

*Please provide the following information, and submit to the NOAA DM Plan Repository.*

### **Reference to Master DM Plan (if applicable)**

*As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.*

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

## **1. General Description of Data to be Managed**

### **1.1. Name of the Data, data collection Project, or data-producing Program:**

Benthic Community Characterization on Shallow (less than 30m) Hardbottom Shelf Habitats in St. Croix, USVI. A preliminary field survey to assess operational and logistical approaches to implement the National Coral Reef Monitoring Program (NCRMP) in the USVI.

### **1.2. Summary description of the data:**

Reef fish populations are a conspicuous and essential component of USVI coral reef ecosystems. Yet despite their importance, striking population and community level changes have occurred in the recent past due to fishing pressure and habitat degradation. The monitoring methodologies described in this document are necessary for understanding how natural and anthropogenic stressors are changing reef fish populations and communities and will be critical for their sustainable management. A collaborative research effort between the NOAA's National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment's Biogeography Branch (BB) and the National Park Service (NPS) has been used to inventory and assess reef fish populations in reef and reef-associated habitats in the northeast region of St. Croix from 2001-2011. The survey method previously used has been refined to enable broader region-wide coverage at the scale of the USVI yet maintains high precision at the Marine Protected Area (MPA) spatial level. Region-wide population metric estimates are required to effectively manage reef fisheries but are also imperative for spatial management and understanding ecosystem-level processes. For example, the ability to place protected fish resources in the context of the greater region not only allows for the evaluation of management actions but it also provides the ability to determine the ecological role of an MPA in the greater ecosystem. The monitoring method previously used by the Biogeography Branch and other partners in St. Croix and other regions within the USVI and Puerto Rico will be used to characterize and establish baseline data for future monitoring. St. Croix was chosen to serve as the first area to implement the protocol and to evaluate the logistics necessary to implement a long term monitoring program in the USVI as part of the National Coral Reef Monitoring Program (NCRMP). Characterization and monitoring of fish communities requires a quantitative measure of the spatial distribution and variation of those communities. These measures will enable

managers to make targeted management decisions (e.g. where to allow mooring or where to allow recreational activities such as snorkeling and SCUBA diving). Additionally, the spatial setting, both within and outside protected regions allows managers to assess the impact, if any, of a change in regulation such as the prohibition of fishing. It also enables analysis of any differential effect (i.e. the effect may be the same throughout the region or it may be more effective toward an edge or center of a management area). To quantify patterns of spatial distribution and make meaningful interpretations, we must first have knowledge of the underlying variables determining species distribution. The basis for this work therefore, is the nearshore benthic habitats maps (less than 100 ft depth) created by NOAA's Biogeography Program in 2001 and NOS' bathymetry models. The sampling domain includes all hardbottom habitats around St. Croix at depths less than 30m. The benthic habitat map and a habitat classification scheme were used to create a sample frame constructed with 50 x 50 m grids. Grids were stratified based on three variables: Hardbottom habitat type, depth zone, and region/management area. Habitat within these grids was stratified into 5 habitat categories (scattered coral/ rock, pavement, bedrock, patch reef and linear reef) each with two depth classifications (shallow (0-11.9 m) and deep (12- 30m)). Further stratification was assigned based on management zones and region of the island. There are three managed areas in St. Croix. Two federal marine protected areas are managed by the Department of Interior's National Park Service: Buck Island Reef National Monument and Salt River Bay National Historical Park and Ecological Reserve. The St. Croix East End Marine Park is a territorial marine protected area managed by the USVI Department of Planning and Natural Resources. Other strata include specific regions of St. Croix: North, East, West, and South shores. Overall there were 70 possible strata: 5 habitat types, 2 depth zones and 8 management areas/regions. The monitoring objectives of this protocol are to determine status, trends, and variability in exploited reef fish species and communities within the USVI region and inside vs. outside different management zones, using measures such as relative abundance (density), spatial distribution, size structure and diversity. The survey design is optimized for nine economically and ecologically important species in the USVI: blue tang (*Acanthurus coeruleus*), queen triggerfish (*Balistes vetula*), coney (*Cephalopholis fulva*), red hind (*Epinephelus guttatus*), four-eye butterflyfish (*Chaetodon capistratus*), French grunt (*Haemulon flavolineatum*), yellowtail snapper (*Ocyurus chrysurus*), stoplight parrotfish (*Sparisoma viride*) and threespot damselfish (*Stegastes planifrons*). These species were chosen to include a broad range of life history traits as well as a variety of habitat utilization patterns. The sample design is optimized with the respect to these species, but because all fish species are recorded, monitoring efforts also obtain important information about many non-targeted species, the overall trophic structure, and form the scientific basis for effective management actions. As such, the sample allocation for this mission is based upon the existing community metrics and the above species specific distribution from the northeast region of St. Croix. It was determined that 250 samples among the various strata would be sufficient to characterize hard bottom habitats around the island and have comparable coefficient of variation (CV) to values observed in the northeast region of St. Croix. The goal was to survey as many of the 250 sites as possible in a t

two week time period. We organized a strong science field team and completed 286 fish and benthic surveys around the island.

**1.3. Is this a one-time data collection, or an ongoing series of measurements?**

One-time data collection

**1.4. Actual or planned temporal coverage of the data:**

2012-05-07 to 2012-05-19

**1.5. Actual or planned geographic coverage of the data:**

W: -64.965, E: -64.433, N: 17.86, S: 17.616

**1.6. Type(s) of data:**

*(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)*

**1.7. Data collection method(s):**

*(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)*

**1.8. If data are from a NOAA Observing System of Record, indicate name of system:**

**1.8.1. If data are from another observing system, please specify:**

**2. Point of Contact for this Data Management Plan (author or maintainer)**

**2.1. Name:**

NCCOS Scientific Data Coordinator

**2.2. Title:**

Metadata Contact

**2.3. Affiliation or facility:**

**2.4. E-mail address:**

NCCOS.data@noaa.gov

**2.5. Phone number:**

**3. Responsible Party for Data Management**

*Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.*

**3.1. Name:**

NCCOS Scientific Data Coordinator

**3.2. Title:**

Data Steward

**4. Resources**

*Programs must identify resources within their own budget for managing the data they produce.*

**4.1. Have resources for management of these data been identified?****4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):****5. Data Lineage and Quality**

*NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.*

**5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible**

*(describe or provide URL of description):*

Process Steps:

- 2012-10-25 00:00:00 - Once on site, divers are deployed and maintain contact with each other throughout the entire census. One diver is responsible for collecting data on the benthic composition. The habitat diver follows the belt-transect diver and records data on small-scale benthic habitat composition and structure along the 25m transect. The habitat diver places a 1m<sup>2</sup> quadrat divided into 100 (10 x 10cm) smaller squares (1 square equals 1 percent cover) at five random positions along the transect. Each position is randomly chosen before entering the water such that there is one random point within every 5m interval along the transect. Percent cover is obtained as if looking at the quadrat in a two dimensional plane (i.e. a photograph) vs. three dimensions where percent cover could add up to greater than 100%. Data are collected on the following: 1) Logistic information - diver name, dive buddy, date, time of survey, site code, and meter numbers at which the quadrat is placed. 2) Habitat structure - to characterize the benthic habitats of the dive site, the habitat diver first categorizes the habitat structure of the site: hard or soft. 3) Transect depth profile - the depth at each quadrat position. Depth is measured with a digital depth gauge to the nearest 1ft. 4) Abiotic footprint - defined as the percent cover (to the nearest 1 percent) of sand, rubble, hard bottom, and fine sediments within each quadrat position. Rubble refers to rocks and coral fragments that are moveable; immovable rocks are considered hard bottom. The percent cover given as a part of the abiotic footprint should total 100 percent. In a seagrass area for example, despite the fact that seagrass may provide 50 percent cover, the underlying substrate is 100 percent sand so this is what is recorded. To estimate percent cover, the habitat diver first positions the quadrat at the chosen meter mark along one side of the transect tape, alternating sides of the transect for subsequent quadrats. Next, the habi

tat diver lays the quadrat along the substrate (regardless of the slope) and estimates percent cover based on a two-dimensional (planar) view (e.g. if bottom is sloping, the quadrat is not held horizontally). Also, the diver should try to use the same planar view for all estimates of percent cover. The habitat diver then estimates, for each quadrat, the height (in cm) of the hardbottom from the substrate to get a sense of bottom relief. Note: Height is collected for all hardbottom substrates, excluding rubble; height is not collected for softbottom substrate. (continued...)

- 2012-10-25 00:00:00 - (continued from above) 5) Biotic footprint - defined as the percent cover (to the nearest 0.1 percent) of algae, seagrass, live corals, sponges, gorgonians, and other biota (tunicates, anemones, zooanthids, and hydroids) within each quadrat position. The remaining cover is recorded as bare substrate to bring the total to 100 percent. Again, the diver must use a planar view to estimate percent cover of the biota. Seagrasses and gorgonians should not be stacked upright. For example, if a single seagrass blade crosses 10 squares, then total seagrass coverage should be the sum of the area taken up by that blade in all 10 squares instead of the area covered if the blade was held upright. Species covering less than 0.1 percent of the area are not recorded. Taxa are identified to the following levels: stony coral-species, algae-morphological group (macro, turf, crustose, rhodolith, filamentous, cyanobacteria), sponge-morphological group, and gorgonians-morphological group. When estimating percent cover, it is important to realize there is a balance between precision and time. For stony corals, the approximate area covered by living coral tissue is recorded. Coral skeleton (without living tissue) is usually categorized as turf algae or uncolonized substrate. Data on the condition of coral colonies are also recorded. When coral is noticeably bleached, the entire colony is considered affected and is recorded to the nearest 0.1 percent. Coral colonies are reported as entirely bleached if they contain any portion of white, blotchy, mottled, or pale tissue. This protocol assumes stress throughout the colony and estimates maximum bleaching impact. Diseased/dead coral refers to coral skeleton that has recently lost living tissue because of disease or damage that is still visible, and has not yet been colonized by turf algae. Turf algae include a mix of short (less than 1cm high) algae that colonize dead coral substrate. 6) Maximum canopy height - for each soft biota type (e.g., gorgonians, seagrass, algae), structure is recorded to the nearest 1cm at the quadrat level. 7) Number of individuals - for sponges, gorgonians and "other" biota type (non-encrusting anemones and non-encrusting hydroids) the number of individuals at the quadrat level is recorded. 8) Rugosity - measured by placing a 6-m chain at two randomly selected positions along the 25m belt transect. The chain is placed such that it follows the substrate's relief along the centerline of the belt transect. Two divers measure the straight-line horizontal distance covered by the chain. The chain is placed on top of any hard substrate encountered, but not on top of soft corals or sponges since we are measuring hard bottom rugosity. Data on rugosity are collected for reef sites only. Rugosity measurements typically are made by the point-count and belt-transect divers while awaiting the completion of other benthic habitat measurements by the habitat diver. Upon completion of the dive, the rugosity data are transferred fr

om the fish data sheet to the habitat data sheet by the habitat diver. 9) Abundance and maturity of queen conchs (*Eustrombus gigas*) - a count of the total number of conch encountered within the 25 x 4m belt transect are enumerated. The maturity of each conch is determined by the presence or absence of a flared lip and labeled mature or immature, respectively. If conch abundance is counted by a fish diver, the data are then reported to the habitat diver. The decision of who will collect conch data should be made prior to entering the water. 10) Abundance of spiny lobsters (*Panulirus argus*) - a count of the total number of lobsters encountered within the 25 x 4m belt transect. No measurements are taken. If lobster abundance is counted by a fish diver, the data are then reported to the habitat diver. The decision of who will collect lobster data should be made prior to entering the water. (continued...)  
- 2012-10-25 00:00:00 - (continued from above) 11) Abundance of long-spined urchin (*Diadema antillarum*) - a count of the total number of urchins encountered within the 25 x 4m belt transect. No measurements are taken. If urchin abundance is counted by a fish diver, the data are then reported to the habitat diver. The decision of who will collect urchin data should be made prior to entering the water. NOTE: If rugosity, conch, lobster or urchin data are collected by a fish diver, data must be transferred to the habitat data sheet. The habitat diver is responsible for transferring the data to their data sheet; however, the fish diver should assist the habitat diver with this task by reporting the data once the dive concludes. 12) Marine debris - type of marine debris within the transect is noted. The size of the marine debris and the area of affected habitat is also recorded along with a note identifying any flora or fauna that has colonized the debris. 13) Acropora presence - mark if *A. palmata* or *A. cervicornis* are seen along the transect or at the site. 14) Photography - habitat diver will take at least two photos in different directions at each site to maintain an anecdotal and permanent visual description of the sites that were sampled. Proper care and maintenance is necessary for all camera and camera housings. It is important to maintain the cameras and housings before, after and in between dives. Data Caveats: Site selection is different from prior Caribbean Coral Reef Ecosystem Monitoring Program (CCREMP) data collection. This data set is the first time a sampling frame has been used to do site selection. CCREMP surveys (2000-2011) had stations on hard- and soft- bottom habitats; this dataset is from hardbottom sites only. CCREMP surveys were conducted only in the northeast portion of St. Croix; primarily waters less than 30 m from Green Cay to Point Udall. This dataset reflects surveys from hardbottom habitats in waters less than 30m around the entirety of St. Croix. More detailed information on the protocols for collecting habitat data in St. Croix can be found at: [http://ccma.nos.noaa.gov/ecosystems/coralreef/fish\\_protocol.aspx](http://ccma.nos.noaa.gov/ecosystems/coralreef/fish_protocol.aspx) (end continuation)

**5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:**

**5.2. Quality control procedures employed (describe or provide URL of description):**

## 6. Data Documentation

*The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.*

### 6.1. Does metadata comply with EDMC Data Documentation directive?

No

#### 6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:

- 1.6. Type(s) of data
- 1.7. Data collection method(s)
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
  - 7.1.1. If data are not available or has limitations, has a Waiver been filed?
  - 7.1.2. If there are limitations to data access, describe how data are protected
- 7.2. Name of organization of facility providing data access
  - 7.2.1. If data hosting service is needed, please indicate
- 7.3. Data access methods or services offered
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

### 6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

#### 6.2.1. If service is needed for metadata hosting, please indicate:

### 6.3. URL of metadata folder or data catalog, if known:

<https://www.fisheries.noaa.gov/inport/item/39570>

### 6.4. Process for producing and maintaining metadata

*(describe or provide URL of description):*

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive:

[https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC\\_PD-Data\\_Documentation\\_v1.pdf](https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf)

## 7. Data Access

*NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.*

**7.1. Do these data comply with the Data Access directive?**

**7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?**

**7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:**

**7.2. Name of organization of facility providing data access:**

**7.2.1. If data hosting service is needed, please indicate:**

**7.2.2. URL of data access service, if known:**

[https://www8.nos.noaa.gov/biogeopublic/habitat\\_photos.aspx](https://www8.nos.noaa.gov/biogeopublic/habitat_photos.aspx)

<https://www8.nos.noaa.gov/bpdmWeb/queryMain.aspx>

**7.3. Data access methods or services offered:**

**7.4. Approximate delay between data collection and dissemination:**

**7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:**

**8. Data Preservation and Protection**

*The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.*

**8.1. Actual or planned long-term data archive location:**

*(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)*

**8.1.1. If World Data Center or Other, specify:**



**8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:**

**8.2. Data storage facility prior to being sent to an archive facility (if any):**

National Centers for Coastal Ocean Science - Silver Spring, MD

**8.3. Approximate delay between data collection and submission to an archive facility:**

**8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?**

*Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection*

**9. Additional Line Office or Staff Office Questions**

*Line and Staff Offices may extend this template by inserting additional questions in this section.*