West Fork Nueces River near Cline, Texas

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

Note: This site was originally named “8 miles above Cline,” later changed to “24 miles downstream from gage near Brackettville,” and on some documents just “near Brackettville.” The current publication name “near Cline” was assigned at some later date. The measurement site is officially described as 24 mi downstream from gage near Brackettville.

Review of peak discharge for the flood of June 14, 1935

Location: The flood was located about 18 mi east of Bracketville, Tex., at 29.3383 N and 100.1102 W.

Published peak discharge: The peak discharge for this miscellaneous site, as published in Asquith and Slade (1995), is 536,000 ft^3/s. The rating is fair.

It is important to note that this site is not one of the 28 extraordinary floods reviewed in this report. However, it is necessary to review this measurement because it is used in conjunction with the measurement at Kickapoo Springs, Tex., to define the peak discharge at gaging station 08190500, West Nueces River near Brackettville, Tex., for the June 14, 1935, flood. The gaging-station peak discharge is one of the 30 peak discharges selected for this review.

Drainage area: 880 mi^2.

Data for storm causing flood: Very little information is available for the June 1935 storm in the Nueces River basin. Paulson and others (1991) has a short narrative for the South Llano and James River basins, which are just north of the Nueces River basin. Paulson and others (1991) indicate that intense rainfall of more than 18 in. fell during June 9–15, 1935, in the South Llano and James River basins that created record floods at several points in these basins. Other information could not be found for rainfall in the Nueces River basin. Historical photographs taken after the June 14, 1935, flood and during the 2003 review and described herein are provided in figures A69–A75.

Method of peak discharge determination: The peak discharge for this site is based on a two-section slope-area computation. All flow was in one channel. High-water profiles were defined on both banks, although the two profiles are quite different— the left-bank profile is considerably steeper than the right-bank profile and the right-bank profile is well defined with many high-water marks. The right-bank profile indicates the possibility of standing waves, whereas the left-bank profile does not have many high-water marks, and there is a fairly large scatter of the marks in the downstream end of the reach. The slope defined by the left-bank profile is twice the slope defined by the right-bank profile. The analyst of the original computations used the upstream high-water marks for the left-bank profile and averaged the high-water marks on the right bank.

The original computations used a roughness coefficient of 0.04 for both cross sections with no subdivision. This computation was a simple application of Manning’s equation and used the average slope defined by the high-water profiles. Corrections were not made for velocity head differences, although differences would have been small because the two cross sections were nearly the same with a slightly contracting reach. The average cross-sectional area used in the original computations was 33,900 ft^2. Average velocity in the reach was 15.6 ft/s.

For this review, two separate slope-area computation (SAC) analyses were conducted. The first analysis used the original two cross sections and the same profiles used in the original computations in an attempt to duplicate the original computations. A peak discharge of 518,000 ft^3/s was computed. The reach is slightly contracting with Froude numbers of 0.59 (upper) and 0.61 (lower).

The second SAC analysis used subdivided cross sections and variable roughness coefficients. The cross sections were subdivided primarily on the basis of shape, with roughness coefficients assigned on the basis of the field-note descriptions and the photographs. The same water-surface elevations were used as in the first SAC analysis. The peak discharge was computed as 509,000 ft^3/s. Area, velocity, and Froude numbers were similar to those from the first SAC analysis.

On the basis of the two SAC analyses, the original computed discharge may be about 3 to 5 percent too high. However, this difference can be accounted for by different interpretations of the left-bank high-water profile and slightly different roughness coefficients. A significant shortcoming of this measurement is that the reach is too short. The channel is about 1,700 ft wide, and the distance between cross sections is only 700 ft. The fall in the reach is 2.25 ft.

Possible sources of error: The interpretation of the high-water profiles and the fact that one bank indicates a much steeper slope than the other are the most likely sources of error. The shortness of the reach is another possible source of error. Froude numbers are small considering the magnitude of this flood.

Figure A69. View looking across and upstream towards left bank from downstream cross section, West Nueces River 8 mi upstream of Cline, Texas. June 1935.

Recommendations of what could have been done differently: A longer reach with an additional cross section would have been appropriate.

Site visit and review: A field visit was made to the site on May 14, 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 main channel is relatively flat and open. The streambed consists of gravel, large cobbles, and small boulders. Both banks have a fairly dense growth of small trees and brush.

Possible sources of error: This seems to be a good slope-area measurement site; however, the uncertainty of the left-bank profile and the fact that one bank indicates a much steeper slope than the other are the main possibilities of error. Another problem is that the two cross sections are too close together, but the reach is uniform and slightly contracting, which is a good feature. Froude numbers are reasonable.

Recommendation: The original peak discharge of 536,000 ft^3/s should be accepted as published.

Figure A70. View looking at West Nueces River 8 mi upstream of Cline, Texas, June 1935.

Figure A71. View looking upstream of downstream cross section at station 1, West Nueces River 8 mi upstream of Cline, Texas, June 1935.

Figure A72. View looking toward left bank and downstream of upstream cross section, West Nueces River 8 mi upstream of Cline, Texas, June 1935.

Figure A73. Coarse bed material in slope-area reach of West Nueces River 8 mi upstream of Cline, Texas, June 2003.

Figure A74. View looking upstream of slope-area reach, West Nueces River 8 mi upstream of Cline, Texas, June 2003.

Figure A75. View looking downstream of slope-area reach, West Nueces River 8 mi upstream of Cline, Texas, June 2003.