

Seco Creek near D'Hanis, Texas

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

Review of peak discharge for the flood of May 31, 1935

Location: This flood site is located at 29.4750 N and 99.3000 W about 11 mi north of D'Hanis, Tex.

Published peak discharge: The peak discharge for this site is 230,000 ft³/s, as published in Crippen and Bue (1977). The rating is poor.

Drainage area: 142 mi².

Data for storm causing flood: Storm data could not be found for this flood. A large storm occurred in June 1935 that caused major floods on the West Nueces River as well as other streams in West Texas. The June 1935 storm was preceded by a major storm in May 1935 that caused a large peak discharge on Seco Creek. This is confirmed by several gaging-station records in the area that show a major peak discharge occurring on or about May 31, 1935. Historical photographs taken after the May 31, 1935, flood and during the 2003 review and described herein are provided in figures A1–A6.

Method of peak discharge determination: The peak discharge for this site is based on a two-section slope-area measurement. The high-water profile was defined for only one bank, and it is not clear if this was the left or right bank. The profile is uniform and fairly well defined, although there are no high-water marks within 60 ft of the downstream cross section. About 200 ft downstream of the downstream cross section, the profile seems to define a hydraulic jump of about 3 ft. The reach is straight. Roughness coefficients appear reasonable on the basis of the original photographs. Cross sections are too close together. About 90 percent of the total flow was in the main channel, with about 10 percent estimated in an overflow channel.

A slope-area computation (SAC) analysis was made for this review using the cross sections, water-surface elevations, and roughness coefficients as defined for the original computations. This SAC analysis attempted to duplicate the original computations as closely as possible. The reach was contracting. The SAC results indicated a discharge of 208,000 ft³/s, for the main channel as compared to 209,000 ft³/s for the original computations. Adding the estimated flow of 20,800 ft³/s, the total peak discharge was computed as 229,000 ft³/s (less than 1 percent less than the published peak discharge). Average main-channel cross-sectional area was 11,800 ft², average velocity was 17.6 ft/s, and Froude numbers ranged from 0.67 (upstream section) to 0.92 (downstream section).

Possible sources of error: The lack of a high-water profile for one bank is the most obvious source of error. In addition, the two cross sections are too close together, but the reach is contracting, which is a good feature. Otherwise, SAC computations confirm the original computations very closely, and the Froude numbers are reasonable. The 10 percent estimated overflow definitely is a possible source of error, and there is no way to verify this flow.

Recommendations of what could have been done differently:

A high-water profile should have been obtained for both banks. This might have been difficult or impossible considering that there was overbank flow on one side, which may have made it difficult to find high-water marks. The field notes do not describe this very well.

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 site is described as being 11 mi upstream of D'Hanis, Tex.

The channel is straight and fairly wide and flat, composed of gravel, large cobbles, and small boulders. Scattered vegetation exists throughout the center part of the main channel, and both banks are heavily vegetated with mesquite and other trees. The main flow area is 200–300 ft wide in the lower part of the channel, with a top width of 600–800 ft. An attempt was made to locate the overflow area for which the flow was estimated. This area could not be located with any certainty, although a few low swales on the right side may have been the overflow area.

During the field visit, a local rancher (Mr. Rothe) drove up to inquire as to why we were there. He was the owner of the land adjacent to the indirect measurement site. Mr. Rothe stated that the flood of 1935 was the highest in his memory. He was in his teens at the time of the flood. It was interesting to note that a person named Rothe is listed in the field notes and assisted Tate Dalrymple in the 1935 survey. This person was the father of the current Mr. Rothe.

Recommendation: The original peak discharge of 230,000 ft³/s should be accepted as published and rated as poor.

Any additional SAC analyses using different interpretations of the high-water profile would be pure speculation and would not be sufficient grounds for revising the original result.



Figure A1. View looking upstream of lower cross section, Seco Creek, Texas, June 8, 1935.



Figure A2. View looking upstream along right bank of lower cross section, Seco Creek, Texas, June 8, 1935.



Figure A3. View looking toward left bank at lower cross section, Seco Creek, Texas, June 8, 1935.



Figure A4. View from right to left bank near middle of slope-area reach, Seco Creek, Texas, June 8, 1935.



Figure A5. Slope-area reach of Seco Creek, Texas, looking upstream, June 2003.



Figure A6. Coarse materials in channel and flood plain of Seco Creek, Texas, June 2003. View toward right bank in slope-area reach. Notebook for scale.