WA Shelf Buoys

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:

NANOOS Washington Coast Moorings, part of Northwest Environmental Moorings (NWEM) Lab and University of Washington (UW)

1.2. Summary description of the data:

Since 2010 the University of Washington has maintained a pair of moorings 13 nautical miles west-northwest of La Push, Washington on the Washington continental shelf and within the Olympic Coast National Marine Sanctuary, collectively referred to as the Northwest Enhanced Moored Observatory (NEMO). The moorings consist of a large surface buoy (Cha'Ba or Quileute for "whale tail") and an adjacent (~400 m away) profiling subsurface mooring referred to as NEMO-subsurface. Both moorings collect oceanographic and atmospheric data, with oceanographic observations throughout much of the 100 m water column. Data are stored both locally and transferred to shore hourly to be displayed on the NANOOS Visualization System (NVS) in near real-time.

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

Ongoing series of measurements

1.4. Actual or planned temporal coverage of the data:

Cha'Ba – Summer deployment for real-time data: May – September
Cha'Ba – Winter deployment for delayed data
NEMO subsurface – May-September deployment only (ideally real-time transmission)

1.5. Actual or planned geographic coverage of the data:

Cha'Ba:	47° 58.05'N,	124° 57.6'W
NEMO subsurface:	47° 58.02'N,	124° 57.29'W

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.).

Digital numeric data will be collected at both moorings
On Cha'Ba the measurements are:
1. air temperature
2. barometric pressure
3. rain rate
4. relative humidity
5. downwelling shortwave radiation
6. wind speed and direction
7. 3-axis magnetometer and accelerometer at 8 Hz averaged over 1 second
8. pCO2 air
9. pCO2 water

10. Near-surface temperature, salinity, dissolved oxygen, pH, fluorometer (chlorophyll), turbidity, pressure, density.
11. Water column temperature, salinity, dissolved oxygen and pressure at multiple depths

On NEMO-Subsurface the measurements are:
12. Profiles of temperature, salinity, pressure, dissolved oxygen, chlorophyll, turbidity, and nitrate between 85 and 20 m.
13. ADCP-measured velocity in 1 m bins from 15 m to 2 m.
14. ADCP-measured velocity in 4 m bins from 85 m to 8 m.
15. Temperature, Salinity, and Pressure at 18 m depth.

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.)

Digital numeric data is collected using multiple in site sensors on moored buoys, which are then compiled into files on the buoy controller. The data are collected from a number of different instruments. Some record full data sets on internal recorders and transmit a subset of the records to the shore for near real-time display, while some do not transmit data, recording all the data internally. Other instruments both record and transmit the data. Data are transmitted to shore via cell model with a back-up Iridium system. Data not transmitted via cell modem are offloaded from instruments during semi-annual mooring servicing cruises.

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

NANOOS

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: Seth Travis

2.2. Title: Data Manager

2.3. Affiliation or facility: Northwest Environmental Moorings at the Applied Physics Laboratory at the University of Washington

2.4. E-mail address: setht1@uw.edu

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: John Mickett

3.2. Position Title: Senior Oceanographer

3.3. Name of current Position holder:

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?

Hardware resources for data storage and processing. A full-time data manager is assigned to manage this data program.

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

Funds for salary and hardware are leveraged between NANOOS and other relevant programs. No specific percentage breakdowns have been assigned.

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)*:

The data are collected from a number of different instruments. Some record full data sets on internal recorders and transmit a subset of the records to the shore for near real-time display, while some do not transmit data, recording all the data internally. Other instruments both record and transmit the data. Data are transmitted to shore via cell model with a back-up Iridium system. Data not transmitted via cell modem are offloaded from instruments during semi-annual mooring servicing cruises.

The real-time data are managed at the APL-UW “waves” server (http://waves.apl.uw.edu/~mooring/), which both archives real-time data and serves data to NANOOS. Full data sets are maintained on the APL-UW “kipapa” server (http://kipapa.apl.washington.edu/datashare/nemo). Both of these servers currently implement restricted access, for security.

In addition to local backups of data, archived data are also backed up semi-annually on Google Drive on a University of Washington Account. Data are stored in raw unprocessed format, which is either binary or ascii, and also in a processed Matlab format. Real-time data are not QA/QC’d, but if data streams are known to be corrupt, we will turn off the sensor remotely if possible. Processed archived data are QA/QC’d according to the data type. Access to fully archived data can be requested at: http://nwem.ocean.washington.edu/prod_DataReq.shtml

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)*:

As there is a wide range of data, we are not able to apply a single technique for quality control, but instead we aim to follow the QARTOD guidelines available for the various types of data. In all cases we archive the raw data in addition to the processed, QA/QC’d data so that a user can refer back to the original data to determine what has been cut or flagged.

As a NANOOS Observing System provider, we follow best practices and manufacturer guidance where applicable, to calibrate, operate, and maintain the equipment used in this effort, and are able to provide documentation of this upon request. NANOOS operators maintain equipment inventories, shipping logs, and instrument maintenance history logs, as appropriate, that are

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

also available 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?

Yes, metadata complies with EDMC Data Documentation directive

6.1.1. If metadata are non-existent or non-compliant, please explain:

6.2. Name of organization or facility providing metadata hosting:

Northwest Environmental Moorings (NWEM) Lab at APL-UW

6.2.1. If service is needed for metadata hosting, please indicate:

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

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

The primary metadata/documentation provided alongside the archived data are an "orientation read-me" document that describes the organization of the data, and a mooring diagram for each deployment. The mooring diagram provides information about the placement (in height or depth) of various instrument serial numbers on each mooring as well as the latitude and longitude coordinates of the deployments. Header information and "info" fields in Matlab structure files provide needed information about variable names and units, instrument serial numbers, and for Matlab files the mooring ID. We are working to include calibration information for all instruments where applicable.

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?

Yes, near-real time data can be accessed via NVS. Archived data will need to have password-protected access.

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:

Data access is password-protected

[2] https://www.nosc.noaa.gov/EDMC/PD.DD.php
[3] Data Access Directive currently in review; URL to be added.

7.2. Name of organization of facility providing data access:

Northwest Environmental Moorings (NWEM) Lab at APL-UW; NANOOS

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

7.2.2. URL of data access service, if known:

http://waves.apl.uw.edu/~mooring/

7.3. Data access methods or services offered:

Data is available for bulk download with HTTP.
Near-real time data can be accessed via NVS.

7.4. Approximate delay between data collection and dissemination:

Once data have been acquired, processed, and quality controlled, we will make the complete data set available. This will occur within 6 month of mooring turn-around cruises, which typically occur in the spring (March-May) and fall (September-November). Near-real time data are displayed and available on NVS within 2 hours of transmission.

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

Data will be archived annual at the National Centers for Environmental Information (NCEI).

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):

Local redundant HDD storage at the University of Washington lab, with redundant offsite HDD storage. The NANOOS DAC database is hosted at APL-UW in a robust server with automatic daily and staggered database dumps and backups.

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

Upload to NCEI annually. Potential for future data agreement with NCEI for automatic archiving monthly.

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:

Protection from malicious modification or deletion is provided by APL-UW Cyberinfrastructure and security firewalls. As noted above, multiple copies of the data exist on hard drives housed in different locations. If the main system goes down, the archived data and processing code can be deployed from a secondary server to restore data transmission, public access, and archiving

procedures.

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