08190500 West Fork Nueces River near Brackettville, Texas

(Gaging station in the Nueces River basin, USGS Texas Water Science Center)

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

Location: This flood was located about 15 mi northeast of Bracketville, Tex., at 29.4725 N and 100.2361 W.

Published peak discharge: The peak discharge for this gaging station is 550,000 ft^3/s, as published in the gaging-station Peak-Flow File, as a historical peak. The stream-gaging station did not exist in 1935. No rating is given to this extrapolated flood discharge.

Drainage area: 694 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. That report indicates 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. Photographs taken during the 2003 review and described herein are provided in figures A66–A68.

Method of peak discharge determination: The published peak discharge for this site is based on drainage-area interpolation using base-10 logarithms of the peak discharges on the West Fork Nueces River near Cline, 24 mi downstream, and near Kickapoo Springs, 33 mi upstream. The peak discharges for the Cline and Kickapoo Springs sites were determined by slope-area measurements that have been reviewed as a part of this study. Data for these sites are as follows:

Kickapoo Springs
Drainage area = 402 mi^2 Q = 580,000 ft^3/s (slope-area computation [SAC] program)

Brackettville (gage)
Drainage area = 694 mi^2 Q = 549,000 ft^3/s (interpolation)

Cline
Drainage area = 880 mi^2 Q = 536,000 ft^3/s (SAC program)

The precise interpolation gives a peak discharge of 549,000 ft^3/s. This apparently was rounded to 550,000 ft^3/s, which seems reasonable.

The published peak discharge for the gaging station also is confirmed with good agreement from the high-water rating for the gaging station. The peak stage at the gaging station for the 1935 flood is published in the Peak Flow File as 40.00 ft and is based on floodmarks for the 1955 flood and local resident information. Considering the method used to determine this stage, it would be better to publish this as 40.0 ft or possibly 40 ft. The method used to determine the peak stage is summarized below.

> 1935 flood, stage = 48.0 ft at a site 0.6 mi upstream (two high-water marks pointed out by local resident Mr. L.E. Bruce, in 1955).
>
> 1935 flood, stage estimated as 48.0 – 8.1 = 39.9 ft (rounded to 40.0 ft).
>
> 1955 flood, stage = 35.2 ft at a site 0.6 mi upstream, from floodmarks.
>
> 1955 flood, stage = 27.1 ft at gaging station. Difference 35.2 – 27.1 = 8.1 ft (fall in reach 0.6 mi).

Possible sources of error: Interpolation methods of this type are subject to uncertainties, especially in a reach of about 60 mi and with a drainage-area increase of 100 percent. It is unlikely that the peak traveled for such a distance without considerable attenuation. Therefore, there must have been significant contributions from tributaries along the reach to sustain the peak discharge at a level of more than 500,000 ft^3/s. The rating curve is the best confirmation provided the peak stage at the gaging station is accurate.

Recommendations of what could have been done differently: Considering that the gaging station was not established until 5 years after the peak discharge occurred, the two methods used probably were the best that could be done.

Site visit and review: A field visit was made to the gaging station on May 13, 2003, by John Costa (USGS Office of Surface Water), John England (Bureau of Reclamation), and Vernon Sauer and Raymond Slade (USGS).

Recommendation: The original peak discharge of 550,000 ft^3/s should be accepted as published.

Considering that the peak discharge is confirmed by two independent methods of computation, it can be published without qualification. The peak stage should be published as “about 40 ft or about 40.0 ft.” The use of hundredths of a foot is not warranted.

Figure A66. View looking from left to right bank, West Nueces River near Brackettville, Texas, May 13, 2003.

Figure A67. View looking downstream of streamflow-gaging station, West Nueces River near Brackettville, Texas, May 13, 2003.

Figure A68. View from right to left bank at streamflow-gaging station, West Nueces River near Brackettville, Texas, May 13, 2003.