

APPENDIX D

STATEMENT OF FINDINGS: WETLANDS AND FLOODPLAINS

STATEMENT OF FINDINGS

FOR

EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)

AND

EXECUTIVE ORDER 11988 (FLOODPLAIN MANAGEMENT)

**Proposed Marine Research and Education Center (MREC) and
Abandoned Hotel Demolition**

**Salt River Bay National Historical Park and Ecological Preserve
St. Croix, U.S. Virgin Islands**

JUNE 2008

Recommended:

Superintendent,

Date

*Certification of
Technical Adequacy
and Servicewide Consistency:*

Chief, Water Resources Division

Date

Approved:

Regional Director

Date

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**Salt River Bay National Historical Park and Ecological Preserve
St. Croix, U.S. Virgin Islands**

1. INTRODUCTION

1.1 Wetlands - Executive Order 11990: *Protection of Wetlands*, issued 24 May 1977, directs all federal agencies to avoid to the maximum extent possible the long- and short-term adverse impacts associated with the occupancy, destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In the absence of such alternatives, parks must modify actions to preserve and enhance wetland values and minimize degradation.

To comply with EO 11990 within the context of the agency's mission, the National Park Service (NPS) has developed a set of policies and procedures found in *Director's Order #77-1: Wetland Protection* and *Procedural Manual #77-1: Wetland Protection*. These policies and procedures emphasize: 1) exploring all practical alternatives to building on, or otherwise adversely affecting, wetlands; 2) reducing impacts to wetlands whenever possible; and 3) providing direct compensation for any unavoidable wetland impacts by restoring degraded or destroyed wetlands on other NPS properties. If a proposed action will have adverse impacts on wetlands such as this project, a Statement of Findings (SOF) must be prepared that documents the above steps and presents the rationale for choosing an alternative that will have adverse impacts on wetlands and presents the compensation or mitigation proposed for offsetting these impacts.

1.2 Floodplains - Pursuant to Executive Order 11988 (Floodplain Management), and the National Park Service (NPS) Director's Order #77-2: Floodplain Management, the National Park Service has evaluated flooding hazards related to the proposed projects. This SOF describes the proposed projects, project site, floodplain determination, use of floodplain, investigation of alternatives, flood risks, and mitigation for the continued use of facilities within the floodplain.

2. PROPOSED PROJECTS

The proposed projects include the following: 1.) construct a proposed Marine Research and Education Center (MREC) at Salt River Bay National Historical Park and Ecological Preserve (SARI) in St. Croix, U.S. Virgin Islands (USVI) and 2.) demolish and remove the abandoned (existing) hotel structure at SARI to return the site to a more natural condition and allow roadway access to the site (Figure 1). Both the proposed MREC and existing, abandoned hotel structure are located on the East Site of SARI (Figure 2). The MREC Preferred Alternative (East Site Alternative) and the Proposed Action of demolishing the abandoned hotel structure both propose development and restoration within wetlands and the 100-year floodplain at this site. The two projects are described in detail in the following paragraphs.

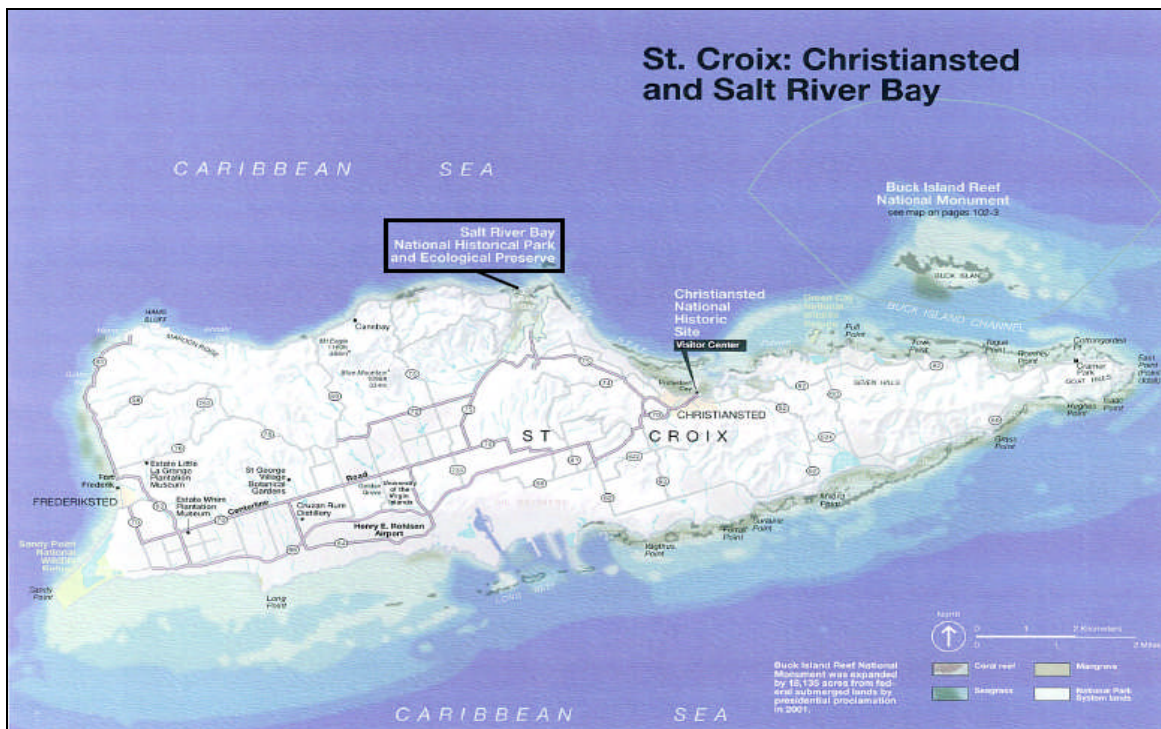


Figure 1. Location Map of Salt River Bay National Historical Park and Ecological Preserve.

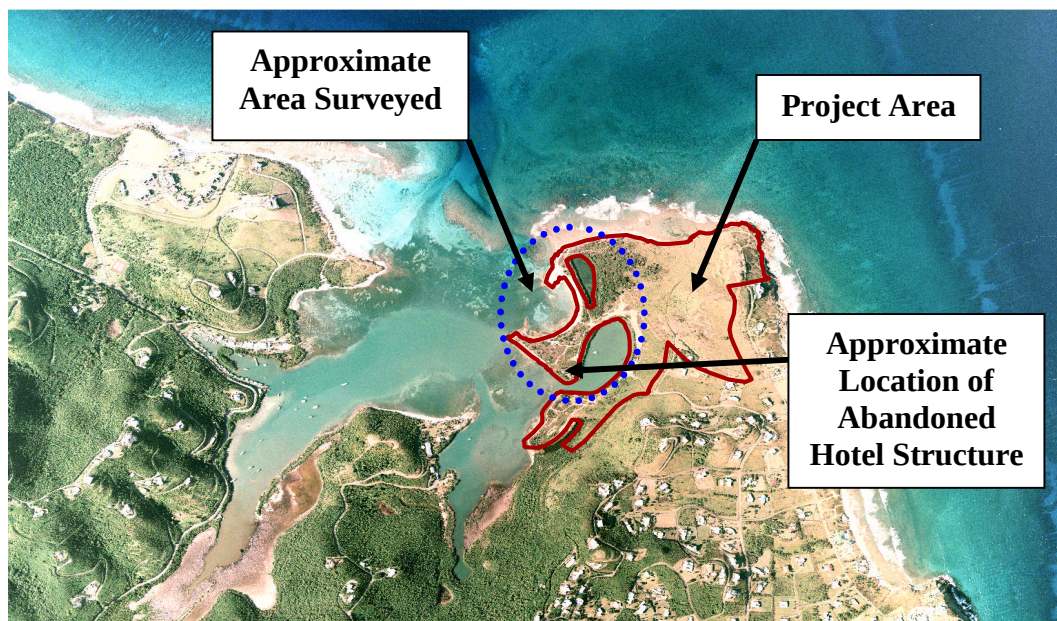


Figure 2. East Site of Salt River Bay National Historical Park and Ecological Preserve

Proposed Construction of a Marine Research and Education Center at SARI – St. Croix has been the host of over thirty years of world class marine research. Both Fairleigh Dickinson University’s (FDU) West Indies Laboratory (WIL) in Teague Bay and National Oceanic and Atmospheric Administration’s (NOAA) National Undersea Research Program (NURP) facility and their manned undersea research habitats “Hydrolab” and “Aquarius” were located in the submarine canyon in Salt River Bay. These two facilities brought hundreds of students and researchers from our local communities and from all over the world to study and work in and around the island’s marine environment annually. Unfortunately, both facilities were closed after hurricane

Hugo. The loss of these facilities greatly impacted the educational opportunities the island resources offer and hindered on-going and future research. There is a great need to reestablish an MREC on the island of St. Croix. SARI was selected as the ideal location for the MREC for the following reasons:

- Long-term conservation and education goal for the NPS and the Government of the USVI who jointly manage and maintain the 1,015-acre park;
- Legacy of the former FDU/WIL and NOAA/NURP programs with years of baseline information on the marine community inside and outside the bay and into the depths of the submarine canyon;
- Need for scientific information for the Government of the USVI to restore and maintain St. Croix's last living and functioning mangrove, estuarine, and coral reef ecosystem;
- Close proximity to the target resources for education and research, and;
- Long-term security for the project through park ownership and management.

The proposed MREC includes the following associated facilities:

- An Education Center along with an adjacent parking lot for public use;
- A wet lab and maintenance building;
- A boat dock, boat ramp, and marina;
- Bungalow-style dormitories and a cafeteria;
- Paved roads and parking facilities and sidewalks, where applicable; and
- A pipeline for the seawater intake system.

Also as part of the project, maintenance dredging would be required if future bathymetry studies reveal that the water depths are too shallow for research boats to reach the MREC boat dock. Impacts as a result of dredging in open water and placement of the dredged material would be addressed in future studies. Also, the exact location and dimensions of the seawater supply pipeline is unknown at this time, but would be sited to minimize impacts to mangroves, marine wetlands (seagrasses), and other wetlands to the maximum extent practicable. This SOF does not include impacts to open water due to dredging because the location and amount of dredging that would be required is unknown at the time. This SOF also does not include impacts associated with the seawater supply pipeline because the exact location is unknown at this time. An additional (or supplemental) Wetland SOF will be completed before the start of any activities (including dredging or disposing of dredge material) that would impact wetlands or waters (less than 2 meters in depth) that are not covered in this SOF. Any applicable permits (10/404 permit) associated with dredging/construction in waters of the U.S. would be obtained from the U.S. Army Corps of Engineers prior to the start of any regulated activities. The NPS is committed to adhering to all requirements of the Federal and Territorial government.

Proposed Demolition of Abandoned Hotel Structure at SARI – Currently, a partially completed, abandoned hotel structure (Figure 2) exists on the peninsula of the East Site, immediately adjacent to the Mangrove Lagoon in Salt River Bay. The hotel structure was part of a development project started in the late 1960s that was never completed; the hotel structure was abandoned following partial completion in the 1970s (Versar 2000). The abandoned hotel structure was partially completed from building materials such as cinder blocks, concrete, piping, and rebar. The basement of the structure, at least two stories of the hotel, a tall steeple with a cross (potentially constructed as a viewing area), and an outdoor swimming pool were completed before the project was abandoned. Currently, the structure is deteriorating and presents a safety and environmental concern for the park; a chain-link fence surrounds the abandoned hotel structure to discourage public access to the hotel site. The park proposes to remove the entire structure, reuse and recycle as much of the material as possible, and return the site to a more natural condition. In addition to these actions, the park is proposing to construct a haul road for the construction vehicles to get to and from the site, and to haul out materials produced from the demolition of the abandoned hotel structure. Following demolition activities, the haul road would be improved and would serve as the main access road to the park. The NPS, in consultation with appropriate resource agencies such as the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), the U.S. Fish and Wildlife Service (USFWS), and the Coastal Zone Management (CZM) would rehabilitate the

peninsula through revegetation of native plant species, including wetland species to return the area to a more natural condition.

Approximately 1,583 cubic yards of debris would be removed from the site, including the hotel and associated structures and all other abandoned building materials at the site and on the peninsula. Following demolition activities and debris removal, a small parking lot (10-15 vehicles) would be constructed on the peninsula mainly for park use and limited use by visitors (i.e., special use permit). From the parking lot a low traffic service road would continue north and end at the proposed footprint for the MREC. The parking lot and service road would be constructed with pervious materials that blend with the predominant landscape tones. Permeable paved surfaces allow limited percolation of precipitation while providing better wear than unpaved surfaces. Finally, as stated above, the NPS, in consultation with appropriate resource agencies, would rehabilitate the peninsula through revegetation of native plant species (including wetland species) to return the area to a more natural condition.

3. PROJECT SITE

SARI is located along the north/central coast of St. Croix along and including portions of Salt River Bay in the USVI (Figure 1). The NPS and the Government of the USVI jointly manage the 1,015-acre park. The park is five miles from Christiansted National Historic Site and can be reached by car via Rt. 75 from Christiansted, connecting to Rt. 80 (Figure 2). Within SARI and on the eastern side of Salt River Bay (Bay) are approximately 70 acres of land owned by the NPS, adjacent to the Estate Judith's Fancy residential community and referred to as the "East Site." The East Site has a Salt Pond and a 10-foot-deep manmade (historically dredged) lagoon (Mangrove Lagoon) that opens into Salt River Bay and is about 300 meters from the primary Bay inlet and the open ocean. A partially constructed abandoned hotel is located on the peninsula adjacent to the Mangrove Lagoon. One-half to one-third of the landform on which this hotel rests is largely made land created with dredge spoil from the Mangrove Lagoon behind the hotel. The East Site also features a large hill about 130 feet above sea level that provides a panoramic view of the ocean and the bay. The site is currently accessed by private paved roads that traverse a residential neighborhood to the south and east of the NPS-owned property.

It is important to note that normal circumstances do not exist at the East Site; portions of the peninsula are characterized as dredged material, as the natural shoreline has been altered from historic and natural conditions. The Soil Survey of the USVI (USDA 1998) maps the peninsula as Ustorthents (Us), or altered soil. In addition to the soil, numerous pieces of rubble and discarded concrete debris exist along the west spit shoreline site and on the entire peninsula. Concrete and debris were also placed along the shoreline of the western spit, possibly for erosion control. The site is therefore characterized as significantly disturbed. Dredge and fill activities have taken place at SARI since the 1960s in various locations around the Bay, which created new land and influenced soil characteristics and vegetation types.

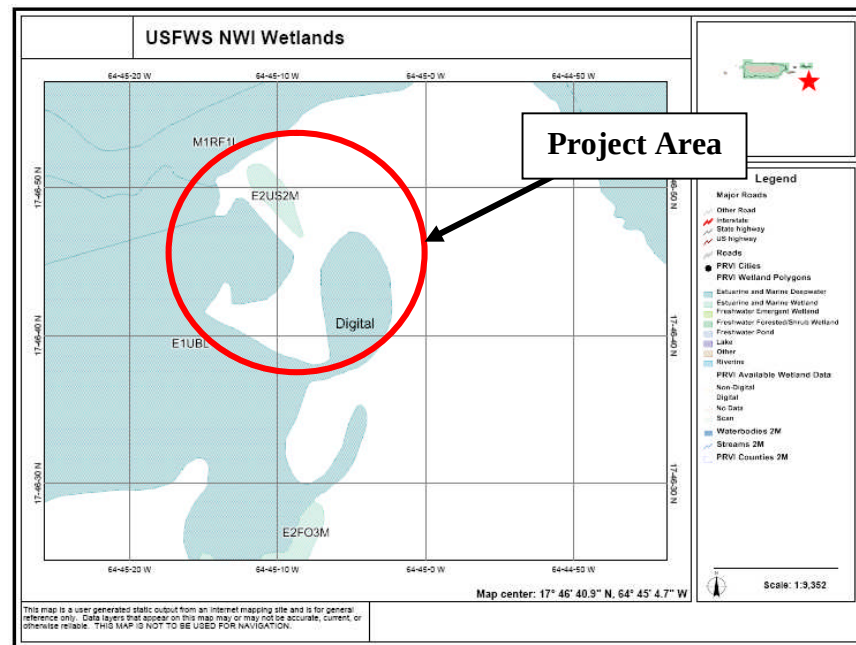
4. DESCRIPTION OF WETLANDS AND FLOODPLAINS IN PROJECT AREA

4.1 Wetlands

General Discussion – The NPS defines wetlands as vegetated areas that are flooded or saturated for a duration sufficient to allow development of at least one of the three wetland indicators described in USACE 1987. The wetland indicators described in USACE 1987 include wetland hydrology, hydric soil, or hydrophytic vegetation. This definition differs from that used by USACE to delineate jurisdictional wetlands. The USACE definition requires the presence of all three wetland indicators for an area to be classified as a wetland. This document presents wetlands as defined by the one-parameter approach adopted by the NPS. Wetlands provide a variety of beneficial functions from supplying habitat for a variety of wildlife, storage and attenuation of floodwaters, trapping silts and other sediments during floods, and biologically filtering contaminants from surface waters.

The National Wetlands Inventory (NWI) of the USFWS produces information on the characteristics, extent, and status of the nation's wetlands and deepwater habitats. The USFWS definition of wetlands is similar to the NPS definition of wetlands in that only one of the three parameters is required to characterize an area as a wetland,

based upon the *Cowardin Classification of Wetlands and Deepwater Habitats* (Cowardin et al. 1979). The USFWS's objective of mapping wetlands and deepwater habitats is to produce "reconnaissance-level information on the location, type and size of these resources" (USFWS 2005). Unfortunately, the NWI maps at the site do not show wetlands on the peninsula with the exception of the salt pond, located north of the peninsula. Figure 3 presents a general map of the wetlands as mapped by NWI. Note that the Mangrove Lagoon is mapped as an estuarine, subtidal, unconsolidated bottom, subtidal (E1UBL) wetland. Wetlands on the peninsula were not mapped by NWI, most likely due to the results of the soil survey (USDA 1998), which characterized soils on the peninsula as Ustorthents (Us), or altered soil. In addition to the NWI map, the USDA NRCS has mapped hydric soils (one of the three wetland indicators) in the Caribbean (USDA 1998). Three soil series in the vicinity of SARI are characterized as hydric soils and include Redhook extremely stony sand, Salt flats, ponded, and Solitude gravelly fine sandy loam (USDA 1998). Table 1 below details the criteria that defines each of the three hydric soils present at SARI and Figure 4 depicts the hydric soils mapped at SARI.



Source: USFWS/NWI 2006.

Figure 3. National Wetland Inventory Wetlands at SARI

Table 1. Characteristics of Hydric Soils Present at SARI Project Site

Soil Series Map Unit Symbol*	Name of Soil Series	Hydric Criteria*	Permeability	Available Water Capacity	Slopes (%)	Flooding	Soil Constraints
RdB	Redhook extremely stony sand, rubbly	1, 3, and 4	Very rapid	Low	0-5	Rare	Moderate salinity and flooding
SaA	Salt flats, ponded	2B, 3, and 4	Slow	High	0-2	Frequent	Flooding, frequent ponding, and strong salinity
SoA	Solitude gravelly fine sandy loam	2B, 3, and 4	Slow	Medium	0-2	Frequent	Wetness, frequent flooding, and slight to strong salinity

Source: USDA, NRCS 2006.

*Explanation of hydric criteria codes (USDA, NRCS 2006):

1) All Histels except for Folistels, and Histosols except for Folists.

2B) Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that are poorly drained or very poorly drained and have either: 1.) a water table at the surface (0.0 feet) during the growing season if textures are, coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or 2.) a water table at a depth of 0.5 foot or less during the growing season if

- permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or 3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
- 3) Soils that are frequently ponded for long or very long duration during the growing season.
 - 4) Soils that are frequently flooded for long or very long duration during the growing season.

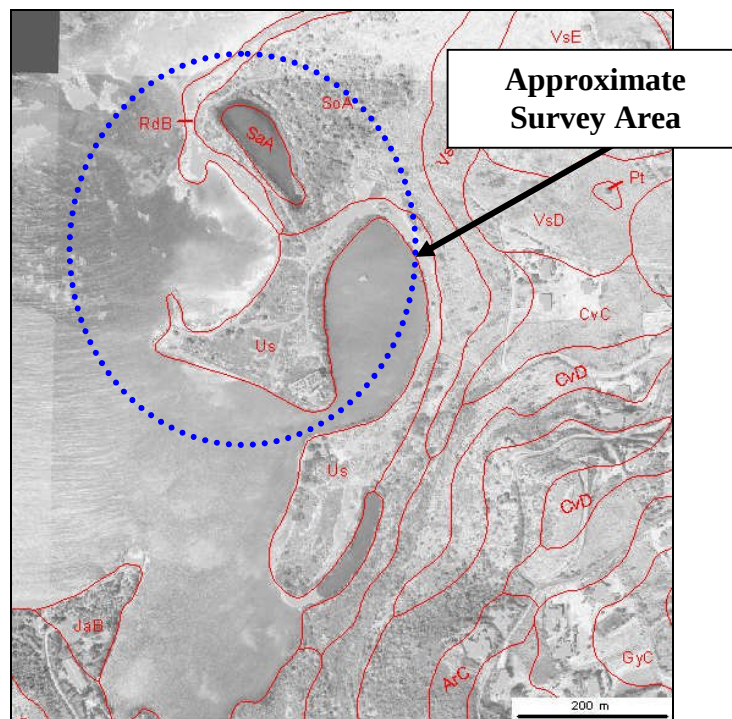


Figure 4. Hydric Soils Mapped at SARI (USDA 1998)

Site-Specific Field Survey – In May 2006, a wetland assessment (using the three-parameter approach of defining wetlands as provided by the USACE and using the one-parameter approach of defining wetlands as accepted by the USFWS and the NPS) was performed at portions of the East Site of SARI. In addition, this wetland assessment was completed to ground-truth wetlands as mapped by the NWI (as discussed above) and mangroves (at the East Site) as mapped in 2000 through digitized orthorectified aerial photography by NOAA (Kendall et. al. 2005) as well as map USACE-defined wetlands and NPS-defined wetlands in the vicinity of the SARI East Site. The wetland delineation survey included only those areas where the proposed projects are located.

The wetland delineation was conducted by Sarah T. Koser of EA Engineering, who received her undergraduate degree at Pennsylvania State University in Plant Biology and has 8 years of field experience mapping wetlands. Ms. Koser has completed the 38-Hour U.S. Army Corps of Engineers Wetland Delineation and Management Training Program as well as experience delineating wetlands for the NPS at the following locations: Tuskegee Airman National Historic Site, Fort Matanzas National Monument, the Chesapeake and Ohio Canal National Historic Park, and Fort Pulaski National Monument. Ms. Koser is currently seeking her Professional Wetland Scientist certification through the Society of Wetland Scientists.

Five wetlands (that constitute as wetland areas defined by the NPS) were observed at SARI within the proposed project area at SARI. Figure 5 presents the wetland areas delineated at the East Site of SARI. Wetland areas exist beyond the footprint of the proposed action at SARI, but were not delineated as part of this effort. The wetlands delineated at the site are located on and surround the eastern peninsula of SARI and are bounded by the Mangrove Lagoon, Salt River Bay, the Salt Pond, and existing “mudflats.” The following paragraphs describe the wetland areas assessed at SARI in May 2006.

In Vicinity of Existing Abandoned Hotel (Wetland W-1) – In the immediate vicinity of the existing hotel, the area is extremely disturbed. Piles of rocks, dirt, and debris were observed adjacent to the existing hotel structure and to the shoreline. Steep slopes from the hotel to the shoreline were also observed and the upland species casha (*Acacia tortuosa*) was observed as the dominant species in this location surrounding the hotel structure. A small stand of mother-in-law tongue (*Sansevieria trifasciata*) was observed growing in a concrete depression of the hotel structure. The shoreline at the hotel structure is very rocky and sandy, with two species of algae washed up on the shore that include disk alga (*Halimeda incrassata*) and soft fan weed (*Avrainvillea nigricans*).

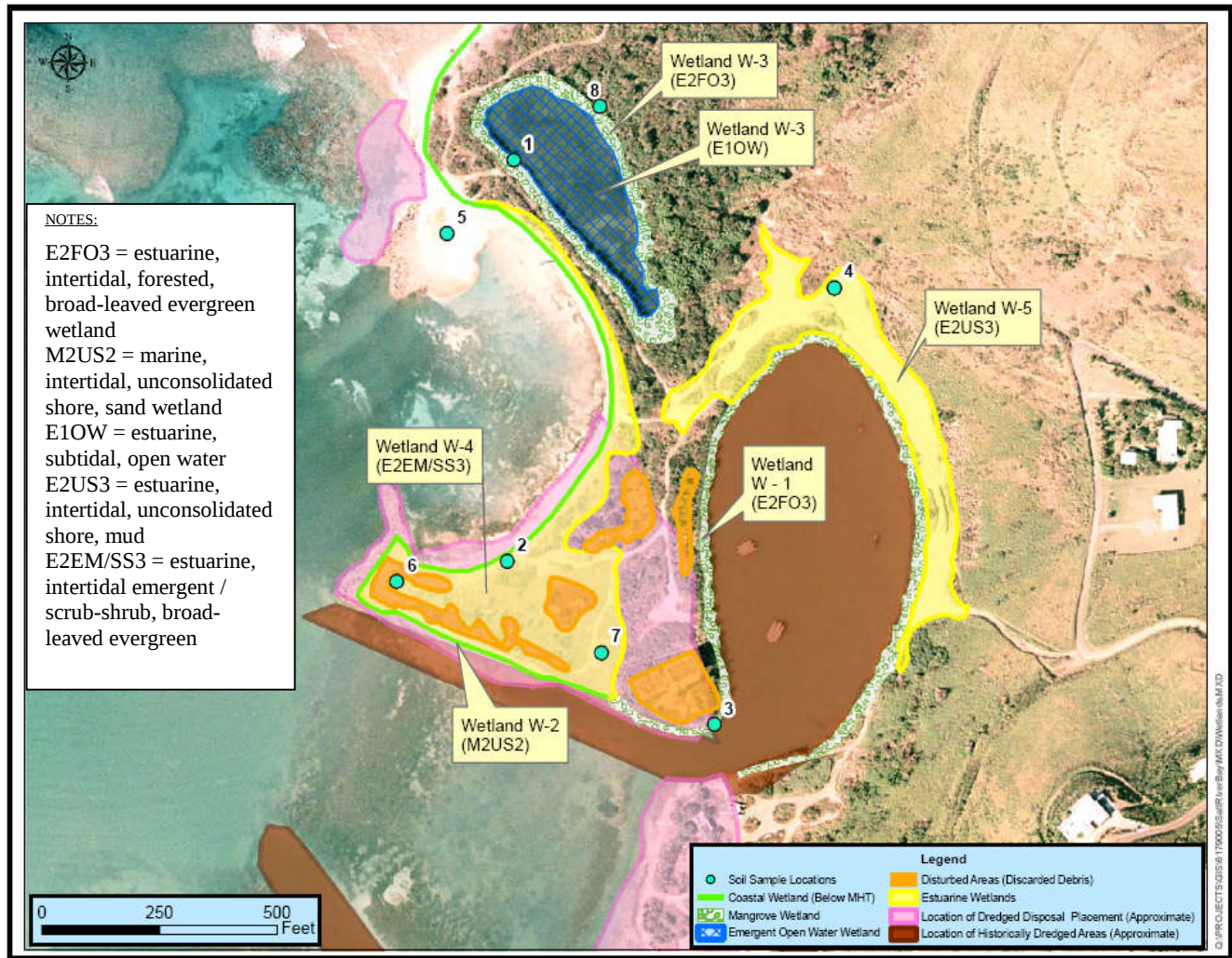


Figure 5. Location of Wetlands Areas at East Site of SARI

One wetland area (W-1) was located in the vicinity of the hotel structure. Immediately along the shoreline adjacent to the hotel a stand of red mangrove (*Rhizophora mangle*) exists and is characterized as Wetland W-1. This wetland is located on the southern tip of the peninsula and wraps around the entire Mangrove Lagoon. Wetland W-1 is a narrow fringe red mangrove shoreline wetland that is characterized as an estuarine, intertidal, forested, broad-leaved evergreen (E2FO3) that is approximately 10 to 15 feet (ft) wide (Cowardin et al. 1979). This wetland area is tidally influenced, regularly inundated, and has some rocky shoreline areas. Vegetation was dominated by red mangrove and was extremely thick in some areas and bare/rocky in the vicinity of the hotel structure. The primary hydrology indicators present at Wetland W-1 included inundation and saturation in the upper 12 inches of the soil. The dominant plant species observed included red mangrove and the subdominant plant species observed included black mangrove (*Avicennia germinans*) and sea purslane (*Sesuvium portulacastrum*). Exactly 100 percent of the dominant plant species observed at W-1 are characterized as hydrophytic. A soil sample (3) was collected from Wetland W-1 within the shoreline wetland

area in the vicinity of the hotel structure and was classified as hydric soils (Figure 5). The soils on the site were characterized as Ustorthents (Us), or altered soil. Wetland W-1 supports greater than 50 percent of hydric vegetation, hydric soils with a low matrix chroma (gleyed) were identified, and hydrology indicators such as saturation in the upper 12 inches were observed. Wetland W-1 is tidally influenced and therefore regularly inundated. Wetland W-1 satisfies all three wetland parameters.

Along Shoreline of Peninsula (Wetland W-2) – Wetland W-2 is marine, intertidal, unconsolidated shore, sand (M2US2) wetland located along the entire coastline of the peninsula from adjacent to the hotel (where the mangroves cease to exist), along the western spit and Crescent Beach, to the extent of the survey area at the northern beach (adjacent to the salt pond). This wetland area is characterized as marine because the extent of the wetland is the landward limit of tidal inundation (extreme high water of spring tides), including the splash zone from breaking waves (Cowardin et al. 1979); more specifically, below the mean high tide line. Along the entire shoreline within this wetland the tidal influences of waves were observed and evidence of the mean high tide line was observed by viewing deposited debris. This wetland was comprised of sandy soils only, very little vegetation was observed. However, because this shoreline area is located at and below the mean high tide line, it is considered a wetland by USACE standards. The sparse and sporadic vegetation that was observed along the shoreline included seaside mahoe (*Thespesia populnea*), crabgrass (*Sporobolus virginicus*), buttonwood (*Conocarpus erectus*), and seaside purslane. The primary hydrology indicators present at Wetland W-2 included regular tidal inundation, and sediment deposits / tidal drift lines. In addition, Wetland W-2 is located within the 100-year floodplain. A soil sample (2) was collected from above the mean high tide line, outside of Wetland W-2 on Crescent Beach near areas of rubble and discarded debris. The soil sample was classified as sand and considered “altered” land in the Soil Survey (USDA 1998) and was not characterized as hydric soil.

In vicinity of Salt Pond (Wetland W-3) – The perimeter of the salt pond was reconnoitered and two soil samples were collected in this area. Two wetland types were classified in the vicinity of the Salt pond and described as Wetland W-3. Two distinct wetland types exist at this site and includes a vegetated estuarine, intertidal, forested, broad-leaved evergreen wetland (E2FO3) that fringes the Salt Pond, and an estuarine, subtidal, open water wetland (E1OW) that constitutes the open water portion of the Salt Pond. The E2FO3 wetland is a narrow wetland approximately 5 to 10 feet wide dominated by a thick stand of red mangroves. Subdominant vegetation observed included white mangrove (*Laguncularia racemosa*), black mangrove, seaside mahoe, and buttonwood, all hydrophytic plant species (Table 2). Two USACE datasheets and soil samples were completed at this wetland, the first (1) located along the northwestern portion of the Salt Pond and the second (2) located along the eastern portion of the Salt Pond. Hydrology indicators present included inundation and saturation in the upper 12 inches of the soil. The first soil sample (1) collected was classified as hydric soil due to low chroma values; the soils at this location were also characterized by the USDA as hydric soils (Table 1). The second soil sample (2) collected was classified as hydric soil due to low chroma values; the soils at this location were also characterized by the USDA as hydric soils (Table 1). Approximately 5 to 10 feet of red mangroves exist along the edge of the pond and beyond the mangroves, another 10 feet of wetland dominated by seaside mahoe exists. Beyond this area, the topography changes rapidly to a steep upland area, dominated by the upland species, casha. It is obvious in the vicinity of this location (2) that normal circumstances do not exist and that the site has been significantly disturbed.

Western Portion of Peninsula (Wetland W-4) – The peninsula is the area defined as inland from the shoreline from the existing hotel structure and western spit to the southernmost portion of the salt pond. As stated previously, it is important to note that normal circumstances do not exist on the peninsula; the entire peninsula could potentially be characterized as dredged material, as the natural shoreline is potentially located far to the east of the peninsula. The Soil Survey of the USVI (August 1998) maps the peninsula as Ustorthents (Us), or altered soil. In addition to the soil, numerous pieces of rubble and discarded concrete debris exist along the west spit shoreline site and on the entire peninsula. A significant change in the topography from the shoreline to the inland areas was observed along with observations of an eroding western shoreline. Concrete and debris were also placed along the shoreline of the western spit, possibly for erosion control. The site is therefore characterized as significantly disturbed.

Three soil samples were collected on the peninsula (2, 6, and 7) to characterize the soil in this vicinity. Soil sample (2) was collected from above the mean high tide line, near areas of rubble and discarded debris and was not characterized as hydric soil. The sparse and sporadic vegetation that was observed along the shoreline included seaside mahoe, crabgrass, buttonwood, and seaside purslane. No hydrology was observed at soil sample 2 above the mean high tide line. Soil sample 6 was located at the western spit of the peninsula, in the vicinity of areas of rubble and discarded debris and was not characterized as hydric soil. Weak hydrology indicators were observed at soil sample 6 that included overtopping of the site during storm events due to proximity to shoreline and being located in the 100-year floodplain. However, the dominant vegetation observed at soil sample 6 was predominantly hydrophytic. Seaside mahoe, buttonwood, bread-and-cheese (*Pithecellobium unguis-cati*), crab grass, and casha were the dominant plant species observed. A third soil sample (7) was collected on the peninsula, northwest of the hotel site, along a “mudflat” area used for access to the existing hotel structure and was not characterized as hydric soil. Weak hydrology indicators were observed at soil sample 7, including potential standing water following storm events due to observations of algae. This may potentially be due to the peninsula’s dredged material source. The dominant vegetation observed at soil sample 7 was predominantly hydrophytic. Sea purslane, buttonwood, crabgrass, and casha were the dominant plant species observed. Based upon the hydrophytic vegetation observed, this area (Wetland W-4) is considered a wetland by NPS standards. Weak hydrology and hydric soils indicators were also observed, as discussed above. In addition, Wetland W-4 is located within the 100-year floodplain and within the Coastal Barrier. Using the Cowardin (1979) Classification, this wetland is characterized as an estuarine, intertidal emergent / scrub-shrub, broad-leaved evergreen (E2EM/SS3). Although ocean-topping most likely only occurs during storm events, due to the vegetation species that exist at the site, this wetland was considered estuarine. Existing vegetation species (not necessarily dominant species, but all specimens that were observed on the peninsula) within this area includes: pink cedar, torchwood (*Jacquinea arborea*), sea lavender (*Tournefortia gnaphalodes*), sea oxeye (*Borrchia aborescens*), casha, bread-and-cheese, seaside mahoe, cattle tongue (*Pluchea odorata*), and buttonwood.

In vicinity of Existing Mudflats/Roadways (Wetland W-5) – The area located along the Mangrove Lagoon, interior from the fringe of red mangroves is an area referred to as existing “mudflats” or Wetland W-5. Currently, the public utilizes this area by foot and vehicle to access the beach areas at Crescent Beach and other locations on the peninsula. This public access has impeded vegetation growing on the “mudflats.” The soil at the “mudflats” is exposed and water often pools following rain events. These soils were classified as hydric soils during a site visit. A soil sample (4) was collected from this area and determined as hydric based on expertise from Mr. Rudy O’Reilly at the St. Croix NRCS (O’Reilly 2006). The USVI Soil Survey (USDA 1988) classifies the soils in this location as Ustorthents (Us), or altered soil, most likely due to the materials that were dredged and discarded in this area from the adjacent, existing Mangrove Lagoon. Standing water at the “mudflats” is observed following rain events and persists for approximately 14 days, according to Mr. O’Reilly, which corresponds to hydrology characteristics. The “mudflats” are fringed on the east and the northeast by African guinea grass, an upland and exotic vegetation species. No dominant vegetation was observed on the “mudflats,” but some specimens of sea purslane and crabgrass were observed in a few spotty locations. This area is considered a wetland based upon NPS standards due to the hydric soils. The soil at this location was so compacted due to vehicular access, that no benthic (or dominant) species were observed during the site survey. Using the Cowardin (1979) Classification, this wetland is characterized as an estuarine, intertidal, unconsolidated shore, mud (E2US3). Although ocean-topping most likely only occurs during storm events, due to the potential salinity of the “mudflats” that exist at the site, this wetland was considered estuarine.

Marine Wetlands – Along the shoreline and off the coast of the East Site persist M1AB (marine, subtidal, aquatic bed) wetlands known as seagrass beds. Seagrasses are seed-producing, flowering marine plants that occur in shallow, nearshore, temperate, and tropical waters. In the year 2000, seagrasses were mapped by NOAA using a hierarchical classification scheme, using digitized orthorectified aerial photos to delineate areas of seagrass coverage in the Bay (Kendall et. al. 2005). The seagrass classification system included 10% to less than 50% cover, 50% to less than 90% cover, and 90% to 100% cover. Figure 6 shows the distribution of seagrasses in the vicinity of the East Site. Patchy and continuous seagrasses are located within the East Cove and in the Bay south of the abandoned hotel structure. It is unknown if seagrasses currently occur within the Mangrove Lagoon. The flushing rate of the Mangrove Lagoon is lower than that of Salt River Bay, due to the

narrow inlet that currently exists. Due to historic dredging activities that have occurred, the silt character of the material in the vicinity of the East Site, and the low flushing rate within the Mangrove Lagoon, seagrasses would not be expected to thrive in this type of habitat. A silt-laden bottom largely devoid of seagrass or algae dominates a large area in the center portion of the Bay, owing to past dredging, continued sediment loading, and low light penetration (NPS 1990). High water turbidities have been observed in the Mangrove Lagoon due to poor water exchanges, elevated nutrient input, and biological productivity (Sugar Bay Land Development 1986). In 1986, five transects in the Mangrove Lagoon were conducted for depth profiles and distribution of seagrasses; recovery at these transects yielded a majority of algae and some patchy areas of seagrasses (Sugar Bay Land Development 1986). The following algae species were identified in the Mangrove Lagoon: *Halimeda opuntia*, *Halimeda incrassata*, *Caulerpa mexicana*, *Penniculus capitatus*, *Hypnea musciformis*, *Caulerpa sertularoides*, *Caulerpa verticillata*, *Acanthopohora spicifera*, *Dictyota* species, *Thalassia* species, *Syringodium* species and *Ceramium* species. Only two true seagrasses were recovered. Turtle grass, was recovered at two shallow transects, located on the eastern and western shorelines of the Mangrove Lagoon and *Halodule wrightii* was recovered at one transect (Sugar Bay Land Development 1986). Turtle grass is the most common seagrass in the Caribbean Sea. During the May 2006 site visit, two species of algae, *Halimeda incrassata* and *Avrainvillea nigricans* were observed washed up on shore of the Mangrove Lagoon at the abandoned hotel site.

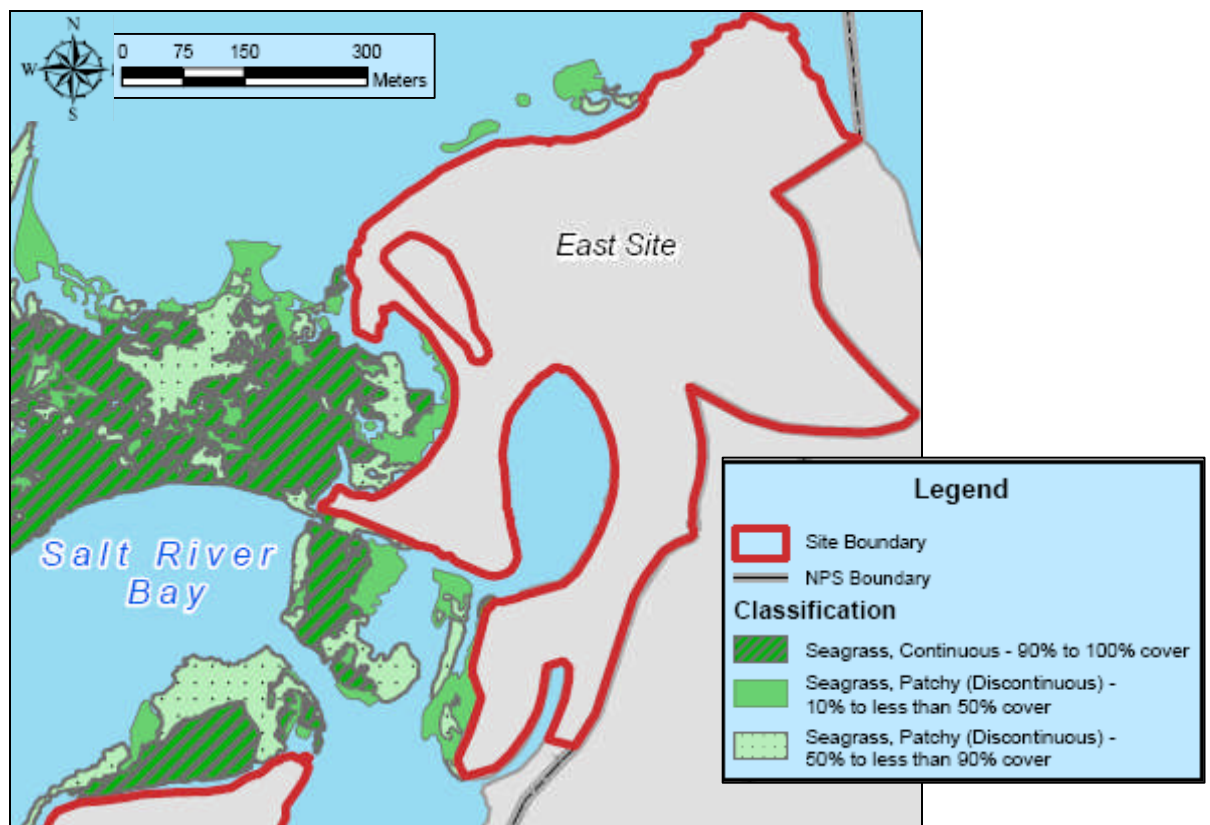


Figure 6. Location of Marine Wetland (M1AB) Areas Near the East Site of SARI

Wetland Functions and Values – Wetlands serve a wide range of ecological functions. They are valuable as holding areas for rising floodwaters. Wetland vegetation reduces floodwater velocity and depletes its destructive energy, thereby protecting mainland and upland areas. Wetland vegetation also forms buffers against erosion by absorbing current and storm energy, stabilizing substrates, and trapping sediments. Filtration of sediments, nutrients, pollutants, and toxic substances has the added advantage of improving water quality. Generally, wetlands provide the following functions and values: flood water storage, nursery areas for aquatic life, ground water recharge, water quality benefits, wildlife habitat, biological productivity, environmental education, and recreational opportunities.

Mangrove Wetland Function and Values – Like wetland values above, mangroves contribute many benefits to the SARI ecosystem. Mangroves stabilize coastal sediment, buffer harmful effects of terrestrial runoff, regulate water temperature on tidal flats, and provide habitat for a diverse assemblage of terrestrial and aquatic organisms. They also trap various organic materials, distributing important nutrients to nearby marine habitats.

Mangroves also serve as nursery grounds for commercially and recreationally important fishes in the USVI. The mangrove wetlands of the USVI have been impacted by natural and anthropogenic forces. Natural stressors include eustatic sea level rise and coastal erosion, hypersalinity, and hurricanes. Anthropogenic stressors include filling wetlands, drainage, or alteration for development. In addition, sewage and thermal effluent, oil pollution, fire, excessive harvesting, herbicides and pesticides, and sedimentations are also anthropogenic stressors that impact the mangrove wetlands.

At one time, the mangrove forests of SARI were considered the best in the USVI. However, the intense winds surrounding Hurricane Hugo aided in the destruction of old-growth mangrove forests in 1989. In 1992, aerial photographs showed that mangrove forests only covered 43% of their former spread. In 1999, the St. Croix Environmental Association began a mangrove restoration project, which replanted 3.5 acres of the lost forest on the western side of Sugar Bay. The survival rate for restoration seedlings is estimated at 80%. Natural regrowth in SARI and has accounted for 2.2 acres of forest since 1992. More recent aerial photographs taken in 2000 indicate that naturally occurring and restoration mangroves now cover 29.7 acres or 54% of the 1988 forest. Numerous bird species nest in the Salt River Bay mangroves, including the endangered white-crowned pigeon (*Columba leucocephala*), along with at least 25 of the 110 other bird species found in the area (IRF 1993).

Estuarine Wetland Areas Functions and Values – Wetland areas observed within the interior portions of the East Site of SARI and associated with the peninsula at the East Site located along the shoreline of Salt River Bay and the Caribbean Sea. These wetland areas are characterized as estuarine tidal vegetated and unconsolidated shore (or beach) habitats. The primary functions provided by these wetland areas are flood storage and protection, nutrient processing, providing wildlife habitat, and assisting in the natural shoreline erosion and accretion processes.

Marine Wetland Function and Values – Seagrasses are important resources that provide habitat and a source of food for a variety of small fishes and invertebrates such as shrimp and crabs as well as larger mammals and avian species. Seagrasses also trap sediment, which helps prevent erosion of the shallow sediments. Seagrasses are very sensitive to stress; natural stressors include tropical storms and hurricanes, and grazing by herbivores (natural exploitation of resource). Anthropogenic sources of stresses include dredging and filling, oil pollution, physical disturbance (i.e., boat propeller and anchor damage), chemical pollutants from industry, and non-point source pollution.

Salt Pond Functions and Values – Salt ponds are enclosed or mostly enclosed water bodies that occur within coastal mangrove wetlands. They are typically hypersaline, with water salinities typically in excess of 50 parts per thousand (ppt). Salt ponds and their surrounding mangrove forests, together known as "basin mangrove forests", are the predominant type of coastal wetland in the Caribbean. These wetlands provide important ecological services, including storm protection and flood mitigation, shoreline stabilization, erosion control, and retention of nutrients and sediments. They also provide critical habitat and food resources for resident and migratory birds in the Caribbean.

4.2 Floodplains - The 100-year floodplain as mapped by the Federal Emergency Management Agency (FEMA) in April 2007 is depicted in Figure 8. The majority of the East Site is located within the 100-year flood boundary (elevations 7, 8, and 9 ft). Other portions of the East Site which are located outside of the 100-year floodplain include the eastern boundary of the park and the abandoned hotel structure and immediately surrounding area.

5. USE OF THE WETLANDS AND FLOODPLAINS

5.1 Historical Use of the Park - SARI contains a combination of marine, estuarine, and terrestrial habitats including the largest remaining mangrove forest within the USVI, coral reefs, seagrass beds, and a submarine canyon. Every major period of human habitation in the USVI is represented at SARI including: South American Indian cultures, the 1493 encounter with Columbus, Spanish extermination of the Caribs, attempts at colonization by European nations, and enslaved West Africans and their descendants. SARI was created in 1992 to preserve, protect, and interpret nationally significant natural, historical, and cultural resources.

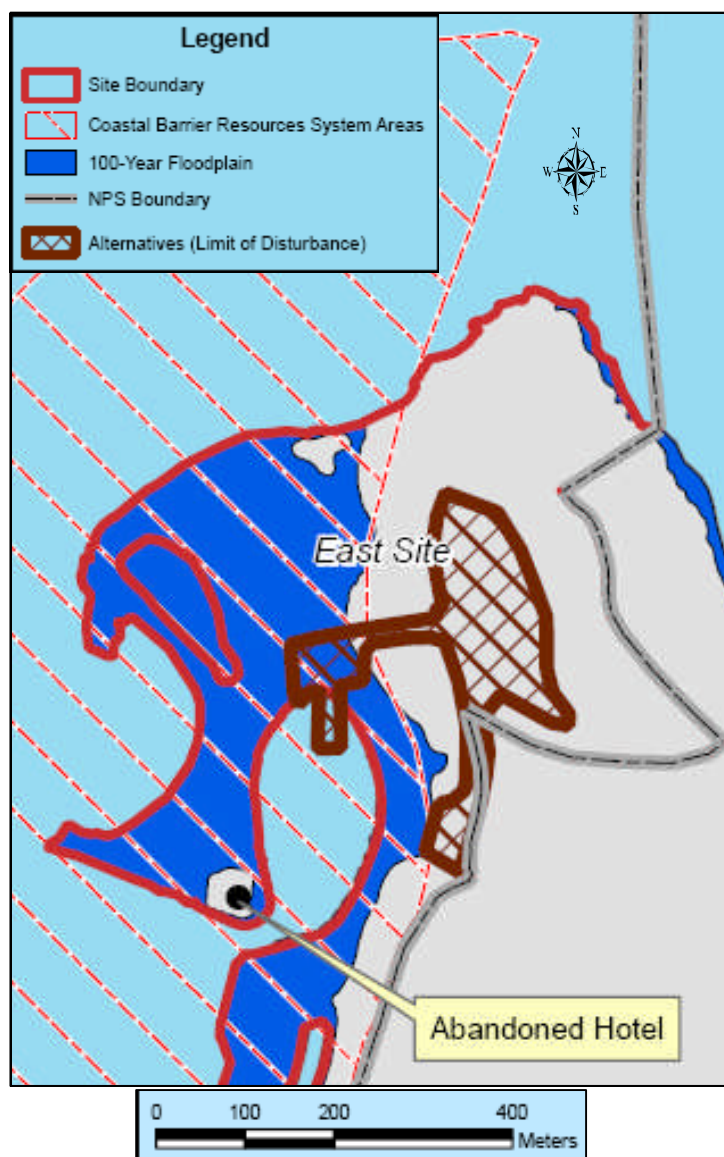


Figure 8. Mapped Floodplains and Coastal Barriers at the East Site of SARI (FEMA 2007)

5.2 Proposed Use of the Park - The NPS is proposing to construct a Marine Research and Education Center (MREC) and demolish the existing abandoned hotel at SARI. As stated above in detail in Section 2, there is a need to reestablish an MREC on the island of St. Croix. The purpose of demolishing and removing the abandoned hotel structure is to alleviate the safety and environmental concerns of the structure and to return the site to a more natural condition. With the construction of the Proposed MREC, visitor use of the park would change and be greatly enhanced. Currently, SARI is utilized by the local residences, mainly for recreation. The

MREC would provide a Visitor and Education Center which would promote the sustainable utilization and conservation of marine resources through educational programs. The current NPS property at the East Site is composed of approximately 70 acres. Of these 70 acres, approximately 9 acres (13 percent of the site) would be developed at the East Site for the MREC and associated uses. Therefore, through the MREC, access would be provided to the remaining 61 acres (87 percent of the site) for visitor education and experience on trails, tropical coastal areas, coral reef shorelines, mangroves, wetlands, and other areas. By building the proposed MREC, the NPS provides controlled use and access to sensitive areas and improves education through the Visitor Education Center and guided tours. The MREC would attract more visitors to the park and become an integral component of the overall tourism experience for the USVI. There are 100-year floodplain zones (as mapped by FEMA) and wetland areas located within the East Site boundary; the existing abandoned hotel structure located outside of a mapped 100-year floodplain and immediately adjacent to mangrove wetlands. In addition to these actions, the park is proposing to construct a haul road for the construction vehicles to get to and from the site, and to haul out materials produced from the demolition of the abandoned hotel structure. Following demolition activities, the haul road would be improved and would serve as the main access road to the park.

6. INVESTIGATION OF ALTERNATIVES

With few exceptions, the majority of SARI is located within the 100-year floodplain and is surrounded by mangrove wetlands. The reasonable alternative sites considered are discussed below.

Alternatives Associated with the Proposed Construction of the MREC – In addition to considering the No Action Alternative, the potential locations for the MREC included three alternatives (Project Site Alternatives): the East Site Alternative, located west of Estate Judith's Fancy; the South Site Alternative, the former NOAA Undersea Research Center; and the West Site Alternative, the NPS Visitor Contact Station and Salt River Marina. These sites were examined in detail, given the information available on existing conditions, and preliminary site plans were developed for each alternative. Additionally, each site was analyzed through a cost analysis and the Choosing by Advantages (CBA) process. CBA scores for each alternative were calculated, and the alternatives were ranked based on total CBA scores.

In addition to the three Project Site Alternatives, two alternatives were considered, but dismissed from further study. The first dismissed alternative included considering other islands in the Caribbean besides St. Croix as alternative locations for the MREC. St. Croix was selected due to its central location in the Caribbean and its proximity to many nations within the region. Additionally, the island has a rich coral reef research history and extensive research has already been conducted on the eastern end of the island and at the NOAA Undersea Research Center based at Salt River Bay. Logistical support in terms of transportation, labor, housing, etc., available on the island is paramount to successful operations of a research, educational and service center. The second dismissed alternative included considering other locations on St. Croix for the MREC. Due to the constraints of operating an MREC and land acquisition challenges, potential options for the location of the MREC were limited on the island of St. Croix. Some of the constraints included easy access from the MREC to estuarine and ocean ecosystems by boat and land, access to high quality clean sea water, and adequate docking and mooring for boats. Using the site of the Former West Indies Laboratory was considered as an alternative for the MREC. This site previously conducted extensive marine research and has adequate docking facilities for boats. However; this alternative was dismissed since the current owner of the site is unwilling to sell the property.

Alternatives Associated with the Demolition of Abandoned Hotel Structure – The No Action Alternative and the Proposed Action (Demolition of Abandoned Hotel Structure) were considered for detailed analysis. Under the No Action Alternative, the abandoned hotel would continue to deteriorate and would continue to present a safety and environmental concern for the park. In addition to the No Action Alternative and the Proposed Action, one alternative was considered, but dismissed from further study. This dismissed alternative included completing or finishing construction of the abandoned hotel structure or building a new structure on the footprint of the site. This alternative was considered in the initial stages of this project, but was dismissed due to significant, adverse impacts to the environment, including Tier 1 of the coastal zone, Coastal Barrier Resources System (CBRS) Areas, water quality in the Mangrove Lagoon and the Bay, the adjacent forested mangrove wetlands that fringe

the Mangrove Lagoon, and the aesthetic viewshed/landscape of the site that would occur as a result of building a new structure on the footprint of the site. Additionally, it was found that the building could not be re-used because the structure is currently deteriorating and presents a safety hazard. Therefore, due to safety issues and adverse environmental impacts, this alternative was considered in the initial planning stages, but was dismissed from further study.

7. WHY THE PROPOSED ACTION IS PREFERABLE

The Proposed Action includes the Preferred Alternative (East Site Alternative), or implementation of the MREC, and the demolition of the abandoned hotel structure. Although the Proposed Action impacts both floodplains and wetlands, it is considered the Preferred Alternative. Based upon the CBA scores, the East Site Alternative scored the highest (of the other two sites) and was considered the Preferred Alternative for the MREC. The East Site Alternative was also the Environmentally Preferred Alternative. This alternative would provide long-term beneficial impacts to the park and would foster public awareness of marine ecosystems through educational programs.

Additionally, the demolition of the abandoned hotel structure was determined as the environmentally preferred alternative due to the long-term beneficial impacts associated with the demolition of the abandoned hotel structure and associated rehabilitation of the peninsula. This alternative would have a long-term beneficial impact to the aesthetics at the park because the un-finished remains of the abandoned hotel represent a visual intrusion on SARI's cultural landscape. Demolition of the hotel shell would be a visual improvement enhancing the viability of the resources within the park as well as the viewshed to the surrounding communities.

The Proposed Action (MREC and Hotel Demolition) would meet park purposes and national environmental policy goals by creating new educational opportunities and by protecting important biological and cultural resources. Considering this, the Proposed Action would be providing protection to historic and archaeological resources for which the park was established, even though wetland and floodplain resources would be affected by the Proposed Action.

8. PROPOSED IMPACTS TO WETLANDS AND FLOOD RISK OF THE PROPOSED PROJECT AREA

8.1 Impacts to Wetlands - Construction of the MREC (East Site Alternative) – The wetlands at the East Site are located on and surround the eastern peninsula of SARI and are bounded by the Mangrove Lagoon, Salt River Bay, the Salt Pond, and the existing area defined as “mudflats.” Based upon the wetland assessment conducted for the East Site and the mangroves as mapped in 2000 through digitized orthorectified aerial photography by NOAA (Kendall et. al. 2005), approximately **0.03 acres of mangrove wetlands** (Wetland W-1) would be impacted as a result of constructing the boat dock and launch. This estimation is a conservative because the fringe of mangroves at the site is approximately 12 ft deep and the boat dock is estimated at a maximum of 50 ft wide. Approximately **0.66 acres of estuarine wetlands** (Wetland W-5) would be impacted by the MREC activities, located on the northern shoreline of the Mangrove Lagoon (Figure 7). A maximum of approximately **0.38 acres of open water** in the Mangrove Lagoon, mapped as an estuarine wetland by NWI would be impacted from the construction of the boat dock; this is a conservative estimate based upon the footprint from conceptual drawings, even though piers (which would decrease the footprint) will be used in the final design document for the boat dock. Therefore, approximately **1.07 total acres of NPS-defined wetlands would be impacted by the MREC** and associated structures, including the boat dock. This 1.07 acres of impacted wetlands represents a conservative estimate of approximately 12 percent of the total mapped NPS wetland areas within the terrestrial portion of the East Site (additional, unmapped wetland areas and the open water areas of Salt River Bay are not included in this calculation).

Wetland impacts at W-5 were reduced by placing the wet lab on piers to raise the structure above the NPS-defined wetland areas. This wetland currently is not vegetated due to unrestricted visitor access and is functioning poorly as a wetland. The soils at this wetland are characterized as Ustorthents, or “altered soil.” As stated above, the boat dock would also impact existing mangrove wetlands (W-1) located along the fringe of the

Mangrove Lagoon. Similar to the wet lab, the boat dock would be located on piers to reduce impacts to the mangrove wetland areas and the open water areas. The seawater supply pipeline would be sited in the same disturbance footprint as the boat dock in order to minimize impacts to mangroves and other wetlands to the maximum extent practicable.

Demolition of Abandoned Hotel Structure – The wetlands delineated at the site are located on and surround the eastern peninsula of SARI and are bounded by the Mangrove Lagoon, Salt River Bay, the Salt Pond, and the existing area defined as “mudflats.” The actual demolition of the abandoned hotel would have no impacts to wetlands. Although the hotel is located immediately adjacent to the mangrove wetland located along the shoreline of the Mangrove Lagoon, no impacts to these mangrove wetlands would occur. During the demolition process, any incidental impacts to the adjacent forested mangrove wetland would be avoided by placing upright sections of plywood between the mangroves and the demolition activities. These barriers will be placed all along the peninsula roadway, adjacent to hotel, and along bay side (south side) of peninsula where there are mangroves (adult plants, propagules, and rhizomes). This will protect mangroves from accidental impact from heavy machinery and prevent sediment from entering the lagoon during project in event of heavy rain. If the hotel will be demolished via mechanical methods versus using explosives, dust would not be an issue for the adjacent mangroves (USACE 2006). If explosives are used, dust may be an issue for the nearby mangroves. The NPS will have an observer on-site during demolition process to ensure that the barriers function to protect the mangroves. In addition to the hotel demolition, the park is proposing to construct a haul road for the construction vehicles to get to and from the site, and to haul out materials produced from the demolition of the abandoned hotel structure. Following demolition activities, the haul road would be improved and would serve as the main access road to the park. The exact route of the haul road is currently unknown. A pond and a tidal gut potentially exist in the vicinity of the proposed haul road. As more detailed survey and site-specific information becomes available, potential impacts to existing wetlands from the haul road will be avoided and minimized whenever possible. The NPS will work closely with the USDA NRCS to ensure that the haul road design is consistent with Federal Executive Order 11990 – Protection of Wetlands and *Director’s Order #77-1* (Wetland Protection). The removal of the debris on the peninsula and the proposed pervious, low impact parking area and pervious access road is on the peninsula, to the west of the existing forested mangrove wetlands along the Mangrove Lagoon (see Figure 2) would impact approximately **2.84 acres of estuarine wetland areas** (W-4 and W-5), considered as wetlands by NPS standards.

Additionally, removing the impervious structures (hotel structure and associated building materials) and revegetating these areas would return the site to a more natural setting which would benefit the long-term water quality in the bay and ultimately benefit the marine wetlands characterized as seagrasses mapped in the vicinity of the East Site. The demolition and road construction improvements have the potential to temporarily and locally increase turbidity in Salt River Bay, which may potentially cause a short-term, negligible, indirect adverse impact to seagrasses. It is recognized that the potential for negligible impacts to seagrasses as a result of increased turbidity may occur, but significant impacts to marine wetlands, specifically seagrasses, are not anticipated as part of this project.

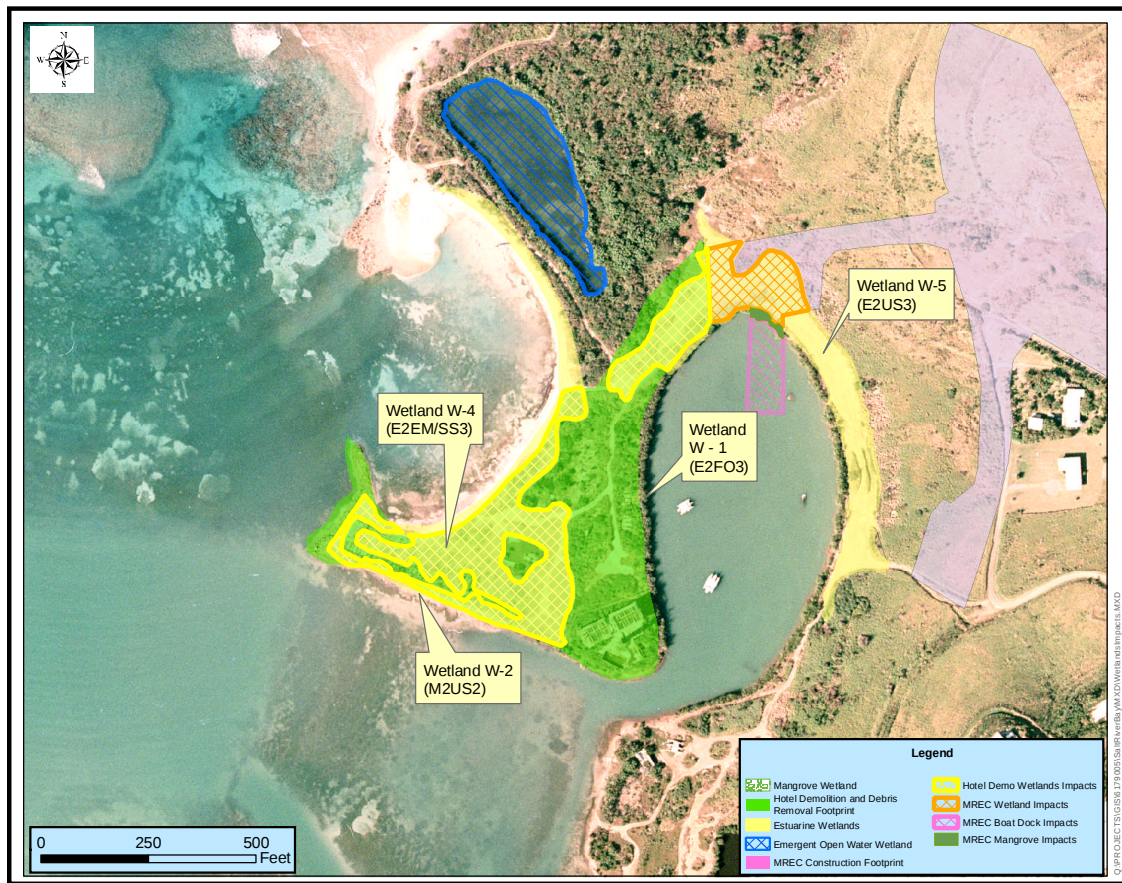


Figure 7. Wetland Impacts as a Result of the MREC at the East Site Alternative and as a result of the Demolition of the Abandoned Hotel Structure

No impacts to the shoreline areas below the ordinary low water tide level are expected. Although the peninsula is currently considered significantly disturbed due to historic uses of the area, wetland vegetation does exist in the areas proposed for debris removal and in some portions of the proposed access road. It is anticipated that a portion of the vegetation would be cleared on the peninsula to remove the existing debris. Desirable, mature wetland shrub species on the peninsula would be flagged and not removed during construction activities. Upon completion of debris removal, the soils of the peninsula would be re-graded for planting of native wetland vegetation. The peninsula would be returned to a more natural habitat, which is considered a long-term, moderate, beneficial impact of the project. Additionally, if the NPS controls and/or confines vehicular traffic onto the East Site via the new haul road, this would allow the restoration of approximately 2 acres of additional wetlands (referred to as mudflats) that are currently not functioning as wetlands. Appropriate stormwater management techniques, including approved and Erosion and Sediment Controls and BMPs would be required to avoid any indirect impacts to existing wetlands during construction of this access road. Based upon the mitigation strategy discussed in Section 9, impacts to the existing wetlands are expected to be short-term and have a long-term, beneficial effect through rehabilitating and revegetating the peninsula to a more natural setting. The table below depicts the total impacts to NPS-defined wetlands as a result of this project:

Project	Wetland Name	Wetland Type	Acres Impacted
MREC Construction (boat dock)	W-1, Estuarine Mangrove	E2FO3	0.03
MREC Construction	W-5, Estuarine Emergent	E2US3	0.66
MREC Construction (boat dock)	Mangrove Lagoon	E1UBL	0.38
Hotel Demolition Activities	W-4 & W-5, Estuarine Emergent	E2EM/SS3 & E2US3	2.84
TOTAL WETLAND ACRES IMPACTED			3.91

8.2 Flood Risk of the Proposed Project Area - Floodplain zones, as mapped by FEMA, are located within the SARI site boundary. NPS has adopted guidelines pursuant to Executive Order 11998 stating that it is NPS policy to restore and preserve natural floodplain values and avoid environmental impacts associated with the occupation and modification of floodplains. As stated previously, portions of the Proposed Action is located in a 100-year floodplain as mapped by FEMA (2007). All Federal agencies are required to avoid building in a 100-year floodplain unless no other practical alternative exists. NPS has adopted guidelines pursuant to Executive Order 11998 stating that it is NPS policy to restore and preserve natural floodplain values and avoid environmental impacts associated with the occupation and modification of floodplains. It goes on to require that, where practicable alternatives exist, Class I actions be avoided within a 100-year floodplain.

The existing, abandoned hotel structure is **not** located in the 100-yr floodplain; therefore, demolition of the hotel would occur outside of the 100-yr floodplain. Long-term positive impacts would be associated with restoring the site to a more natural setting, including restoring the floodplain from a partially impervious surface to a partially pervious surface. Additionally, the abandoned (and incompatible) hotel structure would be removed from the site, resulting in a long-term, moderate, beneficial impact to the surrounding floodplains. Activities associated with the proposed action would cause minor alterations to the floodway through the haul road and the parking area, but these activities would be built at grade and would not affect the floodplain. For the Preferred Action (East Site Alternative), water-dependent structures including the boat ramp, boat dock, boat moorings, and Wet Lab would be located in the 100-year floodplain resulting in long-term alterations to the floodplain. **These water-dependent structures would impact approximately 1 acre of the 100-year floodplain, or approximately 3 percent of the floodplain mapped at the East Site.** Facilities that are water-dependent were placed in the floodplain because no other practical alternative was available. The seawater pipeline, which is water-dependent, would also be located within and impact the 100-year floodplain. Impacts to the floodplain would not be expected to be adversely significant as a result of the pipeline. The pipeline would not interfere with the function of the floodplain.

The *Director's Order #77-2: Floodplain Management* does not apply to historic or archeological structures, sites, or artifacts whose location is integral to their significance or to certain actions as specifically identified in *Procedural Manual #77-2: Floodplain Management*. Portions of the SARI may fall into this category; however, all components of the Proposed Action were considered when assessing impacts to the 100-year floodplain.

NOAA collects oceanographic and meteorological data (historical and real-time) from stations on major waterbodies throughout the country. NOAA has specifically collected historical (limited) high/low water level values at Christiansted Harbor (Station 9751364), in the vicinity of SARI. A data review of the minimum and maximum station elevations for the gauge from March 2006 through September 2006 provides water elevations occurring at the location (Table 2). A review of the extreme values for the year 2006 show that all maximum values occurred either in July or September and that all minimum values occurred either in May or June. The maximum elevation value (ft) at the Christiansted Harbor station was 28.39 in July of 2006 and the minimum elevation value (ft) was 26.51 in May of 2006; this represents a maximum total elevation change in elevation of 1.88 ft in at the Christiansted Harbor station in the year 2006.

Table 2. Highest and Lowest Monthly Extremes (Highest and Lowest Values) for Station (9751364) Elevations in Christiansted Harbor

Month	Highest Elevation	Date	Lowest Elevation	Date
March	28.04	3/26/06	26.89	3/9/06
April	28.05	4/1/06	26.75	4/19/06
May	28.02	5/30/06	26.51	5/15/06
June	28.25	6/28/06	26.54	6/13/06
July	28.39	7/10/06	26.95	7/10/06
August	28.12	8/10/06	26.87	8/7/06
September	28.29	9/7/06	27.06	9/1/06

Source: NOAA 2006; Station data only available from 2/24/06 to 9/30/06.

9. MITIGATION MEASURES

The MREC Preferred Alternative (East Site Alternative) and the Proposed Action of demolishing the abandoned hotel structure both propose development and restoration within wetlands and the 100-year floodplain. Appropriate agencies (USACE and the USVI DPNR) have been notified and consulted on the proposed project to ensure compliance with applicable regulations; any required permits (404 permit) will be obtained from the USACE prior to the start of construction. In addition, during the entire construction process standard sediment and erosion control measures (Erosion Control Plan), such as silt fences and/or sand bags, BMPs, and stormwater management techniques would be used to minimize any potential soil erosion and to comply with both *Procedural Manual #77-1: Wetland Protection* and *Procedural Manual #77-2: Floodplain Management*. A Stormwater Pollution Prevention Plan (SWPPP) would be required and implemented prior to, during, and following ground-disturbing activities that is consistent with the Territorial Pollutant Discharge Elimination System (TPDES). Permeable paved surfaces would be used for the parking areas at the MREC and for the access road and parking lot at the abandoned hotel location to contribute to reducing stormwater runoff. Additionally, for the demolition of the hotel structure, it is recognized that the potential for negligible impacts to seagrasses along the shoreline areas of the East Site as a result of increased turbidity may occur, but significant impacts to marine wetlands, specifically seagrasses, are not anticipated as part of this project. Erosion and sediment controls, and BMPs would be employed during demolition and road construction/improvement activities to minimize impacts to Salt River Bay.

A detailed, stand-alone document describing the project phasing plan and the mitigation plan to compensate for wetland impacts has been drafted for use during construction activities; the section below summarizes the major objectives from this document.

9.1 Wetland Compensation Proposal - For the purposes of implementing Executive Order 11990, the NPS has determined that any area classified as wetland habitat according to the Cowardin (1979) is subject to *Director's Order #77-1: Wetland Protection* and the implementation procedures outlined in the *Procedural Manual #77-1: Wetland Protection*. *Director's Order #77-1* states that for new actions where impacts to wetlands cannot be avoided, proposals must include plans for compensatory mitigation that restore wetlands on NPS lands, where possible at a minimum acreage ratio of 1:1. Both a wetland mitigation plan and a wetland permit would be required for wetlands affected by this project. The wetland mitigation plan was based on impacts calculated from a conceptual design (footprint) of the Proposed Action and is therefore, the best conservative estimation of wetland impacts at this time. The wetland permit application, however, will be completed after a more detailed design of the proposed action is completed and available for use in preparing the permit documents. The mitigation plan for this project is two-fold: 1.) a mangrove wetland mitigation plan and 2.) an estuarine wetland mitigation plan. The mitigation is proposed to compensate for the impacts associated with both the construction of the MREC and the Hotel Demolition projects. The funding source for the proposed wetland mitigation will be the NPS.

Mangrove Wetland Mitigation Plan – The mangroves in the vicinity of Salt River Bay and along the Mangrove Lagoon were decimated due to intense winds as a result of Hurricane Hugo in 1989, which depleted portions of the old-growth mangrove forests. Additionally, the old growth mangrove forest within Sugar Bay was destroyed when St. Croix sustained a direct hit by the hurricane. In 1999, the St. Croix Environmental Association began a mangrove restoration project, which replanted 3.5 acres of the lost forest on the western side of Sugar Bay. The survival rate for restoration seedlings is estimated at 80%. Recent aerial photographs taken in 2000 indicate that naturally occurring and restoration mangroves now cover 29.7 acres or 54% of the 1988 forest.

Based upon these positive results from past restoration efforts, mangrove revegetation/enhancement is proposed as the mitigation strategy to offset the 0.03 acres of mangrove wetland impacts associated with the East Site Alternative. This estimation is a conservative because the fringe of mangroves at the site is approximately 12 ft deep and the boat dock is estimated at a maximum of 50 ft wide. A site survey of the total number of mature mangrove trees to be removed as a result of the boat dock was conducted by the NPS in January 2007. A maximum of 5 adult mangrove trees per 10 linear ft along the Mangrove Lagoon were observed, corresponding to 25 adult mangrove trees impacted as a result of the 50 ft wide boat dock proposed. Mangrove mitigation strategies were discussed and developed in consultation with the NPS and the USDA NRCS and would include mangrove transplantation with propagules (seedlings) to suitable locations along the south side of the peninsula (Figure 9). Specific locations for transplanted propagules will be determined through consultation with the USDA NRCS, the CZM, and other local experts to ensure best results for this project.

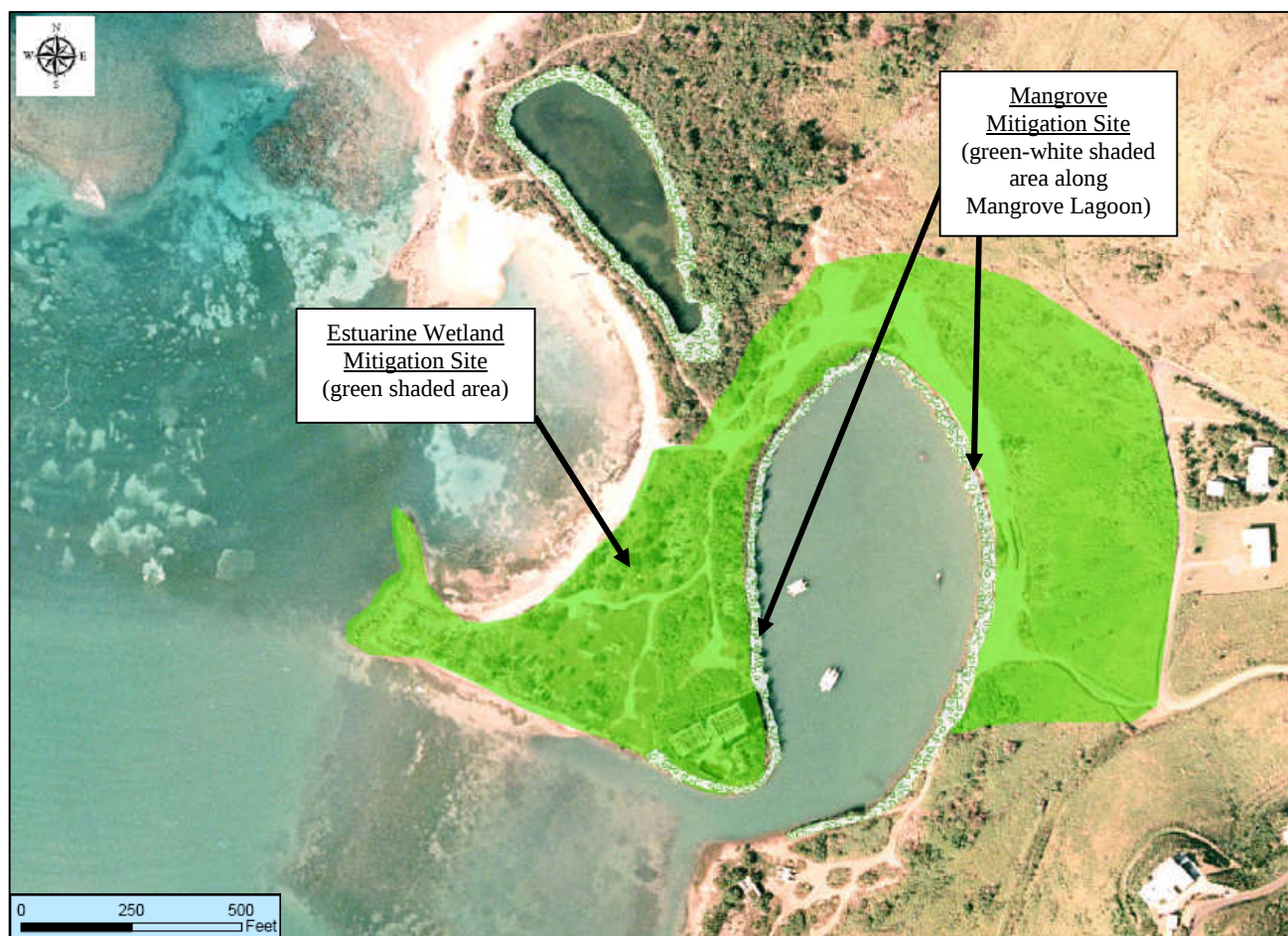


Figure 9. SARI Estuarine Wetland Mitigation Site and Mangrove Wetland Mitigation Site (on peninsula at East Site)

The specific ratio of mangrove revegetation was discussed with the USACE and was determined to be a 3:1 ratio (see Appendix C of the Environmental Assessment for phone conversation with the USACE). For each mature mangrove plant removed (approximately 25) as a result of the boat dock, three mangrove seedlings will be planted as mitigation (approximately 75). Red mangrove seedlings for the revegetation/enhancement plantings will be harvested from on-site, if possible. Based on a site visit by the NPS in January 2007, there are healthy numbers of red mangrove propagules under the existing mangroves for harvest and/or salvage before construction clearing begins; approximately 15 to 20 propagules per square meter were estimated. If this is not possible, red mangrove seedlings will be harvested from a local population in St. Croix, potentially from Green Key Marina Lagoon, Altoona Lagoon, or Kraus Lagoon. Red mangrove seedlings have been previously harvested from Kraus Lagoon and planted at Salt River Bay with success. The mangrove seedlings would be planted in the late summer/early fall season in the months of August, September, or October.

The mangrove planting methodology to be used is called the Riley encased methodology (REM), which has proven successful at SARI in the past. This method of mangrove seedling planting was developed for the purpose of establishing mangroves along high-energy shorelines where natural recruitment no longer occurs and where conventional planting methods are ineffective (Riley et. al 1999). Using this methodology, the individual seedlings are protected from the external environment within tubular encasements of PVC pipes. The PVC pipes provide protection from debris, wind and wave activity, and unintentional damage from human interaction. Previous restoration projects in the USVI and Puerto Rico have also shown that the PVC protects the seedlings from predators like crabs, and from wave action. The roots anchor themselves strongly within the encasement in the first three months of planting the seedlings, and prop roots may sprout in 24 months after planting has occurred (Riley 1999). The seedlings would be monitored on a quarterly basis by the NPS to quantify the success of the plantings. Similar to the Salt River Bay Mangrove Restoration Project, this project may utilize volunteers to plant the seedlings, including individuals from different organizations as well as students from local schools, such as NPS SARI Summer Youth Conservation Corp Program high school students. Based upon the mitigation strategy, impacts to the mangrove wetlands at SARI are expected to be partially offset by this plan. The NPS will monitor the transplanted propagules on a monthly basis to determine the success rate in one year's time from the date of planting. A long-term positive effect of revegetating the historically decimated shoreline of the Mangrove Lagoon with mangroves is anticipated.

Estuarine Wetland Mitigation Plan – The compensation proposal for the impacted 3.88 acres of estuarine emergent / scrub shrub wetlands (excluding mangrove wetlands but including open water in the Mangrove Lagoon) as a result of the MREC construction and the Hotel Demolition is wetland mitigation through wetland vegetation plantings and site rehabilitation on the peninsula at the East Site, owned by the NPS (Figure 9). Following the construction activities, the peninsula at the East Site will be returned to a more natural setting through plantings by the NPS and the USDA NRCS.

Prior to the debris removal and hotel demolition on the peninsula, stands or “islands” of existing wetland shrub species on the peninsula that are desirable and provide good habitat such as buttonwood (*Conocarpus erectus*), white manjack (*Cordia alba*), pink cedar (*Tabebuia heterophylla*), and seaside mahoe (*Thespesia populnea*) will be flagged to be avoided during these activities by representatives from the NPS and the USDA NRCS. These flagged groupings of shrub (and some tree) species will not be removed or impacted during the proposed project, but may be transplanted after the project is complete. In areas where these specimens are among the debris and abandoned construction materials, NPS will trim and cut these specimens prior to debris removal to reduce the amount of damage to the plants while the debris is removed. This will leave the stems and roots to regenerate after debris removal. The NPS will work with a licensed arborist after removal to salvage any damaged plants and improve their chances for survival. Certain types of debris (slabs and pilings) will be marked to be lifted out of the site versus dragged out to better protect plant roots and ground cover. Flagging and spray paint will be used to mark the preferred direction for construction materials to be moved away from plants. The NPS will have a representative on-site during the hotel demolition to ensure that precautions are taken to preserve the marked plants on the peninsula.

Following the debris removal and the hotel demolition in the non-flagged areas, the entire peninsula will be rehabilitated to a more natural setting. After materials have been removed, the NPS will work with a licensed

arborist to prune trees to maximize regrowth. Because desirable and mature wetland shrub species will be avoided, a ratio of 1:1 is proposed for this mitigation site. By avoiding these mature wetland shrub specimens, the functional loss of wetlands at this site can be partially avoided. A typical minimum compensation ratio for replacing a loss of wetland functions with restoration of degraded wetlands is 1:1. The conservative wetland loss as a result of the proposed MREC and the Hotel Demolition is estimated at 3.88 acres. Therefore, at a 1:1 replacement ratio, a minimum of 3.88 acres of wetlands would need to be reestablished/rehabilitated. However, because the entire peninsula will be rehabilitated and is approximately 7 acres, a ratio above 1:1 will be achieved at this site. Additionally, if vehicular traffic onto the East Site via the new access road will be confined, this would allow the restoration of approximately 2 acres of additional wetlands (referred to as mudflats) that are currently not functioning as wetlands.

The wetland mitigation and rehabilitation of the peninsula includes planting native herbaceous wetland plant species that currently exist on-site. After consultation with personnel from the USDA NRCS that are familiar with the peninsula site, it has been determined that grading, but no soil amendments prior to wetland planting will be required (O'Reilly 2006). Once the debris and hotel demolition is completed and all non-natural materials are removed from the peninsula, no fill will be needed and the location is expected to support hydrophytes naturally. The native wetland herbaceous forb species to be planted include saltmeadow cordgrass (*Spartina patens*), crabgrass (*Sporobolus virginicus*), and potentially beachgrass (*Distichlis spicata*). The wetland ground cover species sea purslane (*Sesuvium portulacastrum*) will also be planted at this site as well. These wetland species have been observed on-site and will be harvested from existing locations at the East Site, through the splitting of groupings. The type of herbaceous propagules used will be plugs and the distance between plantings will be dependent on the amount of funding and available plant materials.

Generally, transplant grids are specified that will provide uniform vegetative cover within one full growing season. For most emergent herbaceous plant species (including smooth cordgrass), transplanting on a 2 ft grid will achieve cover in one growing season (MES 2006). However, planting in patches, which has been recommended by NMFS and USFWS in order to create open areas for edge habitat or channel development, may also be specified (MES 2006). Additionally, seeds collected from on-site wetland shrub species, buttonwood, will be spread in the more interior portions of the peninsula. Water buffalos (250 to 500 gallons) will be provided on-site to water the new plantings as well as utilizing clean backpack sprayers.

The wetland plantings will occur along the shoreline of the peninsula to assist with shoreline stabilization. The more interior portions of the peninsula will be conserved as open areas with sparse vegetation (crabgrass, sea purslane, and some buttonwood) to attract the avian species, least tern. Least tern nesting currently occurs at the East Site, on Crescent Beach. Creating additional least tern nesting habitat at the East Site is desired by the NPS and the USFWS to provide new safe least tern nesting area for seasonal migrants. To avoid impacts to the least terns that currently nest at the site, the construction, demolition, and planting activities will be avoided during the active nesting season of April through June. Demolition and debris removal will occur in the early summer and planting at the site will commence in the fall, during September and October. This time of year for planting will ensure that the newly transplanted species will initially endure a rainy season at the mitigation site. The mitigation site is envisioned as a rehabilitated peninsula with groupings of mature wetland shrubs (and some trees) that were avoided during construction activities, a shoreline stabilized with herbaceous wetland forbs and ground covers, and more interior (inland) areas of sparse wetland vegetation that will attract and support least tern nesting. The time frame for full wetland functioning at the site is estimated at approximately two full seasons of wet/rainy weather following the plantings. Monitoring at the site to document success and least tern nesting will be conducted on a quarterly basis through quadrat sampling at designated locations determined by the NPS.

In addition to the rehabilitation of the peninsula, the restriction of visitor vehicular access in the vicinity of Wetland Area W-5 (mudflats fringing the Mangrove Lagoon behind the existing mangrove vegetation) may be authorized to promote the natural re-growth of wetland vegetation in this area. The area referred to as the mudflat has been badly damaged from uncontrolled off-road vehicles (ORVs) and 4x4 vehicle traffic. The area would be graded to allow for recruitment of salt flat species into the previously damaged area; the soil would be broken up to reduce compaction and allow for seed recruitment and better drainage during heavy rains. The

NPS and USDA NRCS would mark off “islands” of salt grass to be protected during the grading process, which would serve as sources of ground cover for the restoration. NPS would install a gate at both access points to the area and control vehicular traffic. The area would be allowed to recolonize naturally, unless funding becomes available for additional restoration and non-native invasive plant control. The NPS would begin the process to control the non-native, invasive species that now dominates portions of the mudflat with assistance from the NPS Exotic Plant Management Team (pending funding). However, it is expected that if left fallow, both crabgrass and sea purslane would recolonize in this location; the area would then constitute 2 acres of additional wetlands enhanced at the site, potentially achieving above the minimum 1:1 ratio of mitigation.

9.2 Floodplain Mitigation - The design of structures within the floodplain would incorporate methods for minimizing flood damage, as contained in the National Flood Insurance Program “*Floodplain Management Criteria for Flood-Prone Areas*” (CFR 44, 60.3) and in accordance with any state or county requirements for flood-prone areas.

Activities associated with the Preferred Alternative (East Site Alternative), or implementation of the MREC, would cause minor alterations to the floodway through the roadway improvements and the parking area. Appropriate stormwater management techniques, including approved BMPs, would be required to avoid any indirect impacts to floodplains during construction of this access road. However, these areas are already so compacted by current visitor and vehicle use that creating a pervious surface may improve the area and would minimize any impacts to the existing floodplain. As mitigation, the MREC and all associated buildings were purposely placed outside of the 100-year floodplain to avoid impacts to the floodplain due to these facilities. Facilities that are water-dependent structures, including the boat dock and wet lab/scuba room, were placed in the floodplain because no other viable alternative was available. Water-dependent structures such as the wet lab have been placed on pilings to raise the structures above the floodplain to allow the areas to continue to function as floodplains. For the boat dock, a floating boat dock system would be constructed since it minimizes impacts to the floodplain. For the abandoned hotel demolition, restoring this site to a more natural setting, from an impervious surface to a pervious surface would improve the floodplain function surrounding this area.

10. SUMMARY

The purpose of this project is two-fold and includes: 1.) the implementation and reestablishment of a proposed MREC at SARI and 2.) demolishing and removing the abandoned hotel structure to alleviate the safety/environmental concerns and restore the peninsula through revegetation of native plant species to return the area to a more natural condition.

The total wetland acres impacted by the project will be 3.91 acres (0.03 mangrove acres and 3.88 acres of estuarine emergent). Mangrove revegetation/enhancement is proposed to offset 0.03 acre of mangrove wetland impacts. For each mature mangrove plant removed (approximately 25) as a result of the boat dock, three mangrove seedlings will be planted as mitigation (approximately 75). The compensation for the impacted 3.88 acres of estuarine emergent/scrub shrub wetlands (excluding mangrove wetlands but including open water in the Mangrove Lagoon) is the restoration of a maximum of 7 to 9 acres of wetland habitat on the peninsula.

Construction of the MREC - Preferred Alternative (East Site) — Minor impacts to floodplains would occur due to proposed activities associated with the Preferred Alternative (East Site) relating to the construction of water-dependent structures (i.e., boat dock, wet lab, sea water pipeline), which would be located in the 100-yr floodplain. Approximately 1 acre of the 100-year floodplain would be adversely affected by the MREC. Minor, adverse impacts to mangroves and NPS-defined wetlands are anticipated from the MREC. Approximately 1.07 total acres of NPS-defined wetlands (includes mangroves and open water from boat dock) would be impacted by activities associated with the MREC. As a result of the Federal (USACE) wetlands impacted by the proposed MREC and associated structures including a new boat dock, and maintenance dredging activities, a Section 404 Permit would be required, and therefore, a *Joint Application for Environmental Resource Permit/Authorization to use State Owned Submerged Lands/Federal Dredge and Fill Permit* would be completed and submitted to both USACE and the VIDPNR. The permit would be submitted prior to the initiation of any construction or dredging activities. The acreage of wetlands impacted and the mitigation plan proposed in this SOF for the loss

of Federal forested mangrove wetlands would be included in the joint application as a requirement of the Section 404 Permit. Because mangrove mitigation has been previously discussed with the USACE for this project, the mitigation included in the Federal (USACE) permit is expected to be the same as the mitigation proposed in this SOF.

Abandoned Hotel Demolition – No direct impacts would occur to floodplains related to the actual demolition of the abandoned hotel, as the hotel is located outside of the 100-year floodplain. However, minor, adverse impacts to floodplains would occur due to proposed activities associated with the demolition of the hotel, such as impacts from the roadway to be located around the Mangrove Lagoon, which is located in the 100-yr floodplain. Construction of the Haul Road would not impact the 100-year floodplain. The Haul Road closely follows the park boundary avoiding encroachment into the floodplain. Appropriate stormwater management techniques, including approved BMPs, would be required to avoid any indirect impacts to the floodplain during demolition of the hotel and construction of the Haul Road. Approximately 7.10 acres of the 100-year floodplain are proposed for the restoration of the peninsula on the East Site. Long-term, moderate positive impacts would occur because impervious surfaces, such as the abandoned hotel and concrete debris, would be removed and replaced with pervious surfaces and the area would be naturally revegetated. These activities would ultimately improve the area and allow the disturbed areas to function as a floodplain. Approximately 2.84 total acres of NPS-defined estuarine wetlands would be impacted by activities associated with the hotel demolition, including roadway improvement activities and the removal of debris on the peninsula. Mitigation would include restoring the removed vegetation with wetland vegetation at a minimum ratio of 1:1. Additionally, it is recognized that the potential for negligible impacts to seagrasses along the shoreline areas of the East Site as a result of increased turbidity may occur, but significant impacts to marine wetlands, specifically seagrasses, are not anticipated as part of this project. Erosion and sediment controls, and BMPs would be employed during demolition and road construction/improvement activities to minimize impacts to Salt River Bay.

Conclusion – The Proposed Action would occur within NPS-defined wetlands and within floodplains as defined by FEMA (2007). Approximately 3.91 total acres of wetlands would be impacted by the Preferred Alternative (East Site) and the Proposed Action (Hotel Demolition). However, because the entire peninsula will be restored, approximately 7 acres of wetlands will be restored/enhanced and the NPS will control vehicular traffic onto the East Site which will result in the restoration of approximately 2 acres of additional wetlands (referred to as mudflats) that are currently degraded. It is possible that a net gain of wetlands at the East Site, following all mitigation activities, could occur. In addition, other wetland areas in the vicinity of the MREC and peninsula such as the salt pond and surrounding mangroves, the shoreline wetland areas such as Crescent Beach, and the majority of the mangroves surrounding the Mangrove Lagoon will not be impacted by the proposed projects.

For the Proposed Action, the demolition of the abandoned hotel structure would result in a long-term, moderate, beneficial impact to the surrounding floodplain on the peninsula. For the Preferred Action (East Site Alternative), water-dependent structures including the boat ramp, boat dock, boat moorings, and wet lab would be located in the 100-year floodplain. These water-dependent structures would impact approximately 1 acre of the 100-year floodplain, or approximately 3 percent of the floodplain mapped at the East Site. Facilities that are water-dependent were placed in the floodplain because no other practical alternative was available.

These projects would not significantly alter wetland systems, would not significantly alter floodplain attributes, or increase potential flooding risks to human safety or property damage. The overall hydrology of Salt River Bay is not expected to change as a result of the proposed action. In addition, flood elevations are not expected to change as a result of the Proposed Action. The proposed action would, therefore, constitute a negligible impact to the floodplain. The NPS finds the Proposed Action to be acceptable under Executive Order 11988 for the protection of floodplains. In addition, the Proposed Action would not constitute a significant impact to wetlands and would be partially offset by the wetland compensation proposed. Based upon the mitigation strategy proposed, impacts to the existing wetlands are expected to be short-term and have a long-term positive effect through rehabilitating the peninsula to a more natural setting. The NPS therefore finds that the proposed action, as stipulated, is consistent with Executive Order 11990 and the policies and procedures found in *Director's Order #77-1* and *Procedural Manual #77-1*.

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