



MAPPING THE WAY FORWARD: SPATIAL DATA INVENTORY AND INSIGHTS FOR MARINE PLANNING IN THE US VIRGIN ISLANDS

St. Croix, US Virgin Islands
Workshop Summary
August 28th – 29th, 2023

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This workshop was co-led by the NOAA National Centers for Coastal Ocean Science, Marine Spatial Ecology Division and the NOAA NMFS Southeast Fisheries Science Center.

Workshop Steering Committee:

- Nicole Angeli, US Virgin Islands Division of Fish and Wildlife
- Meghan Balling, NOAA National Centers for Coastal Ocean Science (Affiliate)
- Wright Frank, Bureau of Ocean Energy Management
- Graciela García-Moliner, Caribbean Fishery Management Council
- Theresa Goedeke, NOAA National Centers for Coastal Ocean Science
- Lamar Hawkins, NOAA Fisheries, Southeast Fisheries Science Center (Affiliate)
- Read Hendon, NOAA Fisheries, Southeast Fisheries Science Center
- Arianna Honeycutt, Bureau of Ocean Energy Management
- Ricardo López-Ortiz, Puerto Rico Department of Natural and Environmental Resources
- Erin McLean, NOAA National Centers for Coastal Ocean Science (Affiliate)
- Matt McPherson, NOAA Fisheries, Southeast Fisheries Science Center
- James Morris, NOAA National Centers for Coastal Ocean Science
- Michael Rasser, Bureau of Ocean Energy Management
- Andrew Richard, NOAA Fisheries, Southeast Regional Office
- Miguel A Rolón, Caribbean Fishery Management Council
- Erica Rule, NOAA Fisheries, Southeast Fisheries Science Center
- Sidney Sapp, NOAA Fisheries, Southeast Fisheries Science Center (Affiliate)
- Noah Silverman, NOAA Fisheries, Southeast Regional Office
- John F. Walter III, NOAA Fisheries, Southeast Fisheries Science Center
- Rich Wilson, Seatone Consulting (facilitation support)
- Jennifer Wright, NOAA National Centers for Coastal Ocean Science (Affiliate)
- Meagan Wylie, Seatone Consulting (facilitation support)

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Workshop Overview

The National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science (NCCOS), in partnership with the NOAA National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC), convened multi-day marine spatial planning workshops in two US territories in late August 2023. Following the federal register notice for both events (88 FR 54302), the first workshop occurred in the United States Virgin Islands (USVI), followed by a second in Puerto Rico. This technical memorandum includes data development outcomes of the first workshop, held on the island of St. Croix from August 28th to 29th.

NCCOS and NMFS SEFSC are working to build spatial planning capacity in the US Caribbean region. Marine spatial planning, especially for insular communities like the USVI and Puerto Rico, holds great promise to assist coastal managers, environmental organizations, and industry with planning for future development of the blue economy, including emerging opportunities like renewable energy and aquaculture. The following goals guided each event:

- Learn more about NOAA's marine spatial planning approaches and activities
- Inventory available spatial data for the USVI and Puerto Rico
- Document data shortcomings and gaps
- Increase local capacity and resources for regional ocean spatial planning
- Further develop a community of stakeholders to inform future marine planning

Workshop Organizers and Participants

NCCOS and NMFS SEFSC assembled and coordinated closely with a steering committee to develop each workshop agenda. Committee membership included territory-based planners and scientists, subject matter experts, and agency leaders and representatives. A facilitation team lent planning support to the steering committee and fostered broad participation at the highly interactive events. The NCCOS Marine Planning Coordinator for the US Caribbean provided overall workshop coordination and will follow up on identified data leads from each workshop.

Nearly 50 individuals attended the St. Croix, USVI event. Participants included local agency leaders and planners, environmental organizations, scientists, subject matter experts, and a small number of colleagues from Puerto Rico. Staff from NOAA—including NCCOS, NMFS SEFSC and the NMFS Southeast Regional Office (SERO)—as well as the Bureau of Ocean Energy Management (BOEM) and Department of Defense (DOD) represented the federal government. Towards the end of the event, several participants acknowledged the lack of fisher attendance in the room, and the need to consistently engage and incorporate the knowledge and interests of the fisheries sector.

Workshop Outcomes

The workshop produced a wide range of data leads and gaps across each ocean sector explored. Participants repeatedly acknowledged that the USVI is generally data poor across every ocean sector. Some suggested development of a comprehensive database that includes all the distinct elements of the tourism sector. Others identified the need for more data from the fishing community and emphasized that local fisheries must be protected from any future impacts associated with development of new industries such as offshore aquaculture or wind energy.

A few participants suggested that the offshore wind industry could provide an alternative source of employment for local people. Getting input from local stakeholders, however, is a critical data gathering step to mitigate conflict, inform project siting processes, and ensure widespread benefits from new industries. A number of questions and comments surfaced about decision-making linked to the protection of threatened, endangered or otherwise ecologically valuable species. Many cited the need for updated, higher resolution data, particularly, though not exclusively, for the natural resources and metocean sectors.

This summary of workshop outcomes charts a path for increased coordination on marine spatial data between the federal government and its territorial partners in the months and years ahead. Detailed workshop outcomes are described below for each ocean sector, including data leads, gaps and additional questions, concerns and insights put forward by participants. The agenda and attendance list are included as appendices. Participants and interested parties can access the NOAA workshop presentations [here](#).



WELCOME AND OPENING REMARKS

Nicole Angeli, Director of the US Virgin Islands Division of Fish and Wildlife (DFW), welcomed and thanked local participants and federal partners for committing to an ambitious, multi-day marine spatial planning workshop. She highlighted the critical functions of the ocean and the many human activities that take place around insular territories like the USVI and Puerto Rico. She then emphasized how good planning and data development help inform decision-making and improve understanding of the surrounding ocean environment. This kind of workshop builds the capacity of local communities to protect natural and cultural resources and reduce conflict as the world transitions to alternative forms of energy and prepares for what comes next with the blue economy.

James Morris, marine ecologist, NCCOS, thanked all attendees and recognized the many different organizations and agencies present in the room. He described how this workshop brings focus to information gathering, discussion of challenging topics in marine spatial data, and development of a digital infrastructure of ocean intelligence. The central goal of the event, James noted, is to mine and compile existing data across multiple ocean sectors. As data come together, NOAA and its partners are then well positioned to build site suitability models which can analyze any emerging projects like offshore aquaculture or wind energy development.

James introduced Jennifer Wright, the NCCOS Marine Spatial Coordinator for the US Caribbean region. He explained how, during the course of the workshop, Jennifer will present data layers across six ocean sectors. Each presentation will set the stage for group identification of missing but available data, data leads, and key data gaps. After the workshop, Jennifer and the NCCOS team will follow up on identified leads. James stressed the importance of the multi-sector aspect of conversation. He acknowledged specific issues of interest that may arise but tasked the group to focus broadly on the range of current and prospective uses and functions of the marine environment in the USVI, from nearshore waters out to the Exclusive Economic Zone (EEZ).

Wright Frank, Renewable Energy Policy Chief, BOEM, expressed appreciation for everyone's attendance. The 2022 Inflation Reduction Act extends BOEM's jurisdiction to the US Caribbean, particularly as it relates to permitting facilities to help meet the Biden administration goal of securing 30 gigawatts of offshore wind energy by 2030 and deploying 15 gigawatts of floating wind technology by 2035. BOEM has recently begun to coordinate with the territorial governments in the USVI and Puerto Rico on this ambitious goal. More formal engagement processes will follow as project applications come forward.

APPROACH TO COLLABORATIVE ENGAGEMENT

Facilitators Rich Wilson and Meagan Wylie, Seatone Consulting, reviewed the workshop goals, agenda and proposed approach to maximize data brainstorming, idea generation and contributions among participants.

The six ocean sectors which served to focus group discussion included the following:

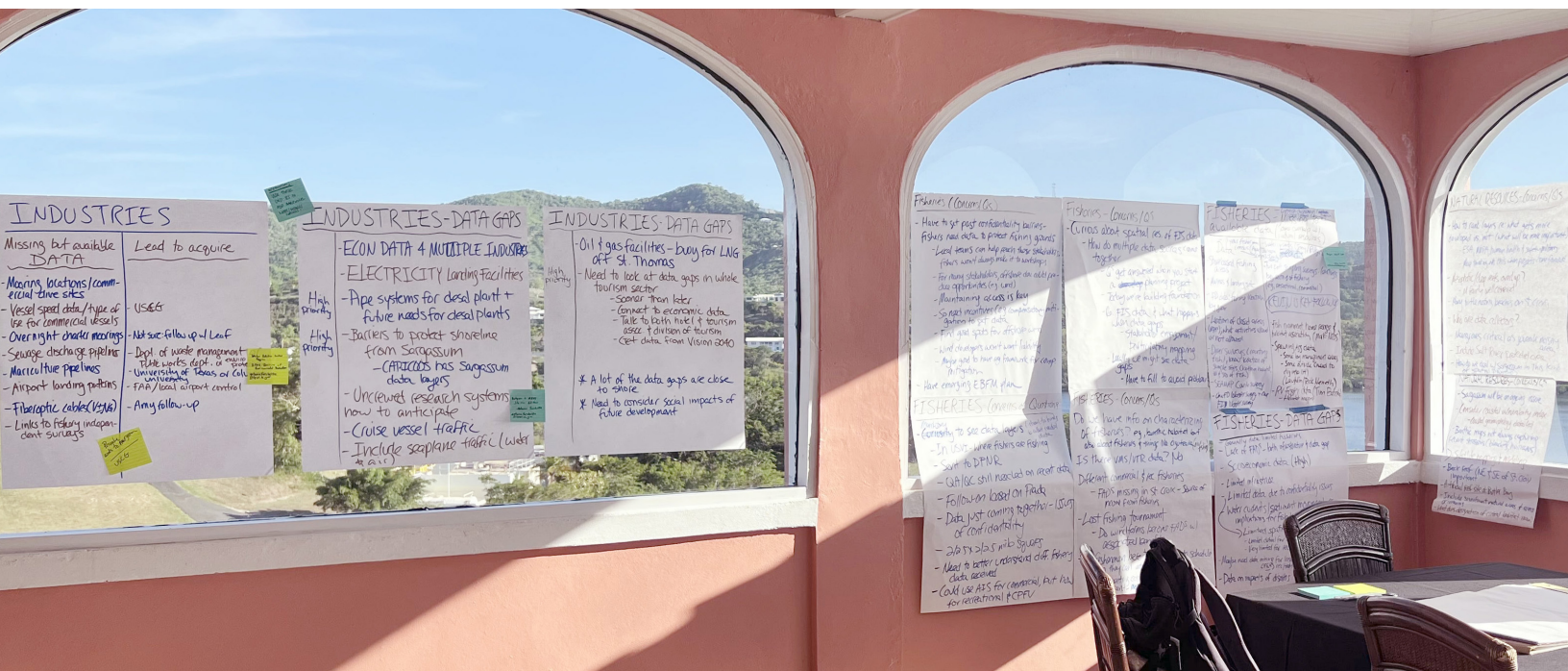
1. *National Security*: locations of various operation areas of the military or the National Aeronautics and Space Administration (NASA)
2. *Industries*: locations of vessel traffic, key industrial concerns (shipping lanes, pipelines, submarine cables, etc.), buoys and weather forecasting devices
3. *Fisheries*: areas where both commercial and recreational fisheries are active (revenue, landings)
4. *Natural Resources*: information about protected species and sensitive habitats
5. *Cultural and Social Resources*: cultural and recreational uses of the environment, social vulnerability, demographic data, and archaeological sites
6. *Metocean and Other*: meteorological and oceanographic conditions (temperature, wind, currents, etc.), shoreline, bathymetry, and boundaries

Following each NOAA presentation on baseline information that has been collected for the sector under consideration, three prompting questions, with related follow-ups, were utilized to stimulate group discussion.

1. What are your concerns or questions, if any, about the data layers just presented?
2. Are you aware of any data that are missing from the presented list, but are available? If so, can you provide a lead to acquire?
3. What data gaps exist? In considering the list of identified data gaps in group discussion, what stands out as a high priority?

At the conclusion of each presentation, individual participants used a simple worksheet to silently generate ideas prior to engaging with others in small and large group discussion. The facilitation team encouraged participants to introduce themselves when sharing comments with the full group, be concise and share the air, and stay focused on marine spatial data. The data development outputs described below represent an amalgamation of information collected on worksheets, via facilitated discussion and chart writing, and by extensive note taking.

As group engagement on each ocean sector concluded, any individual at the workshop could identify a data gap as a high priority. That said, no formal organization or ranking of data gaps by the group occurred. As the event concluded, the full group briefly revisited a comprehensive list of identified data gaps, then shared key takeaways and discussed next steps ahead.



NOAA'S MARINE SPATIAL PLANNING PROCESS

James Morris presented a brief overview of NOAA's marine spatial planning and modeling process in order to set the stage for data development across the six ocean sectors in the USVI. Workshop participants and interested parties may view his presentation [here](#).

Over the last decade, NCCOS has developed a robust marine spatial planning framework. To date, approximately 50 spatial analyses have been completed. These include two published atlases which compile the best available science to inform the identification of Aquaculture Opportunity Areas in the [Gulf of Mexico](#) and [Southern California Bight](#). These established methods provide the foundation for interagency coordination now emerging between NOAA and BOEM as wind energy projects are increasingly proposed in federal waters across the United States.

NOAA and BOEM collaborate with local partners in all regions of the United States to advance marine spatial planning. As data come together, spatial suitability models can be developed which generate heat maps and allow planners and stakeholders to:

- Analyze the whole ecosystem through defensible and transparent methods
- Identify both hotspots of conflict as well as areas of opportunity
- Conduct scenario planning and support comprehensive environmental review

Spatial planning is about improving ocean intelligence and digital infrastructure. Stakeholder engagement—building, for example, on the knowledge and data already possessed by many individuals, organizations and agencies in the USVI—is a key element of the marine spatial planning process. In time, a spatial suitability analysis provides a holistic view across multiple ocean sectors. This workshop, James concluded, will begin to enable local partners in USVI to move in this direction.

Following his presentation, James fielded questions on a range of issues, including options for alternative energy beyond wind farms, the scale and focus of workshop discussions, and the role other agencies have in the marine spatial planning process. He clarified that no specific projects have yet been proposed in nearby federal waters. The USVI is at the early stages of developing and organizing geospatial data. Model development and more formal planning processes, especially as proposed projects emerge, will come later.



DATA DEVELOPMENT ACROSS SIX OCEAN SECTORS

Throughout the course of the workshop, participants engaged in rapid data brainstorming across each of the six ocean sectors. Following the opening NOAA presentation for each sector, participants initially asked questions, shared concerns or offered insights as conversation began. The group then pivoted to identify any missing but available data not included in the presentation, the leads to acquire said data, and key data gaps that need to be addressed.

Data development outcomes for each session are summarized below. NOAA's available database is initially presented for each ocean sector. Subsequent text and associated tables show the information collected from the group for the sector under consideration. Given the early stages of marine spatial planning in the USVI, combined with the rapid pace of brainstorming and group discussion, some redundancy of text in this workshop summary is expected.

Workshop participants and interested parties may access the NOAA presentations [here](#). Given feedback received at the workshop, the spatial extent of the maps used in the presentation has been updated to show only the USVI.



Session 1

NATIONAL SECURITY

The *National Security* sector includes information essential to safeguard the nation's interests, encompassing geographical data on infrastructure, military installations and critical sites. Data layers which NCCOS is aware of include danger zones and restricted areas, formerly used defense sites (FUDS), and unexploded ordnance areas.

Nathan Owens, DOD, offered insights on national security data and described DOD's coordination process with NOAA and BOEM as more ocean-based activities like offshore aquaculture and wind energy come forward. He clarified certain military activities and terms, then noted available data and data leads across a number of topics. DOD works to identify conflict areas and come up with mitigation strategies. Generally, data is available, Nathan noted, it just needs to be acquired and organized. Other participants noted undersea infrastructure (e.g., submerged buoys, fiberoptic cables) while also sharing available leads. Data gaps did not emerge in group discussion, however, some gaps were described in participant worksheets.

Participant worksheets collected at the conclusion of this session include additional questions, concerns and insights for the national security sector. With the exception of minor editing for readability, bullets in this and subsequent sessions reflect direct transcription from submitted participant worksheets.

- How are customs border patrol and national/international boundaries mapped?
- How much of this presented data is publicly available?
- St. Croix is utilized by the military. Does current data include homeland security (e.g., Navy closures on the west coast of St. Croix, cables)?
- We are missing historical data that can be used to show cumulative impacts on areas already impacted. This may be of interest for new offshore development.
- We need the location of marine cables and nearshore anchoring areas.
- We generally need more data for St. Croix.



Table 1. Available Data and Leads for the National Security Sector

Available Data	Leads to Acquire
Special use airspace polygons, low level airspace	<ul style="list-style-type: none"> • Nathan Owens, DOD
Military training routes (mostly linear)	<ul style="list-style-type: none"> • Nathan Owens, DOD
Relocatable over the horizon radar	<ul style="list-style-type: none"> • US Navy
Parachute jump areas/restricted areas	<ul style="list-style-type: none"> • Nathan Owens, DOD
Underwater cables off Frederiksted	<ul style="list-style-type: none"> • Amy Dempsey has lead
Submarine buoy with subsurface float approximately one mile offshore	<ul style="list-style-type: none"> • US Navy, Nathan Owens has lead
Cables, hydrophones 17 miles from Frederiksted, St. Croix	<ul style="list-style-type: none"> • Tracy Meane, US Navy Quality Assurance Test Facility
Sonic deepwater buoy approximately seven miles north of Christiansted	<ul style="list-style-type: none"> • US Navy, Nathan Owens has lead
United States Coast Guard (USCG) operational/training areas	<ul style="list-style-type: none"> • Department of Homeland Security, regional USCG offices
NASA activities	<ul style="list-style-type: none"> • NASA
Exclusion/security zone around ocean point terminals	<ul style="list-style-type: none"> • Brent Stoffle, NMFS SEFSC has USCG leads
Bathymetry, torpedo like instruments in deepwater off St. Croix	<ul style="list-style-type: none"> • NOAA Research Vessel (RV) Nancy Foster • Corroborate information with DOD
Human, drug and gun smuggling	<ul style="list-style-type: none"> • USCG Navigation Center for Excellence • US Border Patrol
Ship traffic	<ul style="list-style-type: none"> • JP Freeman, USCG
Historical data to show cumulative impacts	<ul style="list-style-type: none"> • None provided
Marine cables/nearshore anchoring areas	<ul style="list-style-type: none"> • None provided

Table 2. Data Gaps for the National Security Sector

Data Gaps
Knowledge of residual US Navy impacts
Opening and closure of security areas
Ocean point terminals, oil storage, liquid natural gas facilities
Illegal activities that cross international borders
Cable activities near boundaries with the British Virgin Islands
Illegal trafficking (e.g., humans, drugs and guns)
Range/base level input on area use

Session 2

INDUSTRIES

The *Industries* sector includes a wide array of data pertinent to the operations of maritime and coastal sectors. Data layers which NCCOS is aware of include:

- Automatic Identification System (AIS) vessel tracks
- Aids to navigation
- Wrecks and obstructions
- Submarine cable and pipeline areas
- Ports and harbors, coastal channels and waterways
- Anchorage areas
- Buoy locations
- Pilot boarding areas and stations

Starting in this session, and emerging again later in the workshop, several participants highlighted the need for a comprehensive database across all elements of the tourism sector. Others stressed the importance of developing a central repository to house USVI data sets and improve accessibility to publicly available data. Participant worksheets showed additional questions, concerns and insights for the industries sector:

- Commercial shipping routes seem to overlap with the live fire areas used by DOD. Is this accurate or a concern?
- Cargo lanes are a priority that bring the majority of goods to the territory. What are the buffer lines/points from recreational activities?
- Do shipping lanes/ports include routes used by cruise ships or ferries? Are shipping routes occurring through live fire?
- Does tourism need its own sector?
- Can existing electrical distribution lines be used for wind-generated energy?
- Currently there are no legal fish aggregating devices (FADs) in the USVI. We have a few illegal FADs, but locations are unclear (likely north and south of St. Thomas and St. John).
- Although FADs are prevalent, locations will not likely be provided by fishers to prospective offshore wind developers.
- Data that is sourced from the USVI Department of Planning and Natural Resources (DPNR) online sources may not be up to date or accurate (e.g., potential local buoys, wrecks, FADs).
- Regarding the issue of scale, future USVI data development work needs to focus on each area of interest.
- Lots of “unofficial” anchorages and FADs might cause gaps in spatial data for these layers. We could benefit from ground truthing this topic.
- AIS vessel tracks should be separated by category and it should be noted if passing or landing in/out of the islands (e.g., cruise ships).



- We need to consider, with support from NOAA and DPNR, ecosystem management and coastal pollution (e.g., rum effect, hillside housing development in St. Thomas).
- If enough data is available, consider a tourism sub-model for channel widening considerations and characterization of port types (e.g., cargo, fishing).
- It is hard to assess USVI data when it is shared at such a low resolution. The scale of the map shown excluded local waters. Please remove Puerto Rico for future discussions.
- Not all submarine cables are included on the presented map.

Table 3. Available Data and Leads for the Industries Sector

Available Data	Leads to Acquire
Location of commercial dive site moorings and anchorages	<ul style="list-style-type: none"> ● Tourism sector, dive shops
Location of overnight charter moorings and anchorages	<ul style="list-style-type: none"> ● Leigh Fletcher has leads
Economic data	<ul style="list-style-type: none"> ● NOAA Office for Coastal Management (OCM)
Impacts of the tourism sector on the marine environment	<ul style="list-style-type: none"> ● DPNR ● USVI Department of Tourism
Commercial and recreational fishing, FADs, cruise ships, diving sector	<ul style="list-style-type: none"> ● DPNR ● USVI Department of Tourism
Footprint of parks and protected areas	<ul style="list-style-type: none"> ● DPNR
Commercial vessel speed data/type of use	<ul style="list-style-type: none"> ● USCG
Mariculture pipelines	<ul style="list-style-type: none"> ● University of Texas ● Columbia University
Airport landing patterns, including commercial and recreational air traffic	<ul style="list-style-type: none"> ● Federal Aviation Administration and/or local civil aviation authority
Shipping lanes, including anchorages and safety areas, for cruise ships and ferries	<ul style="list-style-type: none"> ● USCG
Virgin Islands Next Generation Network (VINGN) fiberoptic cables	<ul style="list-style-type: none"> ● Amy Dempsey has leads
Shoreline barriers (<i>Sargassum natans</i> and <i>Sargassum fluitans</i>)	<ul style="list-style-type: none"> ● Caribbean Coastal Ocean Observing System (CARICOOS)
Location of wastewater treatment plant outfalls	<ul style="list-style-type: none"> ● Environmental Protection Agency (EPA) ● Roger Merritt, Virgin Islands Waste Management Authority (VIWMA)
Uncrewed research systems	<ul style="list-style-type: none"> ● Rutgers University ● US Navy
Channels, ocean dumping sites	<ul style="list-style-type: none"> ● Millan Mora, United States Army Corps of Engineers (USACE)
Weather buoys	<ul style="list-style-type: none"> ● CARICOOS and Integrated Observing Ocean System (IOOS)
Private aids to navigation	<ul style="list-style-type: none"> ● USCG
FADs permitted as aids to navigation	<ul style="list-style-type: none"> ● USCG
Altoona Lagoon cable landing site	<ul style="list-style-type: none"> ● None provided

Table 3. Continued

Available Data	Leads to Acquire
Data gaps across all elements of the tourism sector	<ul style="list-style-type: none"> Local hotel and tourism associations USVI Economic Development Authority: Vision 2040
Oil refinery	<ul style="list-style-type: none"> None provided
Superfund sites	<ul style="list-style-type: none"> EPA, Marine Cadastre
Location and outputs from sewage discharge pipelines	<ul style="list-style-type: none"> Antonio Farchette, DPNR and the Environmental Protection Division DPNR Water Pollution Control Program USVI Waste Management Authority USVI Department of Public Works

Table 4. Data Gaps for the Industries Sector

Data Gaps (including identified high priorities*)
Shipping lanes and historical ship/cargo traffic*
Pipe systems for desalination plants*
Future needs for desalination plants*
Shoreline barriers for protection from <i>Sargassum</i> *
Data gaps across all elements of the tourism sector*
Economic data across multiple industries
Cruise vessel traffic patterns
Seaplane traffic patterns (water and air)
Oil and gas facilities (e.g., liquid natural gas pipeline off St. Thomas)
Uncrewed research systems
Undersea cables
Rum effluent pipelines
Moorings near Frederiksted
Slocum glider data
Depth sounding for FADs
Dive sites
Electricity landing facilities
Economic hubs for electricity landing and blue economy opportunities
Tourism, sailing and whale watching
Social perceptions/accessibility of various forms of development

Session 3

FISHERIES

The *Fisheries* sector is divided into three distinct categories: recreational fisheries data (including the charter sector), commercial fisheries data, and data collected through fishery independent surveys. Fisheries play a pivotal role in the socio-economic fabric of the US Caribbean, providing employment, sustenance and recreational opportunities. Accurate spatial data are essential for effective fisheries management, sustainable and productive harvest, and conservation of marine species and ecosystems. NOAA's data for this sector are not currently compiled in layer or map format. Key areas identified by NMFS for future data layer development include:

- *Recreational fisheries*: fishing tournaments (e.g., International Billfish Tournament), Dolphinfish Research Program, and FAD-associated activities
- *Commercial fisheries*: commercial landings reports, port sampling
- *Fishery independent surveys*: Southeast Area Monitoring and Assessment Program (SEAMAP), Coral Reef Conservation Program (CRCP), and National Coral Reef Monitoring Program (NCRMP)

As group discussion opened to questions or concerns about the presented data, many acknowledged that more data is needed from the fishing community. Concurrently, these same participants emphasized that local fisheries must be protected from any future impacts associated with development of new, offshore industries. Some stressed the importance of compensatory mitigation for fishers who lose harvest areas. Others wondered aloud if wind farms will become FADs over time, and, if so, how this might help compensate for lost fishing tournament areas.

Many noted the lack of fishers in attendance, and thus the need for additional outreach. Local teams can help create communication channels with fishers who often do not attend workshops. One participant described emerging fisheries data sets which are still undergoing quality assurance and quality control before being made public. Another suggested that fisheries data needs to be considered within the framework of NOAA's ecosystem-based fisheries management policy and road map.

Participant worksheets showed additional questions, some concerns, and insights for the fisheries sector:

- Spatial data for fisheries still requires more complete exploration. This could give us an indication of areas used. Will we use historical data?
- Do we know where the fishers are gathering their fish (e.g., fish landings survey)?
- We have a complete lack of spatially explicit fishing catch and effort data. We need better fisher participation.



- It looks like fisheries data compilation efforts have just begun.
- USVI needs access to spatial data that NMFS SEFSC has for DPNR DFW use.
- We lack spatial information on recreational fishing data.
- How will spatial planning impact fisheries?
- Availability to collect local, subsistence fishing data is limited.
- It is unclear how the data layers include ecosystem management considerations (i.e., marine protected areas in the east end).
- With the currently available data, it is difficult to create data layers that show where fishing occurs, especially recreational fishing.
- USVI does not have enough spatial data from commercial fisheries.
- USVI has gaps in catch data, poor data collection, lags in reporting times, and no specific data information/poor spatial data.
- USVI has a lack of spatial resolution of fishing locations (e.g., reef fishing, pelagic fisheries, recreational and commercial fisheries).
- Data from 2017 is a bit dated.
- We need scale, resolution and frequency of fishery-independent data in the USVI.
- It is difficult to have a discussion with no data layers available to view.

Table 5. Available Data and Leads for the Fisheries Sector

Available Data	Leads to Acquire
10 year census of licensed USVI fishers	<ul style="list-style-type: none"> ● Barbara Kojis, Norman Quinn and Juan Agar, NMFS SEFSC
Shore-based fishing areas	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
Marinas and landing sites	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
Fishery dependent data (e.g., location, gear type)	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
Fishery independent data generally and for St. Croix East End Marine Park	<ul style="list-style-type: none"> ● Matthew Warham, DPNR
Electronic reporting data for commercial and recreational fisheries	<ul style="list-style-type: none"> ● None provided for the USVI ● Daniel Matos, Puerto Rico Department of Natural and Environmental Resources
Recreational fishing landings reports	<ul style="list-style-type: none"> ● Tyler Smith, University of the Virgin Islands (UVI)
Location of protected areas, including what is allowed and not allowed	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
Coral refugia and coral/fish surveys	<ul style="list-style-type: none"> ● Kimberly Edwards, NCCOS ● The Nature Conservancy (TNC)
Diver surveys, including site location, habitat conditions, number and type of fish species	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
SEAMAP Caribbean surveys	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
Longline vessel monitoring system and logbook data	<ul style="list-style-type: none"> ● None provided
Fishery dependent and fishery independent lobster surveys	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
Two port landings surveys of commercial and recreational sectors	<ul style="list-style-type: none"> ● Kevin McCarthy, NMFS SEFSC
Port sampling	<ul style="list-style-type: none"> ● USVI DFW ● NMFS SEFSC
Fish movement, home range and habitat association	<ul style="list-style-type: none"> ● Mark Monaco, NCCOS
Highly migratory species (HMS) satellite tracking tags	<ul style="list-style-type: none"> ● Read Hendon, NMFS SEFSC
Spawning aggregation data	<ul style="list-style-type: none"> ● Richard Nemeth, UVI
Habitat and benthic mapping data	<ul style="list-style-type: none"> ● Tim Battista, NCCOS

Table 5. Continued

Available Data	Leads to Acquire
Invasive lionfish (<i>Pterois miles</i> and <i>Pterois volitans</i>) data	<ul style="list-style-type: none"> • Frank Cummings, Caribbean Oceanic Restoration and Education (CORE) Foundation
Water currents	<ul style="list-style-type: none"> • Rutgers University, RUCOS Lab • Antonio Farchette, DPNR

Table 6. Data Gaps for the Fisheries Sector

Data Gaps (including identified high priorities*)
Limited spatial information on commercial fisheries*
Very limited spatial information on recreational and charter-for-hire fisheries*
Socioeconomic data and economic value of commercial and recreational fisheries*
Boat access sites*
Generally data limited fisheries
Limited data due to confidentiality issues
Target species fishers are catching and selling
Historical/traditional fishing grounds (i.e., fishery ecological knowledge)
Water currents and sediment movement, and its implications for fish larvae
Impacts of natural disasters on fishing
Whether or not wind farms become a FAD
Vessel monitoring system and vessel trip report data
FADs used by fishers in St. Croix and elsewhere
Ciguatera mapping



Session 4

NATURAL RESOURCES

The *Natural Resources* sector includes data layers of critical habitat, threatened and endangered species, essential fish habitat, and protected areas. Data layers which NCCOS is aware of include:

- Critical habitat designations for two sea turtle species
- Critical habitat designations for seven coral species
- Five fishery management areas
- Essential Fish Habitat (EFH)
- Atlantic Highly Migratory Species (HMS)
- Habitat Areas of Particular Concern

Various federal agencies, as well as USVI agencies and local groups, possess data layers for:

- Protected areas
- Coastal barrier resource areas
- Benthic habitat and coral habitat
- Shallow corals
- Deep sea corals and sponge observations
- *Acropora* presence/absence locations
- Seagrasses
- Bird observations

Matthew Bowers, NMFS SEFSC Marine Mammal and Turtle Division, offered insights on data sources for sea turtle, marine mammal and other protected species distributions (e.g., Ocean Biodiversity Information System).

Following the NOAA presentation, participants initially raised questions about how data layers get ranked when decision-makers must consider which areas get developed and which do not. Many acknowledged the guiding regulatory frameworks of the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA). Others emphasized that St. Croix is home to many turtle nesting beaches. Several participants noted specific areas for consideration:

- Salt River Bay National Historical Park and Ecological Preserve
- Butler Bay artificial reef sites (e.g., wreck dives)
- Back reefs in the northeast and southeast of St. Croix
- Mangroves as critical nursery areas
- Critical habitat for ESA listed coral species



Participant worksheets showed additional questions, concerns and insights:

- Big gaps exist with habitat and species maps. We need information on area restrictions. For example, what does it mean to have a critical habitat designation?
- Is the seagrass layer specific to species or just seagrass/algae? How old is the habitat data?
- Which areas would be most important to prohibit development?
- Are plans underway to develop a regional protected resources model?
- Where did this NOAA data come from? For example, which data sets informed EFH in the Caribbean?
- Benthic data is outdated (NOAA, 2004 perhaps). Where did critical fish habitat data layers come from? TNC has updated data.
- What is the length of data collection?
- Benthic maps might be outdated and not capture recent environmental conditions and changes linked to stony coral tissue loss disease and bleaching events.
- We need to update fishery management plans that we now have for three species in the USVI. We also need to consider prohibited but not ESA listed species (e.g., other corals, parrotfishes, groupers).
- We need both EFH maps and HMS maps.
- No marine mammal data is included in what was shared. NMFS can help provide this information.
- We need to understand the spatial and temporal scale of surveys.

Table 7. Available Data and Leads for the Natural Resources Sector

Available Data	Leads to Acquire
USVI Coastal Vulnerability Index, coastal geomorphology, beaches, salt ponds and mangroves	<ul style="list-style-type: none"> ● DPNR ● Joe Dwyer, NOAA Climate Adaptation Partnerships (CAP) Program
Sea turtle beaches, nesting sites, critical habitat and satellite tagging data	<ul style="list-style-type: none"> ● Kristin Hart, United States Geological Survey (USGS) ● Paul Jobsis, UVI ● Matt Bowers, NMFS SEFSC ● United States Fish and Wildlife Service (USFWS)
Bird counts, inventory of species and migratory routes	<ul style="list-style-type: none"> ● USFWS
Marine mammals (e.g., presence, distribution, population structures)	<ul style="list-style-type: none"> ● Matt Bowers, NMFS SEFSC ● Grisel Rodriguez, Puerto Rico Department of Natural and Environmental Resources
Protected areas, biodiversity and conservation information	<ul style="list-style-type: none"> ● Bill Gould, International Institute of Tropical Forestry ● Amanda Sesser, USFWS
Sargassum satellite mapping and modeling	<ul style="list-style-type: none"> ● Paul Jobsis, UVI ● University of Puerto Rico ● CARICOOS
Sargassum experimental weekly inundation risk	<ul style="list-style-type: none"> ● NOAA Atlantic, Oceanographic and Meteorological Laboratory (AOML) – Joaquin Trinones and Gustavo Goni
Seagrass survey	<ul style="list-style-type: none"> ● Richard Nemeth, UVI
Invasive seagrass (<i>Halophila stipulacea</i>)	<ul style="list-style-type: none"> ● Antonio Farchette, DPNR – St. Thomas 2013 and St. Croix 2016
Habitat maps	<ul style="list-style-type: none"> ● Mark Monaco, NCCOS
Coastal ponds, wetlands, mangroves (e.g., Altoona lagoon, Great Pond, Salt Pond)	<ul style="list-style-type: none"> ● DPNR
St. Croix East End Marine Park turtle habitat, mesophotic reefs, conch and lobster surveys, and fishery independent surveys	<ul style="list-style-type: none"> ● Remi Garcia, US National Park Service ● Jay Gove, US National Park Service ● SEAMAP
Restoration/out-planting sites for ESA listed corals, fine scale coral habitat data, maps of coral cover and reef rugosity, and mesophotic reefs	<ul style="list-style-type: none"> ● Marilyn Brandt, UVI ● CORE ● TNC

Table 7. Continued

Available Data	Leads to Acquire
Deepwater habitat and coral reefs	<ul style="list-style-type: none"> ● Kate Overly, NMFS SEFSC ● NCCOS
Herbivore density on coral reefs	<ul style="list-style-type: none"> ● NCRMP
Overall territorial coral reef monitoring	<ul style="list-style-type: none"> ● USVI Territorial Coral Reef Monitoring Program (TCRMP)
Marine fishes gaps analysis	<ul style="list-style-type: none"> ● William Girno, US Forest Service, Puerto Rico
Indices of abundance based on fishery independent surveys	<ul style="list-style-type: none"> ● NCRMP and TCRMP
Spawning aggregations	<ul style="list-style-type: none"> ● Richard Nemeth, UVI
Critical habitat for Nassau grouper (<i>Epinephelus striatus</i>)	<ul style="list-style-type: none"> ● NMFS SEFSC
Dolphinfish movement	<ul style="list-style-type: none"> ● Wessley Merten, Beyond Our Shores Foundation
HMS satellite tagging	<ul style="list-style-type: none"> ● Read Hendon, NMFS SEFSC
Data from the NOAA NCRMP and the USVI TCRMP	<ul style="list-style-type: none"> ● Tyler Smith, UVI ● Jeremiah Blondeau, NMFS SEFSC
Benthic data	<ul style="list-style-type: none"> ● TNC, NCCOS and NMFS SEFSC
Oceanographic data	<ul style="list-style-type: none"> ● Doug Wilson, UVI and CARICOOS ● Sennai Habtes, DPNR DFW
Changes in land cover (wetlands)	<ul style="list-style-type: none"> ● NOAA OCM Coastal Change Analysis Program and Marine Cadastre



Table 8. Data Gaps for the Natural Resources Sector

Data Gaps (including identified high priorities*)
Fine scale habitat/species maps*
Critical habitat designations*
Hot spot maps of corals recently affected by ocean warming and hurricanes*
Marine mammals (e.g., presence/absence, distribution, population structures)*
Bird nesting areas and migratory routes*
How climate change affects species distribution (e.g., dolphinfish, wahoo)*
Benthic environment*
Herbivore density on coral reefs
Presence/absence of ESA listed corals
Spawning aggregations and nursery habitats
Suitable beach habitat for turtle nesting
Beaches used by soldier crabs (<i>Coenobita clypeatus</i>) to flush eggs
Offshore and nearshore wave movements and sediment transfer
How wave and sediment transfer affects sargassum and invasive seagrass



Session 5

CULTURAL AND SOCIAL RESOURCES

The *Cultural and Social Resources* sector includes data on the cultural uses of, and human interactions with, the marine environment in the USVI. This sector guides equitable and holistic decision-making, providing spatial insights that respect historical significance and empower communities. Data layers which NCCOS is aware of include historic lighthouses, wrecks and obstructions, protected areas, and the results of the NCRMP 2022 socioeconomic survey.

Additional potential sources of data may be incorporated into this sector. These include:

- Historical and archeological sites
- Traditional areas of cultural importance
- Traditional/ceremonial or important recreational uses of marine or coastal areas (e.g., dive sites, sandbars, transit routes)
- Coastal demographic data
- Social vulnerability data
- Traditional and current territory of tribes or native and traditional populations
- Coastal land tenure/land use
- Fishing territories at sea
- Coastal infrastructure/working waterfronts





Initial comments following the presentation centered on the need to define traditional fishing areas, transit routes and locations where local people are buried at sea. Some stressed the cultural importance of beaches and boat access facilities. Similar to how the topic emerged during the fisheries session, many stressed the importance of minimizing economic impacts to fishers from any future aquaculture or wind energy projects. Others suggested that the wind industry could provide an alternative source of employment for local people. Getting input from local stakeholders, a number of participants concurred, is a critical data gathering step for this sector. Additional comments explored the cultural importance of viewshed, and the need to survey both residents and visitors to determine areas with important viewscales.

Participant worksheets showed additional insights and suggestions:

- It is important to review the actual locations of areas, such as latitude and longitude for monuments. St. John has an open rectangle. Liajay Rivera from the Caribbean Fishery Management Council (CFMC) is looking at this issue. Include reference to specific management area uses and prohibitions.
- We need spatial identification of the possible displacement of fishing effort based on the development of new industries.
- We need to identify fishing and underwater archaeological sites along the coast which might be impacted (e.g., Frederiksted Pier Dump Site).
- Non-listed but important sites, recreational fishing, and sailing activities do not appear in the presented information.

Table 9. Available Data and Leads for the Cultural and Social Resources Sector

Available Data	Leads to Acquire
Traditional fishing areas, transit routes and locations where people are buried at sea	<ul style="list-style-type: none"> ● David Brewer, Virgin Islands State Historic Preservation Office ● Amy Dempsey, Bioimpact, Inc.
Wreck data (e.g., Butler Bay and other shallow and deepwater artificial reef sites)	<ul style="list-style-type: none"> ● Island Resources Foundation ● Nicole Angeli, DPNR ● USFWS
Derelict vessels and vessel removal	<ul style="list-style-type: none"> ● USCG ● Kristina Edwards, MyCoast
Submerged/filled lands	<ul style="list-style-type: none"> ● USVI Coastal Zone Management Program ● Sean Krigger, DPNR
Impaired waterways	<ul style="list-style-type: none"> ● DPNR 303(d) List of Impaired Waters reports
Unused/impacted contamination sites	<ul style="list-style-type: none"> ● DPNR environmental enforcement ● EPA
Archaeological sites and historic buildings in St. Croix	<ul style="list-style-type: none"> ● Bruce Tilden ● David Brewer, DPNR
Archaeological sites found in the Sandy Point National Wildlife Refuge	<ul style="list-style-type: none"> ● John Farchette and David Brewer, DPNR ● Graduate student P. Zahedi
Location of recreational sailboat moorings and anchorages	<ul style="list-style-type: none"> ● Leigh Fletcher has leads
Vessel shelter locations during storms	<ul style="list-style-type: none"> ● Marlon Hibbert, DPNR
Shoreline recreation survey conducted every four years in St. Croix	<ul style="list-style-type: none"> ● NOAA NCRMP ● Marlon Hibbert, DPNR
Offshore recreational areas	<ul style="list-style-type: none"> ● None provided
Historic waterfronts and viewsheds	<ul style="list-style-type: none"> ● None provided
Terrestrial and marine protected areas (e.g., St. Thomas East End Reserves)	<ul style="list-style-type: none"> ● Nicole Angeli, DPNR ● International Institute of Tropical Forestry
Species of interest in the USVI	<ul style="list-style-type: none"> ● Michelle Pugh, Dive Experience
Beaches	<ul style="list-style-type: none"> ● USVI Coastal Vulnerability Index
Social vulnerability	<ul style="list-style-type: none"> ● 2010 and 2020 census data ● Federal Emergency Management Authority
Communities potentially impacted by offshore wind development	<ul style="list-style-type: none"> ● None provided

Table 9. Continued

Available Data	Leads to Acquire
Demographics associated with aquaculture and offshore wind energy	<ul style="list-style-type: none"> • None provided
Monuments	<ul style="list-style-type: none"> • Graciela Garcia-Moliner, CFMC
Lighthouses	<ul style="list-style-type: none"> • USCG, USFWS
St. John open rectangle	<ul style="list-style-type: none"> • Liajay Rivera, CFMC
AOML hurricane gliders	<ul style="list-style-type: none"> • Gustavo Goni

Table 10. Data Gaps for the Cultural and Social Resources Sector

Data Gaps (including identified high priorities*)
Traditional fishing areas, transit routes and fish markets*
Where local people conduct ceremonies and/or are buried at sea*
Viewscapes*
Submerged land parcels
Beaches utilized by the local community
Reference library for presented data
Water dependent recreation areas
Pre-Columbian archaeological sites
Maps showing uses of coastal/marine areas
Coastal areas for plant gathering



Session 6

METOCEAN AND OTHER

The *Metocean and Other* sector includes a wide range of meteorological and oceanographic information needed to inform planning and decision-making. This includes:

- Bathymetry and prevailing currents
- Wave patterns
- Wind regimes
- Water temperatures
- Shoreline, ports and harbors, and boundary data

Data layers which NCCOS is aware of include:

- Federal and state water boundaries
- US maritime limits and boundaries
- USFWS management regions
- USACE regulatory boundaries
- County lines
- Shoreline boundaries
- Locations of ports and harbors
- Bathymetry data
- All available information collected by CARICOOS such as wind speed and direction, tidal information, and information on surface and subsurface currents



Participants cited the need for better resolution of metocean and other data in order to engage more effectively on this topic. Many data are likely available based on permit requirements for various projects. But again, some noted, a central repository for publicly available data and information is still needed in the USVI. Others emphasized the need for greater clarity regarding the nexus that links nearshore (coastal zone) and offshore (wider ocean) data.

Participant worksheets showed additional questions, suggestions and insights:

- At what scale/resolution do we have data on ocean currents, waves and the water column, and the benthic environment? How do we capture offshore wind/waves?
- Is there overlap in the boundary maps between St. Thomas and Puerto Rico? Does this affect jurisdictional issues?
- What is the resolution of data that is available? Do we have enough coverage with available data to identify gaps? How much is extrapolated?
- Higher resolution bathymetry data exist for specific areas. This is important for canyons and seamounts. Seasonality of data, such as currents, is important. Climatology is important. CARICOOS is an important source of information.
- We need longitudinal studies of water temperature change.

Table 11. Available Data and Leads for the Metocean and Other Sector

Available Data	Leads to Acquire
Archaeological studies of the benthic environment and undersea cable locations	● USACE
Coral Reef Watch data	● Research vessels Nancy Foster, Okeanos and Nautilus
Deep mesophotic reefs and seamounts	● Tyler Smith, UVI
Coastal waters heat map showing areas of coral bleaching	● NOAA Coral Reef Watch
Larval transport modeling	● Claire Paris, University of Miami
Sea surface temperature anomalies	● CARICOOS
Information on the benthic environment	● NOAA Okeanos Explorer
Tsunami shapefile	● None provided
Earthquakes	● USGS
Wave energy	● USACE hindcast study
Climatological data	● Chris Landsea, National Hurricane Center ● Erica Rule, NMFS SEFSC

Table 11. Continued

Available Data	Leads to Acquire
NOAA ocean satellite products (e.g., sea surface temperature, ocean color, heat content, sea surface heights, wave heights)	<ul style="list-style-type: none"> • NOAA
Surface currents, storm tracks (major/tropical), prevailing wind speeds/direction	<ul style="list-style-type: none"> • NOAA
Influence of Amazon and Orinoco rivers on fisheries and nearby ocean conditions	<ul style="list-style-type: none"> • William Hernandez, CARICOOS
Rugosity/benthic environment	<ul style="list-style-type: none"> • Matt Pendleton, NOAA OCM
Deepwater corals – bathymetry, habitat out to 2,500 meters	<ul style="list-style-type: none"> • NOAA
Updated boundary line between the USVI and Puerto Rico	<ul style="list-style-type: none"> • NOAA
Tsunami data	<ul style="list-style-type: none"> • NOAA National Tsunami Hazard Mitigation Program • Virgin Islands Territorial Emergency Management Agency
Biological cover	<ul style="list-style-type: none"> • Research divers and recreational divers
Bathymetry and seasonality of currents	<ul style="list-style-type: none"> • CARICOOS

Table 12. Data Gaps for the Metocean and Other Sector

Data Gaps (including identified high priorities*)
Resolution across many topics*
Resolution – where are the blind spots?
Biological cover in nearshore habitats
Deepwater corals/habitat maps
Fine scale current and temperature data
Eddies
Storm frequency, wave energy, earthquake/tsunami data
Offshore impacts of increased land-based nutrient flows relative to historical patterns
How climate change affects current conditions and what anticipated changes may occur in the future
Depth contour shapefiles for shallower depths
Subduction zones, seamounts and thermal vents

KEY TAKEAWAYS AND NEXT STEPS

As the workshop concluded, participants shared key takeaways and emerging insights to support marine spatial planning in the USVI. Although some referenced “we” during closing remarks, each bullet below simply reflects a comment made by a single individual. Given the focus of the workshop—initial brainstorming of data development ideas, leads and gaps—no effort was made to either assess or build consensus on any particular comment.

- “Commitment is needed to develop a central repository of data in the US Caribbean, and build out more geospatial data layers. This work represents a great opportunity for agencies and local people alike.”
- “Social science surveys, identified as important during the workshop, take time to conduct. We need this information now in order to effectively guide future planning.”
- “Many in the room clearly desire more data. At the same time, we also need improved resolution of existing and future data to better inform planning and decision-making.”
- “Local stakeholders may have insights which this group cannot see. Involving them early and often can improve planning efforts and buy-in. There is an important opportunity here given the current administration’s focus on equity and environmental justice.”
- “We need more data to inform local stakeholders of the kind of development we are talking about and what impacts may come. This will improve public understanding of conversations ahead. Right now we do not have enough data to ask the right questions.”
- “We are working to achieve equity for the USVI around the issue of data. It would be helpful to have federal expectations for data standards. We would also like our federal partners to assist us in filling critical data gaps.”
- “Jennifer and the facilitation team played an important role in making sure this was an inclusive, focused and productive meeting. This approach could serve as a template for other meetings.”

John Walter, Deputy Director of the NMFS SEFSC, concurred that additional outreach is needed to key partners, including fishers, who were not present at this workshop. As offshore wind or aquaculture projects progress, BOEM and NOAA will advance more formal processes to engage and solicit input from the public in the USVI. These federal agencies intend to work with local partners to acquire the best available science to inform future decisions. He expressed appreciation for the focus of this early dialogue, and the involvement of all participants, to canvas what we currently know and do not know.

James Morris and Jennifer Wright thanked everyone for their hard work over two days, and committed to following up on all identified data leads. James concluded by mapping

out next steps that will guide data development work in the US Caribbean in the months and years ahead, including the following:

1. Develop and distribute the NOAA presentation and workshop report on the NCCOS website
2. Distribute summary of data need priorities to funding sources (NOAA, BOEM, other)
3. Follow up on data leads – Jennifer/NCCOS team will be in touch
4. Develop marine spatial planning data inventory/geodatabase
5. Develop US Caribbean marine spatial toolbox including interactive map viewer
6. Begin working with territory and federal governments on planning priorities
7. Continue working with BOEM on offshore wind planning priorities
8. Continue working with NMFS and USVI DPNR on aquaculture planning priorities
9. Consider research on co-siting of offshore wind and aquaculture as a way to reduce impacts
10. Establish future meetings (virtual/in person) targeted at specific data categories

Nicole Angeli offered closing remarks and thanked everyone, including the agencies which helped fund and thereby secure broad participation at the workshop. She expressed hope that the final products which emerge from these marine spatial data collection efforts will bring USVI communities closer to respectful and sustainable use of the natural resources that elevate the quality of life of friends, families and neighbors.



APPENDIX 1: ACRONYMS AND ABBREVIATIONS

AIS	Automatic Identification System
AOML	Atlantic, Oceanographic and Meteorological Laboratory
BOEM	Bureau of Ocean Energy Management
CAP	Climate Adaptation Partnerships
CARICOOS	Caribbean Coastal Ocean Observing System
CFMC	Caribbean Fishery Management Council
CORE	Caribbean Oceanic Restoration and Education
CRCP	Coral Reef Conservation Program
DFW	Division of Fish and Wildlife
DOD	Department of Defense
DPNR	Department of Planning and Natural Resources
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAD	Fish Aggregating Device
FUDS	Formerly Used Defense Sites
GMRI	Gulf and Marine Research Institute
HMS	Highly Migratory Species
IOOS	Integrated Observing Ocean System
NASA	National Aeronautics and Space Administration
NCCOS	National Centers for Coastal Ocean Science
NCRMP	National Coral Reef Monitoring Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OCM	Office for Coastal Management
SEAMAP	Southeast Area Monitoring and Assessment Program
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
TCRMP	Territorial Coral Reef Monitoring Program
TNC	The Nature Conservancy
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USVI	United States Virgin Islands
UVI	University of the Virgin Islands
VINGN	Virgin Islands Next Generation Network
VISHPO	Virgin Islands State Historic Preservation Office
VIWMA	Virgin Islands Waste Management Authority

APPENDIX 2: WORKSHOP AGENDA

Day 1 (full day)

Time	Activity
8:30 – 9:00 am	Registration
9:00 – 9:15 am	Welcome and Introduction
9:15 – 10:00 am	Overview of NOAA's Marine Spatial Planning Process
10:00 – 10:45 am	Session 1: National Security
10:45 – 11:00 am	Break
11:00 – 12:00 pm	Session 2: Industries
12:00 – 1:00 pm	Lunch Break
1:00 – 2:45 pm	Session 3: Fisheries
2:45 – 3:00 pm	Break
3:00 – 4:45 pm	Session 4: Natural Resources
4:45 – 5:00 pm	Wrap Up Day 1 and Preview Day 2

Day 2 (half day)

Time	Activity
8:30 – 9:00 am	Registration
9:00 – 9:15 am	Recap of Day 1 and Introduction to Day 2
9:15 – 10:00 am	Session 5: Cultural and Social Resources
10:00 – 10:45 am	Session 6: Metocean and Other
10:45 – 11:00 am	Break
11:00 – 12:00 pm	Key Takeaways and Next Steps
12:00 – 1:00 pm	Closing Remarks

APPENDIX 3: WORKSHOP PARTICIPANTS

Name	Affiliation
Nicole Angeli	USVI DPNR
Robbin Beard	DOD Clearinghouse
Matthew Bowers	NOAA NMFS SEFSC
Dinorah Chacin	NOAA NMFS
Amy Dempsey	Bioimpact, Inc.
Joe Dwyer	NOAA CAP/Lynker
Antonio Farchette	USVI DPNR
Carlos Farchette	CFMC
Leigh Fletcher	Bioimpact, Inc.
Wright Frank	BOEM
Graciela García-Moliner	CFMC
Lamar Hawkins Jr	NOAA NMFS SEFSC
Read Hendon	NOAA NMFS SEFSC
Marlon Hibbert	USVI DPNR
Arianna Honeycutt	BOEM
Celeste Jarvis	TNC
Brandon Jensen	BOEM
Hilary Lohmann	USVI DPNR
Kevin McCarthy	NOAA NMFS SEFSC
Sean Meehan	NOAA NMFS SERO
Mark Monaco	NOAA NCCOS
James Morris	NOAA NCCOS
Maggie Motiani	USVI DPNR
Pedro Nieves	USVI Lieutenant Governor's Office
Nathan Owens	DOD Clearinghouse
Matt Pendleton	NOAA OCM
Courtney Pickett	GMRI Marine Resource and Education Program
Julia Plotkin	USVI DPNR
Antares Ramos	Antares Conservation Tactics

APPENDIX 3: CONTINUED 

Name	Affiliation
Michael Rasser	BOEM
Andrew Richard	NOAA NMFS SERO
Erica Rule	NOAA NMFS SEFSC
Sidney Sapp	NOAA NMFS SEFSC
Joe Serafy	NOAA NMFS SEFSC
Laughlin Sicheloff	NOAA NCCOS/Consolidated Safety Services
Noah Silverman	NOAA NMFS SERO
Sarah Stephenson	NOAA NMFS SERO
Mary Stiehler	USVI DPNR
Brent Stoffle	NOAA NMFS SEFSC
Anne Tagini	Bioimpact, Inc.
William Tobias	CFMC District Advisory Panel
John Walter	NOAA NMFS SEFSC
Rich Wilson	Seatone Consulting (facilitation support)
Jennifer Wright	NOAA NCCOS/Consolidated Safety Services
Meagan Wylie	Seatone Consulting (facilitation support)

APPENDIX 4: PHOTO CREDITS

US Virgin Islands Workshop Report Photos

Project staff and facilitators captured group photos during the course of the workshop. Other photos, acquired via Shutterstock, are credited to either the individual or account name listed.

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Rich Wilson	Page 31 (presenter)

