

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:

Guam and CNMI Underwater Photomosaics

### 1.2. Summary description of the data:

This data package contains georeferenced underwater photomosaics for more than 600 sites in 0 to 50 meter depths around the islands of Guam and Saipan. The photographs used to create these photomosaics were acquired from August 2021 to May 2022 using digital single-lens reflex camera (DSLR) cameras. Green lasers provided a measurement scale (10 cm). A Trimble GeoXH GPS provided the location of the vessel, and a Blueprint SeaTrac ultra short baseline (USBL) X150 beacon and X010 transponder provided the location and depth (XYZ) of the drop camera. The photographs were georeferenced (i.e., given a latitude and longitude), and mosaicked using a custom Python script (Pierce and Winians, 2023; performed using Agisoft Metashape application programming interface). The field work in Saipan was funded by NOAA National Centers for Coastal Ocean Science (NCCOS) and the NOAA Coral Reef Conservation Program (CRCP). The field work in Guam was funded by the Naval Facilities Engineering Command Marianas (NAVFAC Marianas). Both efforts were conducted in partnership with and in consultation with local partners and the territorial governments.

### 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:

2021-08-20 to 2022-05-12

### 1.5. Actual or planned geographic coverage of the data:

W: 144.582286, E: 145.837466, N: 15.294146, S: 13.212093

### 1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)  
remote-sensing image

### 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:**

NCCOS Scientific Data Coordinator

**2.2. Title:**

Metadata Contact

**2.3. Affiliation or facility:**

**2.4. E-mail address:**

NCCOS.data@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:**

NCCOS Scientific Data Coordinator

**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?**

**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:

This data was collected by NOAA National Centers for Coastal and Ocean Science (NCCOS). The photographs and positioning information were acquired from August 20, 2021 to May 12, 2022. The photographs were acquired using Nikon D7500 camera in 2021 and a Sony alpha7 IV mirrorless camera in 2022). Green lasers provided a measurement scale (10 cm). A Trimble GeoXH GPS recorded the location of the vessel, and a Blueprint SeaTrac ultra short baseline (USBL) X150 beacon and X010 transponder recorded the location and depth (XYZ) of the cameras. The resulting photographs were georeferenced (i.e., given a latitude and longitude), and mosaicked to produce photomosaic and 3D model of the seafloor using a custom Python script (Pierce and Winians, 2023; performed using Agisoft Metashape application programming interface).

Process Steps:

- The photographs and positioning information were acquired at approximately 668 sites from August 20, 2021 to May 12, 2022. A minimum of 4 square meters of the seafloor was photographed at each site. The process for collecting these overlapping, underwater photographs was identical at each site. A handheld Garmin GPS 76 unit was used to navigate to each site via a small boat. A drop camera system was then lowered to within 1.5 to 2 meters of the seafloor. This drop camera system included: (1) a downward-looking digital single-lens reflex (DSLR) camera (i.e., a Nikon D7500 camera in 2021 and a Sony alpha7 IV mirrorless camera in 2022), (2) two green lasers spaced 10 cm apart, and (3) a Blueprint Subsea SeaTrac ultra-short baseline (USBL) X150 beacon and X010 transponder. In 2022, an oblique-looking GoPro HERO10 Black in a Spot X Squid housing was also included, which provided real-time video topside for situational awareness. The downward-looking DSLR cameras collected still photographs of the seafloor every 0.5 to 1 s. The camera settings included: focal lengths = 18 mm, white balance = auto, and shutter speed = 1/200 s. Both jpeg and .RAW files were recorded. The photographs overlapped by 60 to 80%. The lasers provided a measurement scale (10 cm) and were visible in some but not all of the photographs. The USBL transponder provided the location and depth (XYZ) of the drop camera every 5 s, and a Trimble GeoXH GPS provided the location of the vessel every 1 s. The Trimble GPS antenna was positioned directly over the USBL transmitter pole to minimize lever arm offsets. For more information, see: Costa, B., and Sweeney, E. (2024). Characterizing submerged lands around Naval Base Guam, Mariana Islands. NOAA Technical Memorandum NOS NCCOS 329. <https://doi.org/10.25923/zwwa-h562> Costa, B., Sweeney, E., and Kraus, J. (2024). Characterizing benthic habitats of western Saipan, CNMI. NOAA Technical Memorandum NOS NCCOS 328. <https://doi.org/10.25923/psjm-h924>
- Underwater photographs were visually reviewed for quality and color corrected (performed using Adobe Lightroom software). The GPS data were differentially corrected using a Continuously Operating Reference Station on Guam and

reprojected to the WGS 1984 UTM 55 North coordinate system (performed using GPS Pathfinder Office software). The USBL data were exported from SeaTrac PinPoint software and matched with the corrected GPS locations using timestamps.

Underwater photographs were georeferenced using these GPSUSBL locations (ESRI, 2023; performed using ArcGIS Pro, Geotagged Photos To Points function). Not all images were georeferenced because sampling frequencies differed among the USBL (approximately 5 s), GPS (approximately 1 s), and cameras (approximately 0.5 to 1 sec). To georeference the remaining photographs, a custom Python script was created to interpolate positions between the GPS-USBL locations. This script also mosaicked and developed 3D models from the resulting georeferenced photographs (Pierce and Winians, 2023; performed using Agisoft Metashape application programming interface). For more information, see: Costa, B., and Sweeney, E. (2024). Characterizing submerged lands around Naval Base Guam, Mariana Islands. NOAA Technical Memorandum NOS NCCOS 329. <https://doi.org/10.25923/zwwa-h562>

Costa, B., Sweeney, E., and Kraus, J. (2024). Characterizing benthic habitats of western Saipan, CNMI. NOAA Technical Memorandum NOS NCCOS 328. <https://doi.org/10.25923/psjm-h924>

- Five to seven substrate and 12 to 14 biological cover types were identified visually in the above georeferenced photographs. The amount of annotated area (four meters squared) was standardized in each photograph so that it matched the spatial resolution (i.e., two x two meter pixels) of the environmental predictors. Multiple substrate and cover types were often present at each site. Percent cover was estimated to the nearest 1% for each habitat type. Percent covers were also converted to presences (1) and absences (0) and used to train or validate the habitat predictions. In Saipan, n =1,109 annotations, where 617 annotations were used for model training and 492 annotations were used for model validation. In Guam, n = 674 annotations, where 346 annotations were used for model training and 328 annotations were used for model validation. For more information, see: Costa, B., and Sweeney, E. (2024). Characterizing submerged lands around Naval Base Guam, Mariana Islands. NOAA Technical Memorandum NOS NCCOS 329. <https://doi.org/10.25923/zwwa-h562> Costa, B., Sweeney, E., and Kraus, J. (2024). Characterizing benthic habitats of western Saipan, CNMI. NOAA Technical Memorandum NOS NCCOS 328. <https://doi.org/10.25923/psjm-h924>

**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)
- 4.1. Have resources for management of these data been identified?
- 5.2. Quality control procedures employed
- 7.2. Name of organization of facility providing data access
- 7.2.1. If data hosting service is needed, please indicate
- 7.3. Data access methods or services offered
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 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/72703>

**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](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?**

No

**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?**

No

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

Access Constraints: None | Use Constraints: Users should be aware that temporal changes may have occurred since this data set was collected and some parts of this data may no longer represent actual benthic conditions. Users should not use this data for critical applications without a full awareness of its limitations. | Distribution Liability: This dataset is dynamic and may change with time. Any conclusions drawn from the analysis of this information are not the responsibility of NOAA, National Center for Coastal Ocean Science or its partners.

**7.2. Name of organization of facility providing data access:**

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

**7.2.2. URL of data access service, if known:**

<https://experience.arcgis.com/experience/7b6c0e7164234182985a89d5b5703475/page/>

**7.3. Data access methods or services offered:**

**7.4. Approximate delay between data collection and dissemination:**

**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)*

**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):**

National Centers for Coastal Ocean Science - Silver Spring, MD

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

**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.*