

Mailtrail Creek near Loma Alta, Texas

(Miscellaneous ungaged site in the Rio Grande River basin,
USGS Texas Water Science Center)

Review of peak discharge for the flood of June 24, 1948

Location: This flood was located about 43 mi north of Del Rio, Tex., at 29.9792 N and 100.7375 W.

Published peak discharge: The peak discharge for this site, as published in Asquith and Slade (1995), is 170,000 ft³/s. The rating is poor.

Drainage area: 75.3 mi².

Data for storm causing flood: The following information is given in the original field notes for this flood:

“John Galloway, who has lived for 45 years on the right bank about ½ mile above slope reach, states that this flood was 2 to 3 feet higher than known before; the previous maximum stage occurring in 1932. He measured 22”+ of rainfall at his ranch, with rain beginning in morning and continuing about 12 hours. He stated there were 3 peaks, the highest coming at about 10 a.m.”

Historical photographs taken after the June 24, 1948, flood and during the 2003 review and described herein are provided in figures A42–A58.

Method of peak discharge determination: The peak discharge for this site is based on a three-section slope-area measurement. All flow was in one channel. High-water profiles were defined on both banks, although the right-bank profile is poorly defined with only a few high-water marks. The left-bank profile is well defined. The reach is straight. The original computations attempt to use all three cross sections, but the final result of 170,000 ft³/s is based on only the middle (section 2) and downstream (section 3) cross sections. Roughness coefficients appear reasonable based on the original photographs.

Two separate slope-area computation (SAC) analyses were conducted for this review. The first SAC analysis used all three cross sections, with cross-section subdivisions and roughness coefficients used as in the original computations. Water-surface elevations for the cross sections also were the same as the original computations. This SAC analysis attempted to duplicate the original computations as closely as possible.

The reach is contracting throughout. The SAC peak discharge using all three cross sections is 175,000 ft³/s (3 percent higher than the published peak discharge). The SAC peak discharge, based on sections 2 to 3, was 168,000 ft³/s (1 percent less than the published peak discharge). Average cross-sectional area is 13,200 ft², average velocity is 13.4 ft/s, and Froude numbers ranged from 0.61 (section 1), to 0.74 (section 2), and 0.98 (section 3).

The second SAC analysis used all three cross sections; however, subdivisions of cross sections were somewhat different than the original, and roughness coefficients were slightly different to conform to the different subdivisions. Water-surface elevations for the cross sections were the same as the original computations. This second SAC analysis yielded peak discharges of 172,000 ft³/s for a three-section computation and 169,000 ft³/s for a two-section (sections 2 and 3) computation. The reach is contracting, and cross-section properties are similar to those for the first SAC analysis.

Possible sources of error: The water-surface profile probably is the primary source of error. Other interpretations of the water-surface elevations at each cross section could be made. The lack of good high-water profile definition on the left bank is the primary uncertainty. Cross-section subdivision in the original computations was not done exactly as currently practiced by the USGS; however, the method used did not introduce any significant error. In addition, cross sections are too close together, but the reach is contracting throughout, which is a good feature. Froude numbers are reasonable.

Recommendations of what could have been done

differently: This is a good slope-area measurement made under poor field conditions, and it is doubtful that anything could have been done to improve the results.

Site visit and review: A field visit was made to the site on May 13, 2003, by John Costa (USGS Office of Surface Water), John England (Bureau of Reclamation), and Vernon Sauer and Raymond Slade (USGS). The site was located using latitude and longitude with GPS. Physical markers were not available to locate cross sections. The site is described as being 1.0 mi upstream of U.S. Highway 277 and 0.5 mi downstream of the Galloway Ranch house. The ranch house was located on the basis of conversations with local ranchers.

The channel appears to be much more densely vegetated in 2003 than it was in 1948 based on photographs taken when the slope-area measurement was made. There is no clearly defined main channel but rather a wide flood plain consisting of gravel, large cobbles, and small boulders. The main flow area is about 1,000 ft wide. A small bench or overflow area is indicated on the left side by the cross sections surveyed in 1948. The right side has steep banks. In 2003, a rather dense growth of scrub mesquite was observed throughout the site.

An interview with local ranchers indicated that the flood of 1948 rose quickly, giving no time to evacuate livestock from the flood area. Many sheep, goats, cattle, and horses were swept away by the flood. Ranch equipment of various sorts also was washed away. Velocities were very high, and the water surface had what the ranchers described as large waves.

Recommendation: The original peak discharge of 170,000 ft³/s should be accepted as published and rated poor.



Figure A42. View looking downstream at downstream cross section from near center of channel, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A43. View looking downstream at downstream cross section from near right bank, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A44. View looking downstream of downstream cross section to right of center of main channel, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A45. View looking across channel from right bank near downstream cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A46. View looking downstream from center channel at upstream cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A47. View looking downstream from right bank at upstream cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A48. View looking downstream from near center of channel at upstream cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A49. View looking downstream from left side of main channel at upstream cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A50. View looking downstream from right bank at middle cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A51. View looking downstream at middle cross section—left-bank overflow, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A52. View looking downstream from near center of channel at middle cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A53. View looking downstream from near center of main channel at middle cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A54. View looking downstream from left side of main channel at middle cross section, Mailtrail Creek near Loma Alta, Texas, flood of June 24, 1948.



Figure A55. View looking upstream from channel in slope-area reach, Mailtrail Creek near Loma Alta, Texas, May 13, 2003.



Figure A56. View looking upstream near upstream cross section of slope-area reach, Mailtrail Creek near Loma Alta, Texas, May 13, 2003.



Figure A57. View looking downstream from slope-area reach, Mailtrail Creek near Loma Alta, Texas, May 13, 2003.



Figure A58. View looking downstream from U.S. Highway 277 bridge below slope-area reach, Mailtrail Creek near Loma Alta, Texas, May 13, 2003.

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