

# Data Documentation

## Dataset Information

### Dataset Title:

National Coral Reef Monitoring Program: Assessment of coral reef benthic communities in Flower Garden Banks National Marine Sanctuary from 2018-06-11 to 2018-06-14

### Description:

The National Coral Reef Monitoring Program (NCRMP) assessed coral reef communities in Flower Garden Banks National Marine Sanctuary (FGBNMS) in the Gulf of Mexico using two benthic surveys: the Benthic Assessment (BA) and the Coral Demographic method. Both Benthic Assessment and Coral Demographic surveys are concurrent.

Benthic Assessment provides benthic cover estimates for ecologically important cover types/groups (e.g., macroalgae, turf algae, crustose coralline algae, corals, sponges, sand/sediment, etc.) using a 1-stage stratified random survey design in hardbottom and coral reef habitats less than 30m in depth. The goals of these surveys are to provide: (1) a quantification of percent cover of biotic and abiotic benthic components using a line point-intercept (LPI) method; (2) information on topographic complexity (substratum rugosity) of the survey locations (3) quantitative information on local commercially and ecologically-important macroinvertebrates (Caribbean spiny lobster [*Panulirus argus*], queen conch [*Lobatus gigas*], long-spined sea urchin [*Diadema antillarum*]); and (4) presence-absence information for ESA-listed Threatened corals.

The goal of the coral demographic surveys is to collect and report information on species composition, density, size, abundance, and specific parameters of condition (% live vs. dead, bleaching, disease) of non-juvenile scleractinian corals (>4 cm maximum diameter), and of overall species diversity (all corals) using 10m x 1m belt transects in a stratified random sampling design in hardbottom and coral reef habitats less than 30m in depth.

Three datasets are provided under the Benthic Assessment and coral demographic protocols, and are distributed as one compiled package: (1) analysis ready benthic cover dataset, (2) analysis ready coral demographic dataset, and (3) analysis ready invertebrates/ESA dataset. The methodologies used for this survey can be found in the Benthic Assessment and Coral Demographic protocols. All datasets contain data fields on general station information (e.g., survey strata, depth, rugosity). Each of these data tables contain additional survey-specific data fields. For complete information and descriptions of attributes and data fields for all data tables, refer to the data dictionaries.

### Purpose:

The National Coral Reef Monitoring Program (NCRMP) details a long-term approach to provide an ecosystem perspective via monitoring climate, fish, benthic, and socioeconomic variables in a consistent and integrated manner. The NCRMP is intended to coordinate various Coral Reef Conservation Program (CRCP) biological, physical, and human dimensions activities into a cohesive NOAA-wide effort. Through the implementation of the NCRMP, NOAA will be

able to clearly and concisely communicate results of national-scale monitoring to national, state, and territorial policy makers, resource managers, and the public on a periodic basis.

NCRMP is a framework for conducting sustained observations of biological, climate, and socioeconomic indicators at 10 priority coral reefs across the U.S. and its territories. This integrated approach will consolidate monitoring of coral reefs under a uniform method in the Pacific, Atlantic, Caribbean, and the Gulf of Mexico for the first time. NCRMP is funded by the NOAA Coral Reef Conservation Program (CRCP) and supported by NOAA National Centers for Coastal Ocean Science (NCCOS) and many other partners.

NCCOS is co-leading biological monitoring missions with NOAA's Southeast Fisheries Science Center (SEFSC) to gather data on fish populations and coral reef communities in the U.S. Caribbean, Florida, and the Gulf of Mexico. Each year, our scientists work closely with CRCP and local partners to collect biological data from thousands of strategically selected sites. We then use innovative analysis techniques to develop products that give fellow scientists, managers, decision makers and the public a better understanding of a region's resources and how they are changing over time. The biological component of NCRMP provides a biennial ecological characterization at a broad spatial scale of general reef condition for reef fishes, corals and benthic habitat (*i.e.*, fish species composition/density/size, benthic cover, and coral density/size/condition). Data collection occurs at stratified random sites where the sampling domain for each region is partitioned by habitat type and depth, sub-regional location (*e.g.*, along-shelf position) and management zone.

Data provided in this dataset are from East Bank and West Bank within FGBNMS. Lead agencies involved include the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Coastal Ocean Science (NCCOS) and NOAA Southeast Fisheries Science Center (SEFSC) with partnership support from the NOAA Office of National Marine Sanctuaries (ONMS), Moody Gardens, and Texas Parks and Wildlife Department.

## Methods:

2018 benthic assessment and coral demographic survey locations were selected using a stratified random sampling design within FGBNMS study area. Detailed information describing the sampling design is provided in the NCRMP Caribbean-Gulf of Mexico Sampling Design Protocol.

Briefly, surveys were located on shallow-water coral reefs and hardbottom habitats to a depth of 30 meters. Survey site selection was stratified according to depth classes, benthic habitat types, large marine biotopes and administrative zones. Samples were allocated disproportionate to area and consequently sampling weights are an integral component of data analysis. Variables addressing the sampling design process such as stratum documentation and sampling weights are provided in all data tables as survey attributes.

Data provided from this process are provided in all data tables as station information in addition to a main survey attribute table (sample strata, sampling weights).

## 2018 Benthic Assessment:

For the 2018 field sampling, LPI, macroinvertebrate, ESA and topographic complexity methodologies were combined under a parent protocol: Benthic Assessment.

*Data Documentation*  
*NCRMP FGB 2018 Benthic*

The LPI component of the protocols were modified in 2016 to integrate with similar methods used in Florida, another NCRMP sampling location. These changes were instituted in FGB in 2018. The changes from the 2015 protocols are listed below and are reflected in the 2018 FGB datasets.

1. All benthic surveys (Coral Demographics and Benthic Assessments (LPI)), were conducted at all sites and benthic transects established independently of the fish surveys.
2. In 2016 the overall transect length for Benthic Assessment was reduced to 15m from 20m. This affected all three surveys in 2018.
  - a. LPI data collection points changed to 100 points every 15cm.
  - b. Area for ESA coral and macroinvertebrate assessments changed to 15x2m area.
3. Prior to 2016, Topographic Complexity was collected by the fish diver in 24 measurements in 2x2m bins along a 25m transect. Due to the change in transect length implemented in 2018, 15 measurements in 1x2m bins were collected along the shortened 15m transect by the benthic diver.

**2018 Coral Demographics:**

The Coral Demographic component of the protocols were modified for the 2018 sample year to integrate with similar methods used in Florida, another NCRMP sampling location. The changes from 2015 protocols are listed below and are reflected in the 2018 FGB datasets.

1. All benthic surveys (Coral Demographics and Benthic Assessments (LPI)), were conducted at all sites and benthic transects established independently of the fish surveys.
2. In 2015, all coral demographic surveys started at meter 0 in the transect for data collection regardless of abiotic substrate (hardbottom, softbottom). In 2018, benthic transects were actively placed on hardbottom habitat to begin the survey (0m).
3. In 2018, in the event coral demographic surveys could not be completed, data was collected to the whole meter instead of partial meters.

**Quality Control:**

Before implementation the sampling design was reviewed and agreed upon by representatives from program partners, as well as NCCOS scientists. Quality control procedures are implemented in four main stages:

1. Ongoing routine training of observers (initial detailed training, annual refresher training).
2. Data check following data collection, where divers confer upon returning to boat after dive, to ensure all data were collected accurately and required information is complete.
3. Individual divers compare their raw datasheets against their database entries.
4. Statistical analyses are conducted as the final check before distribution.

For more information, see metadata and protocols included in this accession.

Associated Accessions:

- National Centers for Coastal Ocean Science, Southeast Fisheries Science Center. (2018). National Coral Reef Monitoring Program: Assessment of coral reef benthic communities in Flower Garden Banks National Marine Sanctuary. NOAA National Centers for Environmental Information. Collection. doi:10.7289/V5VD6WTS. <https://doi.org/10.7289/V5VD6WTS>
- National Centers for Coastal Ocean Science, Southeast Fisheries Science Center. (2018). National Coral Reef Monitoring Program: Assessment of coral reef fish communities in Flower Garden Banks National Marine Sanctuary. NOAA National Centers for Environmental Information. Collection. doi:10.7289/V5057D81. <https://doi.org/10.7289/V5057D81>
- Coral Reef Conservation Program (2016). Documentation for NOAA's Coral Reef Conservation Program (CRCP) National Coral Reef Monitoring Program (NCRMP) data archived at NCEI (NCEI Accession 0157633). NOAA National Centers for Environmental Information. Documentation. <https://accession.nodc.noaa.gov/0157633>

People & Projects

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Dataset Author:

- US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)
- US DOC; NOAA; NMFS; Southeast Fisheries Science Center (SEFSC)

Partners:

- US DOC; NOAA; NMFS; Southeast Fisheries Science Center (SEFSC)
- US DOC; NOAA; NOS; Office of National Marine Sanctuaries (ONMS)
- Moody Gardens
- Texas Parks and Wildlife Department

Funding:

- US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)
- US DOC; NOAA; NOS; Coral Reef Conservation Program (CRCP)

Associated Projects:

- NCCOS Project #180, National Coral Reef Monitoring Program Implementation: Biological and Socioeconomic Monitoring, <https://coastalscience.noaa.gov/project/national-coral-reef-monitoring-program-biological-socioeconomic/>
- CRCP Project #743, National Coral Reef Monitoring Plan (NCRMP) Implementation, <http://www.coris.noaa.gov/monitoring/>

## Extents

Start Date: 2018-06-11

End Date: 2018-06-14

Northern Boundary: 27.9069

Southern Boundary: 27.8727

Western Boundary: -93.8226

Eastern Boundary: -93.5965

## Keywords

Sea Areas, Water Bodies, Marine Protected Areas:

- Gulf of Mexico
- Flower Garden Banks National Marine Sanctuary (FGBNMS)

NOAA Ships, Other Vessels, Platforms:

- M/V Fling

NCCOS Keywords:

- NCCOS Research Priorities > Marine Spatial Ecology
- NCCOS Research Topics > Ecological and Biological Characterization
- NCCOS Research Locations > Regions > Gulf of Mexico
- NCCOS Research Data Types > Field Observation
- NCCOS Research Data Types > Long-term Monitoring

CoRIS Keywords:

CoRIS Discovery Thesaurus:

- Numeric Data Sets > Benthic

CoRIS Theme Thesaurus:

- EARTH SCIENCE > Biosphere > Aquatic Habitat > Reef Habitat > Description
- EARTH SCIENCE > Biosphere > Zoology > Corals
- EARTH SCIENCE > Biosphere > Zoology > Corals > ESA Listed Species
- EARTH SCIENCE > Biosphere > Zoology > Corals > Reef Monitoring and Assessment > Coral Colony Size and Condition
- EARTH SCIENCE > Biosphere > Zoology > Corals > Reef monitoring and assessment > Benthos analysis > Transect monitoring > Linear transect (point)
- EARTH SCIENCE > Oceans > Marine Biology > Marine Invertebrates > Macroinvertebrates

CoRIS Place Thesaurus:

- COUNTRY/TERRITORY > United States of America > Texas > East Flower Garden Banks (27N093W0001)
- COUNTRY/TERRITORY > United States of America > Texas > West Flower Garden Banks (27N093W0002)
- OCEAN BASIN > Atlantic Ocean > Gulf of Mexico > Flower Garden Banks > East Flower Garden Banks (27N093W0001)
- OCEAN BASIN > Atlantic Ocean > Gulf of Mexico > Flower Garden Banks > West Flower Garden Banks (27N093W0002)

## File Information

Total File Size: 11.3 MB total, 24 files in 3 folders (unzipped), 9.7 MB (zipped)

### Data Files:

- NCRMP\_FGB2018\_Benthic\_Data01\_BenthicCover.CSV
- NCRMP\_FGB2018\_Benthic\_Data02\_CoralDemographics.CSV
- NCRMP\_FGB2018\_Benthic\_Data03\_InvertebratesESAcorals.CSV
- NCRMP\_FGB2018\_Benthic\_Data04\_NTOT.CSV
- NCRMP\_FGB2018\_Benthic\_Data05\_Boatlog.CSV
- FGBNMS\_2018\_SAMPLE\_FRAME.SHP (and ancillary files .CPG, .DBF, .PRJ, .SBN, .SBX, .SHX, .XML)

Data File Format: Comma-separated value (.CSV)

### Documentation Files:

- NCRMP\_FGB2018\_Benthic\_BrowseGraphic.JPG
- NCRMP\_FGB2018\_Benthic\_DataDocumentation.PDF
- NCRMP\_FGB2018\_Benthic\_DataDictionary01\_BenthicCover.ODS
- NCRMP\_FGB2018\_Benthic\_DataDictionary02\_CoralDemographics.ODS
- NCRMP\_FGB2018\_Benthic\_DataDictionary03\_InvertebratesESAcorals.ODS
- NCRMP\_FGB2018\_Benthic\_DataDictionary04\_NTOT.ODS
- NCRMP\_FGB2018\_Benthic\_DataDictionary05\_Boatlog.ODS
- NCRMP\_FGB2018\_Benthic\_DataDictionary06\_Codes.ODS
- NCRMP\_Protocol\_Benthic\_BenthicAssessment\_2018.PDF
- NCRMP\_Protocol\_Benthic\_CoralDemographic\_2018.PDF
- NCRMP\_Protocol\_SampleFrame\_2018.PDF

## Parameter Information

### Parameters:

- BENTHIC SPECIES - TAXA COUNTS
- BENTHIC SPECIES
- CORAL - SPECIES IDENTIFICATION
- CORAL
- CORAL - CENSUS
- REEF AND/OR BOTTOM REGIME - RUGOSITY

### Parameter Description:

*Parameter:* BENTHIC SPECIES - TAXA COUNTS

*Units:* count

*Observation Category:* *in situ*

*Sampling Instrument:* visual observation

*Sampling and Analyzing Method:*

Benthic taxa enumerated using Benthic Assessment Protocols for the U.S. Caribbean and Gulf of Mexico (2018).

*Data Documentation*  
*NCRMP FGB 2018 Benthic*

Parameter Description:

*Parameter:* BENTHIC SPECIES

*Units:* count

*Observation Category:* *in situ*

*Sampling Instrument:* visual observation

*Sampling and Analyzing Method:*

Abundance of *Diadema antillarum*, *Panulirus argus*, and *Lobatus gigas* species using Benthic Assessment Protocols for the U.S. Caribbean and Gulf of Mexico (2018).

Parameter Description:

*Parameter:* CORAL - SPECIES IDENTIFICATION

*Units:* presence

*Observation Category:* *in situ*

*Sampling Instrument:* visual observation

*Sampling and Analyzing Method:*

Presence/absence of ESA-listed and potential ESA coral species using Benthic Assessment Protocols for the U.S. Caribbean and Gulf of Mexico (2018).

Parameter Description:

*Parameter:* CORAL

*Units:* count

*Observation Category:* *in situ*

*Sampling Instrument:* visual observation

*Sampling and Analyzing Method:*

Coral colony counts, measurements and condition recorded using Coral Demographic Survey Protocol for the U.S. Caribbean and Flower Garden Banks National Marine Sanctuary (2018).

Parameter Description:

*Parameter:* CORAL - CENSUS

*Units:* colony

*Observation Category:* *in situ*

*Sampling Instrument:* ruler

*Sampling and Analyzing Method:*

Coral colony counts, measurements and condition recorded using Coral Demographic Survey Protocol for the U.S. Caribbean and Flower Garden Banks National Marine Sanctuary (2018).

Parameter Description:

*Parameter:* REEF AND/OR BOTTOM REGIME - RUGOSITY

*Units:* n/a

*Observation Category:* other

*Sampling Instrument:* ruler

*Sampling and Analyzing Method:*

Rugosity and topographic complexity variable was recorded using Benthic Assessment Protocols for the U.S. Caribbean and Gulf of Mexico (2018).

All Parameters:

Property Type: measured

Data Quality Method:

Quality assurance checks for every data sheet and entry into database, as well as analytical checks for using query outputs.

## Document Information

Date: 2019-12-17

Resource Provider: NCCOS Data Manager, [nccos.data@noaa.gov](mailto: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 NOAA NCEI data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.

## Use Limitation and Constraints

NOAA makes no warranty, expressed or implied, regarding these data, nor does the fact of distribution constitute such a warranty. NOAA cannot assume liability for any damages caused by any errors or omissions in these data.

Please reference NOAA/NOS/NCCOS and NOAA/NMFS/SEFSC when utilizing these data in a report or peer reviewed publication.

Cite as:

National Centers for Coastal Ocean Science (NCCOS) and Southeast Fisheries Science Center (SEFSC). 2019. National Coral Reef Monitoring Program: Assessment of coral reef benthic communities in Flower Garden Banks National Marine Sanctuary from 2018-06-11 to 2018-06-14 (NCEI Accession XXXXXX). NOAA National Centers for Environmental Information. Dataset. doi:10.7289/V5VD6WTS [access date]

Additionally, knowledge of how this dataset has been of use and which organizations are utilizing it is of great benefit for ensuring this information continues to meet the needs of the management and research communities. Therefore, it is requested but not mandatory, that any user of this data supply this information to the Project Co-Investigators (Atlantic/Caribbean): Kimberly Edwards ([kimberly.edwards@noaa.gov](mailto:kimberly.edwards@noaa.gov)) and Matthew Johnson ([matthew.johnson@noaa.gov](mailto:matthew.johnson@noaa.gov)).