

This report provides a record of flood events and interprets hydrologic information relating to floods on Ríos Yagüez and Guanajibo in the Mayagüez area of western Puerto Rico (fig. 1). The information contained in the report can be used to improve the basis for decisions regarding land use in the flood-prone areas shown by the map. Flood data are tabulated, areas of inundation are delineated, and water-surface profiles and contours are shown to give a record of floods that have occurred. Analyses of data are given to indicate the frequency and magnitude of floods that can be expected to occur in the future.

Floods on Río Yagüez often have inundated areas of the city of Mayagüez. The areas inundated by the floods of March 3, 1933, and July 30, 1963, are shown on the topographic base map. The 1933 flood was the greatest since at least 1899. In contrast, the 1963 flood was a moderate one although much urban area was inundated. In the area of this report Río Yagüez is crossed by five bridges, all within the city of Mayagüez. In downstream order, they are located at Calle Balboa (Highway 106), Calle Luna (Highway 108), Calle Post (Spur Highway 2), Avenida Eugenio María de Hostos (Highway 2), and Calle Concordia (Highway 102). Avenida Eugenio María de Hostos was constructed in 1961 but there were bridges at the other crossings prior to 1933.

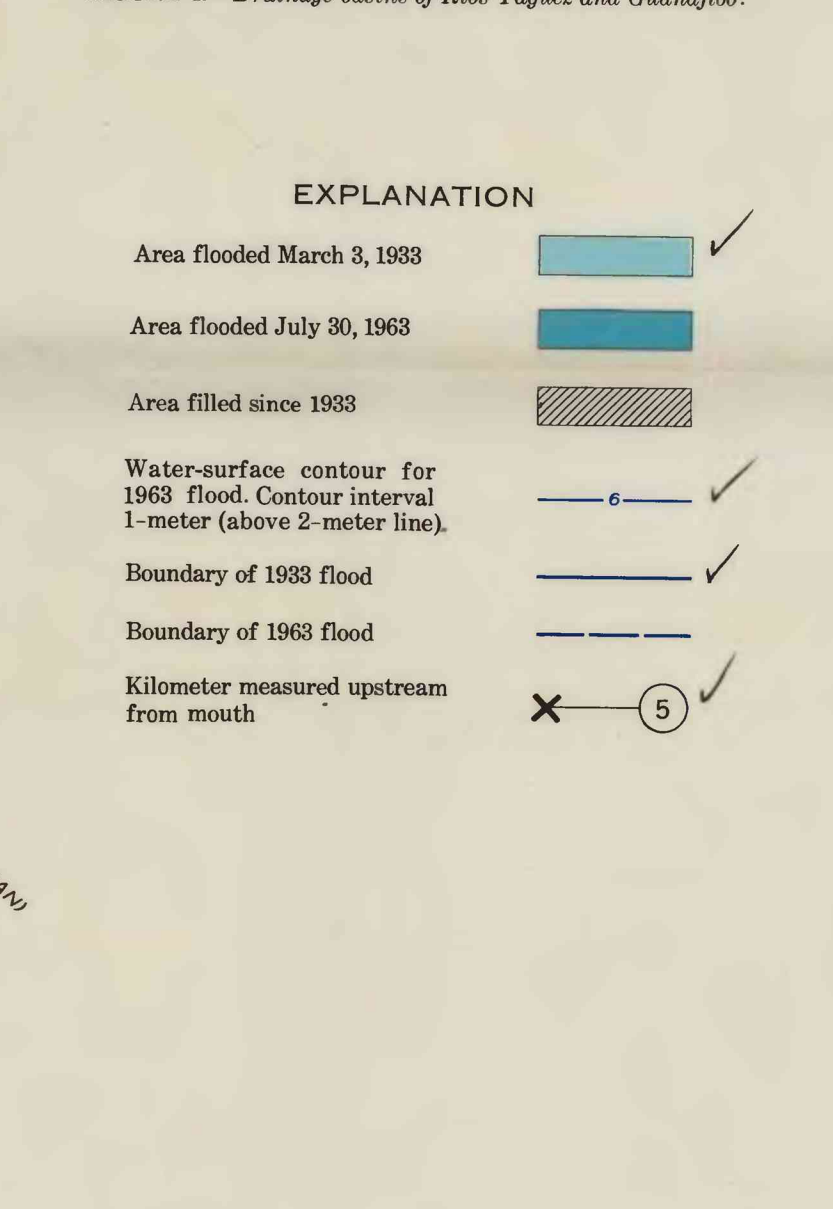
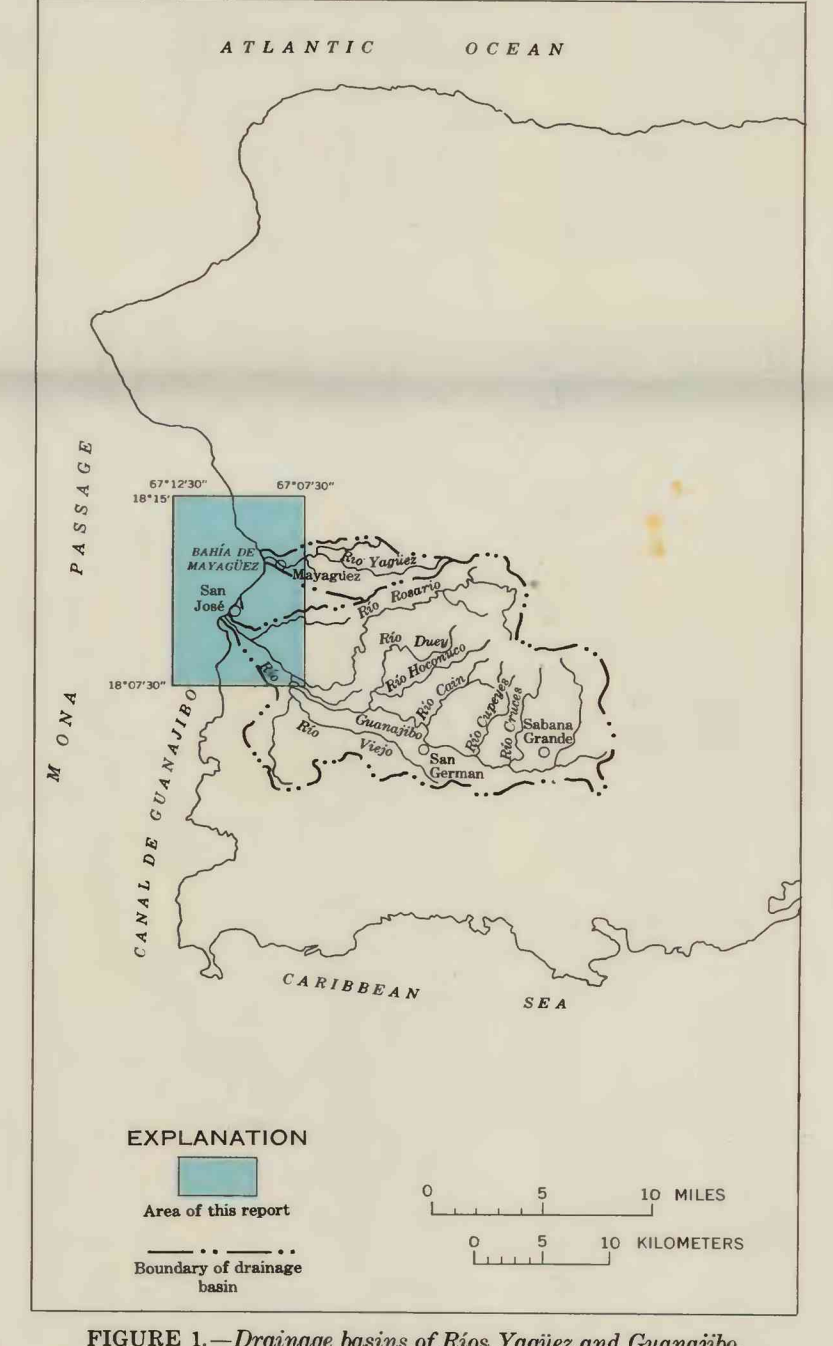
Floods on Río Guanajibo have inundated large areas of agricultural land and many kilometers of highways. The approximate area inundated by the flood of July 30, 1963, in the study area is delineated on the map. Areas flooded by Río Guanajibo to the east and southeast of the study area are so extensive that they warrant presentation in a separate report that will be prepared at a later date.

Delineation of the areas of inundation was based on floodmarks and reflect conditions that existed at the time of the floods. Many changes have been made and are being made in the flood plains of these rivers. Continued alterations to the topography of the valleys will result in altered patterns of inundation.

Drainage basins.—Río Yagüez heads in the mountains east of Mayagüez, at an elevation of about 400 meters. The average slope of the stream is about 0.025 upstream from the study area and less than 0.004 within the area. This is a change in average slope from a fall of 25 meters per kilometer to less than 4 meters per kilometer. The drainage basin is narrow, having a length-width ratio of about 10 to 1, and a total area of 13.7 square miles.

Río Guanajibo originates in the mountains at an elevation of about 800 meters, flows southward to the town of Sabana Grande and then generally westward for about 30 kilometers to the Mona Passage (fig. 1). The river is fed by a series of tributaries that also have their sources in the mountains to the north of the river. The average slopes of the tributary streams are steep, ranging from 0.026 to more than 0.08, but the average slope of Río Guanajibo from Sabana Grande to the mouth is about 0.0028. The average slope of the river in the study area is only 0.0014. The total drainage area of Río Guanajibo is 127 square miles.

Considering the different size of drainage areas, it is probable that an intense small-area storm that could cause severe flooding on Río Yagüez would not cause general flooding on Río Guanajibo.



Flood occurrence.—The greatest flood known on Río Yagüez occurred on March 3, 1933. A 24-hour precipitation of 17.40 inches at Mayagüez was recorded for that date by the U.S. Weather Bureau. Floodmark data are not available for earlier floods but information from local residents indicates that the 1933 flood was the greatest since the flood of August 8, 1899, and might have been greater than the 1899 flood. Data for known floods on Río Yagüez at Calle Post are shown in the following table.

Date of flood	Elevation above mean sea level at Calle Post (meters)	Discharge at Calle Post (cfs)	Recurrence interval (years)
Aug. 8, 1899	<7.39		
Sept. 18, 1928	7.39	25,000	60
Mar. 3, 1933	8.50	3,000	5
Dec. 3, 1959	8.50	4,800	3
July 30, 1963	8.60	6,300	10
Sept. 17, 1966	8.60	6,300	10

*Cubic feet per second.

The earliest and largest flood on Río Guanajibo for which elevation data are available occurred on September 23, 1952. Floods inundating large areas of land occurred at least four times during the period 1953-63 but no other major flood had occurred up to 1967. The discharge of floods on Río Guanajibo has not been determined. Known flood data on Río Guanajibo at the Departamento de Hacienda bonded run warehouse, profile kilometer 5.6, are tabulated below.

Date of flood	Elevation above mean sea level at kilometer 5.6 (meters)
Sept. 23, 1952	8.86
Sept. 24, 1954	8.22
Dec. 3, 1959	8.22
May 17-18, 1963	7.86
July 30, 1963	8.86

Flood frequency.—It is not possible to predict when a flood of specific magnitude will occur. However, it is possible to estimate the long-time average interval between the occurrence of floods of selected magnitudes if a sufficiently long record of floods is available. Stage- and discharge-frequency relations for Río Yagüez at Calle Post are shown in figure 2. These relations will change if the hydraulic characteristics of the valley are changed.

