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:

Cryptobiota metabarcoding using Autonomous Reef Monitoring Structure (ARMS) Deployed at Coral Reef Sites across Hawaiian Archipelago from 2010 to 2016

1.2. Summary description of the data:

The data described here includes cytochrome oxidase I (COI) DNA metabarcoding data collected from Autonomous Reef Monitoring Structures (ARMS). ARMS were deployed by the NOAA Pacific Islands Fisheries Science Center (PIFSC), Ecosystem Sciences Division (formerly the Coral Reef Ecosystem Division) under the National Coral Reef Monitoring Program (NCRMP) at stationary climate monitoring sites and used to assess and monitor cryptic reef diversity in the Hawaiian Archipelago. Developed in collaboration with the Census of Marine Life (CoML) Census of Coral Reef Ecosystems (CReefs), ARMS were designed to mimic the structural complexity of a reef and attract/ collect colonizing marine invertebrates. The key innovation of the ARMS method is that biodiversity is sampled over precisely the same surface area in the exact same manner.

These data were gathered at specific reef sites across the Hawaiian Archipelago. ARMS units were set-up, deployed and recovered as described in the ARMS record in the related items section below. After ARMS were disassembled, different size fractions of samples and plate scrapings were preserved in ethanol for metabarcoding.

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:

2010-10-11 to 2013-08-23, 2008-10-07 to 2013-09-13, 2013-08-03 to 2016-08-22, 2013-09-06 to 2016-09-24

1.5. Actual or planned geographic coverage of the data:

W: -159.6802, E: -154.8176, N: 22.1669, S: 18.968567
Main Hawaiian Islands (MHI), including Hawaii, Kauai, Maui, and Oahu

W: -178.378433, E: -166.11682, N: 28.416767, S: 23.627917
Northwestern Hawaiian Islands (NWHI), including French Frigate, Kure, Lisianski, and

Pearl & Hermes.

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

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.)

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:
Brooke Olenski

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:

2.4. E-mail address:
brooke.olenski@noaa.gov

2.5. Phone number:

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:
Molly A Timmers

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:
Autonomous Reef Monitoring Structures (ARMS) are assembled, deployed, recovered, and processed as in related items below. The sessile organisms and the 100 um and 500 um motile fractions undergo DNA metabarcoding using the COI gene as the amplicon marker.

Process Steps:

- ARMS Deployment - ARMS platforms are deployed as described in detail in the related items section below.
- ARMS Recovery and Processing - ARMS units are recovered, initially processed, and documented as described in related items below. When all of the plate layers in the ARMS unit have been photographed and set aside (in seawater), the seawater from the disassembly tub, photo tray, and rinse bucket is sieved through adjoining 2 mm and 500 um sieve pans and an attachable 100 um mesh hand net. Material collected in the 500 um sieve and 100 um net are bulk preserved into two separate jars. Jars are filled with EtOH and labeled accordingly. The preserved 500 and 100 um sample fractions undergo a decantation process at a later date prior to DNA metabarcoding. All plates from an individual ARMS unit are scrapped en masse. Once all plates have been scraped, all the scrapings are transferred into a blender (Brevill; BBL600XL). The scrapings are blended for 45-60 seconds on maximum power until the sample is homogenized. The sample is then transferred from the blender to a 40 um net. The sample in the net is rinsed with filtered (< 40 um) seawater until all discharge from net is clear (takes ~2 gal). Four ~10 ml samples are preserved in 50 ml falcon tubes with DMSO and 4 ~10 ml samples are preserved in 95% EtOH. These blended preserved samples undergo DNA metabarcoding. The remaining sample is stored in a sterile whirlpak at -20C. Between the processing of each ARMS unit the blender is rinsed in fresh water to remove any remaining homogenate. The blender is then placed in a 10% bleach solution for 15 minutes. Finally all parts thoroughly rinsed with DI water if available or fresh water.
- Decantation of the 100 and 500 um fractions: NOTE: All equipment used in this step that is not already sterile need to be rinsed with fresh water, placed in 10% bleach solution for 20 minutes (new every day), transferred to Milliq water for 20 minutes (bleach bucket that the milliq water will go in first, and rinse) and then

place under a UV light for 20 minutes. Wear gloves. Take sample out the freezer and let sit to defrost before decantation. Empty container(s) into a 1 L conical flask (that has been bleached, rinsed and UV sterilized). Fill the conical flask with ~300 ml of Milli-Q water. Seal neck of flask with parafilm and shake vigorously for 30 seconds. Make sure to hold the parafilm tightly in place with one hand and place the other hand on the base of the flask. When finished, immediately carefully pour the liquid through the correct sieve (45 µm for 100- 500 µm fraction; 106 µm for 500 µm – 2 mm fraction) trying not to pour the more dense sediment into the sieve. Fill flask with another 300 ml of Milli-Q and repeat process. Do this 7 times. The aim is to remove all the less dense biological material from the flask through decantation, while keeping the more dense sediment in the flask. Collect the material in the sieve and weigh it using a sterile spatula and falcon tube. Put exactly half of the material in a 50 ml falcon tube, fill the tube with ethanol and freeze as a back-up. Place the other half in a sterile mortar and use a pestle to crush the sample for 1 minute. Collect the sample in a 50 ml falcon tube, using a little ethanol to re-suspend it and fill the tube with 95 % ethanol. This sample is now ready for DNA extraction. Store samples at -20C until extraction. Finally, collect the sediment left in the conical flask, using a little Milliq water and pour into the same sieve used in the previous step. Collect the material, weigh it and place in a 50ml falcon tube. Fill with ethanol and freeze at -20C.
- For DNA extraction, amplification, and sequencing methods see- Timmers M, Vicente J, Webb M, Jury C, Toonen RJ (2020) Sponging up diversity: evaluating metabarcoding performance for a taxonomically challenging phylum within a complex cryptobenthic community. Environmental DNA. https://doi.org/10.1002/edn3.163
- To obtain the sequencing data, go to XXXXXXX which takes you to the National Center for Biotechnology Information (NCBI) which hosts Genebank, a genetic sequence database collection of all publicly available DNA sequences. To download a sequence file, click on the SRA link associated with each entry. Click on the data access tab in the new link and select the highlighted name to download the sequence file.
- Once sequences are downloaded, you may choose to conduct the bioinformatics in a numbers of ways based on your preference.

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):

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?

No

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

Missing/invalid information:
- 1.7. Data collection method(s)
- 5.2. Quality control procedures employed
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

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/64268

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:

Pacific Islands Fisheries Science Center (PIFSC)

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

7.2.2. URL of data access service, if known:

7.3. Data access methods or services offered:
Data can be accessed online via Genbank.

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)
OTHER

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

NOAA IRC

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

9. Additional Line Office or Staff Office Questions

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