

**COMPENSATORY MITIGATION PLAN
FOR
DEVELOPMENT OF THE
ST. JOHN MARINA
SUMMER'S END GROUP
U.S. VIRGIN ISLANDS**



**PREPARED FOR
SUMMER'S END GROUP**

PREPARED BY

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This plan follows the compensatory mitigation guidelines as set forth in 40 CFR Part 230, Compensatory Mitigation for Losses of Aquatic Resources: Final Rule. The fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts to the waters of the United States authorized by DA permits.

I. INTRODUCTION

The Summer's End Group, LLC is proposing to construct a 144 wet slip, fixed dock marina with services including pump out, fueling and amenities for marina guest and the public. Also included are a Custom facility, retail stores, restaurants, and parking.

A total of 39,258.18sf of docks are over areas with SAV, the majority of which has densities between 20 and 100%. Based on a 46% survival due to shading since the Applicant is using grated decking, 21,199.42sf (0.487ac) of seagrass may be lost. At the maximum capacity and at the maximum size boat in each slip there will be 5.65 acres of shading due to vessels. It can be assumed that 50% of the seagrass in this footprint will be lost due to vessels being in placed more than 2 weeks at a time. There will be some survival due to angle of the sun and vessel types and some available light. There will be impacts due to spudding impact during construction which will probably account for between a 900-1020 sf of impact (6sf per spudding event and between 150 and 170 relocations. The operation of the marina will have an impact due to prop wash scour and you can assume another 10% of seagrass loss.

The project also has the potential of impacting SAV within an envelope of approximately 8 acres as vessels move around during the construction of the marina. The construction impact will be related to barge movements and spuds and this can be minimized through monitoring and delineating spudding and anchoring areas. Barge shading will be mitigated through the periodic relocation of barges to prevent shading impacts. The surrounding SAV could also be impacted by construction related turbidity impacts. This will be abated by the sediment and siltation control and through stringent monitoring. The operation of the marina will have an impact due to prop wash scour and you can assume another 10% loss. In total approximately 3.75 acres of seagrass will probably be lost as a result of the project.

The project will have the potential to impact *Acropora* and other ESA listed species through vessel strikes. To minimize this impact the applicant will be placing informational buoys delineating the shallow hard bottom areas at the entrance of Coral Harbor and will be providing information signage on the dock advising mariners of avoiding shallow reefs while in transit and to avoid anchoring in area of coral and seagrass.

In order to minimize the direct impact by pilings the seagrass within the piling foot prints will be transplanted and plugs will be used to seed the area in the northwest corner of the bay which has been impacted by the deposition of sediment. There are 960 piles which will be driven and these will impact an area of approximately 1350ft².

The applicant will also be providing pump out facilities and waste receptacles which will minimize impacts on water quality and hopefully reduce the amount of refuse being tossed in the sea.

The applicant will be engaging in a derelict vessel clean up and will clean up the remaining sunken vessels which have not been removed during the recent Coral Bay Community Council clean up. There are still 14 vessels or parts of vessels on the bottom effecting seagrass and these will be collected and should allow for the recolonization of approximately 0.10 acres of SAV. The applicant will also pick up

the random debris, ghost anchors and lines which should attribute to approximately another 0.10 acres of recolonization by SAV.

The applicant will also be planting mangroves along the shoreline to create a mangrove fringe along the shoreline.

II. OBJECTIVES

The objective of this mitigation plan is to minimize the impact of the marina development on Coral Harbor and to improve the water quality and habitat function the harbor provides. In order to mitigate for the project impacts, seagrasses within the area of direct impact will be transplanted, derelict vessels and debris will be cleaned up with Coral Harbor, improvements will be implemented in the water shed to minimize the deposition of terrestrial sediments and mangroves will be planted to provide habitat along the shoreline

III. SITE SELECTION

The plan proposes to transplant the *Thalassia* and *Syringodium* from the 1350ft² of piling foot prints to an area in the northwestern corner of the harbor. Seagrass has been lost in this area due to the deposition of sediment. The Summers End Group will be undertaking improvements and maintenance of this drainage way and should significantly abate the input of terrestrial sediment. The area once had thriving seagrass beds. The placement of sod units in this area should serve to accelerate the recolonization of this area.

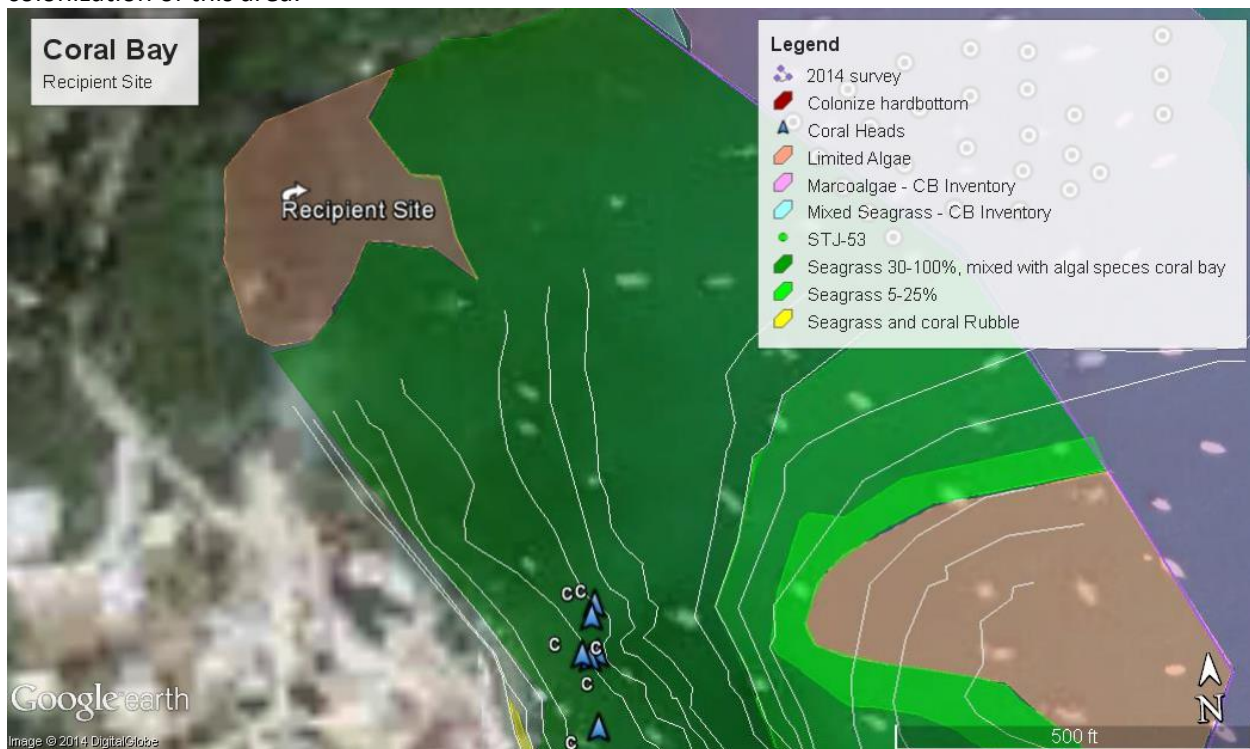


Figure 1. Location of seagrass Recipient Site

Mangroves will be planted along the shoreline seaward of the boardwalk and riprap. This will restore what was probably once an entirely mangrove line shoreline prior to early development of the area.

Three hundred red mangrove (*Rhizophora mangle*) propagules will be placed along the 850ft of waterfront. The area to the west is colonized by red mangroves and this will create a more continuous fringe.

IV. SITE PROTECTION INSTRUMENT

The recipient site is located in Coral Harbor, St. John, As that these are submerged lands both USACE and CZM permits would have to be obtained for any future alteration of this area therefore no Site Protection Instruments should be necessary to protect the recipient area. In order to protect the recipient area informational buoys will be placed to alert boaters of the shallow seagrass bed and the presence of the transplant recipient area.

IV. BASELINE INFORMATION

This project proposes alterations to the marine environment through the construction of a marina and will involve the driving of 960 piles which will directly impact 1350ft² of seafloor and associated benthic community.

The project area is located on the eastern side of Coral Harbor within Coral Bay on the east end of the island of St. John. There are dense grass beds off shore with a shoreline which is a mixture of muddy/cobble to the north and is riprapped to the south. There is a narrow band of muddy sand between the cobbly shore seagrass beds to the north and a mixture of seagrass and cobble to the south. There are a few large coral heads offshore of the culvert discharge in the middle of the property. Dense seagrass, primarily *Thalassia testudinum*, are found in the offshore environment between 1 and 11ft, at which point they begin to diminish and algal species become more prevalent. *Syringodium filiforme* also becomes more prevalent with depth.

In 2009 Paul Bologna presented the "Assessing Faunal Utilization of Seagrass and Mangrove Habitats in St. John' at the annual meeting of the International Marine Conservation Congress, George Madison University, Fairfax, Virginia. He stated that "Results indicate that Coral Bay Harbor, the most anthropogenetically impacted site, had the highest *T. testudinum* biomass, but the lowest floral diversity. Its faunal community was dominated by small polychaetes with significantly lower secondary production."

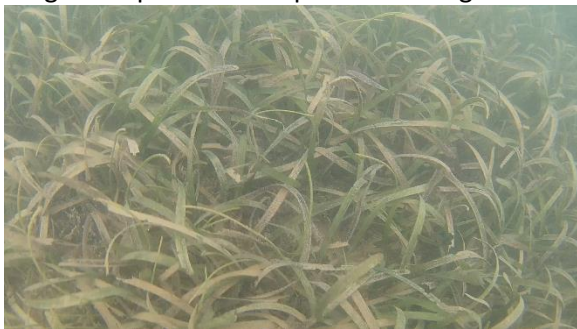
The area is heavily used for boat mooring and there are large scars associated with most moorings, even those with properly installed anchors. Ropes swinging from the moorings denude large areas of seagrass.

Benthic Community Survey Methods

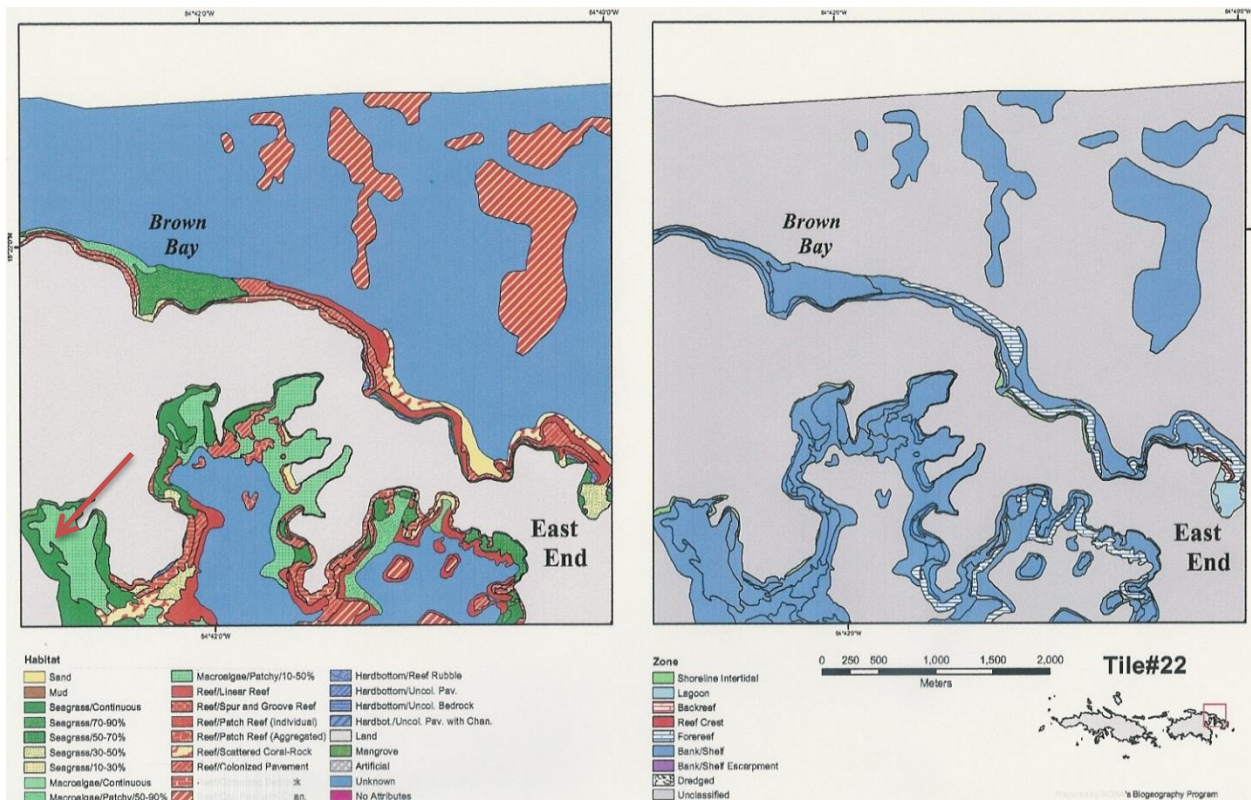
In addition to the seagrass survey information provided in the initial application, the site was resurveyed in 2015, 2016 and most recently in May and June of 2017. Transects previously undertaken were revisited. The entire site marina location, buoy locations and potential construction foot print and transit routes were surveyed. The changes noted included the appearance of *Halophila stipulacea* in the deepest areas with primarily macro-algal cover, regrowth in some areas where there were previously scars in seagrass beds from anchor and rope drags and new areas had been disturbed by anchor and rope drags. The benthic map prepared in 2014 still accurately depicts the abundance and distribution of species. North of the culvert, there is a narrow muddy band of uncolonized sand which varies in width

between 10 ft. and 25 ft. along the shoreline and then *Syringodium filiforme* beds which grade into abundant *Thalassia testudinum*. The seagrass beds are dense and continuous offshore with occasional blow outs which have been predominantly caused by debris, anchoring, or moorings. To the south of the existing stormwater culvert, there is riprap revetment along the shoreline and there are cobble amid the seagrass at a distance of 10 ft.– 25 ft from shore. *Thalassia* dominates the grass beds all the way into shore on the southern side of the property. These beds are extremely dense only broken by debris and anchor scars. There are six relatively large coral heads, *Solenastrea bournoni*, found offshore of the discharge point all were found and are still healthy as of 2017. Small *Siderastrea radians* colonies found on scattered debris and cobbles in the area.

The seagrass densities between depths of 1 ft. and 11 ft. range from 30-100%. The lower densities are found primarily in areas that are recolonizing from previous disturbances. *Thalassia* represents 80% of the seagrass and *Syringodium* approximately 20%. *Halodule beaudettei* is present in areas of regrowth. As depth increases, seagrass densities decrease and *Syringodium* becomes more abundant and represents a greater percentage of the seagrass present. At a depth of 11 ft to 13 ft., the seagrass densities fall to 5% to 30% and at a depth of 13 ft to 14 ft the seagrass densities are no greater than 5% and macroalgae is the dominant colonizer. At 15 ft of depth there is only an occasional *Thalassia* shoot, and macroalgae is the dominant colonizer and has colonized between 10% and 70% of the seafloor. *Halimeda* is the most common algae present. *Halophila stipulacea* is patchily abundant amid the algae. Also found are *Caulerpa*, *Udotea*, *Avrainvillea*, *Penicillus capitatus*, *Laurencia*, *Hypnea* and *Dictyota*. At a depth of greater 16-19ft. the macroalgae density decreases and only several small patches of *H. stipulacea* were present. The system is light limited at this depth. Beyond the inner harbor dense seagrass is present in depths exceeding 25ft.



100% coverage of seagrass at depths up to 10ft.



The NOS Benthic Habitat Map Tile 22.

Sea cucumbers (*Holothuria mexicana*) were common as were sea stars (*Oreaster reticulatus*), and several juvenile conch were noted during all surveys. Due to limited visibility the number of fish that were seen was limited. Tarpon (*Megalops atlanticus*) and yellowtail jacks (*Lutjanus chrysurus*) were both seen, as well as on juvenile black tipped shark (*Carcharhinus limbatus*).

The bay is a known shark nursery and the Coral Bay Community Council funded a study of the harbor and found the harbor is heavily used by lemon, black tip and nurse sharks.

The Figure below from their study shows the long line catch locations of sharks within the harbor.

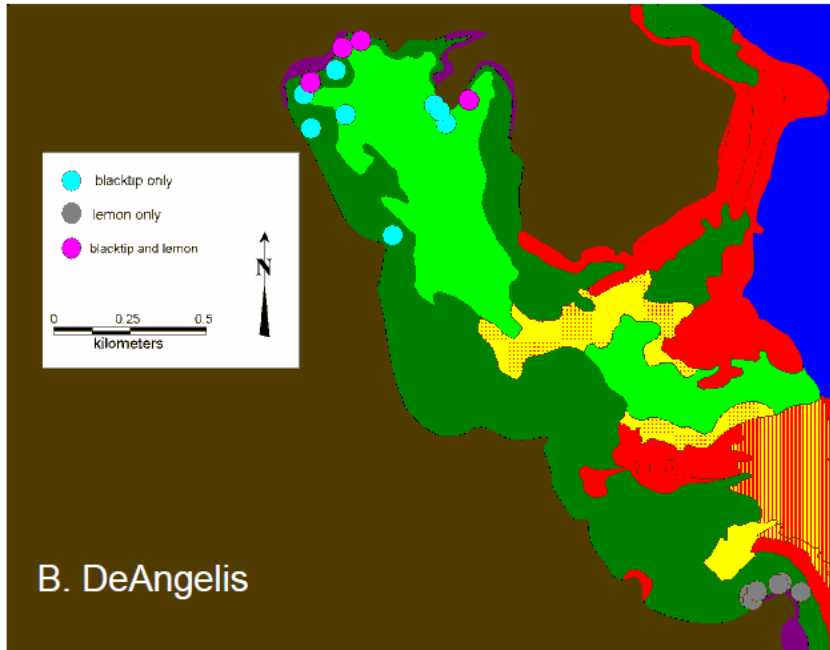


Fig. 1 Capture locations of blacktip and lemon sharks in Coral Harbor and Lagoon Point



At 13ft. algae is become the dominant species



Seagrass still covers up to 25% at 12 ft.



At 11 ft. the transition happens and seagrass densities start to decline



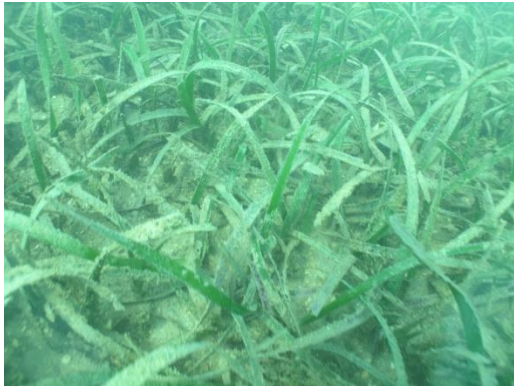
At 15ft. algal species dominate



But an occasional seagrass shoot can still be found at 14-15 ft.



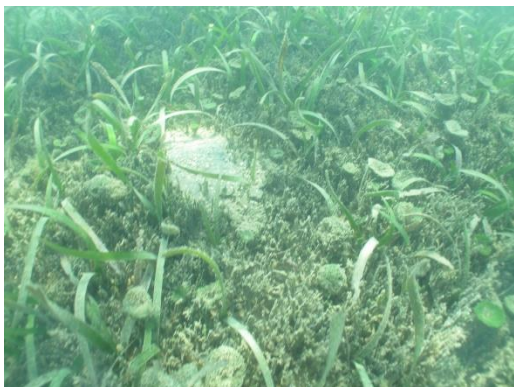
Seagrass and algae at 13 ft.



Dense beds between 1 and 11 ft.



The seagrasses are thriving



Some area are highly mixed seagrass and algae



One of the large coral heads (24" in diameter)



Coral growing on debris



Sea star



Sea cucumber

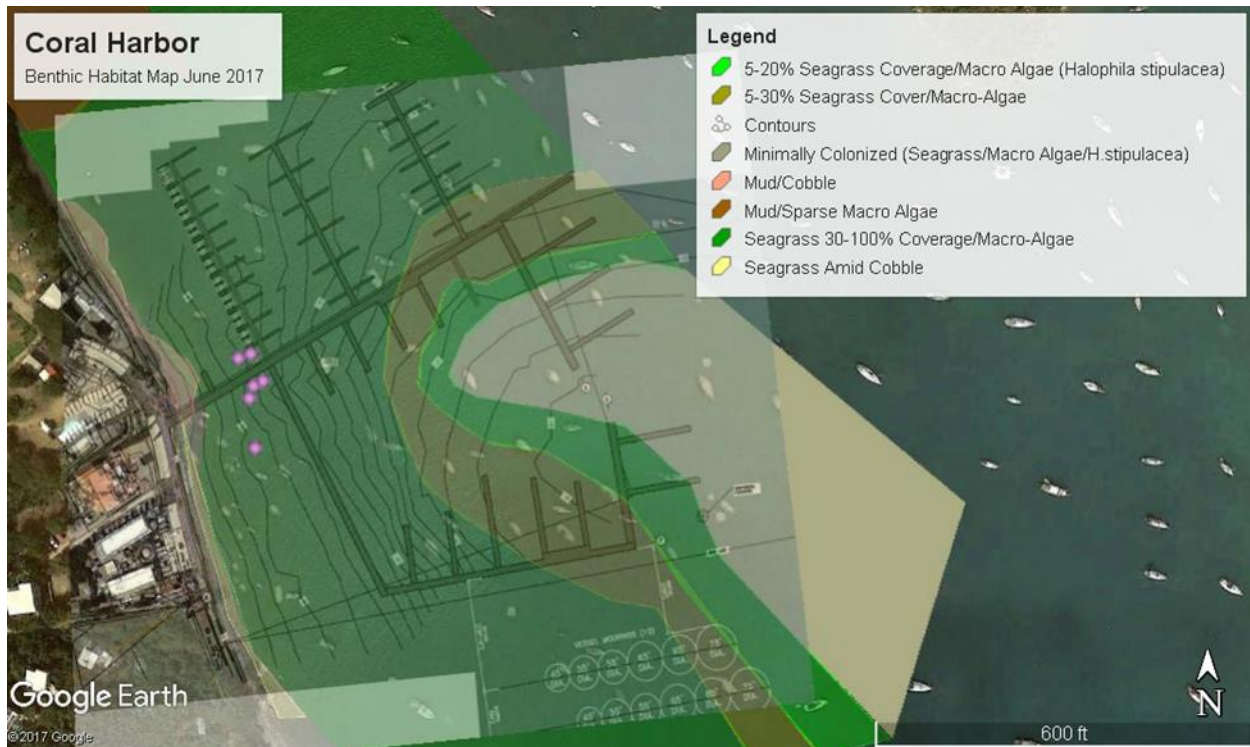
VI. COMPENSATION FOR UNAVOIDABLE IMPACTS

The dock has been positioned offshore to avoid dredging and to avoid the maximum amount of the densest seagrass while still allowing for access into the bay.

The project will be directly impacting approximately 1350ft² due to the placement of 960 piles ranging from 14"-18" in diameters (66- 14"square concrete, 457 14"- round steel encased concrete, 437-18" – round steel encased concrete).

Type	Habitat	Number	Acres	Sq. ft.
Moorings	30-100% Coverage Seagrass	9 (8 +0.5,0.5)		
Moorings	5-30% Coverage Seagrass	3 (1.5 + 1.5)		
	Total	12		
Docks			1.69	73,591.10
	Riprap (above MHW)		0.01	235.00
	Docks Less Above MHW		1.68	73,356.10
	Mud/Cobble		0.02	762.20
	30-100% Coverage Seagrass		0.90	39,258.18
	5-30% Coverage Seagrass		0.48	20,927.41
	5-20% Coverage Seagrass Macro-Algae		0.13	5,836.21
	Minimally Colonized		0.15	6,572.10
	Total		1.68	73,356.10

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Impacts of marina

VII. MITIGATION WORK PLAN

THALASSIA TRANSPLANT

Prior to the start of the marina project the piling locations will be marked. *Thalassia* be collected by divers in large sod units using trowels to cut completely through the root mass, the ideal unit size is approximately 1 sq. ft. and 8"-10" in depth. The sod units will be place in underwater binds and carried to the transport tray which will be beneath the boat.

When the tray is full the boat at idle speed will move to the recipient site in the northwest corner of the bay. The boat will only watch depth and will not get so close that the tray will hit the bottom. The sod units will be removed from the tray and carried to the recipient area. A small depression will be made for each sod unit and once fitted in place the excavated sand will be filled back in around the unit, sea grass staples will be placed in each unit to assist in stability. The units will be evenly scattered across the recipient site to facilitate the re-colonization of the area.

Once the relocation is complete 5 transect lines will be established and a baseline report will be prepared. The transects will be videoed and photographed on a monthly basis for a period of 2 years after the transplant. After two years the beds will be monitored on a quarterly basis for the next 3 years. Reports will be provided with the videos to the reviewing agencies within 30 days of the survey.

CLEAN UP OF DEBRIS AND MOORINGS

Concurrent with the construction of the marina a cleanup of debris from the bay. This will be accomplished by divers using lift bags and other appropriate equipment. Where necessary barges

associated with the marina project may be required to remove boat parts. All debris will be properly disposed of at the landfill. As the mooring field is created the old moorings will be removed, all ropes anchors and other debris associated with each mooring



A small mooring scar



More common foot print



Debris is common

MANGROVE PLANT

Three hundred red mangrove propagules will be placed along the shoreline across the 850' of shoreline on approximate 3ft centers. The mangroves will be carefully placed so that they have the greatest chance of survival.

PLACEMENT OF INFORMATIONAL BUOYS

The Summers End Group will be placing buoys on the locations shown below. These informational buoys will warn boats of the presence of the resources and shallow areas on the approach to the YCSE. The buoys will be located at 18° 20.703'N 64° 42.897'W, 18° 20.460'N 64° 42.750'W, 18° 20.437'N 64°

42.542'W, 18° 20.122'N 64° 42.437'W, 18° 19.949'N 64° 42.046'W, 18° 20.061'N 64° 41.409'W and 18° 19.819'N 64° 40.709'W.

INFORMATIONAL SIGNAGE

Summers End Group will be including information to boats about the protection of resources and safe boating practices to all the boats which utilize the marina. Signage will also be placed in conspicuous places on the dock showing nearby shallow areas, proper anchoring procedures and steps necessary to protect sea turtles and marine mammals.

DONATION TO RESEARCH

The applicant will add a fee to charges levied on each slip which will be dedicated to support of a third party independent research program on vessels strikes to sea turtles and marine mammals similar to the one NOAA is currently funding in St. Croix. Information gleaned from these studies and those in the future may one day help to minimize or alleviate strikes altogether.

PUMPOUT AND WASTE FACILITIES

There are currently no pump out or waste disposal facilities. The marina will be providing these services at minimal cost. This will help prevent the discharge of waste into the harbor, and help lower the nutrient input.

VIII. MAINTENANCE PLAN

Once the project is completed the recipient sites will be surveyed on a monthly basis for a period of two years. If grass rhizomes become unburied they will be reburied and if necessary seagrass staples will be utilized.

The mangrove will be surveyed on a biweekly basis for the first two months and then on a monthly basis for the first 2 years to ensure that they are stable and becoming well rooted. Propagules will be replaced as needed to create a continuous fringe.

The bay will be surveyed on a yearly basis and all new debris will be removed.

IX. ECOLOGICAL PERFORMANCE STANDARDS

In order to objectively evaluate the mitigation project ecological performance standards must be established. The object of this mitigation is to minimize impact to benthic resources which provide high quality habitat to protected marine species. The performance standards will include viability of the transplanted seagrass as well as their use by protected species.

It is the intent of this transplanting program to obtain a minimum of 80% survival of the transplanted seagrasses and have the uncolonized area recolonize. The Summers End Group is committed to put forth the greatest effort to see that the relocation is successful and that they obtain the greatest potential survival of transplanted organisms.

The intent is to have 100% survival of 300 mangroves across the front of the property.

X. MONITORING REQUIREMENTS

Monitoring the compensatory mitigation project site is necessary to determine if the project is meeting its performance standards and to determine if measures are necessary to ensure that the compensatory mitigation project is accomplishing its objectives.

As per the guidelines set forth in §230.96 the mitigation project will be monitored for a minimum period of 5 years. The monitoring will take place along two schemes: the monitor of the transplanted seagrasses and the monitoring of the areas which have been cleared to debris and moorings to see if recolonization is occurring.

Once the relocation project is complete 5 transect lines will be established and a baseline report will be prepared. The transects will be videoed and photographed on a monthly basis for a period of 2 years after the transplant. After two years the beds will be monitored on a quarterly basis for the next 3 years. Reports will be provided with the videos to the reviewing agencies within 30 days of the survey. All species utilizing the beds will be documented in the monitoring reports.

Five transects will also be established through areas where debris has been removed and these will be monitored concurrently to look for recolonization.

The mangroves will be counted on a monthly basis and replaced as necessary.

XI. LONG TERM MANAGEMENT PLAN

Navigational buoys will be placed at the recipient site notifying boaters of the presence of important resources and the need for caution while boating. Periodic monitoring of the bay will ensure that debris is removed if it is introduced.

The applicant will also be assisting in the maintenance of the BMPs within the watershed to help improve runoff water quality and reduce the input of terrestrial sediment.

The applicant is also undertaking a long term water quality monitoring program within the harbor to look at changes throughout the life of the marina. Twelve water quality stations will be established and monitored on a quarterly basis for turbidity (NTU), dissolved oxygen (DOmg/l), salinity (0/00), pH, and temperature. Sediment traps will also be monitored quarterly to look at changes in sediment deposition and sediment samples will be take every 5 years to look at changing characteristics. Photoquadrats will also be monitored which include seagrass and the nearest ESA coral species.

This data can help evaluate the BMP that have been installed and can help determine additional measure that can help improve water quality and the habitats in the bay. When negative changes are noted measures can be developed to help abate and minimize degradation. Reports will be delivered to the agencies (NMFS, ACE, CZM and DEP) on a quarterly basis as monitoring is conducted.

XII. ADAPTIVE MANAGEMENT PLAN

In the event that there are difficulties with the mitigation as planned the Summers End Group is prepared to take additional steps to see that compensatory mitigation is achieved. If necessary

extended monitoring and maintenance or additional marking of the site will be undertaken in order to meet the mitigation goal.

If the mitigation goal of 80% survival at the end of five years is not met, the applicant will prepare a detailed report of why the mitigation was not successful and Summers End will meet with the permitting agencies and coming up with additional compensatory mitigation to meet the mitigation goal.

XIII. FINANCIAL ASSURANCES

Summers End Group will secure a performance bond in the amount of the cost mitigation program and subsequent monitoring throughout the implementation and monitoring period. The bond will follow the guidelines set out by the U.S. Army Corps of Engineers Regulatory Guidance Letter No. 50-1, 14 February 2005, SUBJECT: Guidance on the Use of Financial Assurances, and Suggested Language for Special Conditions for Department of the Army Permits Requiring Performance Bonds. The estimated mitigation cost are shown below.

		MITIGATION	
		One Time Cost	Recurring Annually
Seagrass Mitigation			
	Set up of stations	\$ 2,500.00	
	Baseline	\$ 6,000.00	
	Photoquadrat Baseline	\$ 12,000.00	
	Monitoring	\$ 36,000.00	
	Relocation of seagrass	\$216,612.50	
Mangrove Mitigation			
	Trees, Mangroves, Planting	\$ 20,500.00	
	Monitoring/Maintenance First 2 years	\$108,000.00	
	Monitoring/Maintenance Last 3 years	\$108,000.00	
Turtle Strike Mitigation			
	Turtle study funding 3rd Party		\$33,000.00
Seagrass/Coral Protection			
	Reef/Shallow Seagrass Informational Buoys	\$ 10,000.00	
Water Quality Improvement			
Watershed Enhancement	Repair of existing projects	\$ 75,000.00	
	Annual maintenance		\$25,000.00
Environmental Education			
In Conjunction with NPS	Part time resource officer fundinig		\$20,000.00
	Website and materials	\$ 20,000.00	
Dock signage	Education and Informational Placards	\$ 20,000.00	
Seagrass/Coral Protection			
within NPS waters	NPS informational buoys (4)	\$ 10,000.00	
Long-term Monitoring Water Quality			
	Water Samples		\$135,000.00
Environmental Restoration Coral Harbor			
	Boat removal	\$150,000.00	
	Diver Bay Clean-up/Location of Mooring Footprints	\$ 58,500.00	
		\$853,112.50	\$213,000.00