Storm-Tide Elevations Caused by Hurricane Marilyn on the U.S. Virgin Islands, September 15-16, 1995

By Heriberto Torres-Sierra

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5. Christiansted Harbor
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9. Halfpenny Bay
10. Container Port
11. Cyril King Airport
12. St. Thomas Harbor
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14. Rendezvous Bay
15. Coral Harbor
16. Johnson Bay

CONVERSION FACTORS AND ACRONYMS

Multiply	By	To obtain
inch	25.4	millimeter
foot	0.3048	meter
mile	1.609	kilometer
mile per hour	1.609	kilometer per hour
acre	0.4047	hectare

Acronyms used in this report:

FEMA	Federal Emergency Management Agency
NOS	National Ocean Service
NWS	National Weather Service
USACE	United States Army Corps of Engineers
USCGS	United States Coastal and Geodetic Survey
USGS	United States Geological Survey
USVI	United States Virgin Islands

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Abstract

Hurricane Marilyn impacted the U.S. Virgin Islands with maximum reported winds gusting to near 130 miles per hour from late at night on September 15 to early morning on September 16, 1995. As much as 11.40 inches of rain fell on the island of St. Croix near the airport on September 15. Most of the hurricane damage in the U.S. Virgin Islands resulted from high wind velocities and tidal flooding along coastal areas. At least nine people died and thousands were left homeless as a result of the hurricane. St. Thomas was particularly hard hit; 80 percent of the buildings were damaged or destroyed, six people were killed, and thousands were left homeless.

High-water marks produced by the storm tide from Hurricane Marilyn during September 15-16, 1995, were identified, described, and level-surveyed along the populated coastal areas of Charlotte Amalie in St. Thomas, Cruz Bay and Coral Bay in St. John, Frederiksted and Christiansted in St. Croix, and at other selected areas along the islands' coasts. One hundred seventy-three high-water marks are presented in tabular form listing plate name, mark number, location, latitude, longitude, type and quality of the mark, and high-water mark elevation. Profiles defining the surveyed storm-tide elevation, the inland extent of coastal flooding, and the ground elevation at selected coastal areas are also presented in this report. High-water levels ranged from about 11.4 feet above mean sea level at Estate La Grande Princesse in St. Croix to 3.1 feet above mean sea level at Limestone Bay, Estate Krausses Lagune in St. Croix.

INTRODUCTION

Hurricane Marilyn, a Category 2 hurricane (Saffir-Simpson scale), made landfall on the islands of St. Croix and St. Thomas, U.S. Virgin Islands (USVI) during September 15-16, 1995. The hurricane, with maximum reported winds gusting to near 130 miles per hour, left a path of devastation throughout the islands. This hurricane was one of the most destructive of the nine major hurricanes that have hit the area since the late 1800's (table 1). As much as 11.40 inches of rain fell on St. Croix on September 15. Although some river flooding occurred in low-lying areas near guts (dry stream courses), most of the flooding resulted from tidal flooding along the islands' coasts. The maximum storm-tide elevation measured was 11.4 feet above mean sea level on St. Croix. On St. John and St. Thomas, the maximum storm-tide elevations measured were 11.3 and 10.9 feet above mean sea level, respectively. Damage from Hurricane Marilyn was severe throughout the USVI, particularly on St. Thomas, where about 80 percent of the buildings were damaged or destroyed. Nine people died, several were injured, and thousands were left homeless as a result of the hurricane.

The U.S. Geological Survey (USGS), in cooperation with the Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers (USACE), collected data in the USVI on the storm-tide elevations caused by Hurricane Marilyn. This report presents a brief description of the hurricane and its pathway, the effects of the hurricane, the storm-tide elevation data obtained at 173 sites, and a series of maps showing the location and elevation of high-water marks, bench marks, and reference marks. The data presented may be useful for flood-insurance purposes and in guiding future development in these areas.

Table 1. Chronology of major hurricanes impacting U.S. Virgin Islands from 1867 through 1995

Date	Area affected	Remarks
October 29, 1867	St. Thomas	Hurricane. Maximum wind speed, 170 miles per hour; lowest barometric pressure, 27.95 inches. Deaths, 600.
October 9, 1916	St. Thomas	Hurricane. Wind gusts, 160 miles per hour; lowest barometric pressure, 28.10 inches. Charlotte Amalie, Frenchtown, and Lindbergh Bay areas severely flooded.
August 28-29, 1924	St. Thomas, St. Croix	Hurricane. Maximum wind speed, 143 miles per hour; maximum 24-hour rainfall, 5.7 inches on St. Croix; and lowest barometric pressure, 28.56 inches. Numerous lives lost.
September 12-14, 1928	St. Croix	Hurricane. Maximum wind speed, 130 miles per hour in St. Thomas; maximum 3-day rainfall, 16.6 inches on Christiansted; lowest barometric pressure, 27.50 inches. Substantial loss of life and extensive damage.
August 6-7, 1955	St. Thomas	Hurricane Connie. Maximum wind speed, 71 miles per hour; maximum 24-hour rainfall, 7.0 inches on Charlotte Amalie. Deaths, 3.
August 11-12, 1956	St. Croix	Hurricane Betsy. Maximum wind speed, 86 miles per hour; maximum 24-hour rainfall, 4.7 inches on St. Croix. Damage, $30,000.
August 29-31, 1979	St. Thomas, St. John, St. Croix	Hurricane David. Maximum wind speed, 54 miles per hour in St. Croix; 3-day rainfall, 15 inches.
September 18, 1989	St. Thomas, St. John, St. Croix	Hurricane Hugo. Maximum wind speed, 140 miles per hour. Deaths, 3; 20,000 people homeless; damage, $1.3 billion.
September 15-16, 1995	St. Thomas, St. John, St. Croix	Hurricane Marilyn. Maximum wind speed, 105 miles per hour. Deaths, 9; thousands people homeless; damage, $2 billion; about 80 percent of buildings damaged or destroyed in St. Thomas.

The author greatly acknowledges the following personnel for their assistance in making this study possible: Iris Correa and Dan Deegan of the FEMA; Deborah Peterson, Andrew Geller, Dennis Kraus, Mel Beliky, and Roberto Cortés, of the USACE; and Rafael Mójica of the National Weather Service (NWS), National Oceanic and Atmospheric Administration. Also, cooperation of owners who allowed access to their properties to obtain high-water mark elevations is greatly appreciated.

PATH OF HURRICANE MARILYN

Hurricane Marilyn developed from Tropical Depression 15 that originated over the west-central Atlantic Ocean on September 12 at 6 p.m., Atlantic standard time, about 470 miles east of Barbados (11.9 degrees N. latitude and 52.6 degrees W. longitude; fig. 1). The depression traveled west at about 25 miles per hour (mi/hr) and became Tropical Storm Marilyn on September 13. On September 14 at 2 a.m., Tropical Storm Marilyn, located at about 40 miles east of

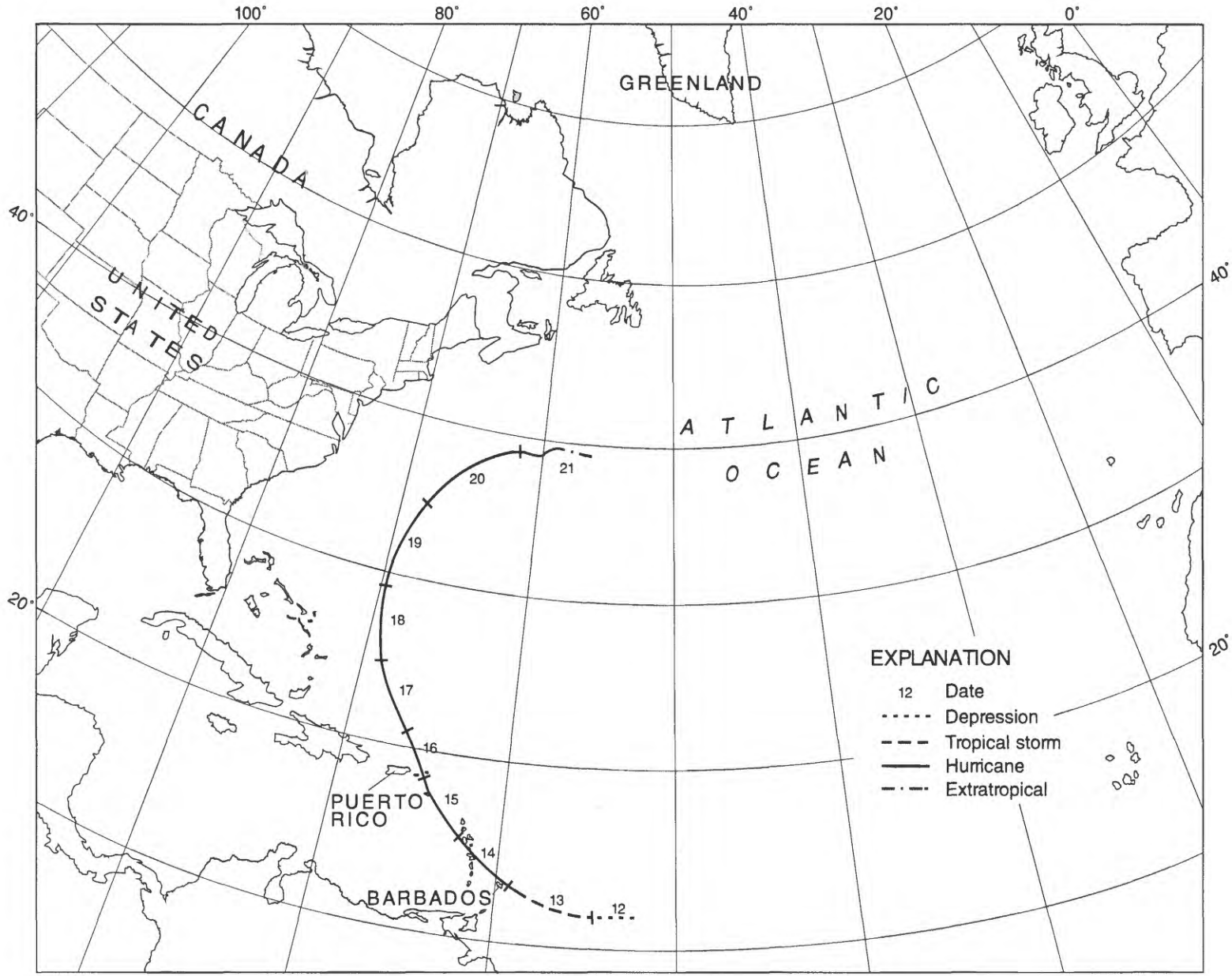


Figure 1. Track of Hurricane Marilyn across the Atlantic Ocean, September 1995 (modified from the National Oceanic and Atmospheric Administration, 1995).

Barbados, was upgraded to hurricane status with maximum sustained winds of 75 miles per hour. Marilyn, now a Category 1 hurricane (Saffir-Simpson scale), continued travelling in a west-northwesterly direction with its center passing at about 20 miles northeast of Barbados on September 14 at about 5 a.m. A hurricane watch was issued on September 14 for the USVI at 8 a.m. and then for Puerto Rico at 11 a.m., when the center of Hurricane Marilyn was located about 40 miles east of Martinique. Marilyn, with maximum sustained winds of 80 miles per hour and a minimum barometric pressure of 983 millibars (29.03 inches of mercury) moved in a generally northwesterly direction and passed just northeast of Martinique, making landfall in Dominica at 5 p.m., and then passed to the southwest of Guadeloupe entering the Caribbean Sea (fig. 2). A hurricane warning was issued for the USVI and Puerto Rico when Hurricane Marilyn entered the Caribbean Sea. Hurricane Marilyn continued moving northwest at nearly 15 miles per hour on Friday, September 15, and at 2 a.m. the maximum sustained winds increased to 85 miles per hour and the barometric pressure dropped to 978 millibars (28.88 inches of mercury). On September 15, at 8 a.m. the maximum sustained winds increased to 90 miles per hour and the hurricane was centered about 95 miles east southeast of St. Croix, USVI. By 11 a.m., Hurricane Marilyn's forward motion decreased to 10 miles per hour and the storm strengthened to a Category 2 hurricane with maximum sustained winds of 100 miles per hour and a minimum central pressure of 972 millibars (28.70 inches of mercury). At 5 p.m., when the center of Marilyn was near the southeast coast of St. Croix, an amateur radio operator from St. Croix reported wind gusts of 97 miles per hour. Shortly before 8 p.m., the center of Hurricane Marilyn passed over the eastern portion of St. Croix. A peak gust of 127 miles per hour was reported by an amateur radio operator during the passage of the hurricane. Hurricane Marilyn slowly intensified as it continued moving northwest between 8 to 10 miles per hour. On September 16, between 1 a.m. and 2 a.m., with maximum sustained winds of 105 miles per hour and a barometric pressure of 960 millibars (28.35 inches of mercury), the eye of Hurricane Marilyn extended from the western coast of St. Thomas, USVI to the eastern coast of Puerto Rico's offshore island of Culebra. On September 16, by 5 a.m. the center of Hurricane Marilyn was located about 45 miles east-northeast of San Juan, Puerto Rico, with sustained winds near 110 miles per hour. By noon, Hurricane Marilyn, with maximum sustained winds of 115 miles per hour (Category 3) and a minimum barometric pressure of 952 millibars (28.11 inches of mercury), was about 70 miles north-northwest of San Juan. At this time Marilyn was moving away from the area and the hurricane warnings for the USVI and Puerto Rico were downgraded to tropical storm warnings. The tropical storm warnings were discontinued for the USVI and Puerto Rico on September 16 at 5 p.m., when the center of Marilyn was about 125 miles north-northwest of San Juan. Over the next 5 days, the hurricane continued its north to northeast movement and lost strength over the open waters of the Atlantic Ocean. By September 21, Marilyn was downgraded to a tropical storm. On September 22, Marilyn was reclassified as an extratropical storm.

EFFECTS OF HURRICANE MARILYN

Rainfall data for the USVI are scarce because many recording rain gages were destroyed or rendered inoperative by strong winds during the passage of the hurricane. The limited rainfall data for the USVI indicate that the south coast of St. Croix, in the vicinity of Alexander Hamilton Airport, received as much as 12.96 inches of rain during September 15-16, 1995 (data were collected at USGS stream and rain gage station 50334500 and are not considered official by the NWS). Approximately 11.40 inches of this total amount fell during September 15. Another USGS rain gage (50252000) in northern St. Thomas, recorded 3.48 inches of rain during September 15 and 5.09 inches of rain during September 16. No data were recovered from recording rain gages on St. John. Although some riverine flooding occurred in areas near guts, most of the flood damage in the USVI occurred in coastal areas and was the result of tidal flooding. High water levels resulting from a combination of normal (predicted) tide, storm surge, and wave action ranged from 11.4 feet above mean sea level at Estate La Grande Princesse, St. Croix to 3.1

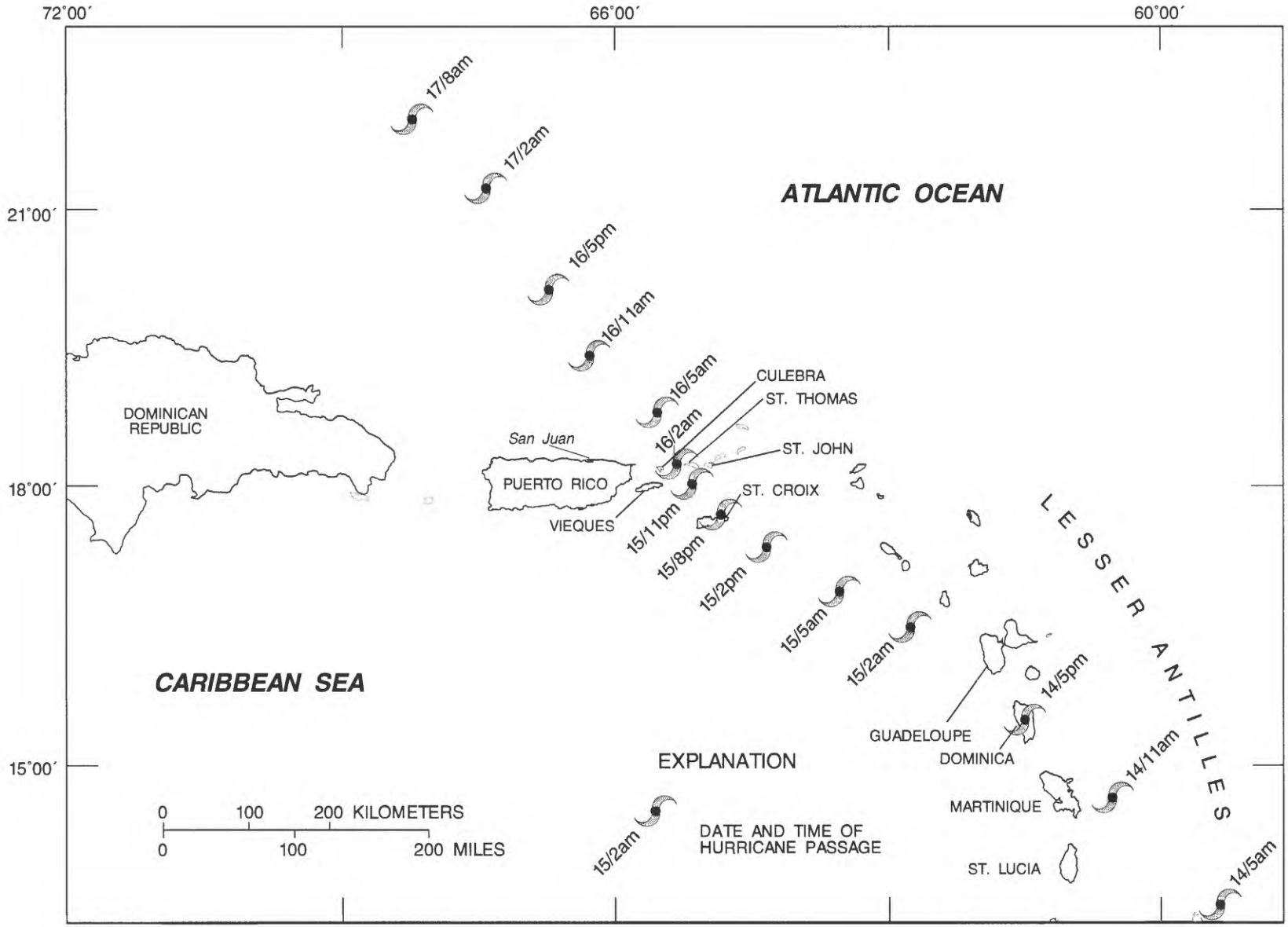


Figure 2. Track of Hurricane Marilyn across the islands of the Caribbean Sea, September 1995.

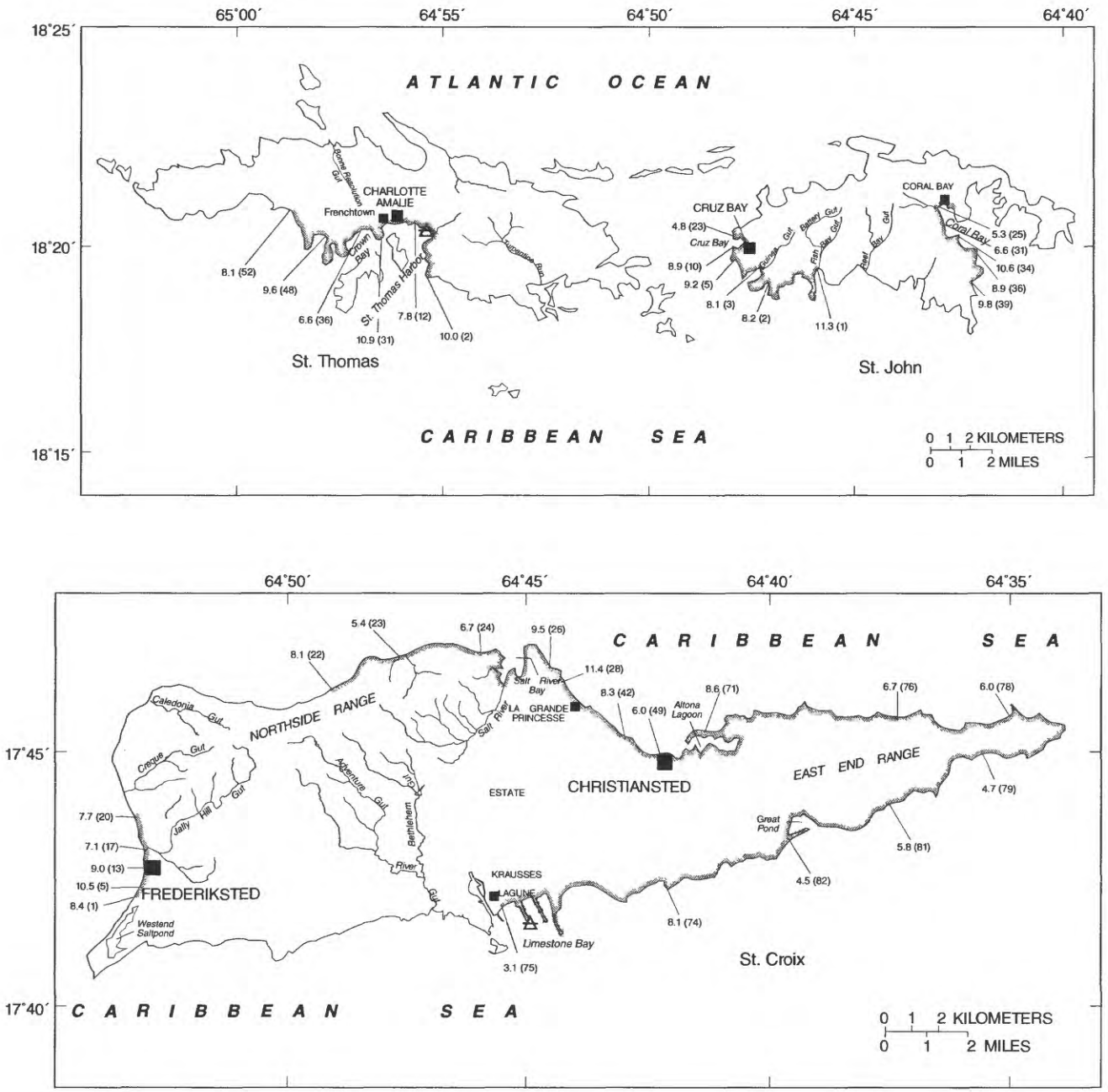
feet above mean sea level at Limestone Bay, Estate Krausses Lagune, St. Croix (fig. 3). The elevation of the storm tide at Limestone Bay, St. Croix and at St. Thomas Harbor was also recorded by the National Ocean Service (NOS) tidal gage stations in the USVI (figs. 3 and 4). As shown in figure 4, the high water elevation at the St. Croix tidal gage peaked shortly after midnight and the high water elevation at the St. Thomas gage peaked near 4:00 a.m., Atlantic standard time.

Hurricane Marilyn left a wake of devastation and desolation in its pathway throughout the USVI. At least nine people died and thousands were left homeless as a result of the hurricane. Emergency housing, medical attention, food, and clothing were provided to thousands of people. Damage was extensive and has been estimated by FEMA at about $2 billion (The Daily News, St. Thomas, USVI, October 25, 1995). More than $1 billion of this amount is related to damage sustained by private and public housing. Losses directly related to the tourism industry were estimated at about $475 million.

Damage was more severe on St. Thomas, where about 80 percent of the buildings were damaged or destroyed and thousands of utility poles were downed, leaving the island without power, public-water supply, or communications. The St. Thomas Hospital received extensive damage, particularly in the medical supply warehouse where all supplies were lost or rendered unusable. Hospital patients and people severely injured by Hurricane Marilyn were airlifted by helicopter to a hospital in San Juan, Puerto Rico. The control tower at the Cyril E. King (formerly Harry S. Truman) Airport in St. Thomas was extensively damaged and the runaway was covered with debris, making impossible the arrival of military and emergency flights from the mainland of the United States during the first hours after the passage of the Hurricane Marilyn. The production and distribution of desalinated water was interrupted during several days due to damage to the desalination plant and to two 1-million-gallon water storage tanks. Private cisterns were contaminated by debris, raw sewage and/or sea water from tidal flooding. The sewage treatment plants and pumping stations were also inoperable. A large number of private vehicles and hundreds of boats were damaged or completely destroyed. All marina and dock facilities were damaged or destroyed by high winds and severe tidal flooding. Coastal flooding occurred in beach and low-lying areas generally where land-surface elevations are less than 8 feet above mean sea level. In some of these areas, sand was transported from the beach and deposited in overwash fans and in other low-lying areas.

Among the areas of St. Thomas most affected by coastal flooding are the Charlotte Amalie Historic District, Frenchtown, and Crown Bay. Private and public housing, hotels, restaurants, stores, and offices within these areas sustained moderate to severe damage. The environmental impact of Hurricane Marilyn was also significant on St. Thomas, where high winds toppled and stripped leaves from trees and bushes, and saltwater burned grass and killed bushes. Six deaths on St. Thomas were directly attributed to the hurricane.

St. Croix and St. John also received substantial storm damage. On St. Croix, the developed coastal areas of Christiansted and Frederiksted were severely affected by high winds and extensive tidal flooding. About 25 percent of the buildings suffered structural damage or were destroyed. Most of the hotels, restaurants, businesses, and private offices in the Christiansted Historic District were affected by coastal flooding. Some schools suffered water damage. All public utility services were disrupted, mainly as a consequence of downed utility poles and wires and damaged or destroyed generators and transformers. The St. Croix Marina was damaged and more than 100 boats were damaged or destroyed along the island's coasts. The manufacturing industry and the agricultural sector were also hard hit by the hurricane. The official death toll from Hurricane Marilyn on St. Croix was reported as two. On St. John, early damage reports estimated that from 25 to 35 percent of all buildings were damaged. Some government buildings sustained major damage. The police station and two clinics were closed due to structural or water damage, or both. The island was left without power when the power supply from St. Thomas to St. John was interrupted by the strong winds. The populated coastal areas of Cruz Bay, on the islands's west coast, and Coral Bay, on the island's east coast, were moderately



EXPLANATION

3.1 (75) STORM-TIDE ELEVATION, IN FEET ABOVE SEA LEVEL AND HIGH-WATER MARK NUMBER IN PARENTHESIS

COASTAL AREA SURVEYED

National Ocean Service Tidal Gage

TOWN OR ESTATE

Figure 3. Study area and storm-tide elevations resulting from the passage of Hurricane Marilyn at selected locations in the U.S. Virgin Islands.

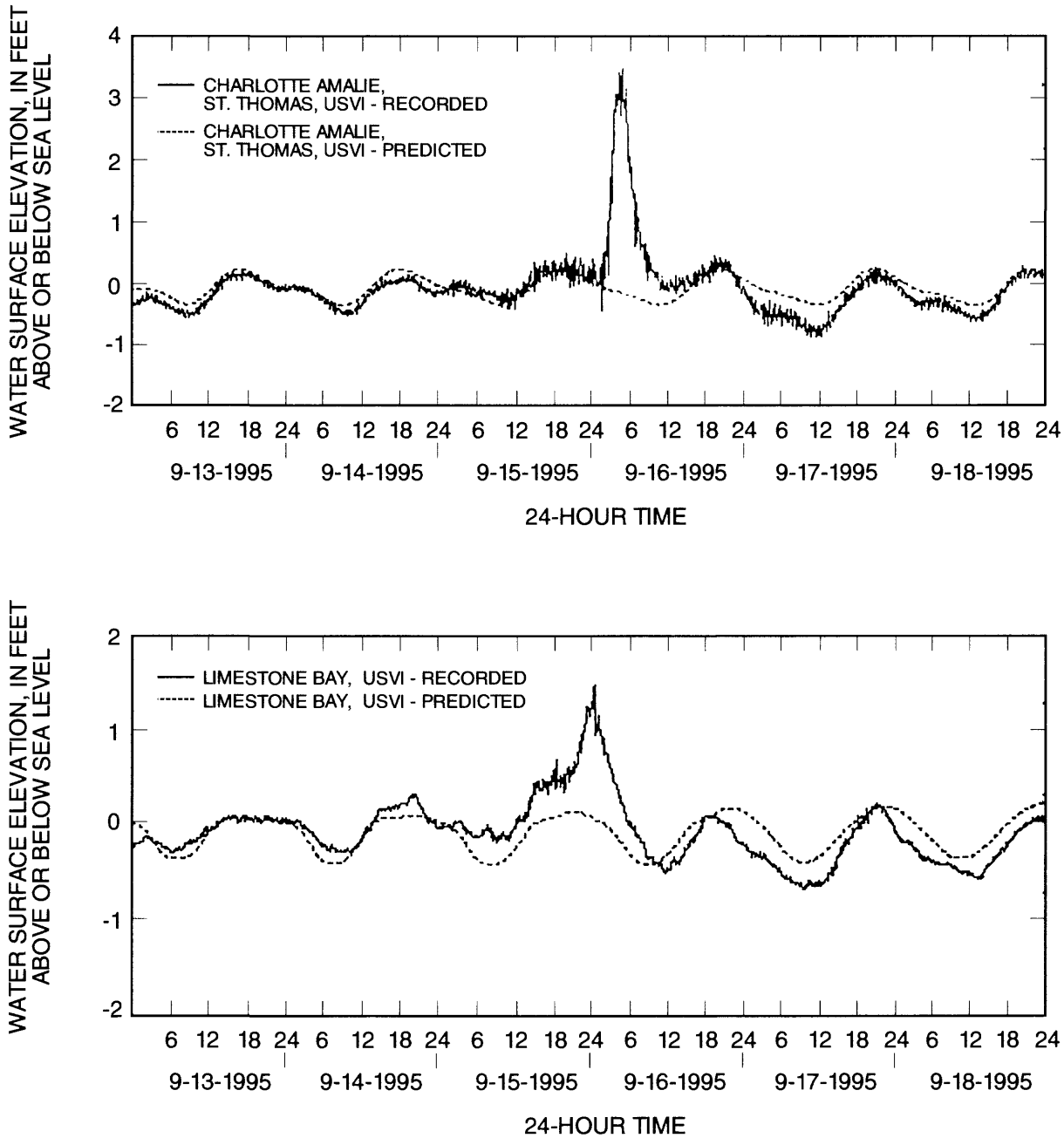


Figure 4. Recorded storm-tide elevations resulting from the passage of Hurricane Marilyn at the NOS tidal gage stations in the U.S. Virgin Islands (modified from National Oceanic and Atmospheric Administrations, 1996).

affected by coastal flooding. Many boats were damaged or destroyed, particularly those docked in marinas along the southern coast. USVI government officials reported one person killed and three injured during Hurricane Marilyn.

VERTICAL DATUM

The vertical datum used for this study is local mean sea level derived by the U.S. Coastal and Geodetic Survey (USCGS), which is now named the National Ocean Service (NOS). The local mean sea level, which varies with time and distance along the coastline, is the average, over selected time periods, of the midpoints in elevation between mean higher-high water (MHHW) and mean lower-low water (MLLW). The mean tide level (MTL) established by the U.S. Department of Commerce, NOS, is physically the same as the local mean sea level of the USCGS, but is referenced to MLLW datum. That is, the MTL is the elevation of the local mean sea level above the MLLW. The MLLW datum, also called the chart datum, is used by NOS to minimize the reporting of negative values in predicting tide elevations. The entire study area has bench marks established by the NOS, the USACE, and the USGS based on local mean sea level datum.

STORM-TIDE ELEVATIONS

Immediately after the storm, the USGS sent crews to the coastal regions to determine the maximum water-surface elevations caused by the storm tide. High-water marks were located, identified and tied to mean sea level datum by way of level-surveying. The elevation of each high-water mark was plotted on USACE maps prepared from aerial photographs (plates 1–16). Discrepancies between adjacent high-water marks result from the effects of wave action, the effects of lag between occurrence of high water outside or both, and the filling of rooms of houses where inside marks were obtained. Further evaluation of local inconsistencies between adjacent elevations of high-water marks is beyond the scope of this study. A description of each mark that included a detailed description of its location, the type of mark (seedline, washline, driftline, or stainline), and an assessment of the quality of the mark was prepared. The quality of each mark was assigned a category for interpretation of the storm-tide elevation as follows:

* **Excellent**—A level, extremely well-defined line of densely accumulated fine debris (or a distinct stain). Reliable to ± 0.05 foot.

* **Good**—A level, well-defined line of densely accumulated fine debris (or a distinct stain). Reliable to ± 0.10 foot.

* **Fair**—A level, but less distinct band of fine or coarse debris (or stain). Reliable to within ± 0.25 foot.

* **Poor**—A poorly defined band of sparsely accumulated coarse debris that may undulate due to surface wave action. Other examples include a discontinuous scatter of coarse debris on a structure, a coarse ground line of heavy-vegetative drift, or debris hanging in the branches of a tree. Uncertainty in true elevation is greater than about 0.25 foot.

The best high-water marks for determining the maximum still-water storm-tide elevation generally were found inside buildings or other locations where wave action was dampened. Outside marks range from fair to poor quality because of wave action or, in the case of debris lines, distortion by high winds that followed the storm tide. Fifty-three percent of the one hundred seventy-three high-water marks were rated poor, twenty-nine percent were considered fair, ten percent were judged to be excellent, and eight percent good.

After each storm-tide high-water mark was located and assigned a quality rating, the elevation of the mark was determined. Most elevations were determined by using conventional leveling equipment and vertical control stations (bench marks) established by the NOS and the USGS. Descriptions of the high-water marks are given in table 2 (see page 16). Descriptions of the survey marks (reference marks and bench marks) used to determine the elevations of the high-water marks are given in table 3 (see page 23) and are shown on the USACE maps (plates 1–16, at end of report).

Profiles defining the storm-tide elevation, the inland extent of coastal flooding, and the ground elevation were surveyed at selected coastal areas on each island (fig. 5). In St. Thomas, a profile was

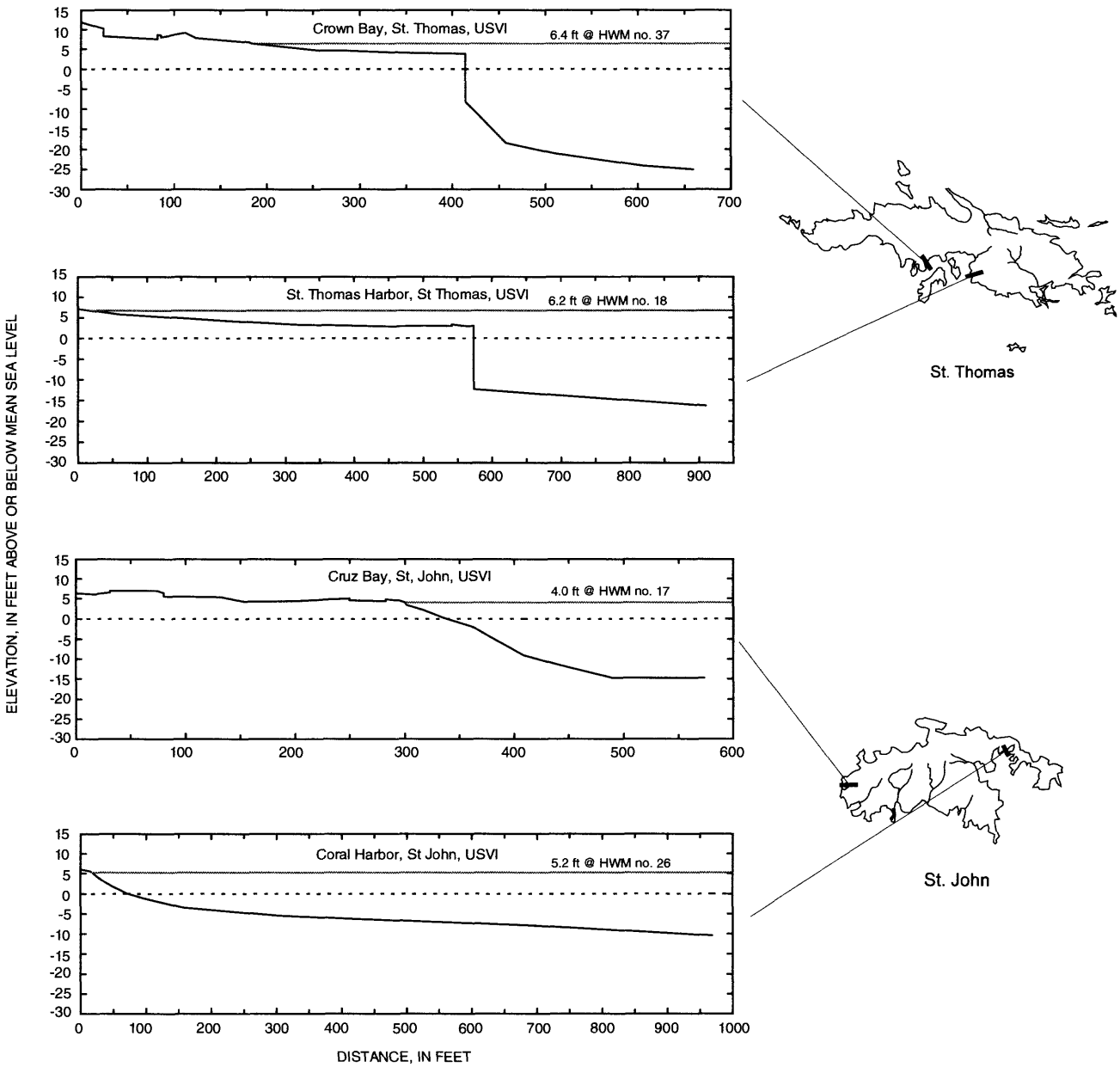


Figure 5. Measured profiles defining the storm-tide elevations resulting from the passage of Hurricane Marilyn at selected locations in the U.S. Virgin Islands.

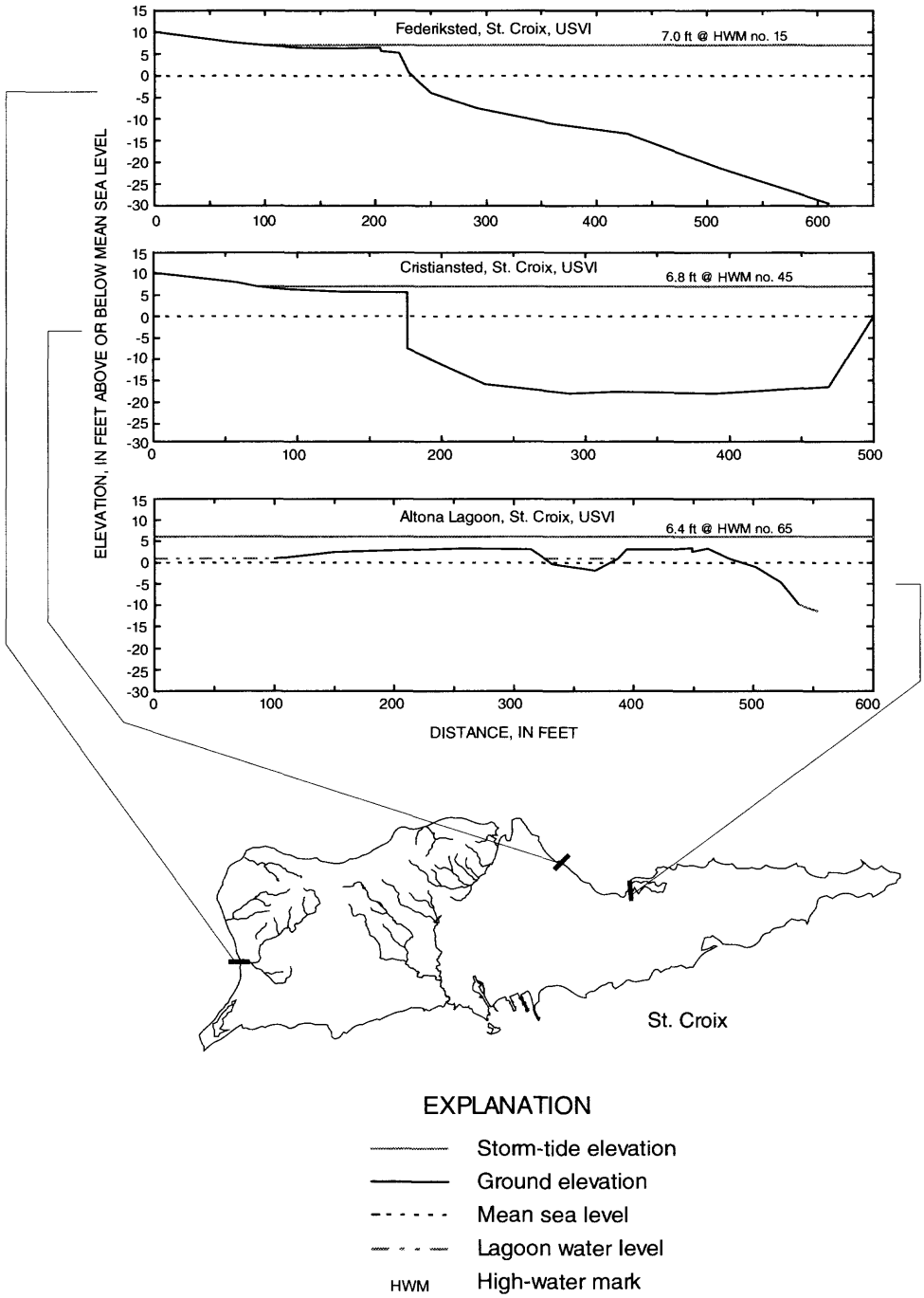


Figure 5. Measured profiles defining the storm-tide elevations resulting from the passage of Hurricane Marilyn at selected locations in the U.S. Virgin Islands—Continued.

measured in the St. Thomas Harbor area at Charlotte Amalie and in the Crown Bay area. Two profiles were measured in St. John: one in the Cruz Bay area and another in the Coral Bay area. Three profiles were measured in St. Croix: one profile was measured in Frederiksted, one in Christiansted, and one in the Altona Lagoon Beach area. These profiles were surveyed normal to the coastline. The approximate depth of flooding at any point along the inundated area can be estimated by subtracting the ground elevation from the storm-tide elevation. The location of these selected profiles are presented on figure 5.

SUMMARY

During September 15 and 16, 1995, Hurricane Marilyn caused severe damage in the islands of St. Croix and St. Thomas, USVI. The hurricane, with sustained wind speed near 105 miles per hour, left a path of devastation throughout the islands. As much as 11.40 inches of rain fell on St. Croix on September 15. Although some damage resulted from river flooding, most of the hurricane damage in the USVI resulted from high wind velocities and storm-surge flooding along the coastal areas. Damage was more severe on St. Thomas, were about 80 percent of the buildings were damaged or destroyed, six people were killed, and thousands were left homeless.

High-water marks produced by the storm surge from Hurricane Marilyn were identified, described, and level-surveyed along the most affected developed coastal areas. One hundred seventy-three high-water marks are described in this report. High-water marks, as well as survey marks, are plotted on 16 USACE maps prepared from aerial photographs.

Storm-tide elevations are presented graphically and in tabular form. Elevations of the storm tide above the local mean sea level ranged from about 11.4 feet at Estate La Grande Princesse in St. Croix to 3.1 feet at Limestone Bay, Estate Krausses Lagune in St. Croix.

SELECTED REFERENCES

Colón-Dieppa, Eloy, Torres-Sierra, Heriberto, and Ortíz, Jorge, 1991, U.S. Virgin Islands floods and droughts - National Water Summary 1988–89: U.S. Geological Survey Water-Supply Paper 2375, p. 521–526.

Federal Emergency Management Agency, 1995, U.S. Virgin Islands Disaster Report on Hurricane Marilyn, September 15-17, 1995 - Synopsis, FEMA-1067-DR-VI: Federal Emergency Management Agency, 7 p.

Komar, P.D. (editor), 1983, CRC Handbook of coastal processes and erosion, CRC Press, Inc., Boca Raton, Florida, 305 p.

National Oceanic and Atmospheric Administration, 1995, Hurricane Marilyn - Preliminary statement for the U.S. Virgin Islands and Puerto Rico: National Oceanic and Atmospheric Administration, National Weather Service, 5 p.

____1996, Natural disaster survey report - Hurricane Marilyn, September 15-16, 1995: National Oceanic and Atmospheric Administration, National Weather Service, 38 p., 8 appendixes.

St. John Tradewinds, September 25, 1995 - October 2, 1995, St. John, USVI, variously paginated.

The Daily News, September 18, 1995, October 21, 1995, October 25, 1995, and October 26, 1995, St. Thomas, USVI, variously paginated.

Torres-Sierra, Heriberto, 1996, Storm-tide elevations caused by Hurricane Hugo on the U.S. Virgin Islands and Puerto Rico, September 18, 1989: U.S. Geological Survey Open-File Report 92–87, 44 p.

U.S. Army Corps of Engineers, 1975, Flood plain information, tidal areas, St. Thomas, St. Croix, and St. John, U.S. Virgin Islands: Jacksonville District, 34 p.

____1977, Flood hazard information, St. Thomas, U.S. Virgin Islands, Demarara (Frenchtown): Jacksonville District, 13 p.

APPENDIX

APPENDIX 1. HURRICANE CATEGORIES

To relate hurricane intensity to damage potential, the National Hurricane Center uses the Saffir/Simpson scale which assigns storms to five categories. Category 1 is a minimum hurricane; category 5 is the worst case.

CATEGORY 1 - Sustained winds of 74 to 95 miles per hour and/or storm surge 4 to 5 feet above normal. Low-lying coastal roads inundated. Minor pier damage, some small craft in exposed anchorages torn from moorings. Damage primarily to shrubbery, trees, foliage, and unanchored mobile homes. Some damage to poorly constructed signs.

CATEGORY 2 - Sustained winds of 96 to 110 miles per hour and/or storm surge 6 to 8 feet above normal. Coastal roads and low-lying island areas inundated. Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes and poorly constructed signs. Some damage to roofing materials of buildings: some window and door damage. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchoraged torn from moorings.

CATEGORY 3 - Sustained winds of 111 to 130 miles per hour and/or storm surge 9 to 12 feet above normal. Serious flooding at coast and flat terrain 5 feet or less above sea level flooded inland some miles. Many smaller structures near coast destroyed; larger structures near coast damaged by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Evacuation of low-lying residences within several blocks of shoreline possibly required. Practically all poorly constructed sings blown down.

CATEGORY 4 - Sustained winds 131 to 155 miles per hour and/or storm surge 13 to 18 feet above normal. Flat terrain 10 feet or less above sea level flooded inland some miles. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Major damage to lower floors of structures near shore. Major erosion on beaches. Massive evacuation of all residences within 500 yards of shore may be required, and of single-story residences on low ground within 2 miles of shore. Extensive damage to structures. Complete destruction of mobile homes.

CATEGORY 5 - Sustained winds greater than 155 miles per hour and/or storm surge greater than 18 feet above normal. Major damage to lower floors of all structures less than 15 feet above sea level within 500 yards of shore. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required. Shrubs and trees blown down; considerable damage to roofs of building; and signs down. Some complete building failures.

GLOSSARY

Advisory. A method for disseminating hurricane and storm data to the public every 6 hours. Small craft warnings are released as necessary.

Tropical Disturbance. A moving area of thunderstorms in the tropics.

Tropical Wave. A westward moving trough of low pressure embedded in the deep easterly current. It tends to organize low level circulation and may travel thousands of miles with little change in shape, sometimes producing significant shower and thundershower activity along its path.

Tropical Depression. An area of low pressure, rotary circulation of clouds and winds to 38 miles per hour.

Tropical Storm. Counterclockwise circulation of clouds and winds 39 to 73 miles per hour. The storm is assigned a name.

Hurricane. When a tropical storm reaches winds of 74 miles per hour or more, it is classified as hurricane.

Hurricane Watch. The watch covers a specified area and indicates that a hurricane may threaten the area, but is not imminent.

Hurricane Warning. A hurricane is expected to strike your area within 24 hours or less with: a) sustained winds of 74 miles per hour (64 knots) or higher, and b) dangerously high water or a combination of dangerously high water and exceptionally high waves.

Hurricane Center or "Eye". The relatively calm area near the center of the storm which can last from several minutes to an hour or more, but it sometimes ends suddenly as winds return from the opposite direction, often with greater force. Do not go out in the "eye" of the storm as winds can increase to hurricane force within seconds.

Storm Surge/Tide. The strong winds associated with Hurricanes and Tropical Storms cause the sea level to rise above normal tidal heights, with giant wind-driven waves and strong unpredictable currents, sometimes covering 50 miles.

Table 2. Description of high-water marks

Plate number	Plate name	High-water mark number	Location (Estate)	Latitude	Longitude	Type/quality of mark	Number of high-water marks	Elevation (feet above mean sea level)
St. Croix, U.S. Virgin Islands								
1	Frederiksted	1	Hesselberg	17°42'12"	64°53'08"	Driftline/fair	1	8.4
1	Frederiksted	2	Hesselberg	17°42'12"	64°53'10"	Driftline/poor	1	5.8
1	Frederiksted	3	Hesselberg	17°42'13"	64°53'08"	Driftline/poor	1	7.1
1	Frederiksted	4	Hesselberg	17°42'19"	64°53'07"	Driftline/fair	1	9.9
1	Frederiksted	5	Two Brothers	17°42'30"	64°53'04"	Driftline/fair	1	10.5
1	Frederiksted	6	Two Brothers	17°42'34"	64°53'03"	Driftline/poor	1	9.6
1	Frederiksted	7	Frederiksted	17°42'38"	64°53'01"	Driftline/poor	1	9.2
1	Frederiksted	8	Frederiksted	17°42'38"	64°53'02"	Stainline[1]/poor	1	9.0
1	Frederiksted	9	Frederiksted	17°42'43"	64°53'02"	Driftline/fair	1	8.4
1	Frederiksted	10	Frederiksted	17°42'46"	64°53'02"	Seedline/poor	1	8.8
1	Frederiksted	11	Frederiksted	17°42'49"	64°53'01"	Seedline[1]/good	1	8.8
1	Frederiksted	12	Frederiksted	17°42'51"	64°53'02"	Seedline/poor	1	8.7
1	Frederiksted	13	Frederiksted	17°42'55"	64°53'03"	Driftline/poor	1	9.0
1	Frederiksted	14	Frederiksted	17°42'57"	64°53'03"	Stainline[1]/fair	1	6.9
1	Frederiksted	15	Frederiksted	17°42'58"	64°53'03"	Driftline/fair	1	7.0
1	Frederiksted	16	Frederiksted	17°42'58"	64°53'04"	Stainline[1]/good	1	6.9
1	Frederiksted	17	Frederiksted	17°43'02"	64°53'03"	Driftline/poor	1	7.1
1	Frederiksted	18	Frederiksted	17°43'05"	64°53'02"	Driftline/poor	1	6.3
1	Frederiksted	19	Frederiksted	17°43'11"	64°53'04"	Driftline/poor	1	6.7
1	Frederiksted	20	La Grange	17°43'16"	64°53'05"	Driftline/fair	1	7.7
1	Frederiksted	21	La Grange	17°43'23"	64°53'08"	Driftlines/fair	2	7.2
2	Belvedere	22	Canebay	17°46'19"	64°48'55"	Driftlines/poor	3	8.1
2	Belvedere	23	Rust Up Twist	17°46'48"	64°47'40"	Driftlines/poor	2	5.4
3	Salt River Bay	24	Salt River	17°46'56"	64°45'54"	Driftlines/poor	3	6.7
3	Salt River Bay	25	Salt River	17°46'38"	64°45'41"	Driftlines/poor	3	4.1
3	Salt River Bay	26	Judith Fancy	17°46'34"	64°44'33"	Driftlines/poor	2	9.5
4	La Grande Princesse	27	La Grande Princesse	17°46'04"	64°44'12"	Driftlines/poor	3	11.4

Table 2. Description of high-water marks—Continued

Plate number	Plate name	High-water mark number	Location (Estate)	Latitude	Longitude	Type/quality of mark	Number of high-water marks	Elevation (feet above mean sea level)
			St. Croix, U.S. Virgin Islands					
4	La Grande Princesse	28	La Grande Princesse	17°45'59"	64°44'06"	Driftline/fair	1	11.4
4	La Grande Princesse	29	La Grande Princesse	17°45'59"	64°44'04"	Seedline[1]/good	1	9.0
4	La Grande Princesse	30	La Grande Princesse	17°45'58"	64°44'03"	Seedline[1]/good	1	9.2
4	La Grande Princesse	31	La Grande Princesse	17°45'54"	64°43'59"	Driftline/poor	1	11.0
4	La Grande Princesse	32	La Grande Princesse	17°45'51"	64°43'57"	Stainline/good	1	7.5
4	La Grande Princesse	33	La Grande Princesse	17°45'50"	64°43'55"	Driftlines/poor	3	8.2
4	La Grande Princesse	34	La Grande Princesse	17°45'51"	64°43'54"	Stainline[1]/fair	1	8.7
4	La Grande Princesse	35	La Grande Princesse	17°45'50"	64°43'53"	Seedline[1]/excellent	1	7.8
4	La Grande Princesse	36	Little Princess	17°45'47"	64°43'42"	Driftline/poor	1	7.9
4	La Grande Princesse	37	Little Princess	17°45'40"	64°43'33"	Driftline/fair	1	7.8
4	La Grande Princesse	38	Little Princess	17°45'38"	64°43'31"	Seedline[1]/excellent	1	6.1
4	La Grande Princesse	39	Little Princess	17°45'28"	64°43'21"	Driftline/poor	1	7.7
4	La Grande Princesse	40	Little Princess	17°45'26"	64°43'20"	Driftline/fair	1	7.1
4	La Grande Princesse	41	Golden Rock	17°45'24"	64°43'15"	Stainline[1]/fair	1	8.2
4	La Grande Princesse	42	Golden Rock	17°45'23"	64°43'14"	Driftline/poor	1	8.3
4	La Grande Princesse	43	Golden Rock	17°45'16"	64°43'08"	Driftline/fair	1	7.7
4	La Grande Princesse	44	Golden Rock	17°45'16"	64°43'04"	Driftline/poor	1	7.8
4	La Grande Princesse	45	Fangselet	17°45'11"	64°42'54"	Driftlines/good	2	6.8
4	La Grande Princesse	46	Fangselet	17°45'03"	64°42'47"	Driftlines/poor	2	5.2
4	La Grande Princesse	47	Richmont	17°45'01"	64°42'45"	Driftline/poor	1	5.1
5	Christiansted Harbor	48	Richmont	17°44'56"	64°42'39"	Driftline/fair	1	5.3
5	Christiansted Harbor	49	Christiansted	17°44'54"	64°42'31"	Seedline/fair	1	6.0
5	Christiansted Harbor	50	Christiansted	17°44'54"	64°42'29"	Stainline[1]/excellent	1	5.2
5	Christiansted Harbor	51	Christiansted	17°44'54"	64°42'26"	Driftline/good	1	5.2
5	Christiansted Harbor	52	Christiansted	17°44'52"	64°42'24"	Seedline[1]/excellent	1	5.7
5	Christiansted Harbor	53	Christiansted	17°44'55"	64°42'20"	Driftline/poor	1	5.3
5	Christiansted Harbor	54	Christiansted	17°44'56"	64°42'19"	Seedline[1]/excellent	1	5.2
5	Christiansted Harbor	55	Christiansted	17°44'56"	64°42'16"	Seedline[1]/poor	1	4.9

Table 2. Description of high-water marks—Continued

Plate number	Plate name	High-water mark number	Location (Estate)	Latitude	Longitude	Type/quality of mark	Number of high-water marks	Elevation (feet above mean sea level)
			St. Croix, U.S. Virgin Islands					
5	Christiansted Harbor	56	Christiansted	17°44'56"	64°42'14"	Seedline[1]/excellent	1	5.6
5	Christiansted Harbor	57	Christiansted	17°44'56"	64°42'09"	Driftlines/poor	2	4.6
5	Christiansted Harbor	58	Christiansted	17°44'54"	64°42'06"	Driftline/poor	1	4.7
5	ChristiansteHarbor	59	Christiansted	17°44'50"	64°42'04"	Driftline/poor	1	5.0
5	Christiansted Harbor	60	Christiansted	17°44'51"	64°42'03"	Seedlines[1]/excellent	2	5.2
5	Christiansted Harbor	61	Christiansted	17°44'51"	64°41'58"	Seedline/fair	1	5.6
5	Christiansted Harbor	62	Christiansted	17°44'55"	64°41'53"	Driftlines/fair	2	5.3
5	Christiansted Harbor	63	Christiansted	17°44'58"	64°41'55"	Seedline[1]/excellent	1	4.5
5	Christiansted Harbor	64	Mount Welcome	17°45'04"	64°41'52"	Seedline[1]/excellent	1	6.0
5	Christiansted Harbor	65	Mount Welcome	17°45'05"	64°41'47"	Seedline[1]/excellent	1	6.4
5	Christiansted Harbor	66	Batteriet Louise Augusta	17°45'13"	64°41'42"	Driftline/poor	1	6.0
5	Christiansted Harbor	67	Batteriet Louise Augusta	17°45'21"	64°41'39"	Seedline[1]/excellent	1	6.0
5	Christiansted Harbor	68	Batteriet Louise Augusta	17°45'24"	64°41'36"	Seedline[1]/excellent	1	8.4
5	Christiansted Harbor	69	Batteriet Louise Augusta	17°45'21"	64°41'35"	Driftlines/fair	2	4.1
5	Christiansted Harbor	70	Batteriet Louise Augusta	17°45'23"	64°41'33"	Driftline/fair	1	10.4
5	Christiansted Harbor	71	Shoys	17°45'23"	64°41'25"	Driftline/poor	1	8.6
5	Christiansted Harbor	72	Shoys	17°45'21"	64°41'11"	Driftlines/fair	2	7.5
5	Christiansted Harbor	73	Shoys	17°45'28"	64°41'02"	Driftlines/poor	2	7.8
6	Tague Bay	76	Cotton Valley	17°45'40"	64°37'27"	Driftlines/poor	2	6.7
6	Tague Bay	77	Slob	17°45'22"	64°36'05"	Driftlines/poor	2	4.7
6	Tague Bay	78	Cottongarden Bay	17°45'37"	64°35'08"	Driftlines/poor	2	6.0
6	Tague Bay	79	Grapetree Bay	17°44'56"	64°35'39"	Driftlines/fair	4	4.7
7	Robin Bay	80	Madame Carty	17°44'11"	64°37'07"	Driftlines/good	2	4.9
7	Robin Bay	81	Mount Retreat	17°43'59"	64°37'36"	Driftlines/good	2	5.8
8	Great Pond	82	Fareham	17°43'10"	64°39'53"	Driftlines/fair	3	4.5
9	Halfpenny Bay	74	Granard	17°42'20"	64°42'10"	Driftlines/fair	5	8.1
10	Container Port	75	Krausses Lagune	17°41'55"	64°45'41"	Driftlines/fair	2	3.1

Table 2. Description of high-water marks—Continued

Plate number	Plate name	High-water mark number	Location (Estate)	Latitude	Longitude	Type/quality of mark	Number of high-water marks	Elevation (feet above mean sea level)
			St. Thomas, U.S. Virgin Islands					
11	Cyril King Airport	36	Contant	18°20'17"	64°57'01"	Driftline/poor	1	6.6
11	Cyril King Airport	37	Nisky	18°20'14"	64°57'11"	Driftline/poor	1	6.4
11	Cyril King Airport	38	Nisky	18°20'06"	64°57'14"	Driftlines/poor	2	6.5
11	Cyril King Airport	39	Nisky	18°20'05"	64°57'17"	Driftline/fair	1	7.4
11	Cyril King Airport	40	Nisky	18°20'01"	64°57'19"	Driftline/poor	1	6.2
11	Cyril King Airport	41	Nisky	18°19'58"	64°57'21"	Driftline/poor	1	7.5
11	Cyril King Airport	42	Nisky	18°19'56"	64°57'38"	Driftline/poor	1	5.7
11	Cyril King Airport	43	Nisky	18°19'59"	64°57'39"	Driftline/fair	1	5.4
11	Cyril King Airport	44	Nisky	18°20'03"	64°57'36"	Driftline/poor	1	4.6
11	Cyril King Airport	45	Nisky	18°20'03"	64°57'43"	Driftline/poor	1	5.8
11	Cyril King Airport	46	Nisky	18°20'01"	64°57'43"	Driftline/poor	1	5.7
11	Cyril King Airport	47	Lindbergh Bay	18°20'16"	64°57'54"	Driftline/poor	1	8.2
11	Cyril King Airport	48	Lindbergh Bay	18°20'16"	64°57'56"	Driftlines/poor	2	9.6
11	Cyril King Airport	49	Lindbergh Bay	18°20'17"	64°58'08"	Driftlines/poor	2	8.1
11	Cyril King Airport	50	Lindbergh Bay	18°20'16"	64°58'13"	Driftline/poor	1	9.0
11	Cyril King Airport	51	John Brewers Bay	18°20'41"	64°58'36"	Washline/poor	1	8.1
11	Cyril King Airport	52	John Brewers Bay	18°20'50"	64°58'47"	Driftlines/fair	2	8.1
12	St. Thomas Harbor	1	Thomas	18°19'58"	64°55'28"	Driftlines/poor	2	9.0
12	St. Thomas Harbor	2	Thomas	18°19'59"	64°55'26"	Driftline/fair	1	10.0
12	St. Thomas Harbor	3	Thomas	18°20'13"	64°55'14"	Driftline/fair	1	7.4
12	St. Thomas Harbor	4	Thomas	18°20'14"	64°55'13"	Stainlines[1]/fair	2	5.7
12	St. Thomas Harbor	5	Thomas	18°20'24"	64°55'18"	Driftline/poor	1	7.0
12	St. Thomas Harbor	6	King Quarter	18°20'26"	64°55'34"	Washline/poor	1	7.5
12	St. Thomas Harbor	7	King Quarter	18°20'33"	64°55'36"	Driftline/poor	1	7.2
12	St. Thomas Harbor	8	King Quarter	18°20'33"	64°55'38"	Driftlines/fair	2	5.7
12	St. Thomas Harbor	9	King Quarter	18°20'35"	64°55'40"	Driftline/poor	1	6.8
12	St. Thomas Harbor	10	King Quarter	18°20'35"	64°55'42"	Driftline/fair	1	7.6

Table 2. Description of high-water marks—Continued

Plate number	Plate name	High-water mark number	Location (Estate)	Latitude	Longitude	Type/quality of mark	Number of high-water marks	Elevation (feet above mean sea level)
			St. Thomas, U.S. Virgin Islands					
12	St. Thomas Harbor	11	King Quarter	18°20'35"	64°54'44"	Stainline[1]/poor	1	5.0
12	St. Thomas Harbor	12	King Quarter	18°20'32"	64°55'48"	Washline/poor	1	7.8
12	St. Thomas Harbor	13	King Quarter	18°20'31"	64°55'49"	Driftline/fair	1	7.1
12	St. Thomas Harbor	14	King Quarter	18°20'30"	64°55'50"	Stainline[1]/good	1	6.6
12	St. Thomas Harbor	15	King Quarter	18°20'30"	64°55'51"	Driftline/fair	1	7.1
12	St. Thomas Harbor	16	King Quarter	18°20'36"	64°55'52"	Seedline/poor	1	7.1
12	St. Thomas Harbor	17	Queen Quarter	18°20'34"	64°55'55"	Seedline[1]/good	1	5.8
12	St. Thomas Harbor	18	Queen Quarter	18°20'35"	64°55'56"	Stainline[1]/good	1	6.2
12	St. Thomas Harbor	19	Queen Quarter	18°20'32"	64°56'02"	Seedline/excellent	1	7.9
12	St. Thomas Harbor	20	Kronprindsens Quarter	18°20'32"	64°56'07"	Seedline[1]/excellent	1	6.6
12	St. Thomas Harbor	21	Kronprindsens Quarter	18°20'33"	64°56'07"	Seedline[1]/excellent	1	7.0
12	St. Thomas Harbor	22	Kronprindsens Quarter	18°20'29"	64°56'16"	Seedline[1]/excellent	1	6.3
12	St. Thomas Harbor	23	Kronprindsens Quarter	18°20'28"	64°56'17"	Driftline/poor	1	7.0
12	St. Thomas Harbor	24	Demarara	18°20'25"	64°56'30"	Driftlines/poor	2	5.6
12	St. Thomas Harbor	25	Demarara	18°20'23"	64°56'31"	Driftline/fair	1	5.2
12	St. Thomas Harbor	26	Altona Welgunst	18°20'19"	64°56'33"	Driftline/poor	1	5.3
12	St. Thomas Harbor	27	Altona Welgunst	18°20'19"	64°56'30"	Seedline[1]/excellent	1	5.4
12	St. Thomas Harbor	28	Honduras	18°20'19"	64°56'28"	Seedline[1]/excellent	1	5.2
12	St. Thomas Harbor	29	Altona Welgunst	18°20'15"	64°56'28"	Driftline/poor	1	8.5
12	St. Thomas Harbor	30	Altona Welgunst	18°20'12"	64°56'29"	Driftline/fair	1	6.6
12	St. Thomas Harbor	31	Altona Welgunst	18°20'11"	64°56'30"	Driftline/good	1	10.9
12	St. Thomas Harbor	32	Altona	18°20'11"	64°56'40"	Driftline/fair	1	7.0
12	St. Thomas Harbor	33	Altona	18°20'13"	64°56'41"	Driftline/poor	1	6.3
12	St. Thomas Harbor	34	Altona	18°20'17"	64°56'46"	Driftline/fair	1	6.6
12	St. Thomas Harbor	35	Altona	18°20'17"	64°56'48"	Driftline/fair	1	6.6

Table 2. Description of high-water marks—Continued

Plate number	Plate name	High-water mark number	Location (Estate)	Latitude	Longitude	Type/quality of mark	Number of high-water marks	Elevation (feet above mean sea level)
			St. John, U.S. Virgin Islands					
13	Cruz Bay	2	Chocolate Hole and Great Cruz Bay	18°19'12"	64°47'03"	Driftlines/fair	2	8.2
13	Cruz Bay	3	Chocolate Hole and Great Cruz Bay	18°19'29"	64°47'14"	Sandline/poor	1	8.1
13	Cruz Bay	4	Chocolate Hole and Great Cruz Bay	18°19'30"	64°47'15"	Stainlines[1]/fair	2	7.0
13	Cruz Bay	5	Enighed	18°19'45"	64°47'49"	Driftline/fair	1	9.2
13	Cruz Bay	6	Enighed	18°19'47"	64°47'51"	Seedline[1]/excellent	1	5.2
13	Cruz Bay	7	Enighed	18°19'46"	64°47'56"	Driftline/poor	1	7.1
13	Cruz Bay	8	Enighed	18°19'48"	64°47'55"	Seedline[1]/excellent	1	5.1
13	Cruz Bay	9	Enighed	18°19'48"	64°47'55"	Stainline/poor	1	7.7
13	Cruz Bay	10	Cruz Bay	18°19'55"	64°47'57"	Washline/poor	1	8.9
13	Cruz Bay	11	Cruz Bay	18°19'58"	64°47'57"	Sandline/poor	1	5.6
13	Cruz Bay	12	Cruz Bay	18°19'59"	64°47'56"	Sandline/poor	1	6.1
13	Cruz Bay	13	Cruz Bay	18°19'56"	64°47'54"	Driftline/poor	1	5.0
13	Cruz Bay	14	Cruz Bay	18°19'56"	64°47'50"	Driftline/fair	1	4.0
13	Cruz Bay	15	Cruz Bay	18°19'57"	64°47'47"	Driftline/poor	1	4.1
13	Cruz Bay	16	Cruz Bay	18°19'59"	64°47'44"	Sandline/poor	1	4.0
13	Cruz Bay	17	Cruz Bay	18°20'00"	64°47'44"	Sandline/poor	1	4.0
13	Cruz Bay	18	Cruz Bay	18°20'01"	64°47'43"	Sandline/poor	1	4.2
13	Cruz Bay	19	Cruz Bay	18°20'02"	64°47'43"	Sandline/poor	1	4.1
13	Cruz Bay	20	Cruz Bay	18°20'03"	64°47'42"	Sandline/poor	1	4.1
13	Cruz Bay	21	Caneel Bay	18°20'07"	64°47'40"	Driftline/poor	1	4.1
13	Cruz Bay	22	Caneel Bay	18°20'11"	64°47'44"	Driftline/poor	1	4.4
13	Cruz Bay	23	Caneel Bay	18°20'10"	64°47'48"	Driftline/poor	1	4.8
14	Rendezvous Bay	1	Fish Bay	18°19'28"	64°45'59"	Driftlines/poor	2	11.3
15	Coral Harbor	24	Emmaus Coral Bay	18°20'57"	64°42'43"	Driftline/poor	1	5.1

Table 2. Description of high-water marks—Continued

Plate number	Plate name	High-water mark number	Location (Estate)	Latitude	Longitude	Type/quality of mark	Number of high-water marks	Elevation (feet above mean sea level)
			St. John, U.S. Virgin Islands					
15	Coral Harbor	25	Emmaus Coral Bay	18°20'56"	64°42'45"	Driftline/fair	1	5.3
15	Coral Harbor	26	Emmaus Coral Bay	18°20'57"	64°42'52"	Driftlines/fair	2	5.2
15	Coral Harbor	27	Carolina	18°20'48"	64°43'01"	Driftline/poor	1	5.2
15	Coral Harbor	28	Carolina	18°20'47"	64°42'59"	Driftline/poor	1	5.6
15	Coral Harbor	29	Carolina	18°20'43"	64°42'56"	Driftline/poor	1	5.0
15	Coral Harbor	30	Carolina	18°20'41"	64°42'55"	Driftlines/good	2	4.6
15	Coral Harbor	31	Little Plantation	18°20'38"	64°42'53"	Driftline/poor	1	6.6
15	Coral Harbor	32	Little Plantation	18°20'36"	64°42'51"	Driftline/poor	1	6.3
15	Coral Harbor	33	Little Plantation	18°20'17"	64°42'46"	Driftline/poor	1	8.2
15	Coral Harbor	34	Little Plantation	18°20'07"	64°42'29"	Driftline/fair	1	10.6
15	Coral Harbor	35	Calabash Boom	18°20'02"	64°42'25"	Driftline/poor	1	7.0
15	Coral Harbor	36	Calabash Boom	18°19'58"	64°42'22"	Driftline/poor	1	8.9
16	Johnson Bay	37	Calabash Boom	18°19'53"	64°42'17"	Driftline/poor	1	6.0
16	Johnson Bay	38	Johns Folly	18°19'14"	64°42'09"	Driftline/poor	1	8.2
16	Johnson Bay	39	Johns Folly	18°19'06"	64°42'10"	Driftline/fair	1	9.8

[1] Inside high-water mark

Table 3. Description of reference marks and bench marks

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. Croix, U.S. Virgin Islands			
1	Frederiksted	RM 26	6.97	17°42'10"	64°53'10"	Chiseled square, painted orange, set on top of wall by *Cottages by the Sea* sign in front of beach resort at Veterans Shore Drive, 0.5 mile south of Frederiksted at Hesselberg Estate.
1	Frederiksted	RM 27	6.52	17°42'12"	64°53'09"	Chiseled square, painted orange, set on sidewalk leading to power plant at southeast corner of On the Beach Resort (former King Federik Hotel), about 650 feet north of the north shore of the Westend Saltpond, 0.5 mile south of Frederiksted at Hesselberg Estate.
1	Frederiksted	RM 27A	10.62	17°42'37"	64°53'02"	Chiseled square, painted orange, set on manhole concrete base, east of manhole outside ring, northwest of building B-10 of Marley Homes and across of fish market place at end of Road 702 (Fisher St.) at Two Brothers Estate.
1	Frederiksted	BM FRED 3	8.63	17°42'54"	64°53'03"	Standard U.S. Army Corps of Engineers disk stamped *FRED STED 3 JAX 1991*, set flush in sidewalk that runs parallel with seawall, about 100 feet southwest of intersection of Strand and Market Streets at Frederiksted Estate.
1	Frederiksted	BM 1 AZ	7.64	17°42'58"	64°53'03"	Standard U.S. Coast and Geodetic Survey disk stamped *1 AZ 1957 8*, set flush in east side of concrete base of light tower at entrance to the Frederiksted pier at intersection of Strand and Custom House Streets at Frederiksted Estate.
1	Frederiksted	RM 28	6.46	17°43'04"	64°52'55"	Chiseled square, painted orange, set on left upstream side of culvert headwall on second culvert in upstream order, over Jolly Hill Gut, about 800 feet southeast of Paul E. Joseph Stadium at Frederiksted Estate.
1	Frederiksted	BM GP N	7.73	17°43'24"	64°53'07"	Standard U.S. Coast and Geodetic Survey disk stamped *GPN 1919*, set flush on southeast side of intersection of Roads 63 and 76 (Mahogany Rd.) at La Grange Estate.
2	Belvedere	BM 21	6.19	17°46'19"	64°48'55"	Standard U.S. Geological Survey disk stamped *Flood Mark*, set flush in southwest corner of west concrete wall of Gabriel Williams boat ramp, about 25 feet north of Road 80 at Cane Bay Estate.

Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. Croix, U.S. Virgin Islands			
2	Belvedere	BM 22	6.06	17°46'51"	64°47'41"	Standard U.S. Geological Survey disk stamped *Flood Mark*, set flush in right upsteam side of culvert headwall on Road 80, 20 feet west of entrance to Mrs. April Williams property at Rust Up Twist Estate.
2	Belvedere	RM 33	5.75	17°46'51"	64°47'40"	Chiseled square, painted orange, set on right upstream side of culvert headwall on Road 80 near entrance to Mrs. April Williams property at Rust Up Twist Estate.
3	Salt River Bay	RM 34	8.40	17°46'56"	64°45'54"	Chiseled square, painted orange, set on corner of concrete slab, about 40 feet west of swimming pool of Gentle Winds Apartments, 0.3 mile northwest of Greig Hill at Salt River Estate.
3	Salt River Bay	BM 23	2.84	17°46'38"	64°45'45"	Standard U.S. Geological Survey disk stamped *Flood Mark*, set flush in south side of Salt River Marina boat ramp at Salt River Estate.
3	Salt River Bay	RM 35	1.87	17°46'38"	64°45'41"	Chiseled square, painted orange, set on top of seawall across from Salt River Marina office at Salt River Estate.
3	Salt River Bay	RM 37	8.93	17°46'33"	64°44'32"	Chiseled square, painted orange, set on left downstream side of culvert headwall on Jefferson Road in front of house no. 83 of Estate of Judith Fancy Homes at Judith Fancy Estate.
4	La Grande Princesse	RM 39	11.72	17°46'03"	64°44'11"	Chiseled square, painted orange, set on top of concrete wall, 1.5 feet from storm sewer grate, behind the Nicasio Niaud Apartments, about 0.6 mile east of St. Johns Ruins at St. Johns Estate.
4	La Grande Princesse	RM 41	6.82	17°45'23"	64°43'16"	Chiseled square, painted orange, set on sidewalk leading to apartment D-102 of the Colony Cove Apartments at Golden Rock Estate.
4	La Grande Princesse	RM 41A	5.61	17°45'11"	64°42'53"	Chiseled square, painted orange, set on southeast corner of the Virgin Islands Water and Power Authority (VIWAPA) and Devcon Company pier, 6.5 feet east of VIWAPA continuous discharge monitoring station at Fangselet Estate.
4	La Grande Princesse	RM 42	37.60	17°44'58"	64°42'55"	Chiseled square set on floor at northwest side of first northwest column of entrance to fire truck garage at Herbert L. Canegata Fire Station on Richmond Street at Fangselet Estate.
5	Christiansted Harbor	RM 1	8.85	17°44'48"	64°42'29"	Chiseled square, painted orange, set on corner of ditch in front of lot 27A near the corner of North and Market Streets at Christiansted Estate.

Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. Croix, U.S. Virgin Islands			
5	Christiansted Harbor	RM 2	4.30	17°44'53"	64°42'29"	Chiseled square, painted orange, set on sidewalk in front of entrance to Watergut Apartments administration office about 50 feet northwest of Watergut Street at Christiansted Estate.
5	Christiansted Harbor	BM NO 3	5.09	17°44'55"	64°42'18"	Standard National Ocean Service disk stamped *NO 3 1974,* set flush in sidewalk leading to the Caravelle Hotel at Queen Cross Street, about 20 feet southeast of main entrance to the hotel at Christiansted Estate.
5	Christiansted Harbor	BM CL	4.38	17°44'56"	64°42'09"	Standard U.S. Coast and Geodetic Survey disk stamped *CL MAGNETIC 1905*, set flush in a concrete post, 54 feet southeast of southeast pillar at entrance to speaker's pavilion on grounds of Fort Christian Park at Christiansted Estate.
5	Christiansted Harbor	RM 3	7.83	17°44'56"	64°42'09"	Chiseled square, painted orange, set on north corner of first step of stair leading from grounds of Fort Christian Park to Fort's entrance at Christiansted Estate.
5	Christiansted Harbor	BM 9 CES	3.60	17°44'52"	64°42'02"	Standard U.S. Geological Survey disk stamped *9 CES 1957 4*, set flush in southeast corner of step at south entrance to saltwater pumphouse, 12 feet south of southwest corner of pumphouse in Public Works Department yard at Christiansted Estate.
5	Christiansted Harbor	BM PORT	5.09	17°44'55"	64°41'59"	Standard National Ocean Service disk stamped *NOS PORT-81*, set flush in center of southwest end of Gallows Bay dock at Christiansted Estate.
5	Christiansted Harbor	RM 4	4.01	17°44'52"	64°41'52"	Chiseled square, painted red, set on the north side of sidewalk corner of intersection of Port and Anchor Way Streets at Mount Welcome Estate.
5	Christiansted Harbor	RM 4A	3.42	17°45'07"	64°41'47"	Chiseled square, painted orange, set on northeast corner of small pier, southeast of first northeast column of pier near entrance to Altona Lagoon Beach at Batteriet Louise Augusta.
5	Christiansted Harbor	RM 6	9.17	17°45'28"	64°41'01"	Chiseled square, painted orange, set on concrete wall around gas tank on beach behind Buccaneer Hotel at Shoys Estate.
6	Tague Bay	BM 5	22.94	17°45'36"	64°37'23"	Standard U.S. Geological Survey disk stamped *Flood Mark*, set flush in first step of entrance to East End Fire Station, 200 feet south of East End Road, south of Yellowcliff Bay at Mary's Fancy Estate.

Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. Croix, U.S. Virgin Islands			
6	Tague Bay	BM NO 1	3.88	17°45'23"	64°36'06"	Standard National Ocean Service disk stamped *NO 1 1975*, set flush in the southeast corner of a concrete slab on the eastern side of entrance to the Fairleigh Dickinson University pier, 13 feet east of a cement pipe enclosure that runds north and south from the Fairleigh Dickinson University lab grounds about 0.1 mile north of Road 66 at Tague Bay Estate.
6	Tague Bay	RM 11	16.87	17°45'36"	64°35'06"	Chiseled square, painted orange, set on concrete floor at north entrance to house in ruin, about 200 feet south of restrooms and east of main entrance to Cramer Park Beach at Longpoint and Cotton Garden Estate.
6	Tague Bay	RM 12	6.91	17°44'57"	64°35'38"	Chiseled square, painted orange, set on south end of 2-feet high concrete wall in front of main entrance to room 1222 of the Grapetree Bay Hotel at Grapetree Bay Estate.
7	Robin Bay	RM 14	25.33	17°44'14"	64°37'06"	Chiseled square, painted orange, set on right upstream side of culvert headwall on South Shore Road near Rod Bay, 0.5 mile northwest of Grass Point, 1.3 miles east of main entrance to Cotton Grove Ruins at Madame Carty Estate.
7	Robin Bay	BM 8	24.71	17°44'01"	64°37'36"	Standard U.S. Geological Survey disk stamped *Flood Mark*, set flush in right upstream side of culvert headwall on South Shore Road near Robin Bay, 0.7 mile east of main entrance to Cotton Grove Ruins at Madame Carty Estate.
8	Great Pond	RM 17A	10.01	17°43'11"	64°39'52"	4-inch nail in last power pole along dirt road that goes from office to the beach at the Boys Scout of America Camp at Fareham Estate.
9	Halfpenny Bay	RM 19	10.44	17°42'21"	64°42'05"	Chiseled square, painted orange, set on step at south entrance to Halfpenny Bay Club, 0.7 mile southeast of intersection of Road 62 and dirt road leading to Manchenil and Halfpenny Bays at Halfpenny Bay Estate.
10	Container Port	RM 20	12.36	17°41'55"	64°45'45"	Chiseled square painted orange, set on floor at southeast side of concrete arched building in ruin, about 400 feet northwest of seashore, 0.2 mile northeast of mouth of Krause Lagoon Channel at Krausses Lagune Estate.

Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. Thomas, U.S. Virgin Islands			
11	Cyril King Airport	RM 4A	8.98	18°20'15"	64°57'12"	Chiseled square, painted orange, set on southwest corner of triangular median at intersection of Roads 33 and 304, southeast of Nisky Center at Nisky Estate.
11	Cyril King Airport	RM 5	14.47	18°20'07"	64°57'35"	Chiseled square, painted orange, set on southeast corner of headwall of culvert at north side of intersection of Road 304 and main entrance to Krum Bay Estate.
11	Cyril King Airport	RM 6	7.99	18°20'18"	64°57'52"	Chiseled square, painted orange, set on north curb of Road 302 to airport, across of entrance to Island Beachcomber Hotel at Lindbergh Bay Estate.
11	Cyril King Airport	BM USVI 6	8.02	18°20'19"	64°57'56"	Standard U.S. Army Corps of Engineers disk stamped *USVI-6, 1990*, set flush on sidewalk north of Road 302, across of Island Beachcomber Hotel, about 1,600 feet east of entrance to Cyril E. King Airport at Lindbergh Bay Estate.
11	Cyril King Airport	RM 7	8.39	18°20'18"	64°58'07"	Chiseled square, painted orange, set on north curb of Road 302 to Cyril E. King Airport, about 200 feet east of entrance to the airport and 20 feet west of first light pole of airport at Lindbergh Bay Estate.
11	Cyril King Airport	BM USVI 5	8.21	18°20'19"	64°58'09"	Standard U.S. Army Corps of Engineers disk stamped *USVI-5, 1990*, set flush on sidewalk north of Road 302, about 200 feet east of entrance to the airport at Lindbergh Bay Estate.
11	Cyril King Airport	RM 9	17.24	18°20'40"	64°58'34"	Chiseled square, painted orange, set on curb at median of Road 30, 30 feet south of crossover, 800 feet southeast of main entrance to the Reichhold Center for the Arts, College of the Virgin Islands at John Brewers Bay Estate.
11	Cyril King Airport	RM 9A	12.11	18°20'48"	64°58'39"	Chiseled square, painted red, set on northeast corner of concrete wall north of upstream headwall of culvert on Road 30, about 20 feet northwest of main entrance to the Reichhold Center for the Arts, College of the Virgin Islands at John Brewers Bay Estate.
11	Cyril King Airport	RM 10	33.98	18°20'52"	64°58'46"	Chiseled square set on northwest corner of upstream headwall of culvert on Road 30, 400 feet northwest of main entrance to the Reichhold Center for the Arts, College of the Virgin Islands at John Brewers Bay Estate.

Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. Thomas, U.S. Virgin Islands			
12	St. Thomas Harbor	BM BETSY	7.87	18°19'56"	64°55'36"	Standard National Ocean Service disk stamped *BETSY 1993*, set flush in the southwest corner of southwest end of the West Indian Company Dock at Thomas Estate.
12	St. Thomas Harbor	BM 1639 J	9.87	18°20'07"	64°55'16"	Standard National Ocean Service disk stamped *1639 J 1986*, set flush in a concrete walk beneath the steps at the main entrance to the West Indian Company Dock administration building at Thomas Estate.
12	St. Thomas Harbor	BM 1639 G	7.80	18°20'13"	64°55'12"	Standard National Ocean Service disk stamped *1639 G 1983*, set flush in the concrete bulkhead cap on the West Indian Company Dock, 88 feet southwest of the south corner of a concrete block wall of the Ramada Yacht Haven Hotel parking lot, and 22 feet southeast of the southeast face of a concrete cargo loading pier at Thomas Estate.
12	St. Thomas Harbor	RM 1A	9.98	18°20'15"	64°55'10"	Chiseled square, painted orange, set on east curb of entrance to east parking lot of the Ramada Yacht Haven Hotel, south of Road 30, and west of intersection of Roads 30 and 313 at Thomas Estate.
12	St. Thomas Harbor	BM 1639 L	7.65	18°20'26"	64°55'35"	Standard National Ocean Service disk stamped *1639 L 1986*, set flush in the top of a 1-foot wide concrete retaining wall extending from the south face of the salt water pumping station on the south side of Road 30, 37 feet south of northeast corner of the pumping station building, and 4 feet east of the southeast corner of the building at Thomas Estate.
12	St. Thomas Harbor	RM 2	5.35	18°20'27"	64°55'36"	Chiseled square set on floor at main entrance to the salt water pumping station building, 12 feet south of northeast corner of the pumping station building, and south of Road 30 at Fredericksberg Point, Thomas.
12	St. Thomas Harbor	BM NO 5	5.03	18°20'30"	64°55'51"	Standard National Ocean Service disk stamped *NO 5 1975*, set flush in the southwest corner of a concrete step at the entrance to the administration building, U.S. Coast Guard Station, 27.3 feet east of the east curb of the road leading to the station, and 3.5 feet west of the foundation at Kings Wharf, King Quarter Estate.

Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. Thomas, U.S. Virgin Islands			
12	St. Thomas Harbor	BM 1639 D	2.94	18°20'32"	64°55'58"	Standard National Ocean Service disk stamped *1639 D 1980*, set flush in the concrete bulkhead near the intersection of Road 30 and Trompeter Gade, about 30 feet south of the south side of Veterans Drive, 1.7 feet north of the bulkhead face, and directly in front of a 2-foot mooring cleat at Queen Quarter Estate.
12	St. Thomas Harbor	RM 3A	3.82	18°20'29"	64°56'11"	Nail with 1-inch stainless steel disk embedded in concrete floor, 4.2 feet west of Emil E. White Memoriam, south of intersection of Road 30 and General Gade at the Waterfront area, Kronprindsens Quarter Estate.
12	St. Thomas Harbor	RM 3B	8.19	18°20'10"	64°56'30"	Chiseled square, painted orange, set on northwest corner of westernmost cistern in front of Chart House Restaurant, east side of stair that goes from the restaurant to the beach at Altona Welgunst Estate.
12	St. Thomas Harbor	RM 3C	6.21	18°20'16"	64°56'55"	Chiseled square, painted orange, set on southeast corner of a concrete cargo loading ramp at end of access road from Road 30 to Tropical Shipping Company at Contant Estate.
12	St. Thomas Harbor	RM 4	5.30	18°20'22"	64°56'56"	Chiseled square, painted orange, set on south curb at median of Road 30, in line with projection of access road to ACE Hardware and Tropical Shipping Company at Contant Estate.
			St. John, U.S. Virgin Islands			
13	Cruz Bay	RM 11	9.06	18°19'12"	64°47'03"	Chiseled square, painted red, set on east corner of partially destroyed stone wall, 150 feet due east of beach at Chocolate Hole, Chocolate Hole and Great Cruz Bay Estate.
13	Cruz Bay	RM 12	6.66	18°19'22"	64°47'11"	Chiseled square, painted orange, set on west base of mountain at first driveway west of hotel, 3 feet from south end curve at Great Cruz Bay, Chocolate Hole and Great Cruz Bay Estate.
13	Cruz Bay	RM 13	4.68	18°20'00"	64°47'44"	Chiseled square, painted orange, set on northeast corner of Loredon Lorence Boynes Sr. dock (Cruz Bay dock), east side of administration and tickets office at Cruz Bay Estate.
13	Cruz Bay	BM NO 2	2.85	18°20'04"	64°47'38"	Standard National Ocean Service disk stamped *NO 2 1972*, set in concrete seawall approximately 1 foot from northwest corner of the National Park Service dock at Cruz Bay Estate.

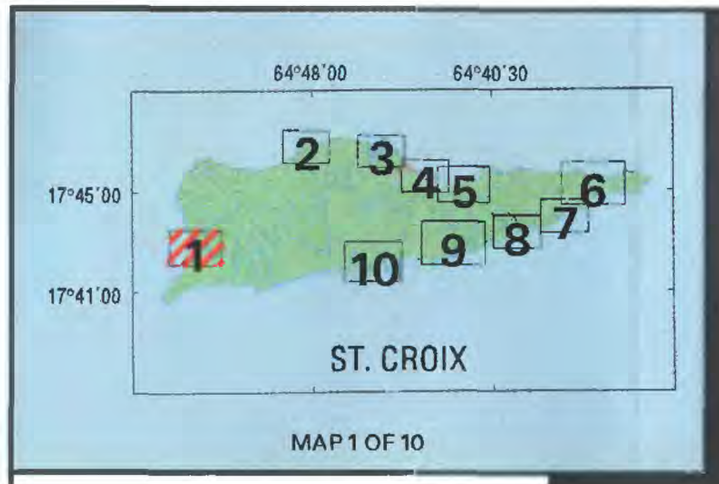
Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. John, U.S. Virgin Island			
14	Rendezvous Bay	RM 9A	13.97	18°19'28"	64°46'00"	Chiseled square, painted orange, set on southeast corner of upstream headwall of culvert on dirt road to Fish Bay, across a two-story blue wooden house, north of *Fish Bay* sign, 0.7 mile east of Road 104 at Fish Bay Estate.
14	Rendezvous Bay	RM 9B	87.90	18°19'22"	64°46'00"	Chiseled square, painted orange, set on south end of retaining wall on east side of dirt road to Fish Bay, about 400 feet south of *Fish Bay* sign, 0.7 mile east of Road 104 at Fish Bay Estate.
15	Coral Harbor	BM 1373 A	1.36	18°20'56"	64°42'44"	Standard National Ocean Service disk stamped *1373 A 1983* cemented to drill hole at northwest corner of concrete wharf in Coral Bay, 0.9 feet east of west edge of wharf, 0.9 feet south of north edge of wharf at Coral Harbor, Emmaus Coral Bay Estate.
15	Coral Harbor	RM 2A	5.30	18°20'54"	64°42'58"	Chiseled square, painted orange, set on west curb of Road 107, in line with projection of north wall of gas station administration office, about 0.2 mile south of intersection of Roads 10 and 107 at Emmaus Coral Bay Estate.
15	Coral Harbor	RM 2B	4.69	18°20'40"	64°42'55"	Chiseled square, painted orange, set on southeast end of upstream headwall of culvert on Road 107, about 500 feet north of Seabreeze Cafe at Carolina; four mailboxes are set over headwall, one reads *Harris-Ball 15-3 #1, Estate Carolina*, Carolina Estate.
15	Coral Harbor	RM 3	8.42	18°20'35"	64°42'50"	Chiseled square, set on southeast corner of retaining wall on leeward side of Road 107, 0.45 mile south of intersection with King Hill Road at Little Plantation Estate.
15	Coral Harbor	RM 3A	60.90	18°20'29"	64°42'49"	Chiseled square, painted orange, set on center of upstream headwall of culvert on Road 107, about 0.15 mile south of Pen Point at Little Plantation Estate.
15	Coral Harbor	RM 3B	18.28	18°20'20"	64°42'47"	Chiseled square, painted orange, set on downstream headwall of culvert on Road 107, about 0.3 mile south of Pen Point at Sanders Bay, Little Plantation Estate.
15	Coral Harbor	RM 4	37.97	18°20'13"	64°42'43"	Chiseled square, painted orange, set on southeast corner of upstream headwall of small culvert at Road 107 in Sanders Bay, 200 feet west of stairway on top of hill, 0.7 mile northwest of Calabash Boom Cemetery, 0.4 mile southeast of Pen Point Cemetery at Little Plantation Estate.

Table 3. Description of reference marks and bench marks—Continued

Plate number	Plate name	Reference mark or bench mark number	Elevation (feet above mean sea level)	Latitude	Longitude	Location and description
			St. John, U.S. Virgin Island			
15	Coral Harbor	RM 4A	10.35	18°20'05"	64°42'28"	Chiseled square, painted orange, set on northwest end of downstream headwall of culvert in front of Shipwreck Landing Restaurant, about 0.3 mile northwest of Calabash Boom Cemetery at Bloomingdale Coral Bay, Calabash Boom Estate.
15	Coral Harbor	RM 4B	11.21	18°20'00"	64°42'24"	Chiseled square, painted orange, set on south end of a 2-foot wide seawall on Calabash Boom Bay, about 0.15 mile northwest of Calabash Boom Cemetery at Calabash Boom Estate.
16	Johnson Bay	RM 5	14.82	18°19'51"	64°42'16"	Chiseled square, painted orange, set on center of downstream headwall of culvert on Road 107, 100 feet west of private concrete paved entrance to the beach, and about 150 feet east of intersection of Road 107 and dirt road, near Johnson Bay Cemetery at Calabash Boom Estate.
16	Johnson Bay	RM 8	25.10	18°19'15"	64°42'06"	Chiseled square, painted orange, set on retaining wall at seaward side of Road 107, north of entrance dirt road to Johns Folly Bay at Johns Folly Estate.

PLATES



MAP 1 OF 10

EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High–water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10–foot elevation contour
- 20–foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

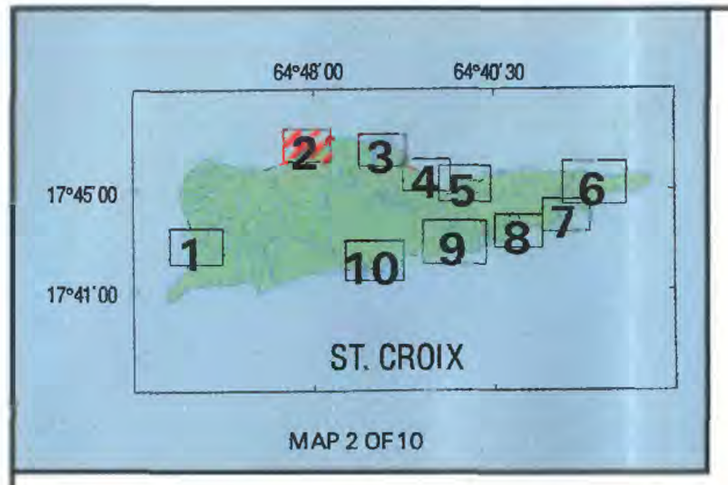
Feet
250 0 250 500

21 (7.2)
BM GP N
20 (7.7)
19 (6.7)
18 (6.3)
17 (7.1)
16 (6.9)
14 (6.9)
15 (7.0)
13 (9.0)
12 (8.7)
11 (8.8)
10 (8.8)
9 (8.4)
7 (9.2)
8 (9.0)
RM 27A
6 (9.6)
5 (10.5)
4 (9.9)
3 (7.1)
2 (5.8)
RM 27
1 (8.4)
RM 26
RM 28
BM 1 AZ
BM FRED 3
Fort Frederick
Frederiksted
La Grange
La Grange Rd.
Wheel of Fortune
Two Brothers
Centerline Rd.
Concordia Rd.
Frederiks Haab
76
631
63
70

HURRICANE MARILYN
SEPTEMBER 15 – 16, 1995
MAXIMUM EXTENT OF STORM TIDE
FREDERIKSTED

Prepared by the
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
Modified by the
US GEOLOGICAL SURVEY, CARIBBEAN DISTRICT

PLATE 1 of 16

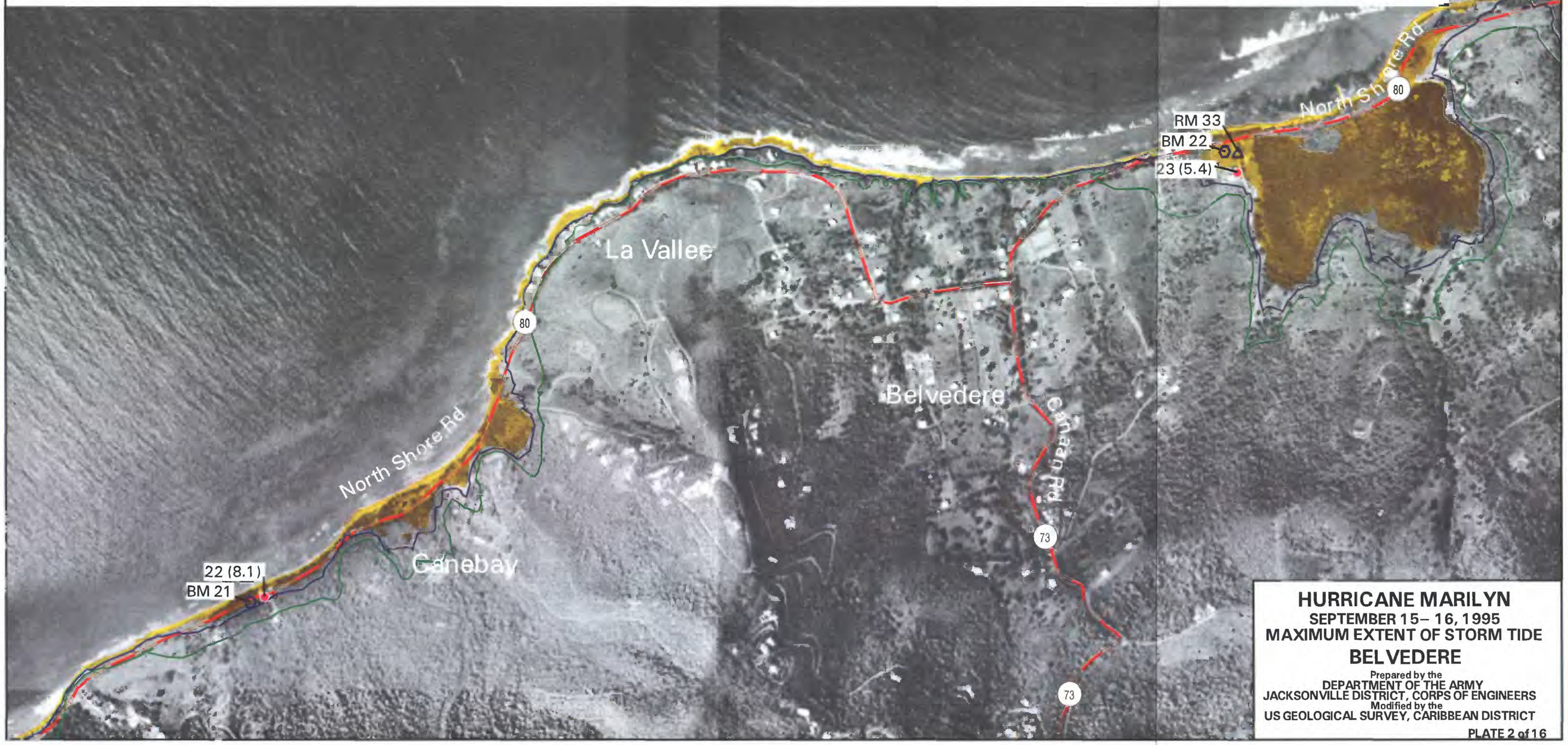


MAP 2 OF 10

EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

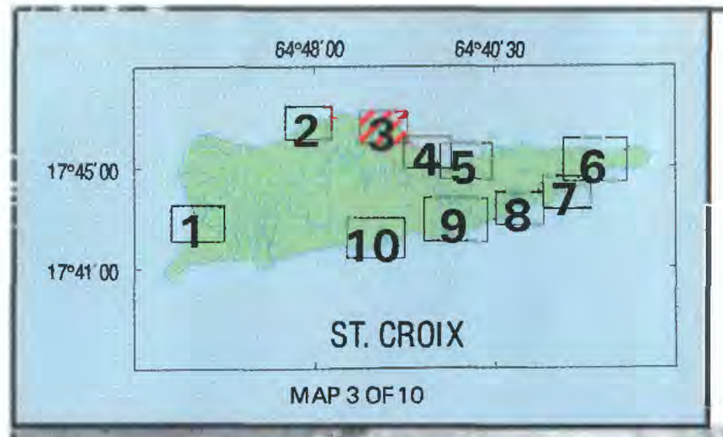
Feet
250 0 250 500



HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
BELVEDERE

Prepared by the
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
Modified by the
US GEOLOGICAL SURVEY, CARIBBEAN DISTRICT

PLATE 2 of 16



MAP 3 OF 10

EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

Feet
250 0 250 500

24 (6.7)
RM 34
Salt River Bay
Judith Fancy
25 (4.1)
BM 23
RM 35
26 (9.5)
RM 37
Sugar Bay
78
80
Salt River
79
781

HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
SALT RIVER BAY

Prepared by the
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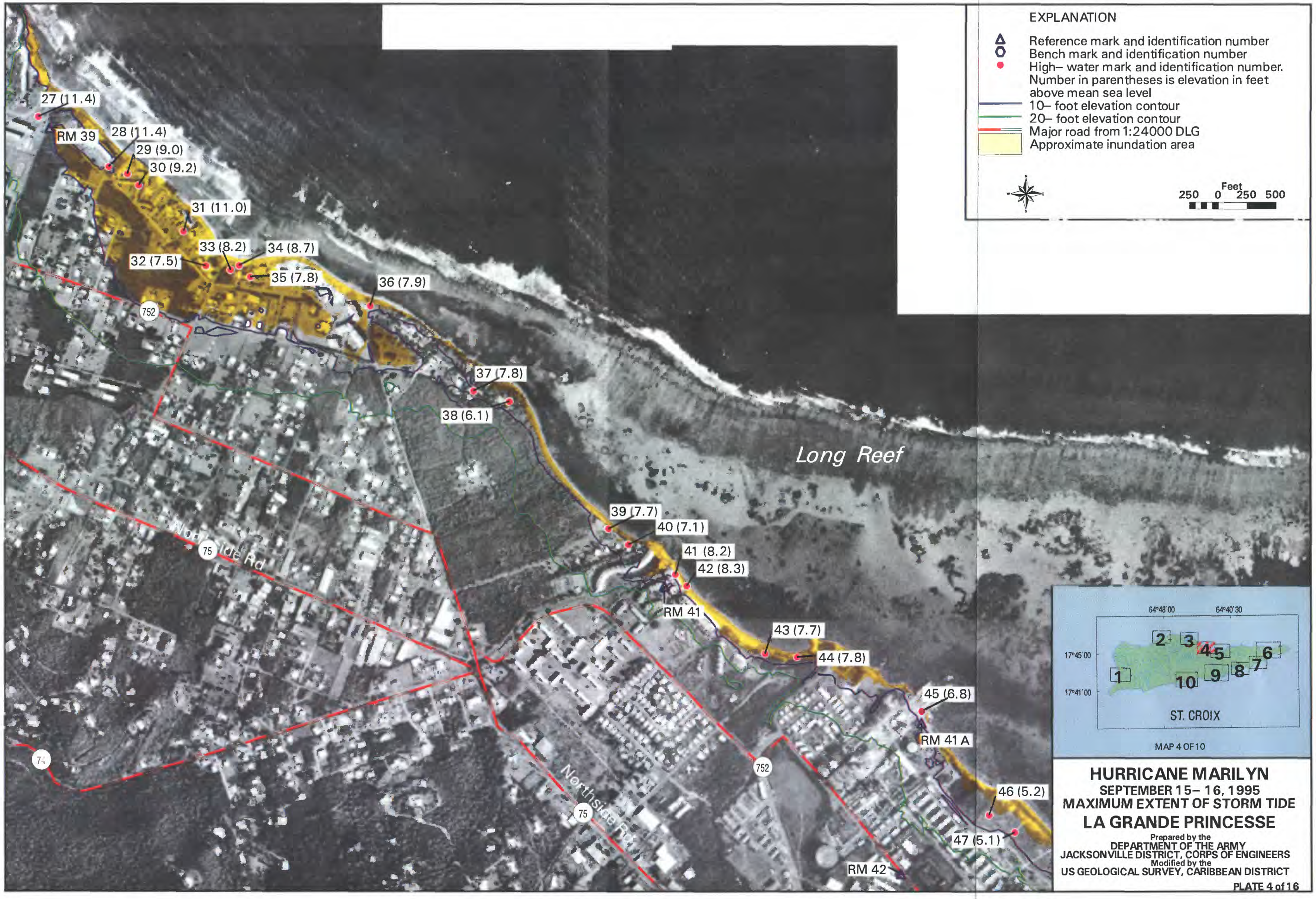
PLATE 3 of 16



MAP 4 OF 10

HURRICANE MARILYN

SEPTEMBER 15– 16, 1995

MAXIMUM EXTENT OF STORM TIDE

LA GRANDE PRINCESSE

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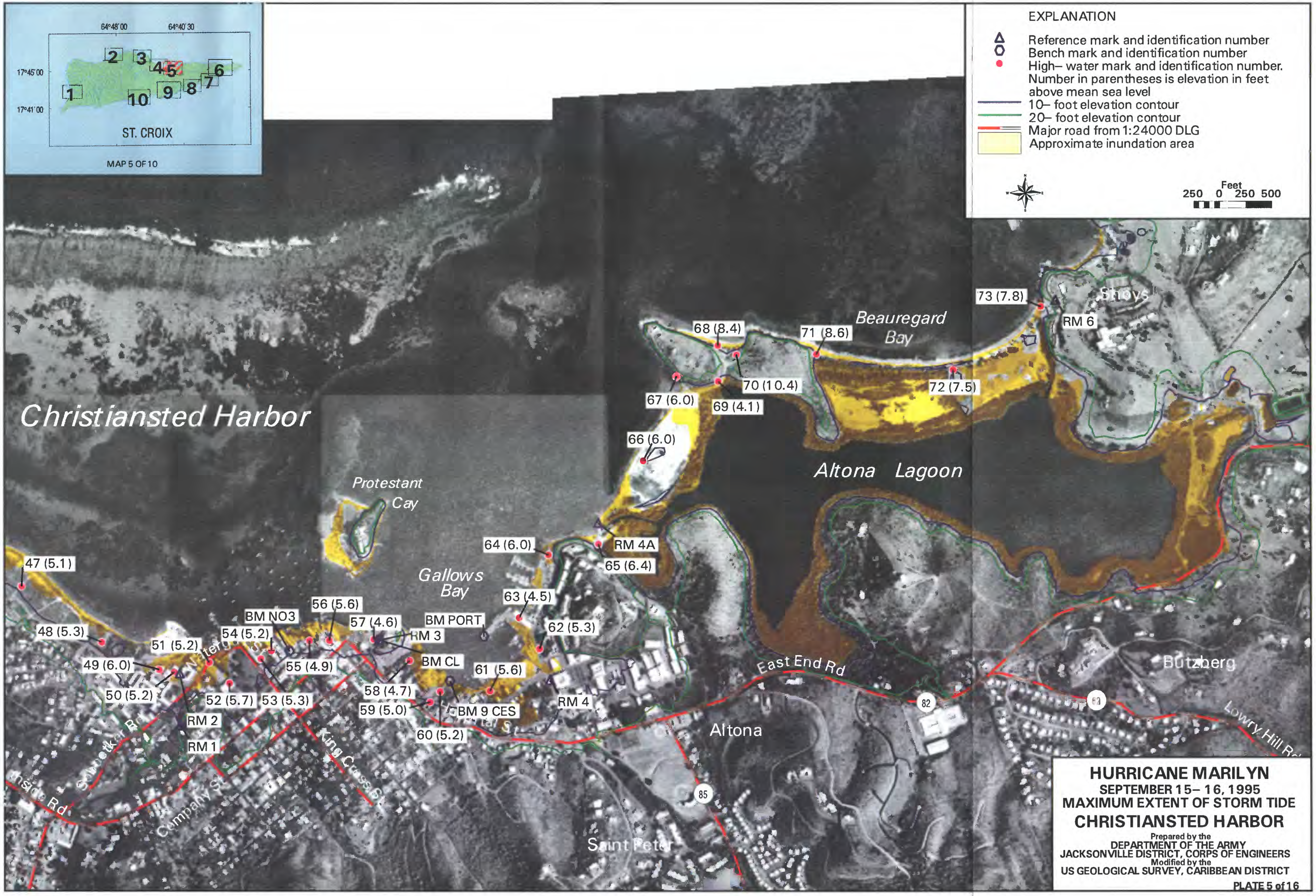
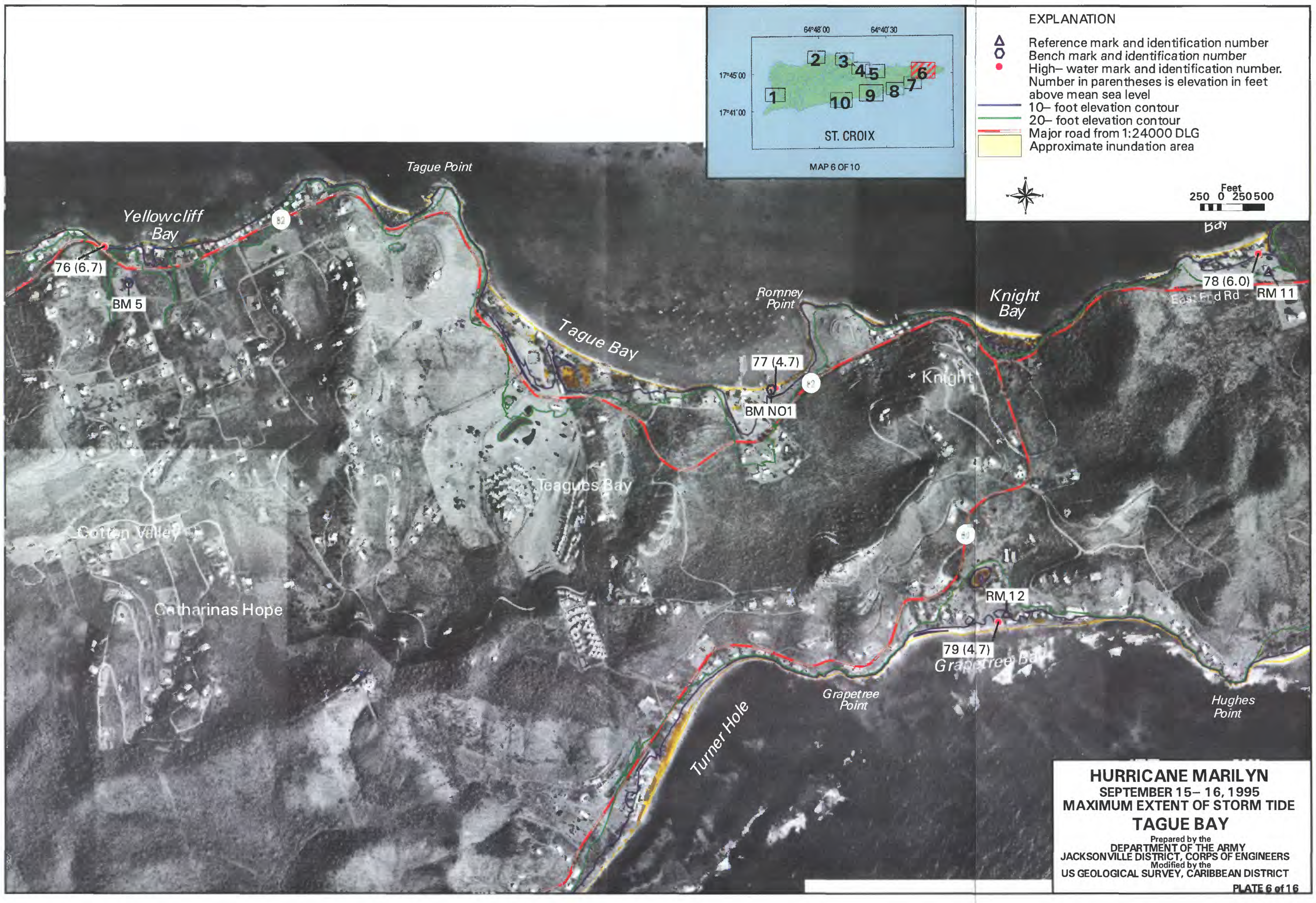
PLATE 4 of 16


64°48'00
64°40'30
17°45'00
17°41'00
1
2
3
4
5
6
7
8
9
10
ST. CROIX
MAP 5 OF 10
EXPLANATION
Reference mark and identification number
Bench mark and identification number
High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
10– foot elevation contour
20– foot elevation contour
Major road from 1:24000 DLG
Approximate inundation area
Feet
250 0 250 500
Christiansted Harbor
Protestant Cay
Gallows Bay
Beauregard Bay
Altona Lagoon
East End Rd
Altona
Saint Peter
Butzberg
Lowry Hill Rd
King Cross St
Company St
82
83
85
47 (5.1)
48 (5.3)
49 (6.0)
50 (5.2)
51 (5.2)
52 (5.7)
53 (5.3)
54 (5.2)
55 (4.9)
56 (5.6)
57 (4.6)
58 (4.7)
59 (5.0)
60 (5.2)
61 (5.6)
62 (5.3)
63 (4.5)
64 (6.0)
65 (6.4)
66 (6.0)
67 (6.0)
68 (8.4)
69 (4.1)
70 (10.4)
71 (8.6)
72 (7.5)
73 (7.8)
BM NO3
BM PORT
BM CL
BM 9 CES
RM 1
RM 2
RM 3
RM 4
RM 4A
RM 6
HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
CHRISTIANSTED HARBOR
Prepared by the
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
Modified by the
US GEOLOGICAL SURVEY, CARIBBEAN DISTRICT
PLATE 5 of 16



HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
TAGUE BAY

Prepared by the
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JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
Modified by the
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PLATE 6 of 16

EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

Feet
250 0 250 500

Madame Carty

RM 14

80 (4.9)

Rod Bay

Grass Point

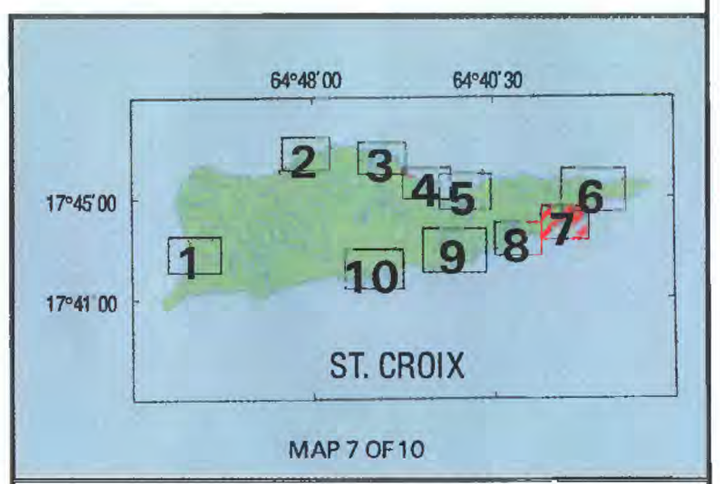
BM 8

81 (5.8)

Cotton Grove

Southshore Rd

Robin Bay



MAP 7 OF 10

HURRICANE MARILYN

SEPTEMBER 15– 16, 1995

MAXIMUM EXTENT OF STORM TIDE

ROBIN BAY

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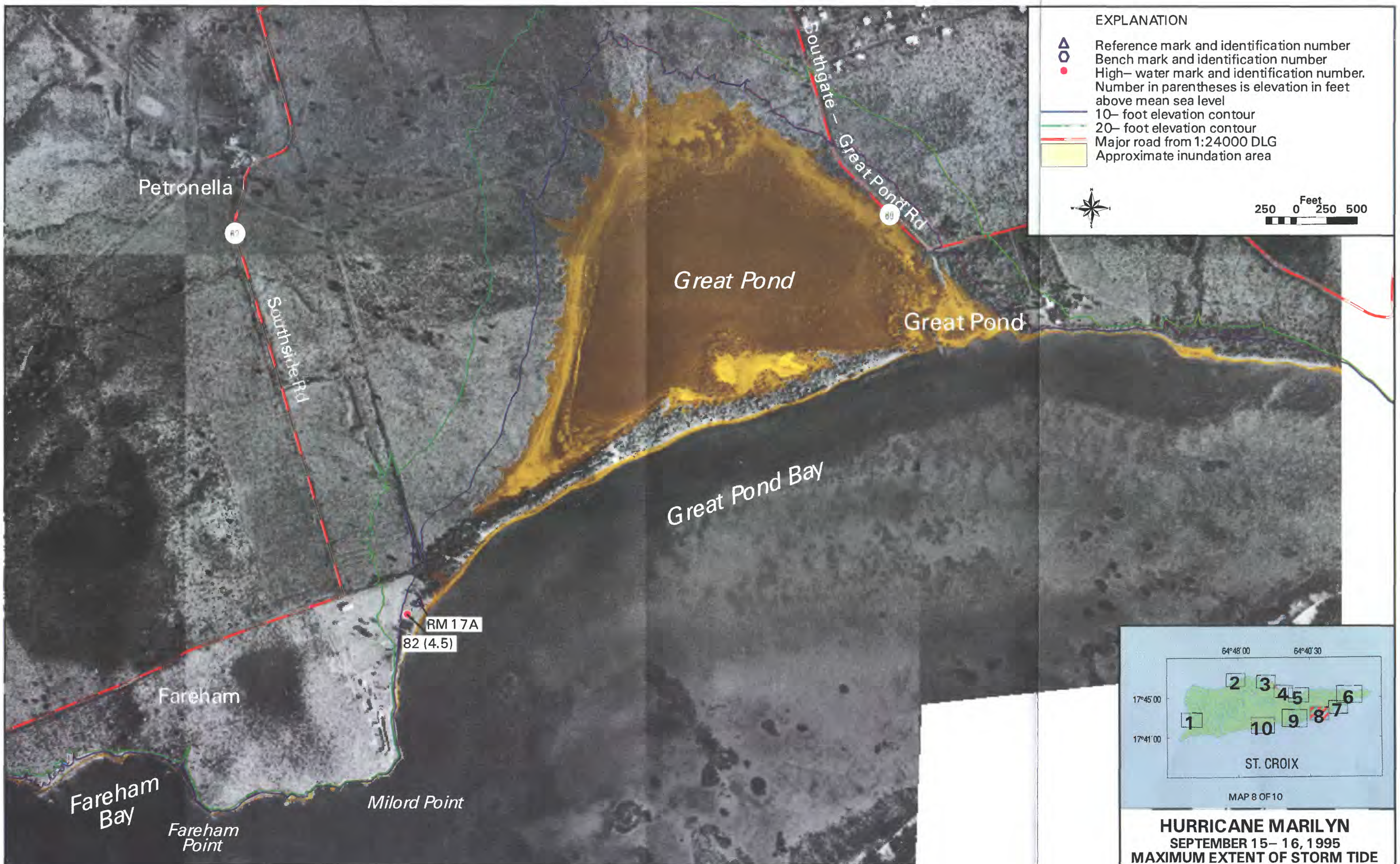
PLATE 7 of 16



EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

Feet
250 0 250 500

MAP 8 OF 10

HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
GREAT POND

Prepared by the
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Modified by the
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PLATE 8 of 16

EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

Feet
250 0 250 500

Boghyhole

Granard

Longford

62

Southside Rd

Southside Rd

Spring Bay

Surlaine Point

Ferrall Point

Halfpenny Bay

Manchenil Bay

Diamond Keturah

RM 19

74 (8.1)

HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
HALFPENNY BAY

Prepared by the
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PLATE 9 of 16


64°48'00
64°40'30
17°45'00
17°41'00
1
2
3
4
5
6
7
8
9
10
ST. CROIX
MAP 10 OF 10
Blessing
Jerusalem and Figtree Hill
75
Krause Lagoon
RM 20
75 (3.1)
Canegarden Bay
EXPLANATION
Reference mark and identification number
Bench mark and identification number
High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
10– foot elevation contour
20– foot elevation contour
Major road from 1:24000 DLG
Approximate inundation area
Feet
250 0 250 500
HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
CONTAINER PORT
Prepared by the
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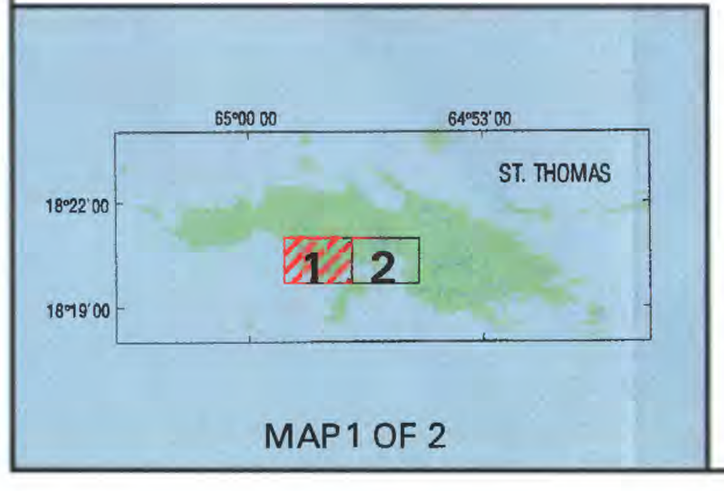
Modified by the
US GEOLOGICAL SURVEY, CARIBBEAN DISTRICT
PLATE 10 of 16

EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

250 0 250 500 Feet

RM 10
52 (8.1)
RM 9A
Brewerg Bay
51 (8.1)
RM 9
303
30
30
Contant
33
Altona
Moravian Hwy
BM USVI 5
RM 7
BM USVI 6
RM 6
Airport Rd
302
302
50 (9.0)
49 (8.1)
48 (9.6)
47 (8.2)
RM 4A
36 (6.6)
37 (6.4)
RM 5
38 (6.5)
39 (7.4)
Cabritaberg
Lindbergh Bay
45 (5.8)
46 (5.7)
44 (4.6)
40 (6.2)
Little Krum Bay
43 (5.4)
42 (5.7)
41 (7.5)
Red Point
Krum Bay
Reeds Point



MAP 1 OF 2

HURRICANE MARILYN

SEPTEMBER 15– 16, 1995

MAXIMUM EXTENT OF STORM TIDE

CYRIL KING AIRPORT

Prepared by the
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PLATE 11 of 16

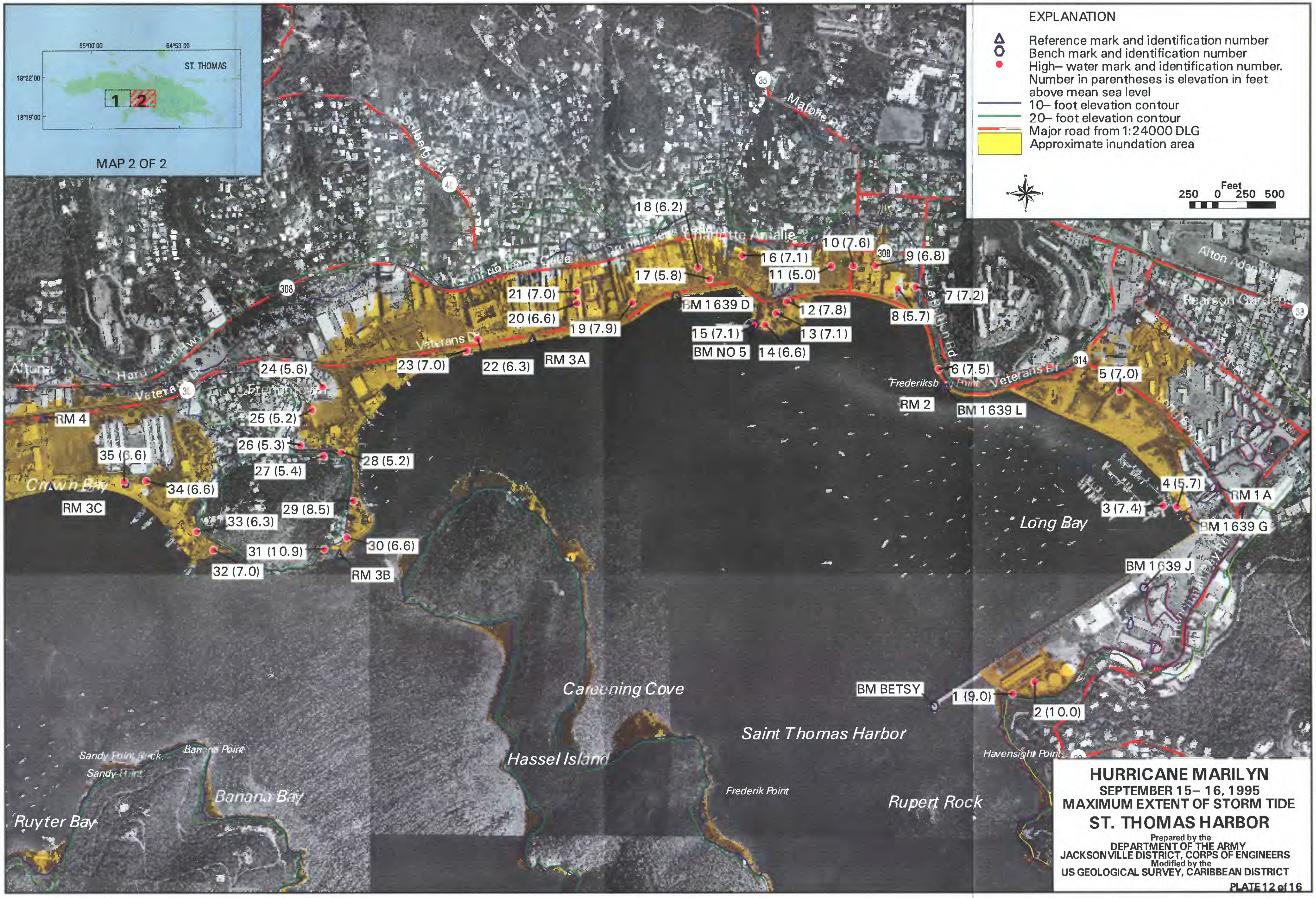
MAP 2 OF 2
ST. THOMAS
1
2
65°00'00
64°53'00
18°22'00
18°19'00
EXPLANATION
Reference mark and identification number
Bench mark and identification number
High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
10– foot elevation contour
20– foot elevation contour
Major road from 1:24000 DLG
Approximate inundation area
Feet
250 0 250 500
1 (9.0)
2 (10.0)
3 (7.4)
4 (5.7)
5 (7.0)
6 (7.5)
7 (7.2)
8 (5.7)
9 (6.8)
10 (7.6)
11 (5.0)
12 (7.8)
13 (7.1)
14 (6.6)
15 (7.1)
16 (7.1)
17 (5.8)
18 (6.2)
19 (7.9)
20 (6.6)
21 (7.0)
22 (6.3)
23 (7.0)
24 (5.6)
25 (5.2)
26 (5.3)
27 (5.4)
28 (5.2)
29 (8.5)
30 (6.6)
31 (10.9)
32 (7.0)
33 (6.3)
34 (6.6)
35 (6.6)
RM 1 A
RM 2
RM 3A
RM 3B
RM 3C
RM 4
BM 1639 D
BM 1639 G
BM 1639 J
BM 1639 L
BM NO 5
BM BETSY
Long Bay
Saint Thomas Harbor
Careening Cove
Hassel Island
Frederik Point
Rupert Rock
Havensight Point
Banana Bay
Banana Point
Sandy Point
Ruyter Bay
Crown Bay
Veterans Dr
Mafolie Rd
Alton Adams Dr
Pearson Gardens
Charlotte Amalie
308
314
35
33
40
30
HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
ST. THOMAS HARBOR
Prepared by the
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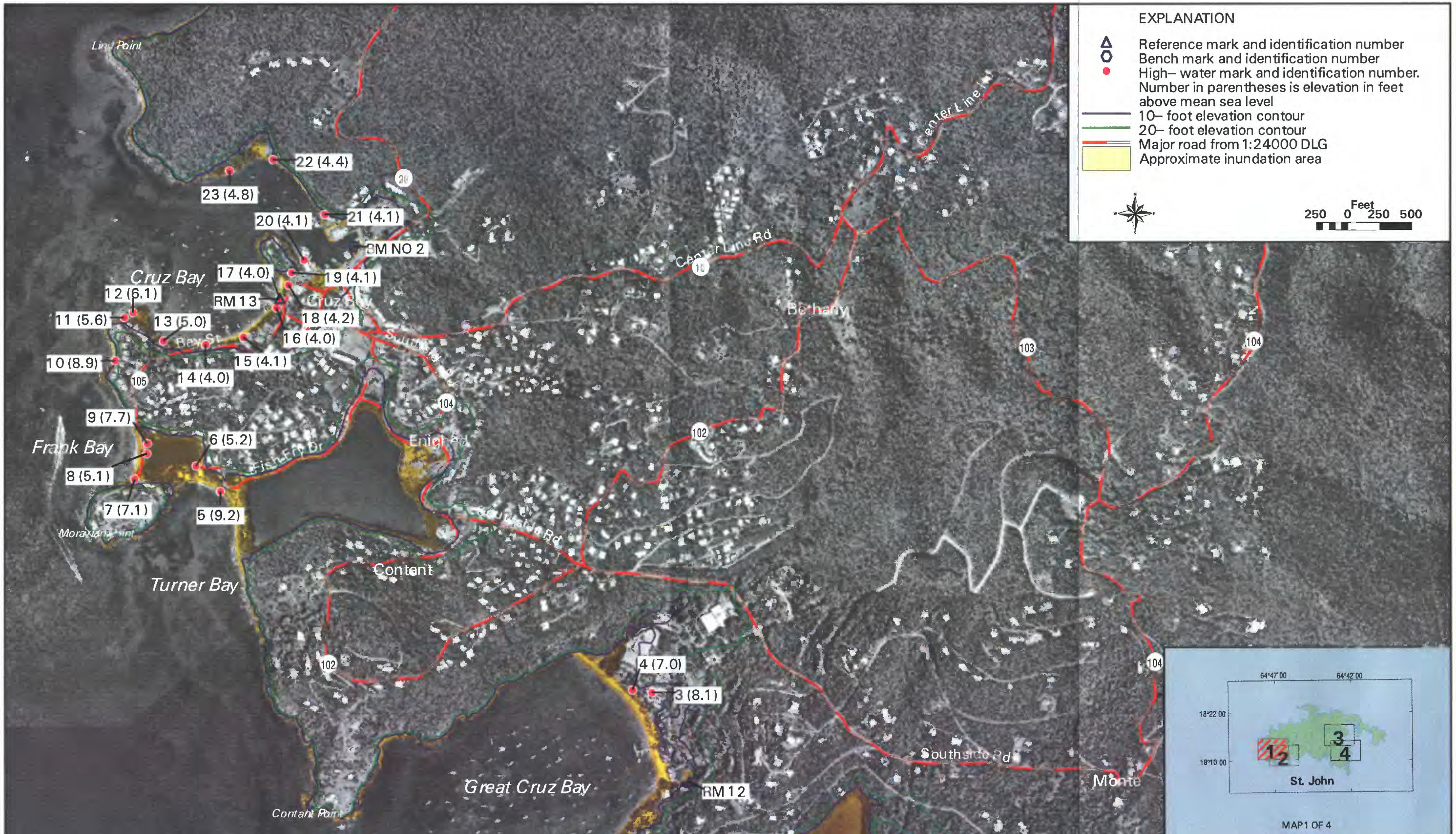
PLATE 12 of 16


EXPLANATION
Reference mark and identification number
Bench mark and identification number
High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
10– foot elevation contour
20– foot elevation contour
Major road from 1:24000 DLG
Approximate inundation area
Feet
250 0 250 500
Lind Point
22 (4.4)
23 (4.8)
20 (4.1)
21 (4.1)
BM NO 2
Cruz Bay
17 (4.0)
19 (4.1)
12 (6.1)
RM 13
18 (4.2)
11 (5.6)
13 (5.0)
16 (4.0)
Bay St
15 (4.1)
10 (8.9)
14 (4.0)
105
9 (7.7)
6 (5.2)
Frank Bay
Fish Fry Dr
8 (5.1)
7 (7.1)
5 (9.2)
Moravian Point
Turner Bay
Content
Center Line Rd
10
Bethany
103
104
102
4 (7.0)
3 (8.1)
Great Cruz Bay
RM 12
Contant Point
Southside Rd
Monte
RM 11
2 (8.2)
Blasbalg Point
Chocolate Hole
64°47'00
64°42'00
18°22'00
18°10'00
1
2
3
4
St. John
MAP 1 OF 4

HURRICANE MARILYN

SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
CRUZ BAY

Prepared by the
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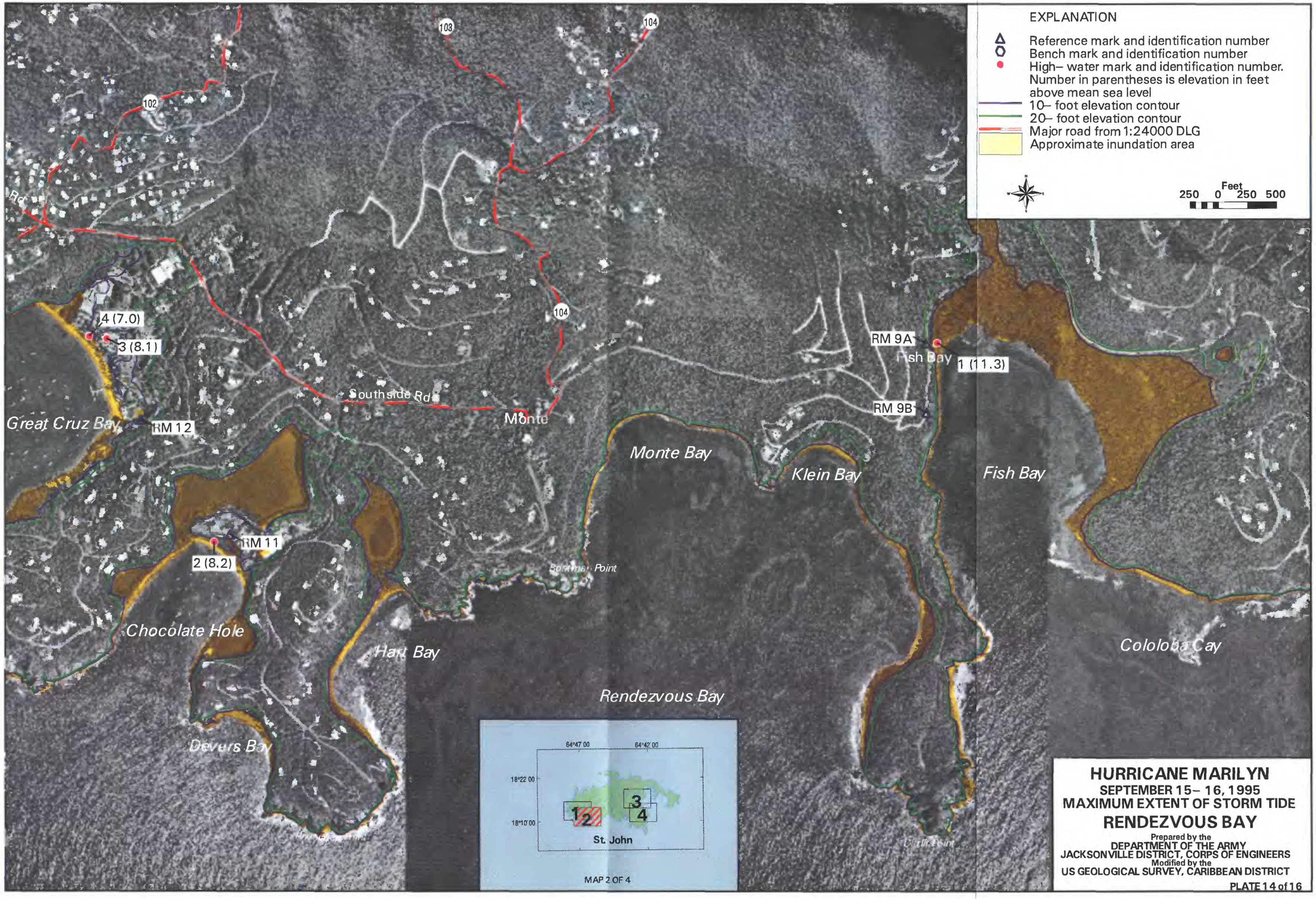
PLATE 13 of 16



HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
RENDEZVOUS BAY

Prepared by the
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PLATE 14 of 16

EXPLANATION

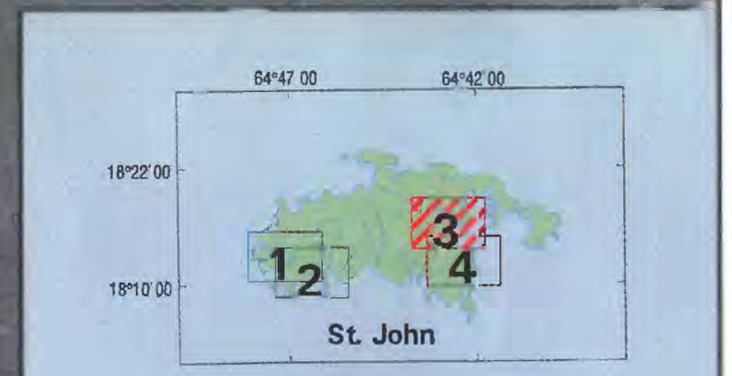
- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

Feet
250 0 250 500

Emmaus
Coral Bay
Carolina
Coral Harbor
Hurricane Hole
Sanders Bay
Bordeaux
Johnson B

26 (5.2)
24 (5.1)
25 (5.3)
BM 1373A
RM 2A
27 (5.2)
28 (5.6)
29 (5.0)
30 (4.6)
RM 2B
31 (6.6)
32 (6.3)
RM 3
M 3A
RM 3B
33 (8.2)
RM 4
34 (10.6)
RM 4A
35 (7.0)
RM 4B
36 (8.9)

109
108
107



MAP 3 OF 4

HURRICANE MARILYN
SEPTEMBER 15– 16, 1995
MAXIMUM EXTENT OF STORM TIDE
CORAL HARBOR

Prepared by the
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PLATE 15 of 16

Bordeaux

Sandy's Bay

RM 4

34 (10.6)

RM 4A

35 (7.0)

RM 4B

36 (8.9)

Johnson Bay

37 (6.0)

RM 5

Calabash Boom

Friis Bay

107

Point

Johns Folly

RM 8

38 (8.2)

Johns Folly Bay

39 (9.8)

107

Mandal

EXPLANATION

- Reference mark and identification number
- Bench mark and identification number
- High– water mark and identification number. Number in parentheses is elevation in feet above mean sea level
- 10– foot elevation contour
- 20– foot elevation contour
- Major road from 1:24000 DLG
- Approximate inundation area

250 0 250 500 Feet

64°47 00 64°42 00

18°22 00

18°10 00

1 2 3 4

St. John

MAP 4 OF 4

HURRICANE MARILYN

SEPTEMBER 15– 16, 1995

MAXIMUM EXTENT OF STORM TIDE

JOHNSON BAY

Prepared by the
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PLATE 16 of 16