

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:

Pacific Reef Assessment and Monitoring Program: Geospatial, Temperature, and Depth Data Collected during Towed-diver Surveys of the U.S. Pacific Reefs from 2000 to 2017

1.2. Summary description of the data:

The geospatial, temperature and depth data included in this dataset are from towed-diver surveys (also referred to as towboard surveys) of coral reef ecosystems conducted during Pacific Reef Assessment and Monitoring Program (RAMP) cruises to the Hawaiian and Mariana Archipelagos, American Samoa, and the Pacific Remote Island Areas from 2000 to 2017 by the Ecosystem Sciences Division (formerly known as the Coral Reef Ecosystem Division) at the NOAA Pacific Islands Fisheries Science Center (PIFSC).

Generally, the towed-diver survey method involved towing a pair of SCUBA divers—one benthic and one fish—behind a small boat for 50 minutes, approximately following the ~15-m depth contour and covering a linear distance of about 2-3 kilometers per survey. A complete 50-minute towed-diver survey is divided into ten 5-minute segments, and up to 6 towed-diver surveys are conducted per day.

Each diver was equipped with a towboard outfitted with instrumentation and used to record observations, and the divers attempted to maintain position ~1 meter above the surface of the reef for the duration of the survey. Both towboards were equipped with a SeaBird™ SBE39 temperature/depth sensor that recorded water temperature and depth every 5 seconds. The survey tracks were also recorded every 5 seconds using a GPS receiver located on the small boat. The survey tracks were georeferenced and a script was applied to adjust the GPS waypoints from the boat's position to the estimated positions of the divers while conducting the surveys, correlate the associated temperature and depth data, and lace the waypoints together into 5-min segments and tow tracks. The dataset includes the adjusted dive points, and the segments and tow tracks are provided as shapefiles.

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:

2003-08-22 to 2003-09-28, 2007-05-12 to 2007-05-22, 2007-05-25 to 2007-06-08, 2009-04-05 to 2009-04-14, 2009-04-18 to 2009-05-05, 2011-04-07 to 2011-05-09, 2005-09-04 to 2005-09-30, 2005-10-03 to 2005-10-08, 2014-03-25 to 2014-05-06, 2017-05-04 to 2017-06-20, 2005-07-14 to 2005-08-06, 2006-07-27 to 2006-08-19, 2008-10-17 to 2008-11-13, 2000-09-09 to 2000-10-05, 2008-12-09 to 2008-12-10, 2010-10-08 to 2010-11-04, 2001-09-13 to 2001-09-25, 2016-07-13 to 2016-08-14, 2002-09-11 to 2002-10-04, 2003-07-14 to 2003-08-08, 2004-09-16 to 2004-10-11, 2006-09-03 to 2006-10-01, 2008-09-14 to 2008-10-09, 2010-09-07 to 2010-09-24, 2005-02-15 to 2005-03-05, 2015-11-03 to 2015-11-18, 2016-09-01 to 2016-09-26, 2010-02-23 to 2010-03-20, 2012-03-21 to 2012-04-25, 2002-02-09 to 2002-03-03, 2004-02-04 to 2004-02-25, 2006-02-11 to 2006-03-09, 2008-02-18 to 2008-03-18, 2015-02-15 to 2015-03-23, 2005-10-18 to 2005-10-21, 2007-04-30 to 2007-05-03, 2009-03-22 to 2009-03-26, 2011-03-23 to 2011-03-27, 2001-02-07 to 2001-02-23, 2002-01-29 to 2002-03-19, 2004-01-12 to 2004-01-24, 2004-03-26 to 2004-04-04, 2006-01-18 to 2006-02-01, 2006-03-20 to 2006-04-02, 2008-01-27 to 2008-02-09, 2008-03-26 to 2008-04-07, 2010-01-24 to 2010-02-08, 2010-04-01 to 2010-04-17, 2012-03-02 to 2012-05-19, 2014-03-16 to 2014-03-17, 2015-01-26 to 2015-04-26, 2017-04-02 to 2017-04-20

1.5. Actual or planned geographic coverage of the data:

W: 142.43534, E: 145.85405835, N: 20.5541903, S: 12.80543

Mariana Archipelago including Guam, Rota, Tinian, Aguijan, Saipan, Sarigan, Guguan, Alamagan, Pagan, Agrihan, Asuncion, Maug, Supply Reef, Farallon de Pajaros, Anatahan, Arakane, Pathfinder, Santa Rosa, Stingray, and Tatsumi.

W: -160.54519, E: -154.80475, N: 22.23715287, S: 18.90733

Main Hawaiian Islands (MHI), including Hawaii, Kauai, Kaula, Lanai, Lehua, Maui, Molokai, Molokini, Niihau, and Oahu.

W: -178.3859, E: -161.91425, N: 28.45932075, S: 23.0554

Northwestern Hawaiian Islands (NWHI), including French Frigate, Gardner, Kure, Laysan, Lisianski, Maro, Midway, Necker, Nihoa, Pearl & Hermes, and Raita

W: -171.09329, E: -168.13673, N: -11.0449, S: -14.91070487

American Samoa including Tutuila, Manu'a (Ofo, Olosega, and Ta'u), Rose Atoll, South Bank, and Swains.

W: 166.59343751, E: -159.97139278, N: 19.32654, S: -0.38306238

Pacific Remote Island Areas, including the Phoenix (Baker and Howland), Line (Jarvis, Kingman, and Palmyra), and Wake Islands, and Johnston Atoll.

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: towboard-benthic, towboard-fish

Platform: In Situ Ocean-based Platforms > SHIPS

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:

Methodology to process the geospatial data (GPS points) from towed-diver surveys, including the associated SBE39 temperature and depth data, to generate the resulting files/shapefiles (Dive Points, Segments, and Tows). The geospatial data are processed using a layback script written in Python that uses various GIS functions to estimate the position of the diver.

Process Steps:

- During towed-diver surveys, a pair of divers was towed approximately 60 m behind a small boat, with 1 diver tasked with benthic data collection and 1 diver tasked with data collection on large fishes (>50 cm in total length). Each diver made observations over a visually estimated 10-m swath (5 m out on each side of their respective tow lines, which act as transect lines). Towed at typical speeds of 0.5-1.3 m s⁻¹ (1-2.5 knots), divers attempted to maintain their position ~1 m above the seafloor. Divers recorded observations every 5 minutes over a survey segment length of ~200 m, summarizing the benthic composition, ecologically and economically important fishes, and macroinvertebrates encountered throughout each survey segment. Each survey takes 50 minutes and includes a total of 10 segments, although the actual time and length of surveys occasionally varied depending on environmental conditions and diving or logistical constraints. Four to six surveys were generally completed during each field day. To georeference all data collected during towed-diver surveys, a GPS receiver located on the small boat was programmed to record every 5 seconds. The towed-diver platforms, or towboards, used by the divers were constructed of StarBoard (King Plastic Corp., North Port, Fla.) marine polymer sheets ~100 cm x 50 cm x 2 cm. Each tow board was outfitted with an SBE 39 temperature and pressure (depth) recorder set to record at 5 second intervals. All timing devices were set to Greenwich Mean Time and synchronized each morning using the calibrated clock on the research vessel. (Citation: Lino K, Asher J, Ferguson M, Gray A, McCoy K, Timmers M, Vargas-Ángel B (2018) Ecosystem Sciences Division standard operating procedures: data collection for towed-diver benthic and fish surveys. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96818-5007. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-18-02, 76 p. <https://doi.org/10.25923/59sb-sy51>)
- The DIVE points file results from these initial post-processing steps, and includes 1) the adjusted LATITUDE and LONGITUDE, 2) the temperature and depth data recorded from the benthic and fish SBE39s, 3) the mean temperature and mean depth of the combined benthic and fish SBE39 data, and 4) the two serial numbers (DIVE ID and SEGMENT ID). The DIVE points are then laced together and 1) grouped by SEGMENT ID to generate the SEGMENTS polyline shapefile, and 2) grouped by DIVE ID to generate the TOWS polyline shapefile. These serial numbers are the link between the geospatial data described here (SEGMENTS and TOWS) and the fish or

benthic observation data (i.e., the observation data is mapped to specific geographic locations, or georeferenced). The mean benthic and fish temperature and depths provided in the SEGMENTS and the TOWS shapefiles are both calculated from the benthic and fish temperature and depths in the DIVE points file, and the standard deviations for the means are also provided. (Citation: Lino K, Asher J, Ferguson M, Gray A, McCoy K, Timmers M, Vargas-Ángel B (2018) Ecosystem Sciences Division standard operating procedures: data collection for towed-diver benthic and fish surveys. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96818-5007. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-18-02, 76 p. <https://doi.org/10.25923/59sb-sy51>)

- Upon return from each cruise, a GIS analyst reviewed the output files, flagged any anomalies, and made corrections, when possible, based on the available information from the physical data sheet. The data was then migrated to the Oracle database. (Citation: Lino K, Asher J, Ferguson M, Gray A, McCoy K, Timmers M, Vargas-Ángel B (2018) Ecosystem Sciences Division standard operating procedures: data collection for towed-diver benthic and fish surveys. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96818-5007. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-18-02, 76 p. <https://doi.org/10.25923/59sb-sy51>)

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):

A GIS analyst reviews the tow tracks and waypoints to flag any anomalies and, if possible, makes corrections based on the available information from the physical data sheet. The data is then migrated to the Oracle database.

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/25298>

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/0189889>

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<https://accession.nodc.noaa.gov/0189889>

<https://accession.nodc.noaa.gov/0189889>

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: output files from the instruments, MS Access cruise database, and PIFSC Oracle database. The output files and MS Access cruise database reside on the cruise server and 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.