

# Eastern Caribbean Tour November 2019



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# Eastern Caribbean Tour November 2019

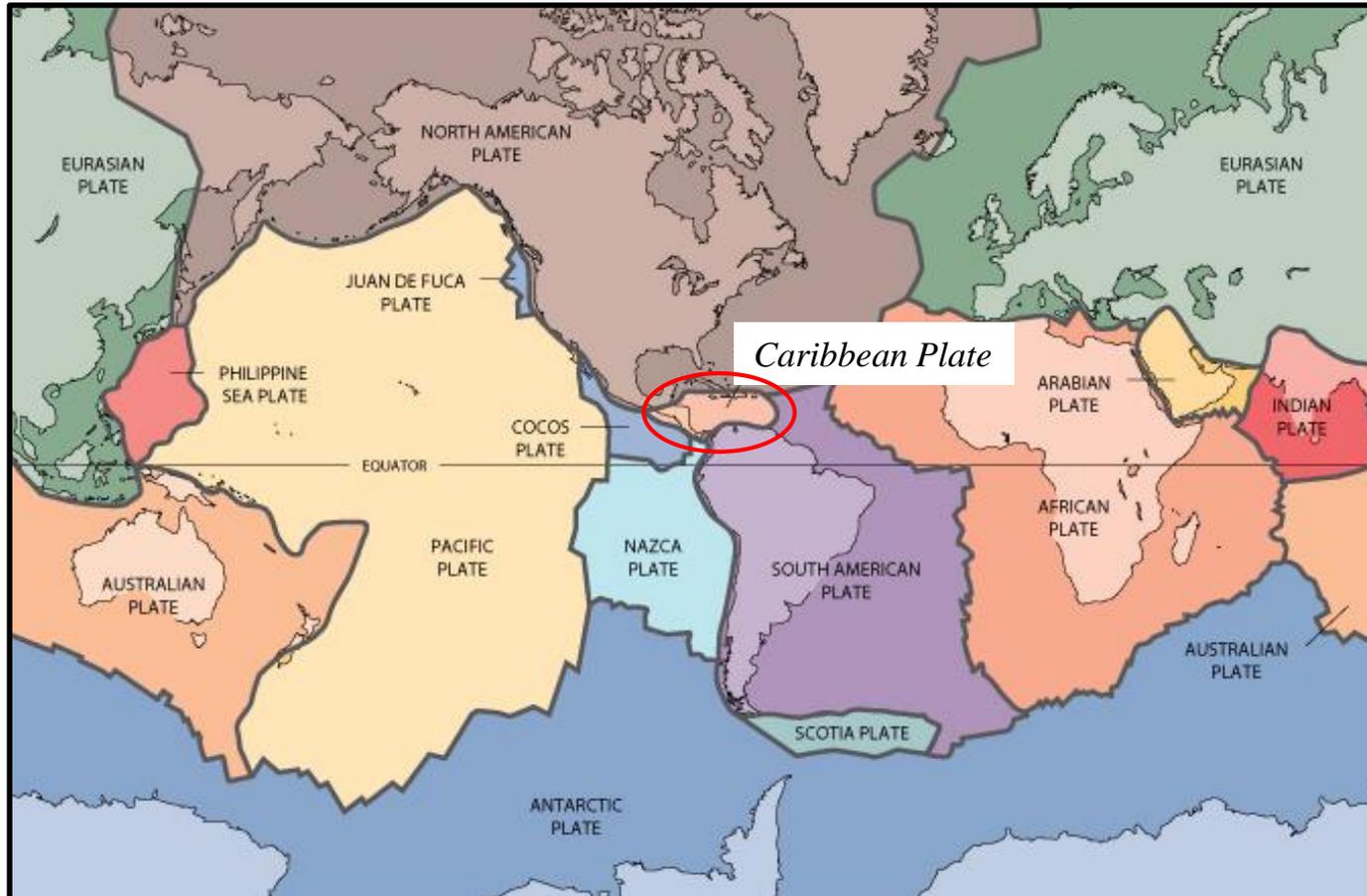


*Silversea Whisper: 11/11/19 to 11/22/19*

## *Science Lecture Topics:*

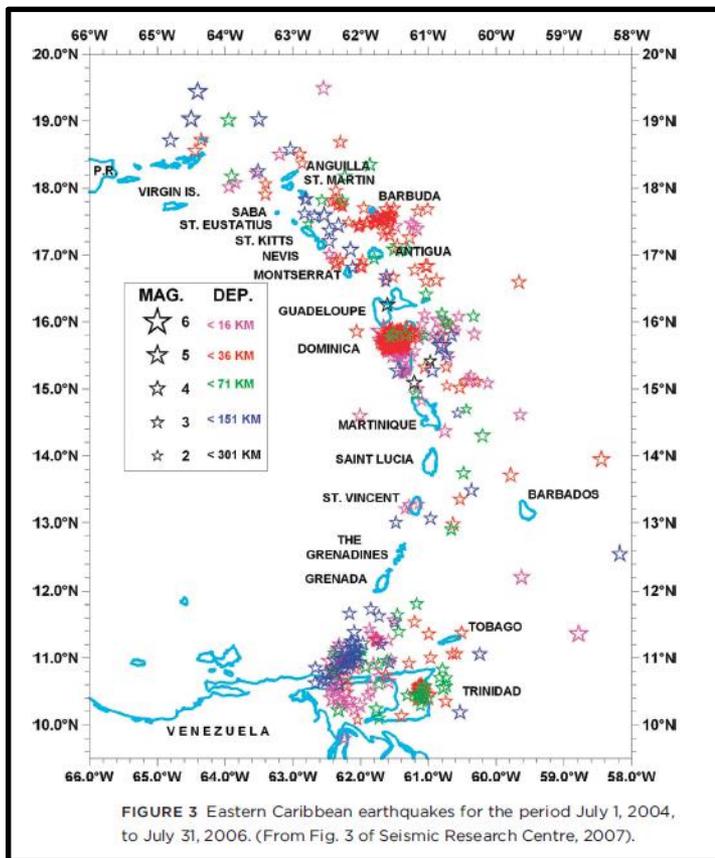
- *WWII in the Caribbean Sea*
- *Geology & Beer of the Caribbean*
- *Tsunamis in the Caribbean*
- *Caribbean Volcanoes*
- *Caribbean Coral Reefs*
- *Caves and Karst in the Caribbean*

# Plate Tectonics: Geology's Unifying Theory and the Caribbean Plate

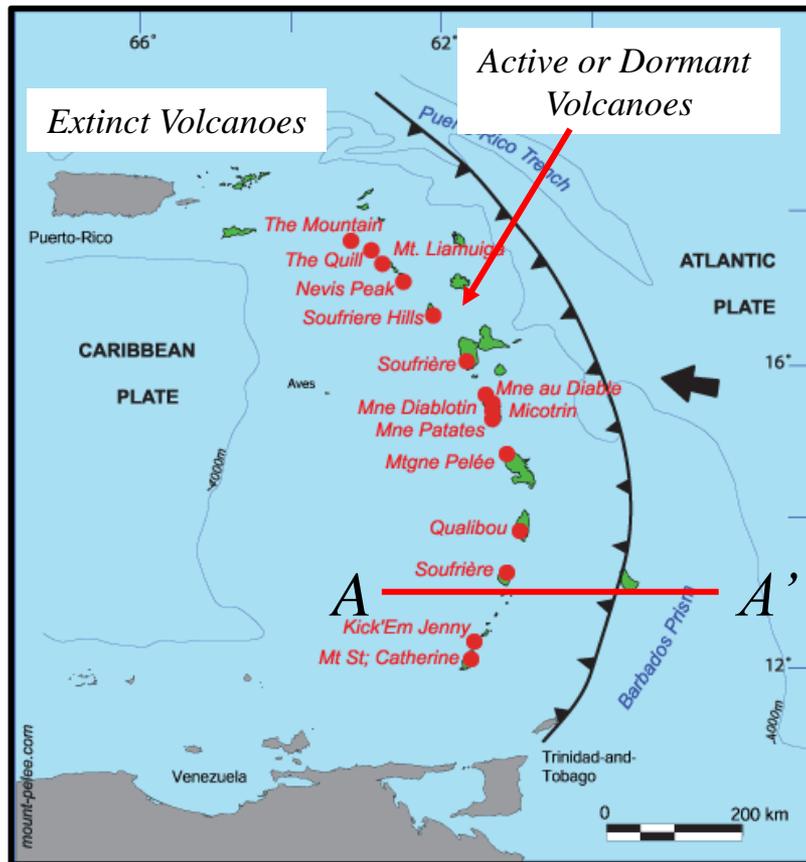


# Lesser Antilles: Earthquakes and Volcanoes in the Eastern Caribbean

*Earthquakes July 1, 2004 – July 31, 2006*



*Map of Volcanoes in Lesser Antilles*





# San Juan, Puerto Rico



# Isla Verde Beach, San Juan, Puerto Rico



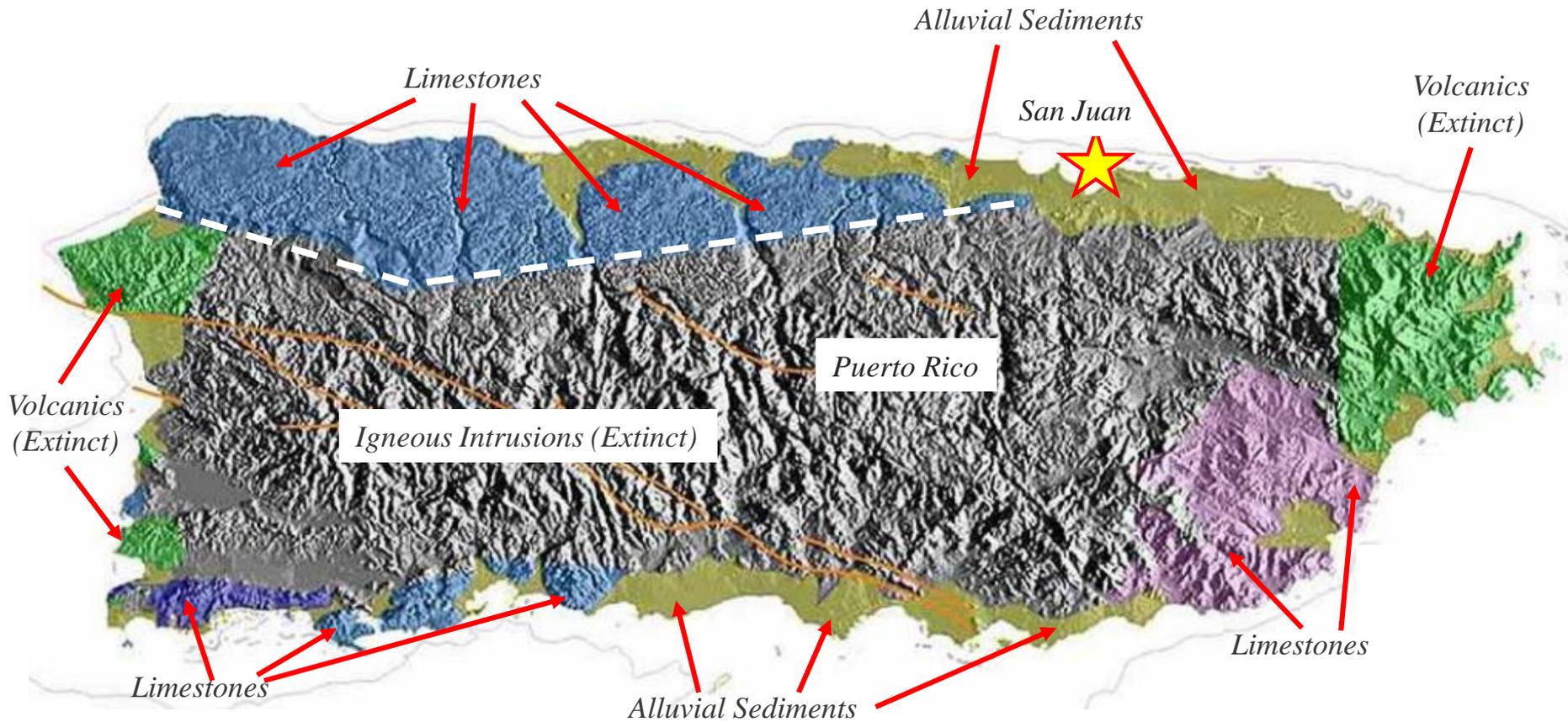
# Castillo de San Cristóbal, San Juan, Puerto Rico



# Puerto Rico from the Air (NASA Image)



Eastern Caribbean Islands (like Puerto Rico) generally contain a mix of igneous rocks, limestones (from reefs), and alluvial sediments



# Coral Reef Morphology, Puerto Rico

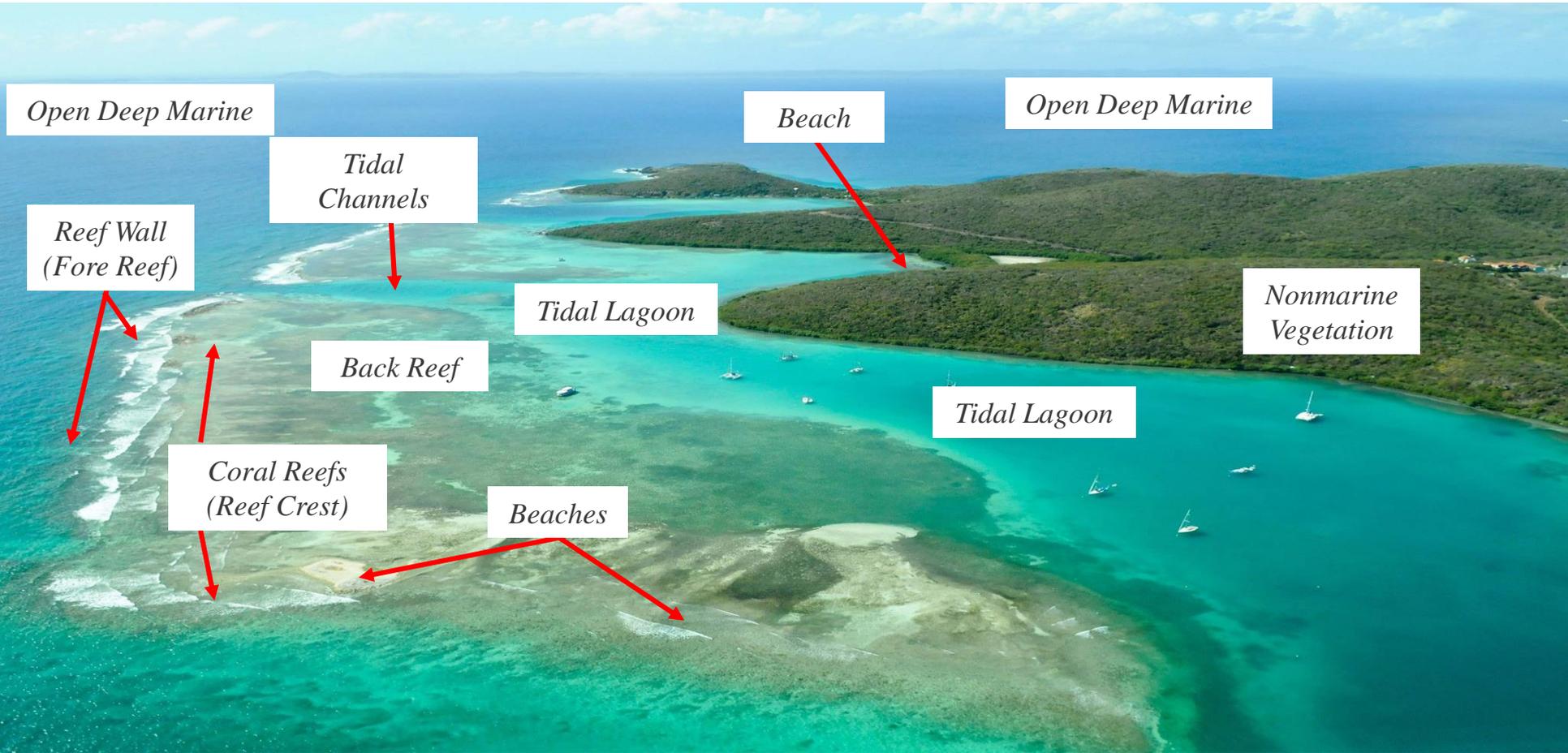
*Culebra – 17 miles east of Puerto Rico*



*Luis Peña Channel Natural Reserve*

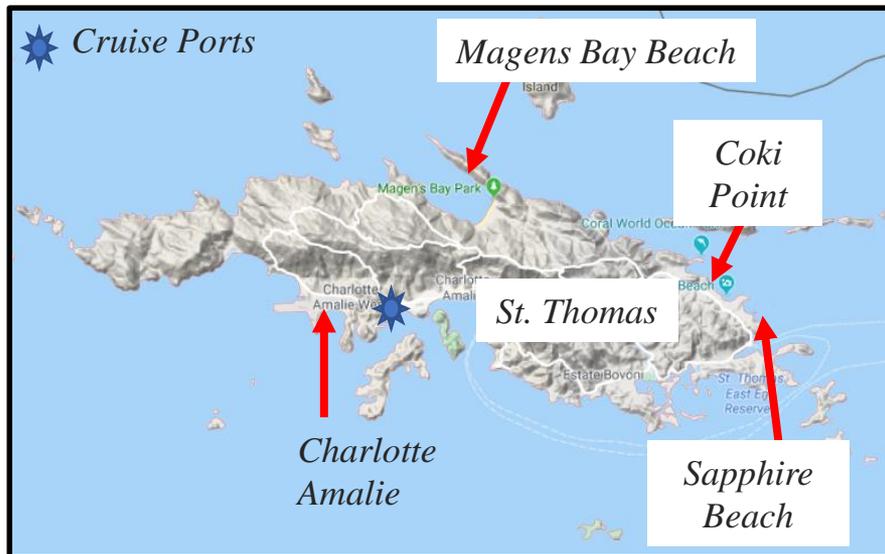


# Typical Coral Reef Morphology, Culebra, Puerto Rico



# Charlotte Amalie, St. Thomas Island, U.S. Virgin Islands

## *U.S. Virgin Islands and Beach Highlights*

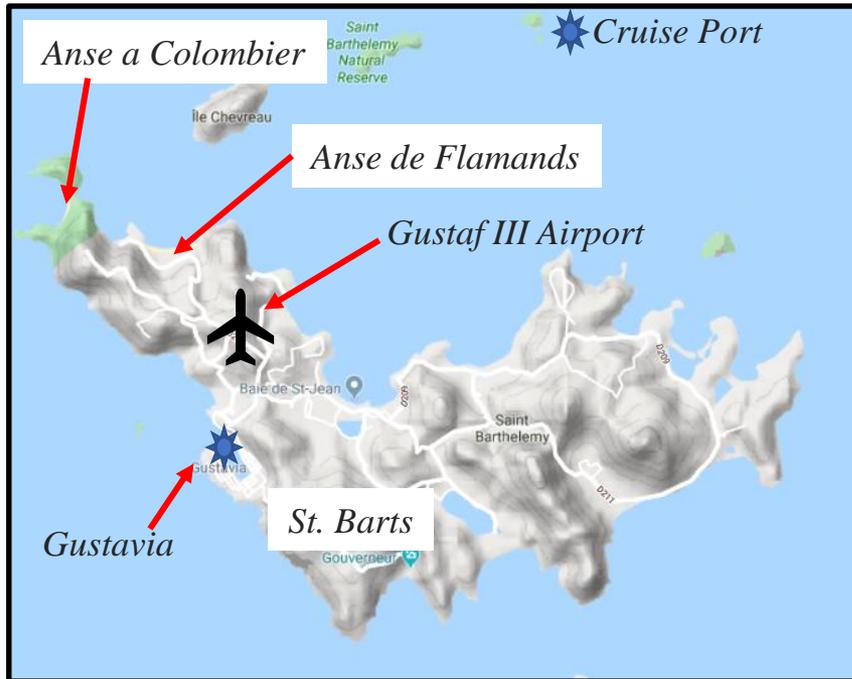


## *The warm waters of St. Thomas*



# Gustavia, St. Barts

*Gustavia, St. Barthelemy (St. Barts)*



*Harbor at Gustavia, St. Barts*



*Originally named Le Carénage, the town was renamed to honor King Gustav III of Sweden*

Fort Karl built 1787 by Sweden in Gustavia sits on volcanic rocks



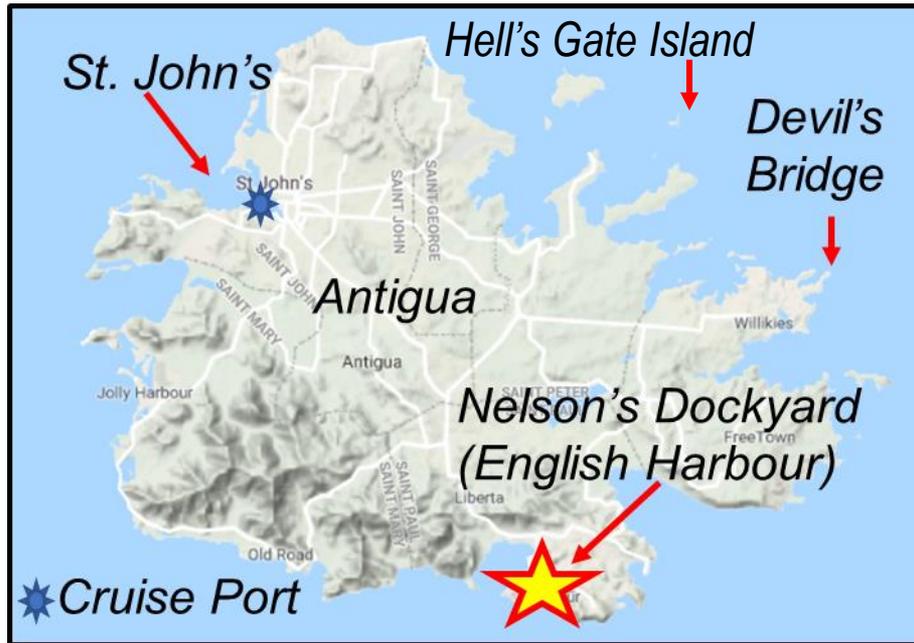
*Silver Whisper* at Dusk, Gustavia, St. Barts



# St. John's, Antigua

*St. Johns: Limestone caves and secret coves*

*St. John's Harbour, Antigua*



# Nelson's Dockyard (English Harbour), Southeast Antigua

*Thin Basalt Layers, Nelson's Dockyard*



*Nelson's Dockyard, a World Heritage Site*

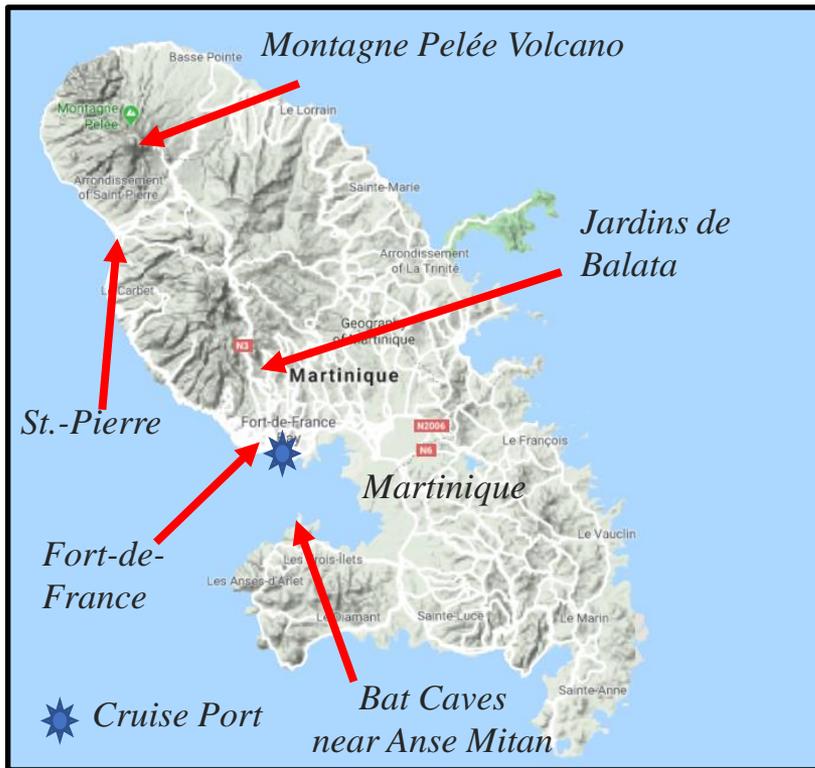


# Looking down to English Harbour, Southeast Antigua



# Fort-de-France, Martinique's Capital

*Fort-de-France: the center of Martinique*



*The Fort in Fort-de-France, Martinique*



*Originally called "Port-Royale," the city changed names to "Fort-La-Republique" during the French Revolution, and finally to Fort-de-France in the 19<sup>th</sup> century.*

# Dusk in Fort-de-France, Martinique



# City Center and St. Louis Cathedral, Fort-de-France, Martinique



# Street shops and cafes of Fort-de-France, Martinique



Old and New, Fort-de-France, Martinique  
*Silver Whisper*, right side of the photo



# Hillside Houses in Fort-de-France, Martinique



Sacred Heart (after Sacré-Cœur of Paris), a replica made with local volcanic basalt rocks, hills north of Fort-de-France, Martinique



# The Exotic-Looking Pitons du Carbet in Martinique: Tropical Volcanic Spires



Mount Pelé above St. Pierre, Martinique:  
the tranquil beauty falsely masks the subsurface dangers



# Sugar cane in northern Martinique, with Mount Pelé in the clouds



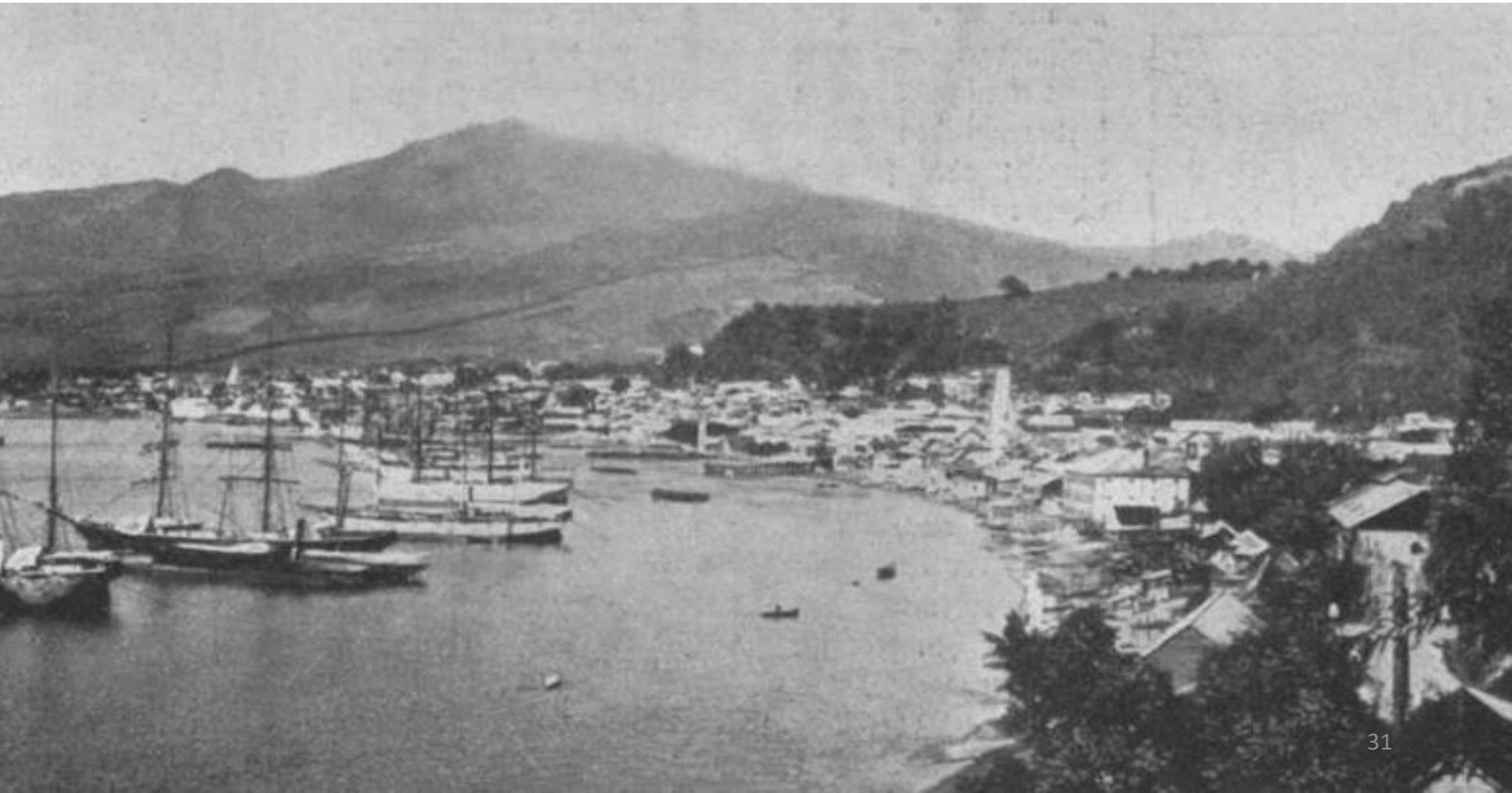
# Sugar cane into rum: Martinique's Magical Elixir for the World



Rhum Depaz, Since 1651; Insert: Sugar Cane

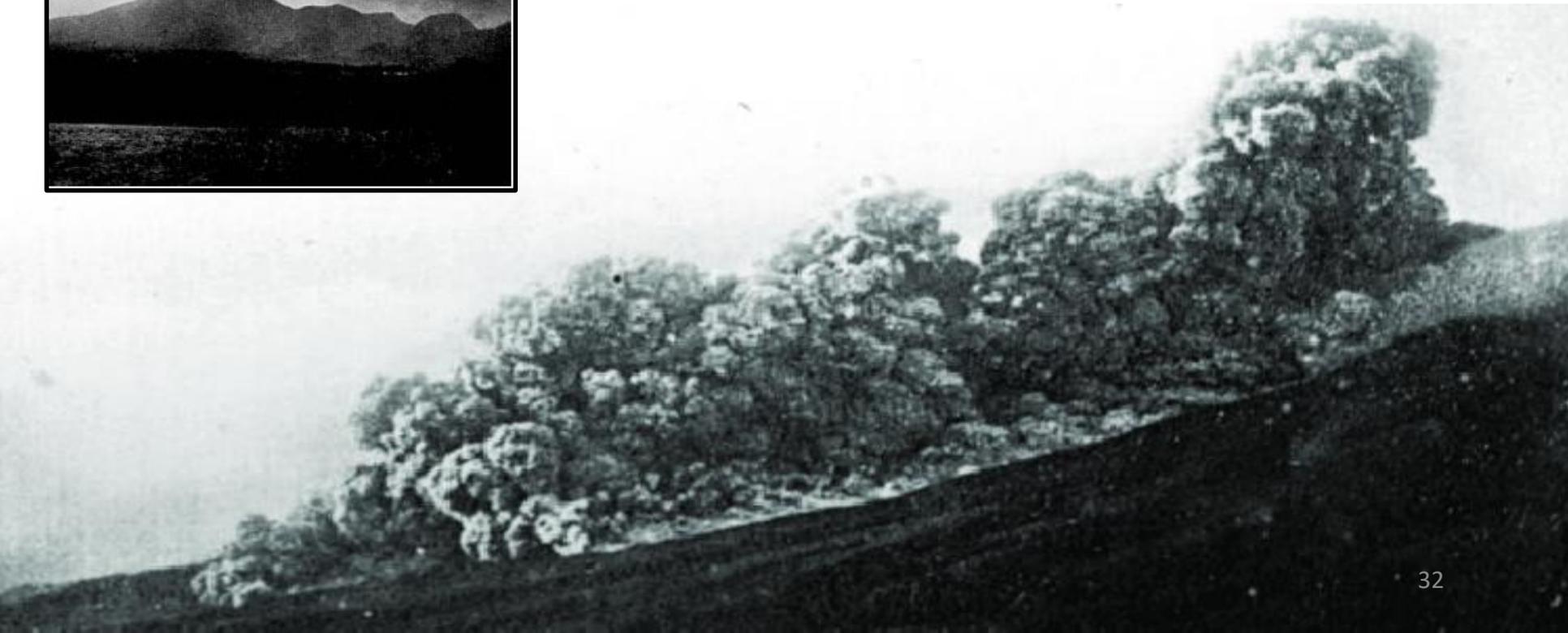
# Saint Pierre, Northern Martinique before Pyroclastic Flow

*Stratavolcano Mount Pelée erupted in 1902, destroying St. Pierre, killing 39,000 residents.*



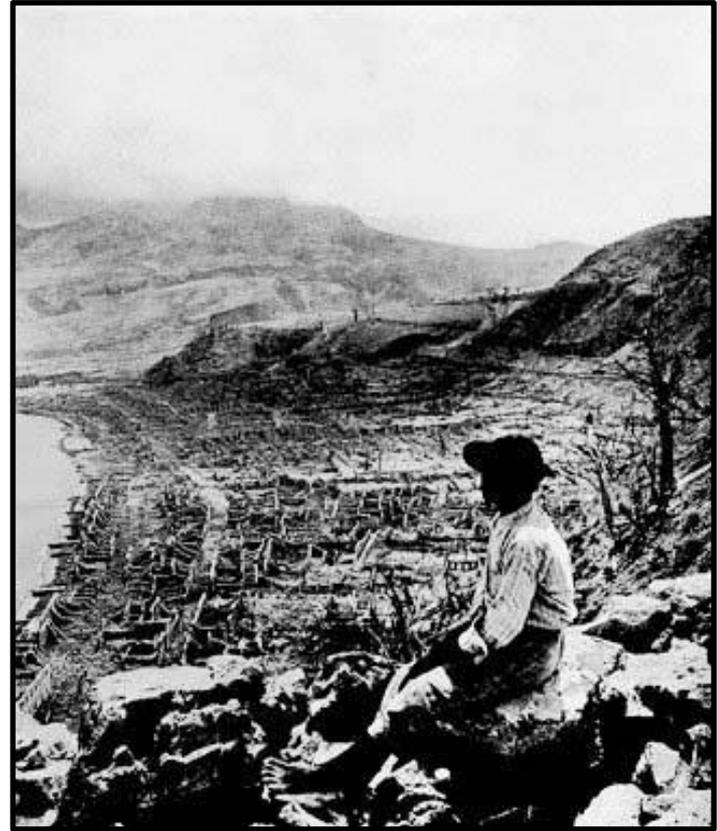
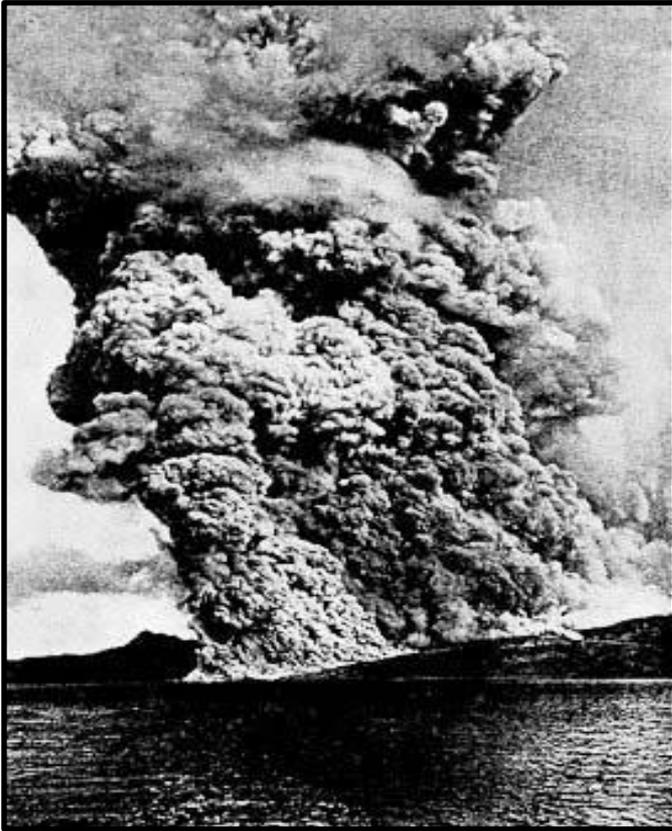
# Pyroclastic flow destroyed St. Pierre in 1902

*Stratovolcano Mount Pelée erupted with a gas and ash-rich fast-moving flow in 1902*



# Saint Pierre, Northern Martinique

*Stratovolcano Mount Pelée and the destruction of the “Paris of the Caribbean.”*



Fort St. Pierre-de la Martinique was built from 1635-1695 but destroyed in 1902



# Memorial to the Catastrophe is a Museum to the 39,000 Victims in St. Pierre, Martinique



# Entrance to the St. Pierre Theatre, St. Pierre, Martinique



St. Pierre was called “the Paris of the Caribbean” and known for its cultural vibrancy and commercial power

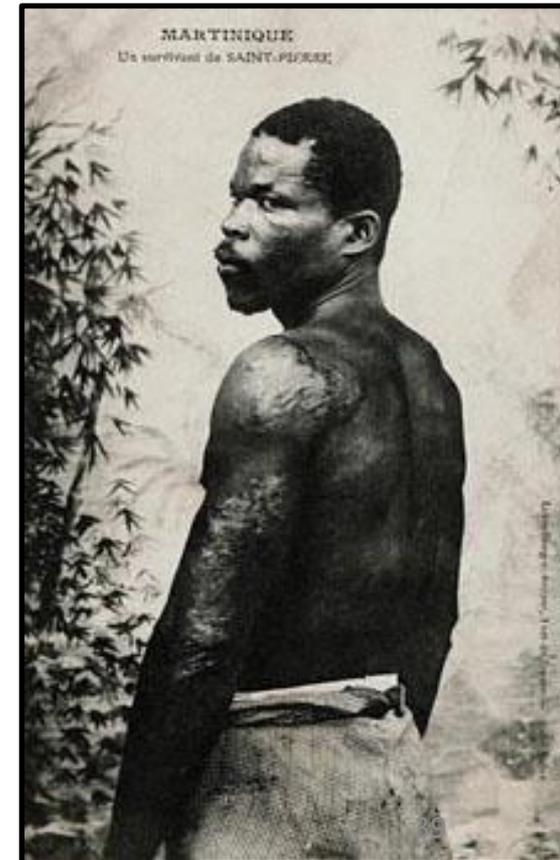
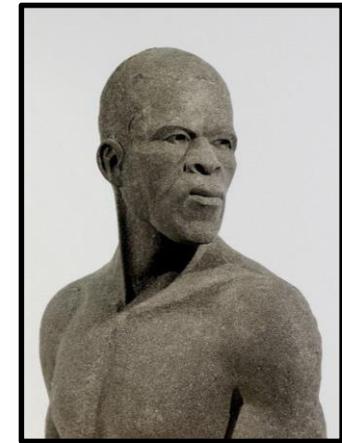


Prison Cell (center of photo) Saved a Man  
St. Pierre is now known as the “Silent City of Death.”



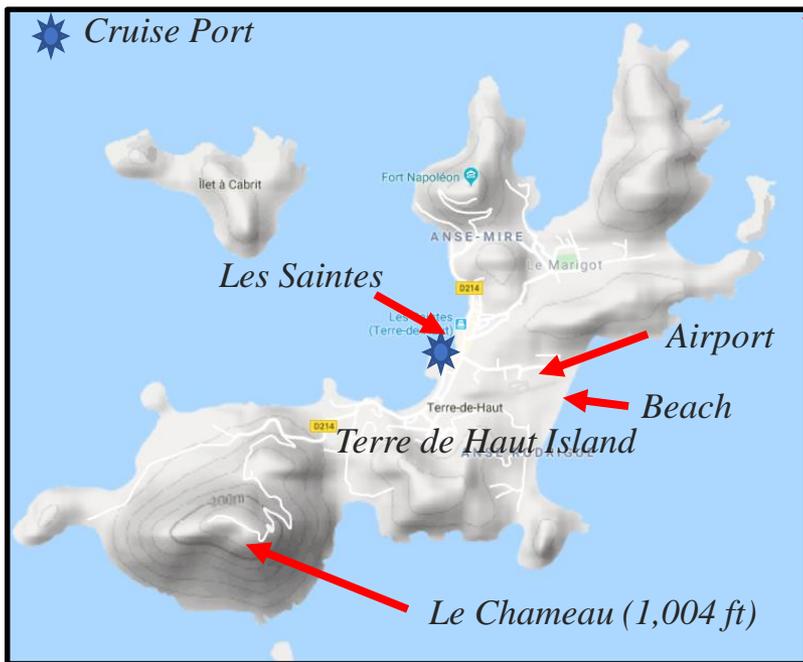
# The Man Who Survived Was Serving Time In A Basement Solitary Confinement Cell

*Ludger Sylbaris: 1 of 3 Survivors  
Later he joined the circus*



# Terre-de-Haut, Guadeloupe Islands

*Les Saintes on Terre-de-Haut*



*Terre-de-Haut south of main Guadeloupe Island*



# Terre-de-Haut, Guadeloupe Islands

## *Columnar basalts at Les Saintes*



# Terre-de-Haut, Guadeloupe Islands

*Fort Napoleon des Saintes built in 1867 using local basalt rocks from local volcanoes on the island. The original Fort Louis was destroyed by the British in 1809.*



# Terre-de-Haut, Guadeloupe Islands

*Guadeloupe Islands represent a volcanic archipelago encircled by shallow coral reefs. The volcanism lasted from about 4.7 to about 2 million years ago. Le Chameau is a former volcano.*

*Le Chameau (1,004 ft)*



# Terre-de-Haut looking North to Guadeloupe



# Saint Martin (French) and Sint Maarten (Dutch)

*Marigot, Capital for Saint Martin and  
Phillipsburg, Capital of Sint Maarten*

*Marigot, Capital for Saint Martin (French),  
Fort Louis built in 1789 (background).*



# Volcanic hills with tropical beaches, St. Maarten



## On the St. Maarten Side: Volcanic Layers



Gray Tuff (Ash) and Black Basalt Layers (34-38 MYA)

St. Maarten/St. Martin: Volcanic island with andesite tuff (ash) and basalt lava flows (38-34 million years ago) surrounded by coral reefs



Volcanic rocks

# Snorkeling and Diving: Spanish Town, British Virgin Islands

## *Spanish Town, British Virgin Islands*



## *The Baths – Giant igneous boulders and pools*

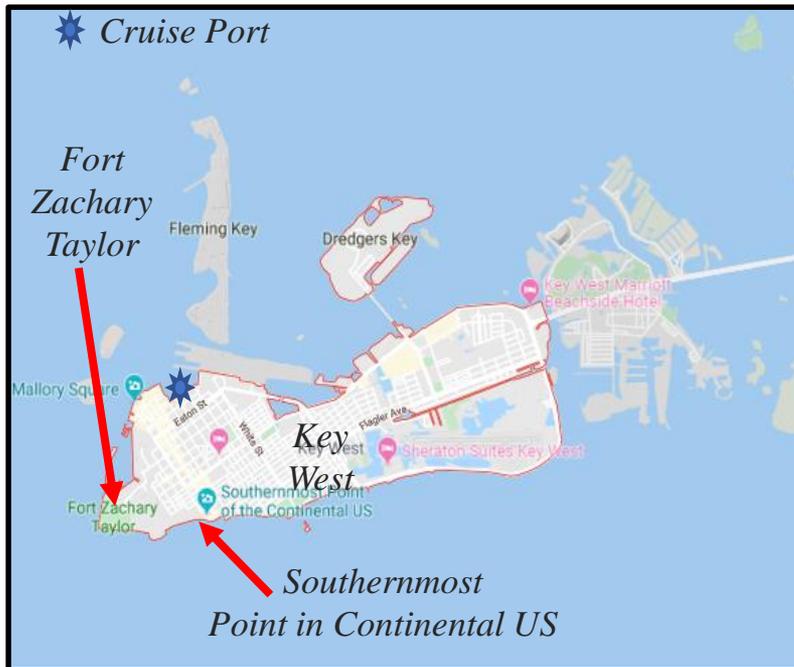


# Spanish Town in center, British Virgin Islands



# Key West and the Florida Keys, Florida

## *Key West*

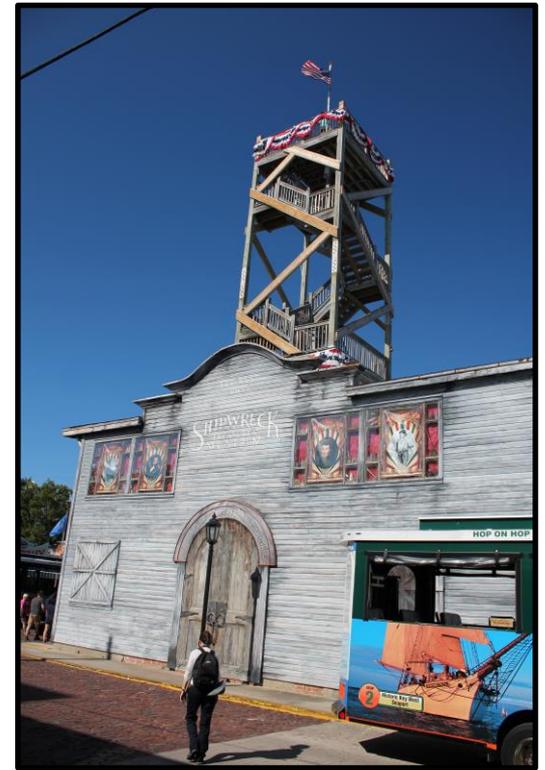
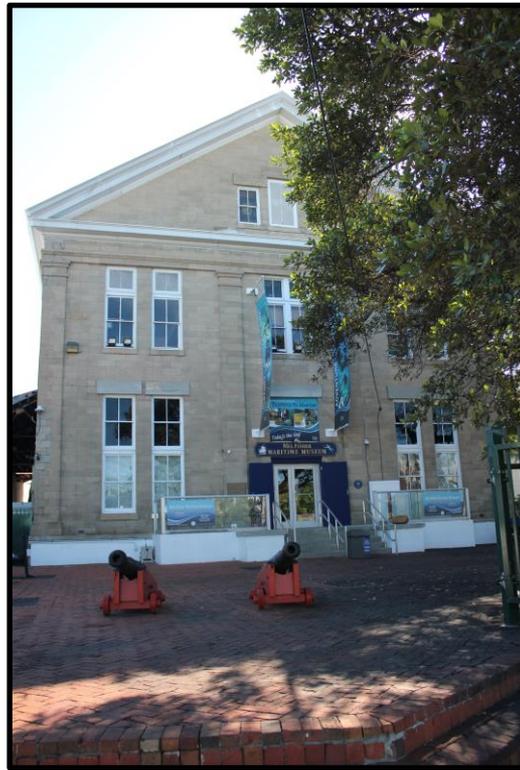


## *The City of Key West*

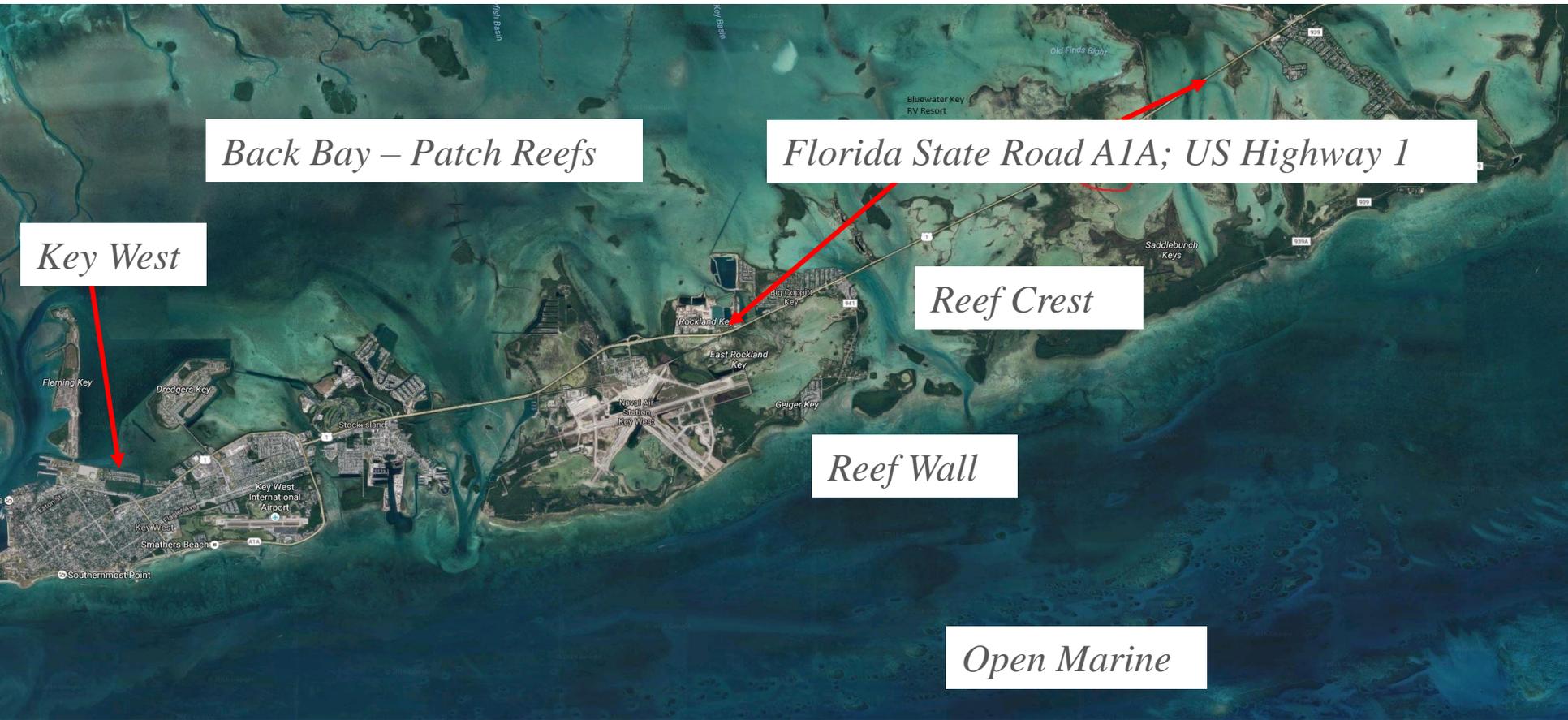


# Street Scenes in Key West, Florida Keys, Florida

*Clockwise from the upper left:  
Mel Fisher Maritime Museum,  
Shipwreck Museum,  
Custom House and Museum,  
Street Scene at the intersection  
of Whitehead Street and  
Sunset Lane*



# Key West and the Florida Keys, Florida (NASA Imagery)



*Back Bay – Patch Reefs*

*Key West*

*Florida State Road A1A; US Highway 1*

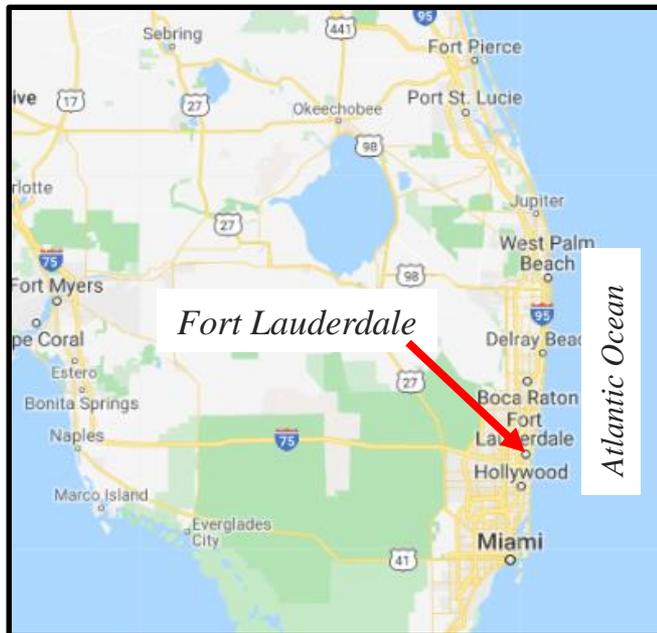
*Reef Crest*

*Reef Wall*

*Open Marine*

# Fort Lauderdale, Florida

*Fort Lauderdale, Florida*



*Intercoastal Waterway in Fort Lauderdale*



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