Benthic Mitigation Plan

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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MARCH 2014

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This plan follows the compensatory mitigation guidelines as set forth in 40 CFR Part 230, Compensatory Mitigation for Loses 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 145 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.

The project will be directly impacting approximately 2500 sq. ft. due to the placement of 1333 piles ranging from 12-17" in diameters. Due to wave turbulence seagrass will also be lost surrounding the piles. The dock itself occupies 1.42 acres of which 181 sq. ft. will be over areas with seagrass and coral rubble, 1567 sq. ft. over area of sparse seagrass, 41,546.37 sq. ft over areas with 30%-100% seagrass coverage , 27,072 sq. ft. over areas with 5-30% seagrass and algae coverage and 4717 sq. ft. over areas with 5% seagrass/algae coverage. The dock will result in a shading impact of 1.42 acres and with the use of the graded decking we are assuming somewhere around a 46% survival rate based on NMFS studies or a 0.8 acre sea turtle foraging habitat loss due to shading (Landry, 2008).

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.

The boats at the dock will shade another 5.7 acres. The slips will be occupied on average 47% of the year as that seagrasses are impacted after approximately 2 weeks of shading this will result in the loss of seagrass with in the marina due to vessel shading. This will probably be seen as loss of density as well as denuding of some areas especially around larger boats which are permanently moored. It is probable that as much as 2 acres of seagrass which is turtle forage habitat may be lost.

The project also has the potential of impacting SAV within the approximate 8 acres project area due to shading of construction vessels and potential construction impact. 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 mitigate 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 project will have the potential to impact Acropora and the nominated species through vessel strikes. To minimize this impact the applicant will be placing informational buoys delineating the shallow hard bottom areas within 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.

There are currently 115 boats anchored or moored within the bay and these conservatively impact an area of between 34,500 and 46,000 sq. ft. based on their anchor drag and rope swing impacts. Many of these have both an aft and bow anchor increasing this impact.

The applicant is entering into an agreement with DPNR and will take over the management of the mooring field in cooperation with DPNR and over the next several years will organize the mooring field and replace all the anchors and moorings with properly installed moorings which will have negligible impact on the seafloor. The applicant will also be providing pump out facilities and waste receptacles which will significantly reduce the indirect impacts of these vessels. This will result in the protection of approximately 16 acres SAV and allow for the recolonization of approximately 1 acre of seagrass by removal of the inappropriate anchors.

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 impact will be transplanted, the mooring field will be managed and proper moorings installed, debris will be cleaned up with Coral Harbor and improvements will be implemented in the water shed to minimize the deposition of terrestrial sediments.

III. SITE SELECTION

The plan proposes to transplant the *Thalassia* and *Syringoduim* from the 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 re-colonization of this area.

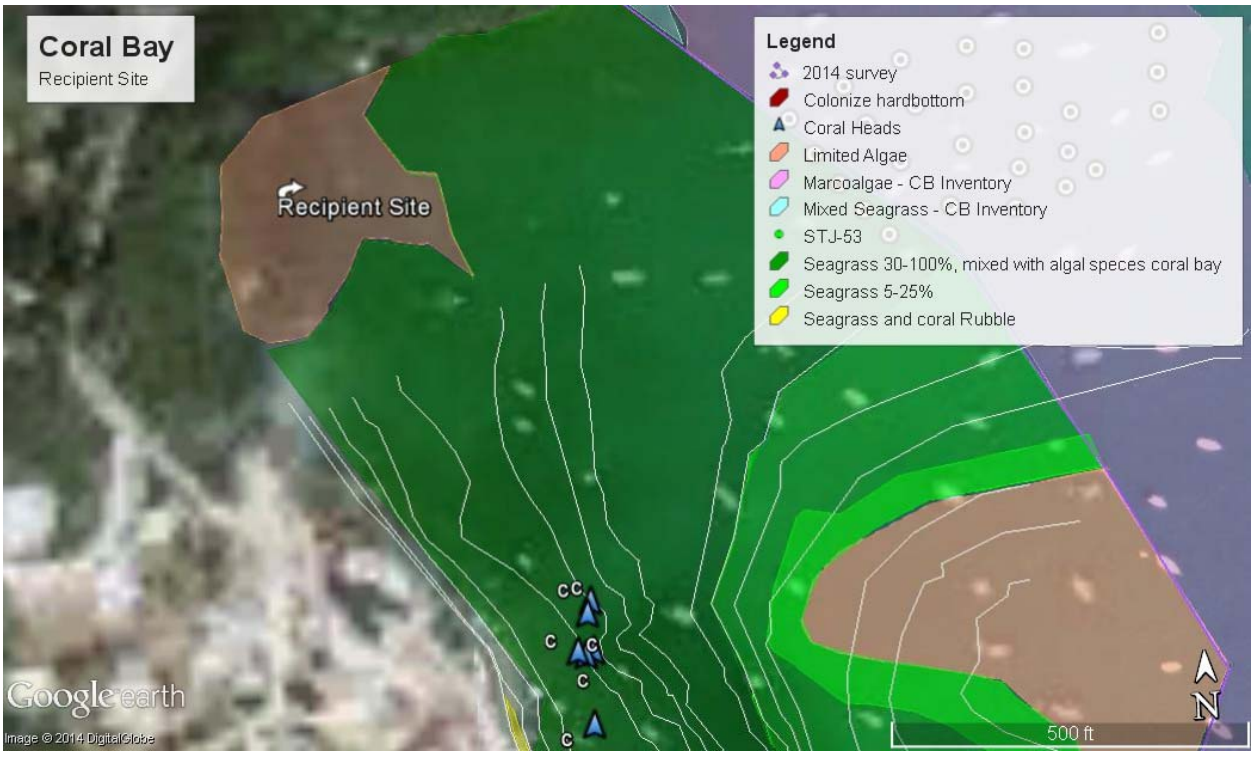


Figure 1. Location of seagrass Recipient Site

IV. SITE PROTECTION INSTRUMENT

The recipient site is located in Coral Harbor, St. John As that these are submerged lands both COE 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.

IV. BASELINE INFORMATION

This project proposes alterations to the marine environment through the construction of a marina and will involve the driving of 1333 piles which will directly impact the 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 prevent. *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

Benthic surveys were undertaken in the proposed project area in June and July 2009, May and November 2012 and in January and February 2014. The surveys were conducted with snorkeling equipment and scuba and six transects were conducted within the area running from the shoreline out to a water depth of 16 ft. Meter squares were used to assess percent covers along the transect lines (Rogers, 1994). The data is present in Appendix X. Figure 6.06.1a and 1b provides the Benthic Habitat Map provided by NOS, NOAA (The project area overlaps two of the habitat tiles on the NOAA maps) and Figure 6.06.2 depicts the larger Coral Harbor area including the location of the nearest ESA listed *Acropora palmata* and Figure 6.06.3 shows the marina area at a larger scale.

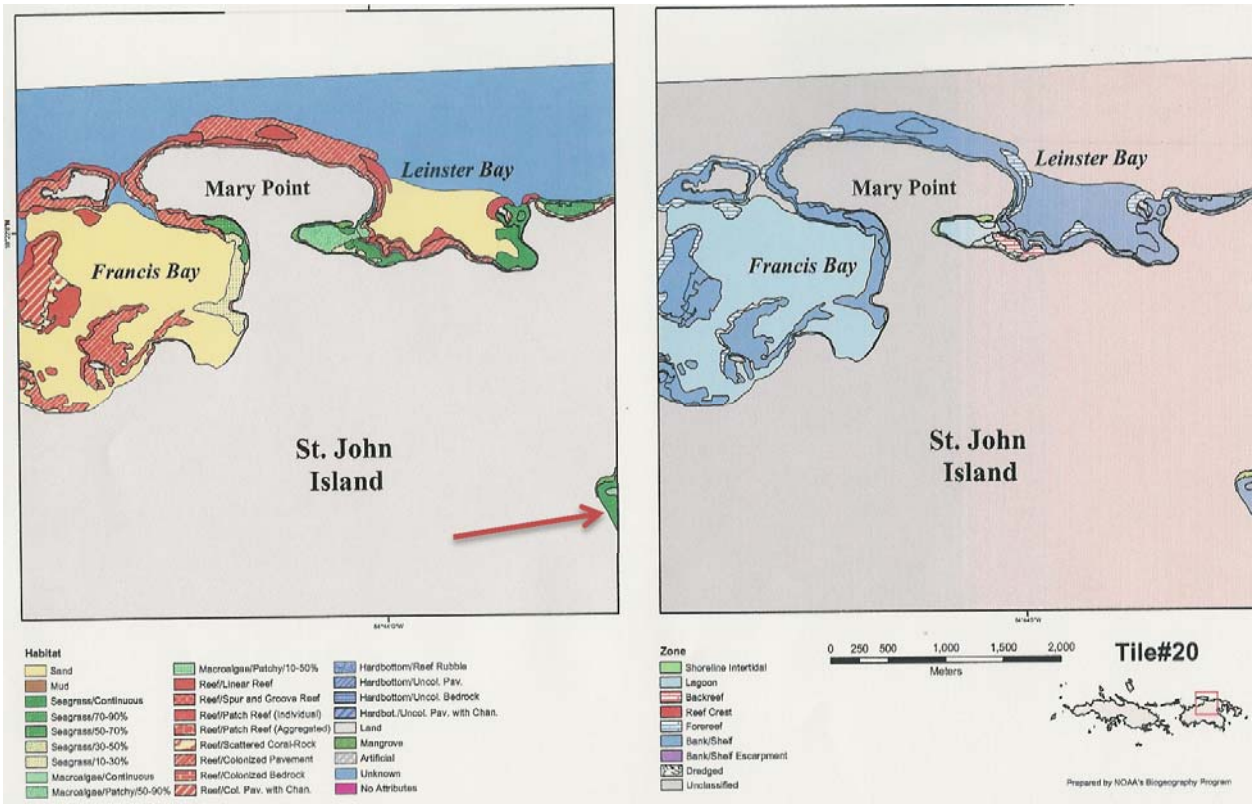


Figure 6.06.1a The NOS Benthic Habitat Map Tile 20.

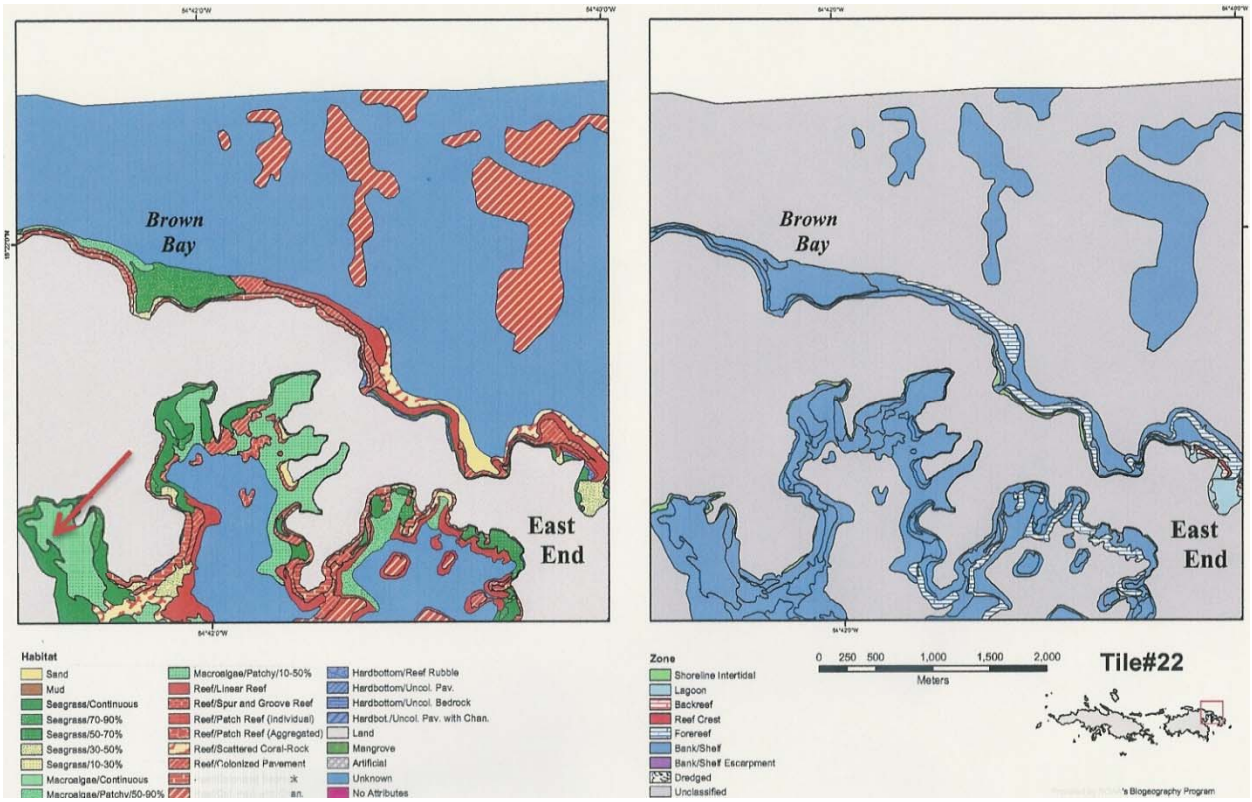


Figure 6.06.1b The NOS Benthic Habitat Map Tile 22.

The NOS Biogeography Program shows the entire area off shore of the site as continuous seagrass beds with patch macroalgae in the center of the bay.

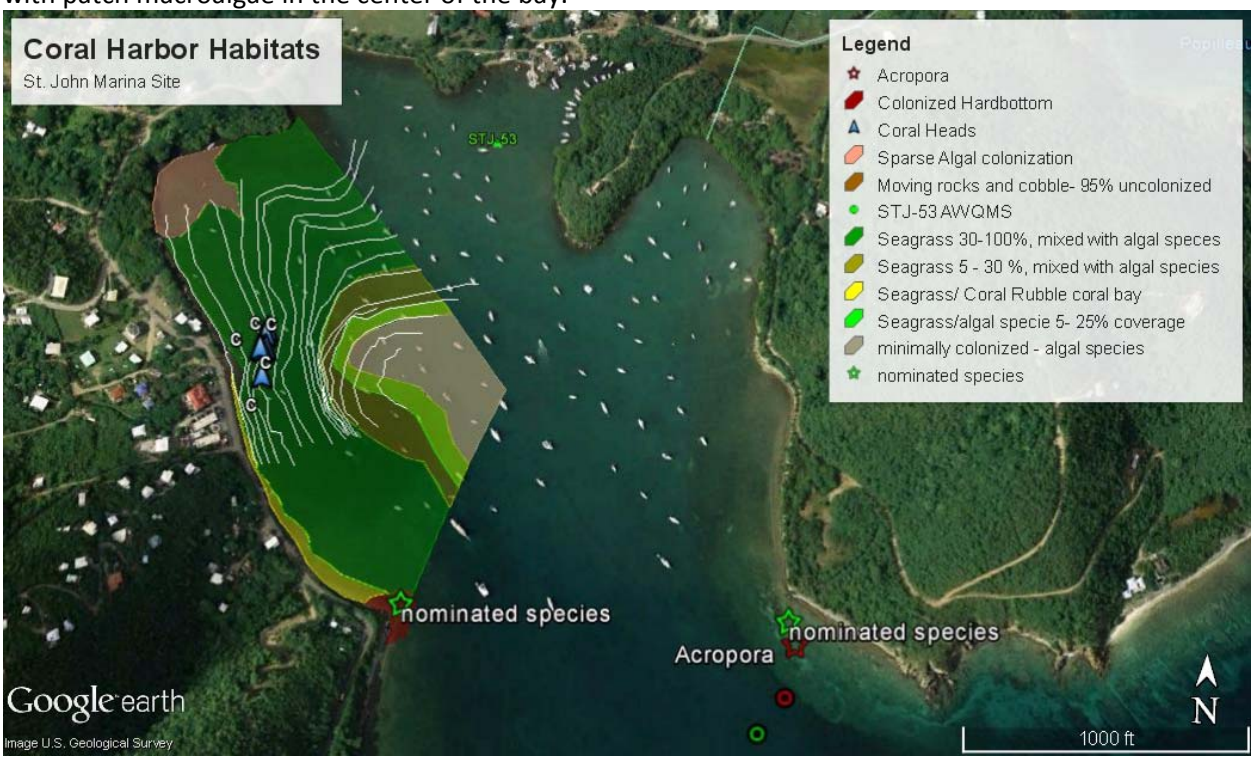


Figure 6.06.2 Habitat Map showing the greater Coral Harbor area and the nearest Acropora coral as well as the ESA nominated species.

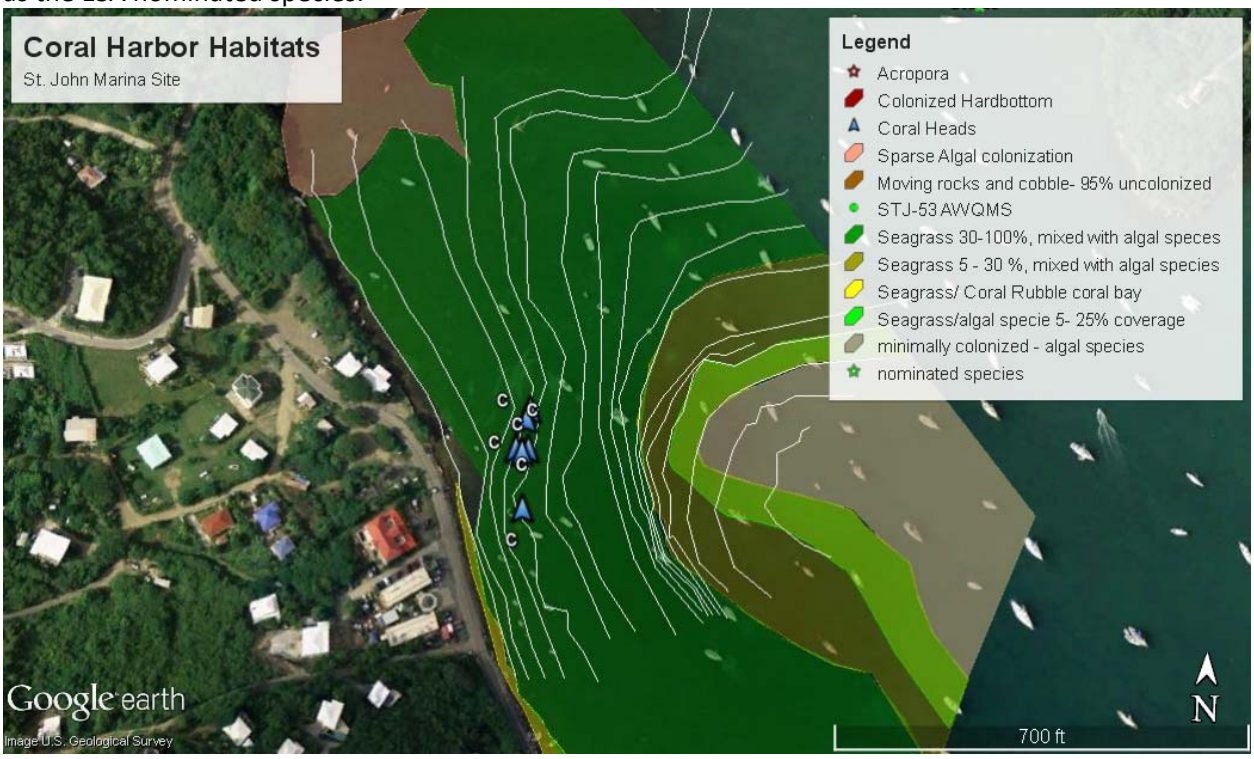


Figure 6.06.3 Benthic habitats in the marina footprint.

The Benthic Community

The shoreline to the north is a mixture of muddy cobbles. The red mangrove (*Rhizophora mangle*) stops to the north of the project area. There is a narrow band of uncolonized muddy sand before seagrass beds begin on the northern side of the beyond the near shore there is a narrow muddy band of uncolonized sand, which varies in width between 10 and 25 ft. Then *Syringodium filiforme* beds begin which slowly grade into a predominant colonization by *Thalassia testudinum*. The grass beds are dense and continuous off shore with occasional blow outs which have been predominantly caused by debris, anchoring or moorings. To the south of the culvert there is riprap revetting the shoreline and there are cobble amid the seagrass of a distance of 10 – 25 ft. from shore. *Thalassia* dominates the grass beds all the way into shore on the southern side of the property. The beds are extremely dense only broken by debris and anchor scars. Immediately seaward of the culvert there is a large area of sediment deposition which is uncolonized. There are six relatively large coral heads found off shore of the discharge point, these are *Solenastrea bournoni*, these corals thrive in low visibility area and can be found on sandy bottoms. There several small Siderastrea radians colonies are found on scattered debris These corals all colonized rocks which were carried downstream from drainage way.

The seagrass densities between 1 and 11 ft. range from 30-100%. Thalassia represents 80% of the grass and Syringodium approximately 20%. Small patches of Halodule beaudettei are present especially in areas of regrowth. As depth increases animal burrows increase and the seagrass densities fall and *Syringodium* becomes more prevent. Between approximately 11 and 13 ft of water depth the seagrass densities fall to between 5 and 30% and by the time the water reaches 13 to 14ft the seagrass densities fall as 5% and the amount of macroalgae increases. By 15ft. there is only an occasional Thalassia shoot and macroalgae is the dominant colonizer and colonizes between 10 and 70% of the seafloor. Halimedia

is the most common algae present, also found in relatively high abundance are *Caulerpa, Udotea, Avrainvillea, Penicillus capitatus, Laurencia, Hypnea,* and *Dictyota.*

But by a depth of 15ft even the macroalgae density decreases. The system is light limited.

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 chyrsurus) 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.

Figure 1 below from their study shows the long line catch locations of sharks within the harbor.

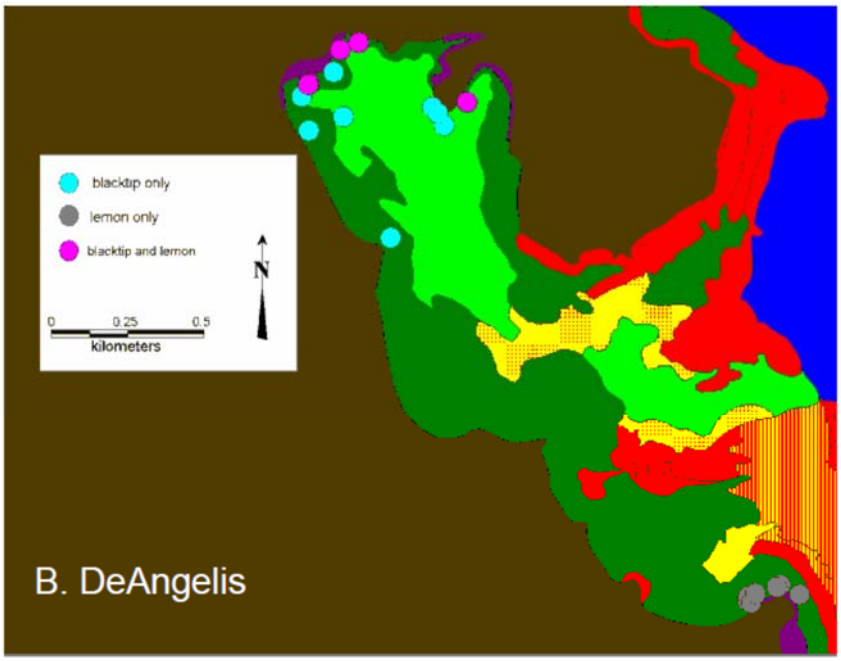


Fig. 1 Capture locations of blacktip and lemon sharks in Coral Harbor and Lagoon Point

Sea turtles were also seen during the surveys. Two small hawksbills (*Eretmochelys imbricata*) were seen while diving and 2 hawksbills were seen in the project area from the boat within the proposed marina footprint.

Surveys were done within the area in over a 5 year period and over that time the density of the seagrass in the nearshore has increased somewhat and while there are new vessel scars old vessel scars have healed and seagrass has recolonized. The habitat while highly impacted is capable of recovery if impacts and stresses are reduced.


At 13ft. algae is become the dominant species


Seagrass still covers up to 25% at 12 ft.

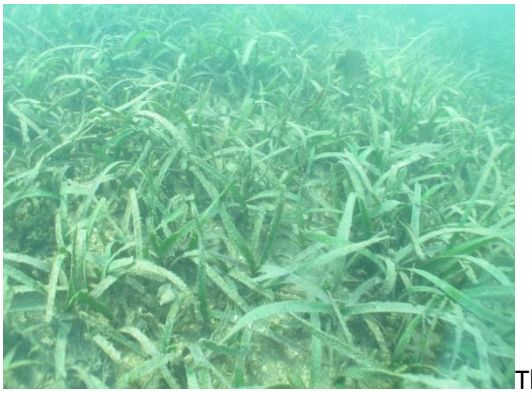

At 11 ft. the transition happens and seagrass densities start to decline

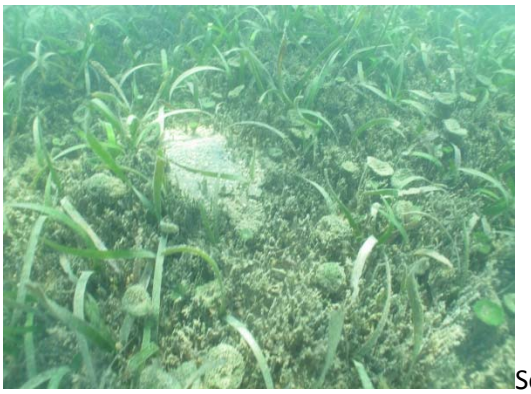

At 15ft. algal species dominate

 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


A small mooring scar


More common foot print


Debris is common

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 2500 sq. ft. due to the placement of 1333 piles ranging from 12-17" in diameters. Due to wave turbulence seagrass will also be lost surrounding the piles. The dock itself occupies 1.42 acres of which 181 sq. ft. will be over areas with seagrass and coral rubble, 1567 sq. ft. over area of sparse seagrass, 41,546.37 sq. ft over areas with 30%-100% seagrass coverage , 27,072 sq. ft. over areas with 5-30% seagrass and algae coverage and 4717 sq. ft. over areas with 5% seagrass/algae coverage. The dock will result in a shading impact of 1.42 acres and with the use of the graded decking we are assuming somewhere around a 46% survival rate based on NMFS studies or a 0.8 acre loss due to shading (Landry, 2008).

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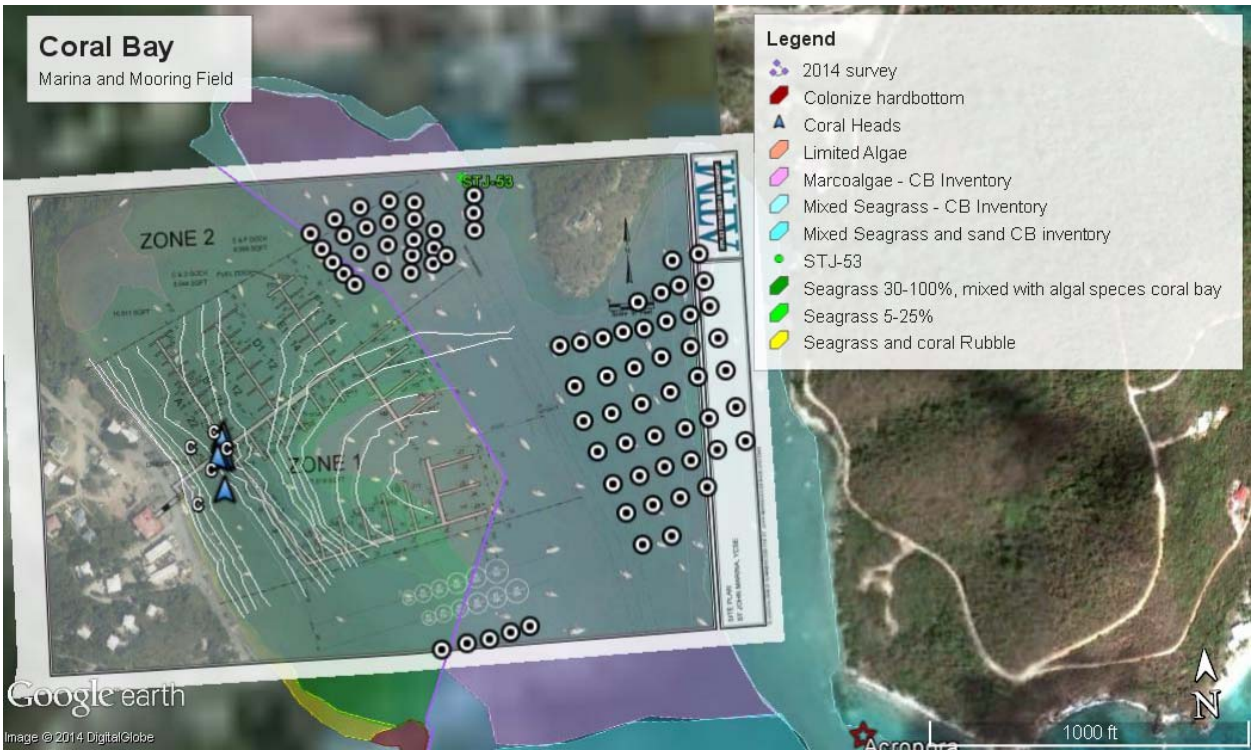

Figure 6.06.4 Impacts of marina and mooring fields.

There are currently 115 boats anchored or moored within the bay and these conservatively impact an area of between 34,500 and 46,000 sq. ft. based on their anchor drag and rope swing impacts. Many of these have both an aft and bow anchor increasing this impact.

The applicant is entering into an agreement with DPNR and will take over the management of the mooring field in cooperation with DPNR and over the next several years will organize the mooring field and replace all the anchors and moorings with properly installed moorings which will have negligible impact on the seafloor. The applicant will also be providing pump out facilities and waste receptacles which will significantly reduce the indirect impacts of these vessels. This will result in the protection of approximately 16 acres SAV and allow for the recolonization of approximately 1 acre of seagrass by removal of the inappropriate anchors.
occurs in the near shore waters.

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

PLACEMENT OF INFORMATIONAL BUOYS

The Summers End Group will be placing buoys on the locations shown in Section III above in order to protect the shallow coral and seagrass resources. These buoys will warn boats of the presence of the resources and shallow areas.

WATER SHED IMPROVEMENTS

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

Boats strike sea turtles and marine mammals, and Summers End Group will collect an additional dollar for each rental (monthly for long-term) which will be contributed to NOAA for research into ways to minimize this impact.

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 reburied and if necessary seagrass staples will be utilized.

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.

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.

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. No anchoring will be allowed in the bay. Periodic monitoring of the bay will ensure that debris is removed if it is introduced.

The applicant will also be overseeing the management of the drainage way to ensure that the impact of terrestrial runoff on the area is minimized.

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.