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:

Marine Debris Survey and Removal Efforts in the Northwestern Hawaiian Islands from 1999 to 2015

1.2. Summary description of the data:

The marine debris data included in this dataset are from annual in-water surveys conducted from 1999 to 2015 at the reefs, atolls and islands in the Northwestern Hawaiian Islands (NWHI) by the NOAA Pacific Islands Fisheries Science Center (PIFSC), Ecosystem Sciences Division (ESD) with funding from Papahanaumokuakea Marine National Monument (PMNM), and NOAA's Marine Debris (MDP) and Damage Assessment Remediation and Restoration (DARRP) Programs.

These surveys and removal efforts of marine debris were conducted primarily during ship-based missions to the NWHI, and also as fly-in missions. During a mission, surveys were conducted by divers based on small boats launched either from a ship or from the shore. Two survey methods were used to search for marine debris; tow and swim surveys. Tow surveys were used in the relatively even-depth (usually less than 10 meters deep), contiguous backreef habitats, typically at Midway Atoll, Kure Atoll and Pearl and Hermes Atoll. Two free-divers were towed behind a small boat to search for debris throughout the water column. Swim surveys were used primarily in the comparatively high-relief and patchy lagoonal reef habitats of Maro Reef and Pearl and Hermes Atoll. During swim surveys, two or more snorkelers swam across the reefs to search for debris while being directed by the small boats to follow pre-planned routes. Survey areas and routes were chosen based on regional reef morphology and past debris accumulation records.

During a survey, if debris larger than 0.012 cubic meters (size of a small toolbox) was encountered, descriptive information about the debris and its location (i.e., type, color, size, biofouling, estimated depth, substrate composition/color) were recorded and a GPS waypoint was taken. Debris was removed if determined to be safe to do so and without causing damage to the surrounding coral reef habitat. Once removed, the volume of removed debris was estimated and recorded. At the end of the survey or if the small boat reached its capacity, the boat returned to the ship or to the shore and the boat's

debris load was weighed and recorded. Up to 4 small boats in one day concurrently conducted surveys during a mission.

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:

1999-10-06 to 1999-11-04, 2000-08-09 to 2000-08-25, 2000-10-09 to 2000-11-05, 2001-09-02 to 2001-11-22, 2001-09-02 to 2001-11-22, 2001-10-22 to 2001-11-20, 2002-05-03 to 2002-07-08, 2002-08-12 to 2002-08-22, 2002-08-28 to 2002-09-13, 2002-04-23 to 2002-07-08, 2002-08-12 to 2002-08-22, 2002-08-28 to 2002-09-13, 2003-05-14 to 2003-08-29, 2003-05-14 to 2003-08-29, 2003-05-14 to 2003-08-29, 2004-06-19 to 2004-10-18, 2005-08-22 to 2005-09-10, 2005-08-31 to 2005-09-19, 2005-06-08 to 2005-07-06, 2005-09-19 to 2005-11-14, 2006-08-10 to 2006-09-06, 2007-10-11 to 2007-11-08, 2007-07-18 to 2007-08-14, 2007-09-17 to 2007-10-03, 2008-05-20 to 2008-06-06, 2009-06-21 to 2009-07-12, 2009-09-01 to 2009-09-29, 2009-10-06 to 2009-10-30, 2011-03-31 to 2011-04-24, 2012-05-28 to 2012-06-23, 2012-06-24 to 2012-07-14, 2013-03-28 to 2013-04-18, 2014-09-25 to 2014-10-27, 2015-08-17 to 2015-09-01

1.5. Actual or planned geographic coverage of the data:

W: -175.831567, E: -173.9573333, N: 27.937667, S: 26.0539
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -166.27653, E: -166.20976, N: 23.87161, S: 23.85918
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.37224, E: -173.96036, N: 28.42655, S: 26.06665
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -175.84309, E: -175.72602, N: 27.96068, S: 27.82589
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.37218, E: -178.28545, N: 28.45381, S: 28.08416667
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.29299, E: -166.2089, N: 28.41266, S: 23.85885
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.29364, E: -173.96063, N: 28.40776, S: 26.06088
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.29399, E: -173.95927, N: 28.42702, S: 26.05971
Geographic area of marine debris survey and removal efforts conducted in the

Northwestern Hawaiian Islands (NWHI).

W: -177.42294, E: -173.95631, N: 28.27849, S: 26.05888
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -170.63708, E: -170.63509, N: 25.44875, S: 25.44791
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.34466, E: -173.9869383, N: 28.45286, S: 26.07293333
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.36651, E: -166.22606, N: 28.4362, S: 23.8677
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -175.9431317, E: -170.62433, N: 27.875405, S: 25.44642
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -170.63949, E: -170.58856, N: 25.46698, S: 25.43243
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.33308, E: -175.72823, N: 28.45294, S: 27.76098
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -166.2994, E: -166.11265, N: 23.87487, S: 23.64915667
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.37245, E: -175.74745, N: 28.45401, S: 27.76133
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -175.986688, E: -175.7250769, N: 27.95949496, S: 27.75658032
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.3695615, E: -175.7266833, N: 28.45310709, S: 27.76363545
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -166.2745784, E: -166.1598293, N: 23.87491434, S: 23.76143234
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -170.6420661, E: -170.5692782, N: 25.44995626, S: 25.43158958

Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.359469, E: -170.5805764, N: 28.44571391, S: 25.44115182
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.3723825, E: -170.5667208, N: 28.45327145, S: 25.4198291
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -175.9841641, E: -166.2579237, N: 27.9266597, S: 23.8662824
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.3682882, E: -166.2192976, N: 28.45026369, S: 23.86557992
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -177.4223873, E: -177.3156932, N: 28.27785322, S: 28.19391022
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -178.3696862, E: -175.7560864, N: 28.45414778, S: 27.78148497
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -177.4227887, E: -177.3177788, N: 28.27737663, S: 28.19319148
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -177.3584175, E: -170.5678008, N: 28.27570645, S: 25.42823355
Geographic area of marine debris survey and removal efforts conducted in the Northwestern Hawaiian Islands (NWHI).

W: -177.4212896, E: -177.3228883, N: 28.27721553, S: 28.19371736
Geographic area of marine debris survey and removal efforts conducted during the land-based mission at Midway Atoll in the Northwestern Hawaiian Islands (NWHI) in 2015.

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:
James M Morioka

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:

Marine debris removal has been conducted by the Pacific Islands Fisheries Science Center's Ecosystem Sciences Division at the atolls, reefs and islands of Northwestern Hawaiian Islands since 1996. Standardized data collection has been implemented since 1999. Two methods are used to survey for marine debris; tow and swim surveys. Tow surveys are typically used in the relatively even-depth (usually less than 10 meters deep) , contiguous backreef habitats, while swim surveys are typically used in the comparatively high-relief and patchy lagoonal reef habitats. Survey areas are chosen based on regional reef morphology and past accumulation records.

Process Steps:

- The towed-diver surveys are used in areas of relatively flat bathymetry less than 10 meters in depth (primarily the contiguous backreef habitats that lie just inside the surf on the lagoon-side of the barrier reef of an atoll) as found at Midway Atoll, Kure Atoll and Pearl and Hermes Atoll. In this method, two free-divers are towed behind a small-boat at speeds of 1-2 knots on a towboard (underwater wing) to search for debris and/or derelict fishing gear snagged on the reef. Divers hold their breath, submerge below the surface and conduct a back-and-forth pattern across the reef visually scanning for marine debris. These surveys cover areas that include depths of 0.5-10 m over hard or mixed hard/soft substrate. The boat conducts a " lawn-mowing pattern" back and forth across the reef and records a trackline with the GPS. When calculating area surveyed on GIS, the boat's trackline is buffered out 7.5 meters on either side to represent the area each diver is able to reasonably visually survey. *Note: Divers measure water visibility at the start and end of each operational day. A minimum visibility measurement of 7.5 m is required to conduct towed-diver surveys. (Citation: Dameron, O. J., Parke, M., Albins, M. A., & Brainard, R. (2007). Marine debris accumulation in the Northwestern Hawaiian Islands: an examination of rates and processes. Marine Pollution Bulletin, 54(4), 423-433.)
- The swim survey method was developed as a necessary alternative to towed-diver surveys in lagoonal, reticulated reef areas that were either too shallow, too irregular, or high-relief habitats difficult to survey effectively with the towed-diver survey technique. The method has typically been used in Maro Reef and Pearl and Hermes Atoll. During swim surveys, two or more divers swim across reefs to search for debris while being directed by the personnel in small boats to follow pre-planned routes and are coordinated for maximum visual area covered. Survey areas and routes are chosen based on regional reef morphology and past accumulation records. (Citation: Dameron, O. J., Parke, M., Albins, M. A., & Brainard, R. (2007). Marine debris accumulation in the Northwestern Hawaiian Islands: an examination of rates and processes. Marine Pollution Bulletin, 54(4), 423-433.)
- When a diver encounters debris larger than 0.012 cubic meters (size of small toolbox), descriptive data about the debris such as type, color, size, foul level, presence/absence of coral growth on the debris, estimated depth of debris, and

substrate composition/color surrounding the debris are recorded. The location of the debris where it was found is also recorded with a GPS. The debris is removed (cut from the reef or pulled out of the sand) when it is determined that it is safe to do so, and that removing the debris won't cause harm to the surrounding corals. Once removed and loaded into the cargo area of the small boat, the volume of removed debris is recorded. (Citation: Dameron, O. J., Parke, M., Albins, M. A., & Brainard, R. (2007). Marine debris accumulation in the Northwestern Hawaiian Islands: an examination of rates and processes. Marine Pollution Bulletin, 54(4), 423-433.)
- When a small boat is at its capacity, the boat returns to the parent vessel and the debris load for the boat is weight and recorded. Typically 3 to 4 small boats are used per day for the underwater surveys. Areas surveyed for each boat are derived from GPS tracks. (Citation: Dameron, O. J., Parke, M., Albins, M. A., & Brainard, R. (2007). Marine debris accumulation in the Northwestern Hawaiian Islands: an examination of rates and processes. Marine Pollution Bulletin, 54(4), 423-433.)
- In 2013 and 2015, the survey and removal efforts were conducted as a component of the shore-based mission at Midway Atoll. Prior to the surveys in 2013, the backreef areas of the atoll were divided into 35 fixed survey boxes (size of each survey box is approximately 0.25 km2). Because of limited time available, the preexisting survey boxes were randomized, and a subset of the boxes were identified as a first- or second-tier priority for each strata to survey. During a shore-based mission, when a small boat was at its capacity, the boat returned to Sand Island at Midway Atoll to weigh and record its debris load. (Citation: PIFSC. 2014. Marine Debris: removal and assessment at Midway Atoll 2013. NOAA Fisheries Pacific Islands Fisheries Science Center. PIFSC Special Publication, SP-14-001. 6 p.)
- Individual weight of each removed debris can be estimated using WEIGHTLOAD_KG and VOLUME_REMOVED fields of each of the entities. First the VOLUME_REMOVED is summed for each GPS_FILE_DATE, WEIGHTLOAD_KG and LOAD_NUM to derive a total volume of debris removed for a load of a boat for a survey date. Fraction of each volume of debris removed is derived from dividing each VOLUME_REMOVED record by the associated total volume of debris debris removed for the load. Individual weight for each debris can be derived from multiplying the fraction by the WEIGHTLOAD_KG for the load. (Citation: Dameron, O. J., Parke, M., Albins, M. A., & Brainard, R. (2007). Marine debris accumulation in the Northwestern Hawaiian Islands: an examination of rates and processes. Marine Pollution Bulletin, 54(4), 423-433.)

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):
Size estimates of debris in water were verified against the more accurate volume estimates of the nets once removed from the shallow coral reef environments and hauled onto the small boats.

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/25089

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/0190879

7.3. Data access methods or services offered:
Data can be accessed online via the NOAA National Centers for Environmental Information (NCEI) Ocean Archive, accession #.

ADD ACCESSION ONCE ASSIGNED

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
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.