# UNITED STATES VIRGIN ISLANDS' CORAL REEF MANAGEMENT PRIORITIES

# INTRODUCTION

The purpose of this Priority Setting document is to articulate a set of strategic coral reef management priorities developed in consensus by the coral reef managers in the USVI. NOAA will use this document in conjunction with its 2010–2015 Coral Reef Conservation Program National Goals and Objectives (available at www.coralreef.noaa.gov) to direct its investment in activities in each jurisdiction through grants, cooperative agreements and internal funding. NOAA will also make the document available to other potential funders (NGOs, federal partners, etc.) and encourage leveraging and new or expanded partnerships to build common coral reef conservation goals.

The work presented here is being guided by the NOAA Coral Reef Conservation Program (NOAA CRCP) as part of an ongoing effort to develop place-based, local coral reef management priorities in each of the seven U.S. state and territorial coral reef jurisdictions (American Samoa, Commonwealth of the Northern Mariana Islands, Florida, Hawaii, Guam, Puerto Rico and the U.S. Virgin Islands) and conduct capacity assessments to identify the support needed to accomplish those priorities. The first step in this effort has been to work with the core group of coral reef managers (local, place-based) in each jurisdiction to articulate a set of strategic coral reef management priorities. The second, and next, step will be to complete a capacity needs assessment that helps each state and territory address these priorities.

This priority setting process stems from an external review of NOAA CRCP conducted in 2007 to independently assess how effectively the program has met its goals. The review included recommendations for future improvements. In response to the review, NOAA CRCP developed a "Roadmap for the Future," laying out new principles and priorities. A key part of this new Roadmap includes developing management priorities for each and all of the coral reef jurisdictions and conducting capacity assessments to achieve these priorities. NOAA CRCP is providing support to the jurisdictions to coordinate with the broader management community in each place to determine these strategic goals and objectives for each state and territory.

This Priority Setting document is divided into the following sections:

1. Scope, Development and Prioritization Process: This section details the process by which the priority goals and objectives were reached, including the preparation for the workshop, work done at the workshop and post workshop refinement.

2. Strategic Coral Reef Management Priorities: This section presents the entire framework of goals and objectives developed and agreed upon by the core group during this process. In this section, the Priority Goals and Objectives are highlighted. These are the top priorities for management action as agreed upon by the core managers group.

3. Priority Sites: This section lists priority sites for application of the Priority Goals and Objectives. It also describes the process by which the sites were determined at the workshop.

4. Linkages to NOAA's National Goals and Objectives: This section describes how the local jurisdiction management priorities align with NOAA CRCP's priorities and direction forward.

# SECTION ONE:
# SCOPE, DEVELOPMENT AND PRIORITIZATION PROCESS

This document captures the final set of priorities agreed upon by the core managers group at the priority setting workshop. The core managers group is defined as the "place-based" coral reef managers who are directly responsible for managing the coral reef ecosystem in a particular geographic location. The managers as well as those who were asked to participate in the initial analysis and review of this document are listed in Appendix 1.

In preparation for the workshop, previously identified goals and objectives were taken from current management documents and presented in the Situation Analysis. The Situation Analysis is a preparatory document that summarizes: coral reef threats, condition and trends; key management issues; and key agencies' management goals ahead of meetings and interviews. Its primary purpose is to compile and consolidate available management documents from various management bodies and geographic localities. Appendix 2 presents a summary of the Situation Analysis' findings.

The Situation Analysis was augmented by a series of interviews that captured managers' working perceptions of management goals as they are stated in management documents. Taken together, this information formed the basis for the workshop discussions by offering an initial set of goal areas to consider.

During the interviews with the core coral reef managers and management advisors in the USVI, facilitators identified challenges to and current deficiencies in achieving stated goals and objectives, noting specific capacity gaps that likely will need attention. This information will serve as the starting point for the capacity assessment, to be completed in the following year. It is summarized in Appendix 3.

Workshop participants worked from the Situation Analysis and interview findings to develop specific and time-bound goals and objectives to address each of these need areas. Participants were asked to develop goals and objectives for the coral reefs for all of the USVI, rather than for each workshop participant's local managed area.

For the purpose of this exercise, the following definitions were used:

> **Goals** are defined as the highest-level result the jurisdiction seeks to achieve (e.g., stable, sustainable coral reef ecosystems) in the next five to seven years.
>
> **Objectives** are defined as the environmental, social and institutional outcomes the jurisdiction must achieve to reach the end goal. Objectives are generally actionable within a three- to five-year time frame.

This document presents the comprehensive set of goals and objectives as developed by the core group as well as the priority actions. **The priority actions are those goals and objectives the core group identified through a voting process as those that require immediate attention over the short term.** These Priority Goals and Objectives will guide NOAA CRCP funding allocations for management activities. The NOAA CRCP understands and respects the flexibility required by coral reef managers in implementing

complex conservation and management programs. Should the partners seek funding for projects related to off-priority issues (either in the comprehensive framework of goals and objectives in this document or a new emerging issue not reflected in this document) it will need to be fully explained why the requested funding is most appropriate for the off-priority work versus efforts to address the priority Goals and Objectives identified through this process.

The Priority Goals and Objectives are identified by blue font and are in italics. The attendees selected the priority actions during the workshop and through an online vote that occurred after the workshop.

The top five Priority Goals as identified by the workshop participants are:

- Reduce impacts to coral reef ecosystems by reducing terrestrial sediment and pollutant inputs and improving water quality.
- Develop and implement a comprehensive education and outreach program to create buy-in and build public support for an effective coral reef conservation program that targets resource users, general public and decision-makers.
- Increase the ability to effectively enforce existing rules, regulations and laws.
- Reduce fishing impacts on critical stocks that most directly affect the health and resilience of the reef ecosystem.
- Manage for resilience to climate change and related effects, including impact of elevated sea temperature; sea level rise; acidification and calcium carbonate dissolution; hurricane intensity/frequency and sedimentation to promote recovery of reefs from previous events.

# SECTION TWO:
# STRATEGIC CORAL REEF MANAGEMENT PRIORITIES

This section presents the entire framework of goals and objectives developed and agreed upon by the core managers group during this process. In this section, the **Priority Goals and Objectives are highlighted in blue/italic font.** These are the top priorities for management action as agreed upon by the core managers group. These Priority Goals and Objectives will guide funding allocations for management activities. Off-priority goals and objectives are shown in plain text.

***GOAL 1: Reduce impacts to coral reef ecosystems by reducing terrestrial sediment and pollutant inputs and improving water quality.***

**Objectives:**

1. *Define and identify priority watersheds and develop management plans, stormwater plans and restoration project that reduce the effects of contaminants and poor water quality on reef resources.*

2. *Develop and apply USVI-specific best management practices and adaptive management plans as necessary throughout the territory (e.g., installation of culverts, catch basins, vegetative buffers, etc.).*

3. *Support the development and implementation of new and stricter development permit conditions that include strong mitigation actions, avoidance, minimization of impacts and compensation. Conditions should also give consideration to cumulative impacts of stressors, including existing and expected development, and other stressors.*

4. *Ensure that the necessary and consistent regulatory and programmatic framework exists and is enforced to implement watershed management strategies necessary to protect coral ecosystems.*

5. Determine effects of contaminants and poor water quality on reef resources and develop and apply best management practices as necessary. Understand water quality status and trends resulting from land-based sources of pollution so that best practices can be formulated and applied in priority areas.

6. Develop coral reef-specific water quality standards and identify threshold values that can be incorporated into the permit process and marine management in general.

7. Build partnerships among local, state, federal and nongovernmental entities to identify, leverage and apply financial and other resources to facilitate improved coastal and upland watershed management.

8. Support a well-informed decision-making process for granting construction permits, ensuring that decision-makers and permit-review staff have access to technical information and known best management practices to mitigate impacts on water quality. Present this in a manner suitable for the audience type.

9. Support the establishment of a policy that requires "no net loss" of any additional natural coastal features that would reduce and retain runoff, including coastal ponds, mangrove systems, etc.

10. Support an upgrade to the sewage infrastructure to increase capacity of processing plants, improve the collection and delivery system and upgrade individual/household Individual Septic Disposal Systems (ISDS).

11. Develop stormwater management plans for each area of jurisdiction in the USVI.

12. Provide education and outreach to upper level leadership (DPNR, public works, other commissions) and government house, legislators, CZM Commission, etc., on the economic value of coral reef resources and the importance of reducing impacts of land-based sources of pollution on them.

***GOAL 2: Develop and implement a comprehensive education and outreach program to create buy-in and build public support for an effective coral reef conservation program that targets resource users, general public and decision-makers.***

**Objectives:**

1. *Convey the importance and economic value of the reef to key constituencies and measure their understanding of the effect of human impacts, such as overfishing, pollution, etc., on this value.*

2. *Ensure public support for resource management actions by hosting conferences, workshops and making school presentations. This outreach program should enable stewardship at all levels of society to affect long-term behavioral change.*
    - *Develop communication strategies and tools and identify priority target audiences.*
    - *Support programs that connect youth classroom experience with field experience. Build from existing programs and curricula such as the Math & Environmental Science Academy and the proposed Reef Rangers.*
    - *Create opportunities to keep coral reef stewards who were nurtured in the youth programs engaged in coral reef conservation, policy and advocacy (e.g., internships, university curriculum, and coral scholarships).*

3. *Emphasize transfer of information and research findings to the general public, developers and decision-makers.*

***GOAL 3: Increase the ability to effectively enforce existing rules, regulations and laws.***

**Objectives:**

1. *Maintain sufficient law enforcement staff and enforce regulations on priority rules and regulations, such as development practices, permit conditions, MPA regulations and fisheries regulations.*

2. *Develop and provide incentive mechanisms for enforcement programs and enforcement officers to keep existing staff and attract new staff.*

3. *Provide cross training between science and management departments and enforcement officers to increase enforcement capacity and enable cross-enforcement of existing regulations.*

4. Determine the success of existing enforcement efforts and management measures that are already in place to build on what works. This includes the determination of success for compatible regulations established in state waters and the territory's ability to enforce them. This may also include a gap assessment to determine where enforcement is currently directed compared to issues presented in this document.

5. Inform and educate judicial and legislative decision-makers to increase support for law enforcement actions.

6. To create separation between enforcement officials and resource users, consider bringing in outside enforcement presence (e.g., exchanges, temporary assignments, etc.) to focus on priority enforcement issues.

7. Provide training along with education and field materials to enforcement officers.

8. Develop and implement outreach and education strategies in partnership with other agencies and programs to work with user groups to increase compliance and reduce the need for enforcement.

9. Work with user groups to promote public support and compliance through workshops, orientations, provision of reporting hotlines and service as interpretive guides.

***GOAL 4: Reduce fishing impacts on critical stocks that most directly affect the health and resilience of the reef ecosystem.***

**Objectives for Licensed Fisheries (Commercial):**

1. *Reduce fishing effort on prioritized key coral reef associated species or functional groups (e.g., herbivores, juveniles, apex predators, etc.).*

2. *Reduce the use of inappropriate gear and fishing in MPAs by strengthening local enforcement and through educational efforts.*

3. *Improve commercial fisheries record-keeping and fisher compliance by developing and implementing an effective mechanism to improve the current data-gathering process.*

4. Clarify jurisdictional-specific fishery management responsibilities and collaborate to ensure effective implementation.

5. Improve understanding of the current status of fisheries resources and patterns of fishing effort through collaboration with local and federal researchers pursuing management-driven fisheries science.

6. Build comparative USVI fisheries health trend data through studies that identify behaviors of present fishery status and trends within the USVI and throughout the region, including studies comparing managed areas to unmanaged areas and managed stocks to similar unmanaged stocks.

7. Develop and implement effective strategies created and enforced by fishers to identify, understand and apply fisheries self-management practices

**Objectives for Unlicensed (Recreational) Fisheries:**

8. *Obtain the necessary information to understand the impacts of recreational fisheries in the USVI.*

9. Continue to develop and implement a recreational license program with associated legislation for recreational fishing regulations and clear requirements and authorities for monitoring and enforcement.

10. Incorporate a mandated sampling program to gauge the status of recreational fisheries.

**Objectives for All Fisheries (Licensed and Unlicensed):**

11. *Understand ecological connectivity through dispersal of eggs and larvae to identify key sources and sinks; assess connectivity between existing and potential MPAs and between spawning aggregations and juvenile habitat to identify resilient areas for protection.*

12. *Support the effective implementation of marine protected areas (MPAs).*

13. *Assess the effectiveness of MPAs in meeting their stated management goals.*

14. Understand the social impacts of legislation and regulatory actions on the fishing community and identify alternatives to mitigate the negative impacts of these actions.

15. Develop and implement enhanced tools to preserve and restore fisheries resources.

***GOAL 5: Manage for resilience to climate change and related effects, including impact of elevated sea temperature; sea level rise; acidification and calcium carbonate dissolution; hurricane intensity/frequency and sedimentation to promote recovery of reefs from previous events.***

**Objectives:**

1. *Support more research on and better understanding of the following issues that are priorities for USVI given this management goal:*

    - *Coral diseases (understanding of the holobiont and dynamics of the health gradient in the holobiont, etiology).*
    - *Relationship between bleaching and disease.*
    - *Coral resistance to bleaching and disease.*
    - *Cumulative effects of multiple stressors.*
    - *Resilience following global, regional and local stressors.*
    - *Possible effects of climate change on coral reefs and associated ecosystems.*
    - *Physiological tolerances and predicted shifts in species distributions.*
    - *Currents; distribution patterns and source of stressors; distribution and sources of seed.*
    - *Thresholds for stressors (i.e., sediment, pollutants, temps, etc.) above which health/resiliency of holobiont becomes compromised.*
    - *Short- and long-term effects of stressors on coral reef ecosystem (as a whole and ecosystem function).*

2. *Identify areas of high resilience and sources of juveniles/recruits of coral species for additional protection.*

3. *Create and implement a coordinated response and restoration strategy for physical disturbances (i.e., storms, vessel impacts, etc.) to increase recovery of affected coral reef ecosystems. Identify means of communication with managers in neighboring islands to alert of disturbance events, leverage resources, etc.*

4. *Develop and incorporate into management/regulatory strategies coral reef ecosystem water quality standards.*

5. *Provide training opportunities to coral reef managers to increase their understanding of the impacts of climate change on coral reef ecosystems; the predicted range and uncertainty of changes that will occur; and management strategies, tools and technologies to assess risk and mitigate adverse impacts of climate change and related stressors (includes training a coordinated response team).*

6. Consider closing areas when bleaching and disease or hurricane damages are extensive to allow for the recovery of reef areas. (In the Florida Keys National Marine Sanctuary, areas have been closed to the public when bleaching has been severe.)

7. Create a mechanism to incorporate knowledge into management action and policy (i.e., MPAs, closures, permit conditions, etc.).

8. Establish and maintain a contingency fund to respond to severe bleaching events.

9. Develop a detection and reporting program to involve citizens in detecting bleaching events as well as other disturbances, such as pollution, storm damage and groundings.

10. Create and implement a mechanism to increase communication between regional resource managers (PR, Culebra, BVI, etc.) to alert to disturbance events, leverage resources, etc.

**GOAL 6: Improve and enable coordination and communication among USVI Coral Reef Practitioners.**

**Objectives:**

1. Implement and strengthen the VI Coral Reef Advisory Group (VICRAG) as a mechanism for improved cooperation and collaborative action to conserve and manage the coral reef ecosystems of the USVI.

2. Develop and implement specific mechanisms to enable improved communications between the coral reef science and coral reef management communities in the USVI and to provide current science-based information and recommendations for management action.

3. Develop and implement specific mechanisms to enable improved cooperation between permitting authorities at the local, territorial and federal government levels to minimize development impacts to the coral reef ecosystems of the USVI.

**GOAL 7: Reduce other sources of marine pollution and human impacts from areas that are most critical to coral reef protection and resilience.**

**Objectives:**

1. Work with the territorial government and the private sector to install and maintain vessel pumpout systems that are available and easily accessible for recreational vessels. (Access federal funds through the Clean Vessel Act and Boating Infrastructure Grant.)

2. Reduce marine debris and coastal debris by both implementing strategies to reduce the production of debris and by implementing debris clean-up activities.

3. Reduce boat and anchor damage to coral reefs by installing and maintaining mooring buoys, navigational aids and markers.

4. Provide education and outreach to promote use of and compliance with vessel pumpout systems, mooring buoys, navigational aids and markers and to reduce the production of marine and coastal debris.

5. Prepare for vessel groundings and oil spills. Develop standard operating procedures for responding to disasters that include specific roles for law enforcement and resource management employees that are consistent with existing guidance and procedures for oil spills and other hazards and grounding response programs.

6. Develop a USVI ballast water policy to reduce negative impacts to coral reef systems.

7. Support effective implementation of existing and developing Clean Marina and Blue Flag programs for the USVI to encourage clean and environmentally compatible marinas, boating activities and coastal resource use.

**GOAL 8: Protect against, prepare for and control/manage invasive species.**

**Objectives:**

1. Research and compile lessons-learned from affected locations (impacts, methods, etc.).

2. Monitor and predict possible distribution and movement (includes predictive modeling based on lessons-learned from other areas).

3. Monitor effects of invasive species, such as Lionfish.

4. Prepare, implement and fund a response strategy, including standard operating procedures for invasive species (defines how agencies, public, etc., react and respond).

5. Generate incentives to encourage public/resource user identification and removal of invasive species.

6. Encourage/establish regional work groups to identify patterns of spread and distribution; communicate lessons-learned; control species movement.

The priorities as stated in the goals and objectives will be implemented using the following primary mechanisms:

1. **Office of DPNR–CZM.** USVI's regulatory and institutional structure names the Office of CZM as the primary agency responsible for coordinating territory-wide reef management. DPNR–CZM is the recipient of annual funds from NOAA CRCP, which provides the core funds used to support coral reef management in the USVI.

2. **Virgin Islands Coral Reef Advisory Group (VICRAG).** VICRAG will be supported by the DPNR–CZM and will serve as the advising group for the implementation of these priorities. Specifically, this group is charged with:
    a. Providing advice and guidance to the Office of CZM as they implement these priorities.
    b. Coordinating resources of those organizations represented in the group to ensure an integrated approach to reef management.
    c. Serving as a forum for lesson-drawing and -learning as these priorities are acted upon.
    d. Implementing or supporting the implementation of priority activities and actions that are national in scale and scope.
    e. Conducting, at regular intervals, territory-wide coral reef symposiums that bring together interested parties from the coral management and stakeholder community to share progress, draw lessons and evolve these priorities and approaches to implementation.

# SECTION THREE:
# PRIORITY SITES

In order to effectively manage the implementation of the above goals and objectives, workshop participants identified high priority geographic areas to apply these goals and objectives. These areas represent a ridge-to-reef approach to coral reef management and include both coral reef habitat and associated watershed areas. The Nature Conservancy (TNC) provided a presentation of relevant geospatial data at the workshop that gave the core managers the information that was needed to develop and apply the following selection criteria:

- Ability to achieve priority goals and objectives from workshop.
- Biological value: irreplaceability, uniqueness and abundance.
- Degree of risk & threat: fishing, land-based sources of pollution, water quality, climate change, marine pollution, human impacts and invasive species.
- Management effectiveness: existing LAS/management function, capacity, support (community, agency, users), political will, etc.

Once the criteria were agreed upon, participants applied weights to each, defining which criteria are most important to least important. This allowed the participants to define the criteria they felt were most important to selecting priority geographic areas. For the most important criteria, participants could vote on a scale of one to six (six being highest). For the least important criteria, participants could vote on a scale of one to four (four being highest). The group agreed to the following weights, listed in order of priority:

- Management effectiveness: *voting scale of one to six*
- Ability to achieve priority goals and objectives from workshop: *voting scale of one to five*
- Biological value: *voting scale of one to four*
- Degree of risk and threat: *voting scale of one to four*

Participants then identified potential priority sites in the USVI for coral reef conservation. This was done using a cumulative brainstorm exercise, wherein each participant identified all of the coral reef sites that they wanted the group to consider. Sixteen sites were identified by the core managers for consideration as priority sites. Each participant was then asked to apply the four weighted criteria to each site.

The sites were then arrayed by their total score from highest to lowest. Table 1 includes a full list of sites and their rank. The final list is below. The top four priority sites identified by the participants are:

- Fish Bay, St. John
- Coral Bay, St. John
- St. Thomas East End Reserve
- St. Croix East End Marine Park

**Table 1. Priority Site Selection**

| Site | Total Votes |
|---|---|
| *(in order of priority)* | |
| Fish Bay, STJ | 68 |
| Coral Bay, STJ | 67 |
| STEER | 66 |
| STXEEMP | 65 |
| Salt River, STX | 64 |
| Botany Bay | 63 |
| Magens Bay, STT | 63 |
| Hawksnest Bay, STJ | 62 |
| STX linear reef | 60 |
| Haulover Bay, STJ | 58 |
| Offshore Cays, STT | 55 |
| NW shore, STX | 52 |
| Mid-shelf Reef, STJ; Bikini Strip | 50 |
| Mesophotic Reef, STT (Deep reef) | 48 |
| Vessup Bay/East End, STT | 45 |
| South Industrial Area, STX | 44 |

In each of these places, a local action strategy (LAS) for coral reef conservation will be developed. Each of these plans will provide a roadmap of action to address key issues and remedy specific threats regarding the health of the specific coral reefs. It will focus on important, solvable issues and detail specific actions targeted at the causes of the threats as well as provide necessary guidance on how the actions will be implemented and evaluated. The written plan will include: threats analysis; clearly framed goals and objectives; actions that are aimed at addressing and reducing threats; assessment of required resources; implementation timeline; and an evaluation process, including performance measures. The development of these strategies will be a participatory process that includes placed-based managers and decision-makers as well as stakeholders.

In addition to this priority setting document, there are a number of well-established, local management plans and programs in place that are focused, at least in part, on managing and conserving coral reefs. The experiences of these programs and the individuals who run them have provided an essential component to the development of this document. These programs have been and will continue to be critical to coral reef management and conservation.

# SECTION FOUR:
# LINKAGES TO NOAA'S NATIONAL GOALS AND OBJECTIVES

Table 2 shows how USVI's Priority Goals and Objectives correlate to NOAA CRCP's National Goals and Objectives for coral reef conservation. Table 2 was developed after the USVI Coral Reef Management Priority Setting Process was complete to explicitly identify potential partnerships between the managers in USVI and NOAA CRCP. Addressing both local jurisdictional priorities and national goals and objectives will increase efficiency and leveraging of the resources available for coral reef conservation. NOAA CRCP will use this table to inform future investments in coral reef conservation in USVI.

**Table 2. Correlations between USVI's Priority Goals and Objectives and CRCP's National Goals and Objectives**

| **USVI's Priority Goals and Objectives** | **NOAA's National Goals and Objectives for Coral Reef Conservation** | **Explanation of Correlation (as needed)** |
|---|---|---|
| **GOAL 1: REDUCE IMPACTS TO CORAL REEF ECOSYSTEMS BY REDUCING TERRESTRIAL SEDIMENT AND POLLUTANT INPUTS AND IMPROVING WATER QUALITY.** | | |
| Objective 1.1: Define and identify priority watersheds and develop management plans that reduce the effects of contaminants and poor water quality on reef resources. | LBSP Objective 1.1: Identify and prioritize those coral reef ecosystems and associated watersheds, within each jurisdiction, that will benefit the most from implementing management conservation strategies to reduce land-based sources of pollution.<br><br>LBSP Objective 1.3: Implement watershed management plans and relevant Local Action Strategies (LAS) within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures. | No explanation needed. |
| Objective 1.2: Develop and apply USVI-specific best management practices and adaptive management plans as necessary throughout the territory (e.g., installation of culverts, catch basins, vegetative buffers, etc.). | LBSP Objective 1.3: Implement watershed management plans and relevant Local Action Strategies (LAS) within priority coral reef ecosystems and associated watersheds to improve water quality and enhance coral reef ecosystem resilience. Where needed, develop (or update) watershed management plans that incorporate coral reef protection measures. | The implementation of watershed management plans and LASs includes the development and application of best management practices (BMPs) to improve water quality. |
| Objective 1.3: Support the development and implementation of new and stricter development permit conditions that include | LBSP Objective 3.3: Support or help develop intergovernmental mechanisms (appropriately designed for each jurisdiction) to promote | The development of stronger conditions and requirements on local development permits that are aligned with federal regulatory guidelines will |

| | | |
|---|---|---|
| strong mitigation actions, avoidance, minimization of impacts and compensation. Conditions should also give consideration to cumulative impacts of stressors, including existing and expected development, and other stressors. | effective local management actions and decisions. | enable better coordination between local and federal agencies and improve development decision-making processes. |
| Objective 1.4: Ensure that the necessary and consistent regulatory and programmatic framework exists and is enforced to implement watershed management strategies necessary to protect coral ecosystems. | LBSP Objective 3.4: Ensure that the necessary and consistent regulatory and programmatic framework exists and is enforced to implement watershed management strategies necessary to protect coral ecosystems. | No explanation needed. |
| **GOAL 2: COMPREHENSIVE EDUCATION AND OUTREACH PROGRAM TO CREATE BUY-IN AND BUILD PUBLIC SUPPORT FOR AN EFFECTIVE CORAL REEF CONSERVATION PROGRAM THAT TARGETS RESOURCE USERS, GENERAL PUBLIC AND DECISION-MAKERS.** | | |
| Objective 2.1: Convey the importance and economic value of the reef to key constituencies and measure their understanding of the effect of human impacts, such as overfishing, pollution, etc., on this value. | Fishing Impacts Objective 4.4: Obtain socioeconomic and human dimension data to inform jurisdiction-specific education and communication strategies and initiatives and monitor program outcomes.<br><br>Climate Objective 2.3: Characterize socioeconomic effects of climate change impacts on coral reef ecosystems to identify vulnerable reef-dependent human communities and understand the impacts to these communities.<br><br>LBSP Objective 3.5: Increase public and political awareness and understanding of the ecological and socioeconomic impacts of land-based pollution on coral reef resources to promote better stewardship and informed decisions regarding activities in watersheds that may adversely impact coral reef ecosystems. | The USVI identified two social science priorities in this objective. The first is to measure and convey economic value of coral reef ecosystems. The next is to assess the understanding of key constituencies of the effect of human-induced impacts to the reef and therefore how these impacts affect the economic value of coral reef ecosystems. Key constituencies include policy makers, the voters that support them and relevant stakeholder groups. |
| Objective 2.2: Ensure public support for resource management actions by hosting conferences, workshops and making school presentations. This outreach program should | Fishing Impacts Objective 4.1: Develop curricula incorporating locally relevant lessons plans about coral reef ecosystems and fisheries management that meets current state and national standards. | This objective calls for the development of a multifaceted coral reef outreach and education program that includes informal education such as conferences, workshops, presentations and broad |

| | | |
|---|---|---|
| enable stewardship at all levels of society to affect long-term behavioral change.<br>• Develop communication strategies and tools and identify priority target audiences.<br>• Support programs that connect youth classroom experience with field experience. Build from existing programs and curricula such as the Math & Environmental Science Academy and the proposed Reef Rangers.<br>• Create opportunities to keep coral reef stewards who were nurtured in the youth programs engaged in coral reef conservation, policy and advocacy (e.g., internships, university curriculum, and coral scholarships). | Fishing Impacts Objective 4.3: Develop targeted, locally relevant outreach and communication strategies to increase community understanding and support for regulations to protect key coral reef ecosystem species/functional groups and expanded use of marine protected areas (MPAs).<br><br>LBSP Objective 3.5: Increase public and political awareness and understanding of the ecological and socioeconomic impacts of land-based pollution on coral reef resources to promote better stewardship and informed decisions regarding activities in watersheds that may adversely impact coral reef ecosystems. | outreach efforts as well as formal education with the introduction of new programs and curricula in the USVI school system and the University of the Virgin Islands. |
| Objective 2.3: Emphasize transfer of information and research findings to the general public, developers and decision-makers. | Fishing Impacts Objective 4.2: Develop and implement effective strategies and tools to improve communication between scientists, managers and policy makers on best management practices to protect key coral reef ecosystem species and functional groups. | Emphasis on the need to improve the transfer of information from the science community to policy-makers as called for in the Fishing Impacts objective, but also to the general public and stakeholder groups that are impacting the reef resources such as developers. |
| **GOAL 3: INCREASE THE ABILITY TO EFFECTIVELY ENFORCE EXISTING RULES, REGULATIONS AND LAWS.** | | |
| Objective 3.1: Maintain sufficient law enforcement staff and enforce regulations on priority rules and regulations, such as development practices, permit conditions, MPA regulations and fisheries regulations. | Fishing Impacts Objective 3.2: Strengthen local agency and community capacity for effective and consistent enforcement of regulations or behaviors that reduce impacts of fishing on coral reef ecosystems.<br><br>LBSP Objective 3.1: Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations and evaluate | The USVI currently suffers from a significant deficit in the number of qualified and capable enforcement staff that are able to dedicate their time to coral reef and coastal and marine resource issues such as the enforcement of MPAs, fisheries regulations and compliance with development permit conditions and regulations. Existing enforcement staff in the Department of Planning and Natural Resources are often forced to focus on homeland security and public safety issues. The development of strong natural resource |

| | | |
|---|---|---|
| | performance.<br><br>LBSP Objective 3.4: Ensure that the necessary and consistent regulatory and programmatic framework exists and is enforced to implement watershed management strategies necessary to protect coral ecosystems. | management legislation and regulations is rendered ineffective if the enforcement capability to support compliance is insufficient. |
| Objective 3.2: Develop and provide incentive mechanisms for enforcement programs and enforcement officers to keep existing staff and attract new staff. | none | none |
| Objective 3.3: Provide cross training between science and management departments and enforcement officers to increase enforcement capacity and enable cross-enforcement of existing regulations. | Fishing Impacts Objective 3.2: Strengthen local agency and community capacity for effective and consistent enforcement of regulations or behaviors that reduce impacts of fishing on coral reef ecosystems.<br><br>LBSP Objective 3.1: Ensure that coral reef jurisdictions have adequate resources and capacity to develop and implement management plans, assess water quality and coral reef ecosystem condition, enforce regulations and evaluate performance. | No explanation needed. |
| **GOAL 4: REDUCE FISHING IMPACTS ON CRITICAL STOCKS THAT MOST DIRECTLY AFFECT THE HEALTH AND RESILIENCE OF THE REEF ECOSYSTEM.** | | |
| Objective 4.1: Reduce fishing effort on prioritized key coral reef associated species or functional groups (e.g., herbivores, juveniles, apex predators, etc.). | Fishing Impacts Objective 1.2: Prioritize key coral reef associated species or functional groups (e.g., herbivores, apex predators, etc.) on which to focus management, research and monitoring activities for each jurisdiction or managed area. | The USVI specifically calls for a reduction in fishing effort on key species and functional groups. |
| Objective 4.2: Reduce the use of inappropriate gear and fishing in MPAs by strengthening local enforcement and educational efforts. | Fishing Impacts Objective 2.4: Work with relevant agencies, offices, and communities to create, implement, and improve the management of MPAs that protect key coral reef ecosystem components and functions. | No explanation needed. |
| Objective 4.3: Improve commercial fisheries record keeping and fisher compliance by | Fishing Impacts Objective 1.4: Obtain necessary information on fishing effort in U.S. coral reef | The USVI objective identifies the need for a specific mechanism to collect data identified in the |

| | | |
|---|---|---|
| developing and implementing an effective mechanism to improve the current data-gathering process. | ecosystems by measuring fishing intensity, fishing mortality, frequency, area coverage, community dependence, etc., to inform management activities. | national Fishing Impacts objective 1.4. |
| Objective 4.8: Obtain the necessary information to understand the impacts of recreational fisheries in the USVI. | Fishing Impacts Objective 1.4: Obtain necessary information on fishing effort in U.S. coral reef ecosystems by measuring fishing intensity, fishing mortality, frequency, area coverage, community dependence, etc., to inform management activities. | The USVI specifically identifies the need to obtain information on recreational fishing efforts in the USVI. |
| Objective 4.11: Understand ecological connectivity through dispersal of eggs and larvae to identify key sources and sinks, assess connectivity between existing and potential MPAs and between spawning aggregations and juvenile habitat to identify resilient areas for protection. | Fishing Impacts Objective 2.1: Identify, characterize and rank priority areas for protection within each jurisdiction, including (but not limited to):<br>• spawning sites, nursery habitats or other areas critical to particular life-history stages<br>• biodiversity hotspots<br>• areas with greatest resilience or potential for restoring resilience<br>• areas facing the greatest threats | The USVI emphasizes the need to not only identify priority areas but to also understand the connectivity between them. |
| Objective 4.12: Support the effective implementation of marine protected areas (MPAs). | Fishing Impacts Objective 2.4: Work with relevant agencies, offices and communities to create, implement and improve the management of MPAs that protect key coral reef ecosystem components and functions. | No explanation needed. |
| Objective 4.13: Assess the effectiveness of MPAs in meeting their stated goal. | Fishing Impacts Objective 2.5: Conduct biological and socioeconomic research and monitoring to assess the performance of MPAs with respect to protection and restoration of key coral reef ecosystem components and functions. | No explanation needed. |
| **GOAL 5: MANAGE FOR RESILIENCE TO CLIMATE CHANGE AND RELATED EFFECTS, INCLUDING IMPACT OF ELEVATED SEA TEMPERATURE; SEA LEVEL RISE; ACIDIFICATION AND CALCIUM CARBONATE DISSOLUTION; HURRICANE INTENSITY/FREQUENCY AND SEDIMENTATION TO PROMOTE RECOVERY OF REEFS FROM PREVIOUS EVENTS.** | | |
| Objective 5.1: Support more research on and better understanding of the following issues. These are priorities for USVI given this management goal and objectives: | Climate Change Objective 2.2: Characterize the responses of coral reef ecosystems and their related components to climate change and ocean acidification to separate impacts from climate | The USVI Climate Change objective 5.2 covers many different research questions. The only area of overlap with the NOAA CRCP National Goals and Objectives is research on the response of coral reef |

| | | |
|---|---|---|
| • Coral diseases (understanding of the holobiont and dynamics of the health gradient in the holobiont, etiology).<br>• Relationship between bleaching and disease.<br>• Coral resistance to bleaching and disease.<br>• Cumulative effects of multiple stressors.<br>• Resilience following global, regional and local stressors.<br>• Possible effects of climate change on coral reefs and associated ecosystems.<br>• Physiological tolerances and predicted shifts in species distributions.<br>• Currents; distribution patterns and source of stressors; distribution and sources of seed.<br>• Thresholds for stressors (i.e., sediment, pollutants, temps, etc.) above which health/resiliency of holobiont becomes compromised.<br>• Short- and long-term effects of stressors on coral reef ecosystem (as a whole and ecosystem function). | change and ocean acidification from impacts of other environmental threats and to test the effectiveness of management actions. | ecosystems to climate change. |
| Objective 5.2: Identify areas of high resilience and source of juveniles/recruits of coral species for additional protection. | Climate Change Objective 2.4: Promote conservation of coral reef ecosystems through identification of areas that are potentially resilient to climate change and vulnerable areas where actions are likely to increase resilience. Encourage and promote management actions necessary to avoid or minimize impacts and spread the risk due to climate change and ocean acidification. | No explanation needed. |
| Objective 5.3: Create and implement a coordinated response and restoration strategy for disturbances (i.e., storms, vessel impacts, | Climate Change Objective 1.3: Develop and implement climate related crisis response plans in all U.S. coral reef jurisdictions to provide a framework | No explanation needed. |

| | | |
|---|---|---|
| etc.) to increase resistance to and recovery of affected coral reef ecosystem. | for early warning, communication, monitoring, research and management response to protect coral reef ecosystems from acute events such as coral bleaching, infectious disease outbreaks, tropical storm impacts and major rainfall events. | |
| Objective 5.4: Develop and incorporate into management/regulatory strategies coral reef ecosystem water quality standards. | none | none |
| Objective 5.5: Provide training opportunities to coral reef managers to increase their understanding of the impacts of climate change on coral reef ecosystem; the predicted range and uncertainty of changes that will occur; and management strategies, tools and technologies to assess risk and mitigate adverse impacts of climate change and related stressors (includes training a coordinated response team). | Climate Change Objective 1.1: Provide training opportunities to coral reef managers to increase their understanding of the impacts of climate change, the predicted range and uncertainty of changes that will occur and management strategies that address the impacts of climate change. | No explanation needed. |

# APPENDIX 1: PRIORITY SETTING PROCESS PARTICIPANTS

**Core Group: place-based managers of specific area of coral reef.**
Each member of this group was invited to attend the workshop, to partake in an interview prior to the workshop and to participate in document revisions.

Workshop Attendees:
Norman Williams, DPNR–CZM
Paige Rothenberger, DPNR–CZM/EEMP
Zandy Hillis-Star, DOI–NPS
Anita Nibbs, DPNR–EP
Mark Hardgrove, DOI–NPS
January Murray, DPNR–DFW
Erinn Muller, DOI-NPS

Absent from Workshop:
Rafe Boulon, DOI–NPS
Joel Tutein, DOI–NPS
Caroline Rogers, DOI–USGS
Toby Tobias, DPNR–DFW

**Advisors**: **managers of jurisdictions and populations impacting USVI coral reefs.**
Each member of this group was invited to partake in an interview prior to the workshop and to participate in document revisions.

Graciela Garcia-Moliner, Caribbean Fishery Management Council
Jennifer Moore, NOAA Fisheries–Protected Resources
Lisamarie Carrubba, NOAA Fisheries–Protected Resources
Julie Wright, USDA–NRCS
J.P. Oriol, DPNR–CZM
Alexandra Holecheck, DPNR
Carol Burke, SEA
Paul Chakroff, SEA
Roberto Tapia, DPNR–DEE
Howard Forbes, DPNR–DEE
Kent Bernier, DPNR–DEP

**Science Advisors: members of the scientific community with specific expertise in issues relating to USVI coral reefs.**
Each member of this group was invited to review documents in preparation of the workshop, as well as drafts of the Priority Setting Document.

Kemit Lewis, DPNR–CZM (NB: now with The Nature Conservancy)
Rick Nemeth, University of the Virgin Islands
Marcia Taylor, University of the Virgin Islands

Tyler Smith, University of the Virgin Islands
Lloyd Gardner, University of the Virgin Islands
Barry Devine, Coral Bay Community Council
Simon Pittman, NOAA–NCCOS
Jeff Miller, NPS–Virgin Islands National Park
James Byrne, The Nature Conservancy
Jeanne Brown, The Nature Conservancy
Aaron Hutchins, The Nature Conservancy
Claudia Lombard, US Fish and Wildlife Service–Division of Refuges (Sandy Point, Green Cay)
Beverly Yoshioka, US Fish and Wildlife Service–Division of Ecological Services
Sean Griffin, NOAA Fisheries–Restoration Center
Juan Agar, NOAA Fisheries–Southeast Fisheries Science Center
Ron Hill, NOAA Fisheries–Southeast Fisheries Science Center
Manuel Valdes-Pizzini, Puerto Rico Sea Grant College Program

# APPENDIX 2: CONTEXT

The Situation Analysis is a preparatory document that summarizes coral reef threats, condition and trends; key management issues; and key agencies' management goals. As an initial step in the priority setting process, it was used ahead of meetings and interviews to provide a reference point and boundary for priority setting discussions with coral reef managers in USVI. The documents that make up the basis of this analysis were identified during interviews with coral reef managers in USVI and via a desk review of existing management plans from those agencies that are responsible for or affect USVI's coral management. The coral reef managers interviewed for this study were identified by the NOAA CRCP team with input from the NOAA CRCP point of contact in USVI and included NOAA National Marine Fisheries Service (NMFS)/Southeast Regional Office, NOAA NMFS/Caribbean Field Office, Caribbean Fishery Management Council, National Park Service/Virgin Islands National Park and Buck Island National Marine Monument, US Fish and Wildlife Service, US Department of Agriculture–Natural Resources Conservation Service (USDA–NRCS), Department of Planning and Natural Resources (DPNR)–Division of Environmental Protection, DPNR–Division of Coastal Zone Management, DPNR–Division of Fish and Wildlife, DPNR–Division of Environmental Enforcement, and St. Croix Environmental Association (SEA).

The Situation Analysis identified the following issue areas—which reflect both specific threats as well as tools to mitigate threats—as those that were most commonly referred to in the documents reviewed. These results are listed in no particular order.

**Education and Outreach** refers to the need to educate all users, both residents and visitors, of the importance of, threats to, and impacts of human activities on the coral reef ecosystem. The opportunities for this are varied and include classroom visits, public snorkel clinics, signage and hotel and cruise ship points of entry.

**Recreational Use** refers to reducing the impacts of recreational use on coral reef resources, such as practicing proper snorkeling and SCUBA diving techniques, following boating regulations, enforcing beach use prohibitions, etc. Another aspect of this issue is access to and promotion of appropriate recreational uses in coastal areas.

**Maintaining Natural and Functional Integrity of Habitats** is an issue shared by all agencies reviewed. However, the purpose for this varies by agency and includes protection of ecological integrity for aesthetic value, commercial value, and for the benefit of future generations. Goods and services of ecosystems are also valued as they provide shoreline protection against natural disasters, natural filtering of sediment, habitat for endangered species, fisheries resources and educational opportunities.

**Fishing** encompasses issues related to fish stocks, impacts on fisheries and coral reef fish habitat from gear and overfishing, enforcement of fishing regulations, reducing user conflicts, and education about all aspects of fishing—impacts, gear restrictions, open/closed seasons, etc. A great deal of emphasis is placed on socioeconomic impacts of fisheries restrictions as well as the need for greater cooperation among stakeholders.

**Impacts of Construction/Land-Based Sources of Pollution (LBSP)** refers to any development that has the potential to affect the marine environment. This includes any upland development, marine dredging and marina construction. LBSP are most commonly the result of construction, such as runoff and discharge from developed areas. The need to reduce anthropogenic stresses is generally referenced in a few documents; however, specific goals are not delineated.

Recent American Recovery and Reinvestment Act (ARRA) funding from NOAA has been granted for the implementation of best management practices in three watersheds (Coral Bay and Fish Bay on St. John and East End Bay on St. Croix) with the intention of reducing LBSP. A comprehensive monitoring program has been developed to monitor the terrestrial and marine components of these projects. Results should encourage identification of the most effective BMPs and implementation of BMPs in other watersheds. Success of BMPs in these watersheds may also encourage compliance by future construction projects.

Based on the literature reviewed for this document, other important goal areas for coral reef management in the USVI are issue-areas related to the following:

**Economic Development** is mentioned exclusively in CZM documents and refers to the growth of the nature-based economy in the USVI. This means encouraging profit-making opportunities based on nature as the product while managing related impacts. This also refers to the need for an East End Marine Park that can sustain itself financially through user fees and other financial mechanisms.

**Enforcement and Management Presence** does not currently deter individuals or groups from carrying out prohibited actions. This is addressed in the reviewed documents by emphasizing the need for a solid enforcement structure, increased cooperation and greater consistency.

**Maintained or Improved Water Quality** was mentioned several times and almost always in the same statement as land-based sources of pollution. Similar to land-based sources of pollution, this issue was mentioned in a general fashion, often as simply as "reducing pollution." However, two CZM documents were more precise and mentioned wastewater management and sewage disposal.

**Community Support** refers to the need for the community to accept management decisions if they are to be successful. This involves public meetings for input, public review of draft documents, community members involved in core planning teams, etc. This issue was only brought up by CZM, SEA and TNC.

# APPENDIX 3: CONTEXT PRELIMINARY IDENTIFICATION OF CAPACITY GAPS AND OTHER BARRIERS TO IMPLEMENTATION OF THE PRIORITIES

During the interviews with coral reef managers in the USVI, facilitators worked to understand the working relationship between managers and management documents. Facilitators noted and identified challenges to and current deficiencies in achieving stated goals and objectives, noting specific capacity gaps that likely will need attention.

The Coastal Resources Center at the University of Rhode Island developed and applied common tools for comparative assessments of coastal ecosystem governance. This approach involves three categories, phrased as key statements, for enabling conditions that allow an initiative to successfully execute a sustained plan of action designed to influence the course of events in an ecosystem.

The three categories are: constituencies, commitment and capacity. This baseline will also identify the immediate capacity gaps that are directly related to implementing this strategic approach. These gaps will be explored further, and a capacity assessment will be completed in phase II of this effort, beginning in fiscal year 2010.

**CONSTITUENCIES**

Premise: *To achieve success, a core of well-informed and supportive* ***constituencies*** *comprised of stakeholders in both the private sector and government agencies must actively support the program.*

Measures:

1. The user groups who are affected by your program understand and support the goals, strategies and targets.
2. There is public support for your program.
3. The institutions that assist in implementing your program, or the institutions that are affected by the plan, understand and support it.

**Results:**

Comments taken during this portion of the survey indicate there is a wide range of constituencies affected by coral reef management and conservation. There was a larger, more identifiable constituency base in protected areas. Outside of these areas, it was more difficult to identify clear user groups who are affected by reef managers outside of very broad-based categories such as tourists. Outside of protected areas, creating an informed and supportive constituency has been difficult because in many instances there isn't a plan to build a constituency around. Respondents noted that the constituency is fragmented and shared many different viewpoints.

**COMMITMENT**

Premise: *To achieve success, it is necessary that the delegated authorities have expressed **commitment** to the policies of a program and to the allocation of financial resources required for long-term program implementation.*

Measures:

1. The appropriate level of government has formally approved the plan of action.
2. The government provided the program with the authorities it needs to successfully implement its plan of action.
3. Sufficient financial resources have been committed to fully implement the program over the long-term.

**Results:**

Because there is a lack of planning (i.e., no comprehensive planning or zoning at the local and island-wide scales) it is difficult to comment on the formal approval and adoption of plans. It was regularly noted, however, that this lack of planning affects many aspects of resource management: water supply, waste, resource use, enforcement, etc. Political will was regularly and consistently mentioned as an impediment to successful reef management. Further, it was also noted that the decision-making process is often driven by existing political, social and economic conditions rather than technical input, scientific knowledge or existing regulations or a clear rationale.

**CAPACITY**

Premise: *To achieve success, it is necessary for sufficient **capacity** be present within the institutions responsible for the program to implement its policies and plan of action.*

Measures:

1. Your program possesses the human resources to implement its plan of action.
2. Your program possesses the institutional resources (equipment, materials, etc.) to implement its plan of action.
3. There are internal or external barriers to successfully implement plan of action. What are these?

**Results:**

There were consistent indications that the jurisdiction lacks the range and depth of capacity to adequately manage the resource. This was compounded by the high rate of turnover at all levels of government as well as with the important constituencies such as hotel managers and construction foremen. Although there is access to equipment, there is a strong need for additional assets as well as a more efficient means for maintaining equipment.

This initial assessment will be followed by a more detailed assessment and analysis that will focus on capacity gaps in relation to the specific management goals and objectives that were finalized by the priority setting process.