St. Croix East End Marine Park

Management Plan: 2016 Update

5-Year Action Plan

September, 2016, V1

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Note that positions changed and/or people migrated to other locals throughout the planning process. This information is relevant at the time of the completion of the updated draft (September, 2016).

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Executive Summary

Purpose of the Management Plan Update

This management plan contains the roadmap for effectively conserving the coastal and marine natural and cultural resources of the east end of St. Croix. In September of 2012, ten years following the original St. Croix East End Marine Park (STXEEMP) Management Plan, a review and update was begun with Department of Planning and Natural Resources (DPNR) staff, implementation partners in the Territory, and facilitators from The Nature Conservancy (TNC). This "St. Croix East End Marine Park Management Plan 2016 Update: 5-Year Action Plan" serves to examine the progress and challenges to implementation of the original 2002 management plan, and identifies new threats and opportunities for management of the St. Croix East End Marine Park (or "Park"). Key managers and experts were engaged in a series of meetings to identify the specific natural resource management targets important to the STXEEMP (coral reef communities, seagrass communities, Great Pond mangrove communities, beaches, and sea turtles), the strategies to address threats to these targets, and fundraising opportunities. The process to update this plan began with an in-depth review of the original management plan (see Appendix C, Review of 2002 Management Plan Action Progress) followed by core planning team meetings and stakeholder meetings in 2013 and 2014. The Marine Park Coordinator position was filled in 2015 and the Management Plan Update was finalized in 2016.

Since 2002, some major milestones include the installation of navigational and zoning marker buoys, development and implementation of outreach and education programs, the completion of a major watershed study, and the collection of extensive biological and benthic data within the park boundaries (Appendix C). Managers identified improved enforcement, increased community involvement and awareness of the Park, interagency collaboration, and sustainable finance as critical for the continued successful management and preservation of STXEEMP's natural resources.

It is important for regular review and modification of a marine park management plan to ensure that the territory's natural resource managers, and the community of St. Croix, understand the management authority's plans for implementation. In this regard, it is useful to reiterate the original goal of the Park and an updated mission for the management actions needed to reach that goal.

GOAL of the STXEEMP

The STXEEMP was established to protect territorially significant marine resources, promote sustainability of marine ecosystems, including coral reefs, sea grass beds, wildlife habitats and other resources, and to conserve and preserve significant natural areas for the use and benefit of future generations.

St. Croix East End Marie Park Management Plan, 2002

As the first Territorially-designated marine protected area, the STXEEMP sets an example for other protected areas in the USVI. Recognizing the critical natural and cultural resources, and their importance for both the environmental and economic sustainability of St. Croix, an updated mission for management actions taken over the next five years was developed.

MISSION of STXEEMP MANAGEMENT

To promote marine stewardship and responsible use of significant coastal and marine resources through: ***resource protection, and restoration, policy engagement, improved inter-departmental and multi-agency collaboration, and education and community engagement*** *to protect and preserve ecological and cultural values for residents and visitors.*

Developed in Core Planning Meetings

Primary Components of the Plan

STXEEMP management focuses on three principles: abating threats through management of the natural resource targets, encouraging the sustainable use of the park by locals and visitors, and taking steps towards an independent financial future.

The main elements of this updated plan to guide action for the next five years are:

The conservation **TARGETS** can be thought of as the resources important or unique to the STXEEMP that need to be protected, whether they are natural, cultural, or socio-economic in nature (Part 3). The Core Planning Team designated five targets for conservation that will be the main focus for management for the next five years:

1. Coral Reef Communities (includes lobsters, reef fish, etc.)
2. Great Pond Mangrove Communities (includes blue crabs, nursery and juvenile fish and nesting sea birds)
3. Seagrass beds (and associated species such as conch)
4. Beaches
5. Sea turtles

The **THREATS** to the targets, also considered impacts or risks, can be something that directly influences a conservation target or indirectly affects an ecological process important to sustaining the target. Understanding the threats that impact the resources forms the basis for formulating strategies and activities for the management of STXEEMP (Part 4).

STRATEGIES described in strategy action tables (Part 5) designed to meet specific, measurable, achievable, realistic, and time-bound (SMART) objectives for each strategy, the key actions to implement to meet the objectives, suggested resources needed, a rough timeline for implementation, and other considerations for planning. Priority strategies and costs are summarized in Table 3, with strategies sorted by functional management area with a timeline and costs summarized in Table 4. Strategies are divided into three main functional

areas:

- **Resource Management and Protection** (management principle #1- abating threats and management of the natural resource targets).
- **Community Outreach and Participation** (management principle #2- encouraging the sustainable use of the park by locals and visitors)
- **Sustainable Tourism and Finance** (management principle #2- encouraging the sustainable use of the park by locals and visitors and #3- and taking steps towards an independent financial future).

MONITORING of MANAGEMENT EFFECTIVENESS A fundamental aspect of adapting planning and taking action, regular monitoring of the resources that the management plan aims to protect has been planned out with notes on who, what, and when. Measure of the resources (targets) and the level and impact of the threats to those resources is described in Table 8. To help gauge overall how the STXEEMP is doing to meet its goals and mission, governance effectiveness and socio-economic measures, adapted from a guideline developed by the Ocean Conservancy in 2008, are listed in Table 9 (Part 6).

CURRENT RESEARCH and STUDIES An inventory of pertinent recent studies or monitoring should help answer what is being done, how it can help answer conservation action plan effectiveness, and should be shared when getting community input (Table 12). The update also permitted a review of the various reports, guidance, studies and assessments that have been completed recently which have direct relevance to the status and operation of the Park. A list of these supporting documents, short description, and suggestions for when and how to reference these is provided in Table 12.

Recommended near future planning and implementation:

- Develop comprehensive communications, outreach and education audience matrix to guide outreach activities. Incorporate the community outreach and development strategies (devised in this update to address threats to resources) into the audience analysis, which systematically recognizes the need, primary audience for communications and outreach, methods and materials, and desired output. Relevant reference documents, such as an inventory done of the STXEEMP education and outreach materials and activities in 2010, the VIMPAN communications plan, awareness and communications strategy for the buoys, Marine Outreach and Education U.S. Virgin Islands' Style Initiative (MOES-VI) and evaluation of the MOES-VI initiative are listed in the References in Table 12, STXEEMP-Relevant Reports and Documents.

- Implementation of Sustainable Financing with an update on current spending and financial needs. Revisit sustainable financing options on a regular basis. This should be done systematically and with input from the core planning team to lay out any progress made, identify impediments, and hash out next steps to advance sustainable financing options.

- Annual operations plan and standard operating procedures including maintenance of buoys, signs, visitors' center, vehicles, and the running of the Park office. Annual work plans with staff time, budgets derived in part from strategy tables in the Management Plan, and timelines with expected periodic review to revise next year's work plans.

- Begin comprehensive review of the 2016 Management Plan with the aim of having an updated plan by 2020. Each subsequent revision should be more refined to reflect contemporary issues and realities. Actual drafting input should diminish over time, with less extensive revisions to content. Primary review and updates should begin with the strategies.

    - Many accomplishments and ongoing projects are opportunistic and not necessarily planned. *These initiatives should be scrutinized in the same way as planned activities outlined in the management plan to gauge effectiveness in resource protection, raising awareness and community involvement, or threat abatement so that effort is not wasted in reaching the overall goals for the STXEEMP.*

List of Acronyms and Common Shorthand Found in the Strategies Tables

BMPs	Best Management Practices
CFMC	Caribbean Fisheries Management Council
CRMP	Coral Reef Conservation Program (NOAA)
CZM	Coastal Zone Management
DA	Department of Agriculture
DEE	Division of Environmental Enforcement
DEP	Division of Environmental Protection
DFW	Division of Fish and Wildlife
DOI	Department of the Interior
DPNR	Department of Planning and Natural Resources
DPW	Department of Public Works
DSPR	Department of Sports, Parks and Recreation
EbA	Ecosystem-based Adaptation
EEMP	(St. Croix) East End Marine Park, more commonly shortened to STXEEMP
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
EPSCoR	Experimental Program to Stimulate Competitive Research
ESA	Endangered Species Act
FAD	Fish Aggregating Device
GIS	Geographical Information System
GPS	Geographical Positioning System
HW	Horsely Witten Group (referred to for watershed management plan)
IUCN	International Union for Conservation of Nature and Natural Resources
LBSP	Land-based Sources of Pollution
MoA	Memorandum of Agreement
MOES-VI	Marine Outreach and Education U.S. Virgin Islands' Style
MPA	Marine Protected Area
NCCOS	National Centers for Coastal Ocean Science (NOAA)
NFWF	National Fish and Wildlife Foundation
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NPSource	Non-point sources of pollution
NRCS	Natural Resources Conservation Service
OC (or TOC)	Ocean Conservancy
PSAs	Public service announcements
Regs	Regulations (rules and regulations)
SEA	St. Croix Environmental Association
SFP	Sustainable Finance Plan
SHPO	State Historical Preservation Office
SLR	Sea Level Rise
STAR	Sea Turtle Assistance and Rescue
STXFAC	St. Croix Fishery Advisory Committee

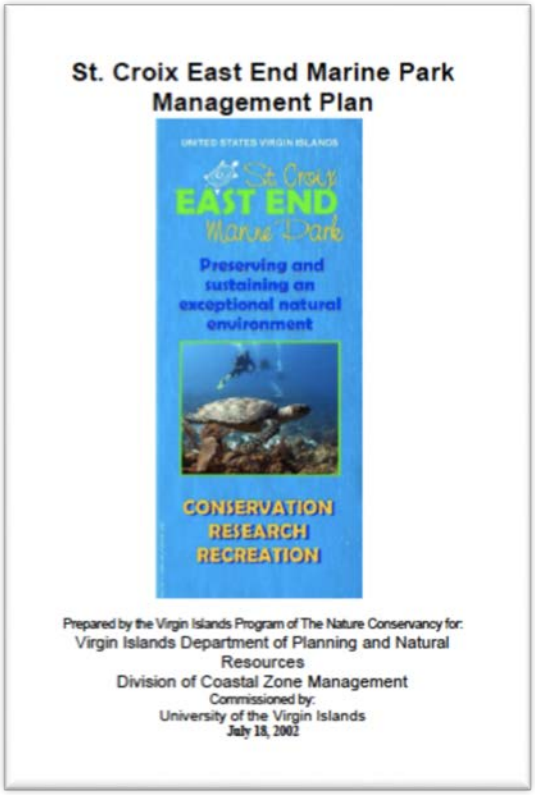
TCRMP	Territorial Coral Reef Monitoring Program
TNC	The Nature Conservancy
TSS	Total suspended sediments
USACE	US Army Corps of Engineers
USCG	US Coast Guard
USFS	US Forestry Service
USGS	US Geological Survey
USFWS	US Fish and Wildlife Service
UVI	University of Virgin Islands
VICRAG	Virgin Islands Coral Reef Advisory Group
VINE	Virgin Islands Network of Environmental Educators
VIMAS	Virgin Islands Marine Advisory Service
VIMPAN	Virgin Islands Maine Protected Area Network
VIWMA	Virgin Islands Waste Management Authority (shorthand “WM” in strategies)
VIPD	Virgin Islands Police Department
VIRC&D	Virgin Islands Resource Conservation and Development
VITEMA	Virgin Islands Territorial Emergency Management Agency
WIDECAST	Wider Caribbean Sea Turtle Conservation Network
WIMARCS	West Indian Marine Animal Research and Conservation Service

St. Croix East End Marine Park Management Plan: 2016 Update

PART 1: OVERVIEW

Introduction and Background of the 2002 and 2016 Management Plans

The St. Croix East End Marine Park (STXEEMP or Park) was created in 2003[1]. The original STXEEMP Management Plan established initial goals and management objectives for the Park (TNC 2002)[2]. The 2002 plan was used to guide implementation of management activities describing the needs and actions to help the park reach its goals. The list of priority strategies and action plans served to steer the development of proposals for funding and was a resource for operations and project implementation for over ten years. It still serves as a comprehensive reference document about the nature and purpose of the STXEEMP.



The original intent, as described in the 2002 management plan (TNC 2002, page 9) was to outline activities for a five-year time horizon. Generally, to remain relevant, protected area management action plans should undergo a review and update of management priorities every five years. This is so we may examine whether the cost and effort in

[1] The Park was established under V.I. Code Title 12, Section 903-906, formally established in Act #6572. For more detail, refer to the 2002 STXEEMP Management Plan (TNC 2002, page 8).

[2] These strategic planning methods eventually evolved to the present day Conservation Action Planning (CAP). More about the CAP process see Appendix A. For more about the original 5-S Method, see TNC 2002, page 72

implementation is, however incrementally, moving us closer to meeting our goals, allow us to adapt to changing conditions, and allow us to be iterative in the planning process in order to be more flexible and effective overall. Ideally the management actions and an updated plan should have begun in 2007. Such a periodic review for the STXEEMP was hampered by lack of resources and facilitation support, and even the minimal amount of funding needed to conduct a review was lacking. These constraints in capacity and funding were overcome by the impetus and foresight of DPNR leadership, and funding support from NOAA's Coral Reef Conservation Program and The Nature Conservancy.

This Management Plan Update of 2016 serves to examine the progress and challenges to implementation of the 2002 plan, and identifies new threats and opportunities for management of the Park. The process to update this plan began in 2012 with an in-depth review of the 2002 management plan, followed by STXEEMP core planning team meetings and stakeholder meetings in 2013 and 2014[3]. The Marine Park Coordinator position was filled in 2015 and the Management Plan was finalized in 2016.

The STXEEMP is part of the U.S. National System of marine protected areas (MPAs) and the Virgin Islands Marine Protected Area Network (VIMPAN), a joint network of MPAs formed to mutually conserve and restore marine resources for the benefit and stewardship of the USVI and future generations. In this capacity, managers have the benefit of focusing on shared goals, challenges and opportunities for all marine protected areas in the U.S. Virgin Islands. An updated and relevant management plan that guides the actions taken to meet an individual MPA's goals is a hallmark of an effective and functional MPA. The update and refinement of strategic actions for such a large and significant Territorial MPA as the STXEEMP, with a variety of conservation and recreational values, serves to collectively raise the effectiveness of the network of MPAs in the USVI and surrounding islands.

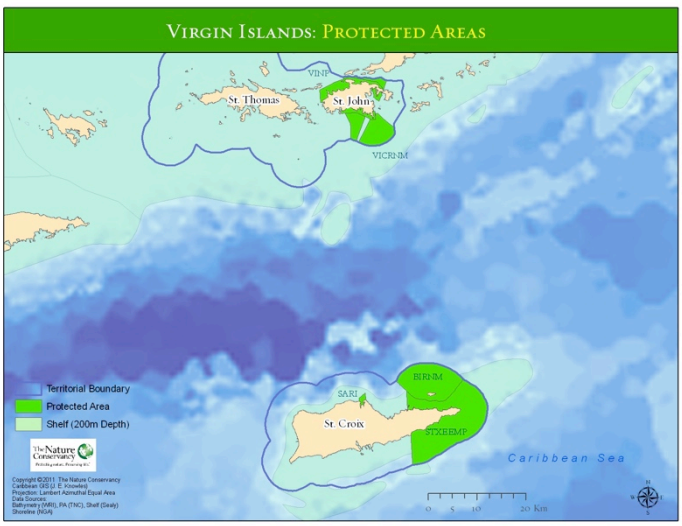


Figure 1. MPAs Belonging to the Virgin Islands Marine Protected Area Network

[3] For more information on the planning meetings, see Appendix A, and Appendix B.

Challenges and Limitations to Past Plan Implementation

During a kickoff meeting in 2012, the core planning team agreed that it was unnecessary to start from scratch in crafting the management plan, and to first conduct a review of the accomplishments of past initiatives and ongoing activities implemented by the Park staff and partners. During the review of both the 2002 STXEEMP Management Plan and the current status of management of the STXEEMP[4], it quickly became apparent that there are accomplishments that should be celebrated; however there is a staff of three-four addressing all management needs which represents a capacity challenge, even with ample partner support. The USVI capacity assessment for coral reef management (SustainaMetrix 2012) elucidates several underlying limitations for consistent review and adaptive implementation. Without regular checking-in and refinement of original action steps, the original work plan quickly became obsolete due to the realities of working within capacity and budgetary limits[5].

More broadly speaking, "Capacity to manage coral reefs in the USVI is generally not hampered by a lack of scientific and technical information regarding the status, extent, and threats to reefs, nor regarding the technical measures needed to improve reef health. Rather, capacity is limited to adequately promote, fund and implement well understood measures such as improved land management practices, the upgrading of critical infrastructure such as sewage treatment and septic systems, enhanced enforcement of existing regulation, controlling unwise development, etc." (SustainaMetrix, 2012).

The main lesson learned from this review is that management action planning is going to start out ambitiously, and that prioritizing and regularly adjusting for current situations and realities is recommended. As the capacity report suggests, "A long-term and sustained commitment to building capacity must address frequent staff turnover, shifts in the social and environmental issues, ongoing learning and the need for adaptation." (SustainaMetrix 2012). Additionally recognizing incremental accomplishments is critical. During the final stages of the review and update for the finalization of the draft in 2016, it became apparent that priority strategies devised beginning in 2012 were still relevant and progress has been incrementally made to meet several key objectives.

Intent of This Management Plan

This document is the result of a collaborative process between: natural resource managers, practitioners and staff; community members and non-governmental organizations; and Federal and

[4] Please see Appendix C, Review of 2002 Management Action Plan Progress for notes on the review of accomplishments of the 2002 with a Summary of Milestones, Ongoing Activities and Current Projects.

[5] Additional background and implementation can be found in the Capacity Assessment (SustainaMetrix 2012) and Fisheries Local Action Strategies Inventory: Overview and Section 4 (Ortiz 2014).

Territorial government staff. The aim of this process was to update the 2002 STXEEMP management plan, provide the long-term vision for the area and guide near-term (3-5 years) objectives and activities.

The intent of this document is to update rather than create a new management plan; therefore, certain details are not repeated in this document. This update was produced using a Conservation Action Planning (CAP) process, designed and implemented by The Nature Conservancy (Appendix A). CAP facilitates a stakeholder-driven process to identify goals, natural and cultural priorities, threats and strategies (TNC 2007).

This management plan is intended to describe the Park's management strategies for five years. It provides a framework to guide priority actions, and contains suggestions for which individual/organization would lead the implementation of each strategy. Specific work plans including estimated costs and budgets, timelines, and action steps should be refined as proposals are developed and specific projects initiated.

A nearly-complete set of strategic actions was formulated in 2013, and implementation was ongoing. Thus the period for this initial phase of management should be considered to be **2013-2018.** A more in-depth review and revision of this plan should be conducted sometime near the end of five years (starting in 2018-2019), to assess current priorities and threats and update management strategies. Some sections are partially complete due to either the interest of time, lack of information, unnecessary repetition from another document, or because a higher level of detail was not needed at the time.

For this iteration of the management plan, several factors should be considered:

1. Not all of the priority strategies identified can possibly be the responsibility of the STXEEMP staff, or Coastal Zone Management (CZM) alone. Thus, where possible, partners have been identified and in some cases the lead is not necessarily someone in the STXEEMP office, CZM or even DPNR. However, the STXEEMP office/CZM staff should lead *coordination* of the implementation activities, monitoring and evaluation.

2. This is a living document and changes should be made to it as needed in order to implement a truly adaptive process for STXEEMP management. The management plan should be reviewed and updated prior to the end of 2019. Interim reviews and annual work planning should be conducted to adjust priorities, adjust timelines, costs, and other details as they become known, or if priorities shift.

3. Strategies developed in this plan should serve as a good first-step guide for future work. In most cases, it is not until the specific work plan for a project or initiative is developed with a team (such as a watershed action group, for example), that the nitty-gritty work of formulating detailed actions can be completed. When developing a strategy further, such as in a proposal or for annual work-planning purposes, consider action steps that flow in a logical results-oriented, *IF-THEN* way (*IF* you do something, *THEN* something happens and the next step should follow based on incremental results) so that overall objectives are met and effectiveness can be gauged with good indicators and a plan for monitoring and evaluation.

4. *The updated management plan does not contain any new rules or regulations that do not already exist in the VI Code.* Rules and regulations for the proper use of park resources and proscribed activities allowed in certain zones are not being considered for modification at this time.

Intended Audience for the Updated Management Plan

The audience for this management plan is first and foremost the DPNR management authority, namely the Division of Coastal Zone Management. It is the responsibility of the Marine Park Coordinator, with staff of the marine park office, and the director of CZM to meet the overall goal of the STXEEMP, and this management plan update provides the blueprint for implementing activities that ultimately meet that goal. This plan should also be referred to by the organizations that are in a position to support the action steps in the strategies for the Park, which includes funders (federal or otherwise), partners who wish to support monitoring, partners than can provide technical assistance and/or who can answer research questions, and the public who have a stake in management actions and results.

These can include (but not limited to):

- DPNR divisions: CZM, Division of Fish and Wildlife (DFW), Division of Environmental Enforcement (DEE), and Division of Environmental Protection (DEP), among others.
- Other territorial government partners: VI Waste Management Authority (VIWMA), VI Police Department (VIPD), Lieutenant Governor's Office (for GIS and cadastral support), Department of Public Works (DPW), Department of Agriculture, Department of Sports, Parks and Recreation (DSPR), etc.
- St. Croix Environmental Association (SEA): partner in turtle monitoring and protection, community outreach, and watershed improvement and restoration.
- The Nature Conservancy (TNC): partner in monitoring, restoration of corals and erosion control strategies, education and outreach, turtle monitoring and protection
- Federal agencies present or active in USVI: US Fish and Wildlife Service (USFWS), National Park Service (NPS), US Coast Guard (USCG), Environmental Protection Agency (EPA), Natural Resources Conservation Service (NRCS), US Army Corps of Engineers (US ACE), etc.
- Department of Interior (DOI) such as local partners in the National Park Service, and

Department of Commerce (namely NOAA and divisions within NOAA): for funding, ecological assessments, socio-economic studies, restoration, marine debris removal, etc.

- University of the Virgin Islands (UVI), as well as other academic partners: research and monitoring, outreach.
- Local business owners: Sustainable financing mechanisms, recreational use, outreach and valuable partnerships.
- Stakeholders of STXEEMP: Members of the St. Croix community including people who live on the east end or who visit the shore and waters of the STXEEMP.

Primary Components of the Plan

STXEEMP management focuses on three principles: abating threats and management of the natural resource targets, encouraging the sustainable use of the park by locals and visitors, and taking steps towards an independent financial future.

The main elements of this updated plan to guide action for the next five years are:

The conservation **TARGETS** can be thought of as the resources important or unique to the STXEEMP that needs to be protected whether they are natural, cultural, or socio-economic. The Core Planning Team designated five targets for conservation that will main focus for management for the next five years: Great Pond mangrove communities, coral reef communities, sea turtles, beaches and seagrass communities as priority management targets (Part 3).

The **THREATS** to the targets, also considered impacts or risks, can be something that directly influences a conservation target or indirectly affects an ecological process important to sustaining the target. Knowing the threats that impact the resources forms the basis for formulating strategies and activities for the management of STXEEMP (Part 4).

STRATEGIES described in strategy action tables (Part 5) designed to meet specific, measurable, achievable, realistic, and time-bound (SMART) objectives for each strategy, the key actions to implement to meet the objectives, suggested resources needed, a rough timeline for implementation, and other considerations for planning. Priority strategies and costs are summarized in Table 3 and strategies sorted by functional management area with a timeline and costs summarized in Table 4. Strategies are divided into three main functional areas:

- **Resource Management and Protection** (management principle #1- abating threats and management of the natural resource targets).
- **Community Outreach and Participation** (management principle #2- encouraging the sustainable use of the park by locals and visitors)
- **Sustainable Tourism and Finance** (management principle #2- encouraging the sustainable use of the park by locals and visitors and #3- and taking steps towards an independent financial future).

MONITORING of MANAGEMENT EFFECTIVENESS A fundamental aspect of adapting planning and taking action, regular monitoring of the resources that the management plan aims to protect has been planned out with notes on who, what, and when. Measure of the resources (targets) and the level and impact of the threats to those resources is described in Table 8. To help gauge overall how the STXEEMP is doing to meet its goals and mission, governance effectiveness and socio-economic measures, adapted from a guideline developed by the Ocean Conservancy in 2008, are listed in Table 9 (Part 6).

CURRENT RESEARCH and STUDIES An inventory of pertinent recent studies or monitoring should help answer what is being done, how it can help answer conservation action plan effectiveness, and should be shared when getting community input (Table 12). The update also permitted a review of the various reports, guidance, studies and assessments that have been completed recently which have direct relevance to the status and operation of the Park. A list of these supporting documents, short description, and suggestions for when and how to reference these is provided in Table 12.

PART 2: GOAL & MISSION of MANAGEMENT

The goal for STXEEMP was written in the founding Act:

> **The STXEEMP was established to protect territorially significant marine resources, promote sustainability of marine ecosystems, including coral reefs, sea grass beds, wildlife habitats and other resources, and to conserve and preserve significant natural areas for the use and benefit of future generations**.
>
> - V.I. Code Title 12, Section 903-906, formally established in Act #6572

As the first territorially designated marine protected area, the STXEEMP sets an example for other protected areas in the USVI. Recognizing the critical natural and cultural resources and their importance for both the environmental and economic sustainability of St. Croix, an updated mission for management actions taken over the next five years was developed.

MISSION of the STXEEMP MANAGEMENT

To promote marine stewardship and responsible use of significant coastal and marine resources through: ***resource protection, and restoration, policy engagement, improved inter-departmental and multi-agency collaboration, and education and community engagement*** *to protect and preserve ecological and cultural values for residents and visitors.*

-Developed in Core Planning Meetings, 2013

PART 3: CONSERVATION RESOURCE TARGETS

STXEEMP's Natural Resources Targets

The STXEEMP identifies mangrove communities, coral reef communities, sea turtles, beaches and seagrass communities as priority resource management targets. The THREATS to the targets, also considered impacts or risks, can be something that directly influences a conservation target or indirectly affects an ecological process important to sustaining the target (Part 4). Knowledge of the threats that impact the resources forms the basis for formulating strategies and activities for the management of the STXEEMP (Part 5). In addition, a sense of what the current status of a target is, and the desired goal for that resource (stay the same, improve, etc.) provides the framework to formulate objectives and specific actions to meet those objectives, and the measures needed to gauge management effectiveness (Part 6).

As previously stated, the mission of the STXEEMP is to promote the responsible use and management of significant coastal and marine resources. The resources within STXEEMP that stakeholders, resource managers and experts feel are to be the primary targets of our conservation efforts were identified in a series of workshops. These "Targets" provide a basis for all subsequent planning steps, including the determination of indicators and creation of monitoring plans to gauge the effectiveness of management of STXEEMP (Part 6). Conservation targets can be thought of as the resources that are important or unique to STXEEMP that needs to be protected for their natural, cultural, or socio-economic value.

From a long list of all desired targets of protection, the top targets for protection, enhancement and restoration were determined to be:

Mangrove Communitie
Habitat for juvenile fises, lb ue crabs and marinesand terrestrial birds

Coral Reef Communitie
Habitat for notable species, incluBling lobsters, reef fis, and two threatened *Acropora* species.

Threatended & Endangered
Sea Turtles

Beaches

Seagrass Beds
Habitat for conch and a nursery for many other species

Core planning team members described the reasons these are targets for the Park (importance). Then, mindful of what each target requires to be present and to thrive (key attributes), the core planning team estimated its current condition. The team also determined a realistic desired condition for where that target should be in five to ten years.

It's important to note that several natural resource targets were considered but ultimately rejected as target for management by the STXEEMP at this time:

- **Deep sea/pelagic fisheries.** Since much of the Park encompasses the deeper waters of Lang Bank and the south shore shelf, it seems that this resource should also be a target for management by the STXEEMP. However, the core planning team decided that since fisheries are the responsibility of DFW within territorial waters as a whole, with management decisions guided by the St. Croix Fishery Advisory Committee (STXFAC), STXEEMP-specific activities will aim to complement, rather than stand alone in improving this resource. Furthermore, many of the strategies outlined in the Local Action Strategy for Fishing addresses the conditions, challenges and research questions regarding threats to this resource and effect of fishing on other conservation targets within STXEEMP (Ortiz, 2014). This target will still be under consideration when guiding studies conducted for federally-managed fisheries or those that seek to answer questions about territorial fishing and fish stocks, such as acoustic tagging done by UVI, NPS, NOAA and the University of Massachusetts. The STXEEMP will endeavor to steer those and future studies to answer Park-specific questions to improve this resource or determine ways to reduce threats to this resource.

- **Salt ponds and coastal embayments (other than Great Pond).** The core planning team decided that these resources are already protected by CZM mandate and are given special consideration during permitting and so the focus for this period of management should be on the high-value and highly threatened Great Pond mangrove communities.

Table 1. STXEEMP targets, viability and goals

Target	Importance	Current Condition	Desired Condition 5-10 yrs	Goal
Great Pond Mangrove Communities (includes sea birds and blue crabs)	Mangroves and mangrove lagoons provide a wide range of ecosystem services such as recycling nutrients, providing shoreline protection from storms, and are considered essential fish habitat (EFH) for federally managed species and critical habitat for Endangered Species Act (ESA) protected species, nesting sea birds, and in particular, juvenile fish that later inhabit coral reefs and pelagic areas.	Great Pond: **POOR**, due to Sargassum flotsam blocking the channel, low rainfall events, and increased siltation from upland erosion, there has been a precipitous decline in the extent and functionality of the mangrove lagoon.	**GOOD**	*Over the next 5 years, the STXEEMP will preserve and protect existing mangrove forests as well as restore and enhance historic mangrove lagoon at Great Pond within the Park's boundaries to increase critical habitat by 10%.*
Coral Reef Communities (includes lobster, *Acropora* spp., and reef fish)	Coral reef communities are an important reason tourists come to the VI, but they also provide food and continued livelihood for fisheries as well as storm protection for shorelines. Corals are considered EFH and ESA critical habitat.	**POOR**- Low coral cover and poor condition due to loss of herbivores, increases in algal cover, land-based sources of pollution, and thermal stress causing bleaching.	**FAIR**- Aim for greater coral cover, greater diversity in fish, higher abundance of lobsters and *Acropora* species of coral.	*Within 5- 10 years the coral reefs and ecosystem function will be improved through resource management. With our community outreach and engagement, our St. Croix community will be more aware and concerned about the health of coral reefs and the Park's biodiversity to foster a sense of stewardship among Park users.*

Target	Importance	Current Condition	Desired Condition 5-10 yrs	Goal
Seagrass Communities (includes conch)	Sea grass communities are important for their ecological services including habitat and nursery areas for many marine species including conch, and for providing critical linkages between ecosystems. They also preserve environmental quality by stabilizing sediments and reducing wave energy. Seagrasses are considered EFH and ESA critical habitat.	Some areas considered **POOR** (closer to mangroves) **FAIR** near the south shore.	**FAIR**	*Over the next 5 years, the STXEEMP will work to maintain and increase the extent of healthy seagrass habitat within the Park as measured by density, abundance, and % of seagrass free of disease covering large areas of the Park.*
Sea Turtles	Sea turtles are an important keystone species, contributing to local, national and international biodiversity and as an important component of the marine food web both as predator and prey. They possess a potential and present economic benefit, through visitor and research dollars, while providing for an enriching cultural and community experience.	**GOOD**	**GOOD**	*Over the next 5 years, the STXEEMP will work to improve nesting and foraging sea turtle habitat and improve public awareness of sea turtle nesting activity to ensure the recovery of endangered sea turtle populations in the USVI.*
Beaches	Beaches provide ESA critical habitat for turtles, sea birds and other coastal species; support tourism, recreation education and outreach while inspiring visitors and locals alike with their iconic island essence.	**GOOD** overall, but considered in **FAIR** condition because of trash loading. Potential stress is increased rate of beach erosion.	**VERY GOOD**	*Over the next five years, the STXEEMP will work toward safeguarding natural beach processes and build awareness of the ecosystem function and economic value of beaches to reduce sand mining, dumping, fire damage and vehicular use on the Park's beaches.*

The following describes the role of STXEEMP conservation targets in the ecosystem, their characteristics, status and extent, and pressures on these resources. For more comprehensive background, studies, and references, please see the original STXEEMP Management Plan from 2002.

Great Pond Mangrove Communities

Over the next 5 years, the STXEEMP will preserve and protect existing mangrove forests as well as restore and enhance historic mangrove lagoon at Great Pond within the Park's boundaries to increase critical habitat by 10%.

Mangroves and mangrove lagoons provide a wide range of ecosystem services such as recycling nutrients, providing shoreline protection from storms, and are critical habitat for ESA protected species, nesting sea birds, and juvenile fish. Mangroves are the only truly terrestrial forests to be found in the marine community, are incredibly unique, and one of the most productive ecosystems on the planet. Mangroves are salt-tolerant plants that grow along tropical and sub-tropical coasts. They require warm temperatures, calm near shore waters, and low-lying coastal land. Their unique structures serve several important roles in marine ecosystems. The dense root system, especially prevalent in the red mangroves, protects coral by filtering land-based sediment that would otherwise flow into the ocean and obstruct sunlight from reaching coral. The roots also provide nutrient-rich detritus and protection for larvae and juvenile fish, resulting in an ideal fish and shellfish breeding ground and nursery. Mangrove trees are also home to various species of birds. Furthermore, mangroves are valuable to humans, especially in times of severe weather. The roots are able to absorb high levels of wave energy; boaters often protect their boats by sheltering them within the mangroves. Mangroves also protect the land behind them from erosion and flooding. The loss of mangroves directly impacts water quality, shorelines, commercially important fish and shellfish as well as threatened and endangered bird species. The critical linkages that flow through mangrove systems intertwine the upland guts, salt ponds, and adjacent coral reefs.

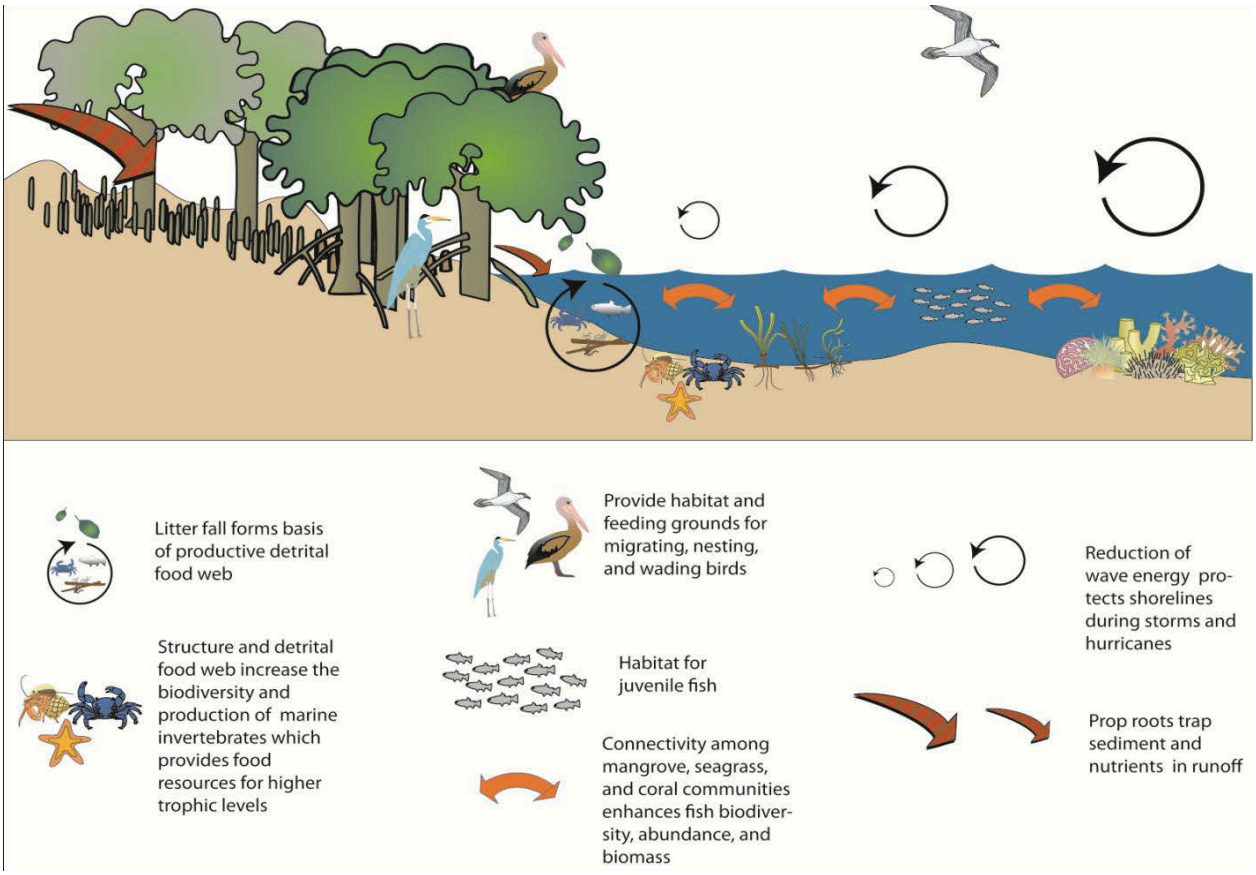


Figure 2. Diagram illustrating the importance and interconnectedness of the mangrove ecosystem with adjacent marine communities. Developed for the STEER Management Plan, 2011.

The condition of the mangrove ecosystem at Great Pond is considered **poor**, primarily because of the diminished condition of the lagoon, and more recently a significant die-off of black mangroves. The shoaling of Great Pond with sediment deposits from upland development, in conjunction with decreased flushing due to channel blockage has resulted in a shift in the structure, hydrology and benefits provided to associated species. What was once a deep pond providing nursery refuge for reef fish and commercially important pelagic fish eventually became a shallower pond where more mangroves could take root and provide a canopy for nesting and roosting birds such as the white-crowned pigeon. More mudflats formed, supporting a different assemblage of shoreline and wading birds, and blue crab. The characteristics of a fish nursery habitat, with complex root structure providing shelter, unimpeded flow to the adjacent bays, and physical parameters to support juvenile fish diminished over time. This pond is susceptible to further development impacts causing changes in hydrology, sedimentation and increased exposure to land based sources of pollution. Overall, this target is threatened by off-road vehicles damaging sensitive mud flats and perimeter vegetation, eventual sea level rise, trash and marine debris.

More recently, with a severe drought, pulse runoff events exacerbated by erosion from exposed berms of soil left from preemptive earth movement construction on the upland Golden property, in

conjunction with the eventual encroachment of mangroves and sargassum flotsam events blocking the channel on the east end of the pond, there has been a precipitous decline in the extent and functionality of the mangrove lagoon in terms of fish habitat, while at the same time, the trees that established in the last 15 or so years began to die off in October 2015 , leaving standing dead trees. Suspected hypoxic and highly saline conditions make the lagoon unsuitable habitat for juvenile and nursery fishes. There have been temperature and salinity extremes and low dissolved oxygen event causing die-offs of species such as white mullet (Toby Tobias, pers comm.).

For comparison, the following is a description of Great Pond from the 2002 Management Plan:

The most extensive mangroves within St. Croix are found in Great Pond. St. Croix once had extensive mangrove communities along its shores. After the destruction of more than 700 acres of wetland in Krause Lagoon, and the filling in of other mangrove communities, there are only three prominent mangrove tracts remaining (Island Resources Foundation 1993b). Great Pond is the only significant salt pond within the STXEEMP; but both Altoona Lagoon and Salt River should receive similar consideration in future planning efforts. In the last 20 or so years, following a gradual natural recovery from Hurricane Hugo, Great Pond occupied approximately 118 acres (48 hectares) in size, with a depth that averaged 12-20 inches (30-50 cm) and was separated from the sea to the south by a 0.6 mile (1 km) long baymouth bar, 82 to 330 feet (25 to 100 m) in width (Tobias 1998). An eroding headland to the east deposits sediments ranging from sand to cobble sized clasts on the bar (Bruce et al. 1989). Hurricane Hugo caused a shift in the vegetation on the higher elevations of the bar, from manchineel trees and upland scrub to thorn scrub, tan-tan, and sea grape (Knowles 1996). The exchange of seawater between Great Pond and Great Pond Bay is limited to a narrow channel (approx. 13 ft (4 m) wide and 5 ft (1.5 m) deep) at the southeastern corner of the pond (Tobias 1998). The saltpond was bordered on the north, east, and west by mud flats (Tobias 1998).

Most of the mangrove species within the STXEEMP occur in Great Pond, the salt pond associated with Great Pond Bay. Within the STXEEMP, mangrove communities are overwhelmingly dominated by red and black mangroves, with white mangroves, and buttonwood trees. These tree-dominated systems are found in the intertidal zone at gently sloping coastal margins, relatively buffered from extreme wave action. Wave protection is provided at times by the barrier reef, but on St. Croix, this service is primarily furnished by semi-enclosed, coastal embayments. The distribution of tree species is somewhat segregated across the intertidal zone, with red mangroves overwhelmingly dominating the lower- and mid-intertidal zones and blacks, the higher reaches (on the north, east, and south). Red mangrove islets are found in the southeastern portion of the pond (Tobias 1998). Both the red and black mangrove zones are flooded daily by the tides. Buttonwoods and white mangroves are found at the extreme, upper intertidal area, which is normally flooded only once or twice a month. Ferns and grasses are fugitive species and found only in disturbed areas in the upper reaches of the wetland. Competition for light, as is the case for terrestrial systems, is thought to exclude grass species from tree-dominated areas.

-From the 2002 STXEEMP Management Plan

The primary strategy to protect this ecosystem is to restore flow, volume, and extent of the pond. The vision for a restored pond will entail finding a balance between conserving canopy habitat for nesting and roosting birds and restoring a functional nursery for juvenile fish. First and foremost, the channel will need to be widened and deepened, with a secondary channel constructed through the bay mouth bar to the west to increase flushing.

See "Very High" priority strategy #1: Great Pond restoration in the supplemental strategies and action plan.

Coral Reef Communities

Within 5- 10 years the coral reefs and ecosystem function will be improved through resource management. With our community outreach and engagement, our St. Croix community will be more aware and concerned about the health of coral reefs and the Park's biodiversity to foster a sense of stewardship among Park users.

Coral reefs are among the most diverse ecosystems on the planet and one of the most valuable natural resources to St. Croix. This biodiversity supports important values such as fishing, tourism and coastal protection from waves and storms. An economic valuation of the reefs of the USVI estimated at $187 million per year (van Beukering, *et al*., 2011). The economic return of healthy coral reefs trickles into the community in the form of a sustained fishery ($3M), shoreline protection ($6M), amenities ($35M), recreation ($48M) and tourism ($96M).

STXEEMP has both fringing reefs and barrier reefs with the longest contiguous reef structures located on the northeastern shores. The barrier reef is easily identified from shore, with a line of waves constantly crashing over the reef crest. The characteristic structures of these reefs have changed over time, due to both anthropogenic effects and their vulnerability to hurricane damage. From the shoreline seaward, the reef type progression is as follows: within the lagoon are well-protected patch reefs and coral heads. The barrier reef runs along the coastline less than 0.5 miles off shore, with a mosaic of patch reefs scattered seaward beyond the fore reef. These patch reefs are concentrated mostly on the northeast shore of St. Croix. The linear reef is present around the tip of the East End and continues around to Isaac Bay where the barrier-like reef structures become less frequent and less contiguous in the western direction on the south shore. A submerged shallow platform known as Lang Bank, extends east from Point Udall, beyond the Park boundaries approximately 11 miles. Lang Bank is characterized by hard bottom gorgonian communities intermingled with patch reefs, sandy bottoms, and seagrass beds.

The network of habitats found within the Park shelters and supports commercially, recreationally and ecologically important species, and coral reefs form an important component of this network. The shallow waters of STXEEMP support a variety of coral species and hard-bottom benthic communities typical of the USVI and Lesser Antilles. Animals completing movements from juvenile settling habitats, such as extensive mangrove areas, to adult habitats, such as offshore reefs, use a variety of coral reef habitats within the Park. On a daily basis, fish and invertebrate species that forage in seagrass and microalgae beds at night use the reef as shelter during the daytime. Thus, coral reefs support the richness of life within the Park and the surrounding marine habitats.

Overfishing, land based sources of pollution and climate change are just some of the threats the coral reefs in the STXEEMP face. In 2005, and 2010, unprecedented warm water temperatures lead to coral bleaching and a subsequent disease outbreak that caused a 40% decrease in shallow water coral cover throughout the USVI. Corals within STXEEMP were also affected by these event(s) with losses on the order of 15% for mixed coral communities on hard bottom to over 65% following the 2005 bleaching event for coral reefs composed of dense star coral (*Montastraea* complex*)* (Smith, 2011). Superimposed on these regional stressors are the local stresses arising from land-based sources of pollution, such as sediments, to marine-based sources of pollution, such as toxins and hydrocarbons, to direct destruction of reef habitats, such as anchor damage. It is not known how fishing, a recognized disturbance to the ecology of coral reefs, affects corals in STXEEMP, as fishing is restricted and monitored at a spatial scale that would not yield this information. However, regional depletion of fisheries species may have impacts, even within marine protected area borders. Of particular concern is the reduction in number of large parrotfish and other herbivores that keep the growth of macroalgae in check, thus allowing for growth of new corals in an already-threatened ecosystem.

The primary strategies to protect coral reefs and associated communities is to directly abate the threats, reduce overfishing within the Park, and restore areas with *Acropora* species of coral along the linear and patch reefs in the STXEEMP. The vision for an improved coral reef is going to take some time, as reefs are naturally slow to respond to benefits of MPAs.

Seagrass Communities

Over the next 5 years, the STXEEMP will work to maintain and increase the extent of healthy seagrass habitat within the Park as measured by density, abundance, and percent of seagrass free of disease covering large areas of the Park.

Seagrass beds are located throughout STXEEMP (Figure 1). St. Croix has an extensive network of seagrass beds off much of the northeast and central coastline as well as off the southern coast. Seagrass beds within the Park are characterized by the habitat-forming turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoalgrass (*Halodule* spp.), and calcareous green algae (*Halimeda* spp. and *Penicillus* spp.). Seagrass beds are most prevalent in lagoon areas and play an integral role in the well-being of the STXEEMP marine ecosystems. Seagrass beds trap and stabilize sediment, resulting in better water clarity and light penetration, conditions necessary for coral reefs to flourish. Seagrass beds also preserve environmental quality by reducing wave energy. The extensive root system of seagrass beds limits erosion by holding the sand substrate together, preventing extensive shifting of sand during storms. Seagrass communities provide foraging and nursery habitat for many marine species including conch, sea turtles and reef fish, and function as a critical linkage to coral reefecosystems. Seagrass also provides important habitat and refuge from predators for juvenile reef fish. Furthermore, birds forage over seagrass beds and green sea turtles, several herbivorous fishes, echinoderms, and mollusks feed on seagrass.

The major threat to seagrass beds is direct physical damage or disturbance caused by accidental boat groundings, improper mooring design, boat anchoring in seagrass habitat and, to a lesser degree, by prop scarring from boats in the shallow waters of the Park. Anchoring within seagrass beds in particular can cause extensive damage by creating 'blowout' holes that can migrate and expand after the initial disturbance, taking years to recover. Coastal development can also have a major impact on nearshore seagrass beds, especially the construction of docks and marinas that project into the shallow waters and shade any seagrass present. Activities, such as sedimentation from land use change, that alter water quality conditions are another major threat to seagrass habitats within the STXEEMP: changes in water clarity and nutrients can favor macroalgal and epiphytic growth that reduces seagrass cover. The non-native seagrass species, *Halophila stipulacea,* which has been spreading throughout the leeward islands of the Caribbean, was recently identified in the Christiansted Harbor. The uncertainty of the extent and impact of this invasive species will be a focus for management in the coming years.

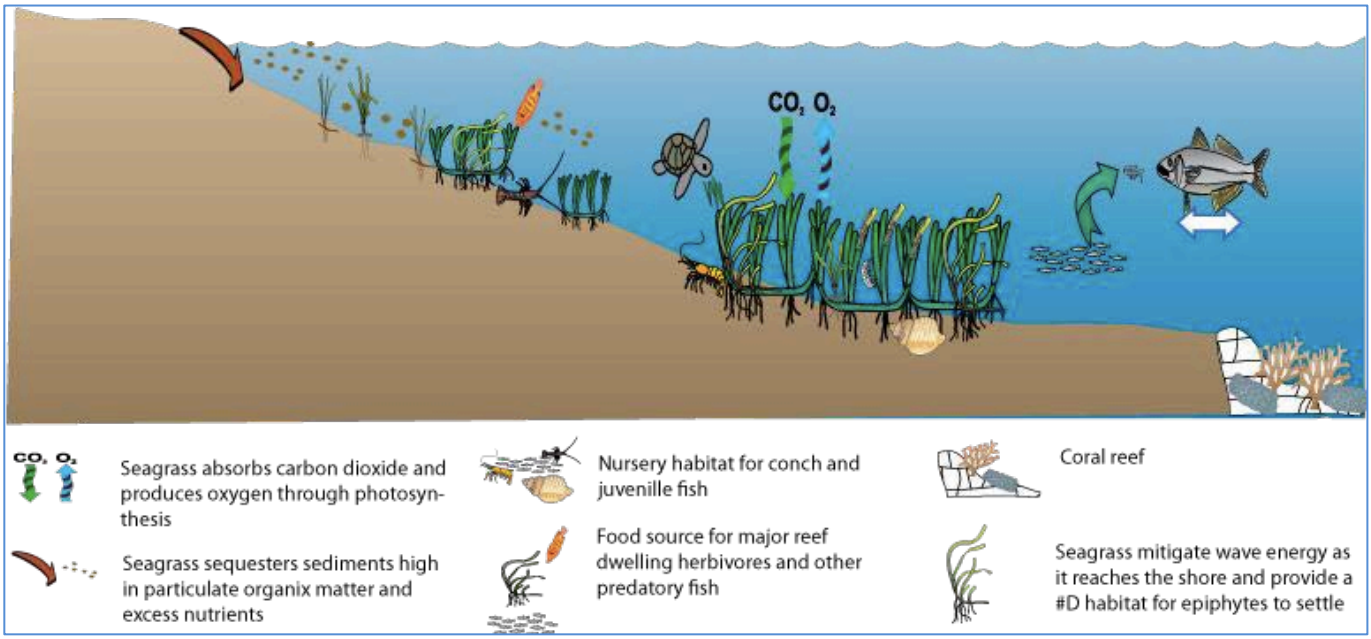


Figure 3. Diagram illustrating the importance and roles that seagrass plays in the marine ecosystem. From the STEER Management Plan, 2011

The primary strategies to protect seagrass beds are to provide alternatives to anchoring, rapid response to groundings, removal of marine debris, and reducing land-based sources of pollution.

Sea Turtles

Over the next 5 years, the STXEEMP will work to improve nesting and foraging sea turtle habitat and improve public awareness of sea turtle nesting activity to ensure the recovery of endangered sea turtle populations in the USVI.

Sea turtles are an important component in the marine food web both as predator and prey and attract both visitors and research funding. Three species can be found nesting on 17 different beaches within the STXEEMP during summer and fall. The Nature Conservancy (three beaches) and St Croix Environmental Association (one beach) each cover high-density nesting beaches within STXEEMP. These groups coordinate the patrolling, reporting, data management and response to

distressed sea turtles with the Sea Turtle Assistance and Rescue group on the island; namely with National Park Service (Buck Island) and USFWS (Sandy Point).

While sea turtles were historically of great economic importance as a food source, their place as a staple in the diet of Caribbean islanders has declined with dramatic reductions in sea turtle populations, in part due to this harvest. Six of the seven species of sea turtles are listed as threatened species by the IUCN (vulnerable to critically endangered). International treaties as well as local, provincial, and national laws provide protection to sea turtles. The Endangered Species Act of 1973 prohibits killing, harming, and harassment of six species of turtles, including the species that inhabit the beaches and waters of St. Croix. Although sea turtles spend only a small portion of their life cycle on beaches, their time there is critical to the survival of future generations of sea turtles. Green (*Chelonia mydas*) and hawksbill turtles (*Eretmochelys imbricata*) use the beaches of the park for nesting grounds. Leatherback turtles (*Dermochelys coriacea*) occasionally nest on a few of the park's northerly beaches. Researchers monitoring turtle nesting at East End Bay, Isaac Bay, and Jack Bay have recently seen an increase in the number of green turtles coming to nest, while hawksbill numbers continue to decline.

Because researchers are generally limited to data collected during nesting, very little is known about the other aspects of sea turtle movements. Their migration patterns and routes continue to be a mystery, and often scientists must rely on chance encounters to fill in these gaps in knowledge. Identifying where turtles reside when they are not nesting and mating continues to be the goal of many research efforts. It is known however, that turtles tend to mate near their nesting beaches, as well as demonstrate fidelity to the beaches from which they hatched. This is important when considering actions taken that aim to conserve turtle populations. Female turtles will nest several times during each nesting season, often returning to the same beach every time. Observations have revealed that nesting turtles remain within one mile of the beach that they are nesting on between nesting events (Z. Hillis-Starr pers. comm.). Because nesting is such a critical time in the turtle's life history, great efforts should be made to protect turtles from disturbance and injury, both in and out of the water. Known anthropogenic stresses to nesting turtles include: turtle poaching, egg poaching, nest destruction by vehicles driving over nests, and predation by introduced species (i.e., mongoose and dogs).

The primary strategies to protect sea turtles are to increase volunteer patrolling on key beaches during nesting season, to continue to educate the public about proper beach use and to continue to enforce laws and regulations that protect both nesting and foraging sea turtles.

Beaches

Over the next five years, the STXEEMP will work toward safeguarding natural beach processes and build awareness of the ecosystem function and economic value of beaches to reduce sand mining, dumping, fire damage and vehicular use on the Park's beaches.

Beaches provide critical habitat for turtles, sea birds and other coastal species. They also provide socio-economic benefits by supporting tourism, recreation, education and outreach. They are threatened primarily by the impacts of climate change, improper stormwater management, trash and development. The sandy coastline that dominates the east end varies, depending on wind and wave action. The most important beaches within the Park, in terms of habitat for nesting turtles are Chenay, East End, Jack, and Isaac Bay. These beaches serve as nesting habitat for green and hawksbill sea turtles year-round, with a peak nesting season between July and October. Although other beach profiles within the Park are amenable to sea turtle nesting, these beaches have remained the least disturbed by anthropogenic effects.

Beaches serve as the gateway to the Park. These have social, cultural and aesthetic benefits and are valued by visitors and locals alike. Not only are beaches gathering places for friends and family (especially during holy week), but convey a sense of place within the natural world. Beaches serve as settings for the guided tours provided by the Park and partners, and a launching point for budding swimmers and snorkelers who gain a greater understanding and appreciation of the coastal and marine ecosystem that surrounds them.

PART 4: THREATS to the TARGETS

Threats, also considered impacts or risks, are activities or forces that directly impacts a conservation target or indirectly affects an ecological process important to sustaining the target. Knowledge of the threats that impact the resources forms the basis for formulating strategies and management activities for the STXEEMP

Threats to conservation targets were identified by two means: first the stresses (similar to *symptoms* observed for a target, such as reduced nesting success of shore birds) were carefully considered. These stresses, the impairment or degradation of key ecological attributes of the target, were ranked based on the severity and scope of the stress. Then, the source of the symptom, or the **threat** (such as predation on sea turtle eggs and hatchlings by mongooses), was identified. These threats were ranked based on the contribution the threat had in causing stress to the target and the irreversibility of the threat. See box, below, for more information on stresses, threats and the criteria to rank these.

During the first iteration, stakeholders, resource managers and experts identified a long list of impacts to STXEEMP, including ones that were pervasive, historical, and others later determined to be minor or secondary concerns (these are not included for management now, but noted below). By using criteria-based ranking of the stresses and threats, the direct threats to targets were prioritized to direct conservation actions where they are most needed. Limited energy, resources and time force managers to choose which activities that can be undertaken to truly address critical threats.

For example, human disturbance was identified as a stressor to nesting sea turtles. This stress, and the source of the stress (the *threat* of human presence on nesting beaches), were later determined to not be a current critical threat to the sea turtles, whereas the predation of eggs and hatchlings by mongooses, dogs, and cats *is* considered a critical threat to this target. Furthermore, since other threats to sea turtles were ranked as critical, the management actions that would address these threats would at the same time reduce the incidence of human disturbance on nesting sea turtles (and their hatchlings).

Many iterations later, after considering the current critical threats to the STXEEMP targets, a list of 20 direct threats was determined. These can be grouped into five primary themes:

Fishing Impacts	Sea Turtle Poaching and Predation
Land-based Sources of Pollution	Lionfish
Climate Change: Coral Bleaching Events, Sea Level Rise, Acidification, Etc.	

These threats often impact multiple targets and threaten the long-term viability of resources. The core planning team ranked threats based on factors of prevalence, irreversibility, and the severity of impact to identify the primary threats facing the management targets.

The following threat matrix (*Table 2*), demonstrates ranking of stresses to targets, and shows how overall impacts to resources elevate targets to require the most attention for conservation, protection or restoration (e.g., the coral reef community), or abatement of critical threats (e.g., land-based pollution). Threats are ranked in the matrix based on existing 2012-2016 knowledge and science. The threats will be reevaluated and revised in the future according to new information and changing conditions.

Table 2. Target and threat ranking matrix

Targets --> Threats	Coral Reef Community	Seagrass Community	Sea Turtles	Great Pond Mangrove Communities	Beaches	Summary Threat Rating
Overfishing	Very High	High				High
Illegal Fishing	High	High				High
Thermal stress bleaching	Very High					High
Poaching adult turtles			Very High			High
Lionfish	Very High					High
Sedimentation/ Sargassum/ mangrove expansion (loss of lagoonal area)				Very High		High
Land Based Sources of Pollution	High	Medium		Medium		High
Sea Turtles: Invasive predators- hatchlings			High			Medium
Sea Turtles: Invasive Predators eggs			High			Medium
Oil Spill	High		Not Specified	Not Specified	Not Specified	Medium
Sea Level Rise				Medium	High	Medium
Fishing gear impacting reefs and seagrass beds	Low	Low				Low
People touching corals	Low					Low
Groundings	Low					Low
Human Disturbance			Low			Low
Trash				Medium	Low	Low
Sea Turtles-Poaching eggs			Medium			Low

Fires			Low		Low	Low
Vehicles			Low	Not Specified	Medium	Low
Marine Debris			Not Specified	Not Specified	Low	Low
Anchoring/Blow Outs	Low	Medium				Low
Erosion of exposed soils					Low	Low
Summary Target Ratings:	Very High	High	High	High	Medium	Very High

This list of threats should be reviewed periodically to reassess the level of threat and when identifying emerging threats. For example, the non-native seagrass species, *Halophila stipulacea,* which has been spreading throughout the leeward islands of the Caribbean, was recently identified in the Christiansted Harbor. The uncertainty of the extent and impact of this invasive species will be a focus for management in the coming years.

Several threats were identified to be suspected threats to the resources based on anecdotal information, but the level of threat could not be specified and therefore these are not ranked. All threats identified during the 2012-2016 CAP process have been recorded so that during later review and assessment of management activities, these threats can be considered for future action if still applicable or not otherwise addressed in the strategies implemented in this period of management:

- Climate change: ocean acidification
- Pollution from ballast water
- Boat strikes on turtles- a known occurrence, but unknown extent within STXEEMP or overall impacts to the turtles within STXEEMP.
- An *increase* of impervious surfaces contributing to volume and velocity of runoff- otherwise covered in land-based sources of pollution and the strategies developed to address runoff.

PART 5: STRATEGIES

Strategy Development

The CAP process helped to develop STRATEGIES to abate these threats or to restore a targeted resource. Based on target viability and threat severity, management and conservation strategies were developed by partners and stakeholders to reduce the threats. The objectives, strategies and action steps form the basis of implementation. Developing these items required significant time and input from partners and stakeholders, because they require the most detail and are the most important components of the plan for guiding actions, funding, and monitoring.

Participants in the CAP process developed objectives, strategies and action steps to address the critical threats. *This is one of the most critical sections of the management plan and will guide activities undertaken in the next 1-2 critical years of early implementation as well as longer-term (5 year) intentions for conservation.*

The **objective** is a specific statement that details the desired accomplishments or outcomes of a particular set of activities within a project, typically set for *abatement of critical threats* and for *restoration of degraded key ecological attributes*. Core questions asked were, "What do we need to accomplish?" and, "How will our objective affect the given threat?"

The objectives then led us to **strategies** for STXEEMP. A conservation strategy is a broad course of action intended to achieve a specific objective (outcome) that abates a threat, and/or enhances the viability of a conservation target. A strategy will include the activities required to accomplish each

The objectives were written to be SMART which guides us into an implementation plan for the next five years.

SPECIFIC (What area? What targets will this benefit? Focus on linkage to a specific threat.)

MEASUREABLE (How will we know that we've reached our objective?)

ACHIEVABLE, REALISTIC (Within capacity and our timeframe?)

RESULTS ORIENTED (Success! Gets us to the desired status and rating for the target and improves the target)

TIME-BOUND (establishes 5 years to start to show progress. Can also suggest an objective of longer-term viability to reach by 5-40 yrs.)

objective, and the specific **action steps** required to complete each strategic action. Core questions asked to determine what our strategies should be were, "What is the most effective way to achieve the results we stated in our objective?" What is the most effective way to abate this threat (threat = source + stresses it causes) or multiple threats?" and "Will the strategic actions accomplish the objective?"

In some cases, strategies or action steps were considered well before an objective was formulated. In this case, the group determined if such strategies would still get us where we needed to be with a target, and could we develop a SMART objective (see box, above) to guide us.

*An **OBJECTIVE** is where you want to be.*
*A **STRATEGY** is how you will get there.*

The strategies are presented as a supplemental materials document in tables in priority order from highest to lowest priority within their respective functional areas (resource management and protection / community outreach and participation / sustainable tourism and financing). The prioritization was developed in consultation with core planning team members based on impact, cost, and feasibility ranking.

Strategies are prioritized as:

- **Very High** priorities (red shading.) These need to happen- either to address a highly-ranked threat, because the Park relies on the strategy to be successful, or the target is most in peril. These should be given the most time and energy to accomplish, as they are either strategies that will have the greatest impact, and/or require significant resources (financing, planning, personnel, coordination) to complete. These were given very high priority ranking either because the impact would be greatest (even if feasibility was low), or it would be relatively easy to implement with a relatively high benefit.

- **High** priorities (yellow shading). Strategies in this category are also considered important for the protection of resources or for abating threats, but were not ranked as high either because of an overall lower beneficial result, or because feasibility of implementation was low. These are sometimes given high ranking because there is a need for it to happen for other steps to occur or management was going to do this anyway. Often, funding and personnel are already in place for these strategies.

- **Medium** (light green shading). There strategies might be regarded as important to the community, but do not address a high threat. These strategies should be relatively easy to implement, but should not take away from the efforts of the higher-ranked strategies. These can be done with community support, volunteerism, partnership, and with minimum funding or opportunistic resourcing.

- **Low** (dark green shading). These strategies can happen later (check back in two years). If these strategies are pursued, they should occur at very little cost to the time of staff and partners. These strategies can be revisited periodically to determine if implementation is feasible or if the need to implement has been elevated (such as if certain mechanisms are in place to raise Park revenue via a fee collection and accounting system).

STXEEMP management focuses on three principles: abating threats and management of the natural resource targets, encouraging the sustainable use of the park by locals and visitors, and taking steps towards an independent financial future. The STXEEMP identifies mangrove communities, coral reef communities, sea turtles, beaches and seagrass communities as priority management targets (see Targets, Part 3).

Some key strategies include:

- Increased coordination of permitting, regulation and enforcement of non-point and point-source pollution and coastal development to prevent habitat loss and sedimentation.
- Improving coordination of the patrol and monitoring of nesting sea turtles and hatchlings.
- Improved watershed and stormwater management (i.e. pave dirt roads, improve ghuts and drainage basins).
- Community outreach and increased participation in management.
- Creation of a moorings program within STXEEMP
- Great Pond restoration activities.
- Sustainable financing, in part through sustainable tourism activities.

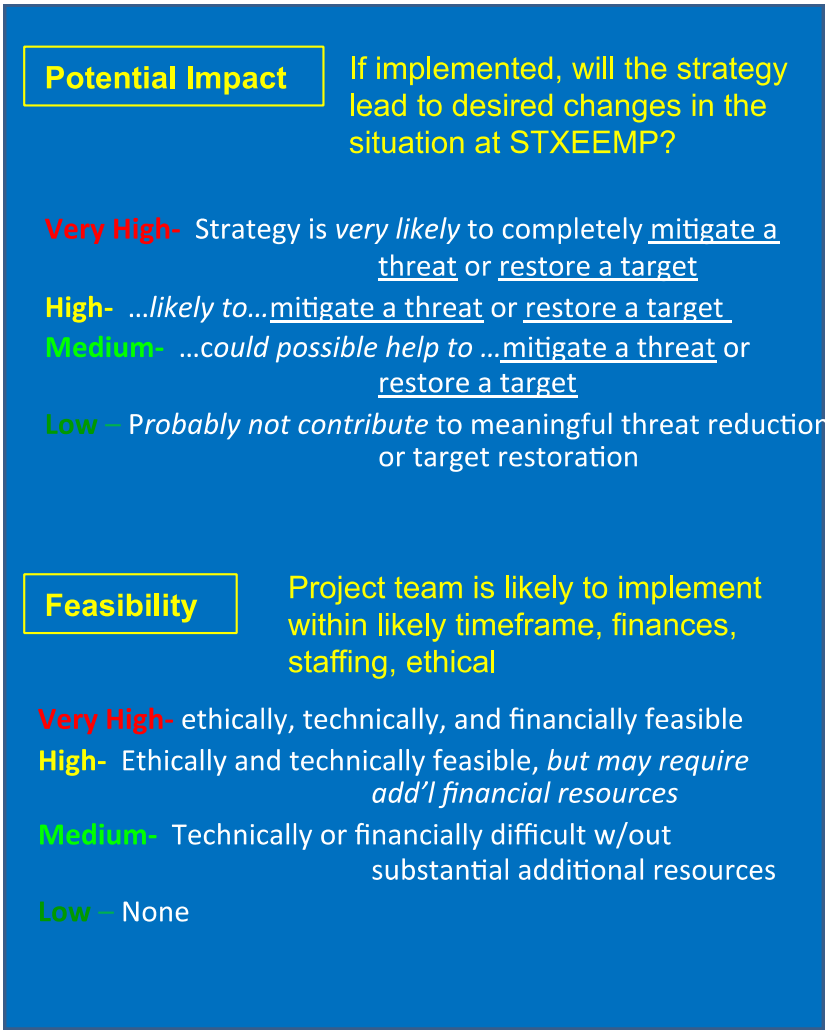


Table 3. STXEEMP management functional areas, strategies and costs

Functional Areas	Strategies	Costs (Estimated over 5 years)
Resource Management and Protection	12 strategies	$1,517,000-$2,106,000
Community Outreach and Participation	5 strategies	$36,000+
Sustainable Tourism and Finance	2 strategies	$560,000+
TOTAL over 5 years to implement strategies (not including monitoring & research, staffing, operations, facilities and maintenance) = $2,112,000 (minimum)		

Strategies for Resources Management and Protection

In total, there are twelve strategies that are categorized as resource management and protection-focused. A summary of the strategies for resources management and protection follows. More detail can be found in the strategies tables in the supplemental "STXEEMP Strategies 2016.pdf".

Table 4. Resource Management and Protection Strategies Timeline and Estimated Costs. Costs are reflective

of estimates over the five-year management cycle.

Functional Area	Priority	Strategy	2016	2017	2018	2019	2020	Estimated Costs
RESOURCE MANAGEMENT AND PROTECTION	VERY HIGH	Great Pond Restoration Phase 1; study						$140,000
		Great Pond Restoration Phase 2; engineering plans						$20,000
		Great Pond Restoration Phase 3; restoration						$400,000
		Great Pond Restoration Phase 4; wildlife enhancement						$100,000
		Restoration of Reef-forming Stony Coral (*Acropora*)						$50K-$100,000 (TNC)
		Day Use Moorings						$50,000-$150,000
		Address Dirt Roads						$50,000-$500,000
		Increase Effectiveness of Prosecutions						$500-$1500
		Increase Effectiveness of Enforcement						$200,000
		(Estimated costs for very high priority strategies: $1,010,500-$1,612,000)						
	HIGH	Watershed Activities						$250,000
		Ghut Restoration						$250,000
		Sea Turtle Citizen Science Day Patrol						$5,000
		Lionfish Hunting						$300
		Lionfish Derbies						$1,000
		Public notice of infractions						minimal
		(Estimated costs for high priority strategies: $506,000)						
Total expected costs for Resource Management and Protection (range over five years)								$1,516,800-$2,118,000

Conservation Target Restoration

Restoration of two of the targets, the Great Pond mangrove community and the fringing reefs, will supplement other resource management and protection strategies to reduce threats and improve the resource. A major restoration initiative will aim to restore the functionality of Great Pond, namely the shallow water nursery for juvenile fishes. This is currently listed as the first strategy and will be a multi-year, multi-agency and community effort requiring considerable coordination, proposal development, and resources to implement.

The other is with partnership from The Nature Conservancy on St. Croix to outplant nursery-grown *Acropora palmata* and *A. cervicornis* at selected sites that have a high potential to be resilient, or to increase resiliency, of the shallow water linear and patch reefs in the nearshore area of the Park. These fast-growing, high relief species are threatened, but also have the most potential to restore structure to shallow reefs, provide suitable habitat for reef fishes, and reduce wave action from storm swells and waves.

Habitat and Species Protection

Park strategies to prepare a rapid response to groundings, provide alternatives to anchoring, remove derelict vessels and other marine debris will further protect coral reefs and seagrass beds within the Park. The Park will aim to maintain low-impact access while drawing access away from sensitive areas, and encouraging and incentivizing sustainable use of shoreline areas; there is overlap with community outreach and participation strategies, below. Education and outreach activities will work to prevent future groundings, anchoring, discarding of marine debris, and unsustainable use, which will complement these strategies.

There are several entities on St. Croix that have been active in sea turtle conservation. The coordination of these groups within STAR to pool resources (trainings, data management, volunteer support base), to coordinate response, evaluate effectiveness, and to share best practices is a key tenet in the sea turtle strategies described in this plan. In conjunction with NPS, USFWS and others in STAR, SEA and TNC will lead efforts to make sure critical beaches are patrolled during nesting, and that there is a continued campaign to raise awareness and support for these efforts, to inform the public about the importance of proper beach and near shore activities.

Watershed Management

The watershed management plan for the park, developed in 2011by the Horsely Witten Group serves to guide the watershed activities to reduce stormwater runoff and restore sensitive habitat within the Park (Horsley Witten, 2011). As part of the CAP process, priority strategies emerged in this regard; to reduce the erosion of the Green Cay Ghut (on the Adams property upslope of Chenay Bay), and pave dirt roads that contribute significantly to sedimentation within the adjacent bays. This latter has been considered cost prohibitive, but will continue to be a priority activity the Park will promote while steering any paving projects to the more erosion-prone hills as the opportunities arise. The other priorities developed in the watershed management plan, such as installation and maintenance of stormwater runoff BMPs such as culverts, swales, and rain gardens, will be periodically reviewed to see if there is a role the Park can play to implement, but overall these will be initiatives not specified in the management plan. The CZM Watershed Coordinator will play an overall role to coordinate implementation of best management practices in construction, infrastructure and watershed restoration across departments and agencies. The Friends of STXEEMP will continue the education and outreach. Community involvement is a critical aspect of watershed protection.

Enforcement

A primary strategy and component of the management plan is to improve enforcement of the existing Park zones and coastal rules and regulations. With rules enforceable only since 2011 (following installation of zone marker buoys), first action steps include communicating a better understanding of the benefits of the regulations, improving effectiveness of enforcement and

compliance, and how the zones are impacting users of the Park. A human use study conducted by TNC in 2015, Geographic Consulting's user survey in 2011, and records kept by part staff will serve to determine the patterns of use and inappropriate behavior within the Park. DPNR is commissioning a study to determine efficiency of environmental enforcement Territory-wide, with recommendations for training and resources provided as a follow-up.

Enforcement of STXEEMP rules and regulations is critical for a functional marine protected area. Successful law enforcement will encourage compliance and is necessary to achieve the goals of the STXEEMP. Prevention is often the most effective way to achieve compliance and can be accomplished through outreach and education as well as frequent patrolling both on land and by sea. Effective enforcement depends on interagency cooperation (e.g. STXEEMP/CZM staff, DEE officers and staff, in some cases, NOAA Office of Law Enforcement, and the judicial system) rapid response times, administrative support, and good outreach and education programs about the rules and regulations of the park.

Some of the specific enforcement strategies include:

- Providing prominent signage, in conjunction with regular education and outreach to inform the users and the public of the rules and regulations specific to the Park and to coastal and marine areas in general.
- Completing an evaluation of environmental enforcement capacity and addressing those gaps with training and resources to fill the gaps.
- Improved coordination and inter-agency support (e.g. . dedication of a full time enforcement officer, strengthening interagency agreements and communications protocol-such as with VIPD and US Coast Guard, fines collected for infractions within the Park returning to Park budget).
- Improving effectiveness of prosecutions.
- Ensuring a Territorial recreational fishing license (should there be one) is complementary to Park's rules and regulations.

Strategies for Community Participation and Outreach

This set of strategies aims to inspire the community to support and be involved with certain STXEEMP management activities through community engagement opportunities, educational activities, and a variety of communication strategies. During the step-wise development of action steps for the protection of resource management, abatement of threats, and sustainable financing, several community development and outreach priorities emerged. These included the installment of informational signage about the Park and sea turtles, boater outreach, and user access (see below). In addition to the strategies specifically defined for resource management and sustainable financing, there are many other facets of outreach which engage the public (residents and visitors) in Park activities and increase awareness and compliance overall.

Current Community Outreach and Participation

The STXEEMP has a variety of ongoing activities to engage the community of St. Croix. These programs include the summer EcoCamp program, travelling Ecovan, classroom visits, and bayside tours. The STXEEMP participates in a variety of island events hosted by other organizations such as the annual Agricultural Fair (USVI Department of Agriculture), Eco Fair (SEA), to educate the public about the Park in particular, and marine and coastal resources in general. A supporting and congruent initiative, Marine Outreach and Education USVI (MOES-VI) initiative, has developed a host of projects that support the STXEEMP, such as the Don't Stop Talking Fish cultural event (held in 2014). Additionally, the Friends of STXEEMP support the Park as a non-governmental partner of DPNR that can assist with outreach and citizen science programs and sustainable financing for the STXEEMP.

The Friends of STXEEMP is a not-for-profit 501 c(3) organization dedicated to supporting the programs and mission of the STXEEMP by promoting responsible recreation, enhancing community outreach and education, and improving compliance within the East End watersheds. The Friends seek to conserve and manage the valuable, and vulnerable, marine ecosystems of today for tomorrow by supporting the overall goal of the STXEEMP.

Friends' initiatives are focused on supporting existing projects and partners, with the expectation of expansion to include new projects and partners in the future.

Examples of current projects include:

- A signage campaign at STXEEMP bay entrances that encourage certain activities (e.g. snorkeling) and behaviors (e.g. trash removal) and discourage others (e.g. fishing in no-take zones, taking shells and corals);
- Extension of the SEA turtle nest patrol program to include more STXEEMP beaches; and
- collaborating with the island's recreational dive community (CRABBS and CORE) to increase the park's in-water capacity and recreational interest in park waters (e.g. derelict boat assessments, lionfish density assessments).

Examples of expected future initiatives include:

- Collaboration with The Nature Conservancy on coral nurseries and outplant sites within the

Park; and

- Collaboration with the Boy Scouts to carry out Sandwatch beach profile assessments, to monitor erosion and accretion of beaches on the park boundary. This data will be especially significant on turtle nesting beaches, to determine the vulnerability of certain nesting areas and identify nests that may require excavation and relocation interventions for survival.

These initiatives will be outlined in a separate strategy development plan for the Friends.

There are six recommended Strategies for Community Outreach and Participation that range from signage to public access.

Table 5. Community Outreach and Participation Strategies Timeline and Estimated Costs

Functional Area	Priority	Strategy	2016	2017	2018	2019	2020	Estimated Costs
COMM. Outreach & Participation		Place signs near major access points and highly used beaches						$4,000
		PSA campaign and signage to discourage sea turtle poaching						$2,000
		Improve Public Access Points						$10,000
		Establish Low-Impact Public Access at Great Pond						$10,000
		Coral Bleachwatch						$10,000
Total expected costs for Community Development and Outreach (range/over five years)								$36,000

Informational Signage

As a means to inform the public of the importance of the Park, make people aware of the rules and regulations, and encourage proper use and visitation, signs will be installed at key access and viewing locations throughout the park. In addition to an upcoming revamp, there is specific need to have a uniform message about sea turtles, watershed protection, and fishing rules and regulations.

User Access

This strategy addresses two issues: the maintenance of traditional access points for fishermen's' plots within the Park (Turner's Hole, Grapetree Bay and Solitude Bay), and providing access to bays in a safe, low-impact way. This will entail addressing entry points so that traffic does not cross sensitive habitats (such as at mud-flats and buffer areas around Great Pond), providing adequate parking, and restricting vehicular access on the short tracks to bays that are prone to coastal erosion.

Watershed Stewardship

Engaging communities who live in the east end is the surest way to build support of, and ensure participation in neighborhood efforts to reduce stormwater runoff into the coastal areas of STXEEMP. In lieu of a limitless budget to implement watershed activities within the Park, a stepwise, incremental approach capitalizes on the energy and resources of direct stakeholders in the park. Furthermore, for the priority watershed protection strategies that will be undertaken in this management period, community involvement and outreach will be critical for the continued success of this project and support for similar projects in the future.

Education and Outreach for Boaters

Strategies in this topic directly supplement enforcement, signage, installation of buoys, and conflict resolution between recreational and commercial interests in the Park. This strategy will be further developed with an audience analysis for a communications, education and outreach program. The strategies that were developed in this management plan update that relate to education and outreach should be a useful start to mapping out action steps (Appendix E).

Future Activities Needed:

- Develop a STXEEMP specific communication, outreach and education (COE) audience and message matrix using existing tools and reports (e.g. VIMPAN Communications Plan, MOES-VI COE plan), to include a social media component; identify target audiences and appropriate COE tools, mechanisms and activities.
- Provide UVI internships to expose young Crucian professionals to the variety of environmental conservation fields beyond marine biology;
- Create opportunities to enlist volunteers in habitat protection and restoration activities such as replanting shoreline vegetation to prevent erosion and sedimentation of coastal waters;
- Develop and implement citizen science and community awareness building and engagement opportunities complimentary to the mission of the STXEEMP visitor center, outdoor classroom and Eco-camp. Include coral bleaching monitoring and Sandwatch beach profile monitoring with local school and community groups;
- Bridge interagency communication gaps, e.g. recommend DPNR inter-division staff meetings monthly or quarterly, newsletters, listservs, etc.
- Host research seminars/webinars for the public/managers when new studies have been conducted within the park and relevant to the park.

Strategies for Sustainable Tourism and Finance

Management of the STXEEMP has faced many challenges, including limitations of financial and human resources. One tool to assist in financial and management planning for protected areas is a Sustainable Finance Plan (SFP), written for the Park in 2010 (Sector, 2010). The SFP uses business planning methodology, adapted for protected areas, to address structural questions and lays the foundation for achieving financial sustainability. The plan identifies the operational and investment needs of the STXEEMP, the historical and current funding resources and the financial gap, and proposes a portfolio of financial mechanisms to fund the gap. The plan also highlights the challenges to implementation and provides a five-year action plan to use as a guide to implementation. Although the specific financial information is now over five years old, the basic recommendations made in this plan are still relevant.

The cost of managing and conserving the natural resources and ecosystem services of the STXEEMP is significant but the current financial gap is manageable with the support of the residents of and visitors to St. Croix. A partial estimate of the ecosystem services and tourism provided by the coral reef and seagrass beds within STXEEMP can be valued at $41 million per year, making this an important area to conserve for the benefit and enjoyment of future generations.

In 2010, the average funding for the park amounted to $340,000 per year and came mainly from Federal funding sources. Much of this funding is for staff positions. The average figure includes two years in which funds totaled almost half that amount due to human resource limitations resulting in challenges in implementing project activities. This caused the STXEEMP to return funds to the Federal government. The recurrent critical financial need of the STXEEMP amount to $633,000, and increases to $734,000 at the optimal level. The resulting financial gap is $230,000 and $340,000 respectively. If investment needs are included, then the financial gap increases to $318,000 at the critical level and $447,000 at the optimal level. It must be noted that recurrent costs are on an annual basis whereas investment costs would be phased in over several years.

The primary sources of funding are rotating federal grants to the Territory, universities, or non-governmental organization partners working in STXEEMP, or through projects conducted by the National Oceanic and Atmospheric Administration or jointly by National Park Service for Buck Island National Monument. The strategy to fill the financial gap identified a variety of financial mechanisms including tours, mooring fees, concessions, special events and private donations as well as the potential in the future for a territory-wide environmental entrance fee for all tourists. Funds raised could pass through a Protected Area Trust, which could also generate funds in a more stable way through its endowment. The implementation of these types of financial mechanisms requires strong political will and community support. In the meantime, the Friends of the East End Marine Park serve a role for providing supplementary income and community support for the Park.

There is some skepticism from stakeholders on the government's ability to effectively manage protected areas and use funds efficiently. The STXEEMP has faced many challenges in hiring staff due to the complex and lengthy governmental hiring process. These challenges and the public's perception hinder the ability of the park to raise funds. It is recommended that a semi-autonomous body be established to manage the territorial marine and terrestrial parks within a territorial system of protected areas. This entity would have its own expenditure line in the USVI budget and would

manage its funds independently of DPNR. It would have its own system of hiring staff. This would increase efficiency, enable a more comprehensive management system and allow for a more balanced distribution of funds raised for conservation throughout the territory.

The cost is considerable but the value of the marine resources that will be better protected is immense as is the importance of the goods and services that will continue to be provided by nature.

Sustainable Financing Strategies

The Core Planning team developed several strategies that would address the sustainable funding shortfall and to implement some of the major recommendations that emerged from the Sustainable Finance Plan. Strategies to develop a fee structure, protected area trust to manage the conservation funds, and a concessionaire program will be revisited at another time when circumstance allows.

Sustainable Tourism

The luxurious beaches and coastlines of STXEEMP are favored sites for snorkeling and water sports, for both residents and visitors, particularly at Chenay Bay, Coakley Bay, Cramers Park, and Turner Hole. An active recreational water sports community partakes in windsurfing, kite boarding, kayaking, and sailing from public beach access points and swimming areas located at condo and hotel locations such as at the Divi Carina Bay Hotel. In addition, visitors engage in sightseeing excursions on both motor boats and sailing vessels. Bait fishing, hook and line as well as sport fishing are prohibited in most zones or otherwise require DPNR permits.

The marine park office, located at Great Pond, has space groomed for a visitor's welcome center. Following the installation of communications and education modules, the visitors' center will have a rollout of 2017.

Table 6. Sustainable Financing and Tourism Strategies Timeline and Costs

SUSTAINABLE TOURISM and FINANCE	Visitors center + marketing campaign + facilities	$550,000
	Underwater sculpture garden	$10,000+
	Create a bus tour that will bring visitors to the East end of the Park (Jack's and Isaac's)	
	Boat entrance fee, create system so that park fines return directly to park budget	
	Install dive moorings	
Total expected costs for Sustainable Tourism/ Finance Development (range/over five years)		$560,000

Strategies That Were Considered but Not Included in This Plan

The above table does not include five strategies deemed to be more of a territorial initiative with implications for STXEEMP. The following are abbreviated strategies tables that do not include detailed suggested action steps, leads, timeline, outputs, etc. The STXEEMP has a stake in the advancement of these initiatives but does not have authority or capacity to implement without significant buy-in from other agencies. These territorial-focused strategies are summarized below (Table 7). For more detail, see STXEEMP Strategies on file with STXEEMP office.

Several ideas surfaced in first rounds of strategy development to address threats, target enhancement goals, or to improve visitation and appreciation of the Park:

- Create a visitor bus tour of the Park and install dive moorings: Both were considered not worth the effort for the current low level of interest. At some point when it seems there would be greater interest, a feasibility study should be conducted to determine best sites for each.

- Blue Flag Beaches & Marinas: this is advancing independently of the STXEEMP management. Case in point: in September 2016, the Green Cay Marina was awarded Blue Flag status. Nonetheless, a continued partnership with Blue Flag committee would be valuable and beneficial for meeting outreach and education objectives.

These will be revisited occasionally to determine if effort should be made to develop these further into strategies.

Table 7. Territory Strategies that would have a STXEEMP Focus

Territory or St. Croix strategies as they pertain to STXEEMP (might require checking in or coordination for STXEEMP)

	"Very High" Priority Strategies:
	SUSTAINABLE TOURISM and FINANCE: Structure for Sustainable Financing
	STRATEGY: Develop the structure for raising, receiving, tracking and spending revenue for the Park
	OBJECTIVE To develop the structure to receive fees, fines, raise funds from sustainable finance mechanisms by the end of the five-year management cycle.

	"High" Priority Strategies:
1	**RESOURCE MANAGEMENT and PROTECTION: Recreational Fishing license within STXEEMP**
	TARGETS: Coral reefs, seagrass beds **MAJOR THREAT**: Overfishing, illegal fishing, no management of recreational fishing, shoreline take
	STRATEGY: Create licensing program for shoreline, recreational fishers
	OBJECTIVE 1. Increase compliance of fisheries and park regulations, increase revenue

2	**RESOURCE MANAGEMENT and PROTECTION: Grounding Response and Debris Removal**
	TARGETS: Seagrass beds and coral reefs MAJOR THREAT: Groundings, derelict vessels, marine trash and debris **STRATEGY: Train in response, develop park vessel removal policy to increase efficiency** **OBJECTIVE** Develop relationships with other agencies and a chain of command-phone tree for incidents
3	**RESOURCE MANAGEMENT and PROTECTION: Sea Turtle Data Collection Coordination and Collaboration**
	TARGETS: Sea turtles **ISSUE:** Lack of cohesiveness in data collection, little data sharing **STRATEGY: Adopt standardized protocol and sea turtle database** **OBJECTIVE** Encourage data dissemination and allow comparing of data across spatial and temporal scales

	"MEDIUM" Priority Strategies:
	RESOURCE MANAGEMENT and PROTECTION: Liability insurance
	TARGETS: Seagrass beds and coral reefs **MAJOR THREAT:** Damage by boat groundings **STRATEGY: Require all registered boaters to have liability insurance that will cover immediate removal of grounded boats, clean up of sinking boats etc.** **OBJECTIVE:** Reduce damage caused by groundings by putting responsibility on owner for amount of time derelict vessels are in the marine environment

PART 6: RESEARCH & MONITORING

Monitoring for Effectiveness

The monitoring program included in the Plan is designed to provide the framework for the evaluation of the effectiveness of the management actions and to provide periodic assessment of the status of resource and overall influence of a threat so that strategies can be altered to be adaptive, if needed. The measure of success in the implementation of strategies and effectiveness of management decisions will be evaluated to ensure that it is achieving the objectives set forth throughout this plan.

Throughout this management plan, there are goals, objectives, and measures of success identified. These are relative to the goals for the protection and management of the conservation targets overall (see Table X, STXEEMP targets, viability and goals), the objective of each strategy, measures of success for each strategy, as well as the mission for management as a whole (page. 19). To make management relevant, ensure resources aren't wasted on efforts that do not have any net benefit, and to periodically adjust management actions to adjust to changing conditions, the goals and objectives should be periodically reviewed using the full range of biophysical, governance and socio-economic indicators and the best available information about the condition of the conservation targets.

In 2008, the Ocean Conservancy developed a MPA monitoring plan for the STXEEMP to gauge the effectiveness of MPA establishment and management actions (Drayton, 2008). It includes biophysical, governance and socio-economic indicators and a blueprint for monitoring (who does it, frequency, resources, costs, and decisions to make based on findings). At the time, the authors and working group acknowledged that the management plan for the park was overdue for a revision. The monitoring plan was based largely on the original 2002 goals, but with a consideration of contemporary issues. The 2016 conservation targets, which are not very different from those listed in the 2002 plan, have specific indicators and attributes to measure according to the 2016 goals set for these targets (see Table X.) The 2008 biophysical indicators not otherwise captured in this update were incorporated where appropriate. The 2008 governance and socio-economic indicators are still relevant. These have been represented in the tables X and X. Further information on

resources, costs, and background can be found in the Ocean Conservancy plan, which is available on file at the STXEEMP office.

To measure all suggested indicators in the monitoring plan would entail a large financial and time commitment. Some indicators are necessary to review annually, in the case that management actions can have an immediate effect on a resource, or to monitor for success of implementation activities in the case that short-term management action needs to be altered to respond to an emerging problem or circumstance. Other indicators are useful to measure on a longer- time scale; those that measure success of a strategy when it will take a few years before success can be detected (particularly for restoration activities). Some indicators are not feasible to measure frequently, in which case, it is useful to have a baseline to then steer research groups to repeat and review at the next management cycle (2021) or as measureable attributes as needed. Priorities should be given to indicators that can inform management action and are feasible to measure.

The role of the STXEEMP is that of monitoring coordinator, to steer projects and funding toward filling the gaps in indicator information, to periodically review results of monitoring, and modify management actions if called for. STXEEMP can work individually with partners to devise protocols that are relevant to the Park and match the capacity to execute the protocols, and to collect attributes that are measured and synthesize the data in the regular review process. To facilitate this process, STXEEMP can conduct a monitoring summit every 1.5-2 years in which experts and monitoring partners (DFW, DEE, DEP, NPS, UVI, SEA, TNC, and NOAA's NCCOS, NMFS, etc.) are assembled to submit and review up-to date information and evaluate effectiveness. The Marine Park Coordinator can develop a shared project workflow that includes reminders to the partners on what metrics they will need to bring to the table for review. It is during this process that indicators can be re-prioritized and partners are invited to report out on any major observations.

Biophysical Monitoring of the Targets and Threats

Monitoring of biophysical indicators entails taking regular observations of the targets and threats and comparing patterns that emerge with past observations. Well thought–out indicators of a conservation resource target's overall health should also be indicative of overall improvement of the resources, and a plan for monitoring these indicators should be reflective of the response time expected for management successes to become apparent. Regular, ongoing monitoring of the effect of management actions, status of the resources over time, or abatement of threats that tell us whether strategies are working or need to be adapted to changing circumstances or conditions (see accompanying strategies and monitoring table). The conservation targets in this management plan are not protected in isolation within the STXEEMP, but rather, are affected by contributing factors outside the control of management of this MPA. However, there should be some net benefit for the targets within the STXEEMP.

UVI faculty, Tyler Smith, collects data for the Territorial Coral Reef Monitoring Program.

Regular monitoring also makes emerging threats apparent, particularly if there is a precipitous decline in health of a particular attribute of a conservation target. In this regard, monitoring of the threats, such as poor water quality due to land-based sources of pollution, coral bleaching, invasive species, or incidence of illegal extraction will reveal if there are new sources of these threats and if management actions are effective in reducing incidents. The targets and threats table below is divided into indicators of the status of resource, level of impact from threats, and measures of success for strategies (as listed in the strategies table) for each target.

Table 8. Monitoring Plan for Resources and Threats

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**		**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
CORAL REEF COMMUNITIES: lobster, *Acropor* a, reef fish									
VERY HIGH	From POOR (loss herbivores, coral cover, bleaching) to FAIR in 5-10 years	***Indicator: status of resource***	**Coral Reef Health**	Coral cover (% live coral) Algae & invertebrate cover Coral diversity & species composition Disease and mortality Juvenile corals (recruitment)	TCRMP, NOAA Biogeo field measurement protocol, TNC's resiliency assessments. AGRRA protocol for recruitment and algal biomass	TCRMP: annual, 4 sites in STXEEMP NCRMP in 2012- included 140 sites in STXEEMP, Biogeo 2012 (60 sites) See past studies from SEFSC, CFMC, DFW, UVI, TNC, EPA's Bio monitoring, NPS • Expand to asses inside vs. outside MPA, increase number of TCRMP sites, add back reef and lagoonal sites (STXEEMP) stagger frequency • Recruitment studies- can include in regular coral monitoring (AGRRA protocol) or use settlement plates.	1X/yr (ideal) TCRMP permanent sites: (4) + more needed NCRMP longitudinal monitoring, randomized design	Tyler Smith, UVI, Biogeo DFW's monitoring for reef fish, conch STXEEMP does additional back reef/ lagoonal sites	Scuba, days/people, boats: $5000? (OC: $680K over 2 years)
			Herbivory	Density (#/100m2) and abundance (biomass: g/100m2) of large-bodied parrotfish + Density of *Diadema* Algal biomass (cover and height)	Included in field measurements for the above coral monitoring AGRRA protocol for recruitment and algal biomass	Only macroalgal %cover is being recorded in NCRMP • Need biomass (height). See AGRRA protocols	1X/yr	Same as above	Same as above

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**		**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
		Indicator: status of resource	**Lobsters**	Density (#/100m2)	Lobster-targeted surveys	Can extract data from NCRMP NPS (BUIS) lobster monitoring protocols	Every 2 years	**STXEEMP**, UVI	Same as above
			***Acropora* spp.**	Density (#/100m2) Distribution (mapped) Size and health (disease, mortality)	Acropora mapping + other monitoring for size dist. and health	TNC did mapping & resilience assessments for outplanting UVI for East End Beach, UVI/NMFS compiled all known data Can extract data from TCRMP?, NCRMP •Assess Acropora on crest	Every 5 years	TNC, UVI, NOAA NCCOS	In-water (surface) GPS for mapping (OC: $8K over 2 years for Acropora-specific monitoring)
			Presence of rare species (Nassau grouper, rainbow, blue, parrotfish)	Density (#/100m2) Abundance (g/100m2)	Roving diver surveys	Can add it to the protocols for any other in-water work	1x/yr	Tyler Smith, UVI, Biogeo DFW's monitoring for reef fish, conch	Less resources if not on SCUBA, or by boat


PRIORITY

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**	**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
CORAL REEF COMMUNITIES: lobster, *Acropor* a, reef fish								
		Indicator: Measures of success of strategies (from strategies tables)	**Effectiveness of enforcement and education strategies**	# successful convictions, reduced incidence of infractions, reduced non-compliance # judges aware and participating in workshops and training -Increase in patrols-spatial and temporal coverage	Regular analysis of police reports, DEE reports	Data accessible? Need administrative procedures to obtain data. Administrative outreach and coordination	Review annually	STXEEMP reports out on # of convictions, outreach events	Training, outreach, coordination
			Effectiveness of zones, rules & regs	Baitfish biomass (NEED) Tracking fish movement Reduced destructive incidents Improved condition of coral (see above)	Fisheries-dependent surveys (observed catches) Fisheries-independent: near shore sampling Fish tagging and acoustic arrays	Reported in catch reports? NPS, UVI and NMFS doing fish tagging in BUIS	Regular surveys-seasonal dependent	DPNR-DFW? NOAA?	Tags, arrays, baitfish survey tools
			Effective coral restoration strategy	Coral outplanting monitoring: # outplanted areas (Objective for five outplanted reefs, up to 100m2 restored reef)	Density, size distribution and extent of replanted reefs, survivorship	assessments/site selection to be done in early 2017	2 years following outplanting?	TNC: Kemit Amon Lewis	TNC has funds, staff, equipment
			Effectiveness of mooring buoys	# of boats anchored vs. use mooring # anchor-caused damage sites	Shore side monitoring, incidence of enforcement, community observations, anchor scars	Can compare to past reports: geographic consulting, TNC, STXEEMP bayside surveys	Before/ after, survey high-use areas	STXEEMP: bayside surveys, seagrass survey	Training, outreach, coordination

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**	**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
CORAL REEF COMMUNITIES: lobster, *Acropor* a, reef fish								
		Indicator: Measures of success of strategies (from strategies tables)						
		Watershed restoration	10% Reduction in TSS in certain bays. Green Cay Ghut: TSS reduced by 17% in Chenay Bay, .3 miles of ghut restored	Carlos Robles methods, Kynoch Reale	Horsley Witten did sediment load models in 2010. • Need during and after project measurements	Before/during and after ghut restoration, road improvement, rain gardens, etc.	STXEEMP: TSS surveys, or by contract (Ky Reale)	boats to take water samples
		Effective groundings response	Extent of grounding or storm-damaged coral # of new groundings removed in a 6 month time frame report of on-site restoration	Groundings response protocols	Grounding response protocols and Point of Contact phone list (TNC and DPNR); EEMP has exopy to re-affix loose corals	As needed	STXEEMP tracks, reports	More people trained
		Lionfish derbies	# of fish brought in, overall weight, largest, # of divers involved	Need tournament spreadsheet	Need tournament spreadsheet	Annual, targeted reefs	STXEEMP, DFW	funds for prizes, publicity
		Lionfish hunting with permit	# of permits issued, reported removal rates by up to 25 divers/ teams	CORE online reporting	first CORE recon dive done September 2016; future dives may help determine reefs to target for removals	Review annually	STXEEMP, DFW	Training, outreach, coordination Lionfish removal permits

PRIORITY	GOAL *(current condition to desired condition)*	Indicator		Attribute to be measured	Methods	Status (already being done? Completed?) / Needs	Frequency, Timing, Location	Who monitors (who to contact)?	Resources needed, annual cost/ funding source
SEAGRASS COMMUNITIES (includes conch)									
		Indicator: *status of resource*	**Seagrass habitat size (overall coverage)**	Mapped # hectares Evidence of expansion or contraction	Remote sensing + in-water groundtruthing	Biogeo has habitat maps; North Shore was groundtruthed in 2015 by UVI MSc student; south shore needs truthing	Baseline, then every 5 years	NOAA NCCOS	Updated LiDAR?, in-water monitoring
HIGH	From POOR (unknown, decline on the S. shore?) to FAIR in 5-10 years		**Seagrass beds health**	seagrass: algae ratio (also is an indicator of water quality), presence of epiphytes Diversity, shoot density, species distribution, invasive species impacts, Fish diversity, size class distribution	Field measurements, permanent quadrats (randomly chosen), photo- CPE, indicators of algae: seagrass ratio at certain locations. Include seagrass sites in TCRMP and NCRMP monitoring.	NEW program to develop Need baseline studies done, then less frequent monitoring	Every 2 years at selected permanent sites	UVI, STXEEMP	Staff time
			Conch	Density (#/100m2) Size in no take zones vs. fished areas	Done every 1-5 years (SEAmap)- long transects surveyed by scooters	Synthesize information done to date; determine regular schedule for monitoring	Every 5 years?	DFW (Jonathan Brown)	
	Threats: Water quality, sedimentation, climate change (sea level rise, temperature), anchor damage, overfishing, illegal fishing (conch)	Indicator: *Level of impact from threats*	**Water quality monitoring**	Temp, pH, TSS, contaminants	See information below in the ALL monitoring: water quality	Ongoing: Can be useful to match point sources with direct and actual impact on seagrasses	Annual review of results		
			Incidence of anchoring, groundings, blow-outs	Map of anchor scars, grounding, blow outs Estimate of area of the above	Make note of incidents and extent of damage. Note anchor scars and blowouts when doing seagrass surveys	Training need: Determination of old vs. new destruction, how to determine if recovery is happening?	When incident occurs and during regular seagrass monitoring (above)	STXEEMP, TNC, other grounding responders	Protocols
			Disease	% seagrass impacted by disease	Monitor during seagrass surveys	Include in above surveys Training need: Determine disease vs. water quality, and temperature?	Every 2 years	UVI	Training, Protocols

PRIORITY	GOAL *(current condition to desired condition)*	Indicator		Attribute to be measured	Methods	Status (already being done? Completed?) / Needs	Frequency, Timing, Location	Who monitors (who to contact)?	Resources needed, annual cost/ funding source
SEAGRASS COMMUNITIES (includes conch)									
		Indicator: *Measures of success of strategies (from strategies tables)*	**Effectiveness of enforcement and education strategies**	# of illegal activities	Same as coral strategy indicator, above	Same as coral strategy indicator, above	Review annually	STXEEMP reports out on # of convictions, outreach events	
			Effectiveness of mooring buoys	# of boats anchored vs. use mooring # anchor-caused damage sites	Shore side monitoring, incidence of enforcement action taken, community observations, anchor scars	Same as coral strategy indicator, above	Before/ after, survey high-use areas	STXEEMP: bayside surveys, seagrass survey	
SEA TURTLES									
HIGH	From GOOD (but there are issues) to maintain at GOOD or improve over 12-20 years	Indicator: *status of resource*	**Nesting sea turtle population**	Breeding population #s, # successful nests/ year, variability by year/cohort	Nest monitoring June-Dec	TNC covers East End Beach, Jack's and Isaac's SEA covers Southgate + expanding with Coakley? Chenay?	During nesting season, need nightly patrols if possible Volunteer/citizen patrol of beaches daily	TNC, SEA, volunteer network, DFW, NPS, STAR	(OC: $77K over 2 years)
			In water sea turtle behavior and condition	# and species of foraging sea turtle General movement patterns	In-water monitoring of foraging, acoustic studies, satellite tracking	7 green turtles nesting at Jack and Isaac Bays satellite tagged in 2015; cultivate opportunities to collaborate with USGS	Every 5 years, Annual review	TNC, NPS, USGS	

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**	**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
SEA TURTLES								
	Threats: Poaching of adults, poaching of eggs, invasive predators: hatchlings, eggs, boat strikes (?) marine debris, human disturbance (fire, vehicles, nesting interference, lights)	Indicator: ***Level of impact from threats***						
		Predation of eggs and hatchlings	Nest monitoring: # nests dug up # predators removed from beaches	Based on turtle monitoring protocols + nest excavations Trapping at beginning of nesting season	Night monitoring by TNC and SEA + citizen beach patrol, DFW trapping	At the end of each turtle nesting season (December)	SEA, TNC, STAR, DFW	Trapping, reporting
		Boat strikes	# of reported boat strikes	STAR reporting	Assessment of incidence, extent, determine specific outreach to target users / seasonal	Annual review	STAR, NPS	
		Poaching of adults	# of poaching infractions	Enforcement reporting	Hard to measure patterns of incidence and potential reduction	Annual review	STAR, DFW, USFWS, NOAA, NPS	
		Poaching of eggs	# nests dug up # evidence poaching (probe holes, bucket indentations) # poaching infractions	Nest monitoring June-Dec, Enforcement reporting	Hard to measure patterns of incidence and potential reduction overall Have a better idea of poaching on key beaches (Southgate, East End beaches)	Annual review	SEA, TNC, STAR, DFW	
		Human disturbance	Fires, vehicles, other: see beach monitoring, below					

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**		**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
SEA TURTLES									
		Indicator: Measures of success of strategies (from strategies tables)	**Citizen patrol**	# volunteers trained # volunteers active in monitoring (objective: engaged community by increasing monitoring to 33% of STXEEMP beaches) # of beaches covered reduced incidence of eggs poaching (see above)	SEA training and data management, STAR training, survey for evidence of poaching: probe holes, bucket indentation	Simple database to receive citizen science data was created in 2016; SEA and Friends of EEMP hoping to harmonize dgital data collection in 2017	Review at the end of each turtle nesting season (December)	TNC, SEA, STXEEMP (evidence of poaching)	Part of monitoring or citizen patrol- need occasional data review
			Improved data collection, collaboration, comparable data	# of turtle coordination meetings, reports	STAR, SEA, NPS, and TNC reporting	Friends have harmonized collection with SEA; EEMP urging partners to actively share data	Check in 2 years		Staff time

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**		**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
BEACHES									
MEDIUM	From GOOD/ FAIR (because of trash loading, erosion rates unknown?) to GOOD in 5-10 years	Indicator: *status of resource*	**Beach condition**	grain size width, natural / seasonal dynamics	On-site sampling: Sandwatch LiDAR	Sandy Point has a good understanding of their beach dynamics and could help inform EEMP Need training, coordination and volunteers for Sandwatch	1x, repeat every 5 years? Sandwatch: quarterly	STXEEMP and citizen science contract out to UVI, NOAA	Training, outreach, coordination
			Cleanliness	# trash cans provided # trash bags collected in cleanups type of debris	Trash clean up reporting forms	Friends and EEMP carry out occasional cleanups; UVI coordinates Coast Weeks in September	Occasional, plus annual Coast Week in September	UVI	Training, outreach, coordination
	Threats: Sea level rise, trash, debris, oil spill, sand mining, fires, vehicles, erosion	Indicator: Level of impact from threats	**Beach erosion rates**	Width, cutting	Sandwatch	Need training and coordination for Sandwatch	quarterly	Friends	
			Beach fires	# fires,	Reported during turtle monitoring, trash cleanups	some information exists from SEA and bayside patrols	during bayside patrols	EEMP	
			Trash, debris	trash type, quantity	See above				
			Water quality monitoring	Non-point source of pollution, bacteria, hydrocarbons	See below (ALL monitoring)				
		Measures of success of strategies	**Access points**	# access points created or maintained General condition of access points (rate on a scale)	background research; Survey sites; create signs; clean up areas as necessary	New project to develop: submitted to CRCP in 2016	Review annually	STXEEMP with DFW	Infrastructure grants
			Education efforts	# signs Compliance vs. non-compliance	Observations, user surveys	Part of bayside monitoring	Report out annually	STXEEMP	

PRIORITY	GOAL *(current condition to desired condition)*	Indicator		Attribute to be measured	Methods	Status (already being done? Completed?) / Needs	Frequency, Timing, Location	Who monitors (who to contact)?	Resources needed, annual cost/ funding source
MANGROVE (GREAT POND) includes blue crabs, nesting birds, nursery reef fish									
HIGH	GOOD (Great Pond improving since Hugo) to VERY GOOD in 5-10 years	Indicator: status of resource	**Area and volume of Great Pond**	Mapped # hectares Evidence of expansion or contraction	Areal / satellite comparisons	Compare with past, map changes	Annual	UVI	GIS, areal and satellite resources
			Condition of mangrove trees	Density, diameter, biomass, spatial representation of trees. # of propagules and recruitment	Field measurements, tagging studies of seedlings, infrared mapping. permanent plots ; density, diameter, biomass, spatial extent. Prop root communities. Walking transects of propagules and recruitment	Incorporate recommendations from UVI ecological assessment. Need: many of the attributes UVI study does not cover	Beginning of strategies and a few years after restoration activities •need to check for plots' tags every year	UVI completes some in current ecological assessment	
			Blue crab population	Density (#/100m2) distribution	Traps	DFW has done studies?	Annual	DFW	Traps
			Bird population	# and type nesting, roosting diversity Foraging patterns	Bird surveys	Caribbean Waterbird Census records at ebird.org; Jan-Feb each year	Annual (seasonal considerations)	SEA	
			Nursery/ juvenile fishes	# juvenile fishes diversity fishes Increase in nursery habitat for fisheries (see next)	Traps, in-water snorkel surveys	Part of UVI ecological assessment Can compare to older studies done by Tobias See studies by Ivan Mateo	1x	UVI	Traps

PRIORITY	GOAL *(current condition to desired condition)*	Indicator		Attribute to be measured	Methods	Status (already being done? Completed?) / Needs	Frequency, Timing, Location	Who monitors (who to contact)?	Resources needed, annual cost/ funding source
MANGROVE (GREAT POND) includes blue crabs, nesting birds, nursery reef fish									
	Threats: Land-based sources of pollution, trash, vehicles, climate change (sea level rise), overharvest blue crab, others	**Indicator: *Level of impact from threats***	**Water quality**	Non-point source of pollution: sediment, bacteria, hydrocarbons, etc.	See below (ALL monitoring)				
			Trash, debris	# bags collected, volume of debris, incidence of large debris	Regular trash pick up at Great Pond	Done occasionally by community groups- needs more directed and coordinated reporting	Annual	STXEEMP	Trucks for hauling, coordination with waste management
		Indicator: Measures of success of strategies (from strategies tables)	**Restoration Plan in place**	Yes/no			2018	STXEEMP	see strategy
			Community involvement	# community consultations # events where community participates	Track with reporting	More needed	Ongoing	STXEEMP	
			Increase in nursery habitat for fisheries species	See above juvenile fishes for measurements			2 years after restoration	UVI/DPNR	
			Restored hydrology	See above area and volume of Great Pond			2 years after restoration	UVI/DPNR	
			Low-impact shore access points	# and condition of access points	Rate based on use, perception	Need a way to quantify- get public perception	At end of 5-year cycle	STXEEMP	

PRIORITY	**GOAL** *(current condition to desired condition)*	**Indicator**	**Attribute to be measured**	**Methods**	**Status (already being done? Completed?) / Needs**	**Frequency, Timing, Location**	**Who monitors (who to contact)?**	**Resources needed, annual cost/ funding source**
	ALL	Water quality	(TSS, Nutrients, pH, CaCO, hydrocarbons)	DPNR's weekly beach monitoring. EPA contaminants study	Horsley Witten Watershed Plan. DPNR's DEP, EPA contaminants study • Consider comprehensive one-time study in suspected problem areas (yacht moorings? Divi? Facing Great Pond?) like STEER's EPA contaminants study	Besides DPNR's regular monitoring, 1x contaminants study	DEP's Benjamin Kuelarts. Coordinate with Anita Nibbs	Coordination, reporting
		Catastrophic Events Assessment	# hectares impacted by oil/ hazardous material spill, storm damage, sargassum, other events Response time, # of groups coordinated	As part of response, assess damage extent, short-term and long-term impacts, recovery	Teams ready with response (DPNR, TNC, US Coast Guard) have protocol	As needed	Various departments	Coordination, reporting
		Education and Outreach	# signs, tours, school events changes behavior inside STXEEMP- reduced incidence of infractions by 60% in five years	Soc-mon surveys, other awareness questionnaires	Can compare to past soc-mon survey by OC/NRCS	Annual review	STXEEMP, NOAA	Needs further consideration in communications, education and outreach plan

Governance and Socio-Economic Monitoring

Governance indicators measure the progress of the planning and implementation activities administrative, staffing, enforcement. Stakeholder participation, compliance and enforcement, as well as the progress and quality of management actions and of the management plan itself is also routinely assessed. Many of the governance indicators provided by the Ocean Conservancy plan are yes/no indicators- such as if the management plan exists. Others are subjective and can be determined through partner consultations and community surveys on awareness and perception of the Park

Socio-economic indicators reflect the state of the human component of coastal and marine ecosystems (e.g., level of economic activity), and are an essential element in the development of MPA plans. They help measure the extent to which STXEEMP is successful in managing the pressures of human activities in a way that results not only in an improved natural environment, but also in improved quality of life in coastal and marine areas, as well as in sustainable socio-economic benefits.

From SustainaMetrix 2021: Recommendation 6.1: Strengthen Linkages Between Science and Management

> *In general, good coral reef management in the USVI is not being limited by a lack of publishable scientific information about the status of reefs, causes of declines, responses to stressors, etc., and more priority should be given to investigating and filling capacity gaps related to good governance (e.g. improving compliance and enforcement, improving bureaucratic function, depoliticizing the selection of natural resource managers, encouraging peer-to-peer learning, improving outreach, education and communications measures to grow a stewardship ethic among decision makers and the general public, updating codes, regulations, job descriptions, handbooks, and other similar recommendations presented in this assessment) over the continued funding of peer-reviewed "pure science." If the VI-EPSCOR program intends to engage in more management relevant science, it has the potential to contribute to the translation of science into effective stories that captivate attention and change behavior, particularly for decision makers.*

A good example of integration across agencies has been the Virgin Islands Marine Protected Area Network (VIMPAN), facilitated by TNC and has established a good platform for dialogue, decision-making, action and reflection on the development of a more integrated and coordinated network of marine protected areas. The network is exploring joint opportunities, coordinating funding cycles, using a strategic planning process with federal partners, and contributing a collective voice to management decisions.

Table 9. Monitoring Plan for Governance and Socio-Economic Indicators

Indicator	Attribute to be measured	Methods	Needs/ Status (already being done? Completed?)	Frequency, Timing, Location	Who monitors (who to contact)?	Resources needed, annual cost/ funding source
GOVERNANCE INDICATORS (from 2008 Ocean Conservancy monitoring plan)						
Existence and adoption of updated, adaptive management plan	Completeness of plan, Adoption of updated management plan, Enforceability of plan	Review previous plan Conservation Action Planning	2002, Started review in 2012, updated plan in 2016	Every five years	STXEEMP	Staff time in planning, coordination, evaluation and reporting
Local understanding of rules and regulations	Level of knowledge when asked in a survey	Baseline survey, compare to previous soc-mon	Soc-mon survey completed in 2010	Every 5 years	STXEEMP	Staff time in planning, coordination, evaluation and reporting
Availability and allocation of administrative resources including sustainable funding	Annual resource request versus allocation (is there a deficit?) What equipment and training available to staff? Are resources being allocated where they are most needed? Structure for Park to generate, receive, track and spend finances	Budgets and workplan, performance report	Sustainable Finance Plan of 2010 Needs updating	Annual review	STXEEMP	Staff time
Clearly defined enforcement procedures	Do enforcement guidelines and procedures exist formally and/or informally? Are staff trained in these procedures? (analyze exam results, training schedule)	Assessment of enforcement	Contract being completed for territory-wide enforcement needs	Review staff needs every 2 years	STXEEMP	Staff time

Indicator	Attribute to be measured	Methods	Needs/ Status (already being done? Completed?)	Frequency, Timing, Location	Who monitors (who to contact)?	Resources needed, annual cost/ funding source
GOVERNANCE INDICATORS (from 2008 Ocean Conservancy monitoring plan)						
Level of stakeholder participation and satisfaction in management (including Level of stakeholder involvement in surveillance)	Attendance of stakeholders at the appropriate meetings and workshops Level of participation within marine protected area advisory board Level of volunteerism Level of satisfaction when asked in a survey Number of surveillance phone calls	Meeting minutes, reporting of volunteer hours, baseline survey	Record keeping	Annual review	STXEEMP	Staff time
Enforcement coverage – includes DEE, EEMP interp. Rangers, police	Patrol records (# hours, who patrolled where) Patrol areas and locations covered (% area patrolled and % time patrolled per area for spatial and temporal coverage)	Patrol records, schedules, maps		Annual review	STXEEMP coordinates, reports out-DEE	Staff time
SOCIO-ECONOMIC INDICATORS (from 2008 Ocean Conservancy monitoring plan)						
Park Visitation	# people visiting shore, beaches Vessel usage in STXEEMP Visitors center recognized by board of tourism, draws visitors, increase park awareness	Human use monitoring, bayside surveys	Tap community volunteer and stakeholder groups- Volunteer Support Network or student project	Weekend coverage- 1x monthly (ideally)	STXEEMP	Database
Local marine resource use patterns	Snorkeling/ diving, fishing, recreational fishing, campers and beach users, boating/ kayaking, kite surfing	Human use monitoring, bayside surveys	Tap community volunteer and stakeholder groups- Volunteer Support Network or student project	Weekend coverage- 1x monthly (ideally)	STXEEMP	Database
Local values and beliefs about marine resources	Perceptions about resource conditions, uses and the value of those resources Changes in values/beliefs over time Perception of rules and regs and management activities	Soc-mon survey	Was last done in 2010 (Ishida) NOAA planning to conduct in 2017	~Every five years		Contract for soc-mon
Economic revenue opportunities	# new businesses established within or operate in STXEEMP		Record keeping	Every five years	CZM	

Current and Ongoing Monitoring and Research

There exists a deep information base for the marine and coastal areas of the east end of the island that is a result of several long-term territorial and federal monitoring programs, individual research studies, and student theses. So many different entities have done work in the STXEEMP that contribute in one way or another to our understanding of the physical conditions, ecological responses, uses, threats, and benefits of the marine resources, making it difficult to keep track of all available useful information. We made an attempt in this plan to list all relevant studies and monitoring efforts, which should be referred to when questions arise, to know when to update past studies, or to direct funding for projects that fill a gap in information. These are consolidated in a table in the References section of plan.

The following table shows the one-time (not long term or regular) studies that answer questions of uncertainty regarding a status of a resource or effect of a threat, and which will guide whether action needs to be taken, where, or how. These differ from regular, ongoing monitoring of the effect of management actions, status of the resources over time, or abatement of threats that tell us whether strategies are working or need to be adapted to changing circumstances or conditions (Table X, above).

Table 10. Research questions to establish baselines

TARGET(s)	**THREAT(s) Category** ***listed in general rank high to low (Catastrophic, wide-spread events such as oil spill, hurricane, sargassum, etc. applies to all)***	***PRIORITY***	**Uncertainty**	**Suggested Research Question/ Comments**
Coral Reef Communities: *lobster, Acropora, reef fish*	Overfishing, illegal fishing, bleaching and other effects of climate change, lionfish, land-based sources of pollution, grounding, anchoring, fishing gear	***VERY HIGH***	Unknown the extent of many of the threats. Lionfish removal thresholds? What is the resiliency?	Examine biogeos blitz info, gaps, conduct more wide-spread randomized survey. ID important sites, establish regular long-term monitoring; map lionfish colonization. Coral recruitment patterns; effectiveness of MPA vis à vis fisheries resources.
Mangrove: *sea birds, blue crabs, juvenile fishes*	Land-based sources of pollution Trash, vehicles Climate change (sea level rise, temperature, changing precipitation patterns with greater frequency of drought) Overharvest blue crab, others?	**HIGH**	Historical extent of mangroves, type, distribution, freshwater/salt water hydrodynamics Mangrove monitoring Blue crab populations Current juvenile fish pop dynamics	UVI Ecological assessment study should answer many questions with core samples, community observations, historical photographs and imagery (Toby has aerial photos)

Seagrass Communities: *conch*	Water quality, sedimentation, climate change (sea level rise, temperature), anchor damage, overfishing, illegal fishing (conch)	**HIGH**	General information is lacking: Extent of physical damage from anchoring, fixed bottom fishing, grounding? Conch populations: #s, migration, population dynamics, vulnerability. Extent and impact of the non-native species, *Halophila stipulacea.*	Historical extent, composition and density of seagrass? Problem high-use areas? Match seagrass aerial and ground-truthed data. One-time wide-spread study? What is the potential impact of the non-native seagrass species, *Halophila stipulacea* on the function of the STXEEMP ecosystem?
Sea Turtles	Poaching of adults, poaching of eggs, Invasive predators: hatchlings, eggs, Boat strikes (?) marine debris, human disturbance (fire, vehicles, nesting interference, lights)	**HIGH**	Extent of boat strikes in STXEEMP?Turtle nesting poaching baseline? Effect of marine debris. Population dynamics. Contaminants	In-water juvenile tagging and cooperation with Buck Island's program to address questions of connectivity. Beaches most in need of surveillance, hard to determine before/after effect. Threats known but not to what extent in STXEEMP, and what is preventable? Genetic work. Socio-economic drivers of poaching- origin, effect, prevention? Incidence/frequency/location of boat strikes and whether rules and regulations can prevent- hard to determine- use STAR reports? Anecdotes?
Beaches	Sea level rise Trash, debris, oil spill, fires, vehicles Erosion	**Medium**	Loss of beaches quantified	Map beach fires; Sandwatch- citizen science to monitor beach accretion and erosion
Deep water and Pelagic Fish (suggested for DFW to inform STXEEMP zones, rules/regs)	Overfishing Ballast/pollution		Baitfish inside and outside NTA? Deep-water/ pelagic fisheries effect of loss of prey? Threat of ghost nets and traps? Effect of ballast discharge? Other pollution effects?	Consider expanding basic fish population monitoring
Climate Change	Climate Change impacts: acidification, sea level rise, storm intensity, and precipitation patterns?		Acidification? SLR? Storm intensity? Precipitation patterns?	Need downscaled projections paired with on-the-ground observations and a long-term monitoring to track changes to determine how the impacts of climate change affect STXEEMP targets.
Socio-Economic			Loss of income? Impact vs. benefits?	How has a decade of park rules and regulations impacted those who used to use the park waters regularly for fishing?
Sustainable Financing			Community financing?	Willingness to pay study like one done by McKenzie for STEER. Feasibility of boater fee/mooring use, recreational license fees?

PART 7: PARK OPERATIONS

Management and Administration

The STXEEMP is under the jurisdiction of the Division of Coastal Zone Management (CZM) and is the responsibility of the Department of Planning and Natural Resources. The Division of Environmental Enforcement (DEE), the Division of Fish and Wildlife (DFW) and the Division of Environmental Protection (DEP) also contribute to STXEEMP operations but do not have a responsibility for the day to day management of the park. This falls to the STXEEMP staff, which consists of the Marine Park Coordinator, the Education and Outreach Coordinator (TBD) and an Interpretive Ranger. The Marine Park Coordinator reports to the CZM Director.

Maintenance

Park staff will perform the maintenance inspections required to keep the marker buoys safe and operational, but outside contractors ay be required to perform repairs. With Sports, Parks and Recreation, EEMP will work to maintain public access points. Regular inspection and maintenance, in some cases, replacement of informational signs at access points, along roadways and on beaches will be necessary and should have an accompanying plan for schedule, tasks, and budget.

The park's headquarters building and associated grounds falls under the Department of Sports, Parks and Recreation, which assists DPNR with the maintenance of the site. In addition, Cramer's Park, which is situated along the STXEEMP marine boundaries, is also under the DSPR, which maintains the bathrooms and other buildings and grounds.

Staff Capacity and Professional Development

The Park personnel, as well as those who are immediately contributing to the management of the STXEEMP from other departments and agencies, should receive targeted training that enhances their job capabilities and to equip them to provide for implementing new technologies as they become feasible and useful to staff and the Park. The cross-agency groups and networks that contribute to the management of MPAs in the Virgin Islands have strong potential to help promote and coordinate coral reef management actions within the territory. These include the Virgin Islands

Marine Protected Area Network (VIMPAN), the Virgin Islands Network of Environmental Educators (VINE) and the Virgin Islands Coral Reef Advisory Group (VICRAG). Capacity should continue to be built within them.

Figure 4. 2010 Expenditures vs. 2016 Estimated Expenditures

PART 8: SUMMARY OF ACTIVITIES & RECOMMENDATIONS

Functional Areas	Programs	Activities
Resource Management and Protection	Patrolling and Enforcement	Monitoring of resources through patrolling and the prevention of illegal activities in the park, as well as the issuance of fines or tickets for violating a rule or regulation.
	Monitoring & Research	Technical monitoring of the health of the marine ecosystem: the coral reef, the seagrass beds, the mangroves, and the animals and plants that live within these areas. Any research and data collection conducted by park wardens as well as outside research studies.
	Habitat Restoration & Wildlife Management	Restoration of Great Pond. Re-vegetation, control and mitigation of invasive species, and restoration of threatened and endangered species.
	Mooring Buoys	Studying the capacity and use of the different mooring locations and rotating them as necessary. Monitoring the buoys on a regular basis to identify those that may need to be replaced.
Sustainable Finance, Tourism and Recreation	Fee Collection (future activity)	Collection and management of recreational fees including but not limited to mooring fees, entrance fees, and camping fees. Reporting, auditing and analyzing fee system.
	Concessions & Recreational Special Uses	Negotiating contract services with nature guides and eco-tourism companies, and vendors. Uses such as special events at the Visitor's Center;
	Visitor Safety and Protection	Search and rescue, emergency medical services, boat safety and patrol.
Management and Administration	General Management and Administration	Staff development activities to increase capacity and environmental leadership through staff education. General administrative activities including hiring staff, procurement, contracting, filing, maintenance of park lost and found items, information technology.
	Financial	Business planning, budgeting, accounting, analysis of

	Management	expenditures and revenue generation, reporting requirements, grant writing and fundraising.
	Planning and Emergency Preparedness	Structural and programmatic development, environmental impact analyses and approval of development plans within and around Park boundaries. Creation and implementation of an emergency preparedness strategy.
	Partnership Relations	Coordinating inter-agency management and planning. Management of donor relationships.
	Advertising and Marketing	Maintain a web presence. Creation of park brand, posters, brochures, radio and TV spots.
Community Outreach and Development	Formal Environmental Education	Preparation of lesson plans on marine ecosystems, conservation, and environmental training for students of various grade levels.
	Public Outreach and Awareness	Outreach activities to community members and park users to increase awareness.
	Stakeholder Engagement	Workshops and meetings to maintain and increase support for the Park through communication and education of stakeholders.
Facility Operations and Maintenance	Buildings, Grounds & Utilities	Cleaning, stocking supplies, and caring for buildings
	Roads & Trails	Maintenance of signs, and trails
	Navigational Markers and Mooring Buoys	Cleaning and basic maintenance of buoys
	Docking, Transportation & Fleet	Gas, replacement of equipment and parts and general maintenance of a vehicle and a boat

Table 11. Program Area and STXEEMP Principal Role for Implementation

Functional Area	Priority	Strategy	Administrative: Record keeping, planning, financing	Education/ Outreach	Comm Outreach, consultation, participation	Restoration by Organizations & Community	Environmental engineering	Regulatory, permits, policy	Training	Research / Monitoring	Installation / maintenance	Agency Coordination	P= STXEEMP Principally Respo	I= STXEEMP consulted-anothe
RESOURCE MANAGEMENT AND PROTECTION		Great Pond Restoration Phase 1; study	P	P	P					I			3	1
		Great Pond Restoration Phase 2; engineering plans	P		P		I						2	1
		Great Pond Restoration Phase 3; restoration	P	P		I	I	P		I		P	4	3
		Great Pond Restoration Phase 4; wildlife enhancement	P	P	P	I				I	P	P	5	2
		Restoration of Reef-forming Stony Coral (*Corpora*)	I	I	I	P				P			2	3
		Day Use Moorings	P		P						I		2	1
		Address Dirt Roads	P		P	P	I	P		I	I	P	5	3
		Increase Effectiveness of Prosecutions	P	I				I	I			P	2	3
		Increase Effectiveness of Enforcement	P	P				P	I			P	4	1
		Watershed Activities											0	0
		Ghut Restoration											0	0
		Sea Turtle Citizen Science Day Patrol											0	0
		Lionfish Hunting											0	0
		Lionfish Derbies											0	0
		Public notice of infractions											0	0
COMM. Outreach & Participation		Place signs near major access points and highly used beache	P	P							I		2	1
		PSA campaign and signage to discourage sea turtle poaching	I	I	P						P	P	3	2
		Improve Public Access Points	I	P	P		I	I		P	I	P	4	4
		Establish Low-Impact Public Access at Great Pond	P	P	P	I	I	P			I	P	5	3
		Coral Bleachwatch	I	I	P				I	I			1	4
													0	0
SUST TOURISM and FINANCE		Visitors center + marketing campaign + facilities	P	P					I		P		3	1
		Underwater sculpture garden	I	I	I			P			P		2	3
		P= STXEEMP Principally Responsible	**11**	**8**	**9**	**2**	**0**	**5**	**0**	**2**	**4**	**8**		
		I= STXEEMP consulted-another is primary or is contracted	**5**	**5**	**2**	**3**	**5**	**2**	**4**	**5**	**5**	**0**		

Recommended near future planning and implementation:

- Develop comprehensive communications, outreach and education audience matrix to guide outreach activities. Incorporate the community outreach and development strategies (devised in this update to address threats to resources) into the audience analysis, which systematically recognizes the need, primary audience for communications and outreach, methods and materials, and desired output. Relevant reference documents, such as an inventory done of the STXEEMP education and outreach materials and activities in 2010, the VIMPAN communications plan, awareness and communications strategy for the buoys, MOES-VI projects and reports are listed in the Appendix X, STXEEMP-Relevant Reports and Documents.
- Implementation of Sustainable Financing with an update on current spending and financial needs. Revisit sustainable financing options on a regular basis. This should be done systematically and with input from the core planning team to lay out any progress made, identify impediments, and hash out next steps to advance sustainable financing options.
- Annual operations plan and standard operating procedures including maintenance of buoys, signs, visitors' center, vehicles, and the running of the Park office. Annual work plans with staff time, budgets derived in part from strategy tables in the Management Plan, and timelines with expected periodic review to revise next year's work plans
- Begin comprehensive review of the 2016 Management Plan with the aim of having an updated plan by 2020. Each subsequent revision should be more refined to reflect contemporary issues and realities. Actual drafting input should diminish over time, with less extensive revisions to content. Primary review and updates should begin with the strategies.
    - Many accomplishments and ongoing projects are opportunistic and not necessarily planned. *These initiatives should be scrutinized in the same way as planned activities outlined in the management plan to gauge effectiveness in resource protection, raising awareness and community involvement, or threat abatement so that effort is not wasted in reaching the overall goals for the STXEEMP.*

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Table 12 STXEEMP-Relevant Reports and Documents

STXEEMP-Relevant Reports and Documents For more detail, see links or reports on file with STXEEMP.				
Reference Title	**Who**	**Results- what does it tell us?**	**What to do with it/when**	**Citation/ Where to Find It**
Resource Management-Related				
Synthesis of Marine Ecosystem Monitoring-1990-2009	Simon Pittman et al, NOAA Biogeo	Synthesis of marine monitoring activities in USVI (methods, location, types of monitoring) to share data and synergies, strategic regional and national monitoring, avoid duplication, increase knowledge.	Lists references for protocols and reports for past monitoring. For St. Croix, conch (limited) lobster (BUIS-centered), fish (BUIS-centered), corals (sampling of STX), *Acropora* (limited), WQ/sediment/and other oceanographic monitoring. Useful for a wide range of related studies in STX	Pittman, S.J., S. Hitt, G.F. Renchen, C.F.G. Jeffrey. 2012. Synthesis of Marine Ecosystem Monitoring Activities for the United States Virgin Islands: 1990-2009. NOAA Technical Memorandum NOS NCCOS 148. Silver Spring, MD. 55 pp. http://www2.coastalscience.noaa.gov/publications/detail.aspx?resource=9j/sB/rSV2RwgrjRrMCaC4Tz/ox5Wy5CsSXfEFb3sNA=
NOAA/ CREMP's "Land-Sea Characterization of the St. Croix East End Marine Park, U.S. Virgin Islands" (2013)	NOAA NCCOS	1) Landscape characterization based on types of land use predicting the condition of adjacent coastal areas within STXEEMP. i.e. through runoff and point source pollution (threats) 2) Document diversity, condition and composition of biological communities (fish, coral, conch, lobster, *Diadema*, etc.) in each Park zone.	See Page 85: Key Findings and Recommendations 1) Review for sources of land-based sources of pollution to target actions and focus priority strategies. 2) Periodically review to determine if ecological shifts are occurring in the coral reef ecosystem.	Pittman, S.J., D.S. Dorfman, S.D. Hile, C.F.G. Jeffrey, M.A. Edwards, and C. Caldow. 2013. Land-Sea Characterization of the St. Croix East End Marine Park, U.S. Virgin Islands. NOAA Technical Memorandum NOS NCCOS 170. Silver Spring, MD. 119 pp. Related : Oliver, L.M., J.C. Lehrter, and W.S. Fisher. 2011. Relating landscape development intensity to coral reef condition in the watersheds of St. Croix, US Virgin Islands. Marine Ecology Progress Series. Vol. 427: 293-302.
Land-Sea Characterization of East End Marine Park-Powerpoint Presentation (May 2013)	Simon Pittman to the STXEEMP core planning team	Summary of the Land-Sea Characterization Report	Reference for future presentations	**Copy on file with STXEEMP**
MPAs of VI Performance Report (2014)	Simon Pittman et al, NOAA Biogeo	The report provides: (1) an overview of the history of MPAs, types of MPAs and associated regulations, and a list of all MPAs in the USVI; (2) an ecological performance report for three NPS MPAs, including 20 biological metrics for fish and benthic habitat; (3) sightings of large-bodied fishes with moderate to high vulnerability to fishing; and (4) synthesis, summary and recommendations for management.	The information, data synthesis, interpretation and recommendations are intended to help focus management actions and goal setting, inform outreach products and adjust expectations regarding ecological performance for MPAs in the region. The data presented here provide important baselines required for tracking MPA performance through future monitoring efforts.	Pittman, S.J., L. Bauer, S.D. Hile, C.F.G. Jeffrey, E. Davenport and C. Caldow. 2014. Marine protected Areas of the U.S. Virgin Islands: Ecological Performance Report. NOAA Technical Memorandum NOS NCCOS 187. Silver Spring, MD. 89 pp. http://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/538/MPAs_Working_Final_tagged_LQ.pdf

Reference Title	Who	Results- what does it tell us?	What to do with it/when	Citation/ Where to Find It
NCRMP: NOAA/NCCOS coral reef ecosystem monitoring (up to 2014 field season)	NOAA NCCOS	In 2012, 290 sites across STX, 140 sites included in STXEEMP (2010, 2011, 2012, and 2014)	Use to compare long-term trends. Also useful for lobster, *Diadema* and *Acropora*	NOAA. 2012. St. Croix, USVI Trip Report St. Croix Hard Bottom Fish and Benthic Community Characterization May 5-18, 2012https://nccospublicstor.blob.core.windows.net/projects-attachments/180/STX_2012_trip_rep_FINAL.pdf
TCRMP: UVI-DPNR Territorial Coral Reef Ecosystem Monitoring Program	UVI Tyler Smith	Summary of results for the four STXEEMP sites of the territorial coral reef monitoring program (Castle, Jacks Bay, Great Pond, and southern mesophotic site, "Lang EEMP"). Benthic cover (% coral, algae, inverts including Diadema), fish and basic physical parameters (pH, temp) and overall coral health.	Track long-term trends, notable if precipitous decline due to certain threats (coral bleaching, storms, land-based sources of pollution, etc.)This summary was provided for the management planning process and summarizes data for STXEEMP sites up to 2011. Periodically request a review and summary to determine if changes are happening.	"Smith, Tyler B. 2011 Summary of East End Marine Park Monitoring: Territorial Coral Reef Monitoring Program. Technical report provided to STXEEMP management authority. Center for Marine and Environmental Studies, University of the Virgin Islands.Full list of TCRMP reports: https://sites.google.com/site/usvitcrmp/tcrmp-reports
NOAA Conch Monitoring	Ron Hill	NMFS -frequency? Sites? Tracking + regular surveys?	Baseline, use for protocols, etc.	SEFMC?
DPNR Conch Monitoring (SEAmap)	Jonathan Brown, DFW	Every five years: long transects on scooters- not sure if same sites or random sites? Last completed (2015)	Baseline, use for protocols, etc.	DFW- Johnathan Brown (DFW)
STXEEMP Lobster Monitoring	STXEEMP, NOAA, NPS	Paige Rothenberger and Jose did a survey in 2008. Duplicated in Oct 2015 by Leslie and Jose. NOAA/NCCOS: Abundance of lobsters were reported for the period 2005-2007. Lobster sightings were recorded during fish and benthic composition surveys (i.e., within the 100 m2 survey unit area).Lobsters were recorded if seen, but without active searches of holes or crevices.	Baseline, use for protocols, etc.	Brief report submitted to TNC (Leslie Henderson). NPS is working on a protocol for Buck and STJ for use in STXEEMP. NOAA/NCCOS field reports
STXEEMP *Acropora* Monitoring	STXEEMP, TNC, NOAA, UVI	Have a recent history (since 2007) of presence and location of *A palmata* and *A cervicornis* within the Park. TNC does ongoing surveys for suitable sites for *Acropora* transplantation.	Useful for baseline if synthesized - consider mapping locations/stands.	NOAA/NCCOS: Density of *Acropora* species gets noted if found within fish and benthic composition surveys (i.e., within the 100 m2 survey unit area).

Reference Title	Who	Results- what does it tell us?	What to do with it/when	Citation/ Where to Find It
***Acropora* Mapping**	TNC, UVI, NOAA/NMFS	Mapping done previously by P. MeyorTNC did comprehensive mapping at different east end bays up to 2008. UVI synthesis study (Lee Carruba?).	Spatial database on the distribution of *A. palmata* (+*cervicornis* if present), useful to monitor changes and health status of *Acroporas* at selected sites	TNC report. NOAA/NMFS completed?
Nesting Females and Hatchling data	TNC and SEA	June-Dec. Chenay Bay and Southgate (SEA), east end beaches (TNC)	Long-term data set, measures of success	Jen Valiulis (SEA), Kemit Amon Lewis (TNC)
Stranded, Injured Sea Turtles	STAR reporting forms, DPNR	Incidence and cause of stranding and injury.	Help pinpoint threats to turtles: source and location	STAR reporting database
Great Pond Studies	UVI (Rick Nemeth, Kristin Wilson, Marcia Taylor)	Compilation of past studies as part of UVI's ecological assessment? (2016)	Refer to past studies to help paint a picture of the changes to Great Pond- useful in public presentations.	Great Pond Restoration strategy in the strategies table of 2016 Management Plan has notation of several past, relevant studies.
Lionfish Control Plan (Updated Version, 2014)	Jamie Kilgo- TNC and NOAA	Strategies for education and outreach, removal, research and monitoring, marketing, and communications.	Refer to recommendations when formulating STXEEMP approach	Jamie Kilgo. 2014. Lionfish Response Management Plan, US Virgin Islands. Update February 2014. http://docs.lib.noaa.gov/noaa_documents/CoRIS/Lionfish_Managment_Plan_Update_2014.pdf
Watershed / LBSP Threats/ Restoration:				
Watershed Management Plan (2011)	Horsley Witten	Sediment load models, mapped sources of runoff, recommended restoration , pollution prevention, recommendations for regulatory and programmatic improvements	Refer to for watershed improvement strategies. Includes future total watershed loading for baselines and potential reduction of TSS as a result of watershed activities	Horsley Witten Group, Inc. 2011b. St. Croix East End Watersheds Management Plan. Sandwich, MA. September, 2011http://www.horsleywitten.com/STX-east-end-watersheds/pubs/final/111114_FinalSTXEEMPWatershedPlan.pdf, http://www.horsleywitten.com/STX-east-end-watersheds/pubs/final/01_Intro_110719.pdfnodc.noaa.gov/pub/data.nodc/coris/library/NOAA/CRCP/project/20471/Final-STXEEMP-WMP.pdf
Watershed Conditions Report (2011)	Horsley Witten	Summary of known conditions, potential pollution sources, and candidate restoration opportunities in six watersheds draining to the STXEEMP. These watersheds include Southgate, Solitude Bay, Teague Bay, Turner Hole, Madam Carty, and Great Pond Bay.	Refer to ranked potential restoration strategies	Horsley Witten Group, Inc. 2011a. St. Croix East End Watersheds Existing Conditions Report. Sandwich, MA. July 2011.http://www.horsleywitten.com/stx-east-end-watersheds/pubs/final/01_Intro_110719.pdf

Reference Title	Who	Results- what does it tell us?	What to do with it/when	Citation/ Where to Find It
Hope and Carton Hill Road Management Plan (2013)	Horsley Witten	Road stabilization opportunities for reducing erosion and sediment loading from Hope Carton Hill neighborhood	Refer to when deciding where to put resources for watershed improvement projects. Divides into road segments for incremental project implementation: road drainage structures, grading and maintenance, restoration opportunities, provides costs	Horsley Witten Group, Inc. 2013. Hope and Carton Hill Road Management Plan http://www.horsleywitten.com/stx-east-end-watersheds/pubs/130131_HopeCarton_FinalPlan_11103.pdf
St. Croix East End Watershed Restoration Project	USDA NRCS	Summary of projects in Southgate, Solitude watersheds, Hope and Carton Hill road management and drainage map, rain garden, etc.	Look for lessons learned and ways to duplicate these projects	PDFs downloadable at USDA/NRCS site: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/pr/water/watersheds/?cid=stelprdb1166717
NOAA/ CREMP's "Land-Sea Characterization of the St. Croix East End Marine Park, U.S. Virgin Islands" (2013)	NOAA NCCOS	1) Landscape characterization based on types of land use predicting the condition of adjacent coastal areas within STXEEMP. i.e. through runoff and point source pollution (threats) 2) Document diversity, condition and composition of biological communities (fish, coral, conch, lobster, Diadema ,etc.) in each Park zone.	See Page 85: Key Findings and Recommendations 1) Review for sources of land-based sources of pollution to target actions and focus priority strategies. 2) Periodically review to determine if ecological shifts are occurring in the coral reef ecosystem.	Pittman, S.J., D.S. Dorfman, S.D. Hile, C.F.G. Jeffrey, M.A. Edwards, and C. Caldow. 2013. Land-Sea Characterization of the St. Croix East End Marine Park, U.S. Virgin Islands. NOAA Technical Memorandum NOS NCCOS 170. Silver Spring, MD. 119 pp. Related : Oliver, L.M., J.C. Lehrter, and W.S. Fisher. 2011. Relating landscape development intensity to coral reef condition in the watersheds of St. Croix, US Virgin Islands. Marine Ecology Progress Series. Vol. 427: 293-302.
Water Quality Monitoring	DPNR- DEP	Weekly monitoring of nearshore water quality	Notification of possible human health impact of pathogens. Long-term data set	DPNR: Benjamin Kuelarts (DEP) and Anita Nibbs (CZM) are the contacts for this project
Temperature, pH, turbidity	UVI	Same location as the TCRMP sites. 2 hobotemps at mesophotic site, all others have 1.	Useful for tracking long-term trends and as a warning system	UVI for TCRMP sites
ARRA USVI Coastal Habitat Restoration through Watershed Restoration Project	East End Bay Trail Stabilization. Marcia Taylor, PI	Project overview, pictures, informational sign for entrance into Isaac Bay	Duplication of erosion-control projects	Final report: http://docs.lib.noaa.gov/noaa_documents/CoRIS/Watershed_Stabilization_Proj_East_End.pdf Reale-Munroe, K., & Ramos-Scharrón, C. E. (2010). Erosion rates in a small subtropical watershed on the East End of St. Croix, USVI: A preliminary assessment. 10th USVI Non-Point Sources of Pollution Conference. St. Thomas.
ARRA UVI Terrestrial sediment delivery and nearshore water turbidity, East End Beach	Tyler Smith (UVI)	Complete: results show the relationship between coral health and high levels of terrigenous sediments. Manuscript in revision (5/2016)	Use when need to propose erosion control projects- can duplicate methods.	Tyler Smith (in revision)

Reference Title	Who	Results- what does it tell us?	What to do with it/when	Citation/ Where to Find It
NOAA SocMon Survey Data Summary (2010)	Ocean Conservancy, Kim Ishida? VIRCD	Use of STXEEMP, opinions Sample size = 157 Data collected July to October 2010	Can be used as a baseline- has outreach improved opinions?	**ON FILE Word document on file with STXEEMP** Tech Memo CRCP 2. NOAA Coral Reef Conservation Program. Silver Spring, MD. 129 + Appendices.? Or VIRCD socio economic survey 2011
Resource Use/User Monitoring Protocols For The St. Croix East End Marine Park (2005)	TNC, 2005	Protocols given with example surveys (167 pages)	Background and some baseline information	**ON FILE Word document on file with STXEEMP** Prepared by the Virgin Islands Program of The Nature Conservancy for: Virgin Islands Department of Planning and Natural Resources Division of Coastal Zone Management 29th August , 2005
Human Use Study (2015)	TNC	Community mapping project done with interactive mapping software. Data collected on: boat ramps and slips, marinas, moorings, recreational and commercial boating, motorized and non-motorized personal watercraft, dive and snorkeling sites, marine restoration, camping beach areas, fish and conch fishing area, and surfing.	Useful to refer to when planning for buoys installation, directing enforcement, etc.	**ON FILE (2-page pdf summary):** TNC, 2015, East End Marine Park Human Uses Mapping, St. Croix, US Virgin Islands Case study summary on Reef Resilience: http://www.reefresilience.org/case-studies/u-s-virgin-islands-mpa-management/ These data are available on the CROP Data Portal (http://caribbean-mp.org/en/) as maps, GIS mapping layers, and analytical products.
Communications, Education and Outreach				
Education and Outreach Inventory (2010)	TNC marine outreach interns for NOAA CRCP grant	Inventory of materials and activities developed, categorized by theme, and age (mostly for school children)	Reference when developing communications strategy. Can be updated.	**On file with STXEEMP:** STXEEMP E&O Activities Inventory 2010.xls

Reference Title	Who	Results- what does it tell us?	What to do with it/when	Citation/ Where to Find It
Awareness and Communications Strategy for the Boundary Marker Buoys (2011)	Commissioned by TNC- Melanie Feltmate, Jenn Travis and Paige Rothenberger	Prior to, and following installation of Park zone boundary buoys, implement outreach activities that communicate the ecological benefits, purpose and regulations of the Saint Croix East End Marine Park and inform the public of upcoming enforcement of regulations for the Park zones. Outline of audiences, messages	Handy reference for outreach regarding the buoys and zonation. Has suggested activities and timeline and audience. Overlap with other outreach and communications initiatives.	**ON FILE Word document on file with STXEEMP:** Communication Plan for Marker Buoy Installation_April2010_draft
VIMPAN Communications Plan (2012)	Commissioned by TNC- Melanie Feltmate & Jenn Travis	Key messages for specific audiences with mock-ups of advertisements and PSAs	Useful for referring to when implementing communications and outreach plans- specific messaging that were vetted.	**ON FILE Word document on file with STXEEMP:**draft plan and powerpoint
Marine Outreach and Education U.S. Virgin Islands Style (MOES) Initiative	NOAA- Jenn Travis, Bob Trumble	Guidance on communications, education and outreach	Review prior to developing new education/outreach programs or plans	NOAA CRCP. 2014. Marine Outreach and Education U.S. Virgin Islands Style Initiative: Strategizing For Improved Outreach, Education and Communication Pertaining to USVI Marine and Fisheries Management and Conservation, U.S. Virgin Islands. Final Report. Prepared by AECOM, Jenn Travis, and Bob Trumble. Christiansted, St. Croix. September 2014http://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/812/MOES-VI_Final_Report_No_Appendices.pdf
Evaluation of MOES-USVI Style	Blue Earth Consultants	What works best for outreach about marine issues in USVI. Good recommendations for future efforts.	Review prior to developing new education/outreach programs or plans	"Evaluation of Marine Outreach and Education USVI Style: Improving Fishing Community Awareness and ComplianceAn Evaluation Prepared for National Oceanic and Atmospheric Administration Fisheries ServiceSEPTEMBER 30, 2015"http://data.nodc.noaa.gov/coris/library/NOAA/CRCP/project/812/FINAL_NOAA_MOES_VI_Eval_Report_09_24_15.pdf

Reference Title	Who	Results- what does it tell us?	What to do with it/when	Citation/ Where to Find It
Governance and Management				
STXEEMP Sustainable Finance Plan (2010)	Agathe Sector, TNC contract with NOAA CRCP grant	Extensive financial analysis based on 2010 expenditures, financial need, and the resulting gap. Recommendations for best fund-raising strategies are presented	Review the numbers to use when pitching initiatives. Current expenditures and future needs based on the updated management pan.	Sector, A. (2010). *St. Croix East End Marine Park Sustainable Finance Plan* . The Nature Conservancy. St. Croix, USVI. https://data.nodc.noaa.gov/coris/library/NOAA/CRCP/other/grants/NA09NOS4190173/USVI/USVI_TNC_STXEEMP_Sustainable_Finance_Plan.pdf
USVI Capacity Assessment (2012)	Sustainamatrix for NOAA CRCP	Summarized capacity building needs for coral reef management and protection	Useful to review recommendations for territory-wide capacity building. Will be relevant for: improving enforcement, implementation support, climate communications, and inter-agency collaboration.	Sustainametrix (2012). *An Analysis of Issues Affecting the Management of Coral Reefs and the Associated Capacity Building Needs in the United States Virgin Islands.* NOAA Coral Reef Conservation Program. http://www.coris.noaa.gov/activities/capacity_assessment/finalusvicapacityassessment.pdf
Fisheries Local Action Strategy (LAS) (2014)	Lia Ortiz, NOAA CRCP	Local Action Strategies as it relates to fisheries threat and activities in STXEEMP	Since deep sea/pelagic fisheries was not deemed a critical target due to the territory-wide reach of the issues, this supplements management for fisheries. Refer to the document periodically to advance the goals for fisheries LAS.	Ortiz, Lia A. (2014) *Fisheries Local Action Strategy Projects in the US Virgin Islands: Progress and Direction* . Final Report, October 10, 2014. NOAA/NMFS/CRCP
STEER Willingness to Pay Study (2014)	Sophia McKenzie for TNC	Interview of 400 residents and visitors-perceptions, willingness to pay. This assessment determined the dollar amount visitors were willing to pay, as well as their preferred method of contribution.	See what people were willing to pay to base any kind of PA trust, fee collection system, etc.	McKenzie, Sophia (2012). *Willingness to Pay Assessment of Visitors to the St. Thomas East End Reserves (STEER), St. Thomas, US Virgin Islands. The Nature Conservancy.*

Appendix A: Conservation Action Planning (CAP) Process, Timeline, Meetings and Workshops

The methodology to update the STXEEMP management plan followed The Nature Conservancy's Conservation Action Planning (CAP) as a mechanism to develop a strategic vision and management plan for the Park (TNC 2007). The CAP methodology has been utilized and tested by TNC and its partners for decades and has resulted in effective management plans for hundreds of protected areas around the world. CAP is based on the principles of adaptive management and is designed to facilitate and utilize input from stakeholders.

The process of working through CAP for a protected area results in a comprehensive management plan based on a solid ecological foundation focused on specific and attainable strategies for biodiversity conservation and threat abatement. Ultimately, the CAP process results in development of strategies for the abatement of threats and addressing capacity issues, scheduling and financing planned for monitoring and management effectiveness measures, and creation of an overall plan of action for the local management authority to incorporate into yearly work plans.

implemented through a series of planning meetings with the core planning team and stakeholder groups, the CAP process guides project teams to identify effective conservation strategies. Facilitated discussions result in the development of goals, identification of priority conservation resources and their condition, understanding of human activities impacting the resources, and selection of objectives and strategies for improving or maintaining the resources within STXEEMP. It provides an objective, consistent and transparent accounting of conservation actions and the intended and actual outcomes of conservation projects. It enables project staff to responsively adapt their actions to improve strategy effectiveness and achieve greater conservation impact. A brief summary of the steps for conservation action planning is provided below.

The sustainable financial plan for STXEEMP (Sector, 2010) was developed using World Wildlife Foundation's financial modeling template and TNC's methods of Integrated Strategic and Financial Planning following Conservation Finance Alliance methods and the Convention of Biological Diversity Programme of Work on Protected Areas. This included a finance gap assessment, which aided in the development of a realistic work plan, with associated costs. The resulting financial model provides comprehensive, long-term estimates of costs of each program, as well as potential sources of revenue. The total costs, revenue estimates and gap analyses derived from the model provide the components for developing sustainable funding vehicles and fundraising proposals.

Steps in Conducting Conservation Action Plan (CAP)

1. Identify site, management context
2. Determine stakeholders, experts, core drafting team
3. Define scope, vision, set conservation targets
4. Assess viability of targets
5. Identify critical threats to those targets
6. Conduct situation analysis
7. Strategies- include Objectives, Strategic Actions
8. Establish measures: management effectiveness, threat abatement, resource protection
9. Develop work plans: monitoring, funding, staffing, training, yearly activities
10. Implement
11. Analyze, learn, adapt, share

1. **Identify site, management context**
   What is the need for the plan? Is the site already protected? What are the circumstances surrounding the need for a management plan?
2. **Determine stakeholders, experts, core drafting team**
   This step asks you to identify your most valuable resource – the people who will be involved in designing and implementing your project. Addresses questions like: *"Who will design our project?" "Who will be responsible for ensuring the plan goes forward?" "Who can give us advice?" "Who will help us through this process?"*
3. **Define scope, vision, set conservation targets**
   With this step you define the extent of your project and select the specific species and natural systems that your project will focus on as being representative of the overall biodiversity of the project area. This step helps your project team come to consensus on the overall goal and scale of the project and your ultimate measures of success. Addresses questions like: *"Where is our project?" "What are we trying to conserve or restore?"*
4. **Assess viability of targets**
   This step asks you to look at each of your focal targets carefully to determine how to measure its "health" over time. And then to identify how the target is doing today and what a "healthy state" might look like. This step is the key to knowing which of your targets are most in need of immediate attention, and for measuring success over time. Addresses questions like: *"How do we define 'health' (viability) for each of our targets?" "What is the current status of each of our targets?" "What is our desired status for each of our targets?"*
5. **Identify critical threats to those targets**
   This step helps you to identify the various factors that immediately affect your project's focal targets and then rank them so that you can concentrate your conservation actions where they are most needed. Addresses questions like: *"What threats are affecting our targets?", "Which threats are more of a problem?"*
6. **Conduct situation analysis**
   This step asks you to describe your current understanding of your project situation – both the biological issues and the human context in which your project occurs. This step is not meant to be an unbounded analysis, but instead probes more deeply into

the conditions surrounding your critical threats and degraded targets to bring explicit attention/consideration to causal factors, key actors, and opportunities for successful action. Addresses questions like: *"What factors positively & negatively affect our targets?", "Who are the key stakeholders linked to each of these factors?"*

7. **Strategies- include Objectives, Strategic Actions**
   This step asks you to specifically and measurably describe what success looks like and to develop practical and *strategic* actions you and your partners will undertake to achieve it. In particular, you want to try to find the actions that will enable you to get the most impact for the resources you have. Addresses questions like: *"What do we need to accomplish?", "What is the most effective way to achieve these results?"*
8. **Establish measures: management effectiveness, threat abatement, resource protection**
   This step involves deciding how your project team will measure your results. This step is needed to help your team see whether its strategies are working as planned and thus whether adjustments will be needed. It is also needed to keep an eye on those targets and threats that you are not acting on at the moment, but may need to consider in the future. Addresses questions like: *"What do we need to measure to see if we are making progress towards our objectives and whether our actions are making a difference?", "Are there other targets or threats that we need to pay attention to?"*
9. **Develop work plans: monitoring, funding, staffing, training, yearly activities**
   This step asks you to take your strategic actions and measures and develop specific plans for doing this work as your project goes forward. Addresses questions like: *"What do we specifically need to do?" "Who will be responsible for each task?" "What resources do we need?"*
10. **Implement**
    Action and monitoring plans won't do any good sitting on the shelf – your challenge here is to trust the hard work you have done and implement your plans to the best of your ability. Implementation is the most important step in this entire process; however, given the diversity of project needs and situations, the only requirement is: *Put your plans into action*
11. **Analyze, learn, adapt, share**
    This step first asks you to systematically take the time to evaluate the actions you have implemented, to update and refine your knowledge of your targets, and to review the results available from your monitoring data. This reflection provides insight on how your actions are working, what may need to change, and what to emphasize next. This step then asks you to document what you have learned and to share it with other people so they can benefit from your successes and failures. Addresses questions like: *"What are our monitoring data telling us about our project?" "What should we be doing differently?" "How will we capture what we have learned?" "How can we make sure other people benefit from what we have learned?"*

TNC, 2007. Conservation Action Planning Handbook: Developing Strategies, Taking Action and Measuring Success at Any Scale. The Nature Conservancy, Arlington, VA.

For a full set of CAP and Efroymson Coaches Network news, tools, training opportunities, examples, and guidance documents, visit
http://conserveonline.org/workspaces/cbdgateway/cap/practices

The following table outlines the meetings that took place to draft the management plan for STXEEMP.

Date	**Meeting**	***Major Highlights***
July 18, 2012	Core Planning Meeting	*Establishing outcomes, general process, timeline and agree on role and responsibilities of participants*
Sept 11-13, 2012	Core Planning Meeting	*Review progress made from 2002 plan. Targets, threats, situations, strategies (objectives, actions and action steps)*
Oct 22-25, 2012	Core Planning Meeting	*Targets, threats, situations, strategies (objectives, actions and action steps)*
Oct 23, 24, 25 2012	Stakeholder Meetings	*Sustainable tourism / finance, sea turtle protection, fisheries strategies, and land-based sources of pollution/implementation of the HW watershed plan focus groups strategies development (see notes, Appendix B)*
December 10, 2012	Stakeholder Meeting	*Research and monitoring plan focus group (see notes, Appendix B)*
December 20, 2012	Core Planning Meeting	*Review, prioritize, determine indicators to monitor*
June 17-18, 2013	Core Planning Meeting	*Review, prioritize, determine indicators to monitor*
August 20, 2014	Core Planning Meeting	*Review, answer questions*
February, 2015	Stakeholder Meeting	*Update strategies tables*
May 27, 2016	Core Planning Meeting	*Get final updates, fill missing elements*

Appendix B: Focus-group Strategies Meeting Notes

STXEEMP Management Plan Update
Focus-group Strategies Development October-December, 2012
MEETING NOTES

Overview

The St. Croix East End Marine Park (STXEEMP) was established in 2002. The Park's existing management plan includes conservation targets, threats, and strategies along with the management objectives for the Park. Ten years have passed since the Park's management plan was published and it's important to revisit this document to ensure that the territory's natural resource managers, and the community of St. Croix, understand the Park's plans for management. Since 2002, some major milestones include the installation of navigational and zoning marker buoys, development and implementation of outreach and education programs, the completion of a major watershed study, and the collection of extensive biological and benthic data within the park boundaries. In September 2012, key managers and experts were engaged in a series of meetings to identify specific management targets (coral reef communities, seagrass communities, mangrove communities, beaches, sea turtles, and deepwater fisheries), strategies to address threats to these targets, and implementation schedule and funding plans. From these meetings, managers identified improved enforcement, increased community involvement and interagency collaboration, and sustainable finance as critical to successful management and preservation of STXEEMP's natural resources. A series of focus-group meetings were held to get input from stakeholders, funding partners, and the community on specific action steps to either abate a threat, improve a resource target, enhance use and sustainable harvest, and engage communities in the management of the natural coastal resources of the east end of St. Croix.

Strategy Development Meetings Schedule:

STRATEGY	DATE, TIME	LOCATION	*Page*
Sustainable Tourism/finance	Tuesday October23, 6pm-8pm	Company Street Hotel, Christiansted	***3-7***
Sea Turtle Protection	Wednesday, October 24, 1pm-4pm	TNC Estate Little Princess	***8-10***
Fisheries Strategies	Wednesday, October 24, 6:30pm-9pm	Company Street Hotel, Christiansted	***11-15***

Land-based Sources of Pollution: Implementation of HW Watershed Plan	Thursday, October 25, 6:30pm-9pm	Company Street Hotel, Christiansted	***16-19***
Research and Monitoring Plan	Monday, December 10, 9am- 12pm	TNC Estate Little Princess	***20-30***
Lionfish Strategies	Date TBD, following territory Forums, update of the Territorial Control Plan		

Focus-Group Meetings Goals:

- Identify specific action steps, costs, funding, and resources for the next 5 years of STXEEMP Management
- Draw on shared expertise/experience from managers, practitioners, and stakeholders

Participants:

Stakeholders who can help implement, share lessons learned, or those who would gain to understand the strategies to be implemented in the next 5 years.

General Agenda:

- Welcome, Introductions
- Background, purpose and process
- Presentation of preliminary STRATEGIES developed
- Identification of issues and factors that support or hinder management
- Development of solutions
- Listing specific action steps
- Wrap up, next steps

Output:

A draft 5-year work plan that will guide implementation of strategic actions for STXEEMP Management

Note: All focus group meetings, except the Research and Monitoring meeting on December 10, were recorded by William Coles of DF

Background and Discussion Topics: Sustainable Tourism and Finance

The Park received most of its funding through grants from the National Oceanic and Atmospheric Administration's Coral Reef Conservation Program through the USVI Division of Coastal Zone Management. To ensure long-term, predictable financing, managers recently discussed methods of generating revenue for the STXEEMP:

1. Develop a conservation trust – From which groups could pursue small grant opportunities?
    a. Territorial or Marine Park specific?
2. Sustainable tourism – What would non-extractive businesses pay for park use?
    a. Encourage the use of the park for a small fee
        i. Tour operators
        ii. Recreational activities (paddleboarding, diving, kitesurfing, kayaking, etc.)
3. Fundraising events
    a. STXEEMP birthday bash
    b. Lionfish derby
    c. Stand up paddleboard race
4. Modest admission charge
    a. Create and maintain facilities to offer the public
        i. Bathrooms, visitors center, outdoor classroom, bird watching hike
    b. Memberships with Friends of the STXEEMP – Who could coordinate this group?
5. Departure tax
6. Willingness-to-pay survey results (from recent coral reef valuation study)

Meeting Notes: Sustainable Tourism and Finance

MAJOR OUTCOMES:

The STXEEMP should be recognized by the board of tourism as a destination to attract visitors and funding. The board of tourism requires the park have at least a visitor's center to achieve this recognition. Several attractions were proposed for the park including an underwater snorkel garden in Cramer's park where use is high, a bus tour to access the more remote east end beaches and the need to market St. Croix's natural attractions.

Attendees:

John Macy - Big Beard's Adventure tours
Bill Craft - Kite Surfing/Paddle Boarding, Kite St. Croix
William Coles – DFW
Marija Macuda – STXEEMP, NOAA Coral Fellow, Friends coordinator
Michelle Pugh- Dive Experience
Henry Tonnemacher – 7-Seas, Ltd.
Jeanne Brown, Anne Marie Hoffman, Collin Daugherty, Sara Aubery, Stopher Slade - TNC

Marija's Presentation:

As part of a Sustainable Tourism program, Marija has developed a plan with input from partners on various activities to engage communities, raise awareness, promote sustainable tourism activities and potentially source areas of revenue for the Park:

- Events (i.e. Lionfish derby)
- Friends of the STXEEMP- there is a website- St. Croix Foundation- monthly activities (i.e. 2nd Wednesday at Divi?)
- Businesses offering monthly tours, Friends get discount
- Adventure tourism: sailing, paddle board, SUP, kayak, etc.
- Bayside Tours
- Marine Operator Guidelines- educate visitors
- Permits (at 1st no fees involved)
- Underwater sculpture garden –
  Argument for local vs. famous underwater sculpturist
  - for - the famous sculpturist
  - Locals - Jan Mitchell?
  - price - to hire professional may be worth it in the end
  - contest to make these sculptures - could be country or international even, provide lots of free marketing, put it at Cramers
- Visitor's Center- trail at Great Pond- cruise ship day- kayak/snorkel
- Vanity license program?
- Mooring Buoys- day use moorings

Looking for Funding options: fees- visitor fees/concession fees
Sustainable Finance Plan

General Comments:

- Concerns about Deepwater fisheries being a conservation target, no deep water areas in the park.
- Don't take the same course as Buck Island - prohibit fishing in all deep water/migratory areas
- Parrotfish - target species = big declines
  - marine park with 81% of the area open to commercial fishing

East end is a hard to use place due to weather

Are any hotels on board? No participation - How do we reach these stakeholders?

- get a spot on hotel association meeting agenda to discuss
- go to hotels and show them something special

Where is board of tourism? How to get them involved?

People expect results - show up ready with immediate output

What is the draw to the STXEEMP?

- has nothing you can't see better or closer somewhere else on the island
- What is unique within the park?
  - Concessionaires say they go to the park because you can't serve food at Buck Island - that's the only reason?
- great for kite surfing, paddleboarding and windsurfing - windward side of the island
- Bill deals with the theft problem by informing his customers of the situation
- snapper fishing for locals from the beach
- Jack's and Isaacs are special and unique, but theft problem deters
- Great pond has great sailing that is under-utilized
- Boy Scout Camp - have an eco-lodge?
- Snorkeling at Green Cay

Visitor's Center

- Have a base system (visitor's center) people think that a park you go in a gate and leave through a gate.
- tourism department wants a visitor's center to make the park a destination

Visitors center could be a hub and then guided tours to these bays

Cramer's Park

- Cramer Park should be a focus area to increase awareness and distribute information because of its popularity as a local spot.
- High Use, great for sculptures, great place for signage.
- entry to community

Access

- want water access at Great Pond - great place to paddle board but no access
- Lots of support for a boat ramp at Great Pond!!
- What are access points like in each bay? primarily by land

Be good to have dive moorings at scotch banks, on South shore, excellent diving in EEMP still.

Lionfish - on St. Thomas dive sites are pretty well cleared of lionfish, moorings in the park could limit the impact of this invasive

"Must be a local to understand what's going on in the EEMP"

Security is a big concern of why people can't visit the park, thievery

- Need to remember safety, some of these bays may have dangerous conditions and encouraging visitors is risky
- Solutions:
- Bus to take people?
- Feasibility study for bus tours?

- tours are going to have to be dynamic depending on weather and what
  - they are looking for
- Hire a security guard?

Michelle, from day one been involved and is still waiting for something, anything to happen, but happy with the progress that SEA has been making

Encourage use

Include communication

Monthly events - talks....but who would go?
East Enders might prefer to go to them at yacht club rather than Divi

What is the objective of sustainable tourism?

- Want increase in tourists because that's where the money is
- #1 industry in the world is tourism and this is why we need to address it

How much traffic do we have now? What is use like from land? From sea?

Big Beard -

- Was set back by the question of 'what we want from the park'? Use? Conservation?
- Have we asked the people of what they want?
- he wants to go to each bay and get tours, but those have fizzled
- supports visitors centers at Cramers and offices, buses to take tours, snorkel tours
- Who are "we" ....what do the people of St. Croix want?

In the beginning there was a lot of interest from the people (campers, fishers). Some people's participation was terminated....?

local input...go to DMV and spend time there and offer information, lots of people waiting around and WANT something to do, want something to listen to. Banks are also good.

What are the things that would be important, necessary and appealing to people?

Signs are overgrown

Need cooperation with parks and rec

Most activities are going to be land based, security, and have to deal with the government which is a huge headache.

Marketing for Nature

Park targets:

- -needs better marketing to market those tourists who come to look for nature
- -not catering to cruise ship passengers
- 'st Croix best known secret for environmental stuff'
- Nature related activities, current and future
- Some value in birding
- EEMP is part of the Iron Man
- some push for a bike trail - Bob White
- trust and communication has been lost with the public
- best way to communicate is to go to them
- Advertisements are not going on local stations...

Snow birds are a source of funding

Next Steps

- visitor center and outdoor classroom
- bird walk
- access point by sea
- underwater sculpture
- go to chamber of commerce, rotary, always looking for speakers....free breakfast

Background and Discussion Topics: Sea Turtle Strategies

The St. Croix East End Marine Park provides important nesting and foraging habitat to leatherback, green, and hawksbill sea turtles. Threatened by a number of anthropogenic impacts, global sea turtle population declines are common despite International, US Federal, and USVI local legislation. In recent years, positive population trends have been the result of pro-active human intervention including an expansion of scientific knowledge of local populations coupled with the identification and reduction of man-made threats. The purpose of this STXEEMP stakeholder meeting is to allow for an exchange of knowledge and concerns regarding sea turtles that inhabit and/or nest throughout the marine park. We encourage your suggestions on how STXEEMP can effectively reduce identified threats (poaching, feral animal predation, beach fire, boat strikes, etc.). At the end, we hope to identify key partners, available resources, and a schedule for activity implementation so as to improve upon the conservation of these ancient mariners.

Meeting Notes: Sea Turtle Strategies

MAJOR OUTCOMES:

The sea turtles within STXEEMP receive a lot of research attention. There is a great need to streamline these efforts among the different agencies by developing a common protocol and database. Volunteers were identified as a good resource to perform day patrols and collect basic information.

Attendees:

William Coles – DFW
John Farchette – STXEEMP
Kemit Lewis – TNC
Sara Aubery – TNC
Jeanne Brown – TNC
Clayton Pollock – NPS
Ian Lundgren – NPS
Carol Burke – SEA
Sharon Grimes – SPNWR
Stopher Slade-TNC
Anne Marie Hoffman -TNC
Richard Gideon-TNC

Beaches with Sea Turtles:
(17 bays in park JF patrols beaches twice a week and notes 'anomalies'

Priorities:

Those with high access and high nesting activity: Robins, Prunes (104 nest activity counted one time), Boiler, Chenay Bay, Coakley (camping pressure a threat, 3 diff spp nest this year), Rod Bay
Sea Turtle activity – whether or not there is a nest negligible, high activity can make these bays a priority

Poaching:

Most activity at low-accessed beaches (Boiler Bay)

Strategies:

Invasive Predators:

Is it STXEEMP responsibility?
Are there quantitative studies? – need for measurement of efforts to reduce
Southgate, Jacks, East End, Isaacs have invasive predator data (SEA, TNC)
Those with permits required to report to DFW
How many nests predated, excavated, hatchling success?

Research Questions

- Ghost nets, cargo nets, boat strikes? Impact is usually death….prevalence? How to prevent? Out of our hands.
- Boat strike prevention: Speed limits would reduce impact. Vehicular traffic not regulated. VI code: inner reef has a speed limit – no wake…..enforce speed limit….not followed at all.
  - Outreach on boating laws, education at boat registration
- Sea level Rise? Lots of anecdotal evidence-PRIORITY

- Sea Grass Habitat? Foraging areas? Where are the turtles coming from? More in water work, aerial surveys
- Genetic Work- PRIORITY: can put different values on different areas depending on who (genetically) these turtles are and where they are coming from
- Contaminants: also sunk boats

Threats:

Marine Debris

Poaching:

Boiler Bay – reduce vehicle access = reduce poaching
Sandy Point use boats to access
Disguise nests – rake
Education Outreach –
Public: PSA on Do's Don'ts Penalties – radio, TV, newspaper
Judges, prosecutors
Lee Carrubba enforcement guide and trainings
Enforcement – problem no night patrol
Measuring Success – less evidence of poaching, inc. in successful prosecutions. Hard to quantify
Limiting access (vehicles)
Who: Migdalia, Sharon and Carol, VINE,
Immigration big driver, majority of offenders
Incidental take of sea turtle adults:
BMP for net usage,
Remove SCUBA harvest?
Need increasing numbers of enforcement officers
Fines need to return to park not VI govt
Fine Schedule – Petition for a tier system for fines. CZM -Ch 99 who: legal council

Citizen Science Day Patrol – Good Engagement

- Receives calls reporting poachers and nesting/hatchlings
- Condos called about hatchlings in the pool
- Helpful?
- SEA has big volunteer training program – worked with USFW, TNC, VI DFW, Wymarks
- Difference between for anti-poaching or data collection
- Prune would be a good beach for this, also Coakley – 2 bays at first
- Disguise nests to reduce poaching – feet, rake, palm frond
- When: Recruit November, Train beginning of next season (June-July nest patrol, August hatching). 2013 will be slow year, may be a good training year, Friends group recruit and advertise for volunteers, Marija reach out to them
- Who: Coordinated by STXEEMP, STAR conduct trainings, SEA own data, Marija reach out to friends, Richard install stakes
- Costs: time (10 hrs a week to enter data), stakes (metal better, $1,000 for first 2 years (startup), find funding-ESA, DFW, TNC, Crowd Funding (Kickstarter, RocketHub), Widecast)

Data Dissemination:

Maybe we need a database remotely for all parties – managed by SEA
Standardize protocol
Min data: date, where (could GPS stake priority sites), species, maybe evidence of predation/poaching

Current Monitoring Activity

SEA March-December
TNC May-December
Partner with SEA to train volunteers and collect data sheets

Background and Discussion Topics: Fisheries Strategies

2002 MP: Incompatible fishing practices identified as a threat to the Marine Park.
2012: Managers identify overfishing and poaching as a persistent threat to the Marine Park.
Possible strategies:

- Outreach to fishers
- Park-specific fishing license
- Improve enforcement
- Boat access ramps to limit destruction of mangroves in Great Pond

Discussion Topics

What can management authorities do to increase compliance?
What can management authorities do to improve enforcement?
If you have a commercial license; what did you learn from the training when you registered for your license?
How can the Marine Park most effectively share/report out on management decisions with Marine Park users?
Deeded Access Points
Boat Speed
Marine Debris
Conch Fishing

Meeting Notes: Fisheries Strategies

MAJOR OUTCOMES:

Public access points were a big issue among this stakeholder group. Improving public access by creating a boat ramp and removing obstacles would be a good way to increase buy in. More information is needed about bait fish populations and juvenile nursery habitat within the STXEEMP.

Attendees:
JP Oriol-CZM
Michele Pugh- Dive Experience, FAC
John Farchette – STXEEMP
Lia Ortiz – NOAA CRCP USVI Fisheries Liaison
Royce Lynch – Deputy Marshal, Supreme Court, rec fishermen
William Coles – DFW
Carol Cramer- Burke – SEA

Sara Aubery, Anne Marie Hoffman, Stopher Slade, Jeanne Brown – TNC
Michelle Pugh–FAC, dive tour operator
Toby Tobias-rec and commercial fisher, STXEEMP Advisory Committee, FAC
Jonathan Brown – DFW
Mike Fuller – rec fisherman, FAC
Chad Sherraw- fishermen, FAC
Edward Schuster – president, ST. Croix Commercial Fishers
Ray Williams
Jeanne Brown, Anne Marie Hoffman, Stopher Slade, Sara Aubery (TNC)
Britni Tokotch(on phone) – NOAA NMFS

Toby – Compliance issues, has ideas on changing rules and regs to increase compliance. Commercial fishermen were on original committee…maybe missing from our CORE group. Need to pay some more attention to important people that worked on the original, acknowledge their support.
Some unhappiness with the ignoring of the previous members of the STXEEMP Advisory Committee.

LBSP/Mangroves

Mangroves in Great Pond to incr. fisheries we need to decrease shoaling and improve circulation
- First studies had only a few mangroves in far eastern end, now changed to forest!
- Tradeoff between wildlife habitat and fisheries resource
- Want to manage areas differently depending on goals or attributes
  - DFW was managing to inc. fisheries
- Hugo changed the dynamic of this ecosystem greatly, altering where mangroves are
- Identifying baselines – important for restoring ecosystem function (70's in this case)

Commercial fishermen gave up this area for fishing – inland development affected mangrove nursery areas.
Hasn't recovered still after Hugo, reefs are not even 50% of fish levels before this storm (personal observation).
Marlon has been identifying funding for Great Pond restoration to increase fisheries value.
Bird walk – does it affect fisheries value?
FAC has been trying to hold construction industry responsible and sedimentation caused by them
- Solution – bush berm used by older HEOs
- Provide incentives for using BMPs for erosion control

Baseline/resource based research:

There is a study that looked at fishery value in Great Pond for finfish – Mangrove Habitat as Nursery grounds for recreationally important fish species - Great Pond , St. Croix , US VI (Tobias 2001).
Is there quantification of the change in biodiversity caused by this change in ecosystem?
- Crabs, shrimps, birds, mullet,

Southgate changed entrance due to family feud and used trees to block entrance
Restricted flow = fish kills caused by low DO and high temperatures
Sources of Information:
- Carlo Aponte's relatives (Jenni Aponte), Robert Schuster old dairy farm, Wanda Violet, may have info on baselines.
- Also a long term school study (high school)

Coakley Bay – had a different original opening as well.- Carden Beach- historic salt marsh
-Start with the easiest, economically makes the most sense

Strategies: Historical Documents, current Use, Weigh objectives (birds? Fish? Recreation? Development?

- Need a coastal pond, wetlands assessment- quantify specis decline, mussles, crab, shrimp, birds, oysters?

- Historical conditions and how to best utilize these resources
- Who: CZM
- How much:?
- Who: USFWS already one of their priorities
- Effluent – 10 wastewater treatment plants within the park alone

Access

Boat launch access – govt tried to contact owner and create an improved access (great pond) no boat access in EEMP. Used to be one at Yacht Club.

Do we need more boat access? Yes

Where? Near the recreational area (especially buz can't drive boat to the rec area with fishing gear exposed) Cramers, turner's hole,

Feasibility? Need launch, but also need trailer parking and turn around space.

Funding: FW looks for funding annually for infrastructure, need all specifics to get funded (sz, how many boats accommodated, location, etc.), also note this entity only fund for recreational use, so would have to be in rec area (sportfish division)

Objective: in the next two years identify location and take steps to create one (i.e. funding proposal completed)

Fishing Pier – also improve access

The following may be an easy win to gain support from the community while at the same time enforcing park rules and regs and providing good example of management**

Deeded Fishermen Plots: N Slob (Smuggler's), Grapetree (Maggie), S Slob (Divi) (look at the words of this, get from FW to pursue legal action with these home owners who are occluding)

Problem: Debris and boulders are blocking this access at grape tree (on southshore road)

Who: Recorder of deeds, Public works can open, DPNR, is there an HOA? What was their role in placing the obstructions.

That shoreline should still be open for rec fishing (R&R)

Strategies – 3 public access points , some vehicle access. North slob, south slob, and grape tree (occluded and between two houses-problem because inaccessible. EEMP doesn't manage land. Public works should maintain if we get an agreement) . Access for shoreline not included in original management plan? TT

Meggy beach,

East end bay vehicle access was also blocked off – due to erosion issues, bad road cut – poor planning

Vehicles, big issue Golden's development, crabbing activities? <- Research ?

Also identified security problems with parking at EEMP.

Zones R&R - Wildlife area: what is the evidence that this area needs a special designation? Originally needed because of the type of gear that used to be used. Now is it still necessary? No gill and trammel.

Turtle safety

Boat strikes?

No desire for marking of the reef cut. Important for fishermen in inclement weather to travel in between reef and the shore

Ghost nets? Marine Debris? Prevention impossible by park staff

Turtle poaching:

Accidental take of turtle? Not that they know of.

Beach across from green key – placed boulders to block off vehicle access because of turtle nest – but no signs against people with dogs, or bonfires. Feeling that they are unfairly persecuted. Signs first and then enforcement.

No Dogs – only for public land beaches, private beaches can have dogs.

Does there need to be a dog beach?

Chad – licensing: requires change in rules and regs

Charters doing inshore fishing in the no take area – Create a recreational guide's license
Shoreline recreational fishing – license these fishers to manage this type of fishing
Lionfish removal in NTA: special permit to take care of that
Strategy – inc. marker buoys and signage: Lots of people do not know that they are in the park.
FW developed a plan with FAC to develop recreational license program, been before the commissioner for 2 years.
Concern that new management plan is being updated without update of rules and regs
Fishermen gave up the NTA but can't get sprat here – but they aren't shown any reasons
One reason for desire of sprat fishing in NTA is the proximity of bait fishing to where they fish for other things because the bait fish won't survive to the fishing areas.

- Part of the concessions included alternative livelihoods with a 6 pack license
- Fishermen have to donate their time to this process vs. others who get paid (govt, conservation partners)

Trust lost -> certain things promised and omitted from original document and this causes contention
What can we do to increase compliance and improve enforcement? Look at those things that were omitted
What is our marine park supposed to do for us?
Want information on the impacts of single line recreation fishing
Use – if people can't use it than why have it? Differences in kind of use
Needs comprehensive management – not just prohibit fishing
Action steps for these discussion points:
Staffing for EEMP – Are there funds to address these short-comings?
Money is there, initiatives are there – regarding the Coordinator
Annually govt funds are being cut 3%
Lots of people don't know that you can't harvest in the park
Strategy: Increase communication and outreach
Include the definition of 'proper storage of gear' for commercial fishers transiting through the STXEEMP
Whelk – October 1 open – line fishing only
Feels that whelk is already regulated through seasons
Lots of misunderstanding about what NTA means,
Possibly need a meeting on fisheries closure
Communication of the results of the management decisions: how can we effectively communicate this data once we have it to fishers,
Do they want to help collect this data?
Develop "management experiments with them"
Reports, monthly meetings
Without enforcement might as well not have a park
Look at original document – lots of compromises shoved to the side to regain trust
Need to make sure to utilize the resources that we have especially from the originals
Transcripts will look at to rectify problem of throwing out agreed on concessions
What fisheries related purpose is NTA? Other areas? – this is a multi-use park
Another fisheries meeting:
Priority: look at originally agreed on document and discrepancies
Objectives:
Improve nursery area

Improve fishery habitat

Using barbless hooks for closure times? And to increase sport fishing, circle hooks.

What do we want to study?

Bait fish populations inside and outside NTA zone

What do we want to accomplish?

Best ways to communicate with interested parties – emails etc.

Bait fish – bally hoo fishing that doesn't drag on bottom,

Strategy

FW when register commercial fishermen, also provided with rec fishing guide – needs to expand section for rules of STXEEMP, definition of 'properly stowed fishing gear' and this document needs to be distributed to park patrons

GPS shapefile on navigational maps

? for Toby – when you say areas were changed – what was the justification of original boundaries

Just because requests were made, doesn't mean that the department accepted it

Keep in mind what are the purposes of the park and the importance of it

Eddie interest in watershed nearshore health

Background and Discussion Topics: Watershed Implementation

The uplands of the Marine Park include approximately 12 square miles from the watersheds of Southgate, Solitude Bay, Teague Bay, Turner Hole, Madam Carty, and Great Pond Bay. Horsley Whitten conducted a study in November, 2011 to assess the status of the STXEEMP watersheds and identify strategies for reducing land-based sources of pollution (LBSP). Because of this high degree of connectivity between marine and terrestrial environments, heavy rain from storms can carry LBSP to the ocean. LBSP threaten each of the Marine Park's management targets (coral reefs, seagrass communities, etc.) and the 2011 watershed study produced a strategy document on ways to improve the East End watersheds. Managers and Marine Park users can now move forward in determining mechanisms and a schedule to implement the recommendations outlined in this report.

Discussion Topics:

- Current Projects
- Funding Options
- Examples:
  - STEER
  - Coral Bay
- Public Works?

TMDL's

Altona Lagoon	Impaired 2010	TMDL 2025	STC-03: DO, turbidity, fecal from hwy, roads, new construction
Teague Bay	Impaired 2010	TMDL 2027	STC-10: Turbidity, pH, fecal from non const. hwy, road runoff
Turner Hole	Impaired 2010	TMDL 2029	STC-11B: DO from erosion VI297470: turbidity, erosion

			sedimentation
Southgate	Impaired 2010	TMDL 2012	STC-05: DO, fecal, entero, turbidity from marina, boat maintenance, non-pt STC-04: DO, fecal, turbidity from vessel discharge, sewers, sedimentation
Salt River	Impaired 2010	TMDL 2016	STC-33A: entero, fecal, turbidity from LBSP, storm sewers STC-33C: turbidity, fecal from LBSP, sewers

Meeting Notes: Watershed Plan Implementation

MAJOR OUTCOMES:

Dealing with watershed issues is difficult because the source of many of the problems comes from outside the parks jurisdiction. Improving habitat quality and conditions for each of the management targets will require cooperation from government, regulatory agencies and those who live and work within the watersheds. One way to improve this collaboration may be to hire a watershed coordinator. The Horsley Witten group developed a watershed management plan and implementation of these recommendations should begin quickly to make best use of this effort. Focusing on paving dirt roads and gut restoration in Adam's gut were identified in this management plan as having the most positive impact on the STXEEMP watersheds.

Attendees:

Marija Macuda – Friends Coordinator, STXEEMP
John Farchette – STXEEMP
Kynoch Reale-Munroe– UVI/grants
Alex Holecek – CZM
May Adams Cornwall- family and WMA
Carol Cramer-Burke – SEA
Julie San Martin –St Croix Yacht Club
Joe San martin – St. Croix Yacht Club
William Coles- DFW
May Adams Cornwall- Ex Direc/VIWMA
Anne Marie Hoffman, Stopher Slade, Sara Aubery , Jeanne Brown - TNC

By phone:
Rob Ferguson – NOAA CRCP watershed

Lisa Vandiver – NOAA restoration Center
Susie Holst – NOAA Restoration
Anne Kitchell – Horsley Witten

Anne Kitchell Presentation of the STXEEMP Watershed Management Plan:

3 main goals (pg 4 of 22 in her presentation)
- Protect marine resources
- Engage residents
- Demonstrate restoration

Key recommendations (5)
- Watershed coordinator, enforcing existing regulations, support ongoing conservation, reduce sediment loads: gut stabilization, drainage improvements, manage untreated stormwater, education, formal tracking mechanism

110 actual projects identified and ranked
Models of where the LBSP are coming from
Watershed plan recommendations: many are regulatory and dealing with development
Not a lot of opportunity for storm water retrofitting- mostly unpaved roads
Structural Practices: each has table of ranked projects, priority actions, maps, imp. concepts
- Stormwater retrofit
- Gut stabilization
- Unpaved road and trail improvement
- Culvert repair/replacement

Pollution prevention: dumpster and trash clean up related
Covered dumpsters
Pg. 47: IMPLEMENTATION

- Increasing Collaboration: No one from Public works has been involved since Roberto Cintron- how to reach out to DPW for maintenance and training?
- Regulatory update is necessary – makes lots of sense
- Volunteer Day on Saturday (Oct 27) to build the rain garden – Contact Carol Burke
- Make sure that solutions are present at multiple scales, ex. Rain gardens that need bulldozers vs. projects individual homeowners can do
- Consider where potential development (Solitude, Robins, Great Pond), Southgate unpaved roads, ghuts

Funding

- What are the resources available right now for starting to implement these projects? None?
- Coordination with local managers to get jurisdictional cooperative agreement within NOAA
- Where does WMA get funding?
- NOAA coastal fellow?

Agency	Grant Name	Amount	Scope	Timing
NOAA	Internal funding	$200k		Ongoing
NOAA	Coral Program	?	Restoration project (Marlon), building partnerships, Assessment activities and efficacy of management strategies, baseline studies	
NOAA	Domestic Coral Reef Conservation Grant	$50k + match	For non-profits and academic institutions, watershed management plan activities or threat reduction	November

	319		Can be received by DPNR	
NFWF	Coral Program	$50k		
USDA	Equip		Give landowners with money to do restoration (already identified as a source for Adam's Gut)	
USDA NRCS		$75k	Technical assistance	
EPA	Region 2		Difficult to receive but still should be pursued	
NOAA	Restoration Center	1-1 Match	Funding for Community based restoration program	
EPA	Care Grant	$100+k	Coral Bay Community Council received this to increase capacity (staff, engineering)	
Gulf of Mexico			NOAA Partnership, works in La Parguerra (PR)	
	AmeriCorps Volunteers			

Watershed Coordinator

Funding for a coordinator? Maybe through Rob's NOAA internal program – if it's a top priority in the watershed management plan.

Duties of watershed coordinator? Share between EEMP and STEER? Probably not. Depending on the size and complexity of watershed.

VI 319 coordinator Emanuel Liburg

Not necessarily be a DPNR person.

Watershed coordinator wouldn't have any legal authority so there's no point

Get ordinances, have MOU's but nothing is happening.

Senate needs to forfeit its right to make zonation

Next NOAA fellow 10% of duties for watershed (for one year)

Misc

- Need cooperation with public works director, TNC and marine park
- Green Kay marina is pursuing blue flag marina program
- TNC could be implementer of demonstration projects on our land
- How long is watershed management plan good for? No clue
- Sometimes changes very fast
- Building capacity of public works – big deal, information is their power so they don't give it away
- How to coordinate within agencies and mandate that people do their job
- We have on board May Cornwall with WMA, and CZM, trying to get commissioner Smalls
- Create a watershed committee that meets every quarter – was denied by commissioner
- Need government house support

Meeting Notes: Research and Monitoring

Agenda:

1) Review STXEEMP management plan update process and progress
2) Review current and recent research and monitoring
3) Review management plan *strategies* being developed for 2013-2018
4) Develop *indicators* to determine impact of management actions
5) Construct and prioritize *research and monitoring* for 2013-2018
    - Need, Feasibility, Impact, Cost

Proposed Targets
Mangrove Communities
Coral Reef Communities
Sea Turtles
Beaches
Seagrass Communities

Major Threats Identified
Overfishing/Illegal Fishing
Lionfish
Sea Turtle Poaching
Land Based Sources of Pollution
Lack of Enforcement

Indicators for:

- Status of **target**, resource trends (i.e. recovering fish stocks)
- Abatement of **threat** (i.e. reduction in sediment loads)
- **Human use** – activities/use trends, compliance, socioeconomic benefit/impact
- **Management Effectiveness**

Considerations/Limitations:

- STXSTXEEMP Coordinator is not in place to evaluate monitoring and research
- Interpretation of research and monitoring not being used to guide management
- Various entities conducting research, however no central STXSTXEEMP database
- STXSTXEEMP has little to no data on the impact of zones, rules and regulations

Research and Monitoring Goals:

1. *Improve inter agency communication and data-sharing to more efficiently feed information into decision making and planning by the CZM and STXSTXEEMP Office.*
   Partners: STXSTXEEMP and DPNR (various Divisions), TNC, UVI, NOAA (Biogeography, CRCP)

   Strategies: Develop R&M subcommittee

2. *Assess impact of zones, rules, regulations and management actions on the status of resources/targets.*
   Partners: STXSTXEEMP and DPNR (various Divisions), TNC, UVI, NOAA (Biogeography, CRCP) **Strategies:** Prioritize research and monitoring based on indicators

MEETING NOTES: Research and Monitoring

Attendees:

Marlon Hibbert - NOAA Coral Liaison
Marcia Taylor – UVI, FAC
Carol Burke - SEA
Toby Tobias - STXEEMP advisory committee, FAC
Tyler Smith - UVI
Jose Sanchez - DPNR/STXEEMP
Jenn Travis - new NOAA fellow, STXEEMP
Bernard Castillo - UVI
Ian Lundgren - NPS
Clayton Pollock - NPS
Jaime Kilgo – NPS
Chad Sherraw, FAC
Sara, Collin, Stopher, Anne Marie - TNC

By Telephone:

Jeanne Brown - TNC
Glenis Padilla- NOAA Affiliate, PR
Ron Hill - NOAA Fisheries TX
Bill Arnold – NOAA SE Regional FL
Paige Rothenberger- DPNR
Lee Carrubba - NOAA Fisheries PR
Lia Hibbert - NOAA Fisheries liaison, USVI (ERT Contractor)
Jennifer Schull- NOAA Science Planning, FL
Simon Pittman, NOAA Affiliate UK
JP Oriol, DPNR/CZM

STEPS

- Current research

- Review priority strategies
- Prioritize *future* Research and Monitoring activities

Current Research (source or speaker in parenthesis)

Territorial Coral Reef Monitoring Program (TCRMP) (Tyler Smith)

4 sites within STXEEMP (+1 inside Buck Island) – 1xyr. For adding more longitudinal sites: need to pick ones with good coral cover. No additional funding at the moment to expand sites.
Other: stratified random sampling, *Acropora* mapping program ,temp, h20 quality- ad hoc schedule
2-3 permanent Acropora - 3x yr. using Williams and Miller protocol

ARRA watershed restoration project in STXEEMP – East End Bay (2010-2011)

There was a lot of turbidity anyway at this site, and not a lot of sedimentation
have info on site selection for a **sediment monitoring program**
Methods being sent

Conch monitoring -

NOAA (Ron Hill)- completed for 2 yrs., 10m radial surveys (n=503, 20-30% in STXEEMP)
3700 juveniles, 1000 adults. reviewing management zones, habitat and depth. NOAA fisheries funding- MARFIN- can compare with DPNR methods

DPNR (Toby Tobias)- Every 5 years. Conch habitat evaluation, methods analysis.
5 yr. cycle w sea map. 26 site 40-50% STXEEMP -
+ back reef embayment survey - conch, fish etc.

Fisheries Independent Survey -

NOAA - would like to expand to examine reef fish distribution

NOAA NCRMP (Anne Marie reported)

Fish blitz - NOAA 20 sites –starting from 2001
trying to standardize protocol. every 2 yrs. benthic surveys to develop baseline and make it compatible w other monitoring efforts (like TCRMP)
(Randy Clark email) Some rough estimates for the amount of direct funds spent and in kind funds come to about 19K and that yielded 62 surveys inside the EEMP. That roughly equates to about 20% of the total survey sites around the island.

Lobster monitoring -

Paige conducted. Data has been QA QC, no analysis yet. (same for *Acroporid* but no more funding)
funding available
Need to make compatible with NPS - multi year rotation. surveying different habitat types and lobster numbers

NOAA Trap Study (Simon Pittman)

Fisheries-independent Monitoring conducted by Todd Gedamke in 2010 using fish traps and drop cameras.

***Acropora* GPS Mapping** (Jeanne Brown)

TNC and UVI mapped *Acorpora* in about 8 bays (6 in STXEEMP) 2005- 2008. Similar to Meyor methods Buck Island: GPS size distribution, incidence of disease and bleaching TNC has data and maps)

Sea Turtles (Carol Burke, Ian Lundgren)

SEA - day patrol and nest excavations since 2005 Chenay Bay. Submitted to DPNR as part of permit.
STXEEMP - John Farchette day patrol of all 17 bays, counting crawls, notes predation, poaching
TNC - Jack's, Isaac's, East End- Reports since 1997
STAR - data submitted to coordinator (Renatta and __) mostly just stranding

Water quality monitoring (Tyler Smith)

monthly sampling at 12 random points within 4 zones - Teague Bay also use CTD - UVI has it
Part of DEP - section 106 water quality standards project
Fecal data – more reliable, others may not

(Bernard Castillo) -
2 yrs, 5 min intervals. Boiler Bay (next to Cramers). Some sediment data

Watershed management plan HW

no plans for water quality monitoring

Watershed restoration

covered by Tyler, sediment trap data- new methodologies
terrestrial and benthic surveys (Carlos Ramos-submitted to NOAA)

Land Sea characterization (Simon Pittman)

NOAA synthesis for fish and benthic communities in and around STXEEMP in addition to land use synthesis - expected early 2013
Baseline characterization for STXEEMP zones
EPA - landscape index, NOAA's report is extended to include marine environment. (Leah Oliver)

Grouper surveys (2006) (Simon Pittman and Tyler Smith)

Hank Tonnemacher surveys of grouper developing spatial dataset along with land sea characterization

Land Crab survey (grad student

Acoustic tracking of Lang Bank SPAG – NPS (Ian Lundgren)

- implementation plan finalized in the next 6 mos

Bird Monitoring

none offshore
Caribbean waterbird census - data should be available eBird Caribbean
coakley, mt. fancy, greatpond,
Monthly surveys greatpond - private
Claudia Lombard - masters thesis least terns, published island wide

TNC *Acropora* and nurseries (Kemit Amon Lewis)

Hobo lt. and temperature data
Teague Bay, Rod Bay, Knight Bay, Green Cay outplanting
data compiled, not shared

Coast weeks

Marine debris- most numerous items found. data downloadable from Ocean Conservancy

SOCIO-ECONOMIC STUDIES

Valuation of coral reefs
2010 – U Netherlands group. draft report submitted to NOAA.
Available February 2013?

SocMon Visitor Perception Survey (TOC/VIRC&D Kim Ishida)

2010 completed, n=157, resulted in a communications strategy for the Park
Jeanne has copies of results from Kim

Recreational fishery in St. Croix (Jennifer Schull)

-Commercial Fishing survey that Theresa Geodeke and Peter Edwards Shore based survey FY13
Jim Berkson from SEFSC - creole intercept survey at boat ramps - Marlon has both those proposals

Need to Document - improving effective management

(Lee Carrubba from email) With FY10 NOAA CRCP funding, we compiled a database of grey and scientific reports of the locations of acroporid corals and the other 7 corals that are now proposed for listing under the Endangered Species Act. We are finalizing the metadata for this, but the database is available. It's not specific to the STXEEMP, but has Territory-wide information.

The NOAA Carib Initiative is working on a webpage through the existing SECART page. The Steering Committee requested that the page include links to all Caribbean data sources so any data could be referenced through this page (or it sounds like the UVI effort Tyler mentioned may be a good chance for a partnership).

The Caribbean Fishery Management Council is working on a historic mapping project using hard copy maps and translating them into electronic maps. They are focusing on fishery habitat. If St. Croix folks haven't joined this effort then they should contact Graciela Garcia or touch base with CFMC at the upcoming council meeting in St. Thomas.

Historical Data

West Indies Lab - Toby has research publications for digitizing or reference, Peter Sales, Warner
Cherubin/Paris - larval sink - for recruitment monitoring
F&W Great Pond fishery nursery - Tobias 2001
Lobster tagging? NMF
EPA's data? - rapid bio assessment, stony coral, water quality data as well, need to communicate paper in MEPS

Need to create a report of all info to date - good UVI student projects

Goal for Ongoing Research and Monitoring

Increase collaboration and data dissemination available to park staff and other managers

- create a **committee**
  - partners - UVI, CZM, USFW, NOAA, NPS, DFW, TNC, Ocean Conservancy?, community members/users, STXEEMP biologist
- **Links** to old reports and current data on STXEEMP website
  - UVI has a new data center GeoCAS - resource. need funding
- **database** for information collected
- create a database of relevant reports
  - NPS has requirements to submit reports to park service
  - DPNR also has the same requirements, should have this data
- require report submission to STXEEMP for all research permits issued within?
- how to make management effective? Enforcement zones
  - GIS layers of Zones? give to Tyler. are on STXEEMP website. buoys in place

(William Coles email) Please remind everyone that when conducting research on natural resources within the Territorial Boundaries a permit is required from DFW.

Monitoring Objectives

Needs

SOCIOECONOMIC- review "Resource Use/User Monitoring Protocols for the St. Croix

East End Marine Park" (2005) for protocols

Park Perceptions

User surveys (GeoCon use assessment (2010) and VIRC&D/OC (2010)

Economic evaluation study - St. Croix residents thought that resources were more valuable (n=1,000+)

Events to gain momentum of public with importance of park

Jenn Travis, next NOAA Coral Fellow - develop relationships with community members, inc. sustainable use activities, coordinate watershed activities

Boat registration - information packets

(Peter Edwards from email)

The USVI (including of course STX) is scheduled for NCRMP Social Science Monitoring sometime in 2014. i.e. coral reef related resident and possibly tourism operator surveys.

Data that might help direct rule and regulation changes that need to be made

ex. moorings in seagrass

Fish spawning Aggregations (Tyler Smith)

Red Hind/ Other Spawning aggs?

need to be identified for future closures/change in zoning

More water quality-

In turbulent areas difficult to separate re-suspension from new addition

Terrestrial monitoring?

Especially for watershed restoration projects

(Simon Pittman from email) greater focus on water quality monitoring and the direct causes and the need to identify water quality targets that are relevant to coral reef ecosystem health. To complement this information it would also be useful to have someone model hydrodynamics near shore (would probably need new seafloor bathymetry though) to map the pathways of runoff from the watersheds. Not sure who would do that kind of thing, but it could be useful to have models of that land-sea connection to narrow down the problem source areas and recipient areas.

Resource Status -

Need a good bathymetry layer for STXEEMP

LIDAR - Tim Bautista, put us on the list (Simon's talked to him)

Need to create that management priority into plan

Current NOAA habitat map maxes out at 20m

Good info about the few sites we monitor, that's it.

Lots of data in between Buck Island and St. Croix

ONE TIME:

Fisheries

Identify nursery areas -

peter sale, bob warner, rick nemeth

Funding - NMFS, F&W

FREQUENT

Coral Reefs

Note - no mesophotic reefs in STXEEMP. Steep shelf break

Benthic Monitoring

Longitudinal sampling - need to increase variety of sites covered (habitat type. especially need barrier reefs, inside and outside, also....) Sites that intersect habitat types and management zones. Need funding

Who-

Include metrics -

herbivory (need size, parrotfish counts) - Margaret Miller submitted NOAA (didn't get funded)

Indicating rare species- ex. roving dive to get data on ex. Nassau Grouper

Coral recruitment indicators? - but so variable....need to be a separate program.

Baitfish Resources?

USFW? important for fishers

Seagrass Communities

Are the functions that seagrass are providing working within and out of management zones?

Aerial Surveys -

happen every 4 yrs. NOAA last one 2011. can see changes over time

- remove established moorings from individuals and develop alternative

Monitor Anchor damage

document locations. provide info to CZM to replace with acceptable mooring equipment

could change rules and regs to make within park moorings compatible

plans to re-establish day use moorings

are there any storm moorings? ex. Teague Bay boats are there permanently.

What's out there now and what is use like?

Ken builds a lot of moorings - may have info on GIS pts

Groundings

most boats grounding in STXEEMP is in seagrass beds

Juvenile Species

More Conch info?

juveniles - baseline study from F&W

annual survey
who - STXEEMP, SeaMap

Sea Turtles
Special Zone
sea turtle activity within this special zone. is this zone necessary?
differences in regs are just a speed limit
visual surveys, acoustic tags,
(Lee Carrubba from email) Also need to know about sea turtles in the water, not just nesting, and interactions with human activities such as boating as part of assessments of the effectiveness of zoning in the park, as well as part of assessments of the populations of these animals.

Beaches
Access issue - 3 public accesses, none identified. one occluded - Grape Tree.
User Survey - having access points match use

Sea Level Rise
- aerial photography
-Beach Profiles -
low cost, low expertise, 3x yr. community engagement **Sand Watch -** Emery protocol
Beach Hotel - erosion problems
Grape Tree: beach nourishment projects - previous were failures
groins, jacks, sand re allocation

Mangroves (seabirds and blue crab)
Great Pond

Blue Crab population studies

Juvenile fish populations

landscape change in Great Pond
restoring hydrologic and nursery function
FO
aerial photos (scheuster), F&W report
not much evidence from photos
Keep in mind current ecosystem services
Dennis Hubbard - Marine Geologist
consulted by USF&W (sportfish restoration program)
1st. EIA
2nd Army Corps permit
3rd Action

Mangrove Oyster
no longer in the root community!!!!!!

Deep Water Pelagics

Census of commercial fishers
who is fishing? Catch reports
transition between reef fish to pelagic resources**

Lionfish

is there a threshold?
results of removal efforts? REEF proposed to study this on the N shore of St. Croix.

Sustainametrics

capacity for coral reef management in the VI - get emails to Marlon so he could send to the group

Climate Change

OA, thermal stress (T data from remote sensing, UVI, TNC),
take vulnerabilities of monitoring results and see what the impacts for climate change to the resources. there is a territorial model of coastal inundation. can be applied. Look at the relationship between zones, what is protected and what is vulnerable.

Other
(Lee Carrubba email) One other issue to be considered for research is the listing of additional coral species (5 as endangered and 2 as threatened) under the ESA, as well as the upgrading of acroporid corals to endangered, which is proposed by NMFS. If any of these listings move forward, research toward the recovery of these species will be important

Appendix C: Review of 2002 Management Plan Progress with Table of Milestones, Ongoing Activities and Current Projects

Strategy/Activity	Overall MPA Priority Level	Year to Complete	Funding Available to Complete	Total 5-year Cost ($1,000)	Date Completed	Comments	Ongoing / Needs completion / Needs Attention
Navigational/Boundary Marking 7.1 (p.25)							
Navigational Marking 7.1.1 (p.26)				138			
Inventory and GeoReference Areas	High	1	No	10	2011	NFWF funding with TNC- Ken Schull	
Implement Navigational Marker Program	High	1	No	42	2011	NFWF funding with TNC- Ken Schull	
Develop Navigational Marker Maintenance Program	High	1-5	No	86	2011	Monitoring plan completed, needs regular $$	Needs Att
Boundary Marking 7.1.2 (p.26)				210			
Inventory and GeoReference Areas	High	1	No	10	2011	NFWF funding with TNC- Ken Schull	
Implement Boundary Marker Program	High	1	No	78	2011	NFWF funding with TNC- Ken Schull	
Develop Boundary Marker Maintenance Program	High	1-5	No	122	2011	Monitoring plan completed, needs regular $$	Needs Att
Zoning 7.8 (p.48)							
Resource Zone Marking Program 7.8.1 (p.49)				149			
Inventory and GeoReference Areas	High	1	No	10	2011	NFWF funding with TNC- Ken Schull	
Implement Zoning Boundary Marking Program	High	1	No	46	2011	NFWF funding with TNC- Ken Schull	
Develop Zoning Marker Maintenance Program	High	1-5	No	93	2011	Monitoring plan completed, needs regular $$	Needs Att
Mooring Buoys 7.6 (p.41)							
Mooring Buoy Program 7.6.1 (p.42)				194			
Inventory and GeoReference Areas	Med	1	No	10		Include the history/background in any plans	Need compl
Implement Mooring Buoy Program	Med	1	No	70		In progress- public consultation (2014)	Need compl
Develop Mooring Buoy Maintenance Program	Med	1-5	No	114		Fashion after STT- Reef Ecology, dive ops cont	Need compl
Enforcement 7.2 (p.28)							
Enforcement Program 7.2.1 (p.29)				1,202			
Hire and Train MPA Enforcement/Interpretive Officers	High	1	Some	1,202	2004	Interpretive ranger training and guide book (2009)	
Interagency Agreements 7.2.2 (p.29)				20			
Develop Interagency Agreements	Medium	1	No	5	2006	Correspondence only. What is needed?	Needs Att
Develop Standard Operating Procedures	Low	2	No	5	?	Yes, but not specific to park	Need compl
Develop Standard Training Program	Low	2	No	10	2012	In progress	Need compl
Education and Outreach 7.3 (p.31)							
Community Involvement/Community Program 7.3.1 (p.32)				289			
School Programs	High	2-5	No	239	2004		Ongoing
Special Events	High	1-5	No	25	2004		Ongoing
Public Forum	High	1-5	No	25	2004	2012 public forums on rules and regs	Ongoing
Product Development 7.3.2 (p.32)				350			
Printed Materials	High	1-5	No	275	2004		Ongoing
Audio-Visual Materials	High	1	No	50	2004		Ongoing
PSAs	High	1-5	No	25	2011	recorded? Aired?	Ongoing
Recreation 7.4.2 (p.35)				5		Moved to this section	
(Reduction of) Coral Touching	Med	2+	No	5	?	No specific policy	
Regulatory 7.4 (p.34)							
~~***Submerged Land Use 7.4.1 (p.35)***~~				~~10~~			
~~Dredging Prohibition~~	~~Low~~	~~2+~~	~~No~~	~~5~~		Non issue/non threat	
~~Dredging Regulation~~	~~Low~~	~~2+~~	~~No~~	~~5~~		Non issue/non threat	
Boating 7.4.3 (p.35)				156			
Boat Groundings/Salvaging/Towing	Med	2+	No	5	X	Standard response plan, Salvaging/Towing added to this category, authorization needed for towing/salvaging	
Pollution Discharges	Low	2+	No	5	In progr	Marinas yes- pump outs? No discharge enforce	Needs Att
Special-Use Permits	High	2+	No	136	In progr	For what, exactly?	
Vessel Operations/PWC Management	Med	2+	No	5	X		
Fishing 7.4.4 (p.36)				151			
Review of Fishing Regulations	High	2+	No	15	In progress		Needs Att
Licensing Program	High	2+	No	136	In progress		Needs Att
Fisheries Liaison Office 7.5 (p.39)							
Promote Fishing Pressure Shift 7.5.1							
Fisheries Liaison Office	High	1-5	No	331	2011	not STXEEMP- DFW does mgt, NOAA fisheries Liaison	

Strategy/Activity	Overall MPA Priority Level	Year to Complete	Funding Available to Complete	Total 5-year Cost ($1,000)	Date Completed	Comments	Ongoing / Needs completion / Needs Attention
FADs	High	1-5	No	25	No		
Fly Fishing Guide Training Program	High	1	No	25	No	not applicable?	
Water Quality 7.7 (p.43)							
Domestic Wastewater 7.7.1 (p.44)				20			
Water Quality Standards	High	2+	No	10		TMDL's exist- PLANS? Coordinate w/ DEP	Needs Att
Resource Monitoring of Surface Discharges	Low	2+	No	10		UVI?	
Stormwater 7.7.2 (p.44)				60			
Stormwater Permitting	High	1	No	10	In progr	Need special regs for upland activities affecting park	
Stormwater Management (Guts, Roads, Etc.)	High	1	No	25	2010	priorities funded + SEA has funding with NRCS	Needs Comp
Stormwater Retrofitting	Low	1-5	No	25	x	DPW + businesses and homeowners	Needs Att
Marinas & Live Aboards 7.7.3 (p.45)				15			
Pollution Discharges	Low	2+	No	5	?	low priority - in progress?	
Marina Pump out	Low	2+	No	5	X	Green Cay, Yacht Club, commercial waste mgt	
Marina Operations	Low	2+	No	5	2012	Green Cay blue marina program	
Hazardous Materials 7.7.4 (p.45)				35			
HAZMAT Response	Med	2+	No	10	No	VITEMA/ CRRT. Need protocol, equipment, tra	Needs Att
Spill Reporting	Low	2+	No	5	No	NRCS/USCG?	Needs Att
HAZMAT Handling	Med	2+	No	20	No	VITEMA response plan	Needs Att
Watershed & Coastal Wetlands Protection 7.7.5 (p.46)				30			
Develop Comprehensive Plan	High	1-5	No	30	2011	Horsley Witten Plan	
Research & Monitoring 7.9 (p.50)							
Biological Monitoring 7.9.1 (p.51)				233			
Develop Biological Monitoring Protocol	High	1	Some	5	2010	Collaboration w/ biogeo, TCRMP, lobster, conch-still needs rev	
Identify Biological Monitoring Sites	High	1	Some	5	2012	Biogeo, TCRMP (permanent sites)	
Implement Biological Monitoring Program	High	1	Some	213	2013	Biogeo, TCRMP, staff and support partners	
Review & Revise Management Practices	Med	2+	Some	10	2013	Staff, core planning, coordinator	Needs Att
Resource Use Monitoring Protocol 7.9.2 (p.51)				233			
Develop Resource Use Monitoring Protocol	High	1	Some	10	2010	Original 2005 report of 167 pages, GeoCon 2010	
Implement Resource Use Monitoring Program	High	1	Some	213	2014	one survey completed, human use mapping 20	Ongoing
Review & Revise Resource Use Mgmt Practices	Med	2+	Some	10	No	With review of RR	Needs Att
Fishing Activity Monitoring 7.9.3 (p.52)				233			
Develop Fishing Activity Monitoring Protocol	High	1	Some	10	2009 (?	GeoCon partially	Needs completion
Implement Fishing Activity Monitoring Program	High	1	Some	213	2013	Enforcement is absent, monitoring occurs of Hind, Yellowtail, Reef fish composite + NOAA recreational and kreel surveys	Needs Att
Review & Revise Fishing Activity Mgmt Practices	Med	2+	Some	10	No	DFW?	Needs Att
Marine Park Database 7.9.4 (p.53)							
Develop Monitoring Database	High	1	Some		No	Biogeo? UVI?	Needs Att
Manage Monitoring Database	High	1	Some		No	Who?	Needs Att
Opening of East End Marine Park Office 7.10 (p.55)							
Open East End Marine Park Office				934			
Open East End Marine Park Office	High	1	Some	934	2007	Park staffed 2004	

Milestones
Park staffed (2004)
Interpretive rangers (2004)
Park office opened (2006)
Earth day event
Moorings installed, removed and relocated
Volunteer Support Network (2008)
Road signs installed (2007)
NOAA/ARRA east end bay erosion project (2009)
Friends of EEMP est. (2010?)
Geocon use survey (2010)
STXEEMP Sustainable Finance Plan (2010)
Horsley Witten Watershed Management Plan & study (2011)
Marker and navigational buoys installed (2011)
Rules and Regulations review (2011)
Joined the U.S. National System of MPAs (2012)
Became part of VIMPAN (2012)
Ongoing Activities
EcoCamp- summer camp
School programs
Sustainable tourism (2011)
Buoy maintenance
Eco fair/Ag fair
Monitoring: Conch, lobster, *Acropora*
NCRMP Monitoring (fish blitz, bioblitz, etc.)
Routine Monitoring - TCRMP
Ecovan
Signs, brochures, materials
Fishermen-increased awareness
In Development
Visitors Center (expected winter 2016)
Enforcement standards training program – Lee Carrubba
Special use permits -lionfish
Pollution discharge - EPA
Licensing Program- lionfish
Implementing Stormwater Reduction activities – Horsley Whitten
Day use mooring placement

Appendix D: Territory Initiatives That Relate to STXEEMP

	Territory or St. Croix strategies as they pertain to STXEEMP (might require checking in or coordination for STXEEMP)
	"Very High" Priority Strategies:
1	SUSTAINABLE TOURISM and FINANCE: Structure for Sustainable Financing
	TARGETS: ALL ISSUE: Lack of sustainable funding STRATEGY: Develop the structure for raising, receiving, tracking and spending revenue for the Park OBJECTIVE To develop the structure to receive fees, fines, raise funds from sustainable finance mechanisms by the end of the five-year management cycle.
	Activity /Program Description: Administration, policy and accounting
	Key Actions (not necessarily listed in sequential order): 1. Develop fee schedule (fees, fines, permits, tours, events, etc.) as listed in 2. Identify priority uses for the revenue. Could also serve as match on other 3. Identify the mechanism by which 4. Establish a marine park account (DPNR) 5. Develop a work group to determine problems to Protected Area financing and 6. Present to CZM Commission (Director, 7. Gain CZM Commission approval
	Lead Person: JP Oriol with assistance Coordinator, working with Port Authority, Proposed Partners: DEE (ticketing, cashier), TNC pro-bono research the structure, the people with direct involvement with Park, Finance When: Ongoing, regular review of activities Products or Outputs: Sustainable financing structure in place to receive, track, spend funds Resources Available: Sustainable Finance Workshop October 2013- many of the Resources Needed: Staff time to follow up Expected Costs: $2,000 Proposed Funding Source: TNC (NOAA Measures of Success: Park able to generate revenues (other than outside grants)
	Other considerations: Background: Park Trust Systems legislation for the Territorial Park System Would be a new division of DPNR, but management of the Trust and accounting will be up to a board Needs to be an agency that is more autonomous- Natural Resources Trust Fund Source of $$ is unconfirmed: visitor center, volunteer donations, head tax for cruise ships other tourists (opposition from Port Auth), boat entrance fee **include Willingness to Pay study- TNC

"High" Priority Strategies:

1

RESOURCE MANAGEMENT and PROTECTION: Recreational Fishing license within STXEEMP

TARGETS: Coral reefs, seagrass beds MAJOR THREAT: Overfishing, illegal fishing, no management of recreational fishing, shoreline take

STRATEGY: Create licensing program for shoreline, recreational fishers

OBJECTIVE 1. Increase compliance of fisheries and park regulations, increase revenue

Activity /Program Description: Regulatory, education and outreach

Key Actions (time of year/schedule):
1) Conduct a thorough evaluation of the recreational fishery territory-wide. How much money does it bring to the territory?
2) Perform willingness to pay study amongst recreational fishermen
3) Create educational materials to distribute
4) Create database to house information collected

Lead Person: DFW
Proposed Partners: DFW, park users

When: Year 1-2
Products or Outputs: Educational Brochures,
Resources Available:
Resources Needed:
Expected Costs:
Proposed Funding Source:
Measures of Success: Information database on recreational take, including high use
Other considerations: Reference Fisheries LAS, pg 17, Goal 1-Objective 1.2, Project 1

2

RESOURCE MANAGEMENT and PROTECTION: Grounding Response and Debris Removal

TARGETS: Seagrass beds and coral reefs MAJOR THREAT: Groundings, derelict vessels, marine trash and debris

STRATEGY: Train in response, develop park vessel removal policy to increase efficiency

OBJECTIVE Develop relationships with other agencies and a chain of command-phone tree for incidents

Activity /Program Description: Reporting, coordination, field response protocol,

Key Actions (time of year/schedule):

1. Use disturbance response point of contacts list to mobilize teams for rapid response to document, assess, do triage. Then have notification protocol with DEE or VIPD- after notification, # of days to remove (completed!)
2. Create derelict vessel assessment report and matrix for sharing across Departments/Divisions
3. Mobilization location- take into consideration gov't plots to land retrieved boat (crusher, bin, etc.)
4. ID survey response team (DPNR, TNC, NOAA Restoration Center)
5. MoA with WM (provide bin) and DPW (on-site crushing)
6. Engage Administrator's office. Agreement for abandoned vehicle task force- but for vessels requires add 'l contractor.
7. Include provision for disaster response priority for protected resource areas (FEMA)
8. Develop specific penalty provisions if vessel isn't removed in certain timeframe ($200-300/day?)
9. Survey damage, follow up long-term impact

Lead Person: CZM

Proposed Partners: DEE, Waste Management Authority, DFW, TNC, NOAA

When: Year 1-2 (plan developed, agreements in place)

Products or Outputs: Standard Operating

Resources Available: Officers, technical divers, GIS technical ability (land ownership)

Resources Needed: Contract for removal

Expected Costs: up to ~$50,000/boat ($15,000- $60,000)

Proposed Funding Source: USCG, FEMA (preparedness for disaster or navigational

Measures of Success: New groundings

Other considerations: August 2013 Vessel Grounding Workshop: Liability insurance? (if none, can't register boat). Registration, funding for removal, etc.

3	RESOURCE MANAGEMENT and PROTECTION: Sea Turtle Data Collection Coordination and Collaboration

TARGETS: Sea turtles ISSUE: Lack of cohesiveness in data collection, little data sharing

STRATEGY: Adopt standardized protocol and sea turtle database

OBJECTIVE Encourage data dissemination and allow comparing of data across spatial and temporal scales

Activity /Program Description: Research and monitoring, STAR collaboration

Key Actions (time of year/schedule):	Lead Person: EEMP to coordinate data
A1. Assemble all data from SEA and TNC for turtles on EEMP beaches 2) Discuss current protocols with TNC 3) determine whether TNC is interested in harmonizing and/or providing data to EEMP on a regular basis and if so, select mechanism 3) Get an intern (Friends?) to do a first-cut report on what is known about turtles using EEMP beaches Separate but equal is to get any BUIS in water	Proposed Partners: TNC, SEA, Friends When: Ongoing Products or Outputs: Database, Resources Available: Resources Needed: Assistance with data Expected Costs: intern stipend of $2000 Proposed Funding Source: could be an SCA Measures of Success: Data comparable, and compared in a synthetic manner, across Other considerations:

RESOURCE MANAGEMENT and PROTECTION: Liability insurance	
MAJOR THREAT: Damage by boat groundings	
STRATEGY: Require all registered boaters to have liability insurance that will cover immediate removal of grounded boats, clean up of sinking boats etc.	
OBJECTIVE 1. Reduce damage caused by groundings. Reduce amount of time derelict	
Activity /Program Description: *Administrative, policy, regulations*	
Key Actions (time of year/schedule): 1.Create dialogue with boating 2. Begin to implement the policy (6	Lead Person: Proposed Partners: SEATOW, DEE in charge of boating registration When: Year 1 Products or Outputs: Resources Available: Resources Needed: Expected Costs: Proposed Funding Source: Measures of Success: Better response time and less derelict vessels Other considerations:

Appendix E: Education and Outreach Strategies Developed to Address Resources and Threat Abatement

"High" Priority Strategies:

1	RESOURCE MANAGEMENT and PROTECTION: STXEEMP Education Program at Commercial Fishing Licensing

TARGETS: Coral reefs, seagrass beds MAJOR THREAT: Overfishing, illegal fishing

STRATEGY: Distribute recreational fishing guides, STXEEMP rules and regulations information, and offer relevant monitoring information when commercial fishermen register

OBJECTIVE Increase compliance, increase support from fishermen and reduce illegal activity within the park

Activity /Program Description: Education and outreach

Key Actions (time of	
1. Use information distributed to recreational fishers and include commercial specific rules and regs	Lead Person: NOAA CRCP Fisheries Liaison, Proposed Partners: DEE, DFW, CZM-STXEEMP, TNC, USCG When: Year 1 Products or Outputs: Educational Brochures, resource report completed Resources Available: NOAA CRCP coordination in place Resources Needed: Staff time, materials Expected Costs: Minimal- $500 Proposed Funding Source: CZM, VI Gov't, CRCP Measures of Success: reduction of reported illegal activity, number of fishers participating
2. Prepare some type of baseline report on fisheries resources in case they are interested	
3. Develop information and materials relevant to STXEEMP zoning	
4. Become a MOES-VI partner	Other considerations: This is an ongoing project through the "Marine Outreach and Education USVI Style" initiative. A proposal to evaluate the process for efficiency and effectiveness is being submitted for internal CRCP funds
5. Seek source of funding for MOES-VI (DFW cannot support.- try CFMC)	

2	COMMUNITY OUTREACH and PARTICIPATION: Boater, Marina and Yacht Club Outreach
	TARGETS: Seagrass beds and coral reefs THREAT: Vessel groundings, lack of awareness and participation in Park activities STRATEGY: Outreach on proper mooring, hurricane preparedness, equipment inspection OBJECTIVE: Decrease boats that break loose during a storm that lead to boat groundings and derelict vessels
	Activity /Program Description: Community participation, education and outreach
	Key Actions (time of year/schedule): 1. Work with DEE to create outreach to boaters 2. Bring boaters into Friends and as supporters of Park. 3. Educate boaters on how to maintain moorings, etc. 4. Get EEMP info on to Garmin GPS software and other common maps in use in the VI
	Lead Person: Marine Park Interpretive Ranger, Coral Fellow Proposed Partners: Yacht Club, Marinas, DEE When: Years 1-2 Products or Outputs: Brochures Resources Available: STXEEMP outreach staff Resources Needed: Time Expected Costs: $1000 Proposed Funding Source: STXEEMP funding Measures of Success: Greater understanding of the STXEEMP Other considerations:

3	COMMUNITY OUTREACH and PARTICIPATION: Incorporate Climate Change Communications Into STXEEMP Outreach	
	TARGETS: ALL ISSUE: Lack of awareness and participation in climate change mitigation/adaptation strategies	
	STRATEGY: Develop climate change mitigation/adaptation communications campaign	
	OBJECTIVE To increase public knowledge in order to improve participation in adaptation planning and strategy implementation.	
	Activity /Program Description: Community participation, education and outreach	
	Key Actions (time of year/schedule): 1. Develop core message for public (6 months) 2. Include what CC means for the Park- why should you care? 3. Build strategy for sharing the core message, using exiting pathways like ecovan, school modules, newsletters 4. Implement strategy in stages according to funding and staff availability	Lead Person: STXEEMP Coral Fellow liaison with territory initiative Proposed Partners: Public health and HR, VITEMA, TNC, NPS, Public TV (TV2), Governor's Office, Dept Education, VINE When: strategy developed by year 2 or 3 Products or Outputs: existing outreach includes CC message Resources Available: DPNR staff, TNC Coastal Resilience website Resources Needed: Outreach materials Expected Costs: $5,000 Proposed Funding Source: NOAA climate office, FEMA, VITEMA, EPA Env Ed, USFWS Measures of Success: People are more aware of the effects of CC Other considerations: Not park specific! Region-wide

"MEDIUM" Priority Strategies:

1	SUSTAINABLE TOURISM and FINANCE: Concessions (consider revisiting as part of outreach program-if commercial interest or tour operations grow)
	ISSUE: Controlled access, lack of funds for the Park STRATEGY: Concessionaire program OBJECTIVE 1. Generate interest?
	Activity /Program Description: Administrative, policy, accounting Key Actions (time of 1) JP has discussions with recreational businesses (Big Beard, Dive Exp, etc.) 2) Caroline wants to meet- see how they present the Park to get coherent messages, info, etc. 3) Lead Person: JP Proposed Partners: Finance, Park Trust When: Year 1-2 Products or Outputs: Resources Available: Resources Needed: Expected Costs: Proposed Funding Source: Measures of Success: Other considerations: there dos not seem to be enough activity for tours inside the park, nor interest for snorkeling, diving, etc. Big Beards does have a moorings. Its possible that with more transient (day use) moorings, people will be attracted to the sites and recreation business in the Park will grow...