

Data Documentation

NCCOS Assessment: Agency priorities for mapping coral reef ecosystems in Puerto Rico and the U.S. Virgin Islands

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Dataset Information

Dataset Title:

NOAA NCCOS Assessment: Agency priorities for mapping coral reef ecosystems in Puerto Rico and the U.S. Virgin Islands, 2021-11-03 to 2022-01-14.

Description:

The National Oceanic and Atmospheric Administration (NOAA) National Centers for Coastal Ocean Science (NCCOS) developed a spatial framework, process, and online application (Buja and Christensen 2019) to identify mapping needs along the Puerto Rico and U.S. Virgin Island (USVI) coasts to support shallow coral reef management by NOAA's Coral Reef Conservation Program (CRCP). Participants from local, federal, academic, and other institutions (sixteen in Puerto Rico, eighteen in USVI), entered their priorities in an online participatory Geographic Information System (pGIS). Participants used virtual coins to denote their priorities in 2.6 km² hexagonal grid cells overlaid on the study area, individually for Puerto Rico and USVI. Grid cells with more coins were higher priorities than cells with fewer coins. Participants also reported why these locations were important, what data types were needed, and data collection methodologies using a pre-set list of options. Results were compiled, summarized, and mapped to identify high priority areas, reasons for those priorities, and information needs. Identifying these high priority areas provide a critical spatial framework for prioritizing mapping efforts in shallow coral reef ecosystems in Puerto Rico and USVI.

Purpose:

The overall goal of the project was to systematically gather and quantify suggestions for mapping needs to support management of shallow coral reef ecosystems along the coasts of Puerto Rico and USVI. This dataset supports these goals by compiling input from a diversity of regional experts on their recommended priorities for mapping data collection.

Methods:

An advisory group was established which included individuals from NOAA CRCP and NOAA Fisheries. This advisory team customized the pGIS process specifically to meet the needs of CRCP and local coral reef manager priorities. In the online pGIS, the Puerto Rico study area was divided into 2007 hexagonal grid cells 2.6 km² in size. The USVI study area was divided into 644 hexagonal grid cells 2.6 km² in size. Existing relevant spatial datasets (*e.g.*, bathymetry, Sanctuary Protection Areas, etc.) were provided as a digital atlas to help participants understand information and data gaps within the project area and to identify locations they wanted to prioritize for future data collections. The pGIS was used by 16 participants in Puerto Rico and 18 participants in USVI to convey their recommendations. Each Puerto Rico participant was provided with 600 virtual coins to place into grid cells that they wished to prioritize. Each USVI participant was provided with 200 coins. They were instructed to place more coins in grid cells that were higher priorities. A maximum of 60 coins could be placed into an individual grid cell in Puerto Rico by each respondent, and a maximum of 20 coins could be placed into an individual grid cell in USVI. Respondents also reported why these locations were important by selecting a

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minimum of one, and a maximum of two, management uses from the following list: endangered species management (e.g.), habitat restoration, monitoring, coastal vulnerability planning, watershed management, fisheries management, consultations and permitting, emergency response, and spatial protection and management. Respondents also reported requirements of data were needed in priority cells. A minimum of one, to a maximum of two choices were selected from the following list: delineations of large topographic features, delineations of hard vs. soft bottom, models of habitat suitability for key taxa or communities, delineations of substrate type (e.g. sand, mud, coral, rock), models of presence/absence or density of corals, identification of coral species and their local environments, documentation of individual specimen condition. Coin values were summarized and mapped to identify high priority areas, reasons for those priorities, and information needs. This ESRI shapefile contains the 2.6 km² grid cells used in this prioritization and their associated coin values overall, as well as by management use, data product, and mapping methodology. Other summary values include the number of participants, number of participating groups, number of management uses, and number of data requirements. Additionally, coins for microscale (identification of coral species and their local environments and documentation of individual specimen condition), mesoscale (delineations of substrate type, models of presence/absence/density of corals), and regional (delineations of topographic features, delineations of hard vs. soft bottom, models of habitat suitability) requirements were summarized. Also included is a ranking of each grid cell based on the total number of coins, management uses, and participating groups allocating coins in the respective cell. For a complete description of the process and analysis see: Kraus et al. 2022, in prep.

Cited Publications:

- Buja, K. and Christensen, J. 2019. Spatial Prioritization Widget: A Tool to Identify Mapping Priorities. Available Online: <https://coastalscience.noaa.gov/project/spatial-prioritization-widget/> (Accessed 26 June, 2019).
- Kraus, J., C.A. Buckel, B. Williams, C. Ames, D. Dorfman, F. Pagan, and E.K. Towle. 2023 Agency Priorities for Mapping Coral Reef Ecosystems in Puerto Rico and the U.S. Virgin Islands. NOAA Technical Memorandum NOS NCCOS 305. Silver Spring, MD. <https://doi.org/10.25923/thds-5s22>
- Kraus, J., C. A. Buckel, B. Williams, C. Ames, D. Dorfman, F. Pagan, E. K. Towle. 2022. Agency Priorities for Mapping South Florida's Coral Reef Ecosystems. NOAA Technical Memorandum NOS NCCOS 304. Silver Spring, MD. 28 pp. <https://doi.org/10.25923/qc9e-gt19>

People & Projects

Dataset Authors:

- Kraus, Jennifer; Buckel, Christine; Williams, Bethany; Ames, Cory; Dorfman, Dan; Pagan, Francisco; Towle, Erica

Principal Investigator:

- Jennifer Kraus, jennifer.kraus@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

Additional Principal Investigators:

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- Tim Battista, tim.battista@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

Primary Point of Contact:

- Jennifer Kraus, jennifer.kraus@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)
- NCCOS Data Manager, nccos.data@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

Collaborators:

- US DOC; National Oceanic Atmospheric Administration (NOAA):
 - Office of Oceanic and Atmospheric Research (OAR), Atlantic Oceanographic & Meteorological Laboratory
 - National Marine Fisheries Service (NMFS)
 - Restoration Center
 - Southeast Regional Office
 - Southeast Fisheries Science Center
 - Caribbean Fisheries Management Council
 - National Ocean Service (NOS)
 - National Centers for Coastal Ocean Science (NCCOS)
 - Office of Coastal Management (OCM); Coral Reef Conservation Program (CRCP)
 - OCM CRCP National Coral Reef Monitoring Program
 - OCM
 - Office of Coast Survey
- US DOI;
 - National Park Service (NPS)
 - Environmental Protection Agency (EPA)
 - US Geological Survey (USGS)
- Puerto Rico Department of Environmental and Natural Resources (PR DENR)
- US Army Corps of Engineers (USACE)
- US Virgin Islands Department of Planning and Natural Resources (USVI DPNR)
- Coastal Survey Solutions (CSS)
- Pew Research Center

Partners:

- NOAA; NMFS; USGS; NPS; EPA; PR DENR, USVI DPNR, USACE, CSS, Pew

Funding:

- NOAA CRCP project #31322 - Mapping Gap Analysis for US Shallow Coral Reef Areas

Associated Online Resources:

- NCCOS Project Page, <https://coastalscience.noaa.gov/project/defining-future-seafloor-mapping-priorities-to-inform-shallow-coral-reef-management/>
- ArcGIS Hub, <https://us-shallow-coral-reef-mapping-priorities-noaa.hub.arcgis.com/>
- Buja, K., and Christensen, J. 2019. Spatial Prioritization Widget: A Tool to Identify Mapping Priorities. Available Online: <https://coastalscience.noaa.gov/project/spatial-prioritization-widget/> (Accessed 26 June, 2019).

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Extents

Start Date: 2021-11-03

End Date: 2022-01-14

Northern Boundary: 18.599

Southern Boundary: 17.624

Western Boundary: -67.965

Eastern Boundary: -64.417

Keywords

Sea Areas, Water Bodies, Marine Protected Areas:

- Atlantic Coast
- Gulf of Mexico

NCCOS Keywords:

- NCCOS Research Priority > Marine Spatial Ecology
- NCCOS Research Topic > Ecological and Biogeographic Assessments
- NCCOS Research Topic > Habitat Mapping
- NCCOS Research Location > Region > Atlantic Ocean
- NCCOS Research Location > Region > Caribbean Sea
- NCCOS Research Location > U.S. States and Territories > Puerto Rico
- NCCOS Research Location > U.S. States and Territories > U.S. Virgin Islands
- NCCOS Research Data Type > Geospatial
- NCCOS Research Data Type > Derived Data Product

CoRIS Keywords:

- CoRIS Discovery Thesaurus:
 - Geographic Information > Socioeconomic
 - Geographic Information > Marine Managed Areas
 - Numeric Data Sets > Bathymetry
 - Documents > Observational Report
- CoRIS Theme Thesaurus:
 - EARTH SCIENCE > Biosphere > Zoology > Corals > Reef Monitoring and Assessment > Mapping
- CoRIS Place Country/Territory Keywords:
 - COUNTRY/TERRITORY > United States of America > Puerto Rico
 - COUNTRY/TERRITORY > United States of America > U. S. Virgin Islands
- CoRIS Place Ocean/Seas Keywords:
 - OCEAN BASIN > Atlantic Ocean > Caribbean Sea

File Information

Total File Size: 1.28 MB total, 9 files in 1 folder (unzipped), (200 KB zipped)

Data Files:

- CRCP_GapAnalysis_Priorities_PR.SHP

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- CRCP_GapAnalysis_Priorities_USVI.SHP

Documentation Files:

- DataDocumentation.PDF

Data File Format(s): Shapefile .SHP (and ancillary files .CPG, .DBF, .PRJ, .SBN, .SBX, .SHX)
Data File Compression: zip
Data File Resolution: 2.6 km²
GIS Projection: WGS 1984 (WKID 4326)

Parameter Information

Parameter Description:

Parameter: Number of virtual coins, respondents, agencies, management uses, or data requirements, and rank

Property Type: Calculated

Units: none

Observation Category: model output

Data Sources: none

Sampling Instrument: Models/Analyses > Data Analysis > Environmental Modeling

Sampling and Analyzing Method:

The data product is derived from a summary of expert opinions obtained using a custom application created in ESRI's Web AppBuilder that implemented a coin placement technique where each expert allocated virtual coins on a map grid to express their mapping priorities. For a complete description of the process and analyses used in a similar project, see Kendall *et al.* 2020.

Data Quality Method:

Results were presented for comment to the participating experts and the Technical Advisory Team. Collectively, these groups recommended and endorsed the details of the dataset. Processing and analysis methods are described in the reference publication. For a complete description of the process and analyses see Kraus *et al.* 2022.

Table 1: Data Dictionary

Variable Name	Code	Definition
GRIDID	GRIDID	Unique number assigned to each grid cell in the Prioritization
TotCoin	TotCoin	Total number of coins allocated to grid cell among all respondents, where the coins allocated by respondents at the same agency were averaged
PtcpNum	PtcpNum	Number of respondents placing coins in a grid cell
AgenNum	AgenNum	Total number of agencies placing coins in a grid cell
ManNum	ManNum	Total number of management uses identified in a grid cell
ReqNum	ReqNum	Total number of mapping products identified in a grid cell
SumRank	SumRank	Cell rank based on the sum of cell ranks by total coins, number of agencies, and number of management uses

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Monitor	Monitor	Number of coins for the management use <i>Monitoring (Long-term biophysical monitoring, discrete management/restoration assessments, or emergency/disaster response assessment).</i>
Fish	Fish	Number of coins for the management use <i>Fisheries management (Planning, enforcement, and assessment of fisheries management actions).</i>
SptPrt	SptPrt	Number of coins for the management use <i>Spatial protection and management (Planning, enforcement, and assessment of spatially managed areas, such as marine protected areas, marine managed areas, etc.).</i>
HabRest	HabRest	Number of coins for the management use <i>Habitat restoration (Restoration planning and implementation of coastal and marine habitats such as corals, submerged aquatic vegetation, etc.)</i>
ESA	ESA	Number of coins for the management use <i>Endangered species management (Including consultations, recovery planning and implementation).</i>
Permit	Permit	Number of coins for the management use <i>Consultations and permitting (Planning and assessment for federal (e.g. USACE, ONMS, etc.) and/or state permits and environmental compliance with other federal regulations (e.g., NEPA, ESA, MSA, etc.).</i>
Wtrshed	Wtrshed	Number of coins for the management use <i>Watershed management (Planning and implementation of watershed management and restoration projects to improve coastal water quality).</i>
CstVul	CstVul	Number of coins for the management use <i>Coastal vulnerability planning (Planning to mitigate for climate change impacts and other coastal hazards).</i>
SubType	SubType	Number of coins for the data requirement <i>Delineations of substrate types (e.g. sand, mud, coral, rock).</i>
SppID	SppID	Number of coins for the data requirement <i>Identification of coral species and their local environments.</i>
HabSuit	HabSuit	Number of coins for the data requirement <i>Models of habitat suitability for key taxa or communities.</i>
MacDens	MacDens	Number of coins for the data requirement <i>Models of presence/absence or density of corals.</i>
Topo	Topo	Number of coins for the data requirement <i>Delineations of large topographic features.</i>
BotType	BotType	Number of coins for the data requirement <i>Delineations of hard vs. soft bottom.</i>
CorCon	CorCon	Number of coins for the data requirement <i>Documentation of individual specimen condition.</i>

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Micro	Micro	Number of coins for microscale mapping requirements (<i>Identification of coral species and their local environments or documentation of individual specimen condition</i>).
Meso	Meso	Number of coins for mesoscale mapping requirements (<i>Delineations of substrate types or models of presence/absence or density of corals</i>).
Reg	Reg	Number of coins for the regional scale mapping requirements (<i>Delineations of large topographic features, delineations of hard vs. soft bottom, or models of habitat suitability</i>).

Document Information

Date: 2022-09-29

Resource Provider: NCCOS Data Manager, nccos.data@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

Comment: This data documentation describes data files archived as a Zenodo data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.

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