Nearshore Bathymetric Surveying, College of Earth, Ocean and Atmospheric Sciences, Oregon State University

Please provide the following information and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

NANOOS DMP: https://www.nanoos.org/documents/certification/DMP/2023/NANOOS-DMP.pdf

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

Nearshore Bathymetric Surveying; College of Earth, Ocean and Atmospheric Sciences (CEOAS); Oregon State University (OSU)

1.2. Summary description of the data:

Nearshore bathymetry data has been collected at least annually along the northwest Oregon and southwest Washington coasts since summer 1999, comprising a beach and nearshore monitoring program partially funded by NANOOS. These data are collected by a partnership between Oregon State University, the Washington State Department of Ecology, the Oregon Department of Geology and Mineral Industries, and the US Geological Survey (USGS). The monitoring program was initiated in summer of 1999 to "fill the coastal processes knowledge gap," in an effort to better understand causes and possible responses to coastal change (Ruggiero et al., 2005). Data are collected using Real Time Kinematic Differential Global Positioning Systems (RTK DGPS) and single beam echosounders at annual timescales, and are later post processed, quality controlled, and archived.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

Ongoing monitoring program

1.4. Actual or planned temporal coverage of the data:

These data have been collected annually since 1999 and will continue as funding allows.

1.5. Actual or planned geographic coverage of the data:

Nearshore bathymetry data is collected along the outer coasts of northwest Oregon and southwest Washington, throughout the Columbia River Littoral Cell along predetermined cross-shore oriented transects.

1.6. Type(s) of data:

2-dimensional, cross-shore oriented bathymetric profiles are collected at discrete transects along the coast. These profiles typically extend from ~12-15 m water depth to as shallow as is safely possible to collect (~0.5 m depth). The bathymetric profiles capture morphologic changes occurring in the highly dynamic surf zone as well as throughout the subaqueous nearshore planform. These transects capture morphologic change in the sediment below the water surface and can be used to determine changes in sediment volume, sandbar migration rates, and contour change rates.

1.7. Data collection method(s):

Nearshore bathymetry data are collected using Oregon State University's Coastal Profiling System (CPS). This system utilizes a highly maneuverable personal watercraft (PWC) equipped with an echosounder to measure water depth, RTK-DGPS receiver and antenna for position

information, and on-board computer system for data collection/storage and navigational capabilities. Cross-shore oriented transects are collected at discrete locations, typically spaced 200 m to 1 km in the alongshore direction. The same individual transects are collected during each survey (on annual timescales), highlighting changes in nearshore morphology through comparison of subsequent surveys. Elevation data are post-processed and quality checked through visualization of elevation profiles collected on each transect, and are archived both locally at Oregon State University and externally by collaborating agencies including the US Geological Survey and the Washington State Department of Ecology.

1.8. If data are from a NOAA Observing System of Record, indicate name of system: N/A

1.8.1. If data are from another observing system, please specify: N/A

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name: Jeffrey Wood

2.2. Title: Senior Faculty Research Assistant I

2.3. Affiliation or facility: College of Earth, Ocean and Atmospheric Sciences, Oregon State University

2.4. E-mail address: woodjef@oregonstate.edu

2.5. Phone number: (503) 910-2776

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: Peter Ruggiero

3.2. Position Title: Professor

3.3. Name of current Position holder: Peter Ruggiero

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. Collected data are stored in PI Ruggiero's college operated servers within the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University.

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"): 10%

5. **Data Lineage and Quality**

NOAA has issued Information Quality Guidelines[1] 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)*:

Data are stored locally on the CPS computer system through Hypack® hydrographic survey software. After collection, survey data are immediately backed-up externally to a field PC and

[1] http://www.cio.noaa.gov/services_programs/IQ_Guidelines_030414.html

later backed up to CEOAS servers (as well as collaborators servers). Raw elevation data are stored in Hypack file format (.raw and .bin) per daily survey .LOG file. Raw GPS data are stored as well to be used for post-processing, if needed. Elevation profile data are later post-processed and quality controlled through use of transectViewer (https://github.com/drewstev/transectViewer) a Matlab-based tool for processing single-beam bathymetry from Hypack. Final, processed, elevation profiles are provided in four data formats per transect collected during each survey, including:

1) A .xyz text file containing easting (State Plane, meters), northing (State Plane, meters), and elevation (NAVD88, meters). Each of the coordinates in the file represents a collected point on that profile.

2) A Google Earth file (.kml) to be used with Google Earth.

3) A text (.txt) file containing the same information as the xyz file in a different form, longitude, latitude, elevation (NAVD88, meters).

4) A netcdf (.nc) file containing all metadata in a structured format.

Both raw and final data products are archived locally on servers operated by CEOAS, as well as externally on servers operated by collaborators at the Washington Department of Ecology and the USGS.

Final data products are then published and made publicly available through a dynamic USGS data series report, available at https://doi.org/10.5066/P9W15JX8.

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: N/A

5.2. Quality control procedures employed *(describe or provide URL of description)*:

We use Trimble® R7 GPS receivers, powered by Trimble Maxwell 6 chips and an unparalleled 440 GNSS channels, capable of tracking carrier signals from a wide range of satellite systems, including GPS and GLONASS. This system consists of a GPS base station (R7), Zephyr Geodetic antenna (model 2), HPB450 radio modems, and R7 “rover” GPS. Trimble reports that the R7 survey-grade GPS receivers used in this project have manufacturer reported RMS accuracies of approximately ±2cm + 2ppm * the baseline length (typically 10km or less from the base station) in the horizontal and approximately ±3cm + 2ppm * the baseline length in the vertical while operating in Real Time Kinematic (RTK) surveying mode (Trimble, 2005).

Bathymetric data are collected at a sample frequency of between 10 and 20 Hz using an Odom CV100 echosounder, with a 9° single beam transducer, capable of measuring water depths ranging from 0.5 – 200 m. Data collection techniques lead to high quality, accurate data. However, there are instances- often in the turbulent surf zone region- where the automated digitizing of the bottom surface by the echosounder is inaccurate. A Matlab based graphical user interface (transectViewer) has been developed to visualize, inspect, and postprocess bathymetric sounding data. Using this program, the user can look through each transect profile data to determine errors in elevation data caused by improper automated digitization of the seafloor. When this is the case, the user can manually digitize the bottom surface by visual inspection of the raw acoustic backscatter returns. This GUI also allows for filters and smoothing functions to be applied to the collected elevation data, removing the effects of heave, pitch, and roll of the survey vessel.

As a NANOOS Observing System provider, we follow industry best practices and manufacturer guidance where applicable, to calibrate, operate, and maintain the equipment used in this effort, and will provide documentation of this upon request.

6. **Data Documentation**

The EDMC Data Documentation Procedural Directive[2] *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:

Metadata files since 2014 adhere to FGDC-STD-001-1998 standards. Metadata for each collected transect is stored in a netcdf file. Prior to 2014, metadata was stored in a .meta text file. Regardless of file type, all metadata files contain relevant information such as: hardware setup and equipment, software versions, PWC operator, location, time, base station monument, etc.

FGDC Meta Data are available with the USGS Data Release mentioned above (https://doi.org/10.5066/P9W15JX8)

6.2. Name of organization or facility providing metadata hosting: US Geological Survey

6.2.1. If service is needed for metadata hosting, please indicate: No

6.3. URL of metadata folder or data catalog, if known:

https://www.sciencebase.gov/catalog/item/get/5c9d3782e4b0b8a7f62e0b98?files.metadataFirst=true#attached-files-section

6.4. Process for producing and maintaining metadata *(describe or provide URL of description)*:

Metadata for each collected transect is stored in a netcdf file. Prior to 2014, metadata was stored in a .meta text file. Regardless of file type, all metadata files contain relevant information such as: hardware setup and equipment, software versions, PWC operator, location, time, base station monument, etc.

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[3] *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?

Access to processed data, as well as metadata, is available through the USGS Data Series Report https://doi.org/10.5066/P9W15JX8.

Additionally, basic analysis of the data, such as contour change plots, can also be made

[2] https://www.nosc.noaa.gov/EDMC/PD.DD.php

[3] Data Access Directive currently in review; URL to be added.

available upon request.

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? N/A

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

7.2. Name of organization of facility providing data access:

Oregon State University, United States Geological Survey, Washington Department of Ecology

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

7.2.2. URL of data access service, if known: N/A

7.3. Data access methods or services offered:

Access to processed data, as well as metadata, is available through the USGS Data Series Report https://doi.org/10.5066/P9W15JX8.

7.4. Approximate delay between data collection and dissemination:

Data is made available approximately 6 months after data collection, after post-processing and quality-control assessment. All data are available immediately after archiving.

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed: N/A

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 NODC, NCDC, NGDC, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

Data are archived on PI Ruggiero's college operated servers within the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University. Data are also archived on servers operated by the USGS and the Washington Department of Ecology.

8.1.1. If World Data Center or Other, specify: N/A

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain: N/A

8.2. Data storage facility prior to being sent to an archive facility (if any):

As discussed above, final data are archived on CEOAS servers, and are also archived on servers operated by the USGS and the Washington Department of Ecology.

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

Data are archived approximately 6 months after data collection to allow sufficient time for post-processing and quality-control assessment.

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:

Data are stored locally on the CPS computer systems through Hypack® hydrographic survey software. After collection, raw survey data are immediately backed-up externally to a field PC and later backed up to Coastal Imaging Lab archives operated on CEOAS servers. Both raw and final data products are archived locally on servers operated by CEOAS, as well as externally on servers operated by collaborators at the Washington Department of Ecology and the USGS.

Data stored on CEOAS operated servers are regularly backed up on hard drive disk (HDD) storage, and are duplicated in multiple external hard drive locations. College servers are routinely backed up and maintained by CEOAS computing personnel.

9. **Additional Line Office or Staff Office Questions**
Line and Staff Offices may extend this template by inserting additional questions in this section.