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:

Nearshore Benthic Habitats of Timor-Leste Derived from WorldView-2 Satellite Imagery

1.2. Summary description of the data:

Benthic habitat classes were derived for nearshore waters (< 20 m depths) around Timor-Leste from DigitalGlobe WorldView-2 satellite imagery, acquired from February 9, 2010 to December 14, 2013, by the NOAA Coral Reef Ecosystem Program (CREP). Habitat classes include soft (sand or mud) and hard (rubble, boulders, etc.) substrates by depth (shallow, mid and deep); seagrass, mangrove, and macroalgae dominated areas; intertidal zones; lagoons; and emergent rocks. Supervised classifications were performed using several different methods (maximum likelihood, and minimum distance) with imagery at several different stages of processing (deglinted, radiance, reflectance and deglinted, depth invariant, sieve, and clump), with final classification based on the classification method and imagery variant that provided the best overall results for eac h WorldView-2 image.

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:

2010-02-09 to 2013-12-14

1.5. Actual or planned geographic coverage of the data:

W: 124, E: 127.5, N: -8, S: -10
Timor-Leste

1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Map (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.)

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:
Tomoko S Acoba

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:

Benthic habitat classes were derived for nearshore waters around Timor-Leste from WorldView-2 satellite imagery. Habitat classes include different combinations of shallow, mid and deep depths, soft (sand or mud) or hard (rubble, boulders, etc.) substrates, macroalgae, seagrass or mangrove dominated areas, intertidal areas, lagoons, and emergent rocks. Supervised classifications were performed using several different methods and with imagery at several different stages of processing, with final classification based on the classification method and imagery variant that provided the best overall results for each WorldView-2 image.

Process Steps:

- Satellite imagery was collected by the WorldView-2 commercial Earth observation satellite owned by DigitalGlobe. WorldView-2 provides panchromatic imagery of .46 meter resolution, and eight-band multispectral imagery with 1.84 meter (6 foot 0 inch) resolution.
- Image pre-processing steps are described in the NOAA Technical Memorandum "Depth Derivation Using Multispectral WorldView-2 Satellite Imagery". Pre-processing of all WorldView-2 satellite images was performed using the same methods, to produce a deglinted image, radiance and depth invariant data layers. (Citation: Depth Derivation Using Multispectral WorldView-2 Satellite Imagery, NOAA Technical Memorandum NMFS-PIFSC-46)
- Each image data layer was loaded into ENVI and 13 different regions of interest (ROIs) were created. The ROIs are classified as followed: hard shallow, soft/sand shallow, hard mid depth, soft/sand mid depth, hard deep, soft/sand deep, seagrass, intertidal, mangroves, emergent rocks, macroalgae, and lagoon. Areas within the imagery unable to be classified were annotated as unknown. The Image classificati on was performed separately on the multi-band image using three different method s: 1) The Mahalanobis Distance Classification, which is a direction sensitive dista nce classifier. J.A.Richards, 1999, Remote Sensing Digital Image Analys is, Springer-Verlag, Berlin, p. 240. 2) The Maximum Likelihood Distance, which ass umes that the statistics for each class in each band are normally distributed. 3) Mi nimum Distance, which uses the mean vectors for each class and calculates the dis tance from each unknown pixel the the mean vector for each class. More infor mation about the Mahalanobis Distance, Maximum Liklihood Distance and the M inimum Distance algorithm can be found in the ENVI documentation. The results of e ach of the three classifications were compiled into an ENVI standard image. The o utputs were exported in a geotiff format. (Citation: ENVI)
- Geotiffs were loaded in ArcGIS and all land and NoData values were removed using the Arc toolbox "extract by mask" tool. The outputs were the same eleven classes as the ROI's. Deep sea areas were manually digitized from classified images as a shapefile with reference to the satellite image as needed, then converted to rast er files and mosaicked back onto classified images. Shallow lagoons were also man ually digitized, converted to raster files , mosaicked back onto the classified imagery. This is required because the habitat derivation method does not work well on

very shallow waters in Timor-Leste as these areas often have high turbidity le vels. (Citation: ESRI ArcGIS Desktop 10.3, 'Extract by Mask' tool)
- The complete methodology to classify benthic features using WorldView-2 satellite imagery. (Citation: Watkins, Russell, L., 2015, A Methodology for Classification of Benthic Features using WorldView-2 Imagery, Report prepared for the Ecospatial Information Team, Coral Reef Ecosystem Division, Pacific Islands Fisheries Science Center, Honolulu, HI, under NOAA contract number WE-133F-15-SE-0518, 29pp.)
- The methodology along with the results are described in the final report produced by CREP for the Government of Timor-Leste, Interdisciplinary baseline ecosystem assessment surveys to inform ecosystem-based management planning in Timor-Leste: Final Report. (Citation: PIFSC. 2017. Interdisciplinary baseline ecosystem assessment surveys to inform ecosystem-based management planning in Timor-Leste: Final Report. NOAA Pacific Islands Fisheries Science Center, PIFSC Special Publication, SP-17-02, 234p.)

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):
An experienced outside contractor was hired to review and suggest modifications to improve the the initial methods for deriving benthic habitat data from WorldView-2 satellite imagery.

Three different modifications for both types of processing were performed on each image. A visual comparison of the 6 resulting geotiffs was made to select the one that best reflected the distribution of benthic habitats for each WorldView-2 satellite image.

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)

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/29128

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:
NOAA National Centers for Environmental Information (NCEI)

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

7.2.2. URL of data access service, if known:
https://accession.nodc.noaa.gov/0168914
https://accession.nodc.noaa.gov/0168914
https://accession.nodc.noaa.gov/0168914
https://accession.nodc.noaa.gov/0168914

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_CO

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

NOAA IRC and NOAA Fisheries ITS resources and assets.

9. Additional Line Office or Staff Office Questions

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