

# US Caribbean Marine Spatial Planning Workshop



## US Virgin Islands

August 28, 2023 - August 29, 2023

The Buccaneer Resort, St. Croix, USVI

National Centers for Coastal and Ocean Science  
National Marine Fisheries Service

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# US Caribbean Marine Spatial Planning Workshop

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NOAA's National Centers for Coastal Ocean Science (NCCOS) in partnership with the NOAA National Marine Fisheries Service (NMFS), Southeast Fisheries Science Center (SEFSC) are working to build spatial planning capacity in the US Caribbean Region.

## Workshop Goals

- Learn more about NOAA's marine spatial planning approaches and activities
- Inventory available spatial data for the US Caribbean
- 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 efforts



**NCCOS**



**NOAA  
FISHERIES**

# Workshop Sessions

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

# Core Data Questions

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



# Regional Ocean Spatial Modeling:

## How NOAA is providing operational marine spatial planning

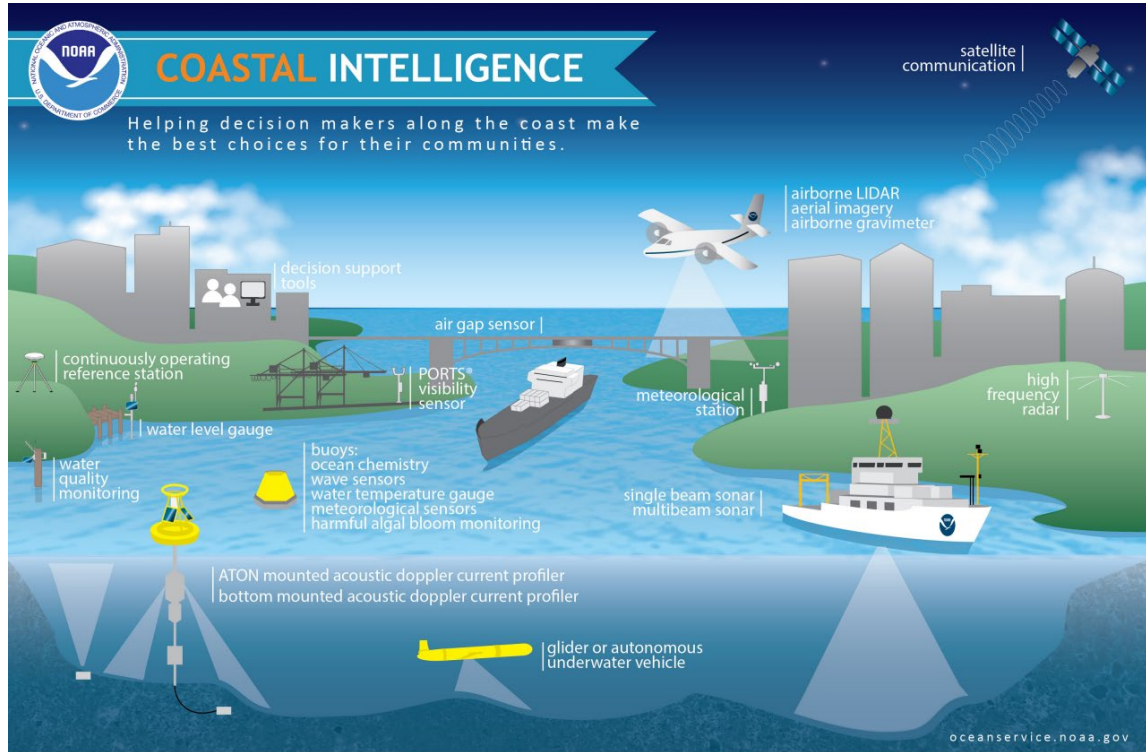
National Oceanic and Atmospheric Association  
National Centers for Coastal and Ocean Science

James Morris

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# Ocean Intel and the Blue Economy



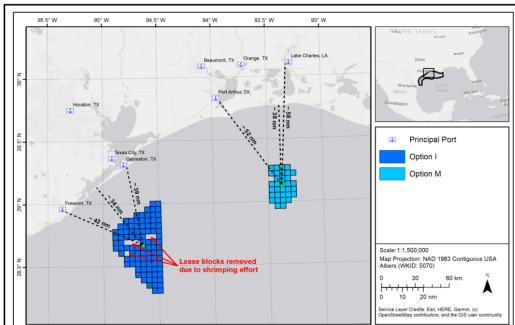
## Ocean Industries

-  Tourism and Recreation
-  Defense and Public Administration
-  Offshore Oil and Gas
-  Transportation
-  Fisheries and other Bio-products
-  Shipbuilding
-  Power Generation
-  Construction
-  Research and Education
-  Professional and Business Services\*

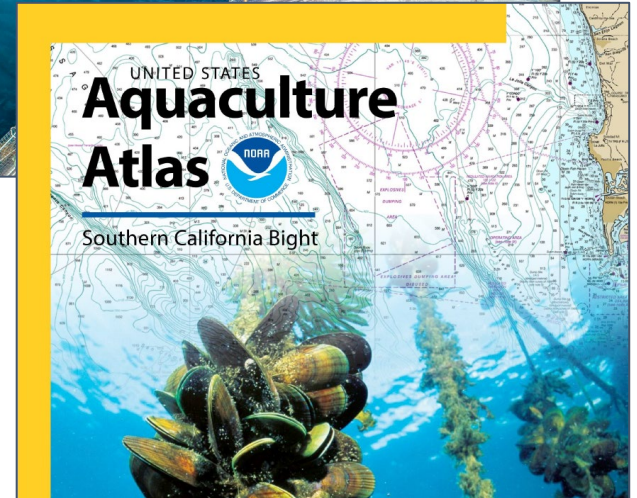
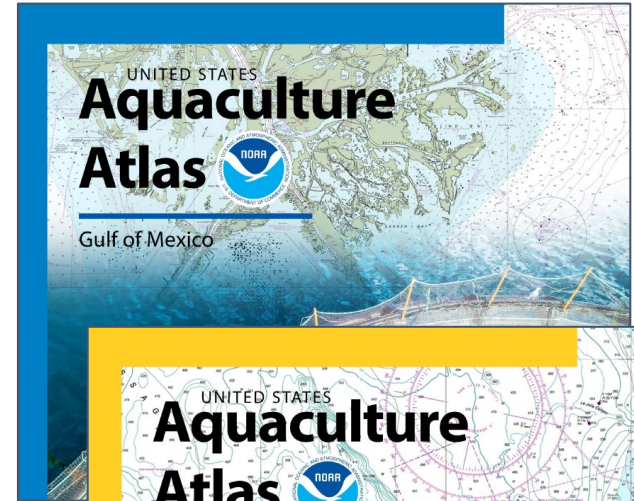
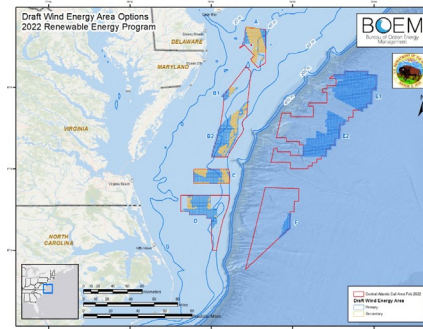
# NOAA Spatial Planning

- Completed 50+ analyses in last 5 years
- Aquaculture Opportunity Areas
- Wind Energy Areas
- State-designated aquaculture use areas
- Spatial planning for Ports/Harbors and farm specific sites
- Tool/app development
- Stakeholder engagement
- Geospatial science and services

## Gulf of Mexico WEAs



## Central Atlantic WEAs



# New Federal Partnerships



National Oceanic and  
Atmospheric Administration  
U.S. Department of Commerce

Home / News & Features

## NOAA and BOEM announce interagency collaboration to advance offshore wind energy

HOME | NEWSROOM

### BOEM Enhances its Processes to Identify Future Offshore Wind Energy Areas

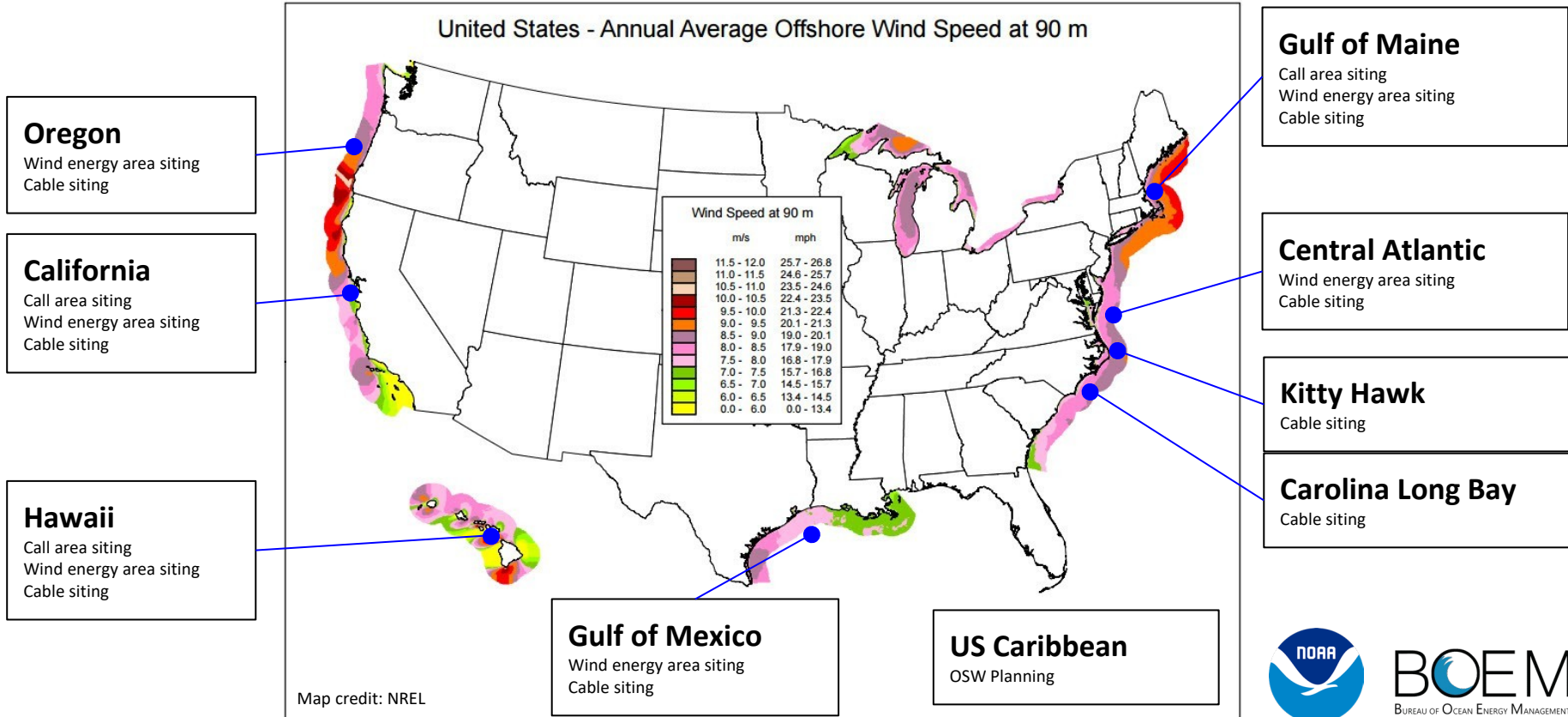
New Changes in Response to Public Input

09/16/2022





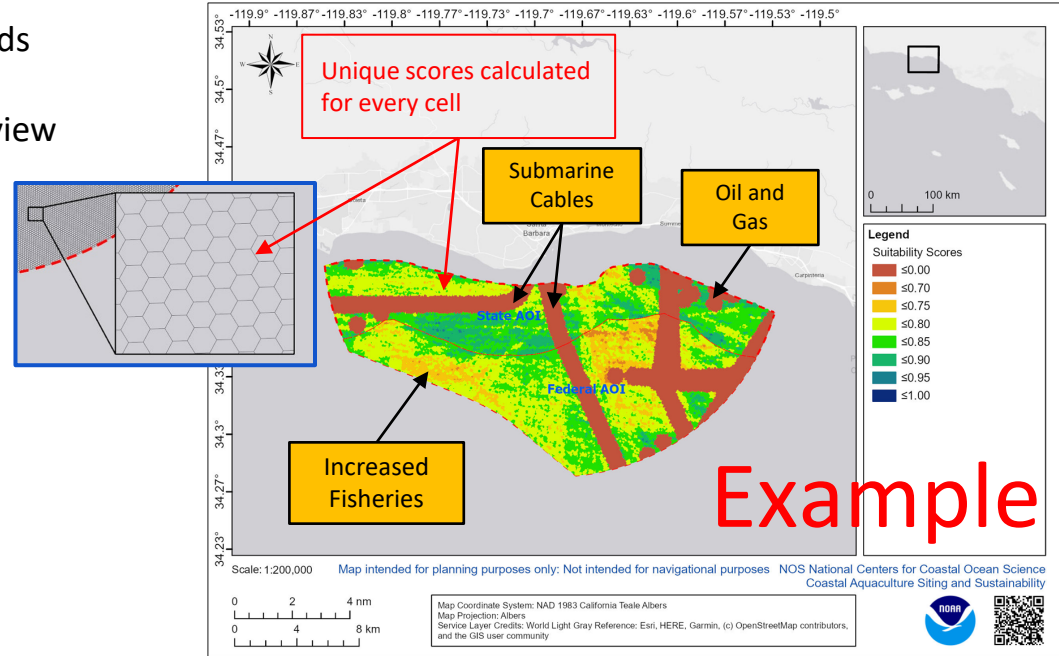
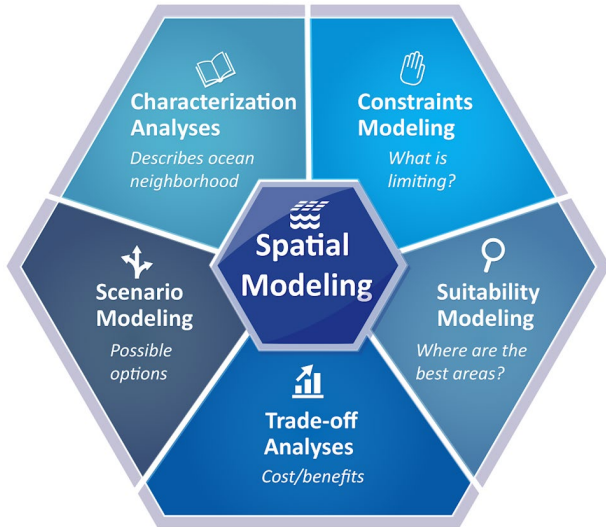
# Wind Spatial Models Underway



# Why Spatial Suitability Modeling?

- Analyzes the “whole ecosystem”
- Identifies hotspots of conflict and opportunity
- Requires set rules (weights) and methods
- Provides defensible and transparent methods
- Allows for scenario planning
- Supports comprehensive environmental review

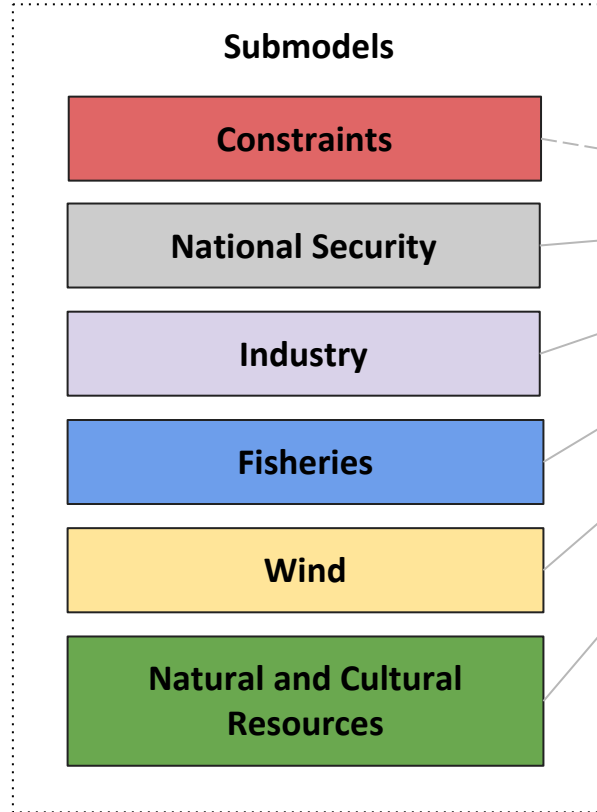
A **spatial suitability model** weights locations relative to each other based on a given criteria.



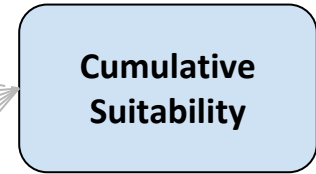
# Spatial Suitability Model



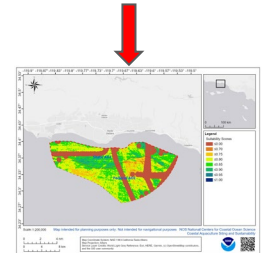
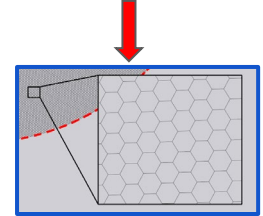
**MarineCadastre.gov**  
 An Ocean of Information  
 A joint BOEM and NOAA initiative providing authoritative data to meet the needs of the offshore energy and marine planning communities.



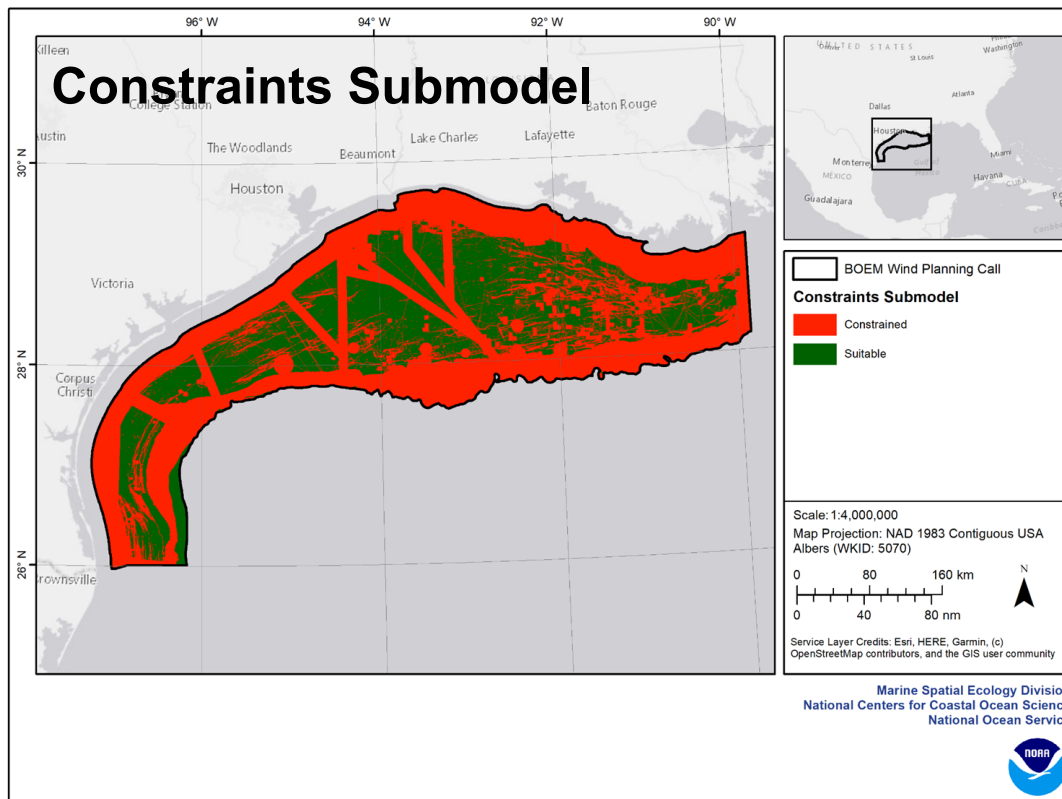
*Areas Eliminated*



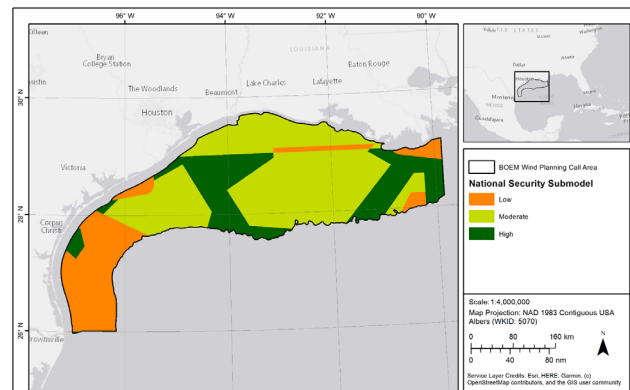
*Geometric Mean Calculated*



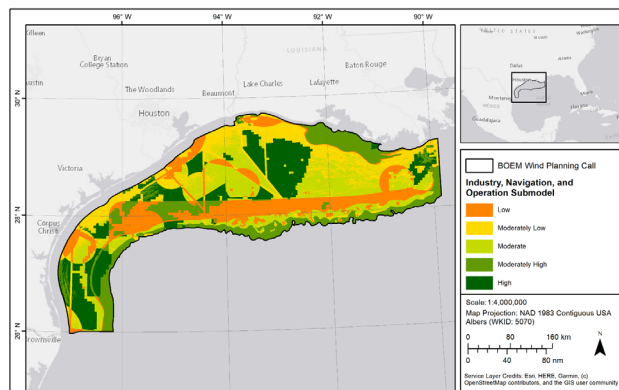
# Gulf of Mexico WEAs Example



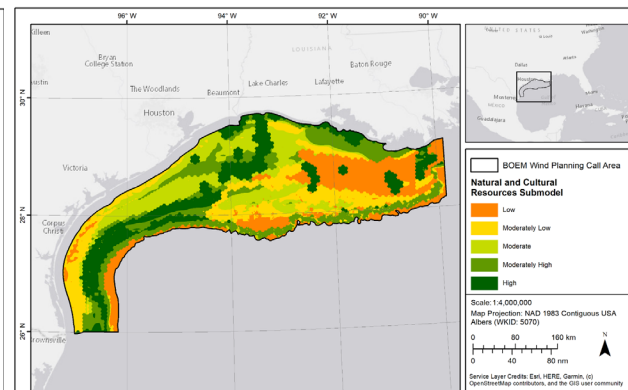
# Submodel Suitability



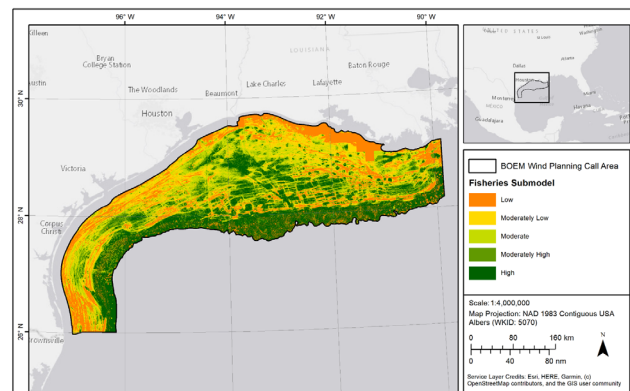
**National security**



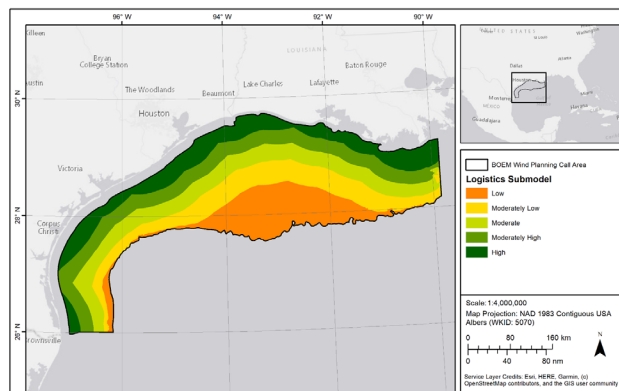
**Industry and Operations**



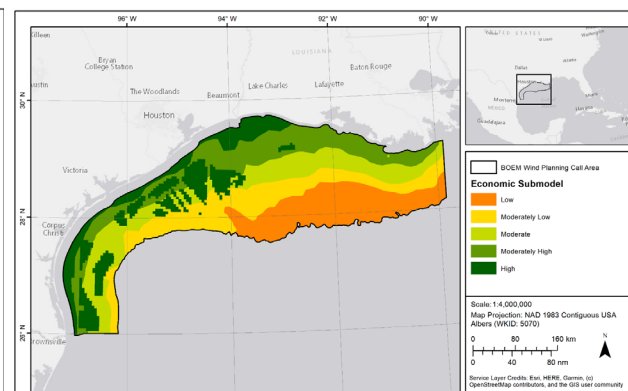
**Natural and Cultural Resources**



**Fisheries**

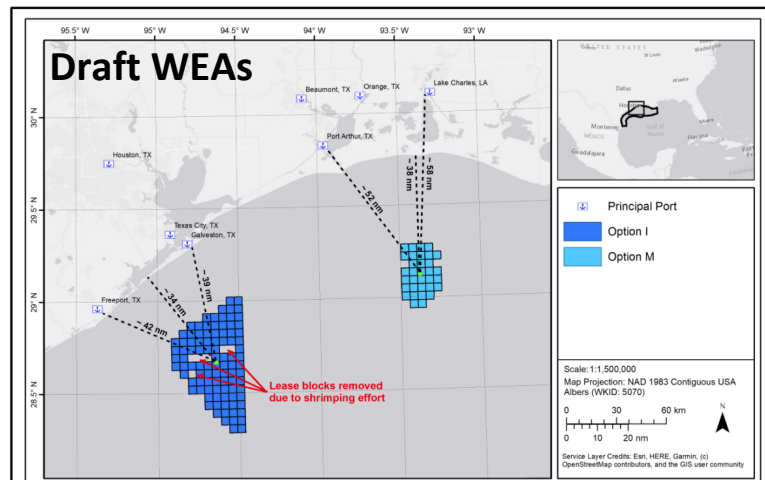
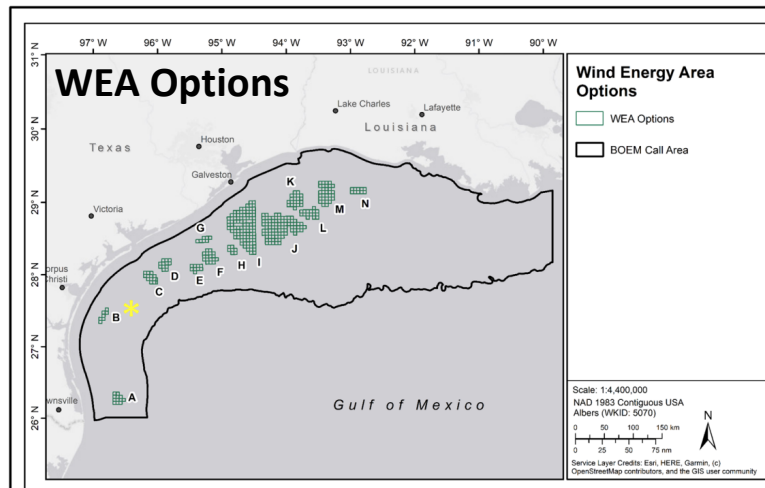
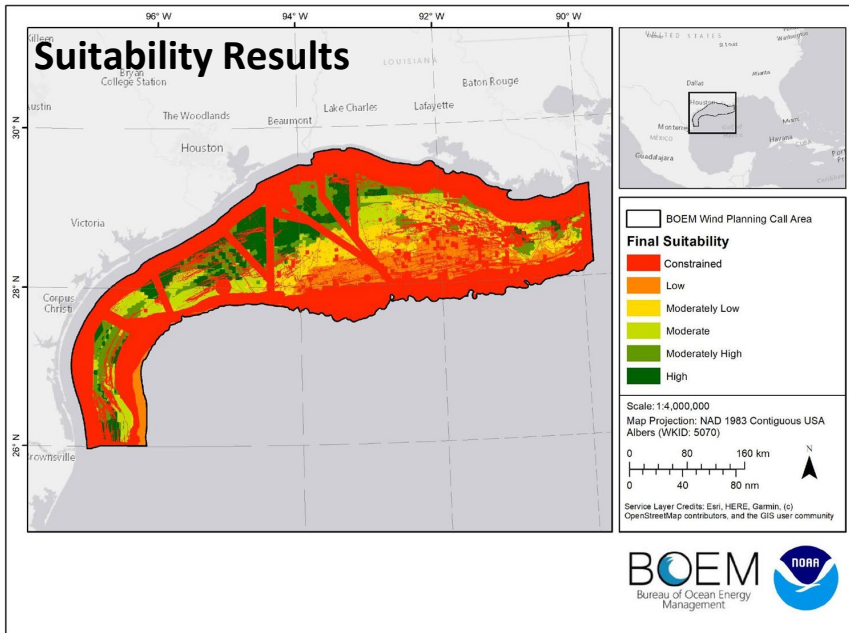


**Logistics**



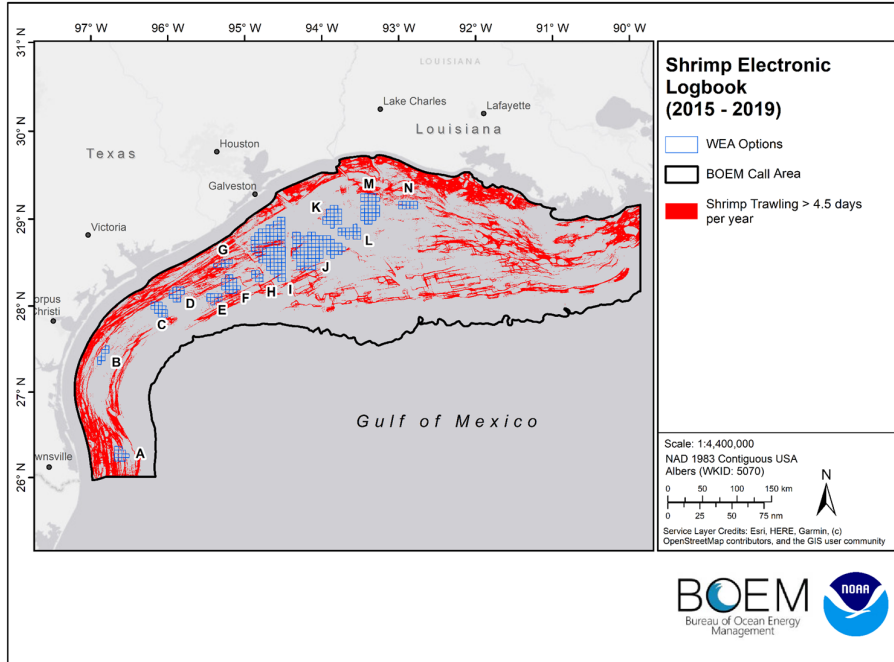
**Economics**

# Gulf of Mexico WEA Model

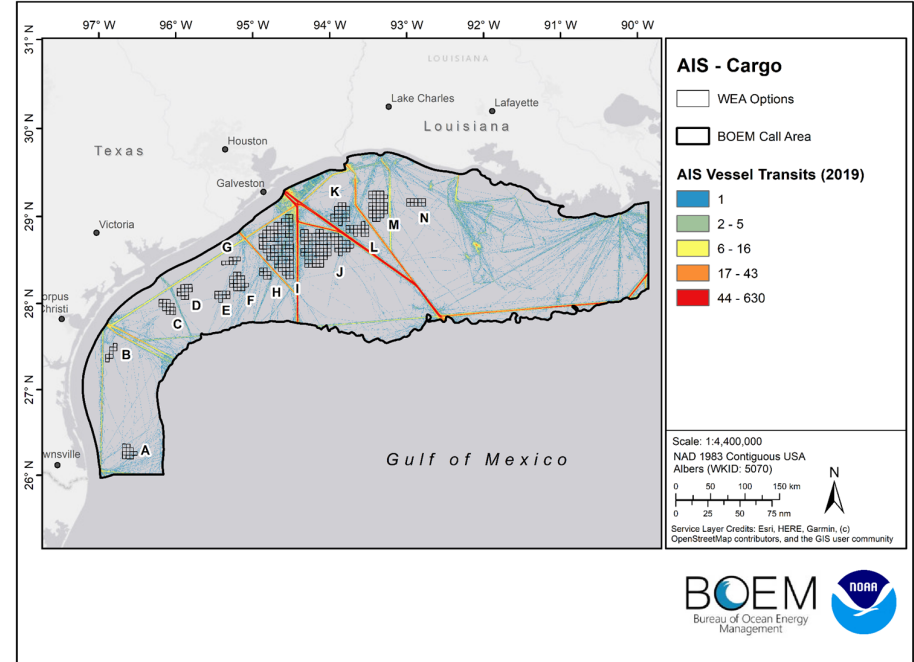


# Model Performance Examples

## Deconflict fisheries



## Deconflict shipping industry



# Current Data Inventory

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1. National Security
2. Industries
3. Fisheries
4. Natural Resources
5. Cultural and Social Resources
6. Metocean and Other



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# National Security

Locations of various military or NASA operation areas



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# National Security

**Danger Zones and Restricted Areas:** areas used for especially hazardous operations or otherwise restricted access

[Data Link](#) / [Metadata Link](#)

**Formerly Used Defense Sites (FUDS):** locations where military activity occurred and the various trajectory and ranges from these areas where weapons were deployed or tested

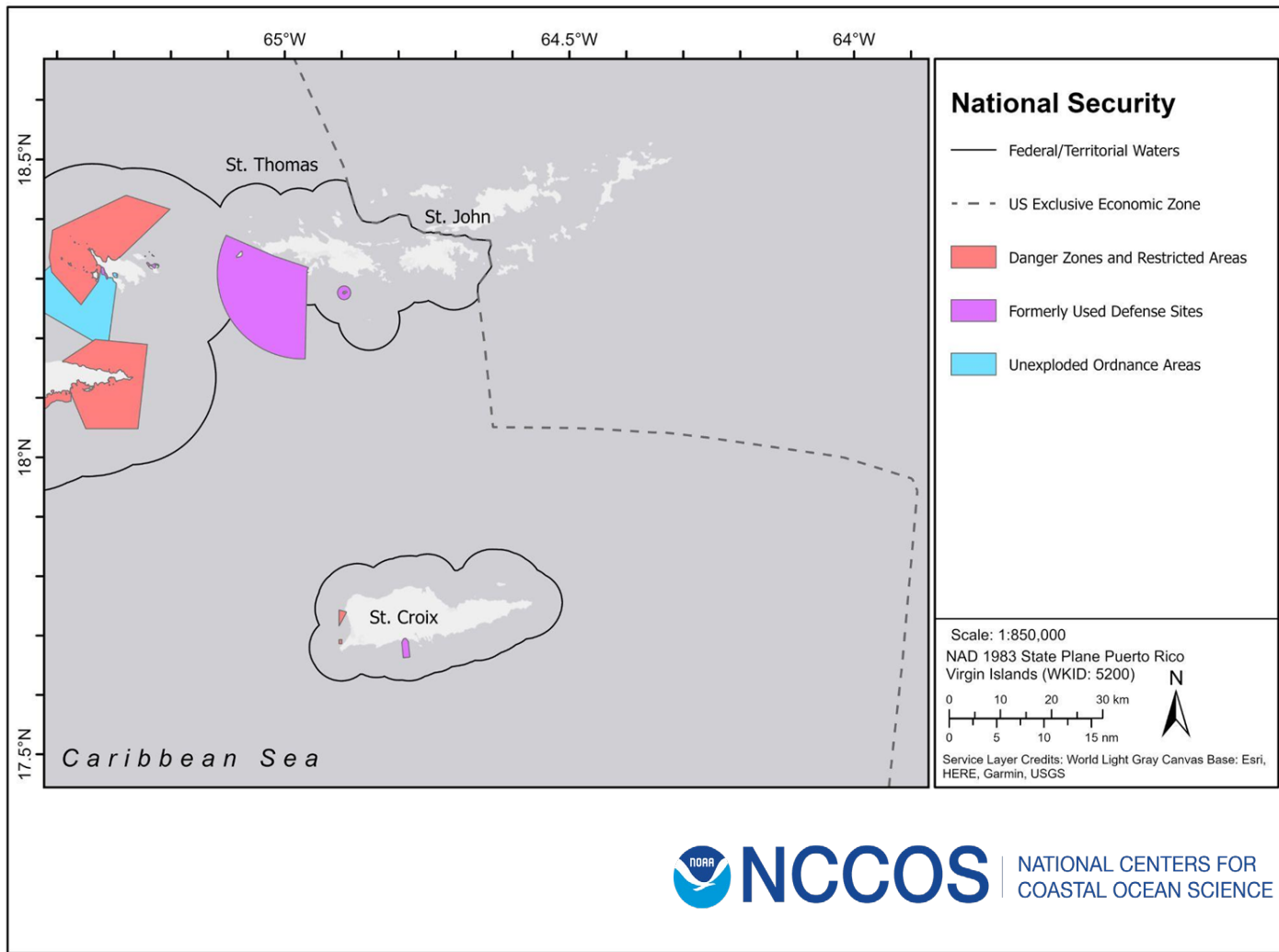
[Data Link](#) / [Metadata Link](#)

**Unexploded Ordnance Areas:** explosive weapons (bombs, bullets, shells, grenades, mines, etc.) that did not explode when they were employed and still pose a risk of detonation

[Data Link](#)

**Type:** Polygon

**Original Source:** DOD (USACE)



# Industries

Locations of vessel traffic,  
key industrial concerns  
(shipping lanes, pipelines,  
submarine cables), buoys  
and weather forecasting  
devices



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# Industries - Summary Data List

- Aids To Navigation
- AIS Vessel Tracks
- Anchorage Areas
- Buoys
- Maintained Channels
- Pilot Boarding Areas
- Pipeline Areas
- Ports and Harbors
- Submarine Cables
- Wrecks and Obstructions

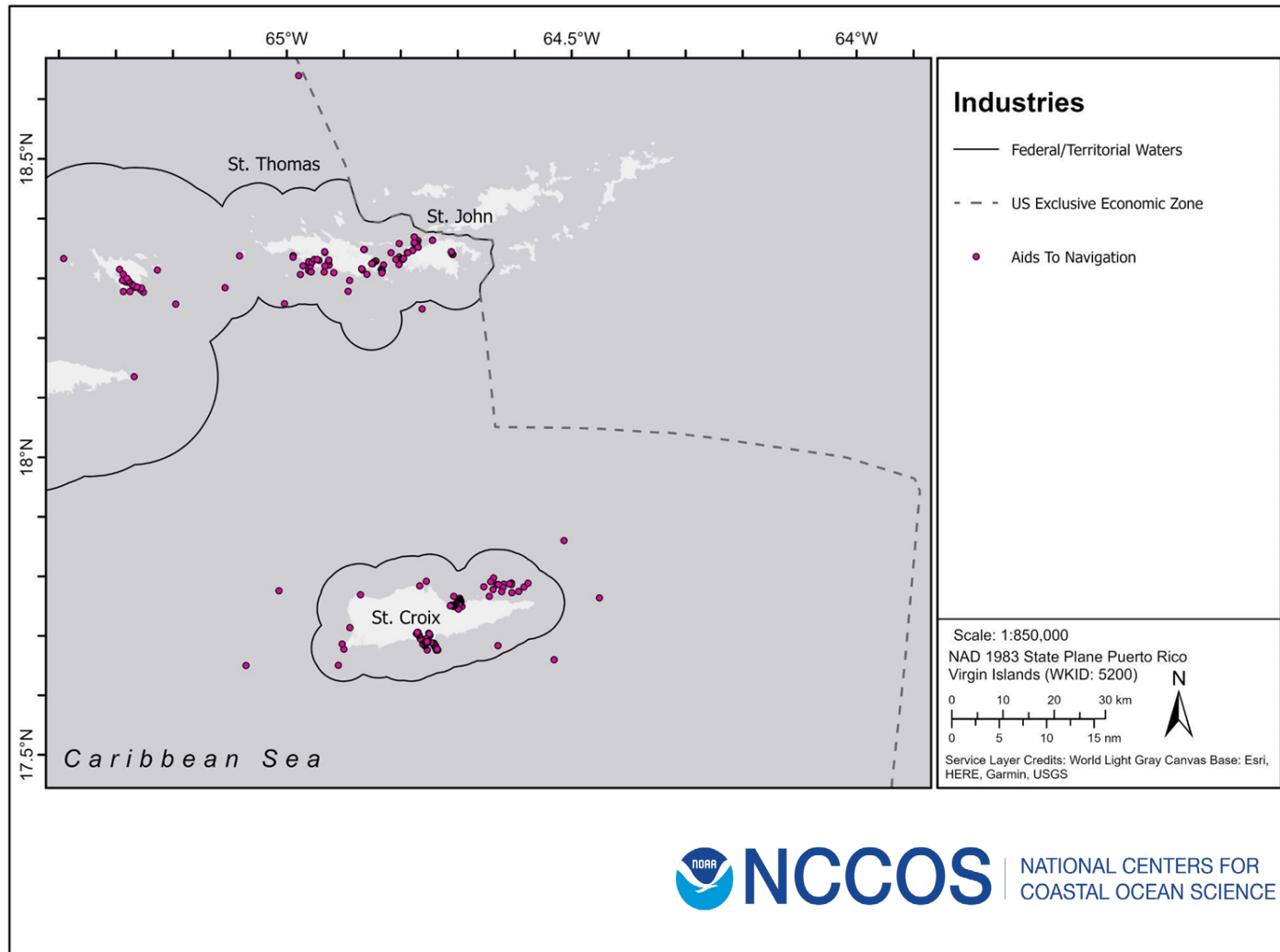
# Aids To Navigation

**Summary:** aids to navigation (e.g., lights, signals, buoys, and day beacons), that are intended to assist a navigator to determine position or safe course, or to warn of dangers or obstructions to navigation. The U.S. Coast Guard is responsible for ensuring that this network is up to date and functioning properly so recreational and commercial boaters can safely navigate the maritime environment.

**Type:** Point

**Original Source:** US Coast Guard

[Data Link](#) / [Metadata Link](#)



# AIS Vessel Tracks 2022

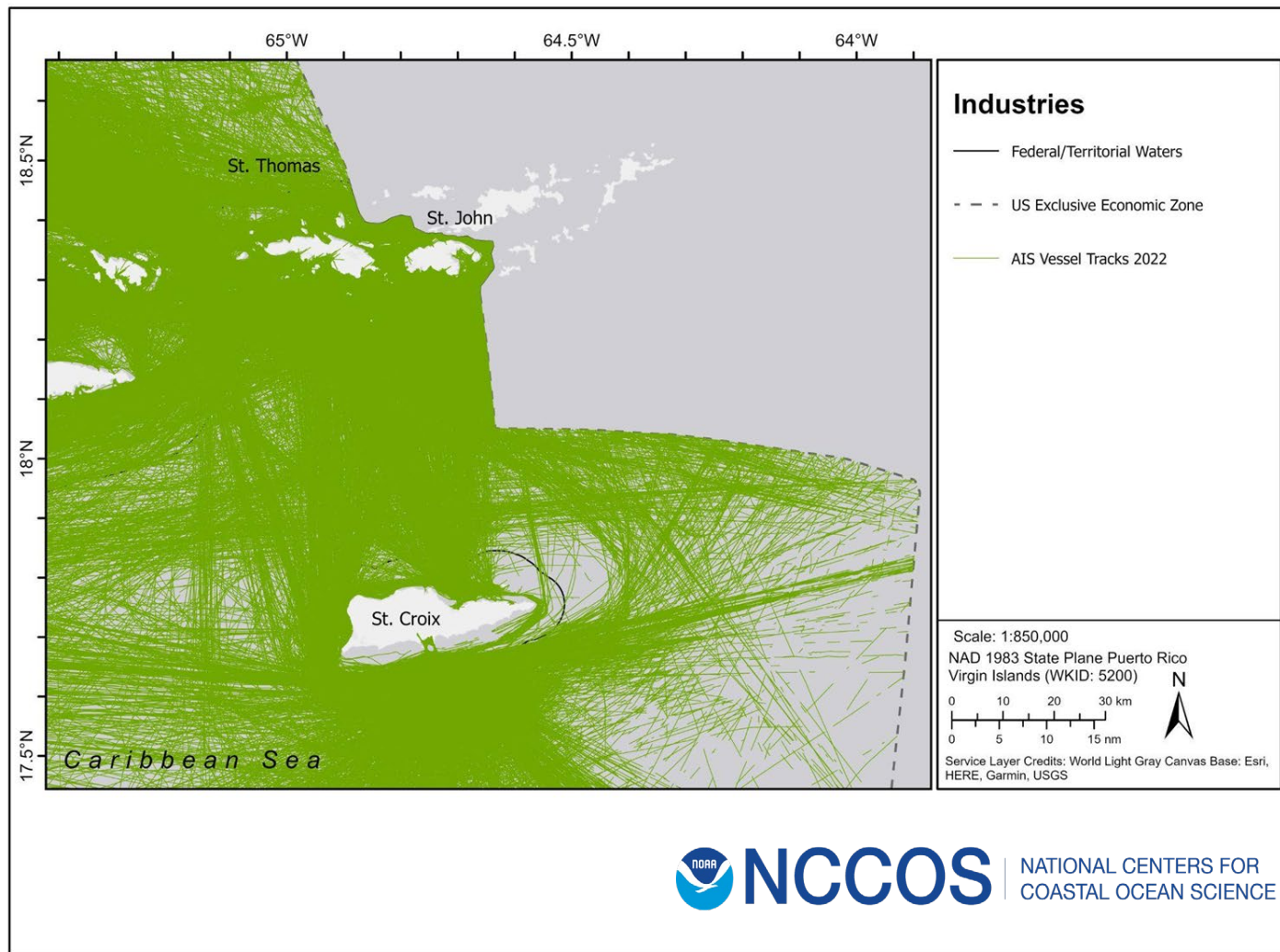
**Summary:** the location and characteristics of commercial and recreational boats as a sequence of positions transmitted by an Automatic Identification System (AIS). The distribution, type, and frequency of vessel tracks are a useful aid to understanding the risk of conflicting uses within a certain geographic area.

Types = Cargo, Fishing, Other, Passenger, Pleasure and Sailing, Tanker, Tug and Tow

**Type:** Line

**Original Source:** US Coast Guard

[Data Link](#) / [Metadata Link](#)



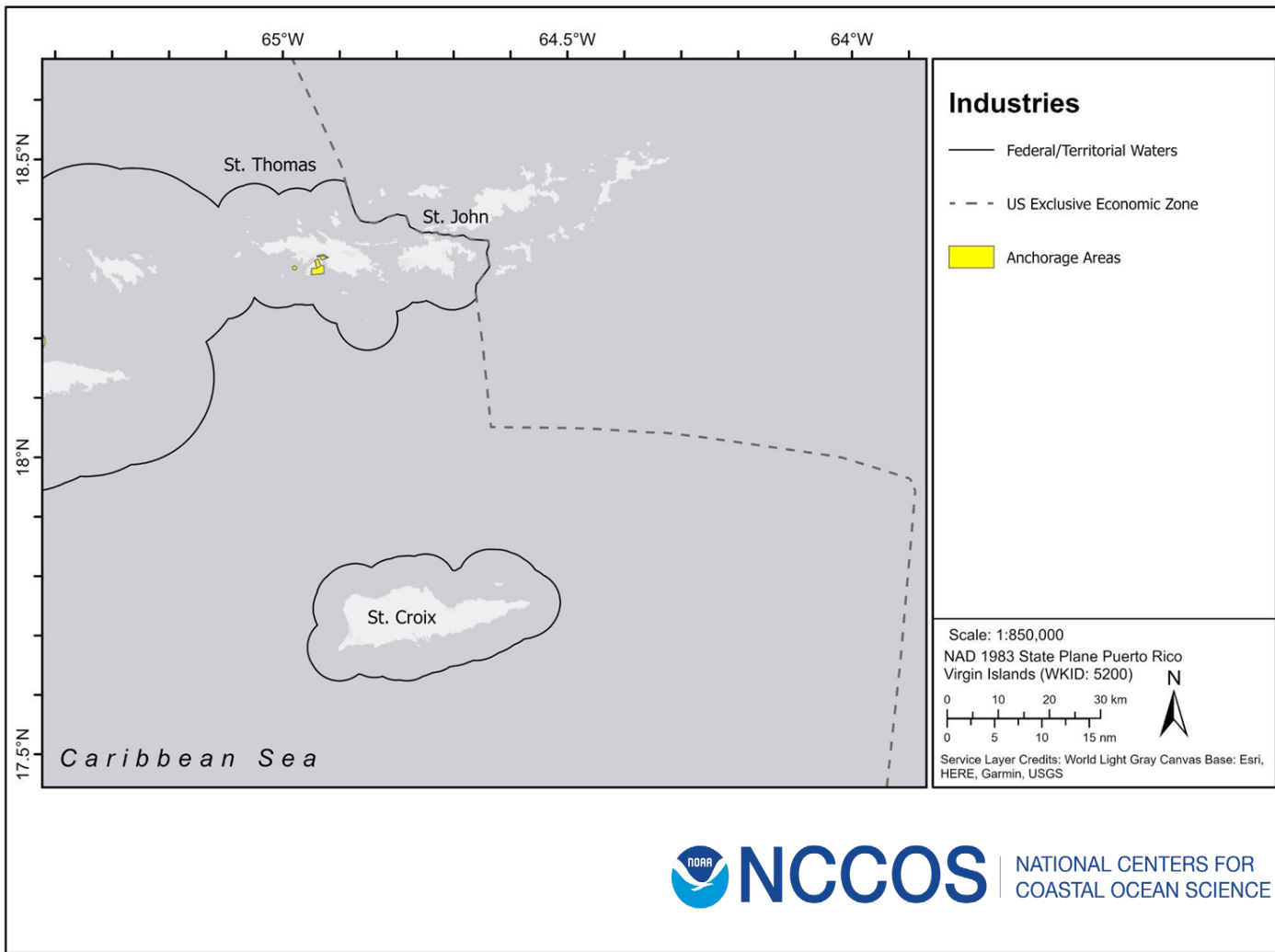
# Anchorage Areas

**Summary:** well defined navigable waters where a vessel may safely drop anchor. The size, shape, and conditions for use can vary widely among different anchorages. Generally anchorages are not used for an indefinite duration, nor are they routinely used for maintenance, repair, overhaul, bunkering, or sea trials.

**Type:** Polygon

**Original Source:** US Government Publishing Office, NOAA Office of Coast Survey

[Data Link](#)



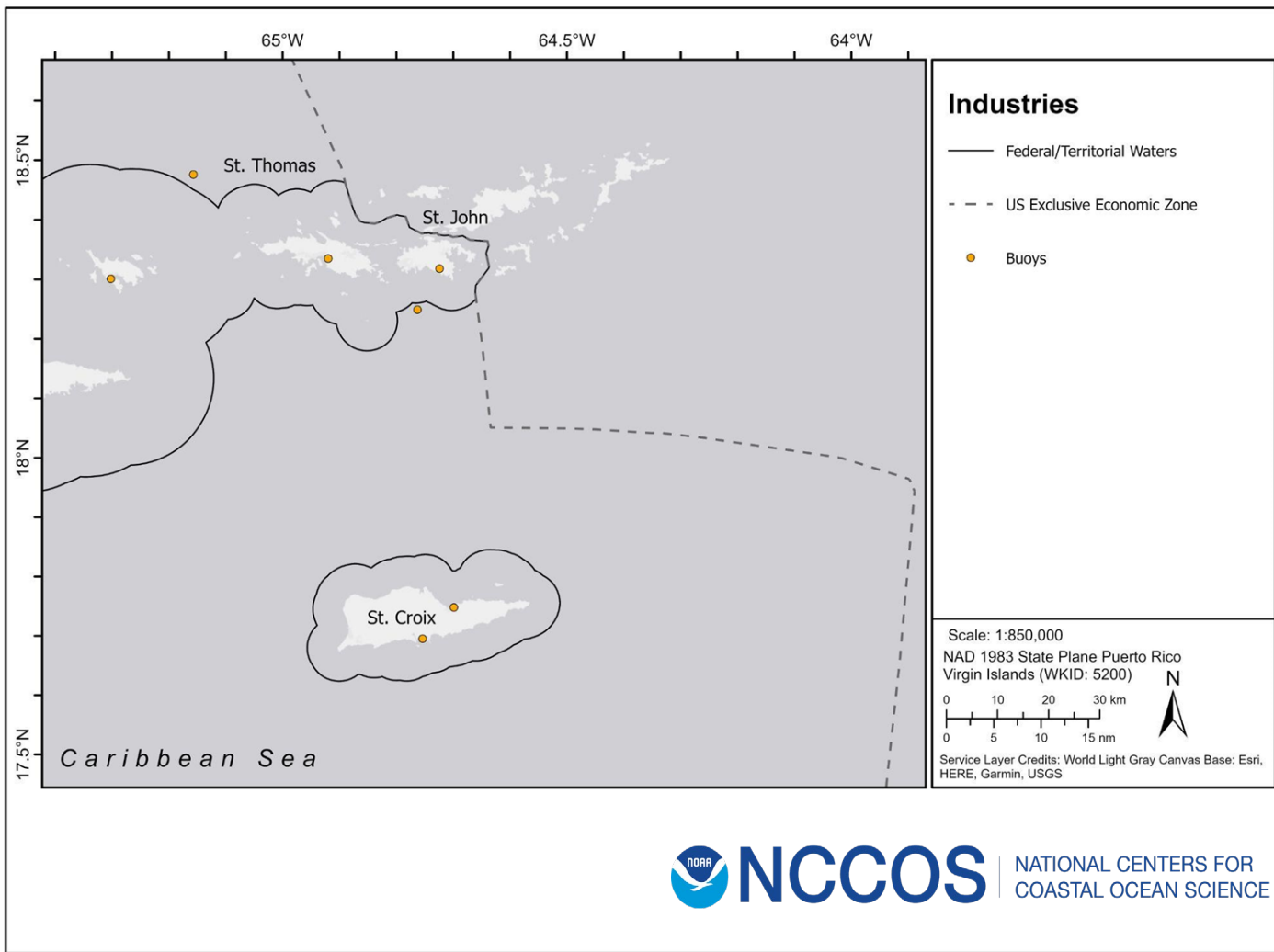
# Buoys

**Buoys (NDBC):** location of buoy stations in the US Caribbean.

[Data Link](#)

**Type:** Point

**Original Source:** National Data Buoy Center, IOOS





# Maintained Channels

**Summary:** coastal channels and waterways that are maintained and surveyed by the U.S. Army Corps of Engineers. These channels are necessary transportation systems that serve economic and national security interests.

**Type:** Polygon

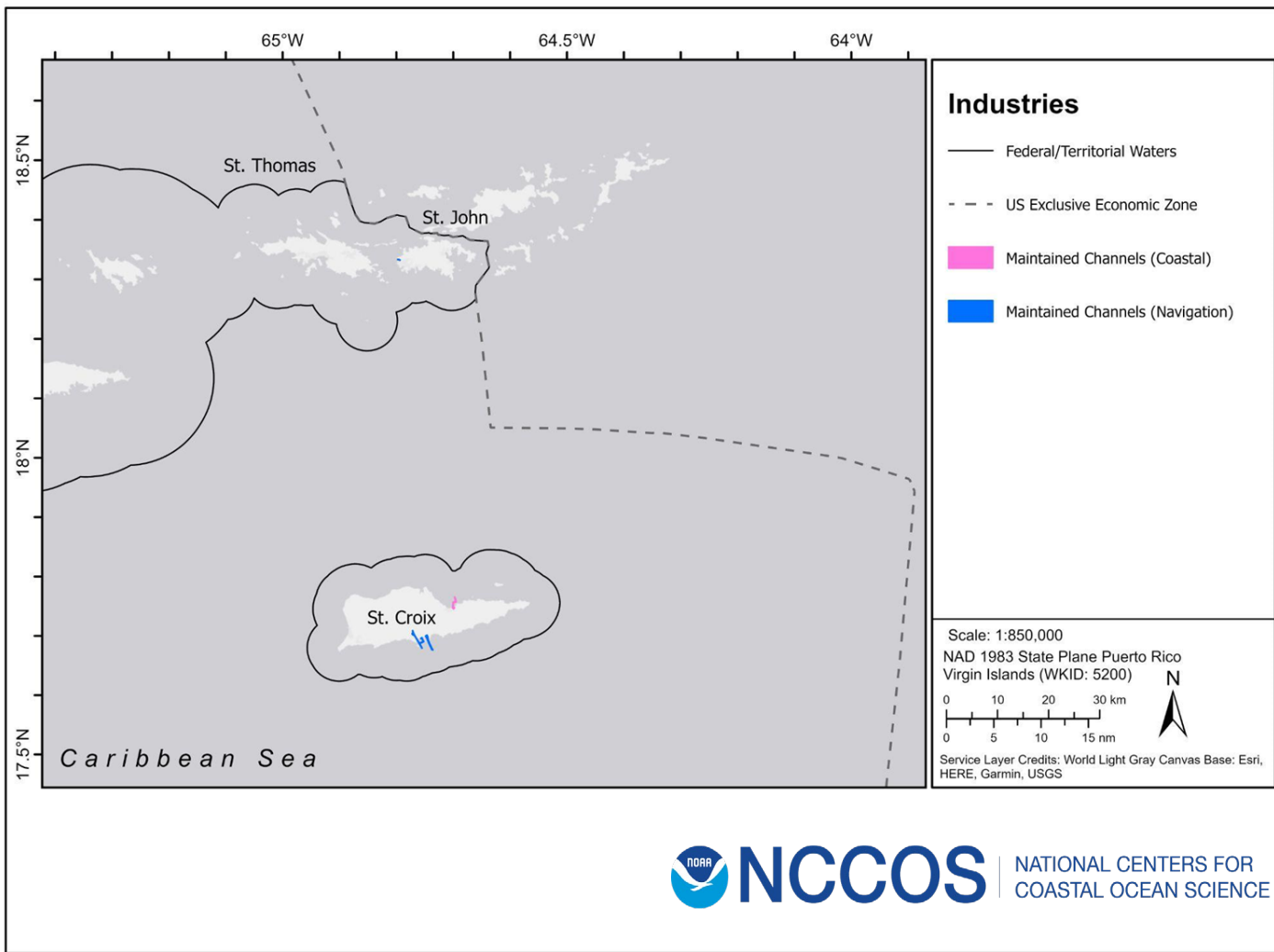
**Original Source:** DOD (USACE), NOAA Office of Coast Survey

Navigation

[Data Link](#) / [Metadata Link](#)

Coastal

[Data Link](#) / [Metadata Link](#)



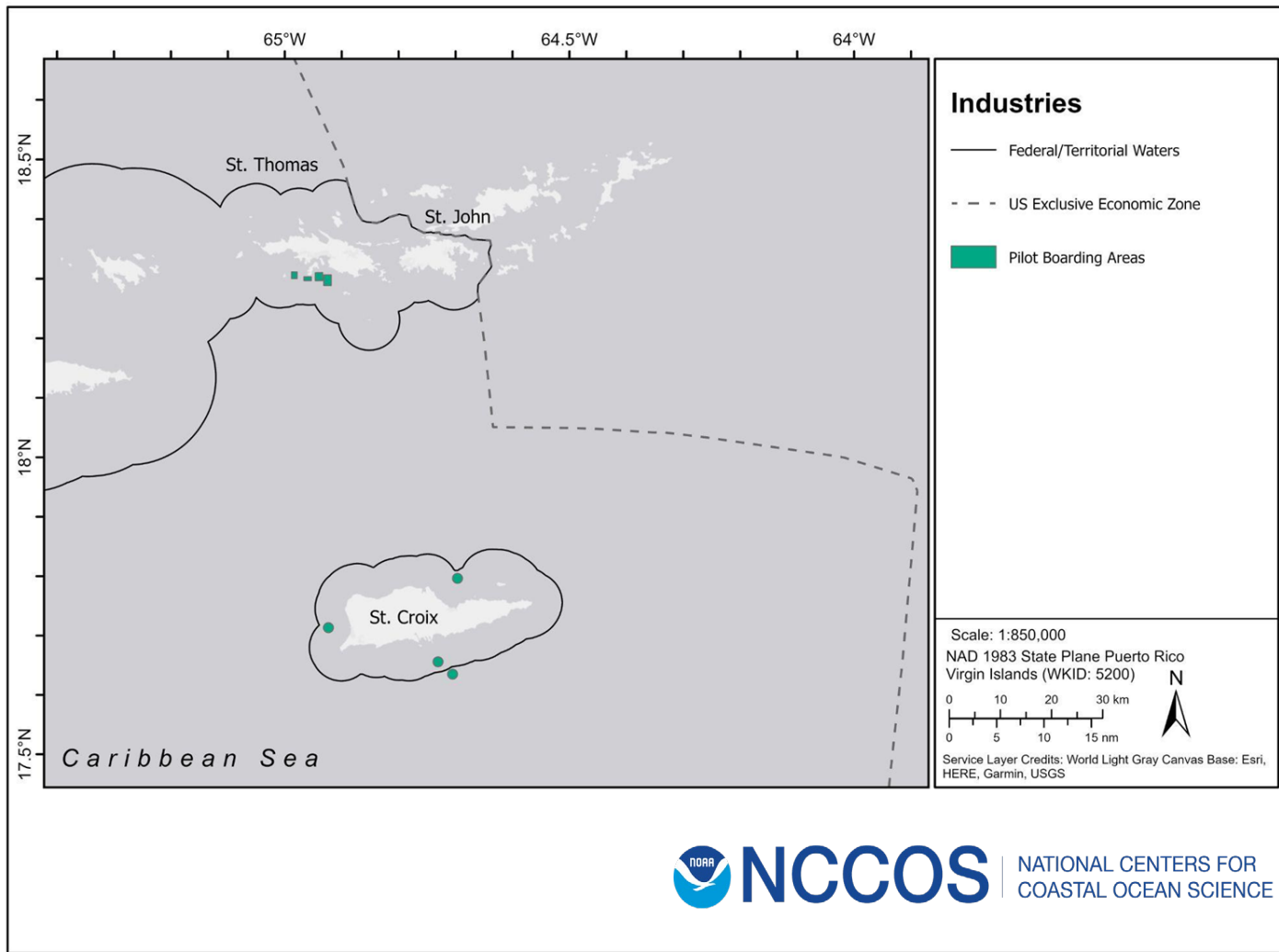
# Pilot Boarding Areas

**Pilot Boarding Areas:** A location offshore where a pilot may board a vessel in preparation to piloting it through local waters. Pilot boarding stations and areas are either a well-defined position, a circular area around a position, or another more complex shaped area with well-defined boundaries.

[Data Link](#) / [Metadata Link](#)

**Type:** Polygon

**Original Source:** DOD (USACE) NOAA Office of Coast Survey



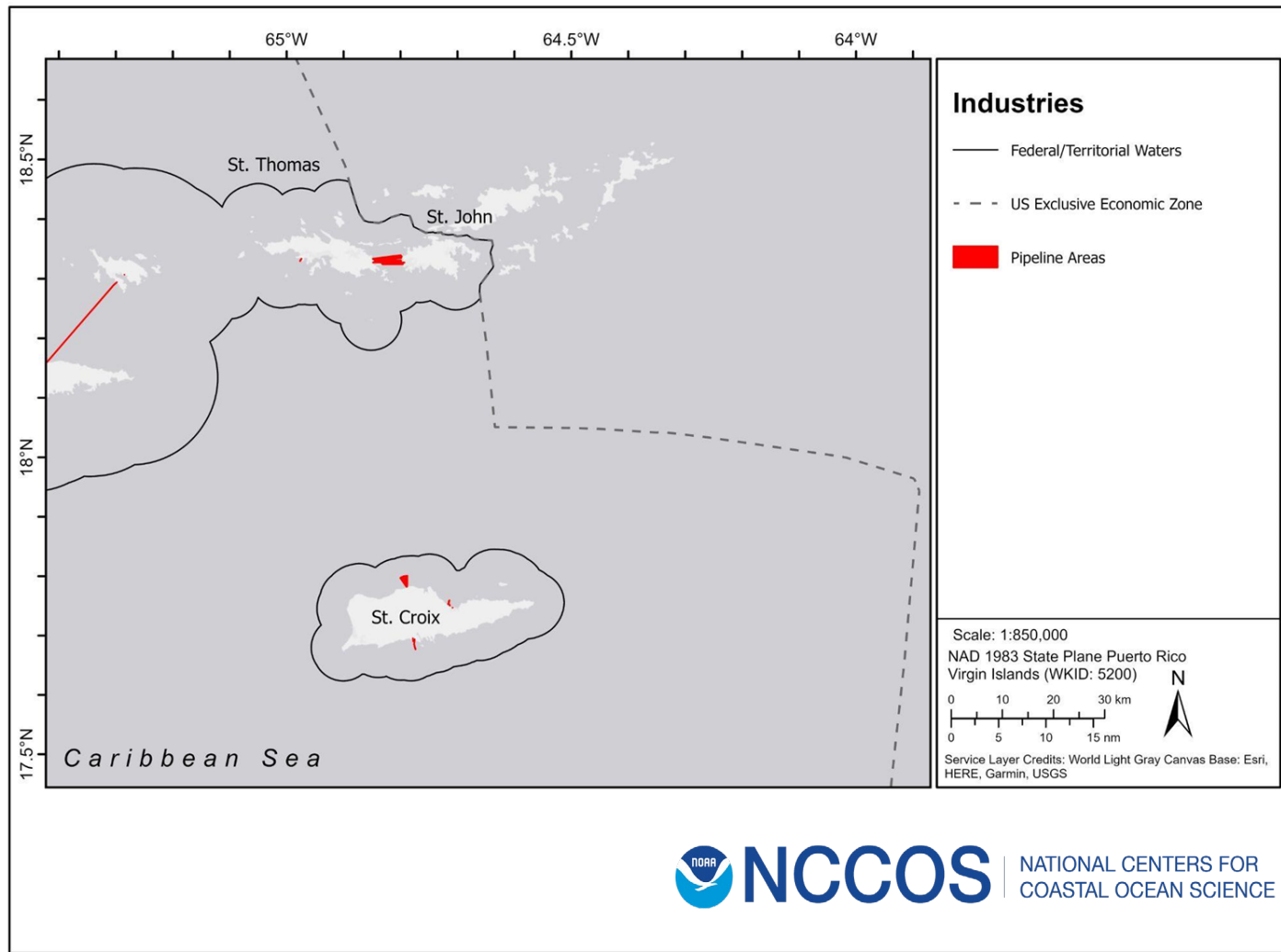
# Pipeline Areas

**Summary:** general location of pipelines within U.S. waters. The geographic footprint for each pipeline may vary and is dependent on the original source data. In the nearshore, pipelines are routinely buried below the seabed. In the offshore, they are placed directly on the seabed. A pipeline area may contain one or more physical pipelines.

**Type:** Polygon

**Original Source:** DOD

[Data Link](#) / [Metadata Link](#)



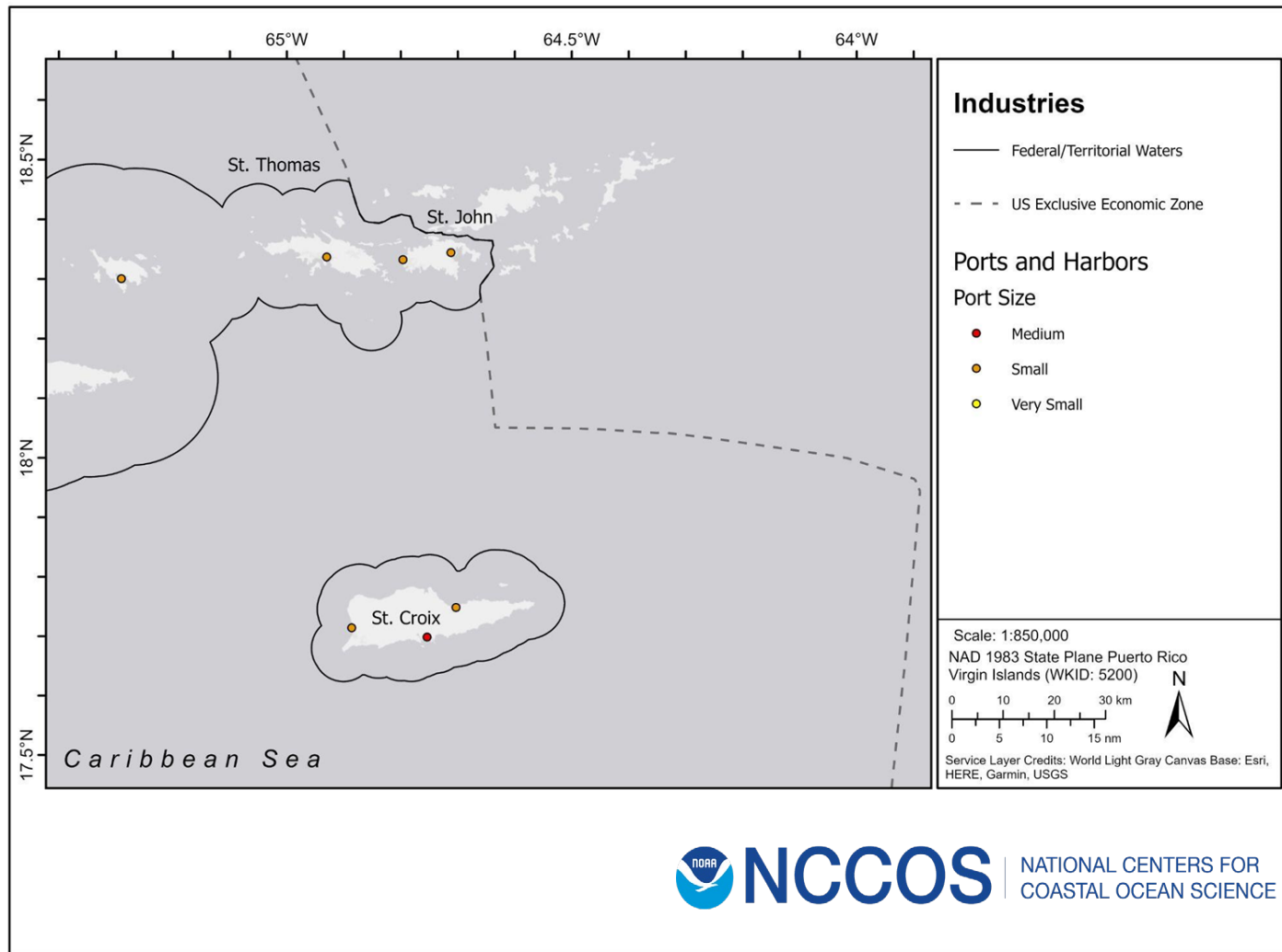
# Ports and Harbors

**Summary:** compilation of publicly accessible seaport information for ports and harbors in Puerto Rico and the US Virgin Islands.

**Type:** Point

**Original Source:** World Port Source

[Data Link](#)



# Submarine Cables & Areas

**Summary:** general location of commercial and research submarine cables in and around U.S. navigable waters. The majority of these cables are for telecommunications, and the remaining are for power transmission. In the nearshore, cables are routinely buried below the seabed. In the offshore, they are placed directly on the seabed.

**Type:** Line / Polygon

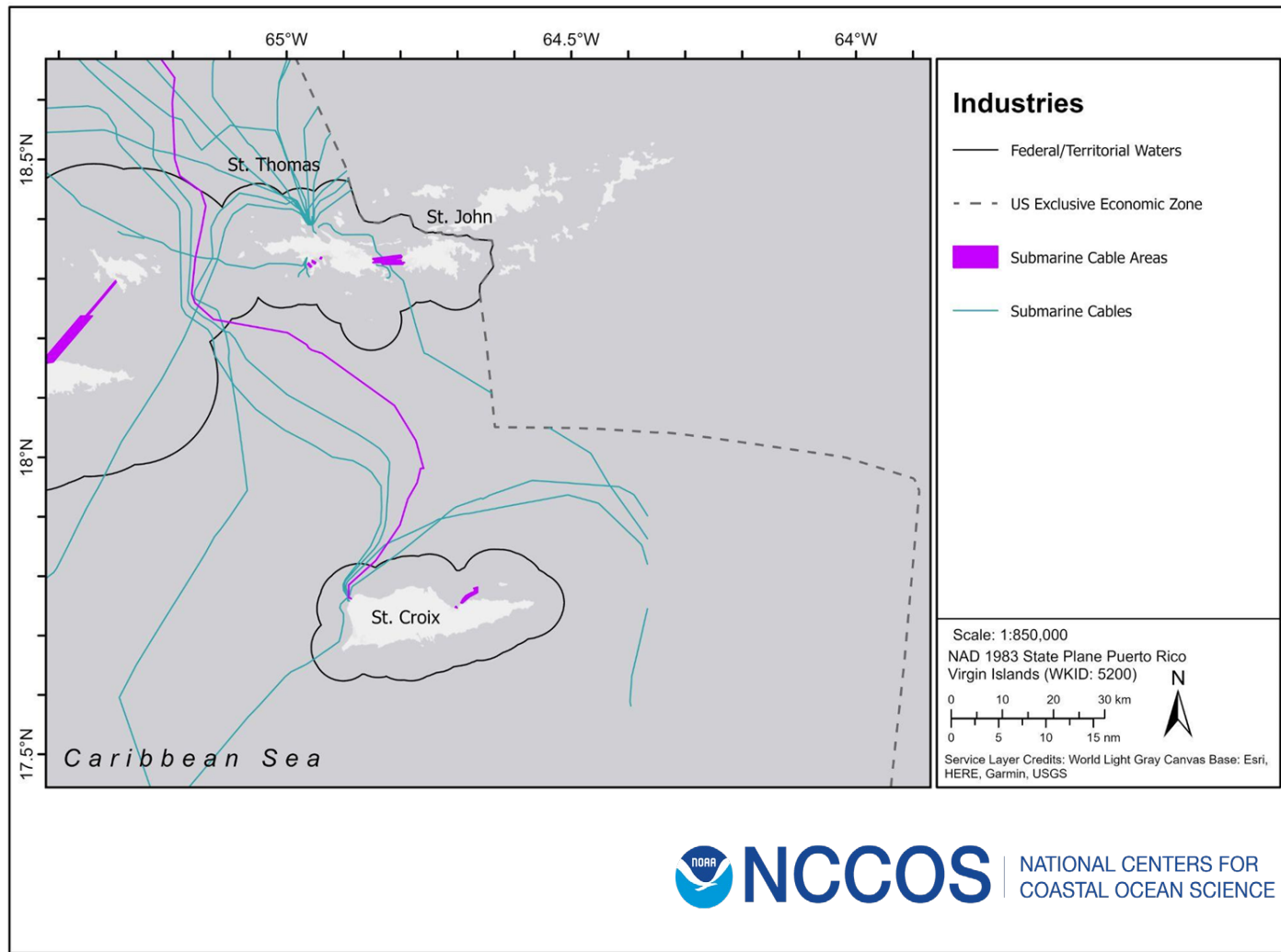
**Original Source:** NOAA Office of Coastal Survey, NASCA, USACE

Submarine Cables

[Data Link](#)

Submarine Cable Areas

[Data Link](#) / [Metadata Link](#)



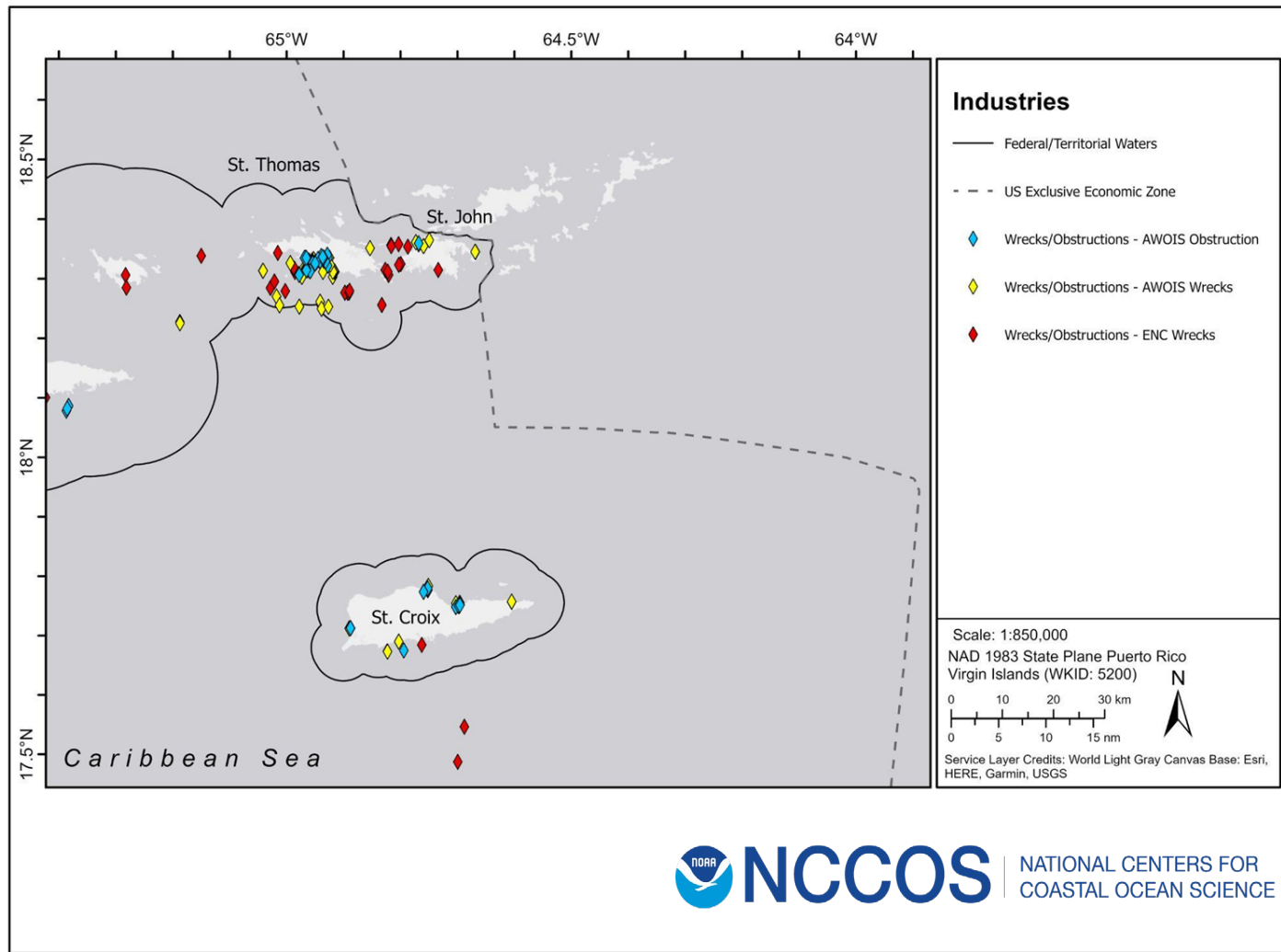
# Wrecks and Obstructions

**Summary:** The Automated Wreck and Obstruction Information System (AWOIS) and Electronic Navigational Charts (ENC) contain information on over 10,000 submerged wrecks and obstructions in the coastal waters of the United States.

**Type:** Point

**Original Source:** NOAA Office of Coast Survey

[Data Link](#)



# Fisheries

Areas where both  
commercial and recreational  
fisheries are active



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# Recreational Fisheries

Recreational data through NOAA SEFSC

- Has not collected data since 2017

Fishing Tournaments

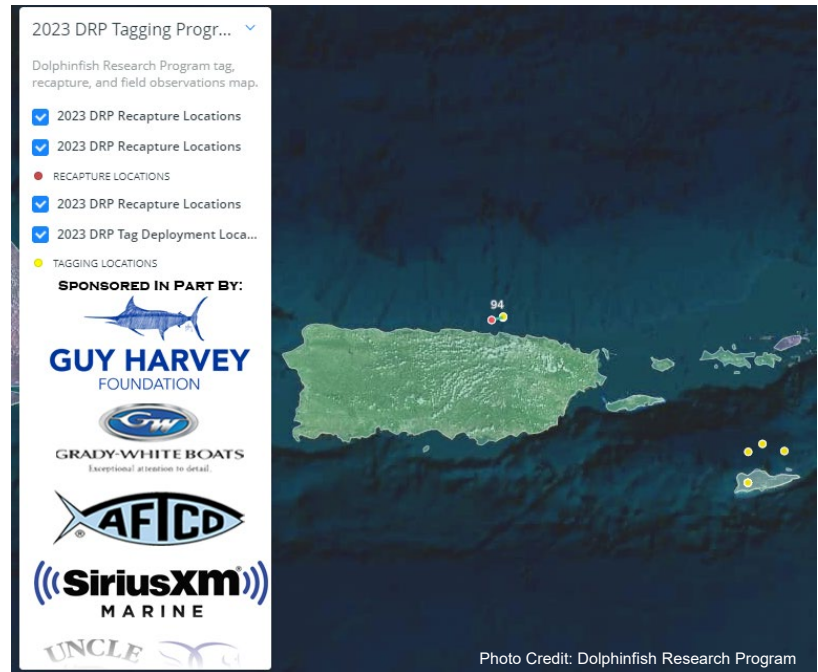
- Recreational tournaments might have some spatial data (catch & release)

[Dolphinfish Research Program](#)

- Some satellite tagging data

Fish Aggregating Devices (FADs)

- [Puerto Rico FAD Sistema](#)
- USVI DPNR - no FADs in territory

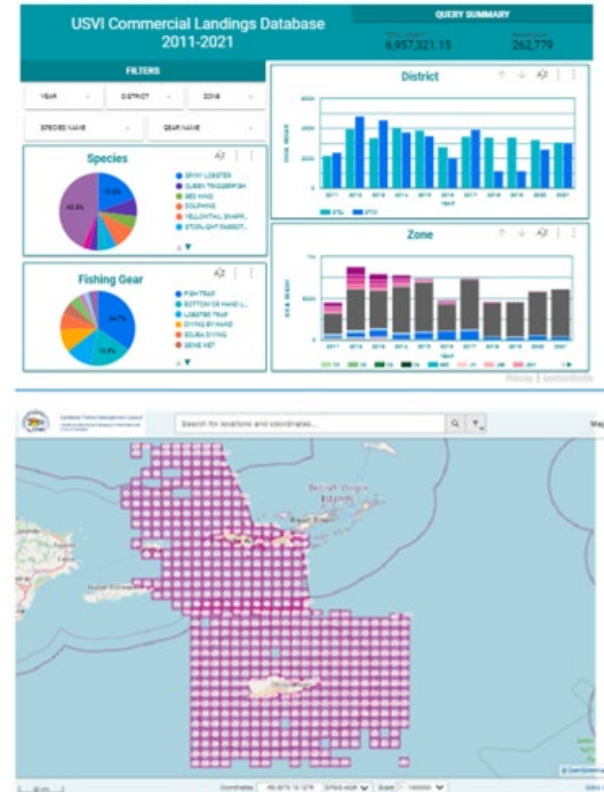




# Commercial Fisheries

## Commercial Landings (CCL)

- All forms request spatial distribution of catch (area fished)
  - Since July 2011 for USVI and January 2012 for PR
  - [Landings Data](#)
  - Data are up to date through 2020/2021
- Limitations with reporting
  - Less than 40% of the reports contain spatial information
  - Delay between reporting and forms sent to the science center
  - Large areas for providing spatial information (low resolution)
- Port Sampling
  - Valuable metrics including fishing area and effort



# Fisheries-Independent Sampling

## **SEAMAP: Southeast Area Monitoring and Assessment Program**

- Provides efficient and effective data collection of fishery-independent sampling (27-30 years of data)

## **CRCP: Coral Reef Conservation Program**

- The program was established in 2000 by the Coral Reef Conservation Act to protect, conserve, and restore the nation's coral reefs by maintaining healthy ecosystem function.
  - Beyond 30 m (mesophotic reef spatial data associated with MPAs and spawning aggregations)
- **NCRMP: National Coral Reef Monitoring Program**
  - Spatial specific information for both habitat and fish communities



# Natural Resources

Information about protected species and sensitive habitats



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# Natural Resources - Data List

- Coastal Barrier Resource Areas
- Coastal Critical Habitat Designations
- Critical Habitat: Sea Turtles
  - Green, Leatherback
- Critical Habitat: Corals
  - Elkhorn, Staghorn, Boulder Star, Lobed Star, Mountainous Star, Pillar, Rough Cactus
- Essential Fish Habitat (EFH)
  - Corals, reef fish, spiny lobster, queen conch
- EFH - Atlantic Highly Migratory Species
  - Bigeye tuna, yellowfin tuna, swordfish, blue marlin, longbill spearfish, sailfish, white marlin, blacktip shark, Caribbean reef shark, lemon shark, nurse shark, oceanic whitetip shark, tiger shark
- Fishery Management Areas
  - Grammanik Bank, Hind Bank MCD, Mutton Snapper Spawning Aggregation, Red Hind Spawning Aggregation, Queen Conch
- Habitat Areas of Particular Concern
- Protected Areas
- Benthic Habitat - NOAA
- Benthic Habitat - TNC
- Shallow Corals
- *Acropora* Presence/Absence Locations
- Deep Sea Coral and Sponge Observations
- Seagrasses
- Bird Observations

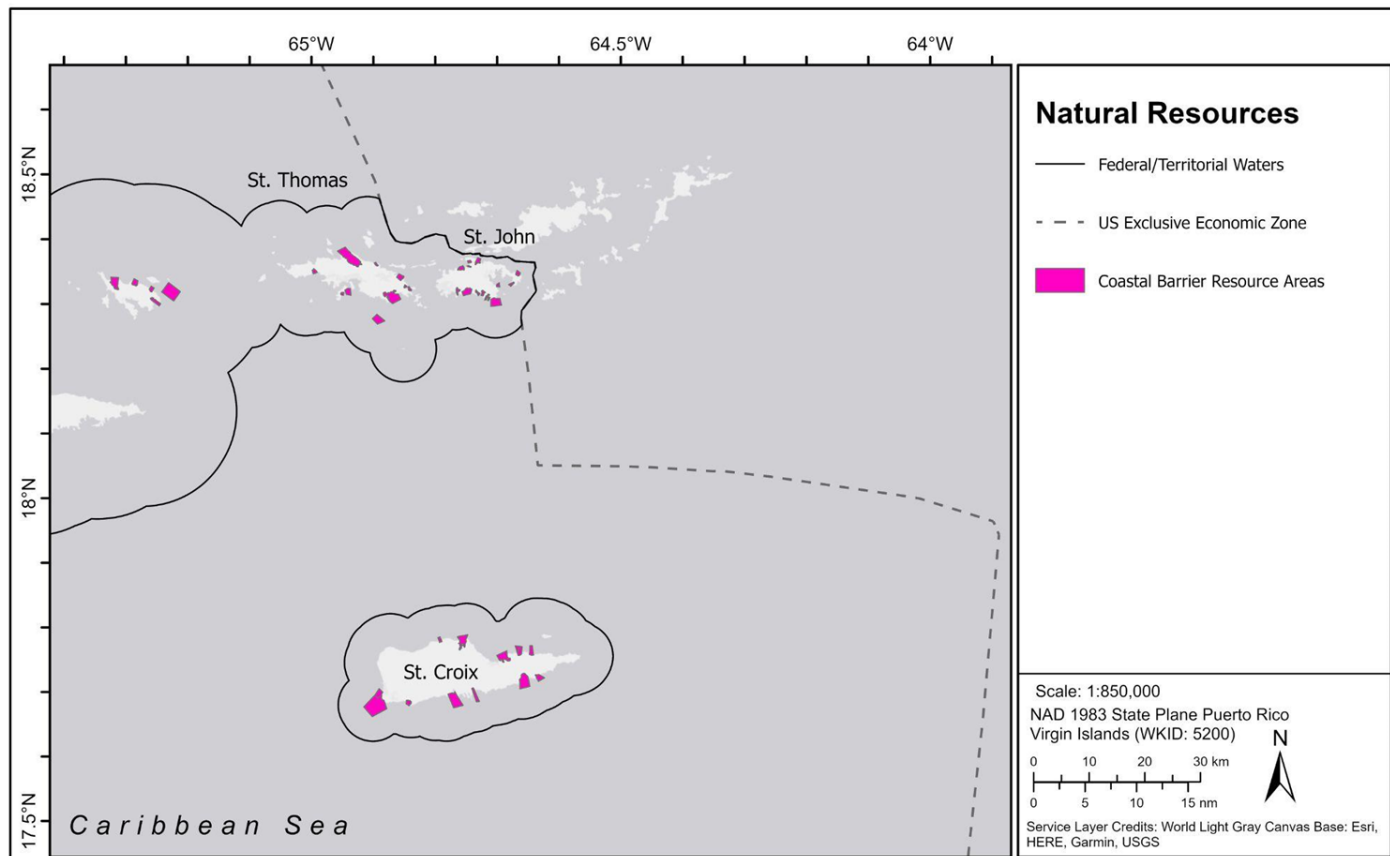
# Coastal Barrier Resource Areas

**Summary:** The Coastal Barrier Resources Act (CBRA) of 1982 and subsequent amendments established the John H. Chafee Coastal Barrier Resources System (CBRS). The CBRS consists of relatively undeveloped coastal barriers and other areas located the Atlantic, Gulf of Mexico, Great Lakes, U.S. Virgin Islands, and Puerto Rico coasts.

**Type:** Polygon

**Original Source:** USFWS

[Data Link](#)



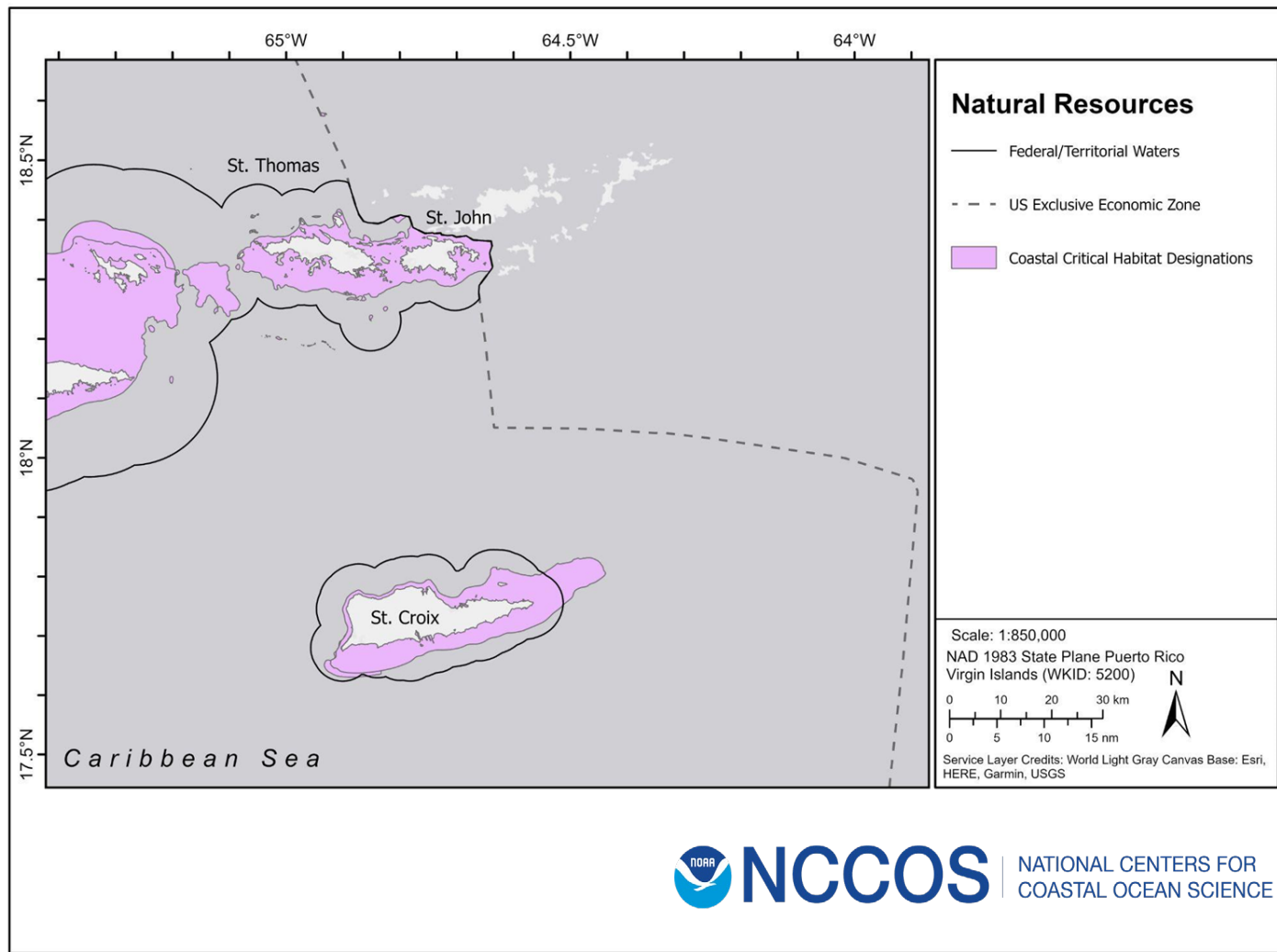
# Coastal Critical Habitat Designations

**Summary:** This dataset is a compilation of the NOAA National Marine Fisheries Service and the U.S. Fish & Wildlife Service designated critical habitat in coastal areas of the United States. Critical habitat is defined as: (1) Specific areas within the geographical area occupied by the species at the time of listing that contain physical or biological features essential to conservation, which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.

**Type:** Polygon

**Original Source:** NOAA NMFS, USFWS, BOEM, NOAA OCM

[Data Link](#)



# Sea Turtle Critical Habitat

**Green Sea Turtle:** Critical habitat for the green sea turtle (North Atlantic DPS) as designated by Federal Register Vol. 63, No. 46693, September 2, 1998.

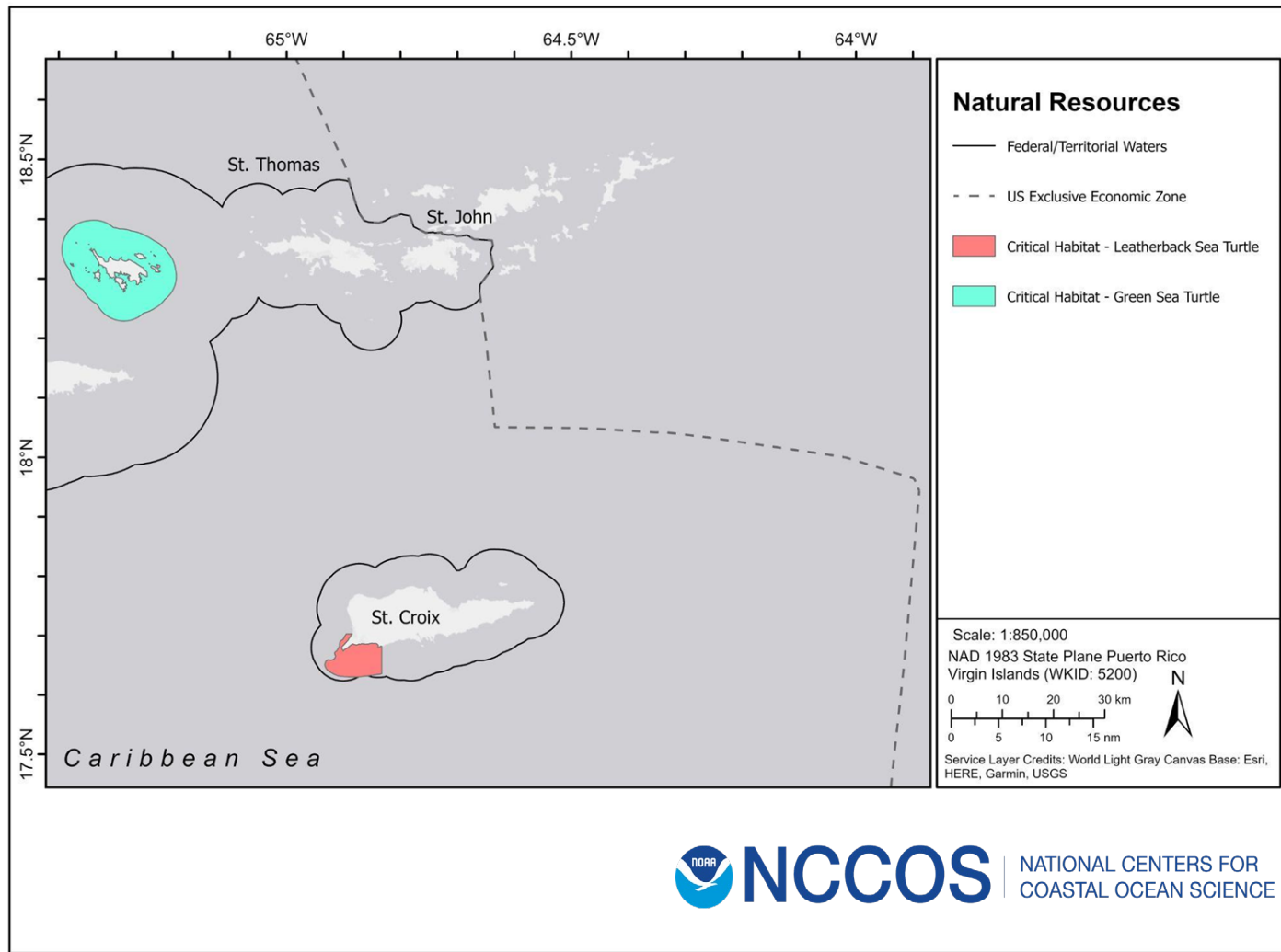
[Data Link](#) / [Metadata Link](#)

**Leatherback Sea Turtle:** Critical habitat designated (March 23, 1979, 44 FR 17710) and revised (January 26, 2012, 77 FR 4170) under the Endangered Species Act for the leatherback sea turtle.

[Data Link](#) / [Metadata Link](#)

**Type:** Polygon

**Original Source:** NOAA NMFS



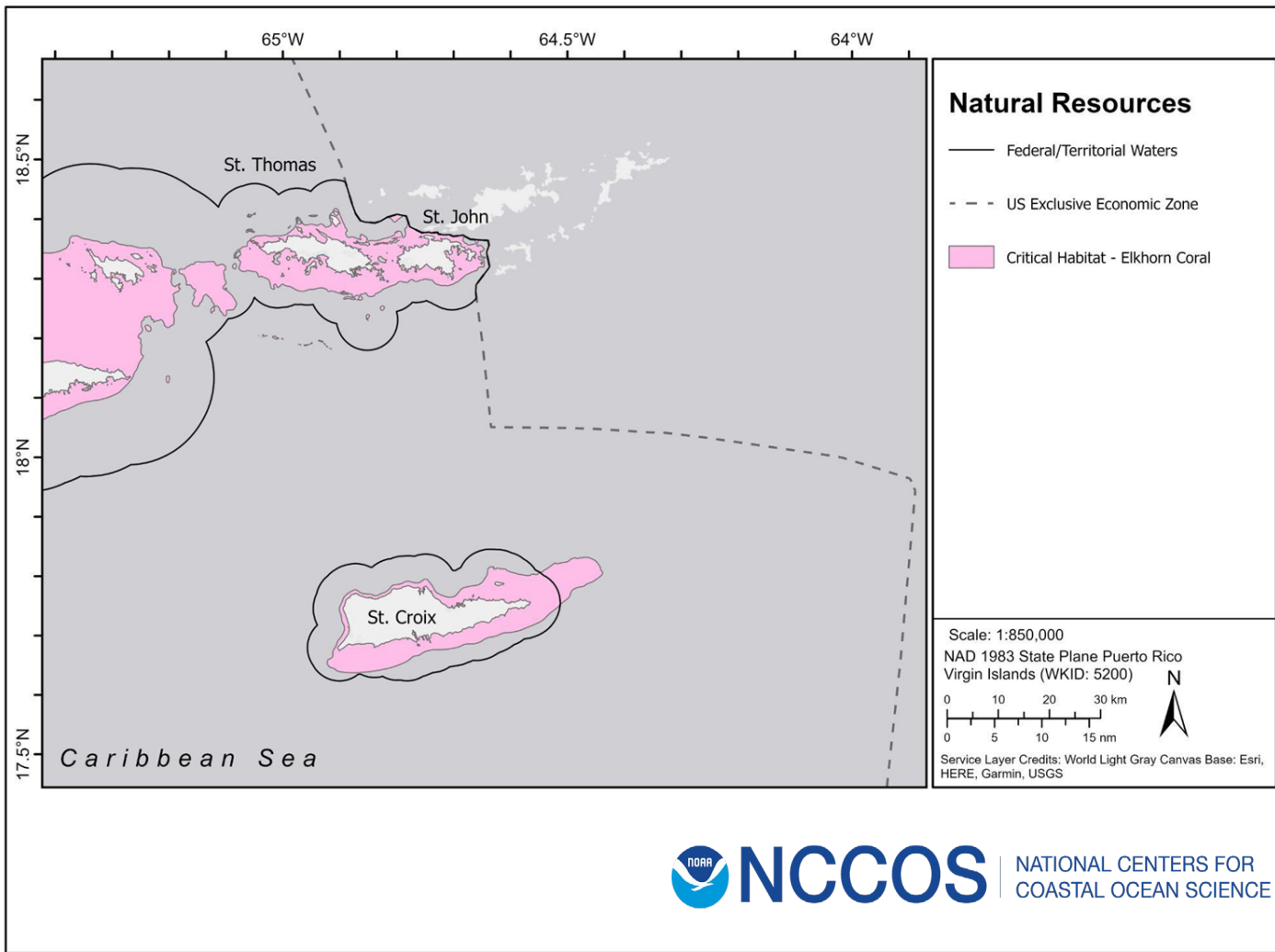
# Acropora: Elkhorn Coral Critical Habitat

**Summary:** These data represent the critical habitat for elkhorn coral (*Acropora palmata*) as designated by 73 FR 72210, November 26, 2008, Rules and Regulations.

**Type:** Polygon

**Original Source:** NOAA NMFS

[Data Link](#) / [Metadata Link](#)



**NCCOS**

NATIONAL CENTERS FOR  
COASTAL OCEAN SCIENCE



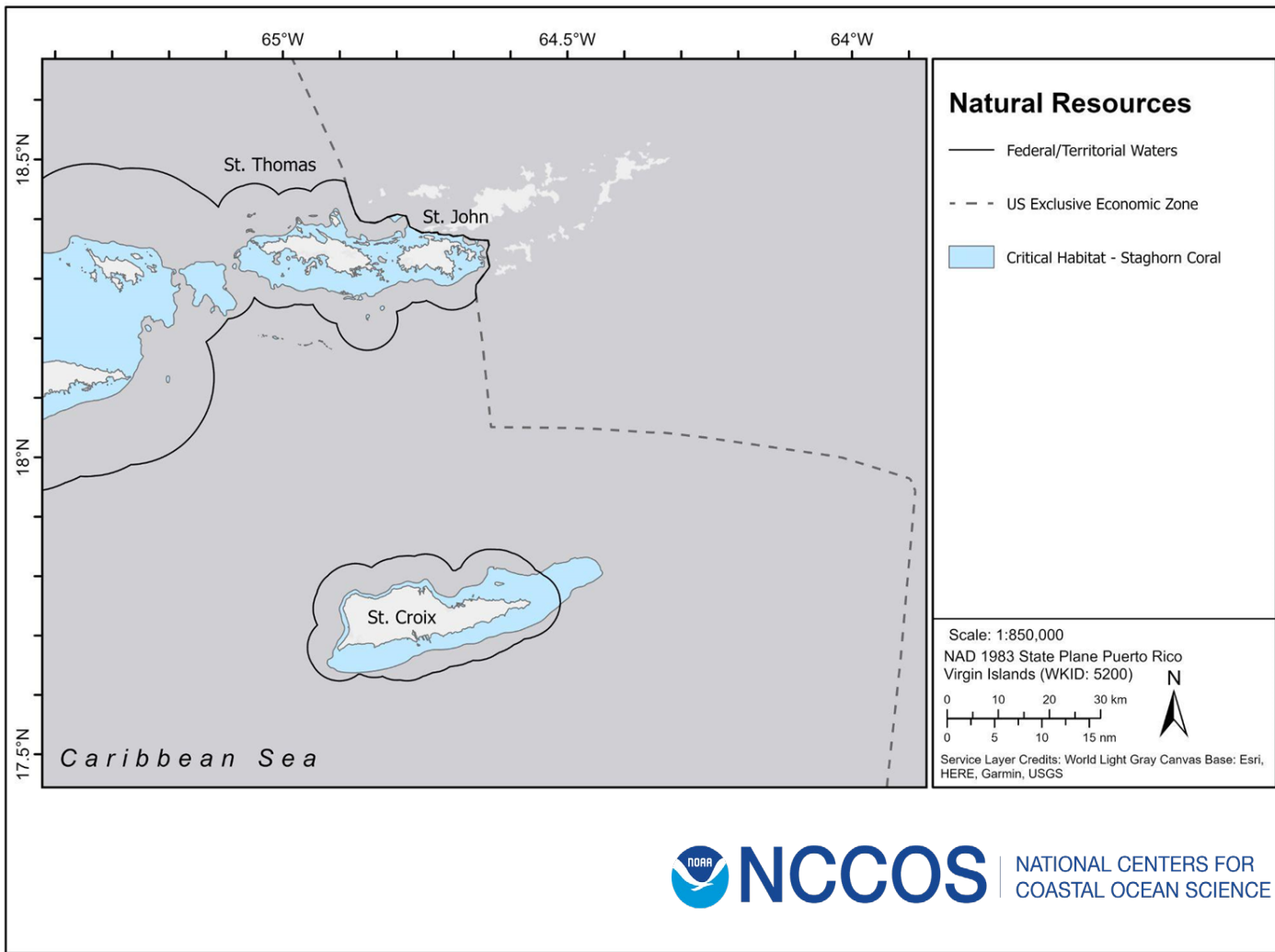
# Acropora: Staghorn Coral Critical Habitat

**Summary:** These data represent the critical habitat for staghorn coral (*Acropora cervicornis*) as designated by 73 FR 72210, November 26, 2008, Rules and Regulations.

**Type:** Polygon

**Original Source:** NOAA NMFS

[Data Link](#) / [Metadata Link](#)



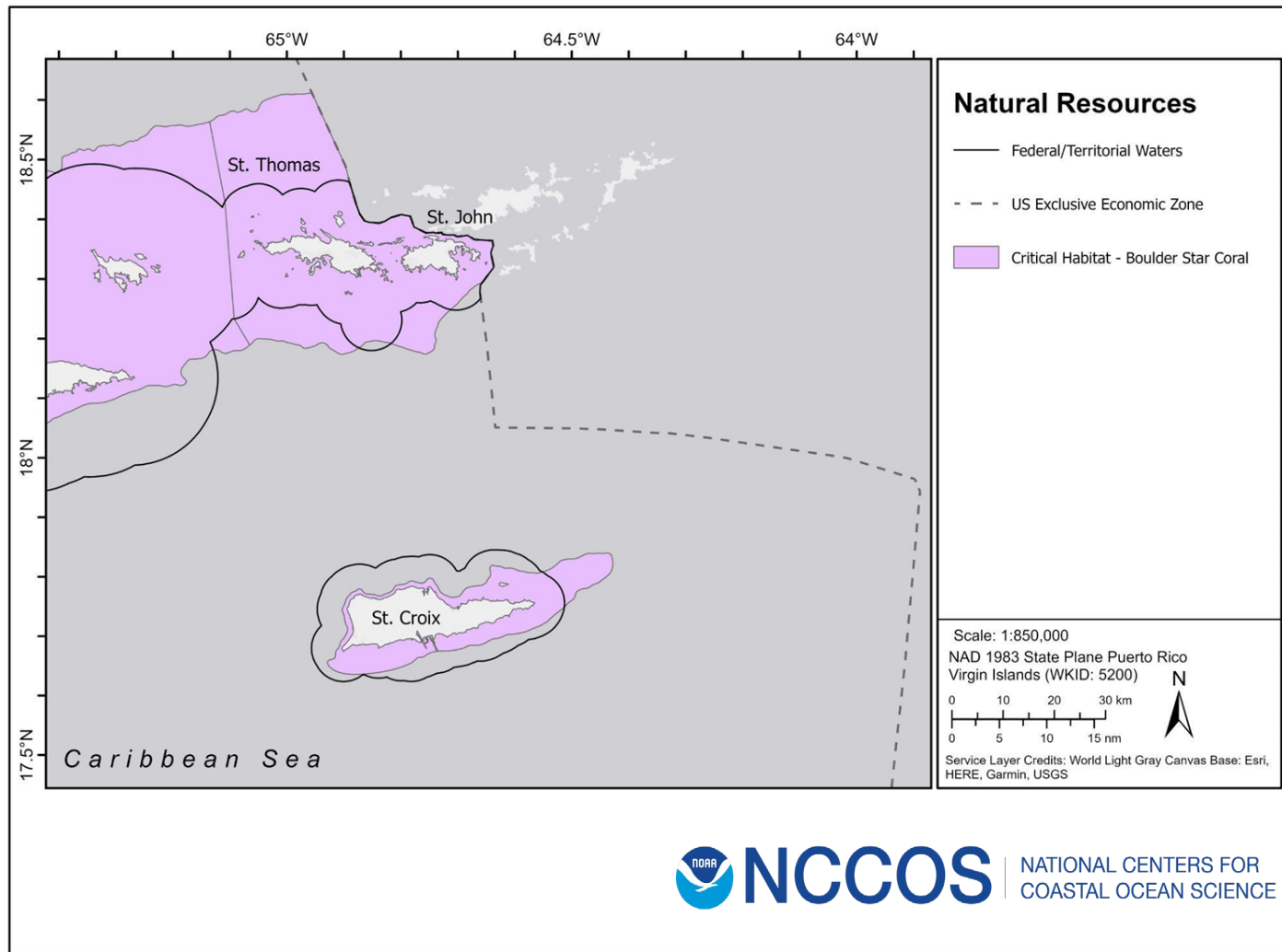
# Boulder Star Coral: Critical Habitat

**Summary:** These data represent the critical habitat designation (August 9, 2023) under the Endangered Species Act for the boulder star coral.

**Type:** Polygon

**Original Source:** NOAA NMFS

[Data Link](#) / [Metadata Link](#)



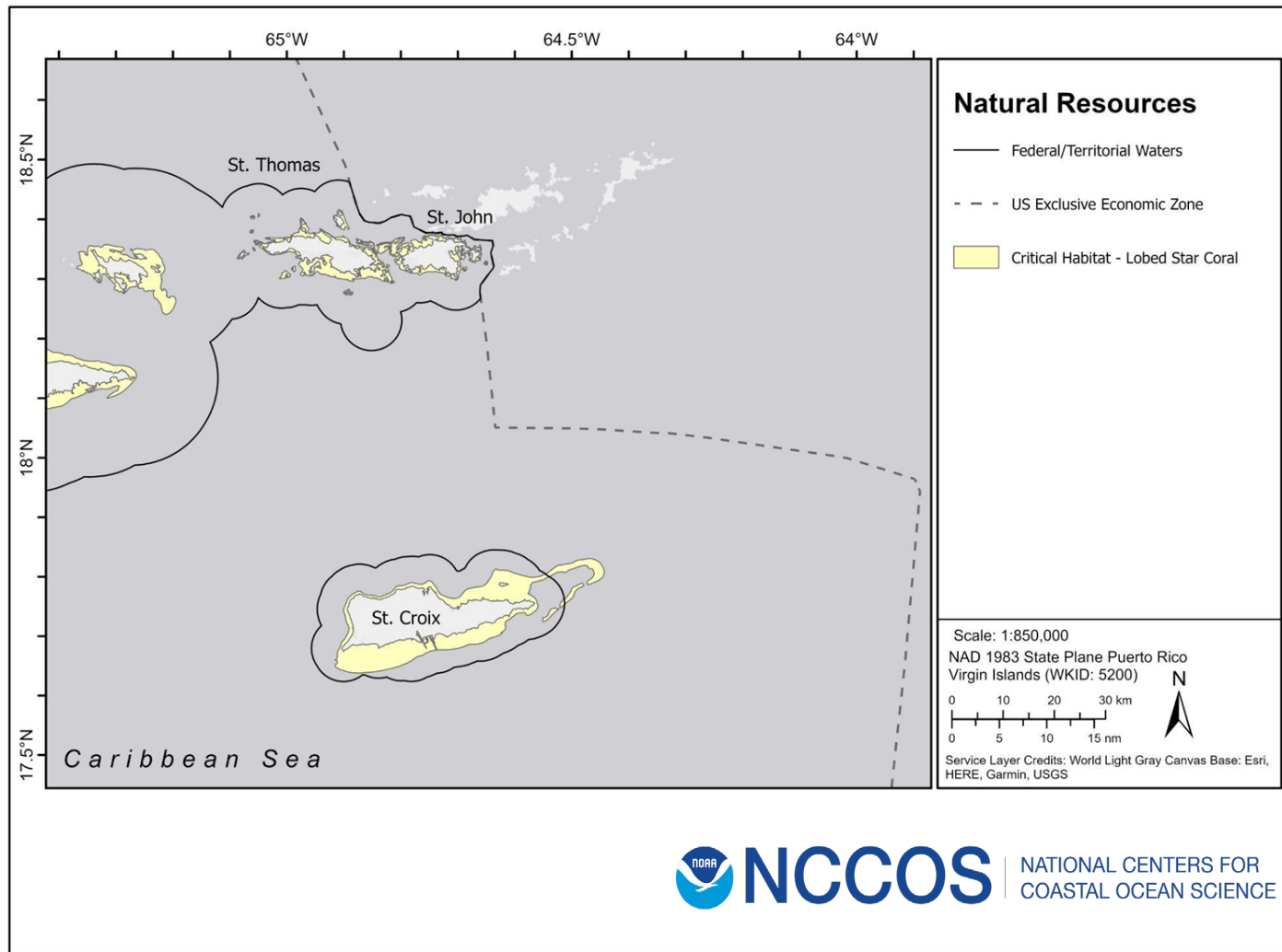
# Lobed Star Coral: Critical Habitat

**Summary:** These data represent the critical habitat designation (August 9, 2023) under the Endangered Species Act for the lobed star coral (*Orbicella annularis*).

**Type:** Polygon

**Original Source:** NOAA NMFS

[Data Link](#) / [Metadata Link](#)



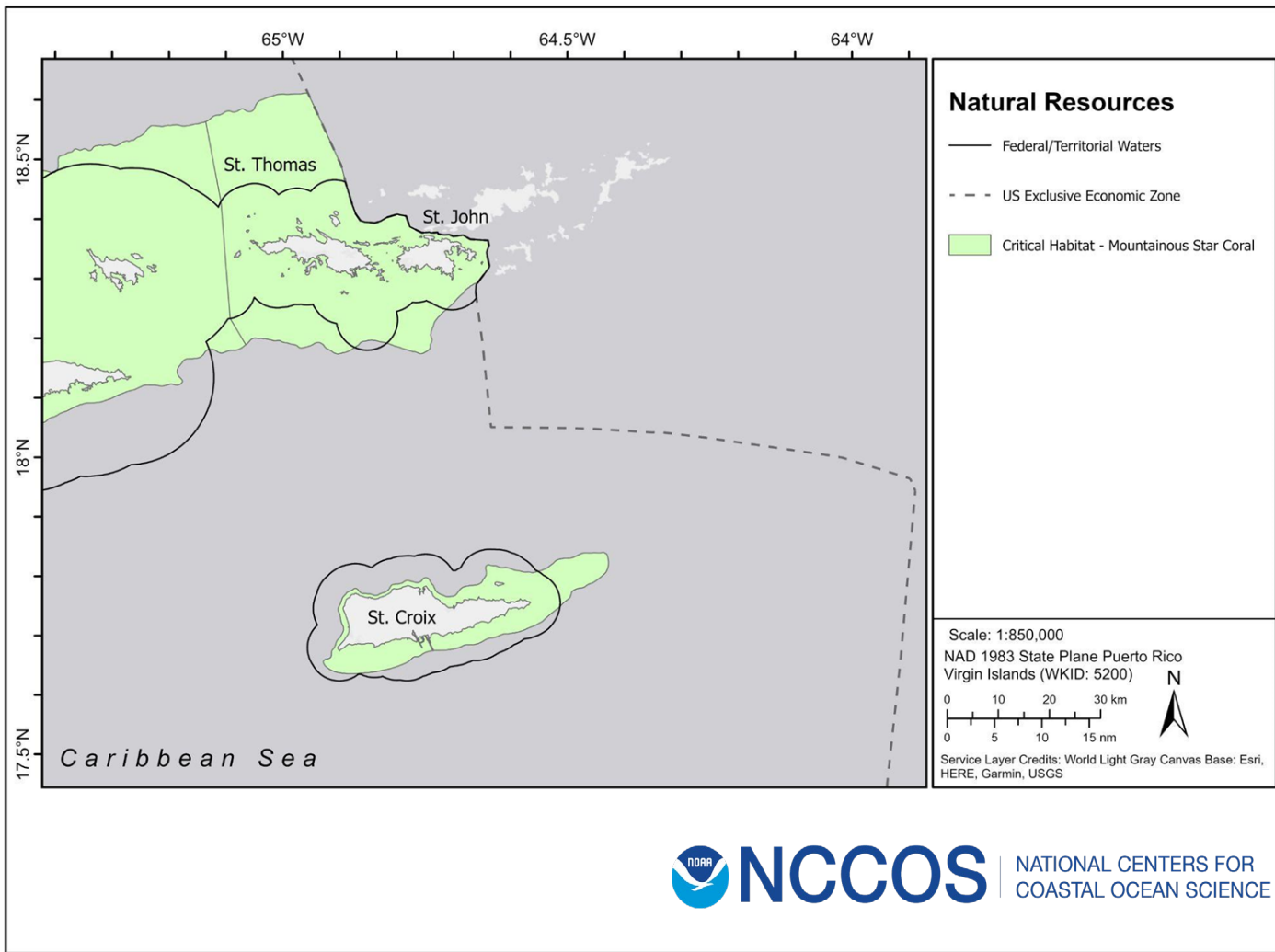
# Mountainous Star Coral: Critical Habitat

**Summary:** These data represent the critical habitat designation (August 9, 2023 under the Endangered Species Act for the mountainous star coral (*Orbicella faveolata*).

**Type:** Polygon

**Original Source:** NOAA NMFS

[Data Link](#) / [Metadata Link](#)



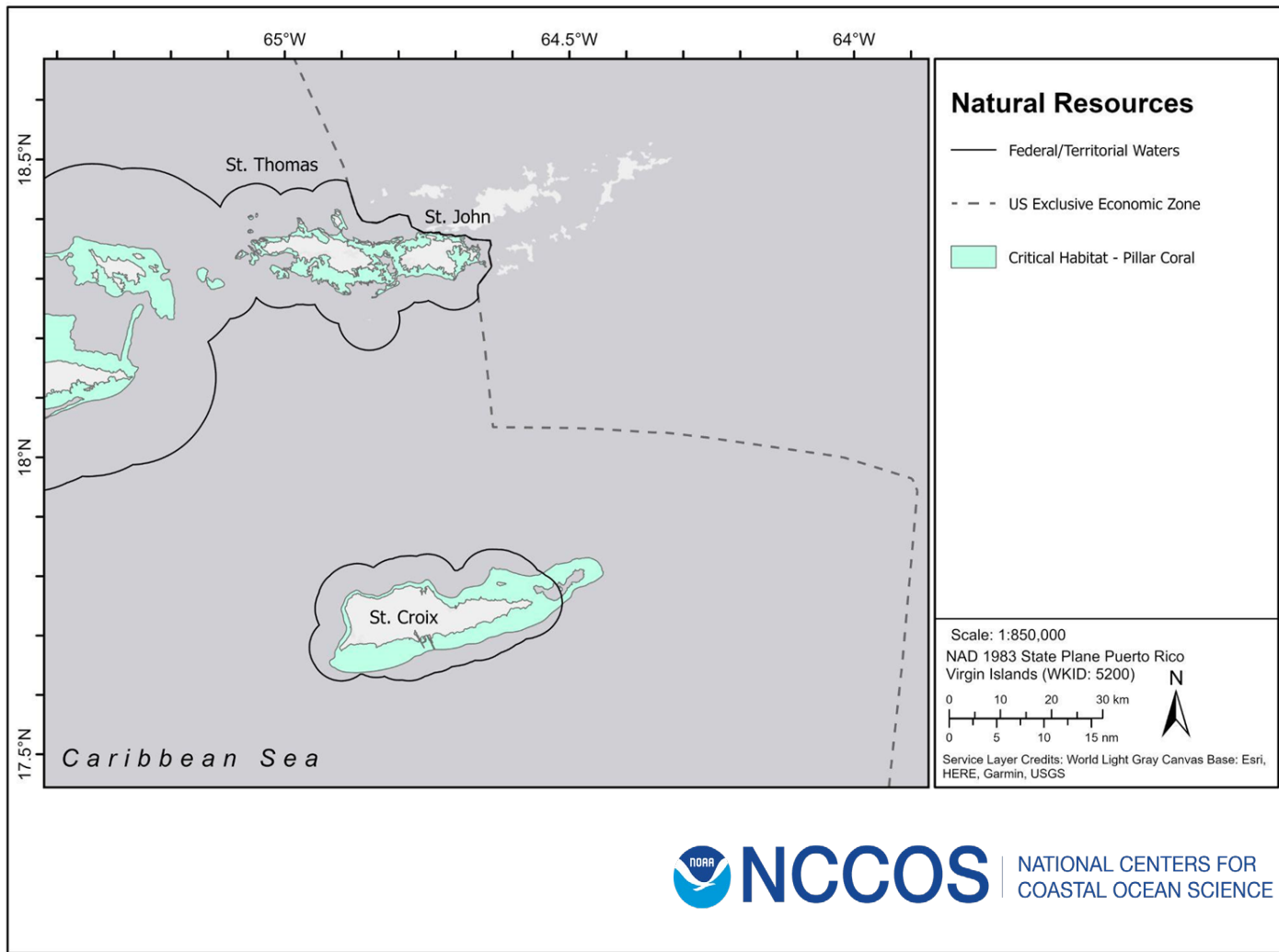
# Pillar Coral: Critical Habitat

**Summary:** These data represent the critical habitat designation (August 9, 2023) under the Endangered Species Act for the pillar coral (*Dendrogyra cylindrus*).

**Type:** Polygon

**Original Source:** NOAA NMFS

[Data Link](#) / [Metadata Link](#)



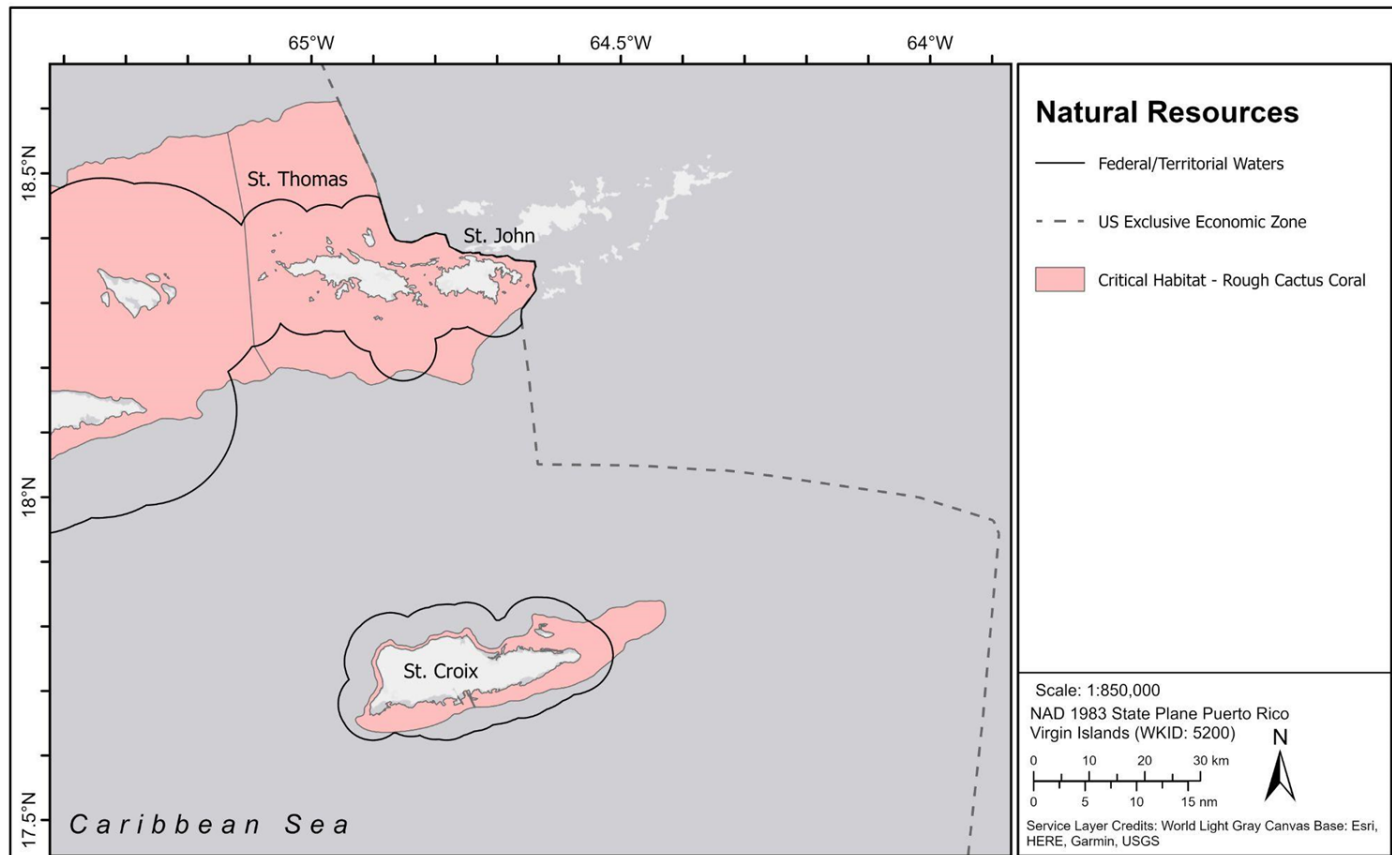
# Rough Cactus Coral: Critical Habitat

**Summary:** These data represent the critical habitat designation (August 9, 2023) under the Endangered Species Act for the rough cactus coral (*Mycetophyllia ferox*).

**Type:** Polygon

**Original Source:** NOAA NMFS

[Data Link](#) / [Metadata Link](#)



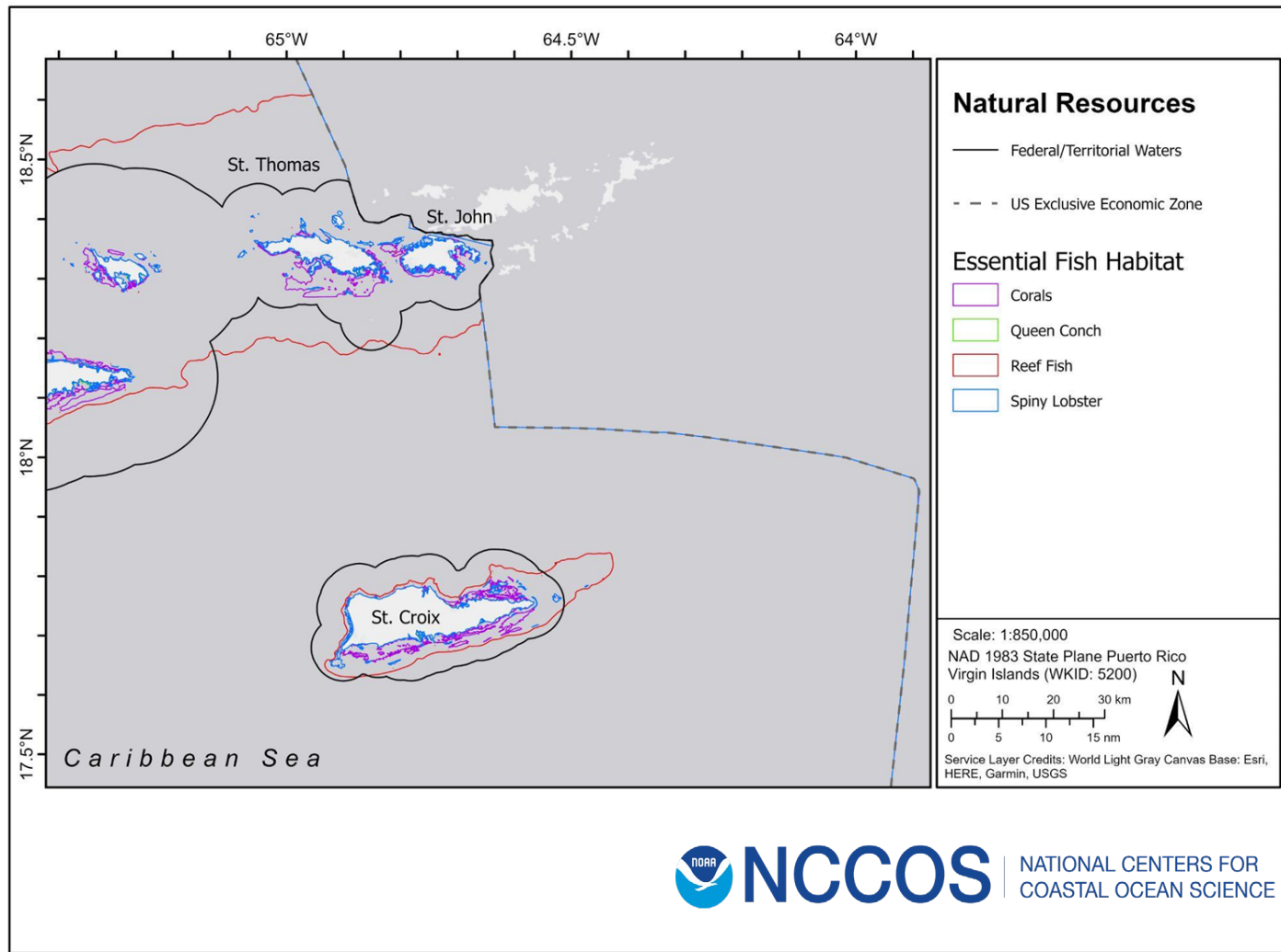
# Essential Fish Habitat

**Summary:** This dataset depicts the boundary of essential fish habitat for managed species in the EFH Mapper. Caribbean Corals and Reef (Innumerable species for data collection purposes only), Reef Fish (Angelfish, Boxfish, Goatfish, Groupers, Grunts, Jacks, Parrotfish, Porgies, Sixty species for aquarium trade only, Snappers, Scups, Squirrelfish, Surgeonfish, Tilefish, Triggerfish and Filefish, Wrasses), Queen Conch, Spiny Lobster

**Type:** Polygon

**Original Source:** NOAA NMFS / CFMC

[Data Link](#)



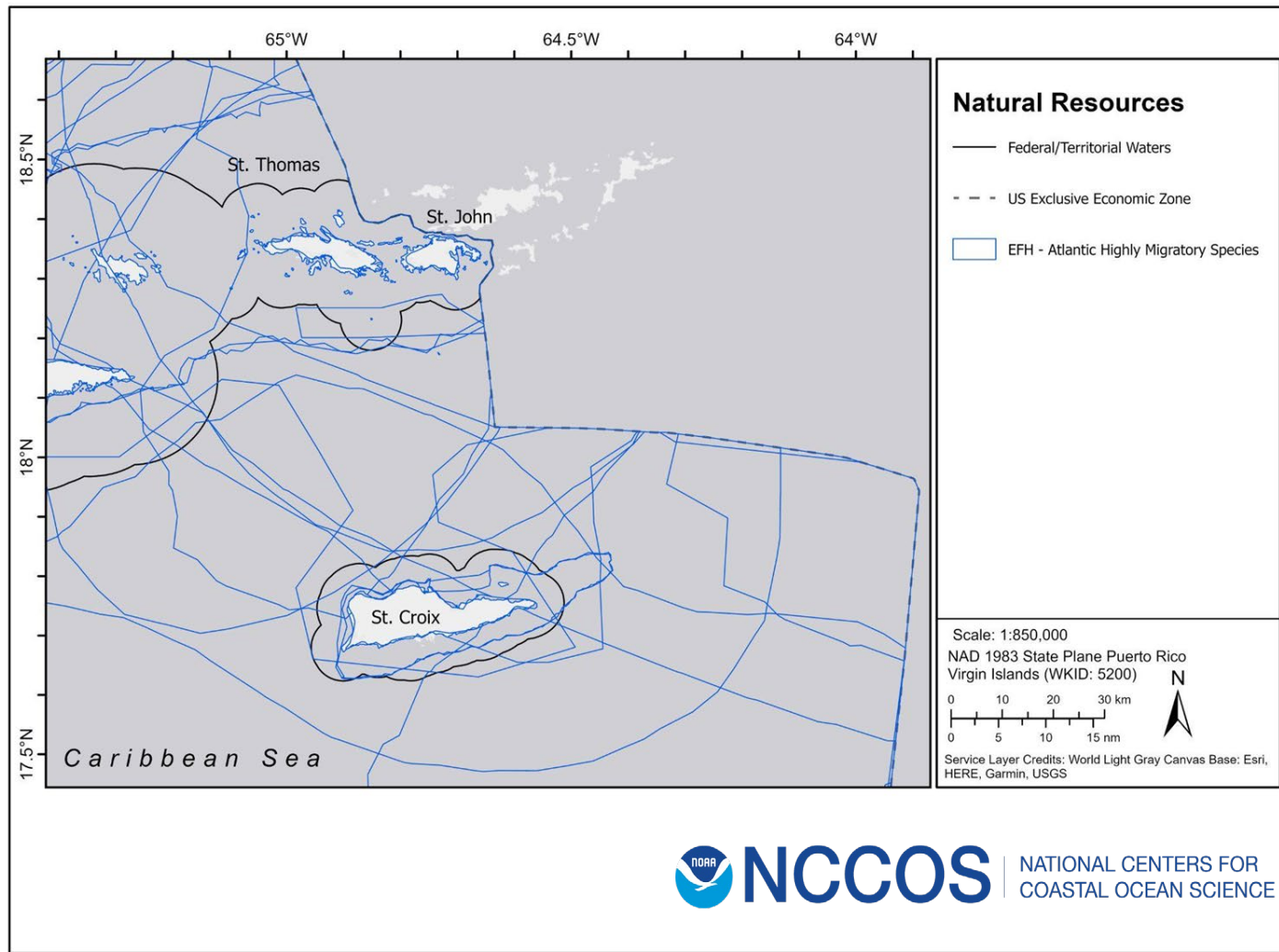
# EFH - Atlantic Highly Migratory Species

**Summary:** This dataset depicts the boundary of essential fish habitat for managed species in the EFH Mapper. Species: Bigeye Tuna, Yellowfin Tuna, Swordfish, Blue Marlin, Longbill Spearfish, Sailfish, White Marlin, Blacktip Shark (Gulf of Mexico Stock), Caribbean Reef Shark, Lemon Shark, Nurse Shark, Oceanic Whitetip Shark, Tiger Shark.

**Type:** Polygon

**Original Source:** NOAA NMFS / CFMC

[Data Link](#)





# Fishery Management Areas

Grammanik Bank Reef Fish

[Data Link](#)

Hind Bank MCD Reef Fish

[Data Link](#)

Mutton Snapper Spawning Aggregation

[Data Link](#)

Red Hind Spawning Aggregation

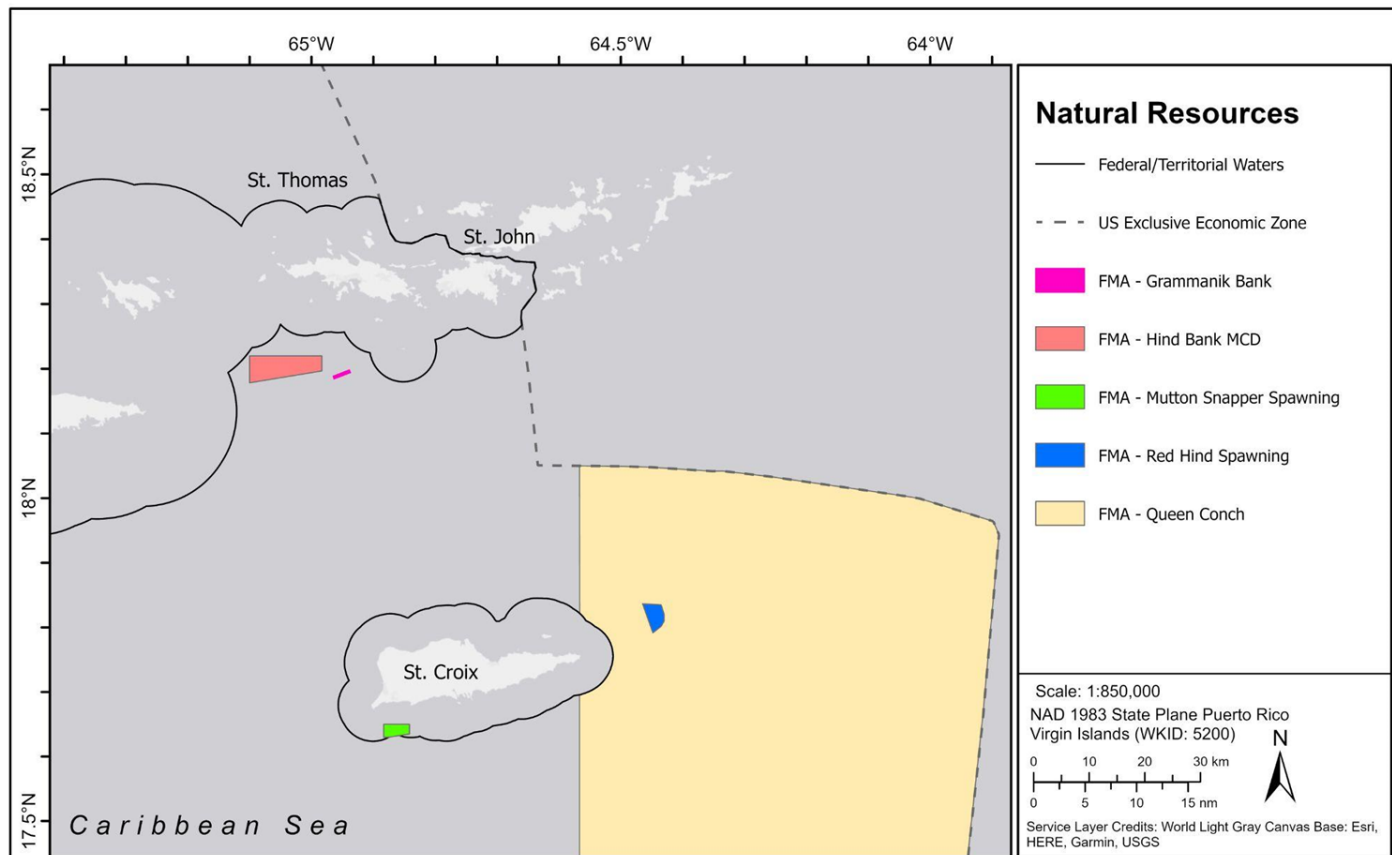
[Data Link](#)

Queen Conch

[Data Link](#)

Type: Polygon

Original Source: NOAA NMFS



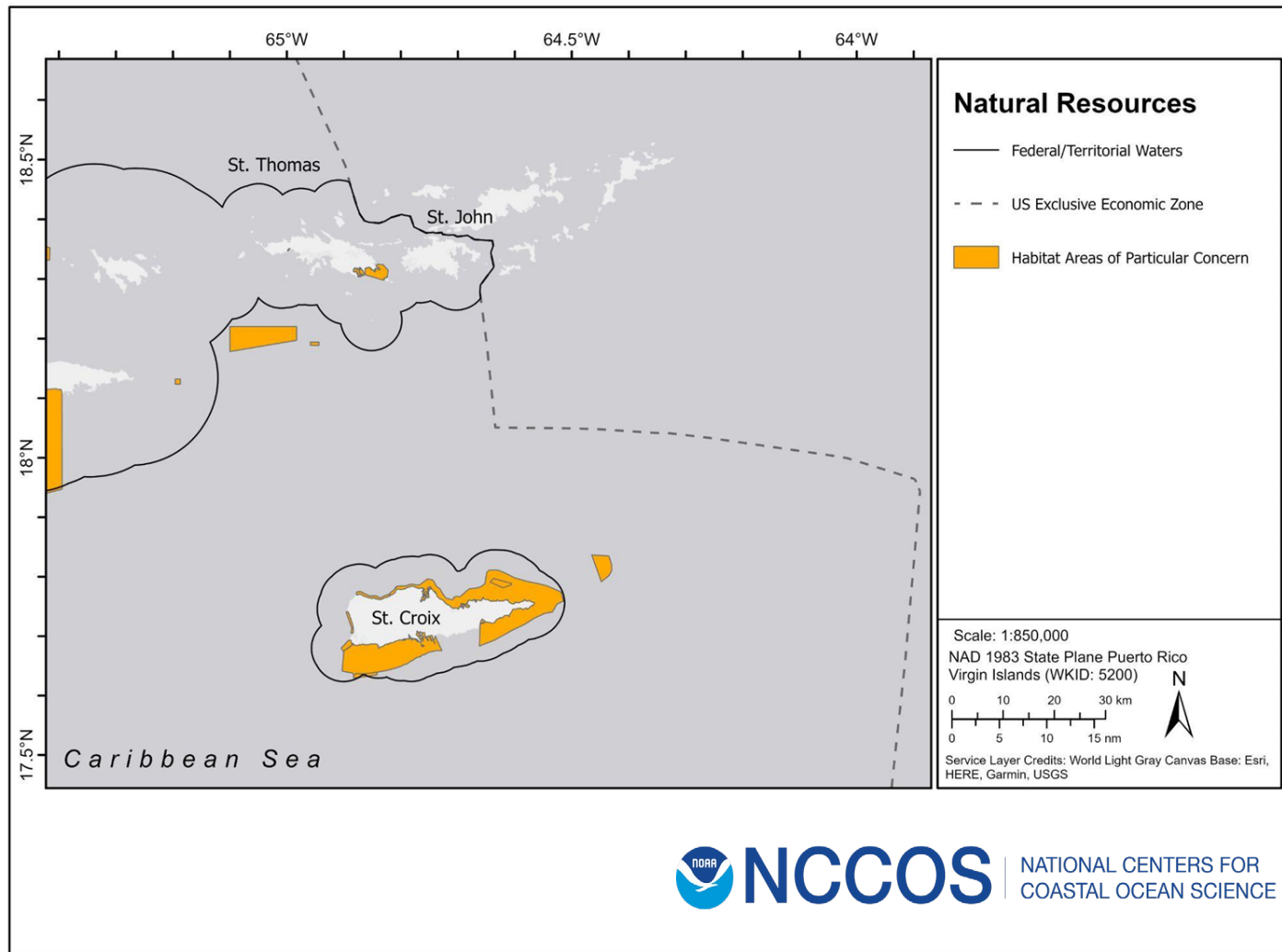
# Habitat Areas of Particular Concern

**Summary:** The Caribbean region includes Puerto Rico and the United States Virgin Islands. These islands are part of NOAA Fisheries' Southeast Region. The Caribbean Fishery Management Council has designated a large number of discrete sites as HAPCs under its Reef Fish and Coral Fishery Management Plans.

**Type:** Polygon

**Original Source:** NOAA NMFS / CFMC

[Data Link](#)



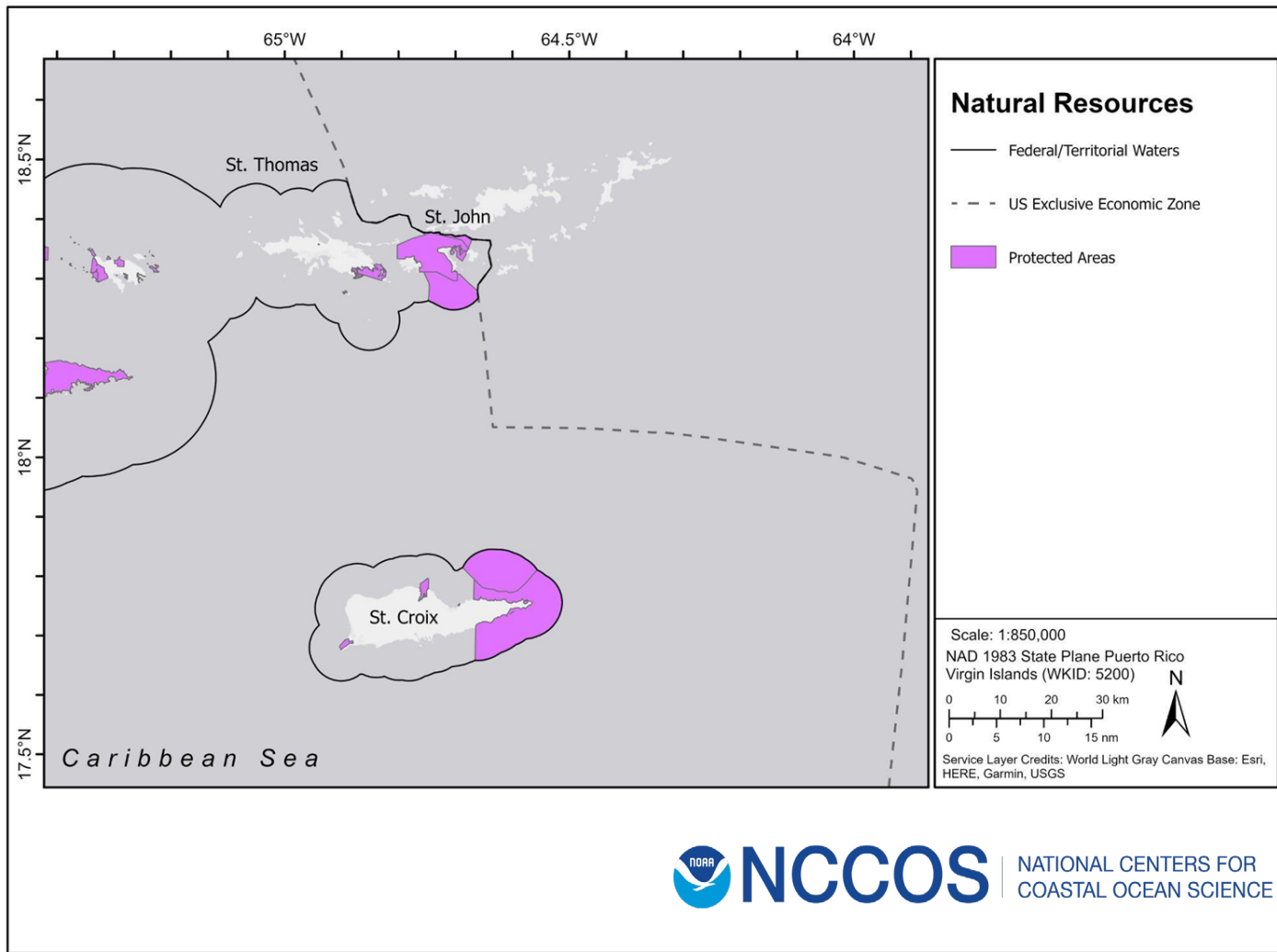
# Protected Areas

**Summary:** These data represent the geographic boundaries of marine and terrestrial protected areas in the Puerto Rico and the US Virgin Islands. Marine features are shown for U.S. state and federal waters as well as those located within 20 miles of coastal submerged lands including hydrologically related rivers and bays.

**Type:** Polygon

**Original Source:** USGS, USFS, NPS, BLM

[Data Link](#) / [Metadata Link](#)



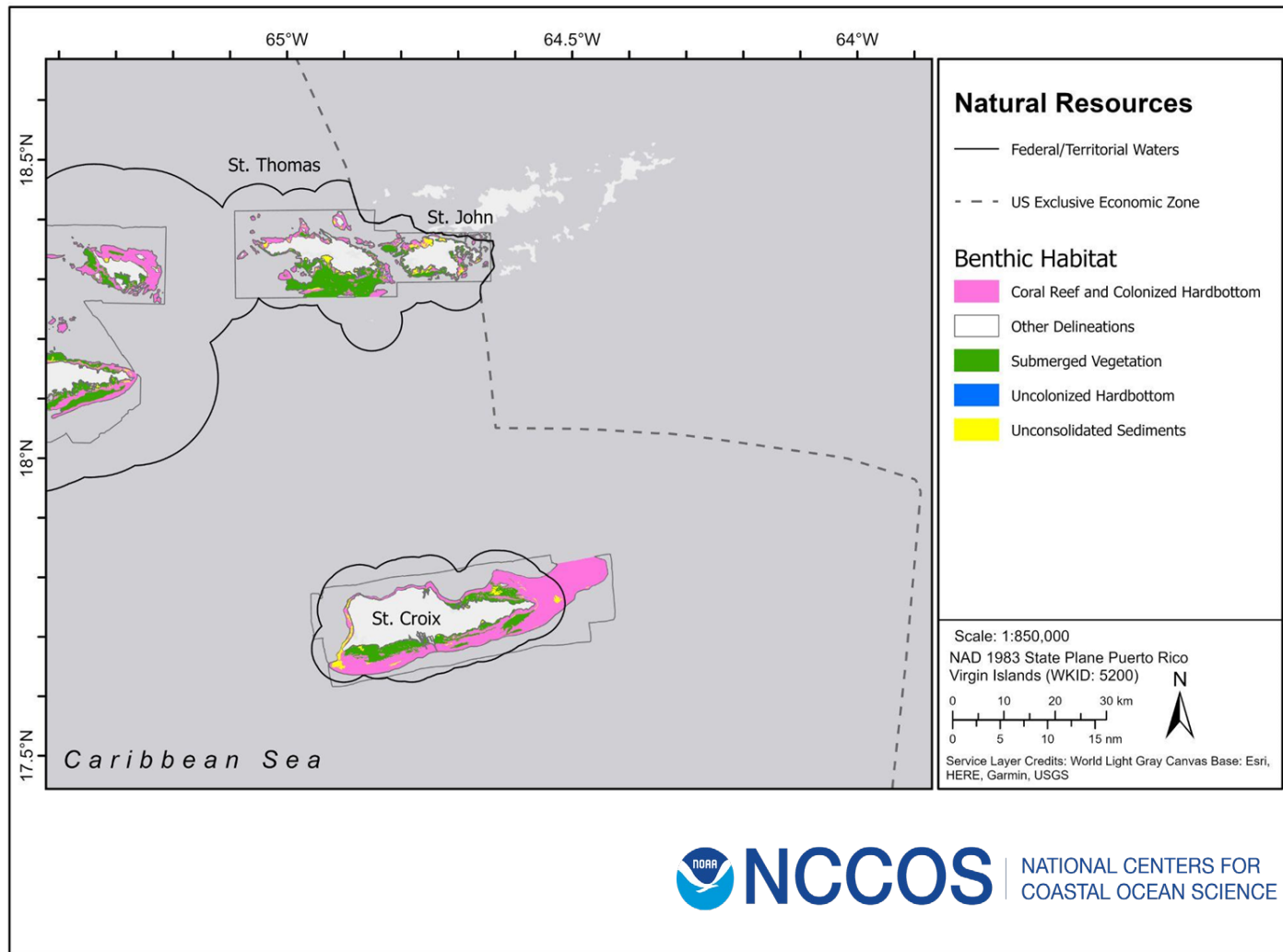
# Benthic Habitat - NOAA

**Summary:** Mapped 21 distinct benthic habitat types within eight zones using visual interpretation of orthorectified aerial photographs

**Type:** Polygon

**Original Source:** NOAA NCCOS

[Data Link](#)



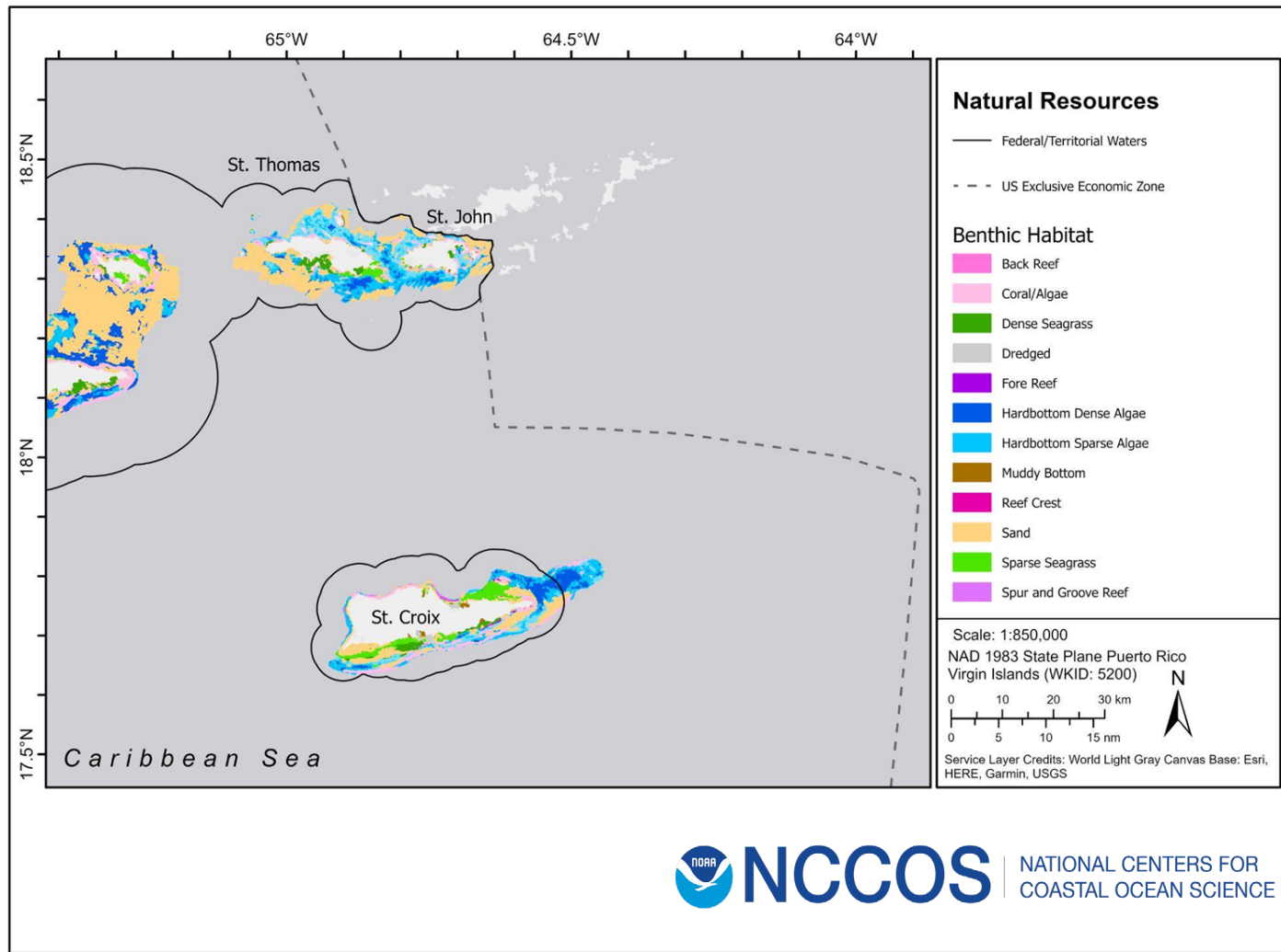
# Benthic Habitat - TNC

**Summary:** The Nature Conservancy (TNC) has developed a first-of-its-kind, high-resolution benthic habitat map for shallow areas across the wider Caribbean region.

**Type:** Polygon

**Original Source:** TNC

[Data Link](#)



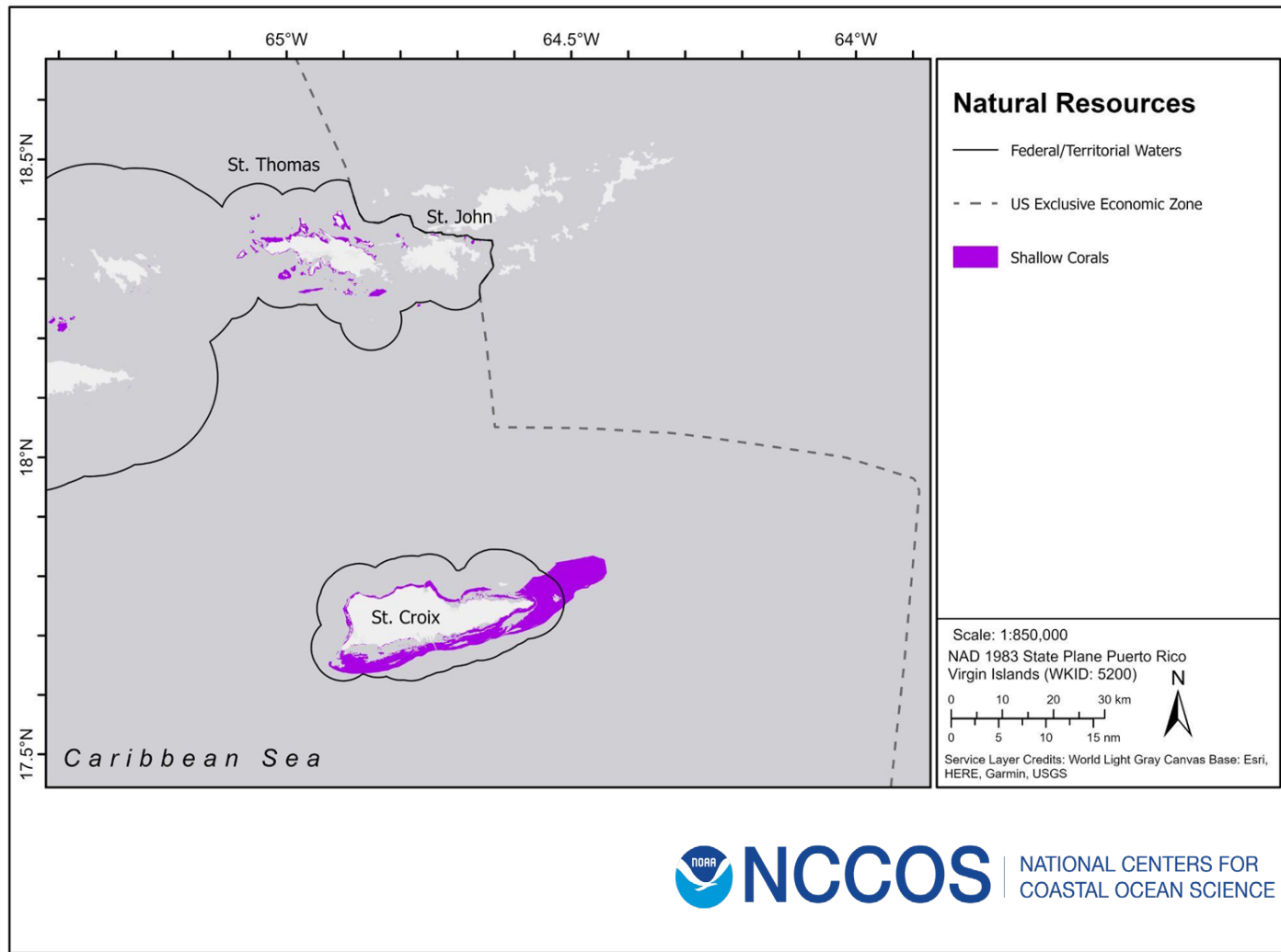
# Shallow Corals

**Summary:** Shallow Corals were extracted from the Benthic Cover described herein by exporting all features classified as "B2.1.2" within the Biotic Cover Code field. Benthic cover (habitat) maps are derived from aerial imagery, underwater photos, acoustic surveys, and data gathered from sediment samples.

**Type:** Polygon

**Original Source:** NOAA OCM / NCCOS

[Data Link](#) / [Metadata Link](#)



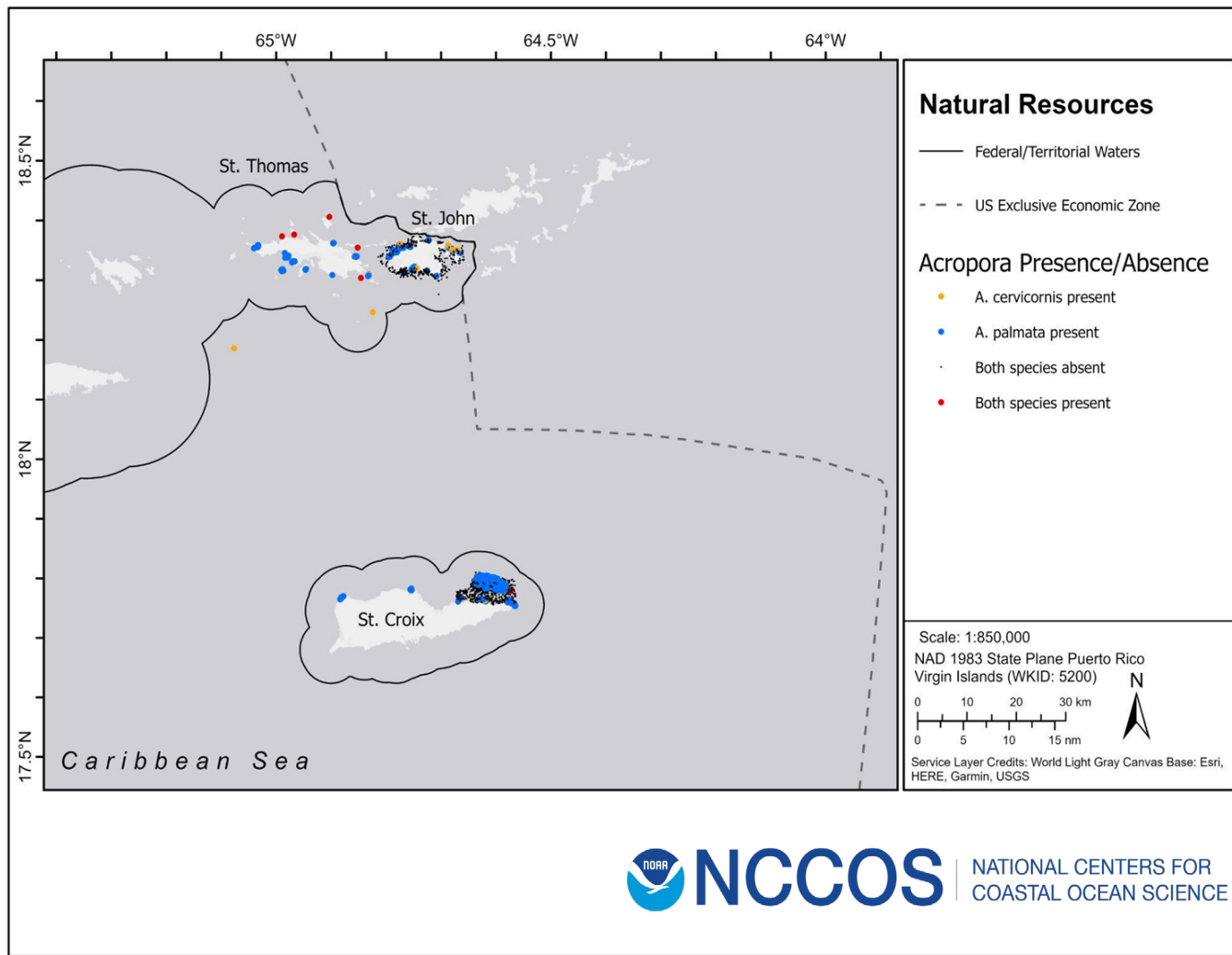
# Acropora Presence/Absence Locations

**Summary:** Reported sightings of *Acropora palmata* and *Acropora cervicornis*. These agencies include NOAA, National Park Service, FWC, University of Miami, University of North Carolina - Wilmington, National Coral Reef Institute and The Nature Conservancy. All datasets include *Acropora* presence/absence and latitudinal /longitudinal coordinates at the minimum. This project was funded by award NA10NMF4720029 from the National Oceanic and Atmospheric Administration/National Marine Fisheries Service, U.S. Department of Commerce.

**Type:** Polygon

**Original Source:** FL FWS

[Data Link](#)



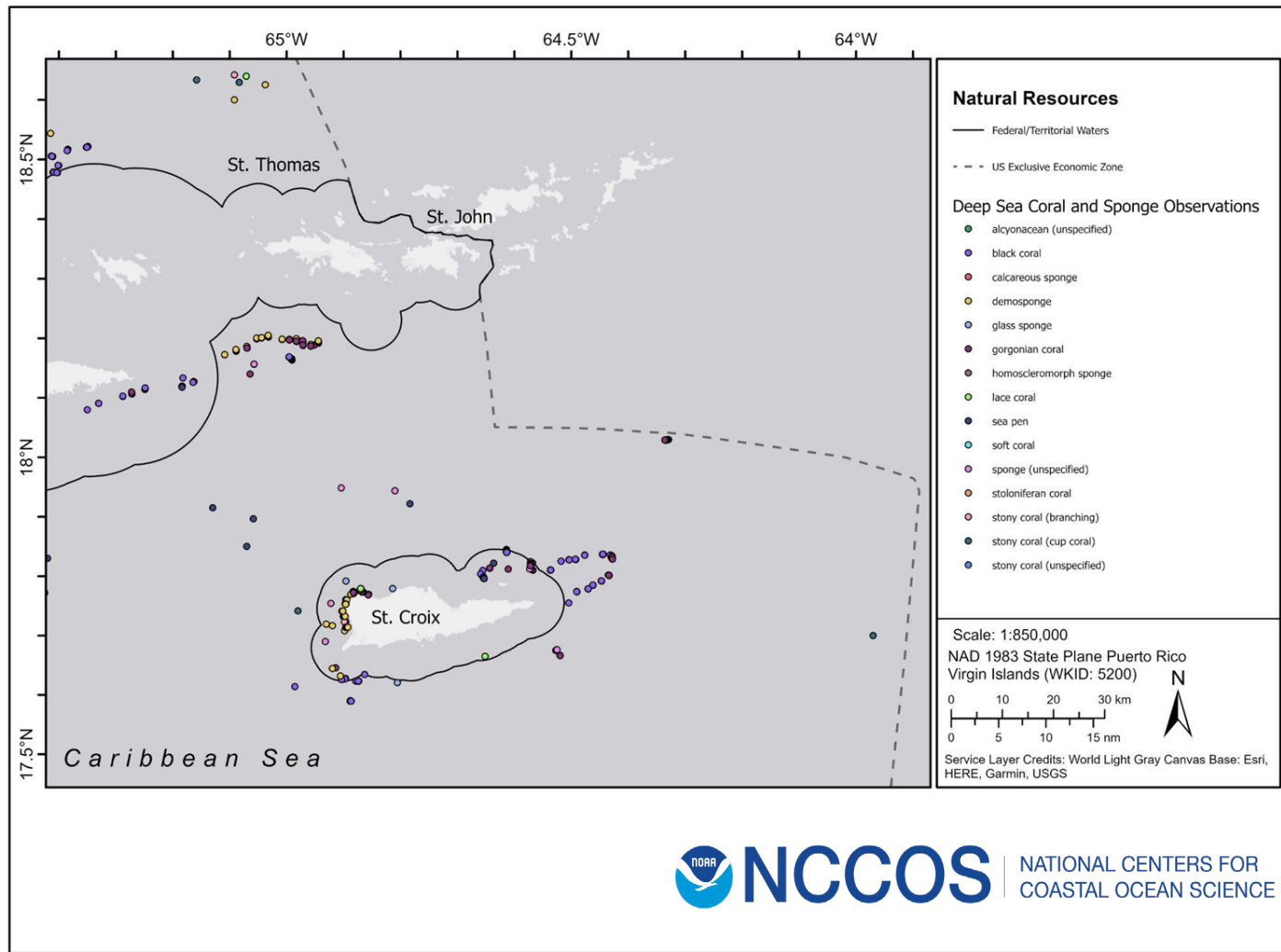
# Deep Sea Coral and Sponge Observations

**Summary:** NOAA's Deep-Sea Coral Research and Technology Program (DSCRTP) compiles a national database of the known locations of deep-sea corals and sponges in US territorial waters and beyond. The structure of the database is tailored to occurrence records of all the azooxanthellate corals, a subset of all corals, and all sponge species.

**Type:** Point

**Original Source:** NOAA NCEI / DSCRTP

[Data Link](#) / [Metadata Link](#)





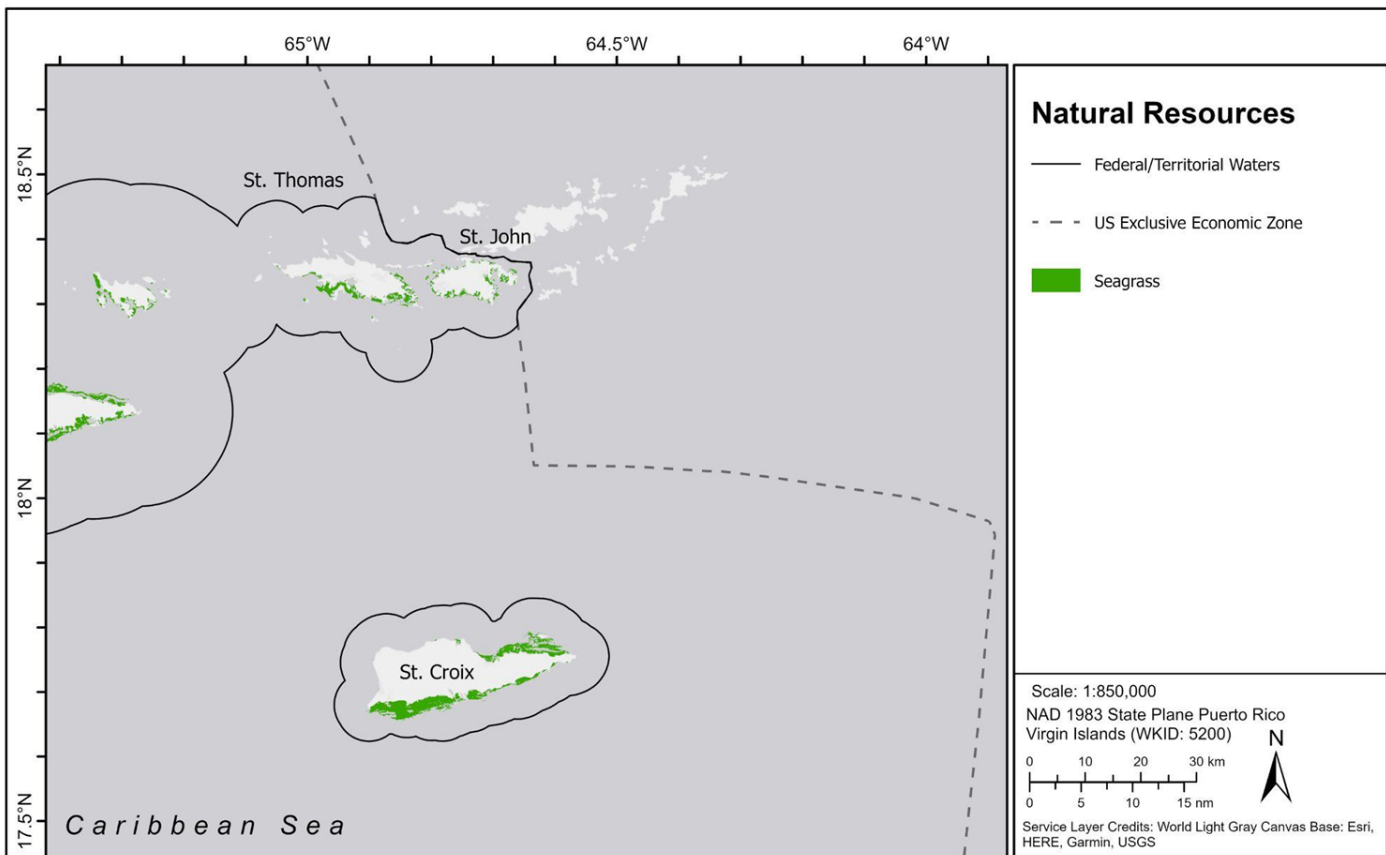
# Seagrasses

**Summary:** These data show aquatic vascular vegetation beds dominated by submerged, rooted, vascular species or submerged or rooted floating freshwater tidal vascular vegetation. The presence and location of the seagrasses have been derived from multiple state and federal sources.

**Type:** Point

**Original Source:** NOAA

[Data Link](#)



**NCCOS**

NATIONAL CENTERS FOR  
COASTAL OCEAN SCIENCE

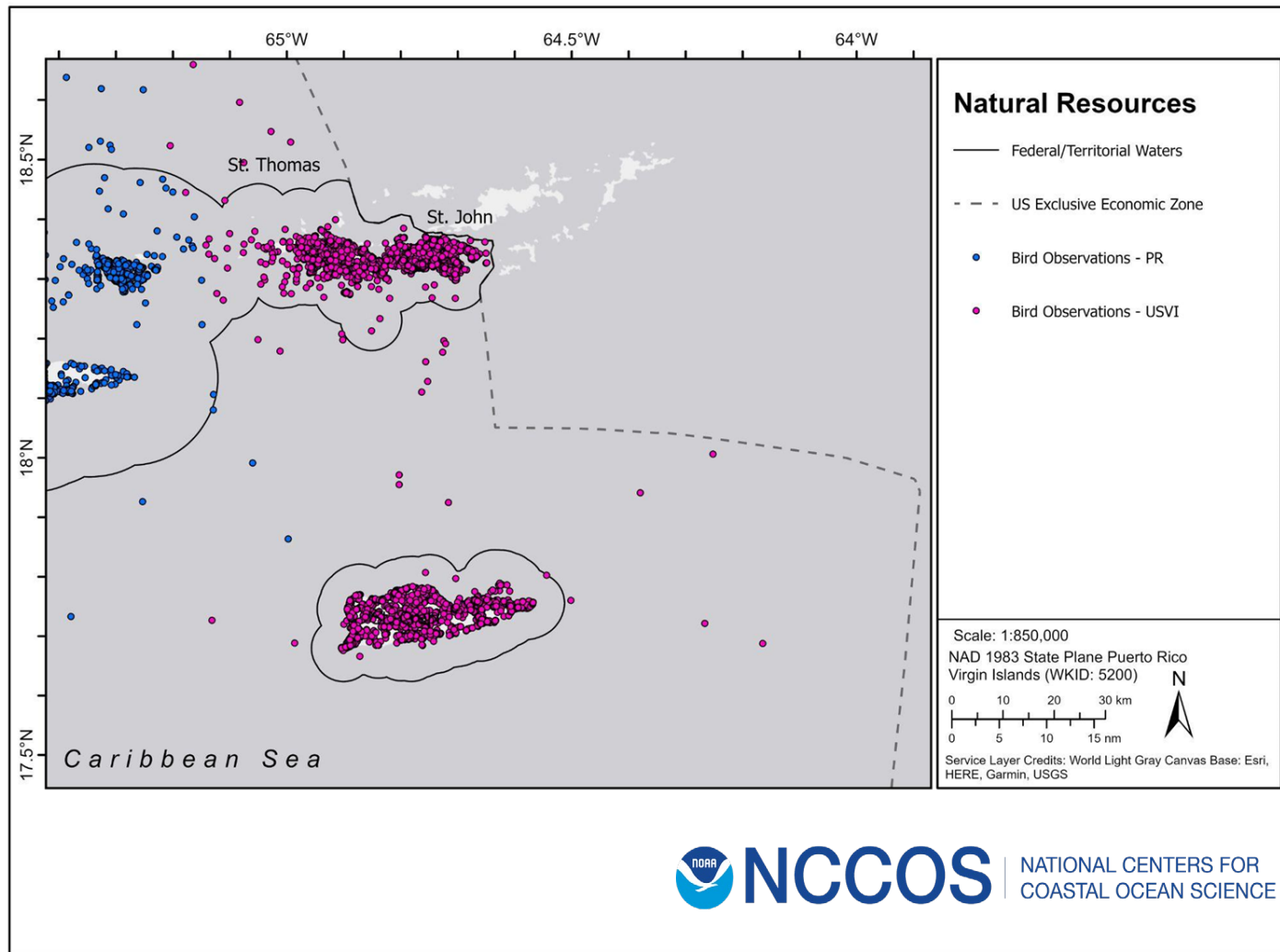
# Bird Observations

**Summary:** The EBD is the core dataset for accessing all raw eBird observations and associated metadata. The EBD is updated monthly (15th of each month), and is available by direct download through eBird to any logged-in user after completion of a data request form. Data are provided with documentation in spreadsheet format, which can be read by a variety of programs.

**Type:** Point

**Original Source:** eBird / Birds Caribbean

[Data Link](#)



# Marine Mammals & Protected Species

- **Sea turtle**
  - State of the World's Sea Turtles (SWOT): includes telemetry and nesting data summary specific to turtles in the Caribbean (SWOT - SEAMAP Duke University)
  - Proposed rule to designate critical habitat for green sea turtles (NOAA NMFS)
  - Information on strandings of sea turtles (Sea Turtle Stranding and Salvage Network)
  - Atlas of sea turtles nesting habitat (TNC & Sea Turtle Conservation Network)
- **Protected species**
  - Marine species distributions and biodiversity (OBIS-SEAMAP)
  - Animal telemetry network (Integrated Ocean Observing System)
  - Acoustic telemetry for fish and sea turtles (SECOORA - FACT Network)
  - Animal tracking data (Movebank - Max Planck Institute of Animal Behavior)
  - List of data references with owners for the report - migratory whales navigating international and national seas
- **Marine mammals**
  - Dwarf and pygmy sperm whales: location in Puerto Rico and the Virgin Islands
  - Cetacean strandings in Puerto Rico and Virgin Islands
  - Beaked whales: new records of beaked whales
  - Dolphins: modeling distribution of common bottlenose dolphin in SW Puerto Rico
  - Caribbean strandings (National Marine Mammal Stranding Database)
  - Passive acoustic monitoring map - NOAA NMFS

# Cultural and Social Resources

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Cultural uses of the environment, social vulnerability, demographic data, archaeological sites



National Centers for Coastal and Ocean Science  
National Marine Fisheries Service

[James.Morris@noaa.gov](mailto:James.Morris@noaa.gov)  
[Jennifer.Wright@noaa.gov](mailto:Jennifer.Wright@noaa.gov)



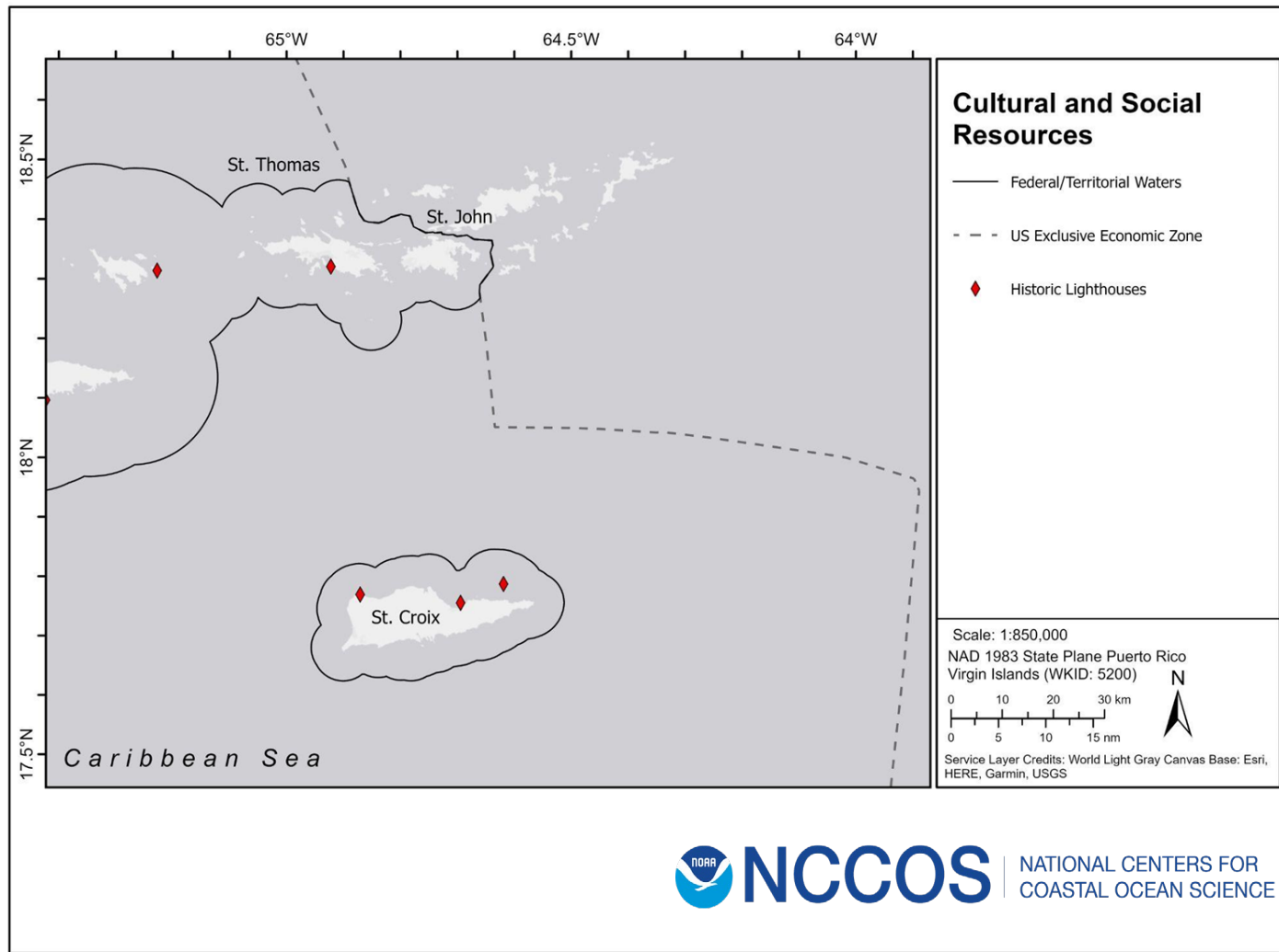
# Historic Lighthouses

**Summary:** This dataset includes lighthouses in coastal areas that may or may not be official or active aids for navigation. This dataset is a compilation of lighthouses identified from various official data sources: Aids to Navigation (ATON), National Geodetic Survey (NGS), National Park Service (NPS), and the National Oceanic and Atmospheric Administration (NOAA).

**Type:** Point

**Original Source:** US Coast Guard, NPS, NOAA National Geodetic Survey, BOEM, NOAA OCM

[Data Link](#)



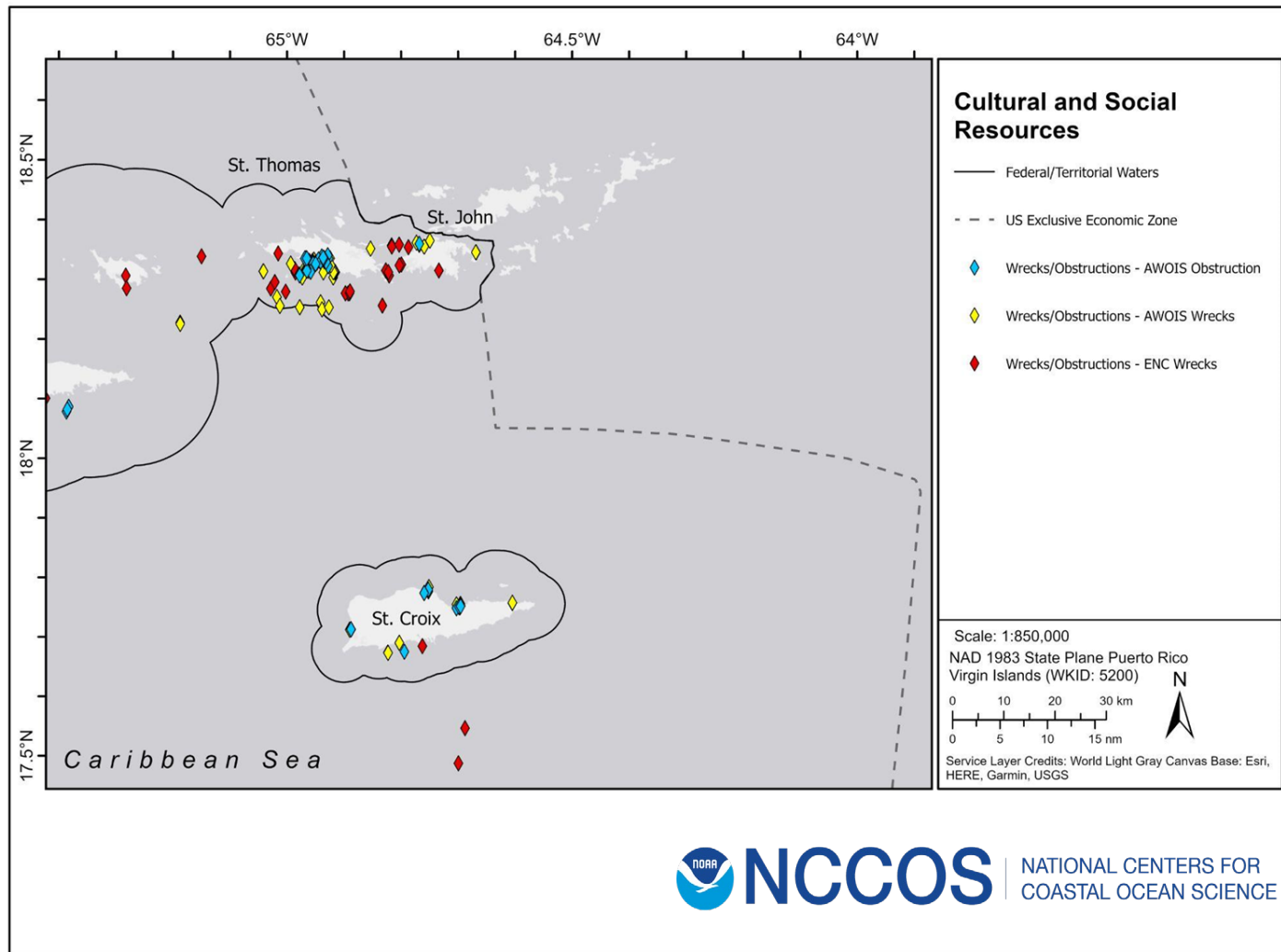
# Wrecks and Obstructions

**Summary:** The Automated Wreck and Obstruction Information System (AWOIS) and Electronic Navigational Charts (ENC) contain information on over 10,000 submerged wrecks and obstructions in the coastal waters of the United States.

**Type:** Point

**Original Source:** NOAA Office of Coast Survey

[Data Link](#)



# Protected Areas

**Protected Areas:** marine and terrestrial protected areas in Puerto Rico and the US Virgin Islands. Marine features are shown for U.S. state and federal waters as well as those located within 20 miles of coastal submerged lands including hydrologically related rivers and bays.

**Type:** Polygon

**Original Source:** USGS, USFS, NPS, BLM

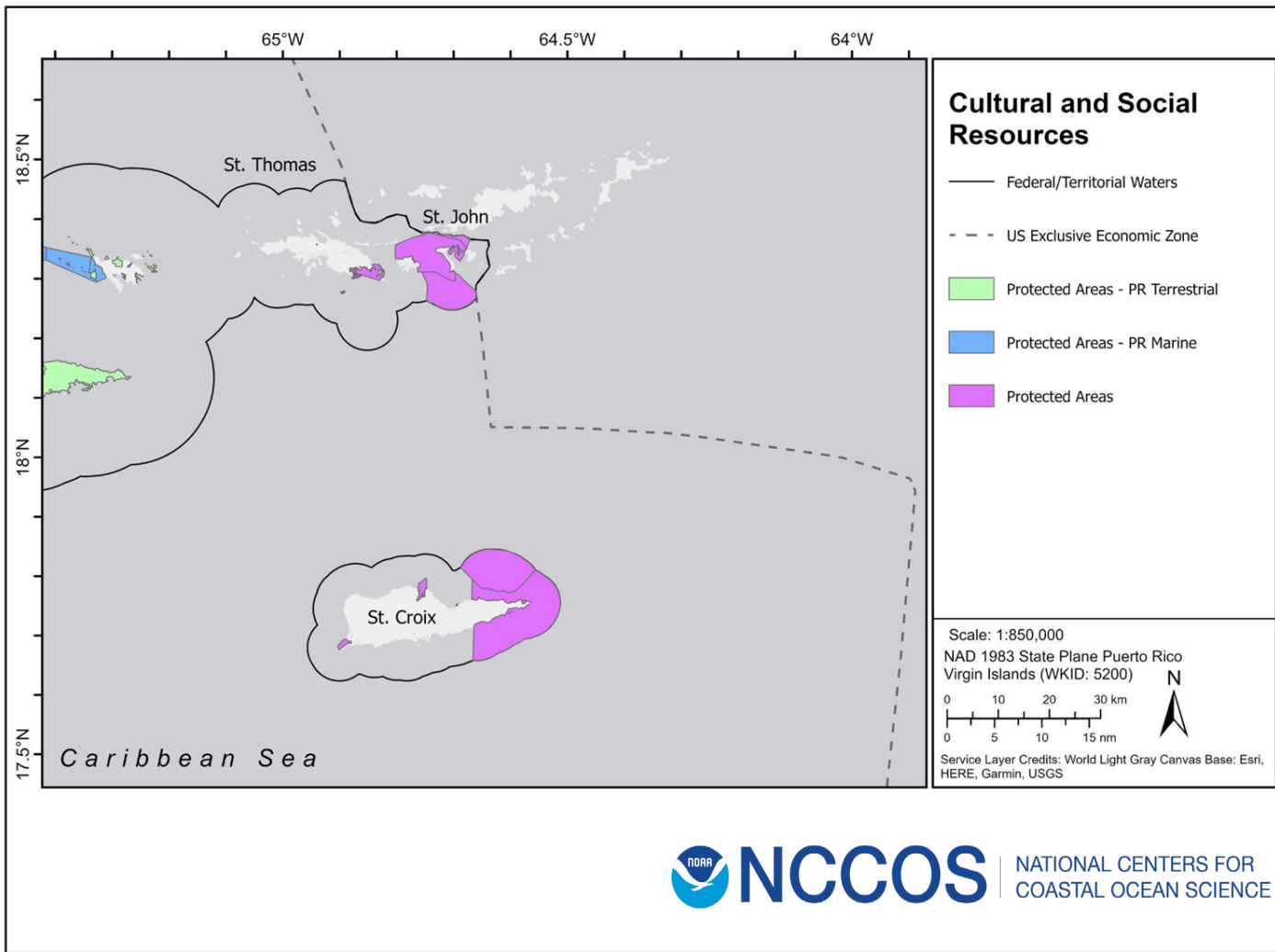
[Data Link](#) / [Metadata Link](#)

**Puerto Rico Protected Natural Areas:** Terrestrial and marine protected natural areas of Puerto Rico compiled by the Protected Areas Conservation Action Team (PACAT) as of December 2018.

**Type:** Polygon

**Original Source:** USDA, USFS, USFWS

[Data Link](#)



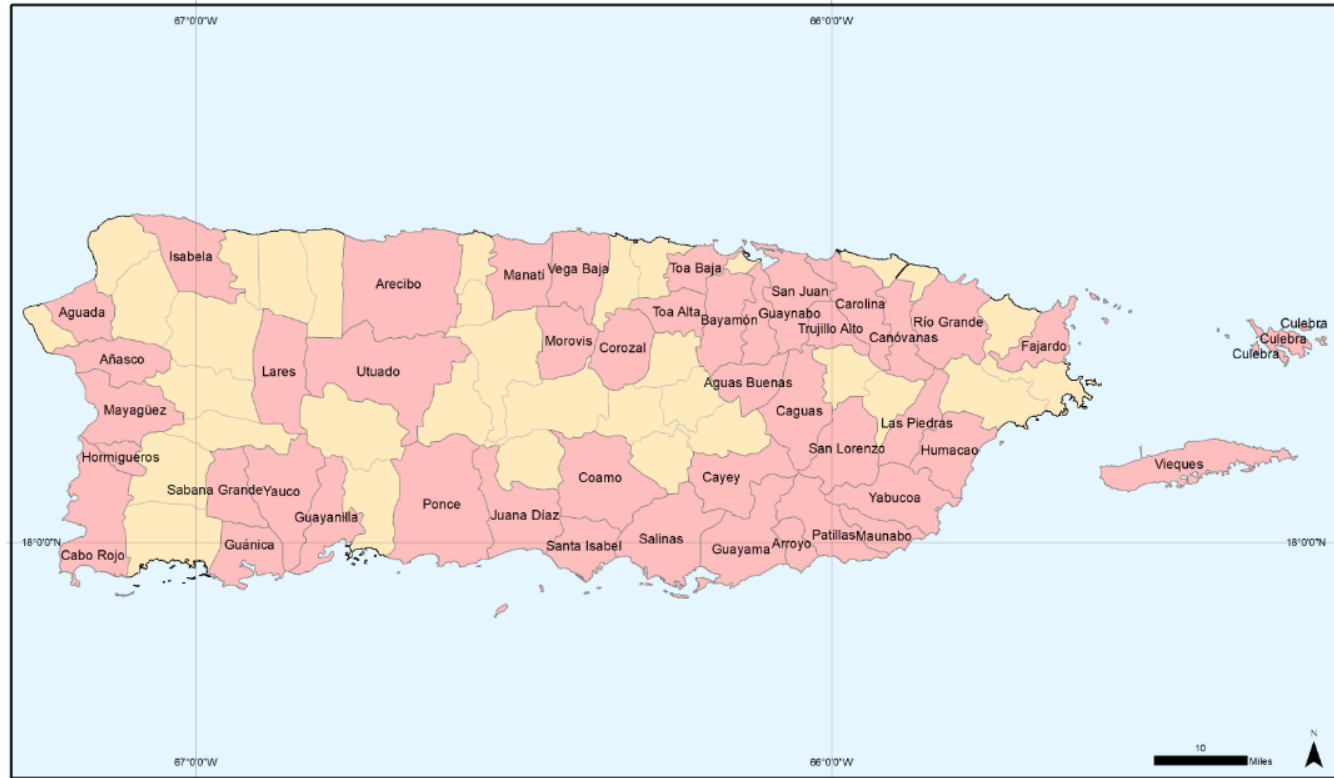
# NCRMP 2022 Socioeconomic Survey

**Summary:** National Coral Reef Monitoring Program resident survey in Puerto Rico. The national survey collects information on resident use of coral reefs, knowledge, attitudes, and perceptions of coral reefs and management. The second cycle of the Puerto Rico socioeconomic survey took place from January through mid summer 2022; 45 Puerto Rican municipalities were randomly selected for surveying and residents within these areas were randomly selected and invited to participate in the survey. The report and data from this resident survey should be available by end of 2023.

**Type:** Polygon

**Original Source:** NOAA NCRMP

[Project Link](#)



Map of municipalities randomly selected to participate in the NCRMP socioeconomic survey.



# Cultural and Social Resources

## Additional Types of Data of Interest

- Coastal demographic data
- Community social vulnerability data
- Traditional and current territory of tribes or native and traditional populations
- Traditional/ceremonial or important recreational uses of marine or coastal areas (dive sites, sandbars, transit routes to those areas, etc)
- Underwater or coastal actual or possible archeological sites
- Coastal land tenure/land use
- Fishing territories at sea
- Coastal infrastructure/working waterfronts

# Metocean and Other

Meteorological and  
oceanographic conditions  
(temp, wind, currents, etc.),  
bathymetry, shoreline,  
boundaries



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National Marine Fisheries Service

[James.Morris@noaa.gov](mailto:James.Morris@noaa.gov)  
[Jennifer.Wright@noaa.gov](mailto:Jennifer.Wright@noaa.gov)



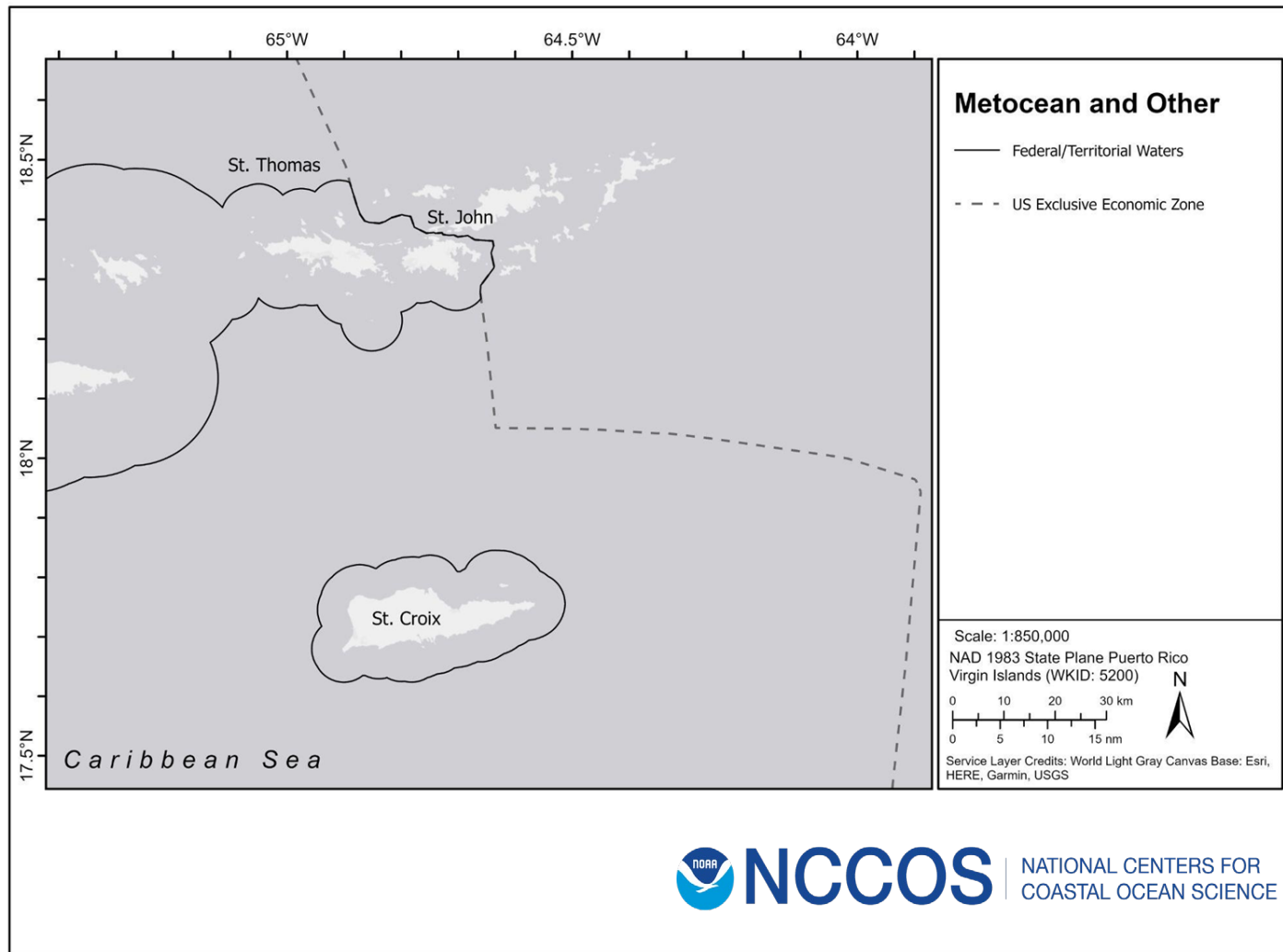
# Federal and State Waters

**Summary:** These data show the geographic representation of Federal and State Waters. The boundary between state and federal waters was determined by consulting The Submerged Lands Act (43 U.S.C. §§ 1301 et seq.), 48 U.S.C. §§ 1705 and The Abandoned Shipwreck Act (43 U.S.C. §§ 2101).

**Type:** Polygon

**Original Source:** BOEM, NOAA OCM

[Data Link](#) / [Metadata Link](#)



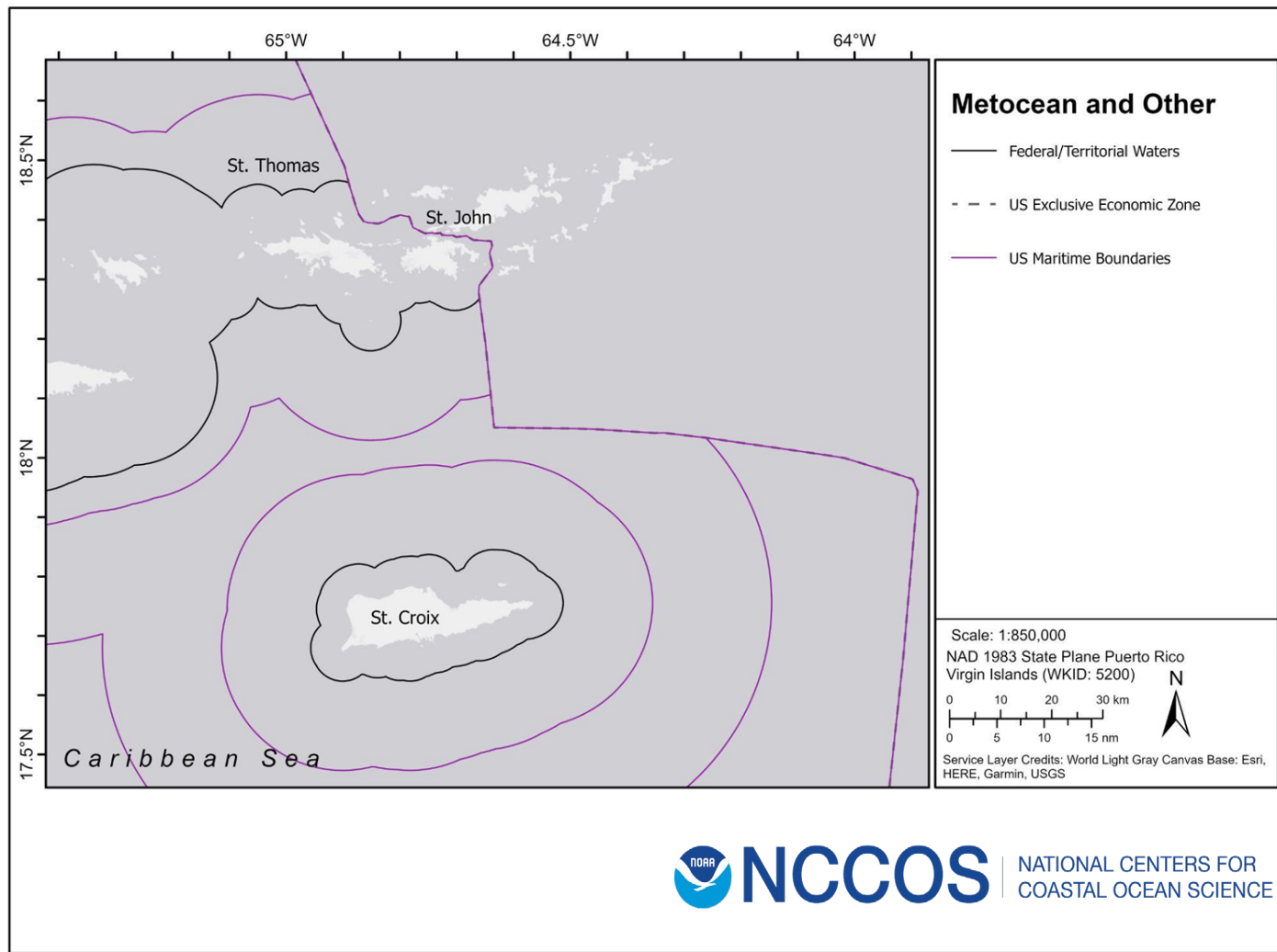
# US Maritime Limits & Boundaries

**Summary:** Maritime limits and boundaries for the United States are measured from the official U.S. baseline, recognized as the low-water line along the coast as marked on the NOAA nautical charts in accordance with the articles of the Law of the Sea. The Office of Coast Survey depicts on its nautical charts the territorial sea (12 nautical miles), contiguous zone (24nm), and exclusive economic zone (200nm, plus maritime boundaries with adjacent/opposite countries).

**Type:** Polyline

**Original Source:** NOAA Office of Coast Survey

[Data Link](#) / [Metadata Link](#)



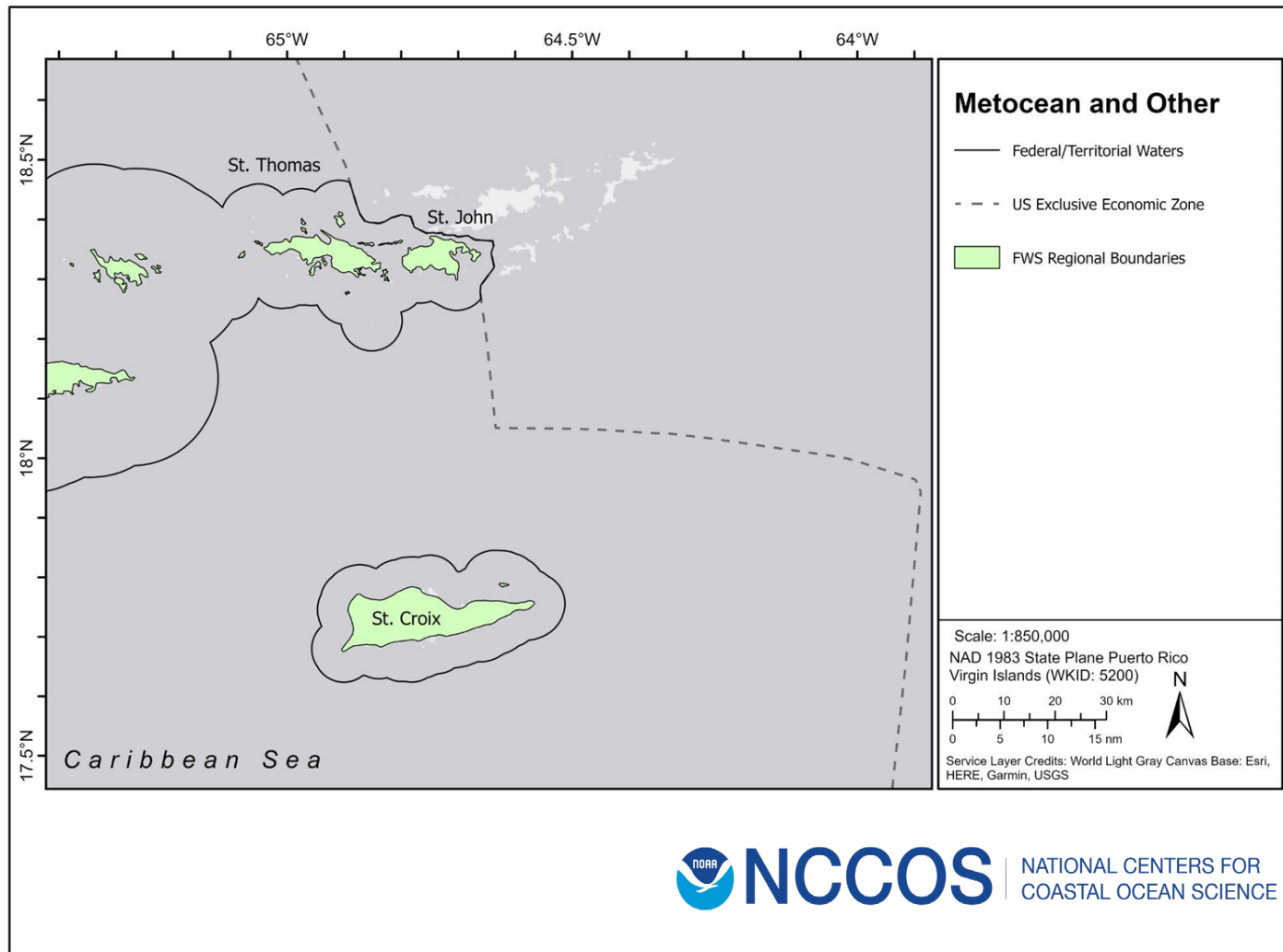
# USFWS Regional Boundaries

**Summary:** Boundaries of the management Regions of the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service is organized into 8 geographic Regions.

**Type:** Polygon

**Original Source:** USFWS

[Data Link](#) / [Metadata Link](#)



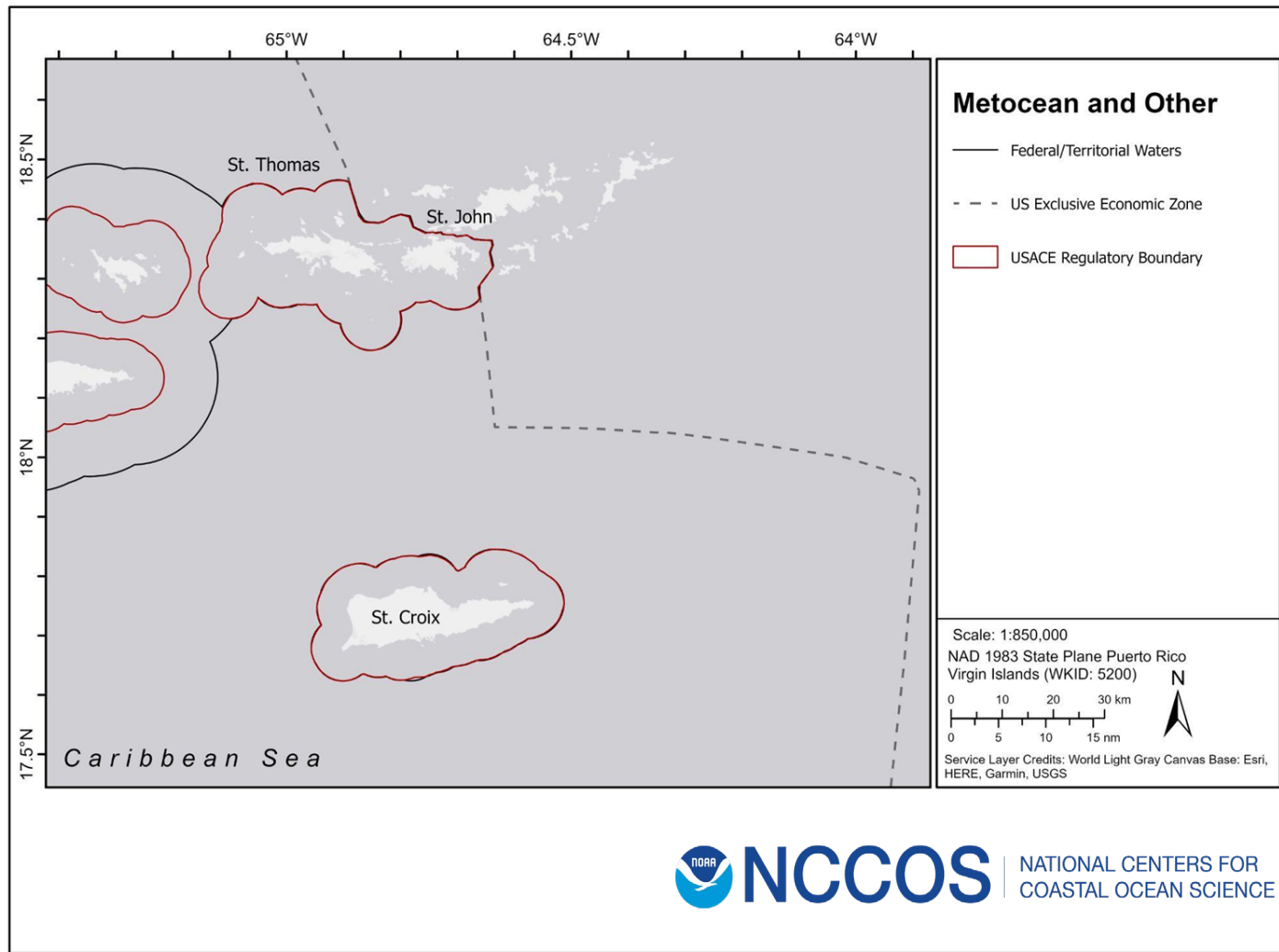
# USACE Regulatory Boundary

**Summary:** The US Army Corps of Engineers has been regulating activities in the nation's waters since 1890. Until the 1960s the primary purpose of the regulatory program was to protect navigation. Since then, as a result of laws and court decisions, the program has been broadened so that it now considers the full public interest for both the protection and utilization of water resources. These boundaries represent USACE regulatory districts.

**Type:** Polygon

**Original Source:** USACE

[Data Link](#) / [Metadata Link](#)



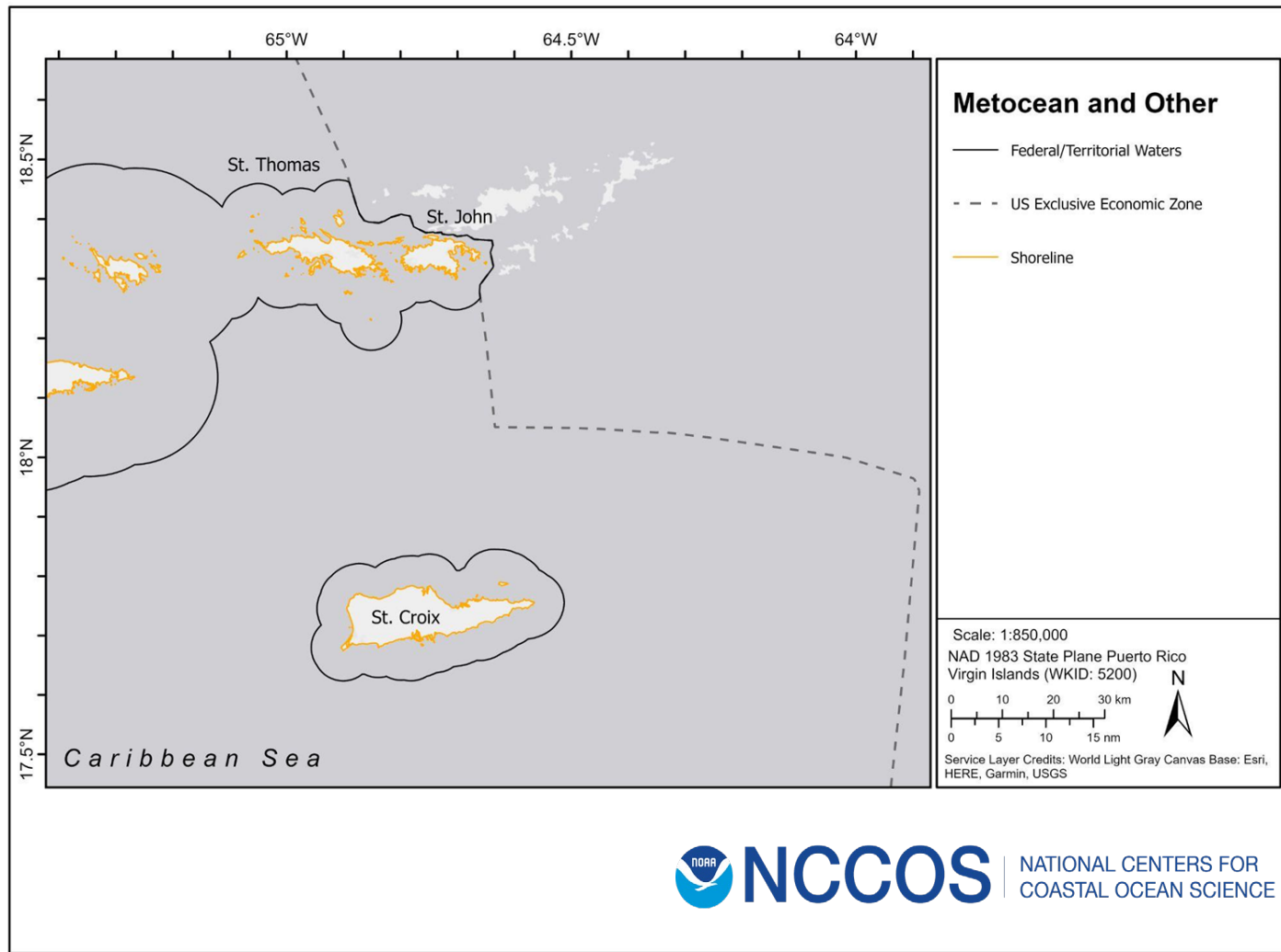
# Shoreline

**Summary:** National Geodetic Survey is building a database of its digital shoreline holdings.

**Type:** Polyline

**Original Source:** NOAA NGS

[Data Link](#)



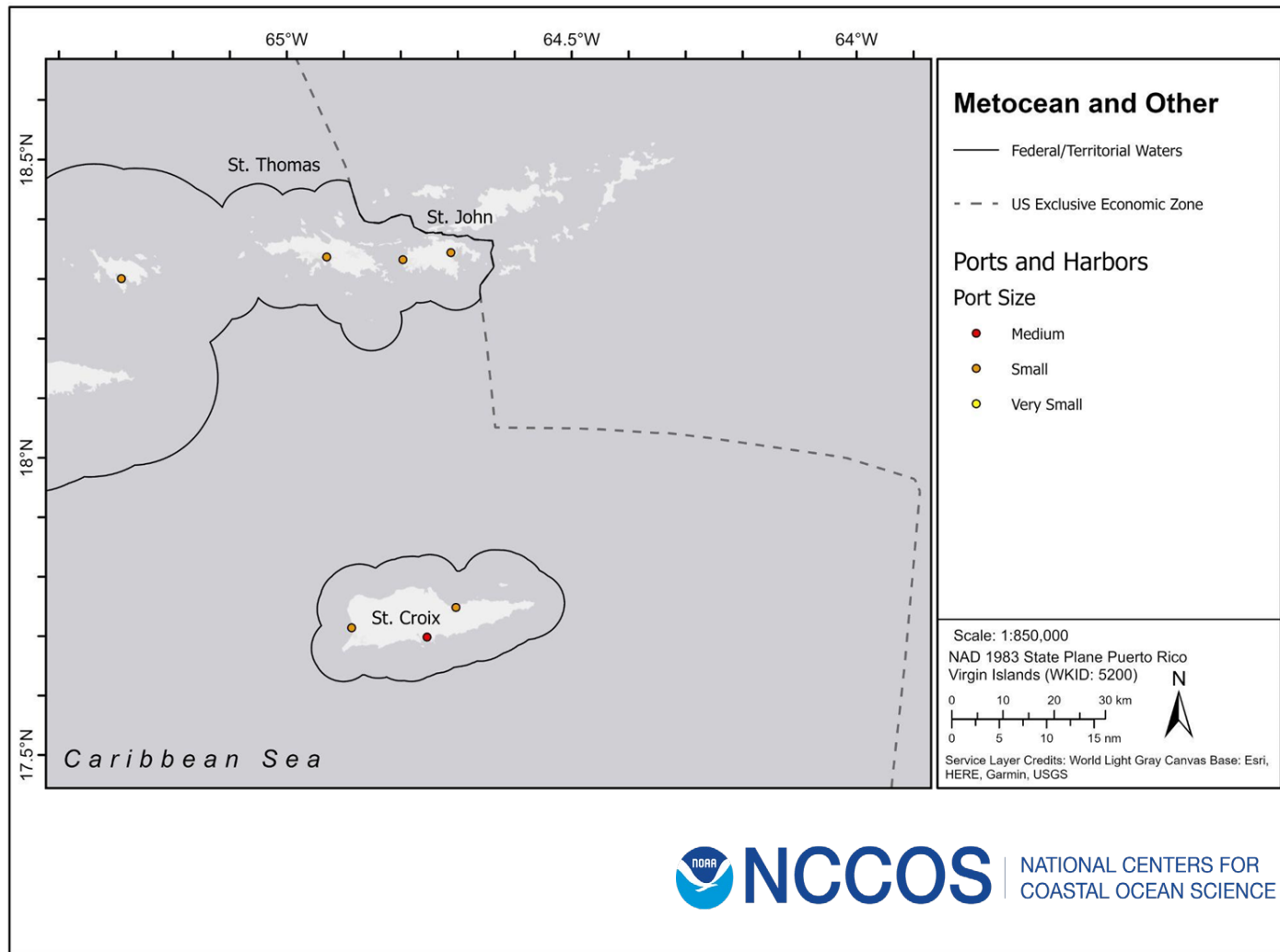
# Ports and Harbors

**Summary:** compilation of publicly accessible seaport information for ports and harbors in Puerto Rico and the US Virgin Islands.

**Type:** Point

**Original Source:** World Port Source

[Data Link](#) / [Metadata Link](#)





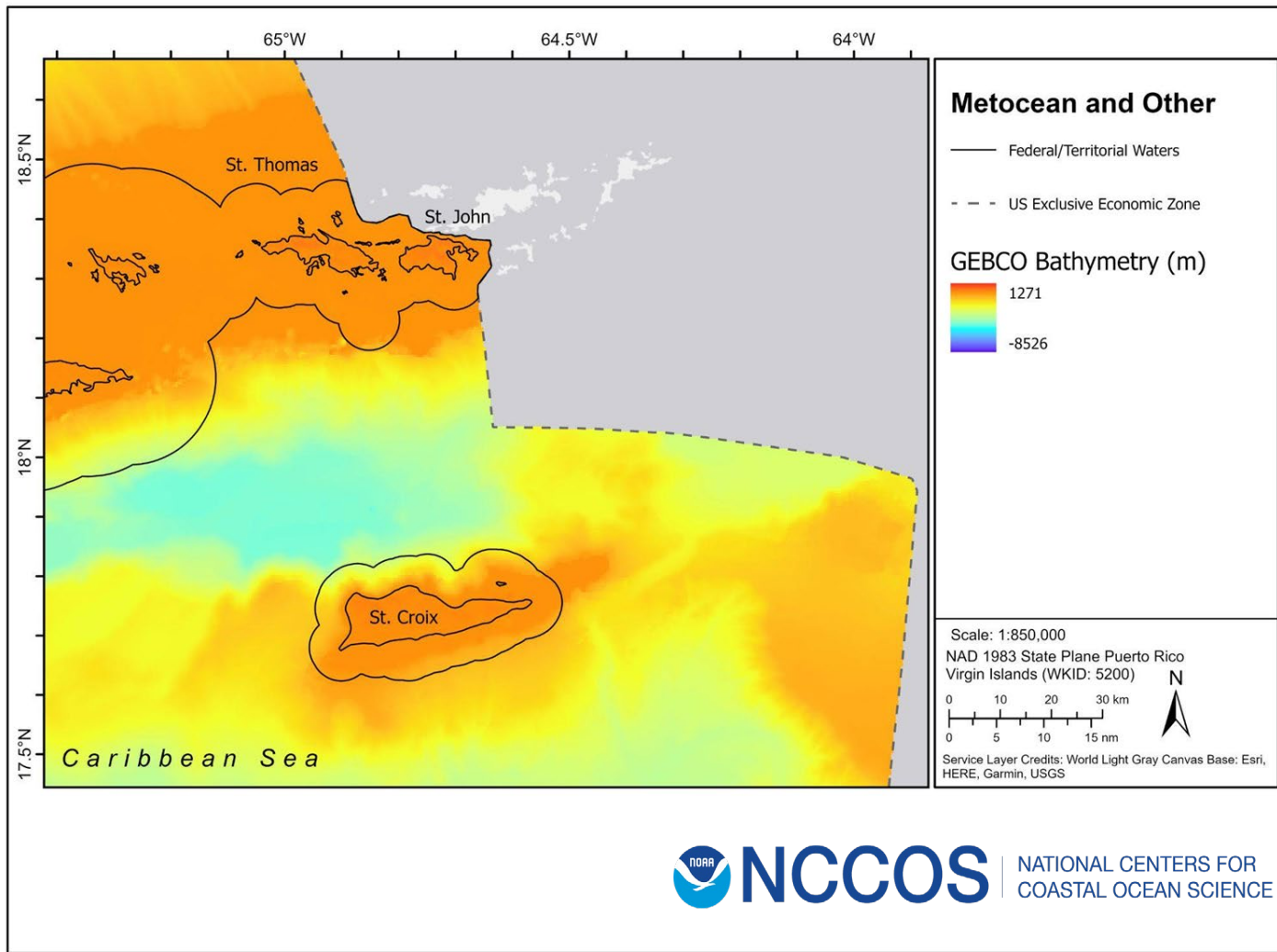
# GEBCO Bathymetry

**Summary:** GEBCO's current gridded bathymetric data set, the GEBCO\_2023 Grid, is a global terrain model for ocean and land, providing elevation data, in meters, on a 15 arc-second interval grid. It is accompanied by a Type Identifier (TID) Grid that gives information on the types of source data that the GEBCO\_2023 Grid is based on.

**Type:** Raster

**Original Source:** GEBCO

[Data Link](#) / [Metadata Link](#)



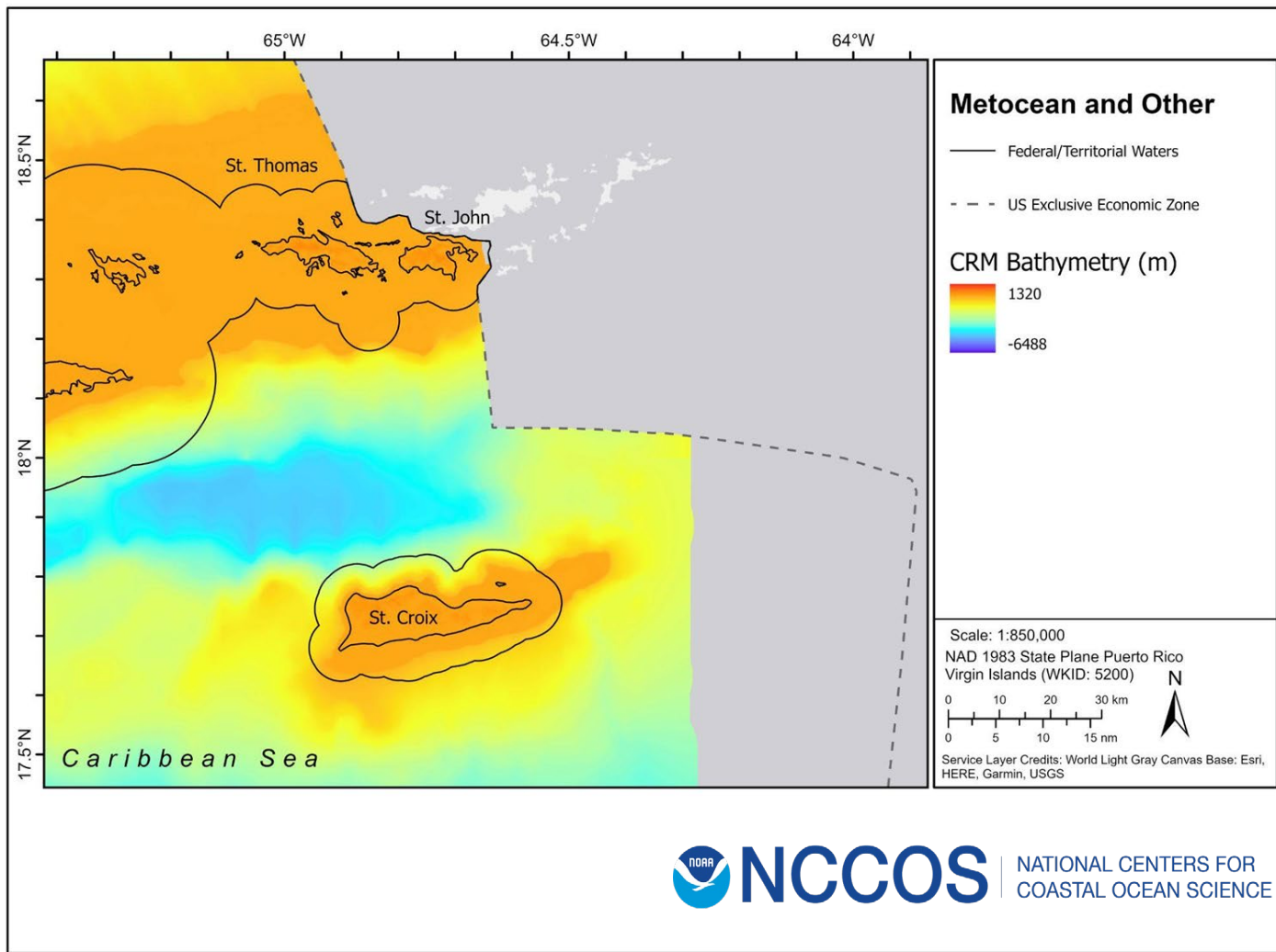
# CRM Bathymetry

**Summary:** NGDC's U.S. Coastal Relief Model (CRM) provides the first comprehensive view of the U.S. coastal zone integrating offshore bathymetry with land topography into a seamless representation of the coast. Bathymetric and topographic data sources include: NGDC's NOS hydrographic surveys, multibeam bathymetry, and trackline bathymetry; the U.S. Geological Survey (USGS); and other federal government agencies and academic institutions.

**Type:** Raster

**Original Source:** NOAA National Geophysical Data Center NCEI

[Data Link](#)



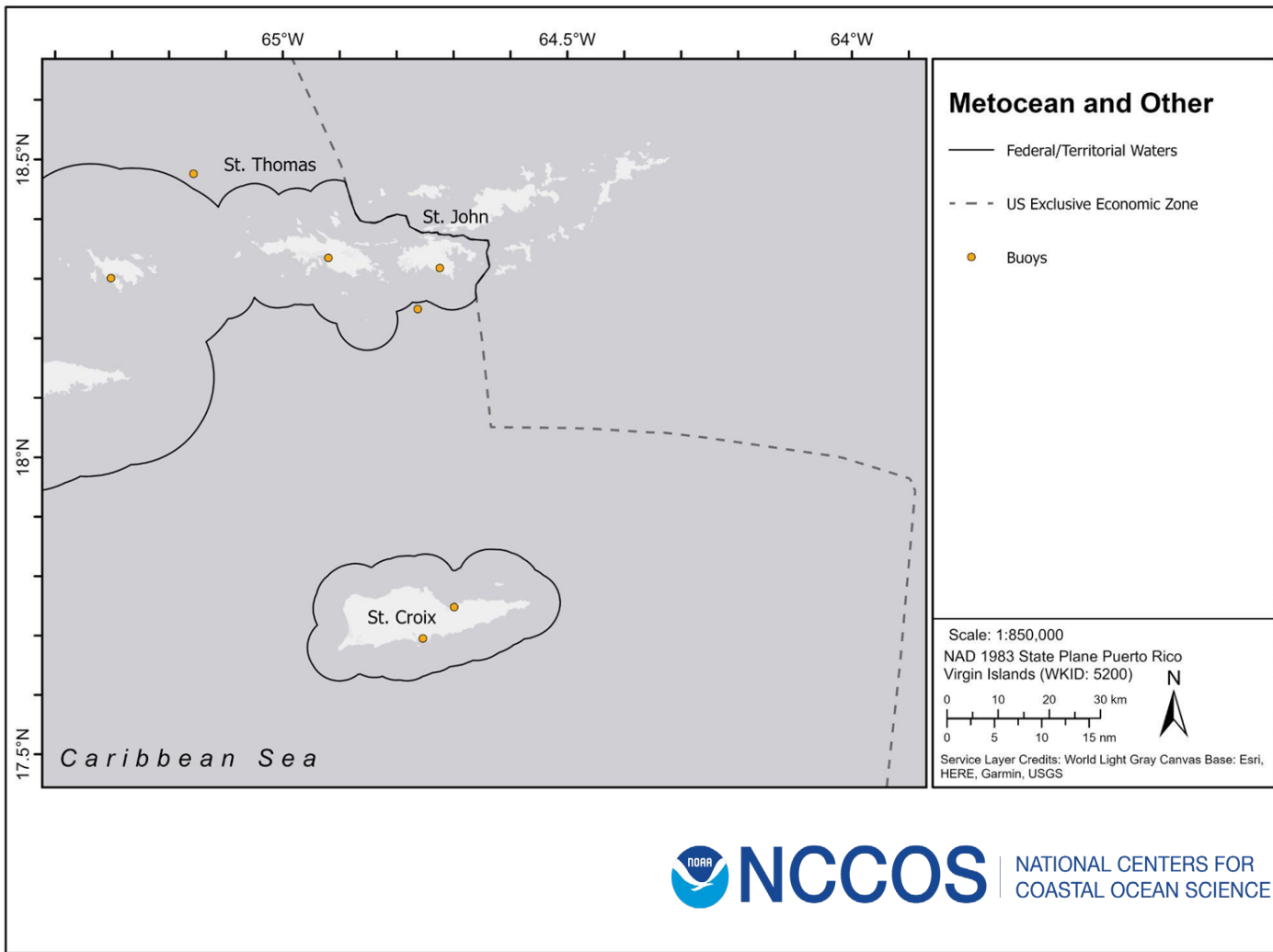
# Buoys

**Buoys:** location of buoy stations in the US Caribbean.

[Data Link](#) / [Metadata Link](#)

**Type:** Point

**Original Source:** National Data Buoy Center, IOOS



# CARICOOS Data

## CARICOOS Buoys

- Wind speed and direction
- Tidal information
- Currents

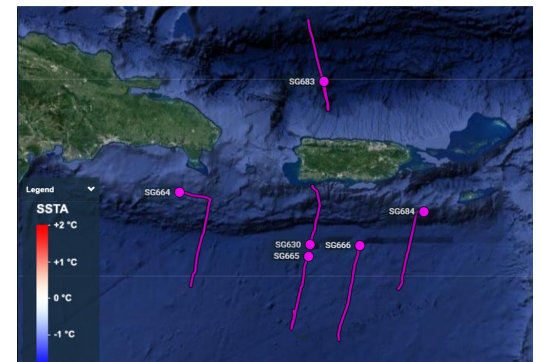
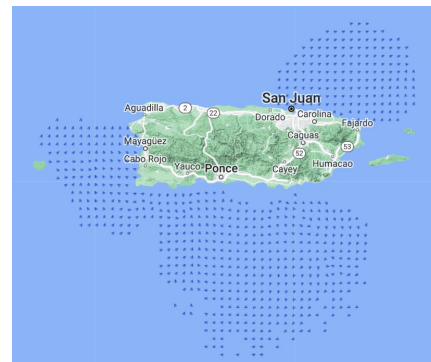
## HF Radar System

- Surface currents

## Gliders

- Ocean temperature and salinity profiles
- currents, chlorophyll fluorescence, optical backscatter, and bottom depth

[CARICOOS Link](#)



# Next Steps

1. Workshop report development
1. Distribute the post-workshop report (NCCOS website)
1. Distribute summary of data need priorities to funding sources (NOAA, BOEM, ....)
1. Follow up on data leads - Jennifer/NCCOS team will be in touch
1. Develop marine spatial planning data inventory/geodatabase
1. Develop US Caribbean MSP toolbox including interactive map viewer
1. Begin working with territory and federal governments on planning priorities (NMFS, DNER)
1. Continue working with BOEM on OSW planning priorities
1. Continue working with NMFS and DNER on aquaculture planning priorities
1. Consider research on co-siting as a way to reduce impacts
1. Establish future meetings virtual/in person targeted at specific data categories



*Thank YOU for trusting us with your  
ocean intelligence*