DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE COUNTY OF HILLSBOROUGH
AND
THE CITY OF TAMPA, FLORIDA

HYDROLOGIC INVESTIGATIONS
ATLAS HA-66 (SHEET 1 OF 2)

Base from U S Geological Survey topographic quadrangles: Sulphur Springs, 7½', 1944 and Tampa, 7½', 1943

EXPLANATION

HILLSBOROUGH RIVER FLOOD TABLE

Flood heights at the Geological Survey gaging station on Hillsborough River at 22d Street. Overflow limits are shown only for the March 1960 flood

Date of flood	Elevation above mean sea level (feet)
September 1933	19.5 (approximate)
March 21, 1960	16.54

FLOODS ON THE HILLSBOROUGH RIVER AT TAMPA, FLORIDA, 1960

The approximate areas inundated by floods on the Hillsborough River in the vicinity of Tampa, Fla., during March 1960, are shown on a topographic map. Greater floods have occurred on the Hillsborough River, but their overflow limits are not defined. New highways and other cultural changes may influence the inundation pattern of future floods.

The preparation of this flood inundation map was financed through a cooperative agreement between the county of Hillsborough and the city of Tampa and the U. S. Geological Survey.

Much of the flood-boundary data in the area between Hillsborough Avenue and 22d Street was furnished by the city of Tampa Engineering Department.

Regulation.--Although flow of the Hillsborough River at Tampa has been subject to regulation by the Tampa waterworks dam since Oct. 1, 1945, the effect of regulation on floodflows has been small.

Floods experienced.--The maximum known flood on the Hillsborough River in the vicinity of Tampa, Fla., since 1930 or earlier, occurred in September 1933. It was about 3 feet higher than the flood of March 1960 in the reach between Sligh and Nebraska Avenues. In the lower reaches of Hillsborough River the 1933 flood was augmented by the failure of the Tampa Electric Co. dam, which was at the site of the present waterworks dam.

The second highest flood on the Hillsborough River since 1930 was that of March 1960, the greatest of three damaging floods of 1960. However, above the Tampa waterworks dam, in a 3-mile reach affected by regulation of the dam, and also upstream from the mouth, in a 4-mile reach affected by high tides in Hillsborough Bay, the height of the July-August flood was greater than that of March. The flood of September 1960, caused by hurricane Donna, was the lowest of the three major 1960 floods in the vicinity of Tampa.

Flood height.--The height of a flood at a gaging station is usually stated in terms of the gage height or stage which is the elevation of the water surface above a selected datum plane. Elevations shown are in feet above mean sea level, datum of 1929. Figure 1 shows the

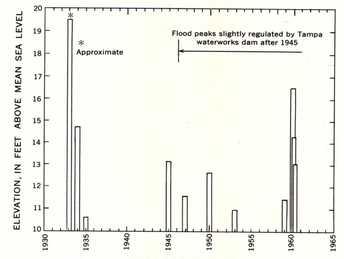

FIGURE 1.—FLOODS ABOVE 10-FOOT ELEVATION, 1933–61, HILLSBOROUGH RIVER AT TAMPA, FLORIDA (22D STREET)

peaks of all floods during the period 1933-61 that equaled or exceeded 10 feet in elevation at the 22d Street gaging station. The irregular nature of flood occurrence is evident. Although the 10-foot stage was exceeded 11 times in 29 years (fig. 1), no floods were experienced during the period 1936-44, whereas floods higher than the 10-foot stage occurred 3 times in 1960.

Flood frequency.--Frequency of floods at the Geological Survey gaging station on Hillsborough River at Tampa (22d Street) has been derived from a regional flood-frequency relation based on records for streams in central Florida. Flood-peak stages in the Tampa vicinity have been converted to equivalent stages at the Geological Survey gaging station at 22d Street. Extrapolation of flood-frequency curves is not recommended because of the possibility of large errors. Longer records and changes in the relation between stage and discharge at gaging stations in the Hillsborough River basin may in the future define somewhat different flood-frequency curves.

Recurrence intervals.--As applied to flood events, recurrence interval is the average interval of time within which a given flood height will be equaled or exceeded once. The recurrence interval is inversely related to the chance of a given flood height being equaled or exceeded in any one year. Thus, the 20-year flood has a 5 percent (1 in 20) chance of being equaled or exceeded in any one year. No regularity of occurrence is implied.

The general relation between recurrence interval and flood height at the 22d Street gaging station is shown graphically in figure 2

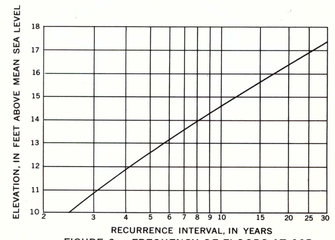

FIGURE 2.—FREQUENCY OF FLOODS AT 22D STREET ON HILLSBOROUGH RIVER AT TAMPA, FLORIDA

It is emphasized that recurrence intervals are average figures, the average number of years in which floods of specific gage height will be equaled or exceeded. Thus on Hillsborough River, a flood that reached a 14.2-foot stage is said to have a 9-year recurrence interval. However, the 14.2-foot stage was exceeded twice during 1960. Because of the erratic nature of flood occurrence, the 14.2-foot stage may not be reached again in the next 9 years or more or it may be reached more than once--the long term average recurrence interval for a 14.2-foot stage is about 9 years.

Flood profiles.--The profiles of the water surface along the Hillsborough River, constructed from marks left by the floods of March, August, and September 1960, are shown in figure 3. The stages for the flood of September 1933 at Nebraska Avenue and at 40th Street, are also shown. Profiles of floods corresponding to other flood heights can usually be plotted on this diagram generally parallel to those shown, although at times, tide effects may affect the shape of the profile in the downstream reaches. The effect of tides extends upstream to the lower pool at the Tampa waterworks dam. At flood stages, however, the effect of tides in the reach immediately below the dam is small. During the floods of March and August 1960, the water surface at the Sulphur Springs gage located at Nebraska Avenue, increased about 0.2 foot as a result of high tides occurring coincident with maximum streamflow. Downstream from Nebraska Avenue, the effects of high tides are more pronounced.

The abrupt changes in the profile shown at the waterworks dam and at some bridges, indicate the difference in water-surface elevations at the upstream and downstream sides of the structures.

Base line for the profiles is located along the centerline of the river. River miles above the mouth of Hillsborough River (Hillsborough Bay) used for the profiles of figure 3 are also marked along the river on the flood inundation maps.

Depth of flooding at any point can be estimated by substracting the ground elevation from the water-surface elevation indicated by the profiles of figure 3. The approximate ground elevation can be estimated from information indicated by contours of the map, although more accurate elevations can be obtained by leveling to bench marks. Land-fill operations after the flood of 1960 have raised the ground elevations in some areas.

Additional data.--Other information pertaining to floods at Tampa, Fla., may be obtained at the office of the U. S. Geological Survey, Ocala, Fla., and from the following published reports:

Pride, R. W., 1958, Floods in Florida, magnitude and frequency: U. S. Geol. Survey open-file report.

U. S. Geological Survey, 1960, Compilation of records of surface waters of the United States through September 1950, Part 2-B, South Atlantic slope and Eastern Gulf of Mexico basins, Ogeechee River to Pearl River; U. S. Geol. Survey Water-Supply Paper 1304.

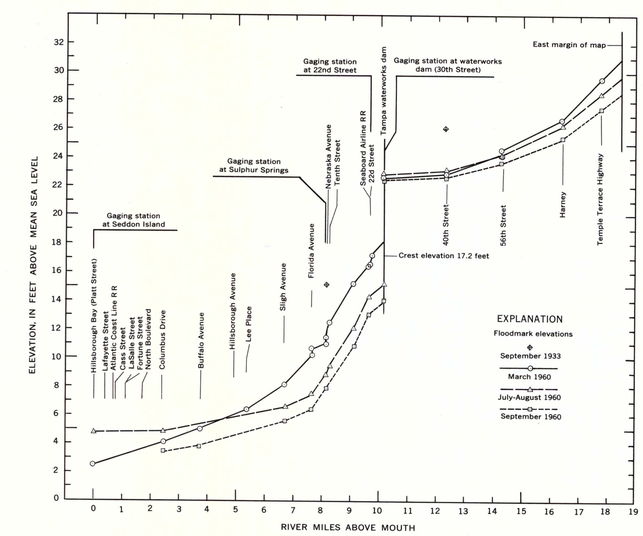

FIGURE 3.—PROFILES OF FLOODS ON HILLSBOROUGH RIVER AT TAMPA, FLORIDA

FLOODS AT TAMPA, FLORIDA

By
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