 0 | 13 | 21 |
| 28 | 30 | 69 | 34 | 18 | 64 | 31 | 92 | 24 | 23 | 0 | 15 | 21 |
| 29 | 34 | .... | 34 | 23 | 49 | 989 | 57 | 17 | 7 | 6 | 17 | 21 |
| 30 | 547 | .... | 42 | 21 | 56 | 406 | 92 | 17 | 4 | 5 | 23 | 19 |
| 31 | 251 | .... | 34 | .... | 113 | ..... | 120 | 24 | ..... | 13 | ..... | 23 |

| Month | Gage Height Extreme-Feet | | Second Feet Extreme | | | Acre Feet | |
|---|---|---|---|---|---|---|---|
| | High | Low | High | Low | Average | Total | Per Sq. Mile |
| January | 3.61 | 0.39 | 830 | 2 | 32 | 1,980 | |
| February | 1.74 | 1.38 | 108 | 57 | 68 | 3,770 | |
| March | 2.69 | 0.89 | 373 | 19 | 56 | 3,450 | |
| April | 4.86 | 0.66 | 1,780 | 7 | 43 | 2,580 | |
| May | 7.02 | 0.62 | 6,360 | 6 | 226 | 13,880 | |
| June | 5.18 | 0.10 | 2,330 | 0 | 90 | 5,360 | |
| July | 11.15 | 0.59 | 21,190 | 6 | 611 | 37,590 | |
| August | 2.13 | 0.39 | 191 | 2 | 41 | 2,530 | |
| September | 1.90 | 0.26 | 138 | 0.4 | 17 | 1,030 | |
| October | 1.31 | 0 | 49 | 0 | 1 | 71 | |
| November | 0.98 | 0.26 | 24 | 0.4 | 10 | 611 | |
| December | 2.82 | 0.69 | 413 | 8 | 45 | 2,780 | |
| Yearly | 11.15 | 0 | 21,190 | 0 | 103 | 75,630 | 41.1 |

## RIO GRANDE AT ROMA STATION

**Description:** Automatic water-stage recorder at international bridge at Roma, Starr County, Texas. Zero of gage is 145.93 feet above mean sea level.

**Records:** Based upon 83 current meter measurements during the year from bridge. Computations by shifting channel methods after April 1. 1931 records considered good.

**Records Available:** August, 1900 to March, 1914. November, 1922 to December, 1931.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated the drainage area above this station is 160,014 square miles; 93,645 being in the United States and 66,369 in Mexico. After March, 1929 the station was operated by the United States, and previously by Mexico. Datum of present gage is 1.1 ft. lower than that used prior to 1922.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| June 22, 1922 | 35.0 | *240,000 | Aug. 29, 30, 1924 | ---- | 1,460 |
| Sept. 23, 1924 | ---- | 55,700 | May 29, 1925 | ---- | 975 |
| **Extreme High Flow** | | | **Extreme Low Flow** | | |
| June 1, 1925 | 24.0 | 155,000 | May 10, 11, 1929 | 2.84 | 1,730 |
| Aug. 26, 1929 | 12.86 | ---- | Apr. 14, 1930 | 2.24 | 1,100 |
| June 12, 1930 | 16.72 | 59,000 | | | |

*From slope-area computation by U. S. G. S. Engineers.

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,180 | 5,950 | 3,240 | 2,570 | 4,340 | 10,500 | 7,640 | 3,900 | 3,060 | 2,380 | 2,240 | 2,760 |
| 2 | 3,180 | 5,270 | 3,180 | 2,570 | 20,900 | 9,500 | 5,710 | 3,980 | 2,960 | 3,680 | 2,480 | 2,840 |
| 3 | 3,460 | 4,610 | 3,110 | 2,340 | 21,000 | 7,400 | 4,680 | 3,760 | 3,000 | 3,750 | 2,470 | 2,980 |
| 4 | 3,380 | 4,290 | 3,110 | 2,450 | 16,300 | 5,070 | 4,720 | 3,640 | 2,870 | 3,360 | 2,450 | 3,010 |
| 5 | 3,310 | 4,290 | 2,980 | 2,690 | 14,100 | 4,630 | 3,750 | 3,520 | 2,780 | 3,150 | 2,470 | 2,970 |
| 6 | 3,240 | 4,450 | 2,800 | 2,510 | 13,100 | 4,600 | 3,380 | 3,420 | 2,710 | 3,010 | 2,490 | 3,560 |
| 7 | 3,180 | 4,290 | 2,980 | 2,450 | 8,140 | 4,350 | 3,450 | 3,310 | 2,670 | 2,870 | 2,490 | 4,780 |
| 8 | 3,240 | 4,130 | 3,040 | 2,450 | 7,240 | 4,250 | 3,900 | 3,240 | 2,760 | 2,880 | 2,540 | 3,930 |
| 9 | 3,180 | 3,980 | 3,110 | 2,340 | 6,160 | 4,150 | 3,530 | 3,030 | 3,120 | 2,980 | 2,440 | 3,880 |
| 10 | 3,180 | 3,980 | 3,040 | 4,350 | 4,940 | 4,060 | 3,670 | 2,940 | 3,100 | 3,480 | 2,430 | 3,740 |
| 11 | 3,240 | 3,830 | 3,310 | 2,840 | 6,630 | 4,380 | 3,830 | 3,120 | 2,770 | 3,250 | 2,460 | 3,420 |
| 12 | 3,310 | 3,830 | 3,180 | 2,420 | 7,500 | 4,050 | 3,930 | 7,590 | 2,670 | 3,040 | 2,430 | 3,330 |
| 13 | 3,310 | 3,760 | 3,040 | 2,240 | 5,310 | 4,500 | 3,880 | 5,800 | 2,780 | 2,940 | 2,490 | 3,100 |
| 14 | 3,380 | 3,760 | 3,310 | 2,740 | 5,330 | 4,460 | 4,080 | 4,510 | 2,740 | 2,870 | 2,510 | 3,090 |
| 15 | 3,180 | 3,760 | 3,180 | 3,170 | 4,890 | 4,290 | 5,700 | 7,140 | 2,580 | 2,860 | 2,510 | 3,150 |
| 16 | 3,180 | 3,980 | 4,140 | 2,450 | 4,550 | 3,970 | 5,570 | 5,790 | 2,420 | 2,890 | 2,450 | 3,140 |
| 17 | 3,240 | 3,980 | 5,360 | 2,330 | 4,260 | 3,810 | 16,010 | 4,980 | 2,400 | 2,800 | 2,460 | 3,030 |
| 18 | 3,180 | 3,830 | 5,440 | 2,340 | 4,130 | 3,530 | 56,000 | 4,970 | 2,330 | 2,780 | 2,490 | 2,930 |
| 19 | 3,180 | 3,830 | 4,450 | 2,390 | 4,910 | 3,440 | 50,480 | 4,980 | 2,320 | 2,810 | 2,560 | 2,920 |
| 20 | 3,310 | 3,760 | 3,830 | 2,380 | 6,800 | 3,630 | 23,450 | 4,600 | 2,340 | 2,810 | 2,580 | 2,880 |
| 21 | 3,240 | 3,680 | 3,530 | 2,380 | 7,620 | 4,520 | 10,440 | 4,600 | 2,260 | 2,920 | 2,640 | 2,920 |
| 22 | 3,040 | 3,600 | 3,310 | 2,450 | 6,980 | 3,650 | 6,210 | 4,760 | 2,240 | 2,700 | 2,630 | 2,970 |
| 23 | 2,920 | 3,530 | 3,040 | 3,920 | 12,000 | 3,440 | 5,550 | 5,570 | 2,210 | 2,550 | 2,520 | 3,030 |
| 24 | 3,040 | 3,460 | 2,920 | 6,160 | 9,530 | 3,290 | 4,800 | 6,340 | 2,220 | 2,560 | 2,660 | 2,960 |
| 25 | 2,980 | 3,380 | 2,800 | 4,820 | 4,880 | 3,380 | 4,620 | 6,420 | 2,240 | 2,520 | 2,750 | 2,950 |
| 26 | 2,860 | 3,310 | 2,860 | 4,240 | 4,010 | 3,470 | 4,740 | 7,410 | 2,220 | 2,510 | 2,830 | 2,960 |
| 27 | 2,800 | 3,310 | 2,800 | 3,830 | 3,660 | 3,310 | 4,950 | 5,410 | 2,310 | 3,100 | 2,790 | 2,890 |
| 28 | 2,980 | 3,380 | 2,580 | 3,710 | 3,540 | 3,950 | 4,050 | 4,320 | 2,400 | 2,960 | 2,780 | 2,920 |
| 29 | 3,310 | ---- | 2,630 | 3,590 | 3,660 | 12,600 | 3,750 | 3,860 | 2,320 | 3,060 | 2,770 | 2,790 |
| 30 | 5,910 | ---- | 2,520 | 3,470 | 4,910 | 6,370 | 3,690 | 3,510 | 2,210 | 2,930 | 2,730 | 2,620 |
| 31 | 6,800 | ---- | 2,580 | ---- | 7,390 | ---- | 3,660 | 3,320 | ---- | 2,760 | ---- | 2,740 |

| Month | Gage Height Extreme—Feet High | Gage Height Extreme—Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 6.69 | 4.00 | 6,950 | 2,740 | 3,380 | 208,000 | |
| February | 6.45 | 4.44 | 6,540 | 3,300 | 3,970 | 220,000 | |
| March | 6.26 | 3.74 | 6,220 | 2,450 | 3,270 | 201,000 | |
| April | 6.40 | 3.58 | 6,750 | 2,240 | 3,020 | 180,000 | |
| May | 9.80 | 4.46 | 24,820 | 3,300 | 7,700 | 473,000 | |
| June | 8.94 | 4.34 | 21,360 | 3,240 | 4,880 | 290,000 | |
| July 18 | 21.58 | 4.53 | 90,400 | 3,330 | 8,820 | 542,530 | |
| August | 7.64 | 4.53 | 11,290 | 2,880 | 4,640 | 285,110 | |
| September 26 | 4.35 | 3.41 | 3,180 | 2,130 | 2,570 | 152,750 | |
| October | 4.82 | 3.50 | 4,000 | 2,300 | 2,940 | 180,820 | |
| November | 3.90 | 3.58 | 2,860 | 2,400 | 2,550 | 151,820 | |
| December | 5.62 | 3.61 | 5,190 | 2,580 | 3,130 | 192,580 | |
| Yearly | 21.58 | 3.41 | 90,400 | 2,130 | 4,240 | 3,077,610 | 19.2 |

## RIO SAN JUAN STATION AT SANTA ROSALIA

**Description:** Automatic water-stage recorder and cable with sit down cable car, located about 17½ miles above the mouth of the San Juan River and 15 miles south of Ciudad Camargo, Tamaulipas, Mexico, at a ranch called Santa Rosalia, 3 miles west of Ochoa Railway Station.

**Records:** Based on 205 current meter measurements during the year from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** 1901 to 1913; 1923 to 1931.

**Remarks:** The river flow is modified by irrigation diversions along San Juan River basin. This station was operated by the Monterrey Office of the Mexican Department of Agriculture and Development. The drainage area above this station is 13,000 square miles, entirely in Mexico.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| 1901 | ..... | 19,140 | 1901 | ..... | 0 |
| 1904 | ..... | 44,360 | 1902 | ..... | 0 |
| 1909 | ..... | 30,060 | 1909 | ..... | 0 |
| 1913 | ..... | 24,860 | 1913 | ..... | 0 |
| **Extreme High Flow** | | | **Extreme Low Flow** | | |
| Sept. 1923 | 33.79 | 95,810 | Aug. 1923 | 1.67 | 6.7 |
| June 1924 | 25.33 | 27,600 | Sept. 1924 | 1.38 | 16.6 |
| Sept. 1925 | 19.68 | 41,830 | Aug. 1925 | 0.43 | 5.3 |
| Oct. 1926 | 17.72 | 34,870 | Mar. 1926 | 2.36 | 84.8 |
| June 1927 | 27.30 | 47,930 | May 1927 | 1.28 | 3.5 |
| Sept. 1928 | 17.52 | 19,980 | Sept. 1928 | 0.82 | 22.6 |
| Sept. 1929 | 14.83 | 8,830 | May, June, 1929 | 0.95 | 17.7 |
| Oct. 1930 | ..... | 35,310 | Apr. 1930 | ..... | 10.6 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 858 | 6,360 | 1,340 | 689 | 480 | 2,150 | 572 | 1,130 | 1,200 | 742 | 222 | 353 |
| 2 | 848 | 3,250 | 1,290 | 671 | 424 | 2,440 | 434 | 1,130 | 1,020 | 600 | 187 | 343 |
| 3 | 837 | 2,400 | 1,220 | 636 | 459 | 1,810 | 381 | 901 | 929 | 530 | 212 | 353 |
| 4 | 837 | 2,030 | 1,150 | 618 | 999 | 1,640 | 335 | 830 | 848 | 473 | 279 | 353 |
| 5 | 802 | 1,770 | 1,130 | 590 | 883 | 1,520 | 283 | 788 | 742 | 441 | 321 | 321 |
| 6 | 773 | 1,700 | 1,110 | 565 | 713 | 1,360 | 261 | 742 | 689 | 403 | 343 | 353 |
| 7 | 738 | 1,620 | 1,060 | 554 | 685 | 1,250 | 240 | 717 | 636 | 388 | 350 | 371 |
| 8 | 738 | 1,590 | 1,010 | 530 | 614 | 1,130 | 222 | 643 | 565 | 378 | 353 | 353 |
| 9 | 727 | 1,480 | 971 | 512 | 554 | 1,050 | 208 | 583 | 682 | 343 | 343 | 388 |
| 10 | 738 | 1,410 | 925 | 501 | 512 | 953 | 184 | 530 | 530 | 300 | 321 | 537 |
| 11 | 706 | 1,340 | 925 | 477 | 466 | 883 | 3,350 | 512 | 547 | 279 | 321 | 459 |
| 12 | 685 | 1,340 | 901 | 448 | 893 | 848 | 1,590 | 1,260 | 477 | 353 | 300 | 424 |
| 13 | 650 | 1,320 | 848 | 441 | 1,870 | 830 | 1,450 | 5,580 | 512 | 300 | 300 | 399 |
| 14 | 696 | 1,310 | 830 | 448 | 968 | 784 | 4,310 | 6,530 | 477 | 261 | 290 | 371 |
| 15 | 696 | 1,270 | 802 | 424 | 713 | 795 | 2,540 | 2,750 | 448 | 233 | 279 | 343 |
| 16 | 653 | 1,320 | 802 | 424 | 614 | 671 | 2,080 | 1,700 | 706 | 222 | 279 | 300 |
| 17 | 650 | 1,380 | 918 | 406 | 572 | 583 | 2,220 | 1,410 | 742 | 201 | 279 | 290 |
| 18 | 636 | 1,470 | 1,010 | 388 | 520 | 516 | 12,010 | 1,180 | 611 | 187 | 261 | 300 |
| 19 | 650 | 1,430 | 996 | 364 | 523 | 459 | 6,890 | 1,010 | 533 | 187 | 261 | 290 |
| 20 | 696 | 1,310 | 918 | 364 | 523 | 413 | 3,320 | 883 | 533 | 321 | 360 | 261 |
| 21 | 865 | 1,290 | 865 | 353 | 494 | 371 | 2,540 | 770 | 477 | 300 | 290 | 279 |
| 22 | 1,340 | 1,270 | 837 | 335 | 459 | 396 | 2,650 | 706 | 448 | 247 | 279 | 290 |
| 23 | 1,110 | 1,240 | 802 | 325 | 6,530 | 364 | 2,120 | 671 | 431 | 233 | 261 | 261 |
| 24 | 939 | 1,170 | 795 | 304 | 12,010 | 388 | 1,530 | 9,990 | 396 | 222 | 279 | 290 |
| 25 | 883 | 1,130 | 759 | 307 | 3,880 | 371 | 1,280 | 2,790 | 371 | 222 | 247 | 261 |
| 26 | 812 | 1,110 | 742 | 300 | 2,190 | 350 | 1,210 | 3,110 | 343 | 222 | 233 | 247 |
| 27 | 777 | 1,180 | 731 | 300 | 1,730 | 855 | 1,570 | 2,910 | 335 | 201 | 233 | 222 |
| 28 | 759 | 1,310 | 724 | 283 | 1,390 | 565 | 1,520 | 2,260 | 307 | 187 | 233 | 233 |
| 29 | 802 | ..... | 724 | 265 | 1,200 | 717 | 1,280 | 1,660 | 381 | 187 | 300 | 233 |
| 30 | 3,710 | ..... | 706 | 692 | 1,240 | 1,280 | 1,730 | 1,440 | 396 | 187 | 343 | 233 |
| 31 | 12,360 | ..... | 689 | ..... | 1,410 | ..... | 1,170 | 1,480 | ..... | 212 | ..... | 233 |

| Month | Gage Height Extreme-Feet High | Gage Height Extreme-Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 16.21 | 4.36 | 12,360 | 636 | 2,890 | 77,300 | |
| February | 12.11 | 5.51 | 6,360 | 1,110 | 1,670 | 92,810 | |
| March | 6.04 | 4.49 | 1,340 | 689 | 922 | 56,570 | |
| April | 4.46 | 3.08 | 689 | 265 | 448 | 26,810 | |
| May | 15.78 | 3.58 | 12,010 | 424 | 1,500 | 92,310 | |
| June | 7.87 | 3.31 | 2,440 | 350 | 925 | 55,030 | |
| July | 15.65 | 2.69 | 12,010 | 184 | 1,980 | 121,940 | |
| August | 14.80 | 3.90 | 9,990 | 512 | 1,890 | 116,320 | |
| September | 5.74 | 3.35 | 1,200 | 307 | 576 | 34,310 | |
| October | 4.69 | 3.02 | 742 | 187 | 307 | 18,970 | |
| November | 3.44 | 3.02 | 353 | 187 | 283 | 16,860 | |
| December | 4.13 | 3.12 | 537 | 222 | 321 | 19,720 | |
| Yearly | 16.21 | 2.69 | 12,360 | 184 | 1,010 | 728,980 | 56.1 |

## RIO GRANDE AT HIDALGO STATION

**Description:** Automatic water-stage recorder at international bridge at Hidalgo, Hidalgo County, Texas. Also automatic water-stage recorder on each of two floodway channels at crossing of East McAllen-Hidalgo highway. Zero of gage is 79.28 feet above mean sea level.

**Records:** Based upon 87 current meter measurements during the year from bridge. Computations by shifting channel methods. 1931 records considered fair.

**Records Available:** July, 1928 to December, 1931.

**Remarks:** The river flow is greatly modified at this station by many irrigation diversions and Elephant Butte and Carlsbad reservoirs in the United States, also by irrigation diversions and Boquilla and Don Martin reservoirs in Mexico. With all closed basins eliminated the drainage area above this station is 175,110 square miles; 94,663 being in the United States and 80,447 in Mexico. No flow in floodways in 1931.

**Previous Extreme Flows:**

| Extreme High Flow | | | Extreme Low Flow | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| Sept. 25, 1928 | 20.20 | 47,500 | April 16, 1930 | ---- | 784 |
| June 15, 1930 | 21.50 | 43,200 | | | |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,790 | 17,200 | 4,470 | 3,110 | 3,820 | 8,900 | 6,670 | 5,020 | 4,820 | 2,830 | 3,310 | 2,990 |
| 2 | 3,790 | 11,000 | 4,470 | 3,110 | 7,250 | 11,800 | 6,380 | 5,140 | 4,740 | *2,720 | 3,220 | 3,080 |
| 3 | 3,790 | 7,940 | 4,490 | 3,080 | 20,200 | 11,900 | 6,510 | 5,270 | 4,670 | *2,730 | 2,800 | 3,160 |
| 4 | 3,940 | 6,810 | 4,320 | 2,950 | 20,900 | 8,000 | 5,540 | 5,060 | 4,500 | *3,030 | 2,590 | 3,200 |
| 5 | 3,940 | 6,330 | 4,220 | 2,900 | 16,500 | 7,490 | 5,330 | 4,910 | 4,110 | *3,470 | 2,480 | 3,270 |
| 6 | 3,850 | 6,230 | 4,060 | *2,920 | 16,500 | 6,590 | 4,400 | 4,310 | 3,910 | *3,800 | 2,530 | 3,300 |
| 7 | 3,870 | 6,130 | 3,880 | *3,200 | 13,200 | 6,230 | 4,000 | 4,210 | 3,830 | 3,720 | 2,570 | 3,510 |
| 8 | 3,880 | 6,030 | 3,790 | 2,920 | 9,170 | 5,730 | 3,620 | 4,240 | 3,570 | 3,330 | 2,700 | 4,280 |
| 9 | 3,980 | 5,670 | 3,910 | *3,060 | 8,130 | 5,220 | 3,540 | 4,180 | 3,710 | 3,120 | 2,850 | 4,620 |
| 10 | 4,060 | 5,490 | 3,680 | *2,820 | 6,970 | 5,220 | 3,470 | 4,490 | 3,630 | 2,930 | 2,810 | 4,380 |
| 11 | 4,060 | 5,310 | 3,670 | 3,640 | 5,900 | 5,010 | 3,540 | 3,770 | 3,660 | 3,240 | 2,580 | *4,200 |
| 12 | 4,050 | 5,050 | 3,770 | 4,290 | 6,660 | 5,030 | 4,640 | 3,730 | 3,690 | 3,690 | 2,640 | *4,070 |
| 13 | 3,910 | 5,030 | 3,850 | 3,600 | 8,000 | 4,820 | 5,650 | 7,370 | 3,480 | 3,560 | 2,580 | *3,910 |
| 14 | 3,810 | 4,950 | 3,820 | 3,100 | 6,350 | 4,610 | 5,200 | 10,670 | 3,430 | 3,400 | 2,450 | *3,710 |
| 15 | 3,710 | 4,980 | 3,850 | 2,920 | 6,090 | 4,740 | 6,340 | 10,150 | 3,580 | 3,370 | 2,650 | 3,670 |
| 16 | 3,850 | 5,010 | 4,030 | 3,280 | 5,570 | 4,570 | 8,030 | 9,460 | 3,360 | *3,340 | 2,800 | 3,490 |
| 17 | 3,810 | 5,040 | 4,220 | 3,340 | 5,270 | 4,470 | 9,220 | 8,420 | 3,350 | *3,190 | 2,660 | 3,360 |
| 18 | 3,860 | 5,120 | 4,990 | 3,050 | 4,710 | 4,130 | 17,760 | 6,710 | 3,480 | 3,140 | 2,730 | 3,320 |
| 19 | 3,910 | 5,120 | 5,730 | 2,840 | 4,440 | 3,840 | 31,070 | 6,230 | 3,370 | *3,360 | 2,660 | 3,250 |
| 20 | 3,970 | 5,120 | 5,470 | 2,710 | 4,510 | 3,740 | 37,530 | 6,160 | 3,300 | *3,270 | 2,590 | 3,190 |
| 21 | 3,960 | 4,990 | 4,860 | 2,830 | 5,190 | 3,790 | 29,510 | 5,720 | 3,160 | *2,970 | 2,580 | 3,200 |
| 22 | 4,100 | 4,850 | 4,420 | 2,680 | 6,230 | 4,290 | 13,720 | 5,710 | *3,380 | *2,890 | 2,710 | 3,050 |
| 23 | 4,240 | 4,630 | 4,160 | 2,700 | 6,860 | 4,180 | 9,760 | 5,860 | *2,910 | *2,890 | 2,750 | 3,110 |
| 24 | 4,350 | 4,520 | 3,960 | 2,890 | 18,300 | 3,770 | 8,380 | 6,470 | *2,840 | *2,740 | *3,040 | 3,100 |
| 25 | 4,240 | 4,420 | 3,780 | 4,860 | 19,700 | 3,550 | 6,500 | 12,210 | *2,930 | *2,790 | *3,160 | 3,200 |
| 26 | 4,050 | 4,400 | 3,610 | 5,370 | 8,450 | 3,540 | 6,140 | 10,280 | *2,950 | *2,960 | *3,060 | 3,190 |
| 27 | 3,860 | 4,320 | 3,460 | 4,980 | 6,020 | 3,740 | 5,940 | 9,730 | *2,730 | 3,020 | *3,160 | 3,290 |
| 28 | 3,700 | 4,320 | 3,410 | 4,500 | 5,490 | 4,140 | 6,530 | 8,120 | *2,890 | 3,040 | 3,120 | 3,250 |
| 29 | 3,760 | ..... | 3,410 | 4,160 | 5,170 | 5,030 | 6,090 | 7,060 | *2,920 | 3,220 | 3,090 | 3,170 |
| 30 | 3,850 | ..... | 3,330 | 4,040 | 5,100 | 10,800 | 5,430 | 5,960 | *2,890 | 3,350 | 3,200 | 2,980 |
| 31 | 10,700 | ..... | 3,170 | ..... | 6,850 | ..... | 5,350 | *5,240 | ..... | 3,290 | ..... | 2,940 |

| Month | Gage Height | | Second Feet | | | Acre Feet | |
|---|---|---|---|---|---|---|---|
| | Extreme–Feet | | Extreme | | | | Per |
| | High | Low | High | Low | Average | Total | Sq. Mile |
| January | 12.35 | 6.44 | 15,500 | 3,670 | 4,150 | 255,000 | |
| February | 12.83 | 7.11 | 18,610 | 4,330 | 5,930 | 329,000 | |
| March | 8.50 | 5.70 | 5,870 | 3,010 | 4,070 | 250,000 | |
| April | 7.97 | 4.93 | 5,430 | 2,720 | 3,400 | 202,000 | |
| May | 13.58 | 6.59 | 24,220 | 3,780 | 8,820 | 542,000 | |
| June | 11.12 | 6.27 | 12,320 | 3,500 | 5,630 | 335,000 | |
| July 20 | 20.30 | 6.03 | 38,200 | 3,190 | 9,090 | 558,930 | |
| August | 11.35 | 5.90 | 13,160 | 3,360 | 6,510 | 400,270 | |
| September | 6.93 | 4.87 | 4,920 | 2,720 | 3,530 | 209,830 | |
| October | 5.69 | 4.66 | 3,870 | 2,650 | 3,170 | 195,180 | |
| November 14 | 5.62 | 4.72 | 3,320 | 2,300 | 2,800 | 166,750 | |
| December | 6.98 | 4.70 | 4,640 | 2,880 | 3,430 | 211,120 | |
| Yearly | 20.30 | 4.66 | 38,200 | 2,360 | 5,050 | 3,655,080 | 20.9 |

*Partly Estimated

## RIO GRANDE AT MATAMOROS STATION

**Description:** Automatic water-stage recorder and cable with sit down cable car, located opposite Matamoros, Tamaulipas, Mexico. The water-stage recorder is attached to the central pier of the railroad bridge over the Rio Grande between Matamoros and Brownsville, Texas. The cable and car are located 0.3 mile upstream from the bridge. Zero of present gage is 15.30 feet above mean sea level.

**Records:** Based on 159 current meter measurements during the year from cable car. Computations by shifting channel methods. 1931 records considered good.

**Records Available:** 1901 to 1912; 1923 to 1927; 1929 to 1931.

**Remarks:** Immediately above this station, particularly in Cameron and Hidalgo Counties, Texas, pumping plants divert annually large amounts of water. During floods only a very small amount of water discharges past this station through the channel of the Rio Grande, as the greater part finds outlet to the Gulf of Mexico through flood channels and floodways in both countries. This station was operated by the Monterrey Office of the Mexican Department of Agriculture and Development. The gage datum was lowered five feet on October 3, 1930.

**Previous Extreme Flows:**

| Maximum Mean Daily | | | Minimum Mean Daily | | |
|---|---|---|---|---|---|
| Date | Gage | Sec. Ft. | Date | Gage | Sec. Ft. |
| 1901 | ----- | 29,970 | 1901 | ----- | 1,640 |
| 1902 | ----- | 27,960 | June, 1902 | ----- | 809 |
| June 1903 | ----- | 36,240 | Aug. 1910 | ----- | 600 |
| July 1906 | ----- | 38,300 | **Extreme Low Flow** | | |
| **Extreme High Flow** | | | May 25, 1923 | -0.89 | 386 |
| Sept. 12, 1923 | 14.96 | 25,500 | Aug. 29, 1924 | -1.31 | 300 |
| Sept. 28, 1924 | 15.81 | 23,750 | May 30, 1925 | -1.80 | 226 |
| Sept. 12, 1925 | 16.63 | 26,700 | Mar. 12, 1926 | -1.21 | 1,670 |
| Apr. 25, 1926 | 13.98 | 29,000 | June 4, 5, 1927 | -2.95 | 10.6 |
| June 28, 29, 1927 | 16.31 | 28,010 | May 11, 12, 1929 | -3.31 | 21.2 |
| May 28, 1929 | 12.50 | 18,000 | Mar. 13 to 16, and | | |
| June 1930 | ----- | 32,000 | Apr. 15 to 21, 1930 | -3.44 | 0.0 |

*Daily Discharge in Second Feet and Annual Summary, 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,380 | 8,400 | 4,120 | 2,430 | 3,870 | 6,500 | 10,100 | 5,300 | 4,400 | 1,700 | 2,130 | 2,450 |
| 2 | 3,300 | 14,300 | 4,170 | 2,220 | 3,600 | 8,200 | 8,200 | 5,200 | 3,700 | 1,750 | 2,550 | 2,380 |
| 3 | 3,270 | 10,300 | 4,000 | 2,750 | 7,100 | 10,700 | 7,000 | 5,100 | 3,000 | 1,900 | 2,450 | 2,350 |
| 4 | 3,520 | 7,400 | 3,950 | 2,180 | 14,400 | 10,700 | 6,100 | 4,900 | 3,400 | 2,150 | 2,020 | 2,250 |
| 5 | 3,680 | 6,700 | 3,930 | 2,480 | 17,000 | 8,800 | 5,300 | 4,600 | 3,100 | 2,750 | 1,700 | 2,220 |
| 6 | 3,550 | 5,750 | 3,870 | 2,570 | 13,000 | 7,000 | 5,050 | 4,200 | 3,130 | 3,050 | 1,400 | 2,380 |
| 7 | 3,380 | 5,600 | 3,750 | 2,250 | 14,500 | 6,700 | 4,500 | 3,900 | 3,150 | 3,400 | 1,250 | 2,800 |
| 8 | 3,200 | 5,850 | 3,600 | 2,050 | 12,000 | 6,400 | 3,700 | 3,700 | 2,920 | 2,900 | 1,580 | 3,030 |
| 9 | 3,150 | 6,000 | 3,650 | 1,900 | 9,100 | 5,400 | 3,000 | 3,400 | 2,600 | 2,450 | 2,430 | 3,300 |
| 10 | 3,100 | 5,770 | 3,300 | 1,780 | 8,000 | 4,650 | 2,650 | 3,450 | 2,430 | 2,080 | 1,830 | 3,800 |
| 11 | 3,270 | 5,650 | 3,030 | 1,950 | 7,400 | 4,300 | 2,550 | 3,400 | 2,350 | 2,100 | 1,700 | 4,050 |
| 12 | 3,630 | 5,600 | 2,750 | 2,430 | 6,300 | 3,800 | 2,670 | 3,000 | 2,400 | 2,430 | 1,580 | 4,000 |
| 13 | 3,650 | 5,500 | 2,780 | 3,150 | 6,500 | 3,800 | 3,300 | 2,800 | 2,700 | 2,480 | 1,420 | 3,980 |
| 14 | 3,500 | 5,230 | 2,970 | 3,470 | 7,300 | 3,900 | 4,400 | 3,850 | 2,830 | 2,250 | 1,550 | 3,820 |
| 15 | 3,400 | 5,100 | 3,200 | 3,200 | 6,400 | 3,950 | 5,000 | 9,500 | 2,550 | 2,000 | 1,700 | 3,600 |
| 16 | 3,450 | 5,150 | 3,330 | 2,700 | 6,100 | 3,700 | 5,300 | 10,500 | 2,480 | 2,000 | 2,050 | 3,200 |
| 17 | 3,700 | 5,120 | 3,450 | 2,500 | 5,700 | 3,200 | 7,800 | 10,000 | 2,450 | 1,830 | 1,920 | 3,000 |
| 18 | 3,870 | 5,050 | 3,630 | 2,730 | 5,300 | 2,950 | 11,000 | 7,500 | 2,320 | 1,900 | 1,780 | 2,900 |
| 19 | 3,820 | 5,000 | 3,680 | 2,950 | 5,000 | 2,670 | 21,000 | 6,300 | 2,500 | 2,270 | 1,500 | 2,920 |
| 20 | 3,750 | 4,950 | 4,300 | 2,750 | 4,300 | 2,650 | 25,000 | 5,700 | 2,550 | 2,150 | 1,400 | 2,950 |
| 21 | 3,800 | 5,030 | 4,900 | 2,300 | 3,900 | 2,650 | 25,500 | 5,400 | 2,670 | 1,800 | 1,350 | 3,000 |
| 22 | 3,750 | 5,050 | 5,000 | 2,250 | 4,050 | 2,670 | 27,000 | 5,000 | 2,380 | 1,200 | 1,730 | 2,900 |
| 23 | 3,750 | 5,170 | 4,800 | 2,080 | 5,150 | 2,500 | 19,500 | 4,800 | 2,100 | 1,270 | 2,150 | 2,650 |
| 24 | 3,820 | 4,700 | 4,000 | 1,950 | 7,200 | 3,950 | 10,500 | 4,850 | 1,900 | 1,270 | 2,730 | 2,350 |
| 25 | 3,950 | 4,500 | 3,570 | 2,180 | 15,000 | 2,970 | 8,700 | 5,800 | 1,750 | 1,500 | 2,000 | 2,450 |
| 26 | 4,000 | 4,300 | 3,170 | 2,550 | 16,500 | 2,600 | 7,800 | 9,400 | 1,800 | 1,970 | 2,150 | 2,600 |
| 27 | 3,950 | 4,200 | 2,950 | 3,950 | 7,000 | 2,200 | 7,000 | 8,000 | 1,950 | 1,720 | 2,320 | 2,750 |
| 28 | 3,950 | 4,150 | 2,730 | 4,420 | 5,800 | 2,670 | 6,200 | 7,800 | 2,050 | 1,580 | 2,270 | 2,800 |
| 29 | 3,970 | ..... | 2,650 | 4,220 | 4,700 | 3,050 | 6,200 | 6,400 | 1,970 | 1,450 | 2,450 | 2,550 |
| 30 | 3,970 | ..... | 2,700 | 3,950 | 4,400 | 4,800 | 6,100 | 5,900 | 1,800 | 1,530 | 2,730 | 2,300 |
| 31 | 4,000 | ..... | 2,620 | ..... | 4,600 | ..... | 5,600 | 5,400 | ..... | 1,830 | ..... | 2,000 |

| Month | Gage Height Extreme-Feet High | Gage Height Extreme-Feet Low | Second Feet Extreme High | Second Feet Extreme Low | Second Feet Average | Acre Feet Total | Acre Feet Per Sq. Mile |
|---|---|---|---|---|---|---|---|
| January | 9.12 | 7.91 | 4,050 | 3,000 | 3,630 | 223,150 | |
| February | 15.19 | 9.45 | 16,500 | 4,050 | 5,910 | 328,330 | |
| March | 10.40 | 7.51 | 5,000 | 2,600 | 3,570 | 219,290 | |
| April | 11.02 | 6.30 | 6,400 | 1,850 | 2,680 | 159,230 | |
| May | 16.96 | 9.48 | 13,050 | 4,100 | 7,780 | 478,410 | |
| June | 13.45 | 7.81 | 13,500 | 2,300 | 4,670 | 277,810 | |
| July | 21.10 | 7.78 | 27,000 | 2,500 | 8,830 | 542,960 | |
| August | 13.52 | 8.63 | 10,000 | 2,700 | 5,650 | 347,230 | |
| September | 10.37 | 6.53 | 9,200 | 1,650 | 2,580 | 153,380 | |
| October | 8.50 | 5.81 | 3,600 | 1,280 | 2,020 | 124,280 | |
| November | 7.78 | 5.81 | 2,800 | 1,230 | 1,930 | 114,640 | |
| December | 9.42 | 6.59 | 4,100 | 1,930 | 2,900 | 177,970 | |
| Yearly | 21.10 | 5.81 | 27,600 | 1,230 | 4,340 | 3,146,680 | |

## SALT DETERMINATIONS AND CHEMICAL AYALYSES OF WATER SAMPLES FROM RIO GRANDE AND TRIBUTARIES—1924 to 1931

The salt determinations reported here were made by the United States Bureau of Reclamation at their El Paso office, from water samples taken by them. Samples were weighed, then filtered to remove silt. The filtrate was then evaporated in an oven and the residue weighed. The tables report the residue as total salts in parts per million by weight (p.p.m.).

The chemical analyses reported here were made by the United States Department of Agriculture at Riverside, California, from water samples taken by the United States Geological Survey, the American Section of the International Water Commission and the United States Bureau of Reclamation.

Conductance, reported in the tables as (K x 10⁵ at 25°C), is a relative measure of the total salt concentration in the water samples.*

Total salts were determined in the same manner as stated above.

To convert "Milligram Equivalents" to parts per million by weight, multiply each ion by its appropriate conversion factor. These factors are: $HCO_3$, 61; Cl, 35.5; $SO_4$, 48; Ca, 20; Mg, 12.15; Na, 23. In the tables AB indicates alkali bases. This is substantially equivalent to the sodium (Na) but it also includes any potassium and other metals.

*Salt Determination of Water Samples from the Rio Grande at San Marcial, New Mexico*

| Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | 1925 | | 1926 | | 1927 | | 1929 | | 1931 | |
| Feb. 1 | 400 | May 12 | 400 | Jan. 4 | 800 | July 26 | 1,100 | Apr. 10 | 500 | Jan. 15 | 700 |
| Feb. 7 | 400 | May 15 | 400 | Jan. 7 | 400 | July 30 | 300 | Apr. 14 | 400 | Jan. 31 | 700 |
| Feb. 26 | 400 | May 18 | 400 | Jan. 10 | 500 | July 31 | 1,000 | Apr. 16 | 1,400 | Feb. 15 | 700 |
| Mar. 1 | 200 | May 21 | 200 | Jan. 22 | 400 | Aug. 25 | 1,300 | Apr. 22 | 400 | Mar. 1 | 700 |
| Mar. 17 | 200 | May 24 | 300 | Jan. 25 | 600 | Aug. 31 | 700 | Apr. 22 | 500 | Mar. 15 | 600 |
| Mar. 25 | 500 | May 27 | 500 | Feb. 16 | 500 | Sep. 9 | 800 | Apr. 24 | 1,300 | Mar. 31 | 600 |
| Apr. 1 | 200 | May 28 | 300 | Feb. 26 | 700 | Sep. 15 | 700 | Apr. 26 | 500 | Apr. 6 | 600 |
| Apr. 8 | 400 | May 31 | 600 | Feb. 28 | 400 | Sep. 24 | 300 | Apr. 28 | 400 | Apr. 12 | 700 |
| Apr. 8 | 400 | June 3 | 100 | Mar. 15 | 700 | Sep. 30 | 300 | Apr. 30 | 200 | Apr. 18 | 600 |
| Apr. 26 | 200 | June 7 | 500 | Apr. 1 | 600 | Oct. 14 | 2,600 | May 2 | 400 | Apr. 20 | 900 |
| May 8 | 0 | June 10 | 400 | Apr. 11 | 1,000 | Oct. 31 | 500 | May 4 | 800 | Apr. 26 | 500 |
| May 9 | 100 | July 26 | 1,300 | Apr. 14 | 600 | Nov. 16 | 400 | May 6 | 400 | May 9 | 400 |
| May 10 | 0 | July 29 | 1,800 | Apr. 30 | 800 | Nov. 30 | 600 | May 8 | 400 | May 15 | 500 |
| May 11 | 200 | July 31 | 2,000 | May 8 | 400 | Dec. 16 | 400 | May 10 | 500 | May 21 | 500 |
| July 12 | 1,100 | Aug. 1 | 1,400 | May 16 | 200 | | | May 13 | 400 | May 27 | 600 |
| July 23 | 400 | Aug. 4 | 1,600 | May 21 | 200 | 1928 | | May 15 | 600 | June 2 | 400 |
| July 26 | 1,000 | Aug. 8 | 1,500 | May 27 | 600 | Jan. 16 | 600 | May 19 | 400 | June 8 | 500 |
| July 31 | 1,400 | Aug. 10 | 1,000 | May 31 | 300 | Jan. 31 | 600 | May 19 | 500 | July 3 | 2,000 |
| Aug. 6 | 1,300 | Aug. 13 | 1,400 | June 6 | 400 | Feb. 15 | 400 | May 21 | 600 | July 8 | 1,700 |
| Aug. 16 | 900 | Aug. 16 | 800 | June 15 | 300 | Mar. 1 | 500 | May 23 | 800 | July 15 | 1,200 |
| Nov. 7 | 500 | Aug. 22 | 1,000 | July 13 | 1,600 | Mar. 16 | 600 | May 25 | 500 | Aug. 4 | 900 |
| | | Aug. 25 | 800 | July 31 | 2,200 | Mar. 31 | 500 | May 28 | 400 | Aug. 10 | 2,100 |
| 1925 | | Aug. 28 | 1,800 | Aug. 14 | 2,000 | Apr. 15 | 500 | June 1 | 500 | Aug. 16 | 800 |
| Jan. 8 | 100 | Sep. 1 | 900 | Aug. 16 | 2,400 | Apr. 30 | 600 | June 3 | 300 | Aug. 26 | 2,000 |
| Jan. 26 | 400 | Sep. 2 | 1,300 | Sep. 15 | 2,500 | May 3 | 500 | June 5 | 400 | Sep. 3 | 2,100 |
| Jan. 29 | 300 | Sep. 6 | 2,000 | Sep. 20 | 2,000 | May 14 | 500 | June 8 | 500 | Sep. 17 | 1,500 |
| Feb. 1 | 200 | Sep. 9 | 1,300 | Oct. 1 | 600 | May 25 | 500 | June 15 | 200 | Sep. 19 | 1,400 |
| Feb. 15 | 500 | Sep. 12 | 1,000 | Oct. 17 | 400 | May 31 | 600 | July 12 | 1,600 | Sep. 25 | 1,600 |
| Feb. 20 | 400 | Sep. 15 | 1,800 | Oct. 31 | 600 | July 31 | 2,500 | July 22 | 1,000 | Sep. 29 | 1,000 |
| Feb. 25 | 500 | Sep. 16 | 1,500 | Nov. 30 | 800 | Aug. 18 | 2,200 | July 26 | 1,000 | Oct. 2 | 2,800 |
| Mar. 1 | 500 | Sep. 19 | 800 | Dec. 17 | 600 | Aug. 26 | 1,300 | July 30 | 400 | Oct. 5 | 1,300 |
| Mar. 9 | 400 | Sep. 21 | 1,100 | Dec. 31 | 600 | Sep. 1 | 800 | Aug. 1 | 900 | Oct. 11 | 600 |
| Mar. 13 | 700 | Sep. 24 | 1,000 | | | Oct. 1 | 1,100 | Aug. 8 | 800 | Oct. 17 | 600 |
| Mar. 19 | 800 | Oct. 3 | 400 | 1927 | | Dec. 31 | 500 | Aug. 16 | 400 | Oct. 29 | 700 |
| Mar. 22 | 400 | Oct. 6 | 600 | Jan. 14 | 500 | | | Aug. 25 | 400 | Nov. 4 | 700 |
| Mar. 28 | 500 | Oct. 9 | 600 | Jan. 31 | 400 | | | Aug. 31 | 900 | Nov. 10 | 600 |
| Mar. 31 | 400 | Oct. 13 | 700 | Feb. 14 | 400 | 1929 | | Sep. 5 | 800 | Nov. 16 | 500 |
| Apr. 3 | 500 | Oct. 14 | 1,100 | Feb. 27 | 600 | Jan. 31 | 700 | | | Nov. 23 | 900 |
| Apr. 6 | 500 | Oct. 19 | 700 | Mar. 15 | 300 | Feb. 6 | 600 | | | Dec. 5 | 500 |
| Apr. 9 | 300 | Oct. 28 | 600 | Apr. 1 | 1,000 | Feb. 8 | 800 | 1930 | | Dec. 11 | 400 |
| Apr. 12 | 400 | Nov. 4 | 300 | Apr. 16 | 400 | Feb. 12 | 600 | Mar. 25 | 700 | Dec. 18 | 900 |
| Apr. 15 | 300 | Nov. 7 | 500 | Apr. 30 | 600 | Feb. 19 | 700 | May 8 | 400 | Dec. 24 | 700 |
| Apr. 18 | 400 | Nov. 18 | 600 | May 16 | 400 | Feb. 25 | 600 | June 8 | 500 | | |
| Apr. 24 | 400 | Nov. 24 | 600 | June .... | 800 | Mar. 2 | 800 | June 12 | 1,000 | | |
| Apr. 27 | 300 | Nov. 30 | 800 | June .... | 500 | Mar. 14 | 600 | Aug. 22 | 500 | | |
| May 3 | 400 | Dec. 20 | 700 | June .... | 500 | Mar. 20 | 600 | Sep. 23 | 1,000 | | |
| May 6 | 400 | Dec. 23 | 600 | July 2 | 500 | Mar. 25 | 600 | Dec. 15 | 700 | | |
| May 9 | 500 | Dec. 29 | 500 | July 15 | 1,500 | Mar. 31 | 800 | Dec. 31 | 1,000 | | |

*See Circular No. 232 U. S. Dep. Agr. July 1932

*Salt Determination of Water Samples from the Rio Grande at El Paso, Texas*

| Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | 1925 | | 1928 | | Dec. 19 | 1,200 | 1930 | | 1931 | |
| Jan. 30 | 1,300 | July 3 | 900 | Mar. 1 | 800 | Dec. 25 | 1,200 | Oct. 27 | 1,208 | June 1 | 802 |
| Feb. 16 | 300 | July 27 | 700 | Apr. 2 | 800 | 1930 | | Nov. 10 | 1,370 | June 8 | 940 |
| Feb. 12 | 1,000 | Aug. 8 | 600 | May 2 | 600 | Jan. 9 | 1,300 | Nov. 17 | 1,440 | June 15 | 820 |
| Feb. 23 | 700 | Sep. 16 | 800 | June 1 | 800 | Jan. 16 | 1,300 | Nov. 19 | 2,400 | June 22 | 810 |
| Feb. 29 | 700 | Sep. 30 | 1,000 | Aug. 16 | 800 | Jan. 23 | 1,500 | Nov. 25 | 2,344 | June 29 | 910 |
| Mar. 7 | 700 | Oct. 5 | 1,100 | Sep. 18 | 600 | Feb. 3 | 1,608 | Dec. 3 | 1,248 | July 3 | 668 |
| Mar. 14 | 800 | Oct. 9 | 1,300 | Oct. 15 | 700 | Feb. 6 | 1,216 | Dec. 13 | 1,208 | July 10 | 916 |
| Mar. 21 | 800 | | | Oct. 30 | 900 | Feb. 15 | 1,200 | Dec. 19 | 1,456 | July 17 | 985 |
| Mar. 28 | 1,200 | 1926 | | | | Feb. 19 | 1,224 | Dec. 26 | 1,128 | July 27 | 856 |
| Apr. 4 | 700 | Jan. 13 | 1,400 | 1929 | | Mar. 1 | 996 | 1931 | | July 31 | 784 |
| Apr. 12 | 700 | Feb. 23 | 1,200 | Jan. 2 | 1,500 | Mar. 11 | 1,136 | Jan. 2 | 1,408 | Aug. 3 | 576 |
| Apr. 18 | 500 | Apr. 24 | 800 | Jan. 16 | 1,700 | Mar. 25 | 888 | Jan. 9 | 1,472 | Aug. 8 | 920 |
| Apr. 26 | 400 | May 1 | 900 | Feb. 2 | 1,500 | Apr. 1 | 992 | Jan. 16 | 1,502 | Aug. 17 | 920 |
| May 9 | 800 | July 10 | 900 | Feb. 16 | 1,000 | Apr. 5 | 960 | Jan. 24 | 1,438 | Aug. 24 | 865 |
| May 23 | 400 | Aug. 25 | 700 | Mar. 1 | 1,000 | Apr. 12 | 1,008 | Jan. 30 | 1,512 | Aug. 31 | 865 |
| July 1 | 600 | Oct. 11 | 1,400 | May 4 | 800 | May 3 | 1,168 | Feb. 6 | 1,464 | Sep. 8 | 930 |
| July 7 | 400 | | | June 6 | 600 | May 14 | 1,020 | Feb. 13 | 984 | Sep. 14 | 885 |
| July [illegible] | 600 | 1927 | | June 28 | 700 | July 2 | 980 | Feb. 20 | 1,096 | Sep. 21 | 875 |
| Aug. 7 | 800 | Feb. 24 | 600 | July 11 | 700 | July 8 | 840 | Mar. 1 | 1,008 | Sep. 28 | 1,107 |
| Sep. 26 | 700 | Mar. 17 | 1,100 | Aug. 1 | 700 | July 16 | 920 | Mar. 9 | 1,004 | Oct. 5 | 1,149 |
| Oct. 31 | 600 | Mar. 24 | 900 | Aug. 11 | 400 | July 23 | 940 | Mar. 16 | 872 | Oct. 14 | 1,288 |
| Nov. 3 | 1,000 | July 21 | 800 | Aug. 24 | 600 | July 26 | 800 | Mar. 20 | 864 | Oct. 19 | 1,410 |
| Nov. 11 | 1,000 | Aug. 4 | 1,600 | Sep. 23 | 800 | Aug. 6 | 988 | Mar. 27 | 824 | Oct. 26 | 930 |
| Nov. 12 | 900 | Sep. 27 | 2,300 | Sep. 30 | 1,100 | Aug. 15 | 744 | Apr. 6 | 824 | Nov. 4 | 1,430 |
| Dec. 29 | 700 | Oct. 5 | 1,000 | Oct. 8 | 1,300 | Sep. 4 | 744 | Apr. 13 | 920 | Nov. 11 | 1,177 |
| | | Oct. 24 | 900 | Oct. 15 | 1,400 | Sep. 22 | 920 | Apr. 17 | 848 | Nov. 18 | 1,370 |
| 1925 | | Dec. 5 | 1,200 | Oct. 28 | 1,300 | Sep. 28 | 880 | Apr. 24 | 1,064 | Nov. 25 | 1,276 |
| Jan. 20 | 1,400 | | | Nov. 7 | 1,300 | Oct. 1 | 1,006 | May 1 | 968 | Dec. 4 | 1,334 |
| Apr. 15 | 500 | 1928 | | Nov. 15 | 1,400 | Oct. 11 | 1,048 | May 11 | 1,144 | Dec. 9 | 1,492 |
| May 7 | 700 | Jan. 20 | 1,000 | Dec. 4 | 1,400 | Oct. 20 | 1,236 | May 18 | 880 | Dec. 16 | 1,444 |
| June 8 | 600 | Feb. 1 | 1,200 | Dec. 12 | 1,400 | | | May 25 | 976 | Dec. 23 | 1,232 |

*Chemical Analyses of Water Samples from the Rio Grande at El Paso Station*

| Date of Sample | K x 10⁵ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Feb. 3, 1930 | 231 | 1,608 | 5.51 | 11.44 | 8.57 | 6.30 | 3.70 | 15.52 |
| Feb. 6 | 188 | 1,216 | 2.36 | 9.86 | 7.16 | 5.55 | 1.48 | 12.35 |
| Feb. 15 | 169 | 1,200 | 3.15 | 7.89 | 8.01 | 4.50 | 1.23 | 13.32 |
| Feb. 19 | 178 | 1,224 | 5.90 | 7.10 | 7.78 | 6.15 | 2.47 | 12.16 |
| Mar. 1 | 129 | 996 | 4.33 | 4.34 | 7.05 | 4.95 | 1.48 | 9.29 |
| Mar. 11 | 168 | 1,136 | 4.33 | 6.31 | 7.74 | 4.20 | 1.48 | 12.70 |
| Mar. 25 | 123 | 888 | 3.93 | 3.94 | 6.74 | 4.50 | 1.48 | 8.63 |
| Apr. 1 | 131 | 992 | 3.54 | 4.73 | 7.49 | 4.50 | 1.32 | 9.94 |
| Apr. 5 | 135 | 960 | 3.93 | 4.34 | 7.18 | 4.20 | 1.32 | 9.93 |
| Apr. 12 | 140 | 1,008 | 5.90 | 3.94 | 7.07 | 6.00 | 2.47 | 8.44 |
| May 3 | 154 | 1,168 | 5.51 | 5.92 | 7.16 | 5.70 | 1.98 | 10.91 |
| May 14 | 138 | 1,020 | 4.33 | 5.52 | 6.30 | 3.75 | 1.89 | 10.51 |
| July 2 | 138 | 980 | 4.33 | 4.73 | 5.97 | 3.75 | 1.73 | 9.55 |
| July 8 | 123 | 840 | 3.15 | 4.34 | 6.20 | 3.60 | 1.48 | 8.61 |
| July 16 | 127 | 920 | 4.33 | 3.94 | 5.82 | 4.50 | 2.47 | 7.12 |
| July 23 | 133 | 940 | 3.93 | 4.34 | 5.97 | 4.50 | 2.47 | 7.27 |
| July 26 | 110 | 800 | 4.33 | 3.94 | 4.43 | 5.10 | 2.14 | 5.46 |
| Aug. 6 | 137 | 988 | 5.51 | 4.73 | 6.22 | 5.25 | 2.14 | 9.07 |
| Aug. 15 | 106 | 744 | 3.54 | 3.94 | 4.78 | 4.50 | 3.29 | 4.47 |
| Sep. 4 | 121 | 744 | 4.33 | 3.94 | 4.43 | 4.50 | 1.23 | 6.97 |
| Sep. 22 | 123 | 920 | 9.84 | 3.94 | 2.91 | 4.50 | 2.47 | 9.72 |
| Sep. 28 | 123 | 880 | 4.33 | 2.76 | 7.32 | 6.75 | 3.62 | 4.04 |
| Oct. 1 | 148 | 1,006 | 4.33 | 5.13 | 6.30 | 6.90 | 3.79 | 5.07 |
| Oct. 11 | 157 | 1,048 | 4.33 | 6.31 | 5.39 | 5.25 | 1.48 | 9.30 |
| Oct. 20 | 187 | 1,236 | 5.51 | 8.28 | 7.57 | 5.85 | 2.63 | 12.88 |
| Oct. 27 | 187 | 1,208 | 5.90 | 8.68 | 5.51 | 6.75 | 2.63 | 10.71 |
| Nov. 10 | 193 | 1,370 | 5.90 | 9.86 | 7.74 | 6.75 | 2.96 | 13.79 |
| Nov. 17 | 207 | 1,440 | 5.90 | 9.86 | 8.05 | 6.00 | 3.13 | 14.68 |
| Nov. 19 | 370 | 2,400 | 5.11 | 25.24 | 9.34 | 10.60 | 4.77 | 24.32 |
| Nov. 25 | 339 | 2,344 | 5.90 | 24.45 | 10.73 | 11.00 | 4.44 | 25.64 |
| Dec. 3 | 199 | 1,248 | 4.72 | 9.07 | 7.82 | 5.10 | 1.81 | 14.70 |
| Dec. 13 | 189 | 1,208 | 4.72 | 7.89 | 7.40 | 5.55 | 2.47 | 11.99 |
| Dec. 19 | 222 | 1,456 | 5.90 | 9.07 | .93 | 7.05 | 3.21 | 5.61 |
| Dec. 26 | 170 | 1,128 | 3.15 | 7.89 | 7.09 | 4.50 | 2.06 | 11.57 |

*Chemical Analyses of Water Samples from the Rio Grande at El Paso Station*—Continued

| Date of Sample | K x 10⁵ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Jan. 2, 1931 | 199 | 1,408 | 3.93 | 10.65 | 8.15 | 4.05 | 1.65 | 17.03 |
| Jan. 9 | 211 | 1,472 | 5.51 | 9.86 | 8.03 | 5.40 | 3.29 | 14.71 |
| Jan. 16 | 211 | 1,502 | 5.51 | 10.25 | 8.01 | 5.40 | 3.29 | 15.08 |
| Jan. 24 | 217 | 1,488 | 6.29 | 11.83 | 8.20 | 5.55 | 3.54 | 17.23 |
| Jan. 30 | 217 | 1,512 | 5.11 | 11.83 | 8.01 | 5.85 | 3.21 | 15.89 |
| Feb. 6 | 215 | 1,464 | 4.33 | 9.86 | 8.36 | 6.00 | 2.55 | 14.00 |
| Feb. 13 | 148 | 984 | 4.72 | 5.52 | 6.14 | 5.55 | 1.73 | 9.10 |
| Feb. 20 | 169 | 1,096 | 4.33 | 5.52 | 6.82 | 6.15 | 1.98 | 8.54 |
| Mar. 1 | 151 | 1,008 | 4.33 | 5.52 | 6.41 | 5.55 | 1.73 | 8.98 |
| Mar. 9 | 158 | 1,004 | 3.93 | 5.52 | 7.16 | 5.55 | 1.73 | 9.33 |
| Mar. 16 | 125 | 872 | 3.54 | 3.94 | 6.28 | 5.55 | 1.65 | 6.56 |
| Mar. 20 | 130 | 864 | 3.54 | 3.94 | 6.45 | 5.55 | 1.65 | 6.73 |
| Mar. 27 | 115 | 824 | 3.54 | 3.55 | 6.14 | 5.55 | 1.56 | 6.12 |
| Apr. 6 | 123 | 824 | 3.54 | 3.55 | 6.14 | 5.40 | 1.07 | 6.76 |
| Apr. 13 | 138 | 920 | 4.33 | 4.34 | 6.66 | 4.80 | 1.56 | 9.08 |
| Apr. 17 | 128 | 848 | 3.54 | 4.34 | 6.30 | 4.80 | 1.56 | 7.82 |
| Apr. 24 | 135 | 1,064 | 3.93 | 4.34 | 8.05 | 4.80 | 1.56 | 9.96 |
| May 1 | 139 | 968 | 3.15 | 5.91 | 5.77 | 5.55 | 1.23 | 8.05 |
| May 11 | 171 | 1,144 | 3.93 | 7.89 | 7.24 | 6.00 | 1.48 | 11.58 |
| May 18 | 128 | 880 | 3.15 | 5.13 | 5.97 | 5.55 | 1.23 | 7.47 |
| May 25 | 138 | 976 | 3.15 | 5.13 | 7.85 | 5.40 | 1.23 | 9.50 |
| June 1 | 115 | 802 | 3.54 | 3.94 | 6.18 | 5.25 | 1.48 | 6.93 |
| June 8 | 123 | 940 | 3.93 | 4.87 | 5.79 | 5.55 | 2.14 | 6.90 |
| June 15 | 135 | 820 | 3.93 | 2.37 | 6.36 | 4.95 | 1.56 | 6.15 |
| June 22 | 123 | 810 | 3.54 | 3.55 | 5.97 | 5.25 | 1.23 | 6.58 |
| June 29 | 142 | 910 | 3.54 | 3.94 | 6.64 | 4.80 | 1.48 | 7.84 |
| July 3 | 106 | 668 | 3.54 | 2.37 | 5.45 | 4.50 | 1.23 | 5.63 |
| July 10 | 139 | 916 | 3.93 | 4.34 | 6.99 | 4.80 | 1.81 | 8.65 |
| July 17 | 148 | 985 | 4.33 | 4.73 | 7.24 | 4.80 | 1.56 | 9.94 |
| July 27 | 121 | 856 | 3.93 | 3.94 | 6.24 | 4.65 | 1.73 | 7.73 |
| July 31 | 121 | 784 | 3.54 | 3.38 | 7.28 | 5.10 | 1.48 | 7.62 |
| Aug. 3 | 92 | 576 | 3.15 | 2.76 | 4.20 | 4.05 | 1.23 | 4.83 |
| Aug. 8 | 128 | 920 | 3.15 | 5.13 | 6.30 | 4.65 | 1.48 | 8.45 |
| Aug. 17 | 134 | 920 | 4.72 | 3.38 | 6.49 | 6.00 | 1.48 | 7.11 |
| Aug. 24 | 129 | 865 | 3.93 | 3.94 | 5.87 | 5.55 | 1.48 | 6.71 |
| Aug. 31 | 126 | 865 | 3.54 | 3.94 | 6.47 | 5.55 | 1.48 | 6.92 |
| Sep. 8 | 134 | 930 | 4.33 | 4.73 | 6.47 | 5.40 | 1.48 | 8.65 |
| Sep. 14 | 125 | 885 | 3.93 | 3.94 | 6.66 | 4.95 | 1.23 | 8.35 |
| Sep. 21 | 127 | 875 | 3.54 | 4.33 | 6.34 | 4.95 | 1.23 | 8.03 |
| Sep. 28 | 160 | 1,107 | 4.72 | 5.91 | 7.52 | 6.00 | 2.22 | 9.93 |
| Oct. 5 | 160 | 1,149 | 5.90 | 6.70 | 6.83 | 6.75 | 2.22 | 10.46 |
| Oct. 14 | 188 | 1,288 | 5.6 | 8.4 | 8.0 | 4.8 | 1.4 | 15.8 |
| Oct. 19 | 186 | 1,410 | 4.8 | 10.0 | 8.4 | 4.7 | 1.7 | 16.8 |
| Oct. 26 | 123 | 930 | 4.0 | 4.4 | 6.1 | 4.4 | 1.4 | 8.7 |
| Nov. 4 | 196 | 1,430 | 5.6 | 10.0 | 8.2 | 5.6 | 1.8 | 16.4 |
| Nov. 11 | 164 | 1,177 | 5.6 | 6.8 | 7.0 | 5.3 | 1.8 | 12.3 |
| Nov. 18 | 189 | 1,370 | 5.2 | 10.0 | 7.9 | 6.3 | 3.2 | 13.6 |
| Nov. 25 | 190 | 1,276 | 4.4 | 7.6 | 7.7 | 6.0 | 2.6 | 11.1 |
| Dec. 4 | 187 | 1,334 | 5.2 | 8.0 | 7.6 | 6.6 | 3.5 | 10.7 |
| Dec. 9 | 223 | 1,492 | 5.6 | 10.0 | 9.0 | 6.9 | 3.5 | 14.2 |
| Dec. 16 | 214 | 1,444 | 4.8 | 8.8 | 9.1 | 6.3 | 2.7 | 13.7 |
| Dec. 23 | 177 | 1,232 | 4.4 | 7.2 | 7.6 | 5.3 | 2.2 | 11.7 |

*Salt Determination of Water Samples from the Rio Grande at Fabens, Texas*

| Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1929 | | 1929 | | 1929 | | 1929 | | 1929 | | 1929 | |
| Jan. 12 | 1,900 | Mar. 1 | 1,300 | Apr. 18 | 1,200 | June 3 | 1,700 | July 17 | 1,400 | Sep. 10 | 1,500 |
| Jan. 14 | 1,800 | Mar. 2 | 1,400 | Apr. 20 | 1,400 | June 5 | 2,100 | July 19 | 1,600 | Sep. 12 | 1,300 |
| Jan. 16 | 2,000 | Mar. 5 | 1,400 | Apr. 22 | 1,200 | June 7 | 1,900 | July 21 | 1,300 | Sep. 14 | 1,400 |
| Jan. 18 | 2,000 | Mar. 7 | 1,400 | Apr. 24 | 1,200 | June 8 | 1,900 | July 23 | 1,200 | Sep. 16 | 1,400 |
| Jan. 20 | 1,800 | Mar. 9 | 1,700 | Apr. 26 | 1,300 | June 9 | 1,300 | July 25 | 1,400 | Sep. 18 | 1,200 |
| Jan. 22 | 1,300 | Mar. 11 | 1,400 | Apr. 28 | 1,300 | June 12 | 1,700 | July 27 | 1,600 | Sep. 20 | 1,200 |
| Jan. 24 | 1,300 | Mar. 13 | 1,600 | Apr. 29 | 1,400 | June 13 | 1,900 | July 29 | 900 | Sep. 22 | 1,500 |
| Jan. 26 | 1,200 | Mar. 15 | 1,300 | May 4 | 1,200 | June 15 | 2,000 | Aug. 2 | 700 | Sep. 24 | 1,100 |
| Jan. 28 | 1,300 | Mar. 17 | 1,200 | May 8 | 1,500 | June 16 | 2,100 | Aug. 4 | 1,100 | Sep. 26 | 1,400 |
| Jan. 30 | 1,500 | Mar. 19 | 1,300 | May 10 | 1,700 | June 17 | 1,400 | Aug. 6 | 1,100 | Sep. 28 | 1,500 |
| Feb. 3 | 1,700 | Mar. 21 | 1,100 | May 12 | 1,400 | June 19 | 1,300 | Aug. 8 | 1,100 | Oct. 1 | 1,800 |
| Feb. 4 | 1,900 | Mar. 23 | 1,100 | May 14 | 1,400 | June 21 | 1,300 | Aug. 10 | 900 | Oct. 2 | 1,300 |
| Feb. 7 | 1,900 | Mar. 25 | 1,300 | May 16 | 1,200 | June 23 | 1,400 | Aug. 12 | 800 | Oct. 3 | 1,800 |
| Feb. 9 | 1,900 | Mar. 29 | 1,100 | May 18 | 1,000 | June 27 | 1,500 | Aug. 15 | 700 | Oct. 4 | 900 |
| Feb. 11 | 1,400 | Mar. 31 | 1,200 | May 20 | 1,000 | June 29 | 1,600 | Aug. 17 | 900 | Oct. 5 | 2,000 |
| Feb. 13 | 1,200 | Apr. 2 | 1,300 | May 21 | 1,500 | July 1 | 1,200 | Aug. 18 | 800 | Oct. 6 | 1,400 |
| Feb. 15 | 1,500 | Apr. 6 | 1,700 | May 22 | 900 | July 3 | 1,300 | Aug. 23 | 1,300 | Oct. 7 | 2,200 |
| Feb. 17 | 1,600 | Apr. 8 | 1,600 | May 24 | 1,100 | July 5 | 1,400 | Aug. 25 | 1,600 | Oct. 9 | 1,800 |
| Feb. 19 | 1,500 | Apr. 11 | 1,800 | May 26 | 1,000 | July 7 | 1,600 | Aug. 27 | 1,400 | Oct. 11 | 1,900 |
| Feb. 21 | 1,700 | Apr. 12 | 1,800 | May 28 | 1,400 | July 11 | 1,500 | Aug. 29 | 1,900 | Oct. 13 | 1,800 |
| Feb. 23 | 1,500 | Apr. 14 | 1,200 | May 30 | 1,500 | July 13 | 1,000 | Aug. 31 | 1,800 | Oct. 15 | 1,900 |
| Feb. 25 | 1,400 | Apr. 16 | 1,200 | June 1 | 1,300 | July 15 | 1,000 | Sep. 8 | 1,400 | Oct. 17 | 1,600 |

*Salt Determination of Water Samples from the Rio Grande at Fabens, Texas*—Continued

| Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1929 | | 1930 | | 1930 | | 1931 | | 1931 | | 1931 | |
| Oct. 19 | 1,000 | Mar. 24 | 1,200 | Sep. 1 | 1,450 | Jan. 22 | 1,586 | June 8 | 1,286 | Sep. 14 | 1,670 |
| Oct. 21 | 1,300 | Mar. 30 | 1,300 | Sep. 4 | 1,400 | Jan. 25 | 1,700 | June 11 | 1,500 | Sep. 18 | 1,300 |
| Oct. 23 | 1,600 | Apr. 2 | 1,600 | Sep. 7 | 1,440 | Jan. 28 | 1,500 | June 14 | 1,912 | Sep. 21 | 1,044 |
| Nov. 7 | 1,500 | Apr. 5 | 1,536 | Sep. 14 | 1,888 | Jan. 31 | 1,816 | June 17 | 1,500 | Sep. 24 | 1,300 |
| Nov. 9 | 1,300 | Apr. 11 | 1,552 | Sep. 16 | 1,500 | Feb. 14 | 1,424 | June 19 | 1,900 | Sep. 27 | 1,536 |
| Nov. 13 | 1,600 | Apr. 14 | 1,300 | Sep. 17 | 2,000 | Feb. 17 | 1,200 | June 20 | 1,936 | Sep. 30 | 1,500 |
| Nov. 16 | 1,700 | Apr. 17 | 1,329 | Sep. 22 | 1,494 | Feb. 20 | 1,248 | June 23 | 1,500 | Oct. 3 | 1,448 |
| Nov. 19 | 1,800 | Apr. 23 | 1,360 | Sep. 25 | 1,500 | Feb. 23 | 1,300 | June 24 | 1,500 | Oct. 6 | 1,500 |
| Nov. 21 | 1,900 | Apr. 26 | 1,500 | Oct. 1 | 1,400 | Feb. 26 | 1,456 | June 26 | 1,896 | Oct. 9 | 2,140 |
| Nov. 29 | 1,800 | Apr. 29 | 1,632 | Oct. 4 | 1,600 | Mar. 1 | 1,562 | June 27 | 1,600 | Oct. 12 | 1,784 |
| Dec. 5 | 2,000 | May 2 | 1,600 | Oct. 7 | 1,460 | Mar. 7 | 1,584 | June 28 | 1,800 | Oct. 22 | 2,312 |
| Dec. 11 | 1,400 | May 5 | 1,864 | Oct. 10 | 1,300 | Mar. 13 | 1,616 | June 30 | 1,900 | Oct. 23 | 1,800 |
| Dec. 18 | 1,800 | May 8 | 1,400 | Oct. 13 | 1,606 | Mar. 16 | 1,300 | July 1 | 1,372 | Oct. 24 | 1,900 |
| Dec. 26 | 1,600 | May 11 | 1,224 | Oct. 19 | 1,730 | Mar. 19 | 1,114 | July 4 | 1,200 | Oct. 26 | 1,300 |
| Dec. 28 | 1,800 | May 14 | 2,100 | Oct. 22 | 1,300 | Mar. 22 | 1,200 | July 7 | 1,163 | Oct. 29 | 1,568 |
| | | May 17 | 2,160 | Oct. 25 | 1,480 | Mar. 25 | 1,560 | July 10 | 1,200 | Nov. 1 | 1,700 |
| 1930 | | May 20 | 2,200 | Oct. 28 | 1,400 | Mar. 28 | 1,100 | July 13 | 1,352 | Nov. 4 | 1,412 |
| Jan. 1 | 1,700 | May 26 | 1,344 | Oct. 31 | 1,840 | Mar. 31 | 1,114 | July 16 | 1,700 | Nov. 7 | 1,500 |
| Jan. 10 | 1,600 | June 3 | 1,480 | Nov. 3 | 1,800 | Apr. 3 | 1,200 | July 19 | 1,408 | Nov. 10 | 1,192 |
| Jan. 14 | 1,700 | June 4 | 1,800 | Nov. 9 | 1,728 | Apr. 6 | 1,162 | July 22 | 1,200 | Nov. 13 | 1,552 |
| Jan. 25 | 1,910 | June 7 | 2,400 | Nov. 12 | 1,840 | Apr. 9 | 1,200 | July 25 | 1,510 | Nov. 16 | 1,584 |
| Jan. 29 | 1,960 | June 10 | 1,232 | Dec. 11 | 1,300 | Apr. 12 | 1,512 | July 28 | 1,500 | Nov. 19 | 1,200 |
| Feb. 2 | 1,960 | July 1 | 1,480 | Dec. 13 | 1,728 | Apr. 15 | 1,500 | July 31 | 1,860 | Nov. 22 | 1,720 |
| Feb. 6 | 1,700 | July 7 | 1,448 | Dec. 14 | 1,600 | Apr. 18 | 1,152 | Aug. 3 | 1,000 | Nov. 25 | 1,400 |
| Feb. 9 | 1,376 | July 18 | 1,392 | Dec. 20 | 1,600 | Apr. 21 | 1,100 | Aug. 6 | 1,163 | Nov. 28 | 1,644 |
| Feb. 12 | 2,200 | July 21 | 2,200 | Dec. 23 | 1,100 | Apr. 24 | 1,144 | Aug. 9 | 1,100 | Dec. 3 | 1,800 |
| Feb. 14 | 1,600 | July 24 | 1,040 | Dec. 24 | 1,408 | Apr. 27 | 1,300 | Aug. 12 | 996 | Dec. 4 | 1,552 |
| Feb. 16 | 1,500 | July 27 | 1,100 | Dec. 26 | 1,400 | Apr. 30 | 1,292 | Aug. 15 | 1,400 | Dec. 7 | 1,744 |
| Feb. 19 | 1,792 | July 30 | 1,400 | | | May 3 | 1,416 | Aug. 18 | 1,810 | Dec. 11 | 1,760 |
| Feb. 22 | 1,800 | Aug. 2 | 1,616 | 1931 | | May 6 | 1,472 | Aug. 21 | 1,770 | Dec. 15 | 1,964 |
| Feb. 25 | 1,522 | Aug. 5 | 1,600 | Jan. 4 | 1,620 | May 10 | 1,864 | Aug. 24 | 1,300 | Dec. 18 | 1,800 |
| Feb. 28 | 1,500 | Aug. 8 | 920 | Jan. 5 | 1,624 | May 18 | 1,176 | Aug. 27 | 1,492 | Dec. 21 | 1,604 |
| Mar. 3 | 1,248 | Aug. 11 | 1,000 | Jan. 7 | 1,600 | May 21 | 1,400 | Aug. 30 | 1,400 | Dec. 24 | 1,300 |
| Mar. 9 | 1,386 | Aug. 14 | 1,100 | Jan. 10 | 1,608 | May 24 | 1,624 | Sep. 2 | 1,472 | Dec. 27 | 1,744 |
| Mar. 12 | 1,600 | Aug. 17 | 1,527 | Jan. 11 | 1,800 | May 27 | 2,160 | Sep. 5 | 1,200 | Dec. 30 | 2,100 |
| Mar. 15 | 1,936 | Aug. 20 | 1,900 | Jan. 13 | 1,700 | May 30 | 1,800 | Sep. 8 | 1,486 | | |
| Mar. 18 | 1,600 | Aug. 26 | 1,240 | Jan. 16 | 1,768 | June 2 | 1,176 | Sep. 11 | 2,100 | | |
| Mar. 21 | 1,344 | Aug. 29 | 1,300 | Jan. 19 | 1,600 | June 5 | 1,400 | Sep. 12 | 2,100 | | |

*Chemical Analyses of Water Samples from the Rio Grande at Fabens, Texas*

| Date of Sample | K x $10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Feb. 4, 1929 | 263 | 1,760 | 4.70 | 14.60 | 8.65 | 7.05 | 3.71 | 17.19 |
| July 9 | 255 | 1,680 | 4.72 | 13.94 | 8.26 | 9.00 | 3.70 | 14.22 |
| Nov. 23 | 286 | 1,724 | 5.34 | 15.77 | 9.04 | 9.15 | 3.21 | 17.79 |
| Jan. 25, 1930 | 279 | 1,910 | 5.11 | 15.77 | 9.24 | 8.70 | 2.47 | 18.95 |
| Jan. 29 | 279 | 1,960 | 5.11 | 15.77 | 8.76 | 9.15 | 2.96 | 17.53 |
| Feb. 2 | 279 | 1,960 | 4.72 | 15.77 | 8.76 | 8.70 | 3.46 | 17.09 |
| Feb. 9 | 206 | 1,376 | 4.72 | 10.25 | 7.36 | 8.70 | 3.29 | 10.34 |
| Feb. 19 | 264 | 1,792 | 5.11 | 14.20 | 8.76 | 10.05 | 3.79 | 14.23 |
| Feb. 25 | 224 | 1,522 | 4.72 | 11.44 | 7.99 | 8.70 | 3.05 | 12.40 |
| Mar. 3 | 187 | 1,248 | 4.72 | 8.28 | 7.05 | 8.70 | 2.06 | 9.29 |
| Mar. 9 | 190 | 1,386 | 4.72 | 9.86 | 7.51 | 6.90 | 2.22 | 12.97 |
| Mar. 15 | 286 | 1,936 | 3.15 | 17.75 | 10.25 | 7.80 | 2.80 | 20.55 |
| Mar. 21 | 200 | 1,344 | 7.48 | 4.73 | 5.49 | 7.50 | 2.80 | 7.40 |
| Mar. 27 | 185 | 1,341 | 3.54 | 11.09 | 7.59 | 7.05 | 2.06 | 13.11 |
| Apr. 5 | 231 | 1,536 | 3.15 | 13.01 | 9.03 | 7.20 | 2.89 | 15.19 |
| Apr. 11 | 224 | 1,552 | 4.72 | 11.83 | 8.53 | 8.40 | 3.05 | 13.63 |
| Apr. 17 | 189 | 1,329 | 5.11 | 8.28 | 7.84 | 7.80 | 2.22 | 11.21 |
| Apr. 23 | 217 | 1,360 | 5.11 | 10.65 | 7.40 | 7.50 | 2.72 | 12.94 |
| Apr. 29 | 247 | 1,632 | 5.11 | 12.23 | 8.76 | 7.95 | 2.72 | 15.43 |
| May 5 | 281 | 1,864 | 5.51 | 15.38 | 9.40 | 10.35 | 2.55 | 17.39 |
| May 11 | 192 | 1,224 | 3.54 | 9.46 | 7.16 | 7.35 | 1.98 | 10.83 |
| May 17 | 328 | 2,160 | 3.93 | 19.72 | 10.40 | 10.50 | 2.63 | 20.92 |
| May 26 | 198 | 1,344 | 3.93 | 9.46 | 7.78 | 7.50 | 2.47 | 11.20 |
| June 3 | 218 | 1,480 | 4.26 | 10.06 | 7.26 | 8.40 | 1.73 | 11.45 |
| June 10 | 185 | 1,232 | 3.93 | 7.89 | 7.26 | 7.35 | 1.40 | 10.33 |
| July 1 | 214 | 1,480 | 5.51 | 9.86 | 8.20 | 7.50 | 2.47 | 13.60 |
| July 7 | 214 | 1,448 | 5.51 | 9.86 | 7.82 | 7.80 | 2.14 | 13.25 |
| July 18 | 205 | 1,392 | 4.33 | 9.86 | 7.76 | 7.65 | 2.47 | 11.83 |
| July 24 | 151 | 1,040 | 4.72 | 5.92 | 6.30 | 7.50 | 2.14 | 7.30 |
| July 30 | 194 | 1,400 | 4.72 | 9.46 | 7.53 | 7.35 | 1.98 | 12.38 |
| Aug. 2 | 264 | 1,616 | 5.51 | 13.80 | 6.93 | 8.40 | 2.39 | 15.45 |
| Aug. 8 | 142 | 920 | 3.54 | 4.73 | 6.53 | 6.30 | 1.98 | 6.52 |
| Aug. 17 | 247 | 1,527 | 4.72 | 12.23 | 8.20 | 7.95 | 3.37 | 13.83 |
| Aug. 26 | 190 | 1,240 | 4.72 | 7.89 | 7.32 | 6.60 | 2.14 | 11.19 |

*Chemical Analyses of Water Samples from the Rio Grande at Fabens, Texas*—Continued

| Date of Sample | K x $10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Sep. 1, 1930 | 212 | 1,450 | 4.33 | 10.25 | 8.07 | 7.05 | 1.65 | 13.95 |
| Sep. 7 | 214 | 1,440 | 3.93 | 11.83 | 8.53 | 6.60 | 2.22 | 15.47 |
| Sep. 14 | 276 | 1,888 | 4.33 | 14.99 | 9.57 | 8.55 | 3.05 | 17.29 |
| Sep. 22 | 221 | 1,494 | 4.72 | 11.04 | 9.90 | 7.05 | 2.22 | 16.39 |
| Oct. 1 | 216 | 1,400 | 4.72 | 10.25 | 8.28 | 7.05 | 2.14 | 14.06 |
| Oct. 7 | 212 | 1,460 | 3.15 | 11.83 | 8.80 | 6.00 | 2.39 | 15.39 |
| Oct. 13 | 229 | 1,606 | 4.72 | 11.83 | 9.09 | 8.10 | 2.47 | 15.07 |
| Oct. 19 | 280 | 1,730 | 5.51 | 13.80 | 9.38 | 8.55 | 3.46 | 16.68 |
| Oct. 25 | 214 | 1,480 | 4.72 | 9.86 | 4.92 | 8.55 | 2.22 | 8.73 |
| Oct. 31 | 268 | 1,840 | 3.93 | 14.99 | 9.90 | 7.80 | 2.80 | 18.22 |
| Nov. 3 | 278 | 1,800 | 5.90 | 15.77 | 7.40 | 8.55 | 3.46 | 17.06 |
| Nov. 9 | 240 | 1,728 | 6.29 | 13.01 | 9.40 | 7.50 | 2.22 | 18.98 |
| Nov. 12 | 276 | 1,840 | 5.11 | 14.59 | 10.05 | 8.25 | 3.05 | 18.45 |
| Dec. 13 | 255 | 1,728 | 2.75 | 14.20 | 9.38 | 6.90 | 1.31 | 18.12 |
| Dec. 24 | 199 | 1,408 | 6.29 | 9.46 | 8.86 | 7.05 | 2.47 | 15.09 |
| Jan. 4, 1931 | 247 | 1,620 | 5.18 | 14.59 | 9.04 | 6.45 | 3.29 | 19.07 |
| Jan. 5 | 241 | 1,624 | 2.36 | 14.59 | 8.90 | 5.70 | 1.31 | 18.84 |
| Jan. 10 | 274 | 1,608 | 5.11 | 14.20 | 9.39 | 8.25 | 2.47 | 17.98 |
| Jan. 16 | 264 | 1,768 | 3.93 | 14.99 | 9.20 | 7.80 | 3.05 | 17.27 |
| Jan. 22 | 247 | 1,586 | 3.15 | 14.20 | 8.87 | 5.25 | 2.22 | 18.75 |
| Jan. 31 | 274 | 1,816 | 5.11 | 14.20 | 7.16 | 7.95 | 3.05 | 15.47 |
| Feb. 14 | 209 | 1,424 | 5.51 | 9.86 | 7.16 | 7.05 | 2.22 | 13.26 |
| Feb. 20 | 205 | 1,248 | 3.54 | 9.86 | 7.58 | 5.25 | 2.22 | 13.51 |
| Feb. 26 | 224 | 1,456 | 3.93 | 11.83 | 7.85 | 6.45 | 2.39 | 14.77 |
| Mar. 1 | 224 | 1,562 | 3.93 | 11.83 | 8.66 | 6.00 | 2.14 | 16.28 |
| Mar. 7 | 259 | 1,584 | 4.33 | 13.80 | 9.14 | 8.10 | 2.55 | 16.62 |
| Mar. 13 | 274 | 1,616 | 10.23 | 13.80 | 5.75 | 8.25 | 3.70 | 17.83 |
| Mar. 19 | 166 | 1,114 | 3.54 | 7.89 | 7.00 | 5.55 | 1.81 | 11.07 |
| Mar. 25 | 263 | 1,560 | 4.33 | 11.38 | 8.70 | 7.65 | 3.62 | 13.14 |
| Mar. 31 | 169 | 1,114 | 2.36 | 7.89 | 7.16 | 6.15 | 1.56 | 9.70 |
| Apr. 6 | 185 | 1,162 | 2.36 | 7.89 | 7.68 | 5.55 | 2.14 | 10.24 |
| Apr. 12 | 205 | 1,512 | 4.72 | 11.04 | 8.06 | 7.05 | 2.39 | 14.38 |
| Apr. 18 | 175 | 1,152 | 7.08 | 9.46 | 5.77 | 7.30 | 1.23 | 13.78 |
| Apr. 24 | 178 | 1,144 | 4.33 | 7.89 | 6.83 | 6.00 | 1.89 | 11.15 |
| Apr. 30 | 180 | 1,292 | 3.93 | 8.68 | 7.31 | 6.00 | 1.89 | 12.03 |
| May 3 | 208 | 1,416 | 4.33 | 10.25 | 8.12 | 6.15 | 1.98 | 14.57 |
| May 6 | 228 | 1,472 | 4.33 | 10.25 | 8.06 | 6.60 | 2.80 | 13.24 |
| May 10 | 270 | 1,864 | 5.11 | 15.77 | 11.43 | 7.50 | 3.29 | 21.52 |
| May 18 | 179 | 1,176 | 4.72 | 7.49 | 6.83 | 6.75 | 1.56 | 10.73 |
| May 24 | 247 | 1,624 | 4.72 | 13.80 | 8.56 | 8.25 | 2.63 | 16.20 |
| May 27 | 332 | 2,160 | 5.11 | 22.08 | 10.68 | 10.50 | 3.29 | 24.08 |
| June 2 | 179 | 1,176 | 4.33 | 7.49 | 6.82 | 6.75 | 1.73 | 10.16 |
| June 8 | 214 | 1,286 | 4.72 | 9.86 | 6.82 | 7.05 | 2.22 | 12.13 |
| June 14 | 269 | 1,912 | 5.11 | 14.59 | 9.94 | 7.80 | 2.96 | 18.88 |
| June 20 | 318 | 1,936 | 5.11 | 17.35 | 9.71 | 9.60 | 2.88 | 19.69 |
| June 26 | 296 | 1,896 | 6.29 | 17.75 | 8.53 | 8.25 | 3.29 | 21.03 |
| July 1 | 199 | 1,372 | 3.93 | 11.04 | 7.84 | 6.60 | 2.22 | 13.99 |
| July 7 | 161 | 1,163 | 4.72 | 8.67 | 6.57 | 6.00 | 1.73 | 12.23 |
| July 13 | 211 | 1,352 | 4.72 | 9.01 | 8.24 | 6.30 | 1.73 | 13.94 |
| July 19 | 206 | 1,408 | 4.72 | 11.04 | 8.20 | 6.00 | 1.56 | 16.40 |
| July 25 | 246 | 1,510 | 3.93 | 13.01 | 8.69 | 7.65 | 3.37 | 14.61 |
| July 31 | 274 | 1,860 | 5.11 | 17.75 | 9.57 | 7.65 | 4.20 | 20.58 |
| Aug. 6 | 161 | 1,163 | 4.72 | 7.49 | 6.53 | 5.40 | 1.98 | 11.36 |
| Aug. 12 | 151 | 996 | 3.93 | 5.92 | 6.51 | 5.55 | 2.47 | 8.34 |
| Aug. 18 | 264 | 1,810 | 4.72 | 14.99 | 9.28 | 6.90 | 3.21 | 18.88 |
| Aug. 21 | 266 | 1,770 | 4.72 | 14.99 | 9.55 | 7.80 | 3.29 | 18.17 |
| Aug. 27 | 211 | 1,492 | 4.0 | 11.6 | 8.2 | 6.3 | 2.7 | 14.8 |
| Sep. 2 | 211 | 1,472 | 4.4 | 10.4 | 8.1 | 6.4 | 2.8 | 13.7 |
| Sep. 8 | 224 | 1,486 | 4.8 | 11.6 | 8.2 | 7.8 | 2.8 | 14.0 |
| Sep. 14 | 253 | 1,670 | 2.8 | 14.0 | 9.0 | 7.1 | 2.3 | 16.4 |
| Sep. 21 | 160 | 1,044 | 4.0 | 6.8 | 6.8 | 5.4 | 2.0 | 10.2 |
| Sep. 27 | 214 | 1,536 | 5.2 | 10.2 | 8.2 | 6.6 | 2.6 | 14.4 |
| Oct. 3 | 220 | 1,448 | 4.4 | 10.4 | 8.6 | 7.1 | 2.8 | 13.5 |
| Oct. 9 | 319 | 2,140 | 5.2 | 18.0 | 10.4 | 8.3 | 3.5 | 21.8 |
| Oct. 12 | 264 | 1,784 | 5.6 | 14.4 | 8.8 | 8.1 | 2.7 | 18.0 |
| Oct. 22 | 339 | 2,312 | 5.2 | 20.4 | 10.8 | 9.8 | 4.4 | 22.2 |
| Oct. 29 | 240 | 1,568 | 4.4 | 12.0 | 9.0 | 7.2 | 2.7 | 15.5 |
| Nov. 4 | 225 | 1,412 | 4.0 | 12.0 | 7.6 | 7.1 | 2.7 | 13.8 |
| Nov. 10 | 180 | 1,192 | 4.0 | 8.0 | 7.5 | 6.6 | 2.7 | 10.2 |
| Nov. 13 | 231 | 1,552 | 4.8 | 11.6 | 8.5 | 7.8 | 2.9 | 14.2 |
| Nov. 16 | 247 | 1,584 | 4.8 | 12.4 | 8.9 | 7.2 | 3.1 | 15.8 |
| Nov. 22 | 262 | 1,720 | 5.2 | 12.4 | 9.4 | 7.2 | 3.1 | 16.7 |
| Nov. 28 | 249 | 1,644 | 4.8 | 12.0 | 8.8 | 8.4 | 4.1 | 13.1 |
| Dec. 4 | 261 | 1,552 | 5.6 | 13.6 | 8.9 | 7.5 | 2.9 | 17.7 |
| Dec. 7 | 264 | 1,744 | 4.4 | 14.0 | 9.6 | 7.4 | 3.1 | 17.5 |
| Dec. 11 | 271 | 1,760 | 4.8 | 14.0 | 9.6 | 7.3 | 3.1 | 18.0 |
| Dec. 15 | 290 | 1,964 | 5.2 | 15.6 | 10.0 | 9.0 | 3.8 | 18.0 |
| Dec. 21 | 250 | 1,604 | 6.4 | 12.0 | 8.4 | 8.7 | 2.9 | 15.2 |
| Dec. 27 | 283 | 1,744 | 13.2* | 12.8 | 1.5* | 7.1 | 4.1 | 16.3 |
| Dec. 30 | 312 | 2,100 | 5.2 | 17.6 | 10.2 | 6.9 | 4.4 | 21.7 |

*Decomposed, odor of $H_2S$.

*Salt Determination of Water Samples from the Rio Grande at Fort Quitman Station*

| Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. | Date of Sample | Total Salts p.p.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1927 | | 1928 | | 1929 | | 1930 | | | | 1931 | |
| Sep. 18 | 2,200 | May 22 | 2,400 | Aug. 7 | 1,700 | Mar. 23 | 1,976 | Oct. 30 | 1,528 | June 23 | 3,212 |
| Sep. 27 | 3,900 | June 5 | 2,400 | Aug. 19 | 1,200 | Mar. 27 | 2,144 | Nov. 6 | 2,288 | July 1 | 2,136 |
| Oct. 25 | 3,200 | June 26 | 2,600 | Aug. 20 | 1,000 | Mar. 31 | 1,920 | Nov. 13 | 2,152 | July 6 | 1,624 |
| Nov. 1 | 2,600 | June 29 | 2,100 | Aug. 21 | 1,400 | Apr. 3 | 1,728 | Dec. 8 | 1,920 | July 10 | 1,848 |
| Nov. 8 | 1,500 | July 3 | 2,800 | Aug. 27 | 1,400 | Apr. 9 | 2,332 | Dec. 15 | 1,824 | July 17 | 2,416 |
| Nov. 15 | 3,200 | July 10 | 2,400 | Sep. 4 | 2,900 | Apr. 17 | 2,208 | Dec. 22 | 2,300 | July 24 | 1,560 |
| Nov. 29 | 2,100 | Aug. 7 | 1,400 | Sep. 9 | 2,800 | Apr. 23 | 1,930 | Dec. 29 | 2,028 | July 31 | 3,848 |
| Dec. 6 | 2,600 | Dec. 5 | 2,300 | Sep. 16 | 2,400 | May 7 | 2,744 | 1931 | | Aug. 4 | 2,784 |
| Dec. 13 | 1,600 | Dec. 11 | 2,200 | Sep. 17 | 1,600 | May 14 | 2,148 | Jan. 2 | 2,038 | Aug. 14 | 1,256 |
| Dec. 27 | 2,400 | 1929 | | Sep. 26 | 2,000 | May 19 | 3,520 | Jan. 12 | 2,152 | Aug. 21 | 2,488 |
| 1928 | | Jan. 4 | 2,300 | Oct. 2 | 3,500 | May 26 | 3,856 | Jan. 19 | 2,304 | Aug. 28 | 2,582 |
| Jan. 3 | 2,500 | Jan. 11 | 2,300 | Oct. 7 | 3,600 | June 2 | 2,064 | Jan. 26 | 2,658 | Sep. 3 | 1,360 |
| Jan. 10 | 2,500 | Jan. 24 | 2,200 | Oct. 30 | 2,300 | June 11 | 2,048 | Feb. 1 | 2,308 | Sep. 11 | 2,256 |
| Jan. 17 | 2,700 | Jan. 30 | 2,000 | Nov. 12 | 2,000 | June 18 | 1,368 | Feb. 9 | 2,440 | Sep. 18 | 3,104 |
| Jan. 24 | 2,300 | Feb. 6 | 2,800 | Nov. 19 | 2,600 | June 25 | 2,704 | Feb. 16 | 2,030 | Sep. 25 | 1,688 |
| Jan. 31 | 2,900 | Feb. 6 | 2,700 | Nov. 27 | 2,820 | July 2 | 3,360 | Feb. 23 | 1,856 | Oct. 2 | 2,080 |
| Feb. 7 | 2,500 | Feb. 13 | 2,800 | Dec. 4 | 2,800 | July 9 | 2,040 | Mar. 1 | 2,368 | Oct. 8 | 2,304 |
| Feb. 14 | 2,000 | Mar. 5 | 2,800 | Dec. 11 | 2,500 | July 23 | 2,232 | Mar. 9 | 2,648 | Oct. 16 | 2,436 |
| Feb. 21 | 1,700 | Mar. 13 | 3,100 | Dec. 18 | 2,900 | July 27 | 1,450 | Mar. 16 | 2,560 | Oct. 23 | 2,464 |
| Feb. 28 | 2,000 | Mar. 22 | 2,900 | Dec. 25 | 2,500 | Aug. 6 | 3,150 | Mar. 23 | 1,888 | Oct. 30 | 1,716 |
| Mar. 5 | 2,200 | Apr. 13 | 3,400 | 1930 | | Aug. 15 | 1,150 | Mar. 30 | 2,856 | Nov. 6 | 2,144 |
| Mar. 15 | 2,300 | Apr. 22 | 2,100 | Jan. 2 | 2,900 | Aug. 27 | 3,008 | Apr. 6 | 1,872 | Nov. 13 | 1,552 |
| Mar. 20 | 2,300 | Apr. 29 | 2,900 | Jan. 9 | 2,700 | Sep. 3 | 1,530 | Apr. 13 | 2,304 | Nov. 20 | 2,068 |
| Mar. 27 | 2,700 | May 6 | 2,300 | Jan. 16 | 2,800 | Sep. 12 | 1,817 | May 2 | 1,464 | Nov. 27 | 1,740 |
| Apr. 3 | 3,100 | May 13 | 3,600 | Jan. 23 | 3,000 | Sep. 15 | 2,216 | May 9 | 2,024 | Dec. 4 | 1,948 |
| Apr. 10 | 1,600 | June 10 | 3,800 | Feb. 6 | 2,832 | Sep. 22 | 2,880 | May 18 | 3,404 | Dec. 11 | 1,981 |
| Apr. 24 | 2,300 | June 19 | 3,300 | Feb. 13 | 2,376 | Oct. 1 | 2,070 | May 25 | 2,592 | Dec. 18 | 2,210 |
| Apr. 30 | 2,300 | July 16 | 1,400 | Mar. 6 | 2,072 | Oct. 6 | 1,672 | June 1 | 3,280 | Dec. 24 | 2,010 |
| May 15 | 1,400 | July 23 | 3,300 | Mar. 13 | 2,168 | Oct. 16 | 1,544 | June 8 | 2,112 | | |
| May 18 | 1,700 | Aug. 1 | 1,500 | Mar. 20 | 3,064 | Oct. 24 | 2,120 | June 15 | 2,504 | | |

*Chemical Analyses of Water Samples from Rio Grande at Fort Quitman Station*

| Date of Sample | $K \times 10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Feb. 6, 1930 | 436 | 2,832 | 5.90 | 25.98 | 9.93 | 10.95 | 5.84 | 28.62 |
| Feb. 13 | 351 | 2,376 | 5.90 | 22.48 | 10.06 | 10.95 | 5.84 | 21.65 |
| Mar. 6 | 322 | 2,072 | 2.75 | 20.11 | 9.99 | 9.45 | 2.63 | 20.77 |
| Mar. 13 | 350 | 2,168 | 4.33 | 20.90 | 10.30 | 11.85 | 3.29 | 20.39 |
| Mar. 20 | 413 | 3,064 | 4.33 | 33.13 | 13.07 | 15.30 | 3.04 | 32.19 |
| Mar. 23 | 322 | 1,976 | 4.33 | 19.32 | 9.91 | 11.25 | 5.68 | 16.63 |
| Mar. 27 | 328 | 2,144 | 3.54 | 21.69 | 10.41 | 11.53 | 3.29 | 20.82 |
| Mar. 31 | 308 | 1,920 | 4.33 | 18.14 | 9.93 | 10.95 | 3.95 | 17.50 |
| Apr. 3 | 280 | 1,728 | 2.36 | 18.14 | 9.39 | 9.15 | 3.70 | 17.04 |
| Apr. 9 | 368 | 2,332 | 1.97 | 25.63 | 10.41 | 10.05 | 4.53 | 23.43 |
| Apr. 17 | 370 | 2,208 | 2.36 | 24.45 | 10.85 | 10.05 | 4.28 | 23.33 |
| Apr. 23 | 296 | 1,930 | 2.75 | 19.32 | 9.03 | 7.80 | 3.95 | 19.35 |
| May 7 | 436 | 2,744 | 2.36 | 31.55 | 12.53 | 11.25 | 3.95 | 31.24 |
| May 14 | 336 | 2,148 | 5.11 | 21.29 | 10.16 | 12.30 | 3.95 | 20.31 |
| May 19 | 569 | 3,520 | 2.36 | 43.38 | 14.51 | 14.55 | 7.57 | 38.13 |
| May 26 | 617 | 3,856 | 3.93 | 46.14 | 13.93 | 15.75 | 7.57 | 40.68 |
| June 2 | 336 | 2,064 | 4.33 | 21.29 | 10.24 | 12.45 | 6.58 | 16.83 |
| June 11 | 370 | 2,048 | 4.72 | 21.69 | 9.93 | 12.30 | 5.92 | 18.12 |
| June 18 | 219 | 1,368 | 4.33 | 11.04 | 7.91 | 7.50 | 3.29 | 12.49 |
| July 2 | 528 | 3,360 | 3.93 | 41.01 | 13.93 | 11.25 | 7.24 | 40.38 |
| July 9 | 308 | 2,040 | 3.93 | 18.93 | 9.56 | 8.70 | 3.46 | 20.26 |
| July 23 | 336 | 2,232 | 3.93 | 22.87 | 8.65 | 11.10 | 3.70 | 20.65 |
| July 27 | 218 | 1,450 | 3.93 | 11.83 | 7.61 | 8.55 | 2.47 | 12.35 |
| Aug. 6 | 462 | 3,150 | 4.33 | 31.55 | 12.21 | 12.90 | 6.17 | 29.02 |
| Aug. 15 | 187 | 1,150 | 4.33 | 8.68 | 6.82 | 7.80 | 3.05 | 8.98 |
| Aug. 27 | 493 | 3,008 | 3.93 | 36.39 | 12.17 | 14.40 | 5.43 | 32.66 |
| Sep. 3 | 231 | 1,530 | 3.54 | 13.01 | 7.99 | 9.00 | 2.47 | 13.07 |
| Sep. 12 | 264 | 1,817 | 3.93 | 15.77 | 9.76 | 8.10 | 2.72 | 18.64 |
| Sep. 15 | 321 | 2,216 | 3.93 | 20.51 | 10.09 | 10.50 | 3.87 | 20.16 |
| Sep. 22 | 411 | 2,880 | 3.93 | 29.58 | 11.96 | 12.60 | 4.69 | 28.18 |
| Oct. 1 | 322 | 2,070 | 4.33 | 19.32 | 9.05 | 10.80 | 3.95 | 17.95 |
| Oct. 6 | 254 | 1,672 | 3.93 | 15.77 | 7.26 | 8.85 | 2.80 | 15.31 |
| Oct. 16 | 254 | 1,544 | 3.93 | 14.20 | 7.99 | 8.55 | 3.70 | 13.87 |
| Oct. 24 | 321 | 2,120 | 4.33 | 19.72 | 9.88 | 9.60 | 3.87 | 20.46 |
| Oct. 30 | 247 | 1,528 | 3.93 | 14.20 | 8.59 | 8.10 | 3.21 | 15.41 |
| Nov. 6 | 336 | 2,288 | 3.93 | 22.08 | 11.02 | 11.10 | 4.03 | 21.90 |
| Nov. 13 | 328 | 2,152 | 4.33 | 20.90 | 10.84 | 12.30 | 3.87 | 19.90 |
| Dec. 8 | 296 | 1,920 | 4.33 | 17.75 | 9.71 | 10.80 | 3.87 | 18.38 |
| Dec. 15 | 274 | 1,824 | 4.33 | 16.56 | 9.21 | 9.75 | 2.14 | 18.21 |
| Dec. 22 | 322 | 2,300 | 5.11 | 19.71 | 9.55 | 11.60 | 3.70 | 19.07 |
| Dec. 29 | 285 | 2,028 | 5.11 | 17.75 | 8.99 | 10.80 | 3.46 | 17.50 |

*Chemical Analyses of Water Samples from Rio Grande at Ft. Quitman Station*—Continued

| Date of Sample | K x 10⁵ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Jan. 2, 1931 | 322 | 2,038 | 5.11 | 19.72 | 10.23 | 7.95 | 3.29 | 23.82 |
| Jan. 12 | 336 | 2,152 | 5.11 | 20.51 | 10.05 | 9.00 | 4.20 | 22.47 |
| Jan. 19 | 352 | 2,304 | 4.72 | 21.69 | 10.23 | 8.55 | 4.36 | 23.73 |
| Jan. 26 | 370 | 2,658 | 5.90 | 24.45 | 10.77 | 8.55 | 4.61 | 27.96 |
| Feb. 1 | 351 | 2,308 | 5.11 | 24.45 | 10.05 | 8.55 | 4.03 | 27.03 |
| Feb. 9 | 354 | 2,440 | 4.33 | 25.63 | 10.94 | 9.00 | 4.44 | 27.46 |
| Feb. 16 | 321 | 2,030 | 5.11 | 19.72 | 9.38 | 8.55 | 3.46 | 22.20 |
| Feb. 23 | 284 | 1,856 | 5.11 | 16.96 | 8.57 | 7.50 | 3.95 | 19.19 |
| Mar. 1 | 370 | 2,368 | 4.72 | 23.66 | 10.34 | 10.50 | 3.95 | 24.27 |
| Mar. 9 | 399 | 2,648 | 5.51 | 26.42 | 11.61 | 9.30 | 5.27 | 28.97 |
| Mar. 16 | 389 | 2,560 | 4.33 | 29.58 | 9.96 | 9.30 | 3.95 | 30.62 |
| Mar. 23 | 294 | 1,888 | 4.33 | 18.54 | 8.90 | 7.50 | 3.70 | 20.57 |
| Mar. 30 | 430 | 2,856 | 4.33 | 30.76 | 12.27 | 11.40 | 5.02 | 30.94 |
| Apr. 6 | 296 | 1,872 | 4.33 | 17.35 | 9.55 | 9.90 | 2.96 | 18.37 |
| Apr. 13 | 370 | 2,304 | 3.93 | 32.54 | 5.26 | 5.10 | 1.56 | 35.07 |
| May 2 | 239 | 1,464 | 3.93 | 11.83 | 7.99 | 7.50 | 2.55 | 13.70 |
| May 9 | 336 | 2,024 | 3.93 | 20.51 | 10.14 | 8.55 | 4.28 | 21.75 |
| May 18 | 484 | 3,404 | 3.93 | 34.31 | 16.99 | 13.50 | 5.18 | 36.55 |
| May 25 | 390 | 2,592 | 3.93 | 27.61 | 11.14 | 12.00 | 4.28 | 26.40 |
| June 1 | 476 | 3,280 | 3.93 | 36.11 | 12.74 | 13.65 | 5.18 | 33.95 |
| June 8 | 319 | 2,122 | 3.93 | 23.66 | 9.49 | 9.75 | 3.70 | 23.63 |
| June 15 | 370 | 2,504 | 3.93 | 26.42 | 11.10 | 9.30 | 3.95 | 28.20 |
| June 23 | 504 | 3,212 | 1.97 | 37.86 | 13.31 | 11.55 | 2.80 | 38.79 |
| July 1 | 336 | 2,136 | 3.93 | 21.69 | 10.92 | 8.25 | 3.46 | 24.83 |
| July 6 | 248 | 1,624 | 3.93 | 13.41 | 9.44 | 6.60 | 2.80 | 17.38 |
| July 10 | 267 | 1,848 | 3.93 | 15.04 | 11.37 | 7.80 | 2.80 | 19.74 |
| July 17 | 390 | 2,416 | 3.48 | 23.66 | 12.48 | 9.75 | 3.29 | 26.58 |
| July 24 | 233 | 1,560 | 3.93 | 13.80 | 7.57 | 7.05 | 2.47 | 15.78 |
| July 31 | 528 | 3,848 | 3.54 | 46.54 | 14.04 | 13.50 | 4.61 | 46.01 |
| Aug. 4 | 402 | 2,784 | 3.93 | 28.00 | 13.77 | 9.90 | 2.63 | 33.07 |
| Aug. 14 | 206 | 1,256 | 4.72 | 10.25 | 7.36 | 6.60 | 2.47 | 13.26 |
| Aug. 21 | 370 | 2,488 | 3.93 | 28.00 | 10.90 | 6.75 | 2.96 | 33.12 |
| Aug. 28 | 390 | 2,582 | 3.93 | 27.60 | 11.25 | 12.00 | 2.96 | 27.82 |
| Sep. 3 | 206 | 1,360 | 4.72 | 9.86 | 7.70 | 5.70 | 2.47 | 14.11 |
| Sep. 11 | 344 | 2,256 | 3.93 | 22.48 | 9.90 | 9.00 | 4.28 | 23.03 |
| Sep. 18 | 471 | 3,104 | 3.93 | 35.10 | 12.71 | 12.30 | 5.10 | 34.34 |
| Sep. 25 | 253 | 1,688 | 5.11 | 14.59 | 8.08 | 6.00 | 3.29 | 18.49 |
| Oct. 2 | 308 | 2,080 | 5.11 | 20.51 | 9.39 | 8.55 | 4.44 | 22.02 |
| Oct. 8 | 316 | 2,304 | 4.72 | 23.66 | 9.68 | 7.80 | 4.94 | 25.32 |
| Oct. 16 | 368 | 2,436 | 4.0 | 26.4 | 11.5 | 9.3 | 6.4 | 26.2 |
| Oct. 23 | 368 | 2,464 | 4.0 | 25.2 | 11.0 | 9.9 | 5.6 | 24.7 |
| Oct. 30 | 261 | 1,716 | 4.4 | 14.4 | 8.8 | 7.9 | 2.9 | 16.8 |
| Nov. 6 | 333 | 2,144 | 4.8 | 20.0 | 10.3 | 8.4 | 3.9 | 22.8 |
| Nov. 13 | 247 | 1,552 | 4.0 | 13.2 | 8.5 | 7.8 | 2.8 | 15.1 |
| Nov. 20 | 318 | 2,068 | 4.4 | 20.0 | 10.2 | 8.4 | 3.5 | 22.7 |
| Nov. 27 | 271 | 1,740 | 4.0 | 15.2 | 9.0 | 7.5 | 3.3 | 17.4 |
| Dec. 4 | 302 | 1,948 | 4.0 | 17.2 | 9.7 | 8.1 | 2.6 | 20.2 |
| Dec. 11 | 323 | 1,981 | 4.4 | 18.4 | 10.0 | 8.6 | 2.9 | 21.3 |
| Dec. 18 | 347 | 2,210 | 3.6 | 20.8 | 10.6 | 9.6 | 4.6 | 20.8 |
| Dec. 24 | 326 | 2,010 | 4.4 | 18.8 | 9.8 | 9.0 | 3.7 | 20.3 |

*Chemical Analyses of Water Samples from Rio Grande Above Presidio, Texas*

| Date of Sample | K x 10⁵ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Jan. 2, 1931 | 324 | 2,120 | 3.93 | 20.11 | 10.86 | 10.05 | 3.29 | 21.56 |

*Chemical Analyses of Water Samples from Rio Grande at Boquillas Station*

| Date of Sample | K x 10⁵ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Mar. 12, 1930 | 119 | 880 | 3.14 | 4.34 | 5.97 | 3.75 | 1.23 | 8.47 |
| Apr. 5 | 144 | 1,088 | 3.15 | 5.52 | 6.83 | 5.25 | 2.64 | 7.61 |
| Apr. 28 | 150 | 1,120 | 3.93 | 5.91 | 7.35 | 4.50 | 2.47 | 10.22 |

*Chemical Analyses of Water Samples from Rio Grande at Langtry Station*

| Date of Sample | K x 10⁵ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Apr. 8, 1930 | 100 | 648 | 2.36 | 3.55 | 4.80 | 4.80 | 1.57 | 4.34 |
| Apr. 23 | 121 | 784 | 3.15 | 4.73 | 4.60 | 4.50 | 2.14 | 5.84 |
| June 17, 1931 | 68 | 467 | 2.75 | 1.58 | 3.87 | 4.50 | 1.48 | 2.22 |

*Chemical Analyses of Water Samples from Pecos River Near Comstock, Texas*

| Date of Sample | K x $10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Mar. 18, 1930 | 514 | 3,760 | 3.54 | 35.10 | 20.32 | 18.75 | 6.58 | 33.63 |
| Apr. 22 | 522 | 3,840 | 2.36 | 38.65 | 21.61 | 19.50 | 9.22 | 33.90 |
| May 8 | 493 | 3,416 | 1.97 | 33.91 | 17.30 | 18.75 | 8.23 | 26.20 |
| June 5 | 406 | 3,336 | 3.94 | 31.55 | 17.07 | 15.75 | 9.55 | 27.26 |
| July 9 | 336 | 2,240 | 2.75 | 20.10 | 11.27 | 9.40 | 6.42 | 18.22 |
| Sep. 15 | 296 | 1,820 | 2.75 | 16.96 | 10.58 | 7.80 | 5.92 | 16.57 |

*Chemical Analyses of Water Samples from Devils River Near Del Rio, Texas*

| Date of Sample | K x $10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Mar. 19, 1930 | 32 | 232 | 3.14 | 0.39 | 0.21 | 3.00 | 1.00 | ..... |
| Apr. 22 | 44 | 300 | 3.15 | 0.79 | 0.21 | 2.25 | 0.74 | 1.16 |
| May 5 | 36 | 200 | 2.75 | 0.39 | 0.33 | 2.85 | 1.56 | ..... |
| June 2 | 33 | 256 | 3.16 | 0.39 | Trace | 2.40 | 1.00 | 0.15 |
| July 1 | 32 | 185 | 2.75 | 0.39 | 0.21 | 1.95 | 0.58 | 0.82 |
| Sep. 2 | 37 | 180 | 2.36 | Trace | Trace | 2.55 | 0.49 | ..... |
| Oct. 1 | 37 | 214 | 3.54 | 0.39 | 0.31 | 2.10 | 0.33 | 1.81 |
| Nov. 28 | 49 | 270 | 3.93 | Trace | 0.33 | 4.05 | 0.41 | ..... |
| Feb. 16, 1931 | 41 | 278 | 4.33 | 0.39 | Trace | 2.60 | 0.33 | 1.79 |
| June 18 | 37 | 192 | 3.93 | 0.39 | 0.17 | 2.85 | 0.49 | 1.15 |

*Chemical Analyses of Water Samples from Rio Grande at Del Rio, Texas*

| Date of Sample | K x $10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Mar. 8, 1930 | 161 | 1,040 | 3.54 | 8.67 | 5.56 | 5.60 | 1.81 | 10.36 |
| Apr. 19 | 134 | 1,008 | 3.93 | 6.70 | 5.12 | 4.50 | 1.73 | 9.52 |
| May 2 | 154 | 1,040 | 3.54 | 8.28 | 5.91 | 6.00 | 3.21 | 8.52 |
| June 7 | 83 | 568 | 2.76 | 3.94 | 2.81 | 2.40 | 1.23 | 5.88 |
| July 11 | 104 | 620 | 3.15 | 3.94 | 3.25 | 2.55 | 1.32 | 6.47 |
| Aug. 8 | 116 | 692 | 3.93 | 4.34 | 3.41 | 4.50 | 2.22 | 4.96 |
| Sep. 6 | 79 | 573 | 3.93 | 2.76 | 3.21 | 3.90 | 1.06 | 4.94 |
| Oct. 2 | 80 | 540 | 3.93 | 2.76 | 2.39 | 3.90 | 1.23 | 3.95 |
| Dec. 12 | 148 | 950 | 3.93 | 6.70 | 4.50 | 7.05 | 3.04 | 5.04 |
| Jan. 18, 1931 | 154 | 1,064 | 4.72 | 7.49 | 5.82 | 5.25 | 2.63 | 10.15 |
| Feb. 14 | 148 | 955 | 4.33 | 6.70 | 4.76 | 5.25 | 2.96 | 7.58 |
| Apr. 3 | 139 | 940 | 3.54 | 7.49 | 5.12 | 5.10 | 3.21 | 7.84 |
| June 15 | 111 | 728 | 3.15 | 5.52 | 3.83 | 5.40 | 1.48 | 5.62 |

*Chemical Analyses of Water Samples from Rio Grande at Eagle Pass, Texas*

| Date of Sample | K x $10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Apr. 18, 1930 | 151 | 976 | 3.54 | 7.10 | 4.73 | 4.95 | 2.39 | 8.03 |

*Chemical Analyses of Water Samples from Rio Grande at Roma, Texas*

| Date of Sample | K x $10^5$ at 25° C | Total Salts p.p.m. | Milligram Equivalents | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $HCO_3$ | Cl | $SO_4$ | Ca | Mg | AB |
| Mar. 4, 1930 | 128 | 824 | 2.36 | 5.91 | 4.87 | 5.40 | 1.31 | 6.43 |
| Apr. 8 | 126 | 864 | 2.36 | 5.92 | 5.12 | 4.95 | 2.31 | 6.14 |
| Apr. 27 | 67 | 480 | 1.97 | 2.76 | 2.93 | 3.00 | 1.07 | 3.59 |
| May 13 | 91 | 544 | 1.97 | 3.55 | 3.16 | 3.15 | 1.00 | 4.53 |
| June 6 | 62 | 448 | 2.36 | 2.37 | 2.58 | 1.80 | 1.56 | 3.95 |
| July 7 | 75 | 520 | 3.54 | 3.15 | 2.48 | 3.30 | 1.98 | 3.89 |
| Aug. 5 | 81 | 504 | 3.54 | 2.37 | 2.89 | 2.55 | 2.30 | 3.95 |
| Sep. 5 | 64 | 400 | 2.36 | 1.97 | 2.56 | 3.15 | 1.07 | 2.67 |
| Oct. 6 | 57 | 355 | 1.97 | 2.37 | 2.00 | 2.55 | 0.50 | 3.29 |
| Oct. 18 | 67 | 512 | 3.15 | 3.15 | 2.21 | 3.90 | 0.82 | 3.79 |
| Nov. 8 | 87 | 632 | 3.15 | 3.55 | 3.58 | 5.10 | 1.23 | 3.95 |
| Jan. 5, 1931 | 100 | 648 | 3.54 | 3.94 | 3.74 | 4.95 | 2.06 | 4.21 |
| Feb. 7 | 121 | 760 | 3.54 | 5.52 | 3.91 | 5.70 | 1.89 | 5.38 |
| Mar. 4 | 125 | 895 | 2.75 | 5.92 | 5.35 | 5.55 | 2.47 | 6.00 |
| Apr. 7 | 123 | 796 | 2.75 | 5.92 | 3.93 | 4.65 | 1.48 | 6.47 |
| May 2 | 87 | 577 | 2.75 | 3.55 | 3.06 | 4.05 | 1.23 | 4.08 |
| June 6 | 93 | 664 | 3.15 | 3.94 | 3.79 | 4.35 | 1.23 | 5.30 |
| July 7 | 95 | 616 | 2.75 | 3.55 | 3.91 | 3.45 | 1.81 | 4.95 |
| Aug. 17 | 74 | 496 | 2.75 | 3.55 | 2.12 | 3.75 | 1.32 | 3.35 |
| Sep. 18 | 84 | 549 | 3.54 | 3.94 | 2.25 | 3.30 | 1.81 | 4.62 |
| Oct. 7 | 86 | 563 | 2.75 | 3.15 | 3.33 | 3.90 | 1.40 | 3.93 |
| Nov. 6 | 90 | 618 | 2.80 | 3.60 | 3.41 | 4.05 | 1.07 | 4.69 |
| Dec. 3 | 109 | 824 | 2.80 | 4.80 | 5.00 | 3.80 | 4.00 | 4.80 |

## SILT SAMPLING OF RIO GRANDE WATER
### By American Agencies—1928-1931

The gravimetric percentages of dry silt reported here were determined by the United States Department of Agriculture at Austin, Texas, from samples of Rio Grande water taken by the United States Geological Survey and the American Section of the International Water Commission.

The samples were taken in small necked bottles at three points at the surface of the stream, viz: at the mid point, and at each side, one sixth of the width from the edge of the stream.

Numerous experiments have shown that the mean of three samples so taken gives 0.908 of the mean suspended silt in the stream within reasonable limits of accuracy.

The daily figures reported here have been computed in accordance with the foregoing.

*Gravimetric Percentages of Dried Silt in the Rio Grande at Boquillas, Texas, as Determined from Water Samples During 1928-1931*

| Date | % Silt | Date | % Silt | Date | % Silt | Date | % Silt | Date | % Silt | Date | % Silt |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1928 | | 1929 | | 1929 | | 1929 | | 1930 | | 1930 | |
| Aug. 6 | .9361 | May 27 | .4719 | July 20 | .0055 | Sep. 14 | .3729 | June 23 | .0891 | Aug. 31 | .0451 |
| Aug. 7 | .5896 | May 29 | .2156 | July 22 | .0132 | Sep. 20 | .1166 | July 5 | .0022 | Sep. 6 | .0209 |
| Aug. 8 | .2563 | June 5 | .1683 | July 26 | .9317 | Sep. 23 | .0440 | July 10 | .0011 | Sep. 9 | .0088 |
| Aug. 9 | .2288 | June 7 | .1507 | July 27 | .3960 | Sep. 24 | .1133 | July 14 | .3212 | Sep. 11 | .0055 |
| Aug. 11 | .4026 | June 9 | .2442 | July 29 | 2.5586 | Sep. 26 | .0495 | July 19 | .0330 | Sep. 18 | .0066 |
| Aug. 14 | 1.2837 | June 11 | .7117 | July 30 | 3.8665 | Sep. 29 | .0396 | July 24 | .6622 | Sep. 22 | .0011 |
| Aug. 15 | 1.1605 | June 12 | .1672 | Aug. 9 | .5489 | Oct. 7 | .0176 | Aug. 4 | .5753 | Sep. 24 | .0099 |
| Aug. 24 | .6545 | June 13 | 1.9790 | Aug. 11 | .3641 | Oct. 9 | .0132 | Aug. 8 | 1.0428 | 1931 | |
| 1929 | | June 19 | .0715 | Aug. 17 | .5676 | Oct. 15 | .0231 | Aug. 16 | 1.0912 | May 20 | .0792 |
| May 7 | .0066 | June 24 | .0187 | Aug. 20 | .8899 | Oct. 17 | .7260 | Aug. 18 | .3179 | May 23 | .0726 |
| May 8 | .0000 | June 30 | .0275 | Aug. 23 | .4037 | 1930 | | Aug. 20 | .3663 | May 25 | .0748 |
| May 11 | .0022 | July 13 | .0099 | Aug. 30 | .1793 | May 7 | .0143 | Aug. 23 | .2420 | June 2 | .1166 |
| May 16 | .0088 | July 14 | .0143 | Sep. 6 | .2266 | May 28 | .0330 | Aug. 25 | .1276 | June 6 | .2970 |
| May 23 | .4290 | July 16 | .0044 | Sep. 11 | 2.4519 | June 5 | .0253 | Aug. 28 | .0561 | June 16 | .0671 |
| May 25 | .8316 | July 18 | .0055 | Sep. 13 | .9702 | June 8 | .5863 | Aug. 29 | .0308 | | |

*Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas, as Determined from Water Samples in 1929*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ..... | ..... | ..... | .0198 | .0308 | .2101 | .1419 | .0100 | .1573 | .1166 | .1914 | .0282 |
| 2 | ..... | ..... | ..... | .0154 | .0261 | .3102 | .0833 | .2090 | .1584 | .0693 | .1276 | .0275 |
| 3 | ..... | ..... | ..... | .0036 | .0198 | .0855 | .3976 | .1397 | .1012 | .0462 | .2035 | .0231 |
| 4 | ..... | ..... | ..... | .0022 | .0074 | .0597 | 1.1016 | .0781 | .1001 | .0429 | *.1947 | .0165 |
| 5 | ..... | ..... | ..... | .0066 | .0143 | .0883 | 1.1132 | .0946 | .0781 | .0506 | .1859 | .0165 |
| 6 | ..... | ..... | ..... | .0201 | .0146 | .0905 | .5156 | .3597 | .1111 | .0418 | .1892 | *.0154 |
| 7 | ..... | ..... | ..... | .0192 | .0052 | .0667 | .2533 | .6743 | .1375 | .0374 | .1320 | .0143 |
| 8 | ..... | ..... | ..... | .0184 | .0140 | .1064 | .1304 | .5599 | .0869 | .0330 | .1100 | .0198 |
| 9 | ..... | ..... | ..... | .7048 | .0055 | .1361 | .1048 | .5698 | .0748 | .0187 | .1122 | .0363 |
| 10 | ..... | ..... | ..... | .2964 | .0136 | .1573 | .0781 | .5401 | .0550 | .0121 | .1419 | .0440 |
| 11 | ..... | ..... | ..... | .3003 | .0055 | .1551 | .0583 | .4994 | .0440 | .0187 | .2068 | .0319 |
| 12 | ..... | ..... | ..... | .1210 | .0096 | .1059 | .1752 | .9086 | .0891 | .0132 | .1815 | .0220 |
| 13 | ..... | ..... | ..... | .0877 | .0021 | .0027 | .1004 | .3531 | .0528 | .2871 | .2464 | .0187 |
| 14 | ..... | ..... | ..... | .0498 | .2681 | .1009 | .2118 | .3377 | .0847 | .0242 | .2442 | .0154 |
| 15 | ..... | ..... | ..... | .0418 | .2879 | .0734 | .0162 | .2519 | .0605 | .2761 | .2167 | .0165 |
| 16 | ..... | ..... | ..... | .0154 | .1375 | *.0800 | .0201 | .1672 | .7249 | .4664 | .1661 | .6061 |
| 17 | ..... | ..... | ..... | .0173 | .0836 | .0866 | .0074 | .1639 | .7524 | .5115 | .1419 | .5060 |
| 18 | ..... | ..... | ..... | .0468 | .0644 | .1617 | .0084 | .1188 | 1.6489 | .3410 | .1034 | .2629 |
| 19 | ..... | ..... | ..... | .0451 | .0627 | .0652 | .0074 | .1045 | .8415 | .2189 | .0858 | .2475 |
| 20 | ..... | ..... | ..... | .0338 | .0550 | .0528 | .0052 | .1243 | .5467 | .1298 | .0682 | .1991 |
| 21 | ..... | ..... | ..... | .0341 | .0990 | .0429 | .0238 | .0935 | .3080 | .1133 | .0528 | .0891 |
| 22 | ..... | ..... | ..... | .5184 | .0517 | .0371 | .0275 | .1166 | .3113 | .0462 | .0473 | .0396 |
| 23 | ..... | ..... | ..... | .1254 | .0382 | .0231 | .0201 | .1463 | .3729 | .0737 | .0407 | .0352 |
| 24 | ..... | ..... | ..... | .0462 | .0495 | .0239 | .0308 | .2244 | .3245 | .0748 | .0330 | .0759 |
| 25 | ..... | ..... | ..... | .0478 | .3743 | .0407 | .0110 | .1661 | .2816 | .0770 | .0319 | .0594 |
| 26 | ..... | ..... | .0740 | .0217 | .5937 | .0360 | .0187 | .7788 | .2486 | .0759 | .0352 | .0275 |
| 27 | ..... | ..... | .0388 | .0165 | *.6381 | .0641 | .4752 | .5236 | .1672 | .0451 | .0282 | .0275 |
| 28 | ..... | ..... | .0495 | .0113 | .6825 | .0726 | .1540 | .3564 | .0968 | .0462 | .0242 | *.0588 |
| 29 | ..... | ..... | .0363 | .0440 | .4056 | .3897 | .0396 | .3190 | .1023 | .0484 | .0220 | .0902 |
| 30 | ..... | ..... | .0223 | .0275 | .2258 | .2590 | .0195 | .1265 | .1870 | .1232 | .0231 | .0429 |
| 31 | ..... | ..... | .0198 | ..... | .1328 | ..... | .0156 | .1144 | ..... | .2893 | ..... | .0220 |

*Estimated

*Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas, as Determined from Water Samples in 1930*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .0355 | .0044 | .0058 | .0058 | .3693 | .4224 | .0685 | .002 | *.1690 | .0429 | .3504 | .0382 |
| 2 | .0253 | .0069 | .0055 | .0066 | .3330 | .2673 | .0726 | .011 | .1191 | .0084 | .1477 | .0242 |
| 3 | .0216 | .0091 | .0051 | .0135 | .1504 | .1844 | .0740 | .012 | .1042 | .0094 | .0908 | .0195 |
| 4 | .0187 | .0159 | .0058 | .0110 | .4246 | .1054 | *.0722 | .018 | .1804 | .0228 | .0828 | .0151 |
| 5 | .0143 | .0154 | .0044 | .0022 | .4304 | .0729 | .0704 | .025 | .5599 | .0272 | .0737 | .0239 |
| 6 | .0132 | .0066 | .0051 | .0036 | .1723 | .0272 | .0506 | .050 | .1512 | .0212 | .0652 | .0247 |
| 7 | .0190 | .0044 | .0066 | .0000 | .5808 | *.1004 | .0429 | .074 | .0613 | .3116 | *.1388 | .0173 |
| 8 | .0165 | .0044 | .0044 | .0000 | .4968 | .1735 | .0462 | .102 | .0418 | 1.1498 | .2123 | .0124 |
| 9 | .0088 | .0154 | .0051 | .0014 | .3094 | .1309 | .0377 | .140 | .0421 | .4912 | .1526 | .0113 |
| 10 | .0073 | .0044 | .0033 | .0036 | .1290 | .7989 | .0374 | .290 | .1119 | .2706 | .0902 | .0107 |
| 11 | .0190 | .0110 | .0073 | .0022 | .7439 | .6036 | .0385 | .222 | .1400 | .1845 | .0965 | *.0085 |
| 12 | .0138 | .0082 | .0022 | .0095 | .5423 | 1.0197 | .1474 | .195 | .0792 | .1612 | .0795 | .0063 |
| 13 | .0073 | .0069 | .0036 | .0080 | .2703 | .6413 | .0644 | .136 | .1232 | .5324 | .0789 | .0126 |
| 14 | .0110 | .0091 | .0014 | .0080 | .2225 | .3776 | .0454 | .233 | *.0920 | .8646 | .1444 | .0088 |
| 15 | .0099 | .1782 | .0000 | .0106 | .1130 | .3908 | .0333 | .217 | .0608 | .8965 | .0756 | .0162 |
| 16 | .0106 | .2967 | .0865 | .0066 | .0682 | .4645 | .0201 | .548 | .0492 | .8104 | .0517 | .0121 |
| 17 | .0077 | .2280 | .0498 | .0528 | .0498 | .3897 | .0421 | .645 | .2060 | .3726 | .0558 | .0135 |
| 18 | .0190 | .2365 | .1028 | .3754 | .0176 | .2648 | .0476 | .998 | .2057 | .3644 | .0528 | .0104 |
| 19 | .0088 | .1628 | .0344 | .0883 | .9188 | .1884 | .0377 | 2.036 | .0597 | .2156 | .0767 | .0077 |
| 20 | .0066 | .0984 | .0139 | .0315 | 1.4971 | .2832 | .0140 | 1.057 | .0525 | .2365 | .0492 | *.0110 |
| 21 | .0091 | .0561 | .0135 | .0198 | .5178 | .2835 | .0069 | 1.575 | .0624 | .1914 | .0407 | *.0110 |
| 22 | .0099 | .0544 | .0249 | .0135 | .1631 | .1507 | .0176 | 1.275 | .0473 | .1166 | .0517 | .0143 |
| 23 | .0099 | .0360 | .0388 | .0077 | .1092 | .1248 | .0008 | 1.087 | .0770 | .1892 | .0484 | .0088 |
| 24 | .0088 | .0157 | .0311 | .0095 | .5970 | .0811 | .0036 | 1.001 | .0363 | .7293 | .0402 | .0129 |
| 25 | .0091 | .0129 | .0193 | .0069 | .3949 | .0399 | .0014 | .921 | .0220 | .5239 | .0371 | .0118 |
| 26 | .0088 | .0091 | .0165 | 1.0860 | .1782 | .0624 | .0014 | .701 | .1122 | .2505 | .0322 | .0157 |
| 27 | .0066 | .0050 | .0105 | 1.1120 | .4911 | .0811 | .0014 | .558 | .0341 | .1864 | .0280 | .0104 |
| 28 | .0132 | .0039 | .0073 | .8752 | .8910 | .0833 | .0022 | .464 | .0294 | .1474 | .0264 | .0132 |
| 29 | .0113 | ..... | .0077 | .8850 | .9576 | .0971 | .0014 | .305 | .0594 | .5299 | .0278 | .0118 |
| 30 | .0046 | ..... | .0044 | .8752 | .7656 | .0833 | .0014 | .228 | .2461 | .4410 | .0396 | .0044 |
| 31 | .0035 | ..... | .0066 | ..... | .4785 | ..... | .0008 | .219 | ..... | .7021 | ..... | .0129 |

*Estimated

*Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas, as Determined from Water Samples in 1931*

| Day | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .0066 | .0470 | .0173 | .0069 | .3061 | .1595 | .172 | .0888 | .0767 | .0151 | .0638 | .0209 |
| 2 | .0140 | .0344 | .1231 | .0080 | .8236 | .2197 | .111 | .0976 | .0974 | .0396 | .0462 | .0250 |
| 3 | .0143 | .0201 | .0132 | .0096 | .4326 | .1199 | .103 | .0751 | .0888 | .0308 | .0297 | .0231 |
| 4 | .0226 | .0143 | .0157 | .0044 | .3204 | .0814 | .0481 | .282 | .0506 | .0250 | .0341 | .0206 |
| 5 | .0272 | .0014 | .0058 | .0044 | .3322 | .0748 | .0671 | .179 | .0627 | .0217 | .0187 | .0484 |
| 6 | .0096 | .0063 | .0088 | .0036 | .2310 | .0773 | .0671 | .0921 | .0495 | .0206 | .0187 | .0443 |
| 7 | .0096 | .0074 | .0080 | .0129 | .2527 | .0990 | .0459 | .0666 | .0377 | .0308 | .0077 | .0407 |
| 8 | .0135 | .0118 | .0088 | .0085 | .2079 | .0704 | .0586 | .0377 | .0226 | .0580 | .0055 | .0503 |
| 9 | .0143 | .0190 | .0022 | .0063 | .2684 | .0575 | .0509 | .0314 | .0344 | .1240 | .0082 | .0561 |
| 10 | .0088 | .0143 | .0000 | .2541 | .2604 | .0729 | .0473 | .0344 | .0264 | .1562 | .0066 | .0245 |
| 11 | .0121 | .0198 | .0036 | .0223 | .2604 | .0682 | .0289 | .0842 | .0154 | .1617 | .0077 | .0212 |
| 12 | .0206 | .0220 | .0129 | .0429 | .4213 | .0745 | .0377 | .318 | .0236 | .1309 | .0044 | .0228 |
| 13 | .0165 | .0132 | .0102 | .0135 | .1565 | .0764 | .0833 | .221 | .0060 | .1056 | .0099 | .0212 |
| 14 | .0187 | *.0156 | .0157 | .0206 | .1086 | .0726 | .135 | .1386 | .0217 | .0891 | .0033 | .0267 |
| 15 | .0148 | .0179 | .0616 | .0283 | .3671 | *.0425 | .0935 | .124 | .0066 | .0952 | .0000 | .0082 |
| 16 | .0168 | .0154 | .0635 | .0894 | .2511 | .0124 | *.3862 | .119 | .0044 | .0825 | .0011 | .0272 |
| 17 | .0022 | .0082 | .0591 | .0201 | .1378 | .0465 | .679 | .187 | .0044 | .0605 | .0000 | .0124 |
| 18 | .0140 | .0099 | .0352 | .0173 | .1144 | .0148 | .889 | .227 | .0030 | .0470 | .0000 | .0179 |
| 19 | .0022 | .0162 | .0402 | .0184 | .0899 | .0426 | .581 | .399 | .0011 | .0638 | .0011 | .0179 |
| 20 | .0146 | .0058 | .0690 | .0143 | .2753 | .0418 | .594 | .586 | .0234 | .0561 | .0000 | .0118 |
| 21 | .0143 | .0022 | .0363 | .0242 | .2511 | .1048 | .426 | .583 | .0187 | .0990 | .0000 | .0341 |
| 22 | .0085 | .0044 | .0193 | .0022 | .3413 | .0806 | .207 | .628 | .0099 | *.0776 | .0110 | .0374 |
| 23 | .0088 | .0044 | .0193 | .0693 | .6952 | .0641 | .338 | .432 | .0292 | .0561 | .0110 | .0308 |
| 24 | .0051 | .0044 | .0118 | .0729 | .1507 | .0473 | .341 | .608 | .0195 | .0440 | .0099 | .0242 |
| 25 | .0051 | .0110 | .0052 | .0429 | .1177 | .0396 | .232 | .604 | .0190 | .0385 | .0187 | .0187 |
| 26 | .0063 | .0077 | .0000 | *.1210 | .1067 | .0440 | .243 | .334 | *.0194 | .0440 | .0154 | .0644 |
| 27 | .0044 | .0135 | .0063 | .1991 | .0704 | *.0486 | .0844 | .206 | .0198 | .0506 | .0176 | .0275 |
| 28 | .0080 | .0044 | .0091 | .2896 | .0638 | .0531 | .0734 | .208 | .0239 | .0715 | .0099 | .0234 |
| 29 | .0275 | ..... | .0030 | .3957 | .0588 | .6787 | .0676 | .554 | .0228 | .3333 | .0132 | .0151 |
| 30 | .1246 | ..... | .0011 | .2750 | *.1700 | .3391 | .0803 | .131 | .0113 | .0528 | .0132 | .0253 |
| 31 | .0899 | ..... | .0044 | ..... | .2810 | ..... | .0566 | .107 | ..... | .1122 | ..... | .0165 |

*Estimated

## TONS OF SUSPENDED SILT PASSING ROMA IN THE RIO GRANDE BY YEARS

The tables below were computed in the following manner: The daily percentages from the foregoing tables were multiplied by the daily tons of water passing Roma, thus giving the daily tons of suspended silt passing Roma. The monthly total tons of silt divided by the monthly total tons of water gave the monthly average percent of silt by weight, and similarly for the yearly figures.

It is impossible to foretell the density with which this silt would settle into the bottom of a reservoir; but merely for visualizing and comparison, the assumption is indulged here that 1,452 tons of silt would occupy one acre foot in a reservoir bottom, which is equivalent to saying that one cubic foot of silt thus placed would weigh 66.7 pounds.

*Period Summary 1929*

| Months 1929 | Tons of Water | Suspended Silt | | |
|---|---|---|---|---|
| | | Tons | Average Percent by Weight | Acre Feet at 1,452 Tons per Ac. Ft. |
| January | ---------- | ---------- | ------ | ---------- |
| February | ---------- | ---------- | ------ | ---------- |
| March 6-31 | 219,000,000 | 17,900 | .00817 | 12.3 |
| April | 252,000,000 | 402,000 | .160 | 277.0 |
| May | 444,000,000 | 1,538,000 | .346 | 1,059.0 |
| June | 250,000,000 | 315,000 | .126 | 217.0 |
| July | 327,000,000 | 1,144,000 | .350 | 788.0 |
| August | 376,000,000 | 1,375,000 | .366 | 947.0 |
| September | 460,000,000 | 2,814,000 | .612 | 1,938.0 |
| October | 343,000,000 | 545,000 | .159 | 375.0 |
| November | 233,000,000 | 293,000 | .126 | 202.0 |
| December | 261,000,000 | 463,000 | .177 | 319.0 |
| Period | 3,165,000,000 | 8,906,900 | .281 | 6,134.3 |

*Annual Summary 1930*

| Months 1930 | Tons of Water | Suspended Silt | | |
|---|---|---|---|---|
| | | Tons | Average Percent by Weight | Acre Feet at 1,452 Tons per Ac. Ft. |
| January | 198,700,000 | 25,200 | .0127 | 17.4 |
| February | 187,800,000 | 176,000 | .0937 | 121.0 |
| March | 134,700,000 | 27,600 | .0205 | 19.0 |
| April | 303,500,000 | 1,953,000 | .643 | 1,345.0 |
| May | 552,600,000 | 3,592,000 | .650 | 2,474.0 |
| June | 809,800,000 | 3,933,000 | .486 | 2,709.0 |
| July | 178,300,000 | 70,500 | .0395 | 48.6 |
| August | 334,800,000 | 2,280,000 | .681 | 1,570.0 |
| September | 159,200,000 | 232,000 | .146 | 160.0 |
| October | 996,300,000 | 4,572,000 | .459 | 3,149.0 |
| November | 457,300,000 | 418,000 | .0914 | 288.0 |
| December | 289,900,000 | 41,100 | .0142 | 28.3 |
| Yearly | 4,602,900,000 | 17,320,400 | .376 | 11,929.3 |

*Annual Summary 1931*

| Months 1931 | Tons of Water | Suspended Silt | | |
|---|---|---|---|---|
| | | Tons | Average Percent by Weight | Acre Feet at 1,452 Tons per Ac. Ft. |
| January | 283,000,000 | 67,900 | .0240 | 46.8 |
| February | 299,000,000 | 42,900 | .0143 | 29.6 |
| March | 274,000,000 | 60,100 | .0219 | 41.4 |
| April | 245,000,000 | 208,000 | .0850 | 143. |
| May | 644,000,000 | 2,116,000 | .329 | 1,457. |
| June | 395,000,000 | 582,000 | .147 | 401. |
| July | 738,400,000 | 3,358,000 | .455 | 2,313. |
| August | 388,000,000 | 1,030,000 | .265 | 709. |
| September | 207,900,000 | 62,100 | .0299 | 42.8 |
| October | 246,100,000 | 192,600 | .0783 | 133. |
| November | 206,600,000 | 26,200 | .0127 | 18.1 |
| December | 262,100,000 | 74,700 | .0285 | 51.4 |
| Yearly | 4,189,100,000 | 7,820,500 | .187 | 5,386.1 |

## SILT SAMPLING OF RIO GRANDE WATER
### By Mexican Agencies—1923-1931

The gravimetric percentages of dry silt reported here were determined by the Mexican Section of the International Boundary Commission from samples taken by them at the various gaging stations. The corresponding discharges tabulated here are the flows shown by current meter measurements made at the same time as the water samples were taken.

The samples were taken with small necked bottles at mid-depth. Usually three samples were taken, viz: one near each bank, at approximately one sixth of the stream width, and one in the place of maximum current. However, during very low flow periods only two samples were taken, viz: one near the bank and one in the maximum current. The percentages shown here are the means of the two or three samples.

*Gravimetric Percentages of Dried Silt in the Rio Grande at El Paso, Texas as Determined from Water Samples During 1923-1925*

| Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1923 | | | 1924 | | | 1924 | | | 1924 | | |
| Nov. 12 | 387 | .059 | Mar. 12 | 892 | .149 | July 16 | 1,300 | .245 | Dec. 4 | 384 | .114 |
| Nov. 21 | 309 | .041 | Mar. 26 | 836 | .171 | Aug. 1 | 1,130 | .229 | Dec. 18 | 528 | .053 |
| Dec. 5 | 323 | .036 | Apr. 9 | 1,050 | .094 | Aug. 13 | 1,540 | .152 | | | |
| Dec. 19 | 503 | .080 | Apr. 10 | 2,300 | .329 | Aug. 27 | 2,540 | .079 | 1925 | | |
| | | | Apr. 23 | 3,370 | .222 | Sep. 11 | 1,410 | .377 | Jan. 1 | 351 | .044 |
| 1924 | | | May 7 | 1,960 | .125 | Sep. 25 | 897 | .201 | Jan. 15 | 160 | .031 |
| Jan. 2 | 807 | .155 | May 21 | 2,100 | .136 | Oct. 9 | 633 | .238 | Jan. 29 | 139 | .036 |
| Jan. 16 | 197 | .020 | June 4 | 1,240 | .054 | Oct. 23 | 318 | .036 | Feb. 12 | 528 | .159 |
| Feb. 1 | 163 | .020 | June 18 | 1,460 | .060 | Nov. 6 | 455 | .059 | | | |
| Feb. 18 | 980 | .131 | July 2 | 1,460 | .124 | Nov. 20 | 272 | .118 | | | |

*Gravimetric Percentages of Dried Silt in the Rio Grande at Fort Quitman, Texas, as Determined from Water Samples During 1923-1925*

| Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1923 | | | 1924 | | | 1924 | | | 1924 | | |
| Nov. 21 | 312 | .039 | Feb. 16 | 669 | .137 | July 10 | 1,730 | 1.501 | Sep. 30 | 311 | .040 |
| Nov. 30 | 246 | .027 | Feb. 28 | 701 | .137 | July 10 | 2,140 | 2.960 | Oct. 14 | 290 | .034 |
| Dec. 15 | 500 | .124 | Mar. 15 | 445 | .076 | July 10 | 2,130 | 2.775 | Oct. 30 | 239 | .028 |
| Dec. 16 | 755 | .136 | Apr. 15 | 686 | .152 | July 15 | 1,610 | .454 | Nov. 29 | 220 | .019 |
| | | | Apr. 29 | 739 | .143 | July 23 | 1,370 | .180 | Dec. 16 | 404 | .047 |
| 1924 | | | May 15 | 665 | .133 | July 31 | 774 | .143 | Dec. 30 | 333 | .021 |
| Jan. 1 | 789 | .176 | May 31 | 855 | .114 | Aug. 14 | 317 | .050 | | | |
| Jan. 15 | 241 | .023 | June 14 | 510 | .116 | Aug. 30 | 1,300 | .204 | 1925 | | |
| Feb. 9 | 645 | .113 | June 28 | 742 | .143 | Sep. 18 | 709 | .128 | Jan. 14 | 217 | .010 |

*Gravimetric Percentages of Dried Silt in the Rio Grande at Upper Presidio Station Near Presidio, Texas as Determined from Water Samples During 1924-1926*

| Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | | 1925 | | | 1925 | | | 1926 | | |
| Apr. 23 | 767 | .074 | Jan. 12 | 431 | .062 | Oct. 5 | 779 | .357 | May 31 | 879 | .729 |
| May 2 | 804 | .095 | Jan. 26 | 314 | .130 | Oct. 19 | 748 | .308 | June 14 | 1,020 | .358 |
| May 16 | 715 | .210 | Feb. 9 | 204 | .170 | Nov. 2 | 532 | .110 | June 28 | 598 | .278 |
| June 2 | 838 | .746 | Feb. 23 | 411 | .200 | Nov. 16 | 298 | .133 | July 12 | 812 | .350 |
| June 16 | 493 | .030 | Mar. 10 | 1,510 | .147 | Nov. 30 | 224 | .142 | July 26 | 1,190 | .336 |
| June 30 | 820 | .213 | Mar. 24 | 1,270 | .178 | Dec. 14 | 254 | .165 | Aug. 9 | 980 | .133 |
| July 14 | 882 | .781 | Apr. 6 | 192 | .129 | Dec. 29 | 236 | .183 | Aug. 25 | 2,270 | .393 |
| July 28 | 845 | .257 | Apr. 20 | 130 | .103 | | | | Sep. 6 | 416 | .108 |
| Aug. 11 | 349 | .077 | May 4 | 260 | .144 | 1926 | | | Sep. 20 | 959 | .159 |
| Aug. 26 | 1,110 | .062 | May 18 | 312 | .192 | Jan. 11 | 441 | .201 | Oct. 4 | 3,730 | .726 |
| Sep. 8 | 1,060 | .281 | June 1 | 606 | .768 | Jan. 25 | 313 | .169 | Oct. 18 | 805 | .283 |
| Sep. 22 | 753 | .148 | June 15 | 257 | .137 | Feb. 8 | 271 | .160 | Nov. 1 | 389 | .247 |
| Oct. 6 | 477 | .146 | June 29 | 605 | .431 | Feb. 22 | 236 | .174 | Nov. 15 | 445 | .111 |
| Oct. 20 | 271 | .030 | July 13 | 283 | .130 | Mar. 8 | 302 | .234 | Nov. 29 | 365 | .123 |
| Nov. 3 | 255 | .029 | July 27 | 84 | .031 | Mar. 22 | 350 | .253 | Dec. 13 | 405 | .148 |
| Nov. 17 | 236 | .035 | Aug. 10 | 1,450 | .757 | Apr. 5 | 696 | .641 | Dec. 27 | 358 | .220 |
| Dec. 1 | 227 | .036 | Aug. 24 | 783 | .448 | Apr. 19 | 1,170 | .583 | | | |
| Dec. 15 | 379 | .070 | Sep. 7 | 1,760 | .650 | May 3 | 875 | .429 | | | |
| Dec. 29 | 471 | .062 | Sep. 21 | 1,090 | .435 | May 17 | 913 | .408 | | | |

*Gravimetric Percentages of Dried Silt in the Rio Grande at Lower Presidio Station Near Presidio, Texas, as Determined from Water Samples During 1924-1931*

| Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | | 1925 | | | 1925 | | | 1926 | | |
| Apr. 24 | 1,650 | .052 | Jan. 27 | 1,210 | .113 | Dec. 1 | 2,330 | .231 | Sep. 7 | 5,400 | .233 |
| May 3 | 1,880 | .059 | Feb. 10 | 1,280 | .126 | Dec. 16 | 1,950 | .215 | Sep. 21 | 5,680 | .266 |
| May 17 | 1,620 | .116 | Feb. 24 | 1,540 | .158 | Dec. 30 | 1,750 | .259 | Oct. 5 | 6,040 | .510 |
| June 3 | 1,780 | .450 | Mar. 9 | 361 | .185 | | | | Oct. 19 | 8,970 | .347 |
| June 17 | 1,260 | .030 | Mar. 23 | 307 | .147 | 1926 | | | Nov. 2 | 4,450 | .292 |
| July 1 | 1,440 | .113 | Apr. 7 | 1,060 | .188 | Jan. 12 | 2,030 | .306 | Nov. 16 | 4,300 | .167 |
| July 15 | 1,670 | .465 | Apr. 21 | 897 | .160 | Jan. 26 | 1,980 | .279 | Nov. 30 | 3,860 | .158 |
| July 29 | 2,170 | .473 | May 5 | 963 | .216 | Feb. 9 | 1,680 | .273 | Dec. 15 | 3,460 | .164 |
| Aug. 12 | 1,150 | .070 | May 19 | 954 | .314 | Feb. 23 | 1,480 | .322 | Dec. 28 | 2,690 | .216 |
| Aug. 25 | 341 | .063 | June 2 | 2,010 | .533 | Mar. 9 | 2,030 | .376 | | | |
| Sep. 9 | 2,060 | .339 | June 16 | 1,540 | .239 | Mar. 23 | 1,600 | .309 | 1931 | | |
| Sep. 23 | 2,960 | .163 | June 30 | 4,130 | .580 | Apr. 6 | 1,920 | .467 | Oct. 15 | 1,090 | .073 |
| Oct. 7 | 3,020 | .176 | July 14 | 4,390 | .633 | Apr. 20 | 2,160 | .450 | Oct. 29 | 1,240 | .050 |
| Oct. 21 | 1,760 | .058 | July 28 | 2,830 | .342 | May 4 | 2,000 | .418 | Nov. 12 | 1,030 | .052 |
| Nov. 4 | 1,200 | .056 | Aug. 11 | 13,400 | .392 | May 18 | 2,020 | .390 | Nov. 26 | 1,060 | .049 |
| Nov. 18 | 1,110 | .056 | Aug. 25 | 7,370 | .526 | June 1 | 2,300 | .506 | Dec. 15 | 1,040 | .038 |
| Dec. 2 | 848 | .062 | Sep. 8 | 18,690 | .482 | June 15 | 3,070 | .331 | Dec. 31 | 994 | .049 |
| Dec. 16 | 1,010 | .073 | Sep. 22 | 5,190 | .346 | June 29 | 2,350 | .262 | | | |
| Dec. 30 | 1,040 | .664 | Oct. 6 | 5,170 | .333 | July 13 | 2,860 | .582 | | | |
| | | | Oct. 20 | 10,550 | .427 | July 27 | 2,690 | .510 | | | |
| 1925 | | | Nov. 3 | 4,920 | .120 | Aug. 10 | 4,190 | .165 | | | |
| Jan. 13 | 1,100 | .063 | Nov. 17 | 2,700 | .246 | Aug. 28 | 12,180 | .464 | | | |

*Gravimetric Percentages of Dried Silt in the Rio Grande at Laredo, Texas as Determined from Water Samples During 1924-1931*

| Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | | 1925 | | | 1925 | | | 1926 | | |
| June 13 | 3,050 | .094 | Feb. 3 | 2,460 | .003 | Oct. 17 | 15,250 | .210 | July 14 | 4,830 | .163 |
| June 27 | 2,130 | .004 | Feb. 17 | 2,190 | .002 | Oct. 31 | 4,870 | .082 | July 31 | 3,880 | .117 |
| July 11 | 1,860 | .011 | Mar. 14 | 2,710 | .055 | Nov. 14 | 3,950 | .057 | Aug. 14 | 4,010 | .167 |
| July 25 | 2,710 | .044 | Mar. 28 | 2,800 | .043 | Nov. 28 | 3,330 | .055 | Aug. 28 | 18,760 | .358 |
| Aug. 8 | 2,190 | .087 | Apr. 15 | 2,520 | .025 | Dec. 16 | 3,130 | .028 | Sep. 15 | 30,020 | .292 |
| Aug. 22 | 1,890 | .021 | Apr. 29 | 11,160 | .313 | Dec. 30 | 3,960 | .052 | Sep. 29 | 5,890 | .174 |
| Sep. 5 | 1,860 | .005 | May 16 | 2,690 | .068 | | | | Oct. 15 | 35,300 | .434 |
| Sep. 15 | 31,340 | .724 | June 7 | 3,090 | .082 | 1926 | | | Oct. 30 | 5,610 | .162 |
| Sep. 16 | 23,700 | .338 | July 15 | 11,650 | .323 | Jan. 16 | 2,960 | .022 | Nov. 13 | 3,680 | .140 |
| Sep. 19 | 6,180 | .068 | July 29 | 1,050 | .107 | Jan. 30 | 3,130 | .016 | Nov. 27 | 3,300 | .131 |
| Sep. 22 | 53,320 | .480 | Aug. 2 | 31,750 | .609 | Feb. 17 | 2,800 | .013 | Dec. 15 | 3,750 | .118 |
| Oct. 3 | 5,070 | .110 | Aug. 10 | 4,610 | .608 | Feb. 27 | 2,490 | .011 | | | |
| Oct. 17 | 5,220 | .112 | Aug. 13 | 22,750 | .669 | Mar. 17 | 2,360 | .015 | 1931 | | |
| Nov. 3 | 3,390 | .028 | Aug. 15 | 29,940 | .570 | Mar. 31 | 2,500 | .074 | Aug. 14 | 8,160 | .151 |
| Nov. 18 | 3,050 | .014 | Aug. 29 | 9,300 | .279 | Apr. 10 | 8,010 | .207 | Aug. 31 | 2,740 | .101 |
| Dec. 2 | 2,890 | .006 | Sep. 8 | 4,350 | .375 | Apr. 17 | 2,170 | .019 | Sep. 30 | 2,720 | .021 |
| Dec. 16 | 2,640 | .006 | Sep. 9 | 31,940 | .303 | Apr. 21 | 28,360 | .353 | Oct. 14 | 2,580 | .056 |
| | | | Sep. 11 | 32,500 | .328 | Apr. 28 | 3,750 | .142 | Oct. 30 | 2,280 | .075 |
| 1925 | | | Sep. 14 | 27,380 | .292 | May 15 | 3,230 | .126 | Nov. 30 | 2,380 | .017 |
| Jan. 2 | 2,510 | .008 | Sep. 30 | 6,820 | .099 | May 29 | 2,480 | .125 | | | |
| Jan. 16 | 2,630 | .003 | Oct. 14 | 9,070 | .118 | June 16 | 3,650 | .152 | | | |

*Gravimetric Percentages of Dried Silt in the Rio Grande at Roma, Texas as Determined from Water Samples During 1924-1926*

| Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | | 1925 | | | 1925 | | | 1926 | | |
| June 16 | 2,810 | .040 | Jan. 15 | 2,820 | .030 | Aug. 3 | 24,110 | .848 | Feb. 25 | 2,250 | .010 |
| July 3 | 2,880 | .210 | Jan. 26 | 2,810 | .028 | Aug. 4 | 11,860 | .837 | Mar. 25 | 1,580 | .008 |
| July 28 | 2,610 | .028 | Feb. 12 | 2,570 | .023 | Aug. 24 | 10,930 | .712 | Apr. 12 | 1,450 | .007 |
| Aug. 14 | 2,250 | .052 | Feb. 23 | 2,500 | .018 | Sep. 8 | 52,580 | .910 | Apr. 22 | 43,790 | .937 |
| Aug. 28 | 2,440 | .040 | Mar. 5 | 2,430 | .011 | Sep. 11 | 57,350 | .920 | Apr. 23 | 42,090 | .956 |
| Sep. 11 | 2,730 | .019 | Mar. 23 | 3,450 | .107 | Oct. 8 | 12,480 | .612 | May 13 | 4,970 | .853 |
| Sep. 16 | 34,320 | .925 | Apr. 9 | 2,100 | .110 | Oct. 26 | 9,010 | .609 | May 27 | 4,170 | .843 |
| Sep. 20 | 28,540 | .171 | Apr. 27 | 1,430 | .010 | Nov. 30 | 3,360 | .016 | June 14 | 3,880 | .635 |
| Sep. 25 | 48,130 | .447 | May 11 | 5,480 | .205 | Dec. 7 | 3,060 | .017 | July 15 | 2,730 | .657 |
| Oct. 6 | 10,330 | .822 | May 25 | 1,490 | .008 | Dec. 28 | 2,610 | .012 | July 29 | 1,750 | .504 |
| Oct. 30 | 5,460 | .207 | May 30 | 62,350 | .935 | | | | Aug. 17 | 1,180 | .566 |
| Nov. 10 | 4,550 | .206 | June 11 | 5,530 | .215 | 1926 | | | Sep. 30 | 4,120 | .372 |
| Nov. 24 | 4,280 | .021 | July 9 | 2,740 | .210 | Jan. 11 | 2,860 | .014 | Oct. 11 | 4,240 | .375 |
| Dec. 11 | 3,600 | .027 | July 27 | 3,720 | .111 | Jan. 28 | 2,540 | .011 | Oct. 25 | 4,960 | .338 |
| Dec. 25 | 3,250 | .028 | July 29 | 3,010 | .213 | Feb. 11 | 2,590 | .010 | | | |

*Gravimetric Percentages of Dried Silt in the Rio Grande at Matamoros, Tamaulipas as Determined from Water Samples During 1924-1926*

| Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % | Date | Sec. Ft. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | | 1925 | | | 1925 | | | 1926 | | |
| Apr. 17 | 2,270 | .018 | Jan. 5 | 4,690 | .013 | Sep. 21 | 19,680 | .573 | May 17 | 5,650 | .048 |
| Apr. 24 | 1,480 | .035 | Jan. 19 | 3,580 | .011 | Oct. 5 | 21,180 | .582 | June 7 | 7,280 | .071 |
| June 2 | 9,990 | .266 | Feb. 6 | 2,580 | .008 | Oct. 19 | 16,720 | .432 | June 22 | 2,880 | .017 |
| June 23 | 2,310 | .061 | Feb. 18 | 1,360 | .007 | Nov. 2 | 8,850 | .201 | July 5 | 20,370 | .562 |
| June 26 | 3,960 | .050 | Mar. 2 | 669 | .008 | Nov. 17 | 5,090 | .173 | July 19 | 7,130 | .075 |
| July 3 | 1,800 | .027 | Mar. 16 | 283 | .005 | Nov. 30 | 4,360 | .171 | Aug. 2 | 5,780 | .510 |
| July 7 | 4,830 | .260 | Mar. 30 | 3,220 | .067 | Dec. 7 | 25,420 | .172 | Aug. 16 | 5,160 | .481 |
| July 17 | 1,190 | .015 | Apr. 13 | 1,620 | .029 | Dec. 21 | 4,530 | .170 | Aug. 30 | 15,990 | .527 |
| Aug. 6 | 1,420 | .023 | Apr. 27 | 862 | .022 | | | | Sep. 6 | 11,070 | .428 |
| Aug. 21 | 722 | .017 | May 3 | 6,910 | .273 | 1926 | | | Sep. 20 | 12,550 | .488 |
| Sep. 4 | 520 | .006 | May 11 | 1,550 | .105 | Jan. 4 | 4,810 | .014 | Oct. 4 | 4,930 | .394 |
| Sep. 15 | 2,660 | .040 | May 25 | 1,130 | .033 | Jan. 18 | 4,580 | .014 | Oct. 18 | 25,640 | .556 |
| Sep. 18 | 19,990 | .817 | June 4 | 20,510 | .587 | Feb. 1 | 4,690 | .014 | Nov. 2 | 27,930 | .596 |
| Oct. 4 | 11,530 | .170 | June 9 | 9,550 | .224 | Feb. 15 | 3,730 | .018 | Nov. 16 | 4,120 | .179 |
| Oct. 15 | 14,760 | .410 | June 22 | 4,760 | .071 | Mar. 1 | 2,810 | .011 | Nov. 29 | 3,900 | .077 |
| Oct. 27 | 6,860 | .084 | July 6 | 3,610 | .026 | Mar. 16 | 2,570 | .010 | Dec. 6 | 3,450 | .020 |
| Nov. 10 | 5,070 | .079 | July 20 | 7,030 | .207 | Mar. 29 | 3,780 | .015 | Dec. 21 | 4,300 | .022 |
| Nov. 24 | 4,270 | .033 | Aug. 3 | 3,420 | .012 | Apr. 5 | 2,920 | .015 | | | |
| Dec. 8 | 5,040 | .276 | Aug. 18 | 22,830 | .574 | Apr. 14 | 2,610 | .018 | | | |
| Dec. 22 | 4,050 | .034 | Sep. 7 | 12,450 | .182 | May 4 | 14,290 | .593 | | | |