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

Reference to Master DM Plan (if applicable)

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

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

1. General Description of Data to be Managed

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

National Coral Reef Monitoring Program: Stratified Random Surveys (StRS) of Coral Demography (Adult and Juvenile Corals) across the Mariana Archipelago since 2014

1.2. Summary description of the data:

The data described here result from benthic coral demographic surveys for two life stages (juveniles, adults) across the Mariana archipelago since 2014. Juvenile colony surveys include morphology and size. Adult colony surveys record morphology, colony size, partial mortality in two categories - old dead and recent dead, cause of recent dead partial mortality, and non-lesion forming condition including bleaching and disease).

A two-stage stratified random sampling (StRS) design was employed to survey the coral reef ecosystems throughout the U.S. Pacific regions. The survey domain encompassed the majority of the mapped area of reef and hard bottom habitats in the 0-30 m depth range. The stratification scheme included island, reef zone, and depth in all regions, as well as habitat structure type in the Main Hawaiian Islands. Sampling effort was allocated based on strata area and sites were randomly located within strata. Sites were surveyed using belt transects to collect juvenile and adult coral colony metrics. These data provide information on juvenile and adult coral abundance (density, proportion occurrence, and total colony abundance), size distribution, partial mortality, prevalence and abundance of recent mortality and cause, prevalence of disease and bleaching, and diversity.

The StRS design effectively reduces estimate variance through stratification using environmental covariates and by sampling more sites rather than sampling more transects at a site. Therefore, site-level estimates and site to site comparisons should be used with caution.

The data from the coral demographic surveys can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive.

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

One-time data collection

1.4. Actual or planned temporal coverage of the data:
2014-03-25 to 2014-05-07, 2017-05-05 to 2017-06-21

1.5. Actual or planned geographic coverage of the data:
W: 144.63743415, E: 145.85269754, N: 20.55177966, S: 13.23559751
Mariana Archipelago, including Guam, Rota, Tinian, Aguijan, Saipan, Sarigan, Guguan, Alamagan, Pagan, Asuncion, Maug, and Farallon de Pajaros.

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Table (digital)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)
Instrument: Not applicable
Platform: Not applicable
Physical Collection / Fishing Gear: Not applicable

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

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

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

2.1. Name:
Annette M DesRochers

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:
annette.desrochers@noaa.gov

2.5. Phone number:
(808)725-5461

3. Responsible Party for Data Management

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

3.1. Name:
Dione W Swanson

3.2. Title:

Data Steward

4. Resources

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

4.1. Have resources for management of these data been identified?

Yes

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

Unknown

5. Data Lineage and Quality

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

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

(describe or provide URL of description):

Lineage Statement:

The two-stage stratified random sampling (StRS) design and belt transect methodology for adult and juvenile corals, employed by the PIFSC Ecosystem Sciences Division since 2013.

Process Steps:

- A two-stage stratified random sampling (StRS) design was employed to survey the coral reef ecosystems throughout the region. The survey domain encompassed the majority of the mapped area of reef and hard bottom habitats. The stratification scheme included island, reef zone, and depth. The habitat structure types included simple, complex, and coral-rich. Depth categories of shallow (>0-6 m), mid (>6-18 m) and deep (>18-30 m) were also incorporated into the stratification scheme. Allocation of sampling effort was proportional to strata area. Sites were randomly selected within each stratum. A geographic information system (GIS) and digital spatial databases of benthic habitats (NOAA National Centers for Coastal Ocean Science NCCOS), reef zones (IKONOS satellite imagery, NDGC 1998) bathymetry (NDGC 1998, ESD benthic mapping data), and marine reserve boundaries (NOAA) were used to facilitate spatial delineation of the sampling survey domain, strata, and sample units. Map resolution was such that the survey domain could be overlain by a grid using a GIS with individual cells of size 50 m by 50 m in area. A two-stage sampling scheme following Cochran (1977) was employed to control for spatial variation in population parameters at scales smaller than the grid cell minimum mapping unit (2,500 sq meters). Grid cells containing hard-bottom reef habitats were designated as primary sample units (referred to as sites), while the second-stage sample unit was defined as a diver visual belt transect of fixed area (10 sq. meters or less). (Citation: Swanson D, Bailey H, Schumacher B, Ferguson M,

Vargas-Angel B. 2018. Ecosystem Sciences Division standard operating procedures: data collection for rapid ecological assessment benthic surveys. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-71, 63 p. doi:10. 25923/39jh-8993.)

- At each site, benthic Rapid Ecological Assessment (REA) surveys were conducted within two 10 sq. meter belt transects, 18 meters in length. Adult coral colonies (>=5 cm) were surveyed within four (1.0 x 2.5 m) segments at 5 meter increments along the 18 meter transect in the following manner: 0-2.5 m (segment 1); 5.0-7.5 m (segment 3); 10-12.5 m (segment 5); and 15-17.5 m (segment 7). All colonies whose center fell within 0.5 m on either side of each transect line were identified to lowest taxonomic level possible (species or genus), measured for size (maximum diameter to nearest cm), and morphology was noted. In addition, partial mortality and condition of each colony was assessed. Partial mortality was estimated as percent of the colony in terms of old dead and recent dead. The cause of recent mortality was identified if possible. The condition of each colony including disease (not attributed to recent tissue loss) and bleaching was noted along with the extent (percent of colony affected) and level of severity (range from moderate to acute). The lowest taxonomic level of coral identification was genus except for a select number of species consistently identified to species by all divers conducting the surveys. The number of species may change for each survey year depending on the experience and training of the benthic divers conducting the surveys. The list of coral species is included for each survey year. Within the same four segments per transect as the adult coral surveys, crustose coralline algae (CCA) diseases and Alcyonarian disease are surveyed. In each segment, each occurrence of a specific disease is identified and the lesion is measured (maximum diameter). In addition to the adult coral surveys, CCA diseases, and Alcyonarian disease, the presence of other Anthozoans (other cnidarians including Alcyonareans, Zoantharians, coralliomorphs and Antipatharians) are also noted. These data exist as individual records coded for each group. Juvenile coral colonies (<5 cm) were surveyed within three (1.0 x 1.0 m) segments along the same two transects: 0-1.0 m (segment 1); 5.0-6.0 m (segment 3); and 10.0-11.0 m (segment 5). Juvenile colonies were distinguished in the field by a distinct tissue and skeletal boundary (not a fragment of larger colony). Each juvenile colony was identified to lowest taxonomic level (genus or species) and measured for size by recording both the maximum and perpendicular diameter to the nearest 2 mm. (Citation: Swanson D, Bailey H, Schumacher B, Ferguson M, Vargas-Angel B. 2018. Ecosystem Sciences Division standard operating procedures: data collection for rapid ecological assessment benthic surveys. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-71, 63 p. doi:10. 25923/39jh-8993.)

- Raw data include individual colony records with the corresponding physical data which reflect the description of the site. An individual colony record for adult corals includes colony species/genus identification, morphology, maximum diameter (cm), percent old dead, percent recent dead, cause of recent dead general category, cause of recent dead specific category, condition, extent and severity. Juvenile coral

colony records include colony species/genus identification, morphology, maximum diameter (cm) and perpendicular diameter (cm). For species level identification of adult and juvenile corals, check the species list for each year to ensure species identification across all divers conducting the surveys. Individual records for crustose coralline algae diseases use the taxon code CALG and the Alcyonarian disease uses the taxon code for the octocoral genus. The colony length measurement is the maximum diameter of the lesion for both disease types. The raw presence/absence data for other Anthozoans include the general identification code and 0 or 1 to represent absence or presence respectively. The physical data for all records includes the following: region, island, site, date (day, month, year), latitude (dd), longitude (dd), transect, segment, segment length, segment width, minimum depth (ft), and maximum depth. (Citation: Swanson D, Bailey H, Schumacher B, Ferguson M, Vargas-Angel B. 2018. Ecosystem Sciences Division standard operating procedures: data collection for rapid ecological assessment benthic surveys. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-71, 63 p. doi:10.25923/39jh-8993.)

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

5.2. Quality control procedures employed (describe or provide URL of description):
Quality control of the data occurred at a few stages from data entry to data ingestion into the Oracle database. Observations, including species identification, are periodically checked during expeditions for consistency between and among divers. Data entry is usually conducted on the same day as the surveys using a data entry interface with several data controls employed, and are quality controlled by individual divers checking entry errors at a separate time. Following a mission, the data is then run through rigorous quality control checks by the data management team before the data are migrated to the Oracle database. The data is quality controlled against the physical data sheets following data entry. There are also several queries in the MS Access / Oracle database to flag errors based on pre-defined criteria. Given the size of the data set, there remains some possibility of typographical or other errors.

6. Data Documentation

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

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

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

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

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

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/36165

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

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

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

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

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

7.2. Name of organization of facility providing data access:
National Centers for Environmental Information - Silver Spring, Maryland (NCEI-MD)

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

7.2.2. URL of data access service, if known:
http://accession.nodc.noaa.gov/0159166
http://accession.nodc.noaa.gov/0159166
http://accession.nodc.noaa.gov/0159166
http://accession.nodc.noaa.gov/0159166
http://accession.nodc.noaa.gov/0159166
http://accession.nodc.noaa.gov/0166383
http://accession.nodc.noaa.gov/0166383

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http://accession.nodc.noaa.gov/0166383
https://accession.nodc.noaa.gov/0157633
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https://accession.nodc.noaa.gov/0157633
https://accession.nodc.noaa.gov/0157633
https://ecowatch.ncddc.noaa.gov/erddap/tabledap/CRCP_Coral_Demographic_Survey_Adult_CNMI_G
https://ecowatch.ncddc.noaa.gov/erddap/tabledap/CRCP_Coral_Demographic_Survey_Juvenile_CNMI

7.3. Data access methods or services offered:

Data can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive.

7.4. Approximate delay between data collection and dissemination:

Unknown

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

8. Data Preservation and Protection

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

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

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

NCEI_MD

8.1.1. If World Data Center or Other, specify:

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

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

Pacific Islands Fisheries Science Center - Honolulu, HI

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

Unknown

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

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

The data is captured in several locations: physical data sheets, MS Access cruise database, and PIFSC Oracle database. The physical data sheets are housed at PIFSC. The

MS Access cruise database is regularly backed up by the cruise data manager while at sea. The PIFSC Oracle database is regularly backed up by PIFSC ITS.

9. Additional Line Office or Staff Office Questions

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